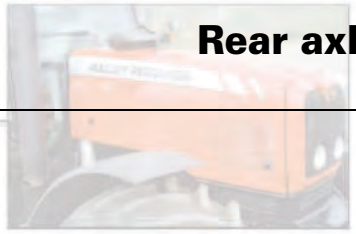
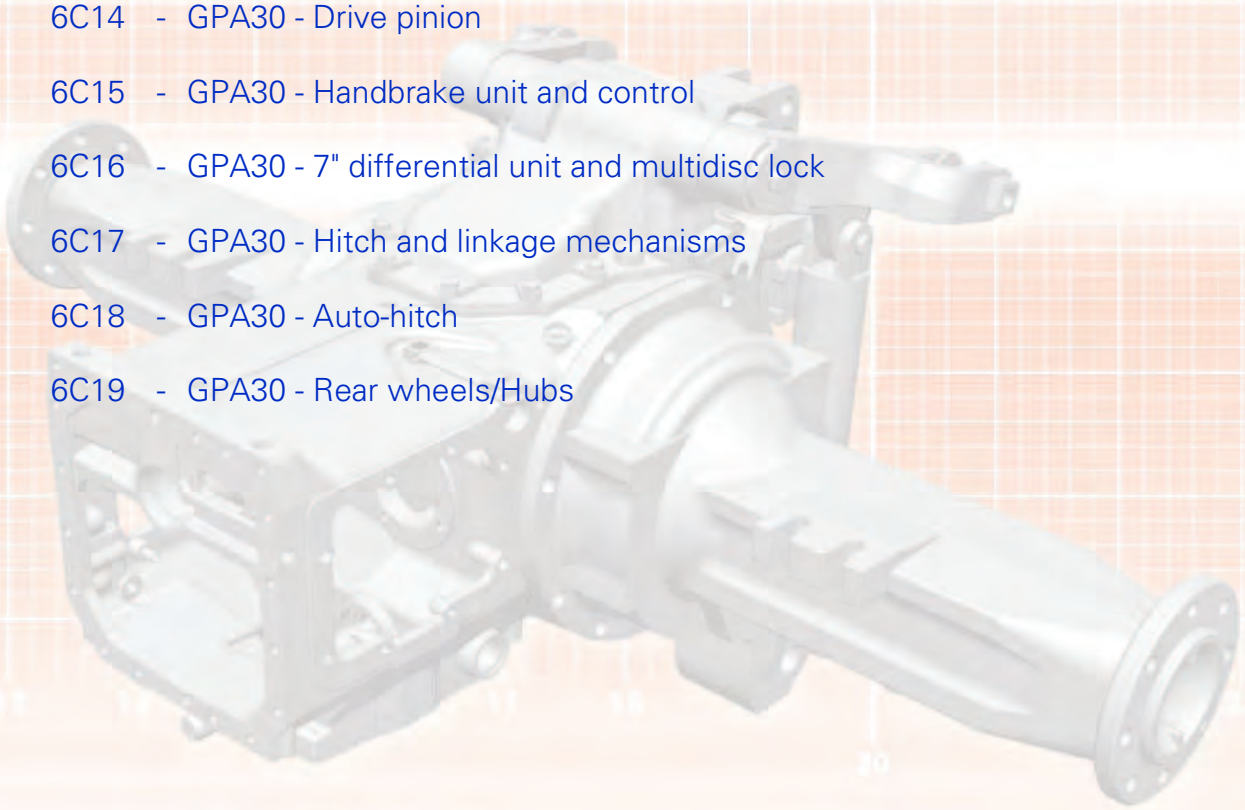




06 - Rear axle

CONTENTS





6A10 - General - GPA20 operation

CONTENTS

A . General

The rear axle comprises four main housings:

- the centre housing which contains the bevel gear, the power take-off gear in all variants and the 4-wheel drive transmission, the handbrake and main brake control unit. It also supports the two trumpet housings, the lift cover, and the side covers (see chapter 9),
- the right and left trumpets fixed to each side of the centre housing, and housing the rear wheel drive axle (see chapter 6),
- the lift cover fitted to the top of the centre housing supporting the lift arms which are attached to the tractor linkage (see chapter 6).

B . Centre housing assembly

Differential

The drive pinion is driven by the gearbox output shaft, integral via splined sleeves with the link shaft. The helical bevel gear assembly transmits the drive to the trumpet final drive units. A differential lock system fitted with a coupler and activated by hydraulic pressure is incorporated into the unit (see chapter 6).

The differential lock is controlled by the Autotronic.

4-wheel drive clutch

A driving pinion integral with the drive pinion drives the counterdriven pinion of the 4WD clutch assembly. Drive is then transmitted via Belleville washers to the clutch output shaft (see chapter 8).

The 4WD clutch is hydraulically activated.

There is therefore no possibility of accidental disengagement of the 4WD clutch in the event of hydraulic failure.

Power take-off drive

The rotation of the shaft passing through the gearbox, proportional to engine speed, is transmitted to the hydraulic clutch located at the front of the centre housing (see chapter 7).

In the engaged position, drive is transmitted by a layshaft and a set of driving and driven pinions to the 540 or 1000 rpm PTO shaft. Speeds are selected by a system of interchangeable shafts (see chapter 7) or by coupler (see chapter 7).

A hydraulic braking device stops the rotation of the PTO shaft in the disengaged position.

Two additional options are offered:

- 4 speed LSPTO (see chapter 7)
- GSPTO (see chapter 7).

Handbrake assembly

A brake assembly comprising two plates and an expander mechanism is mounted on the driving pinion (see chapter 6).

Main brakes

Two pistons fitted laterally in two cavities in the centre housing act on two discs integral with the trumpet input sun gears. The brake pistons are activated hydraulically (see chapter 6).

Centre housing assembly (longitudinal section)

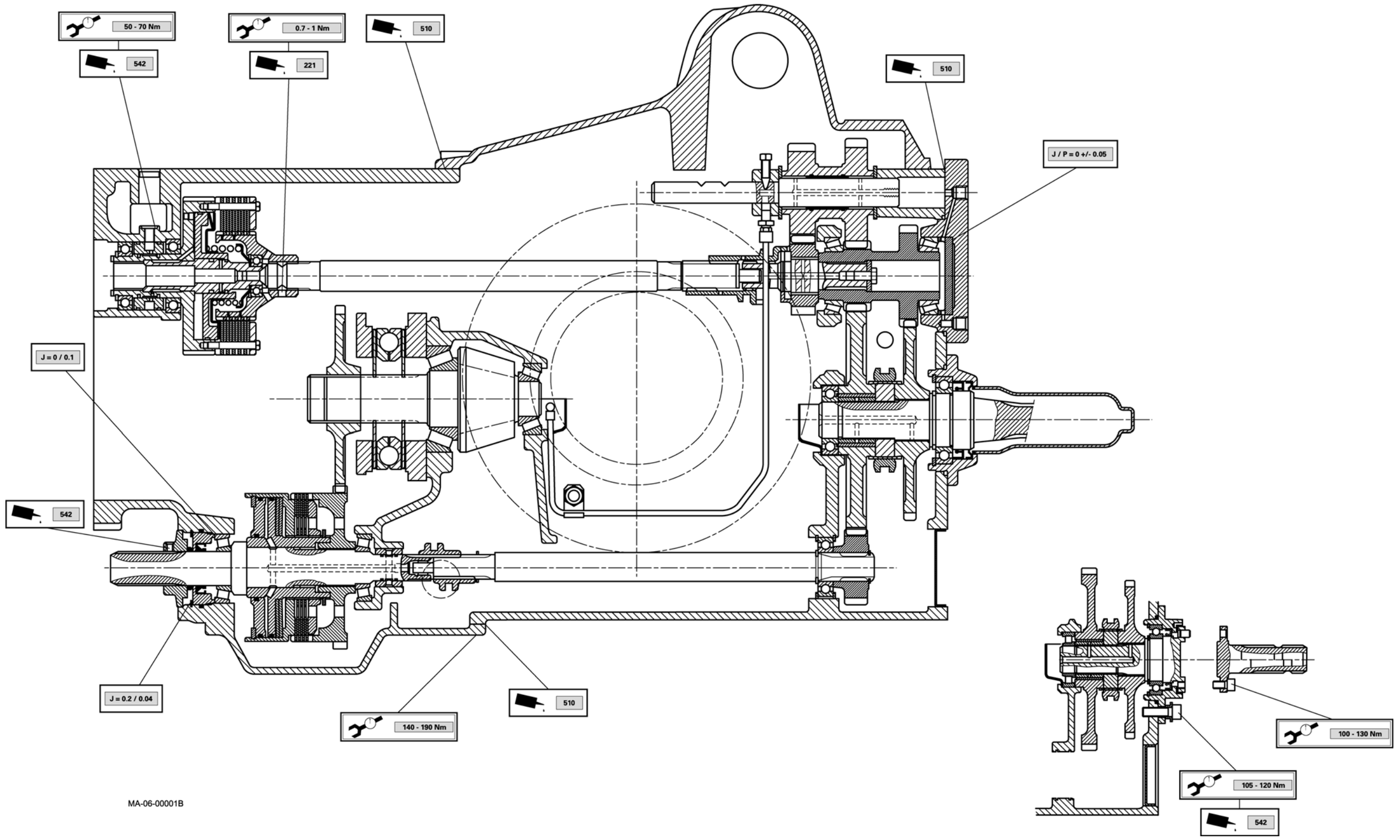


Fig. 1

Rear transmission assembly (cross section)

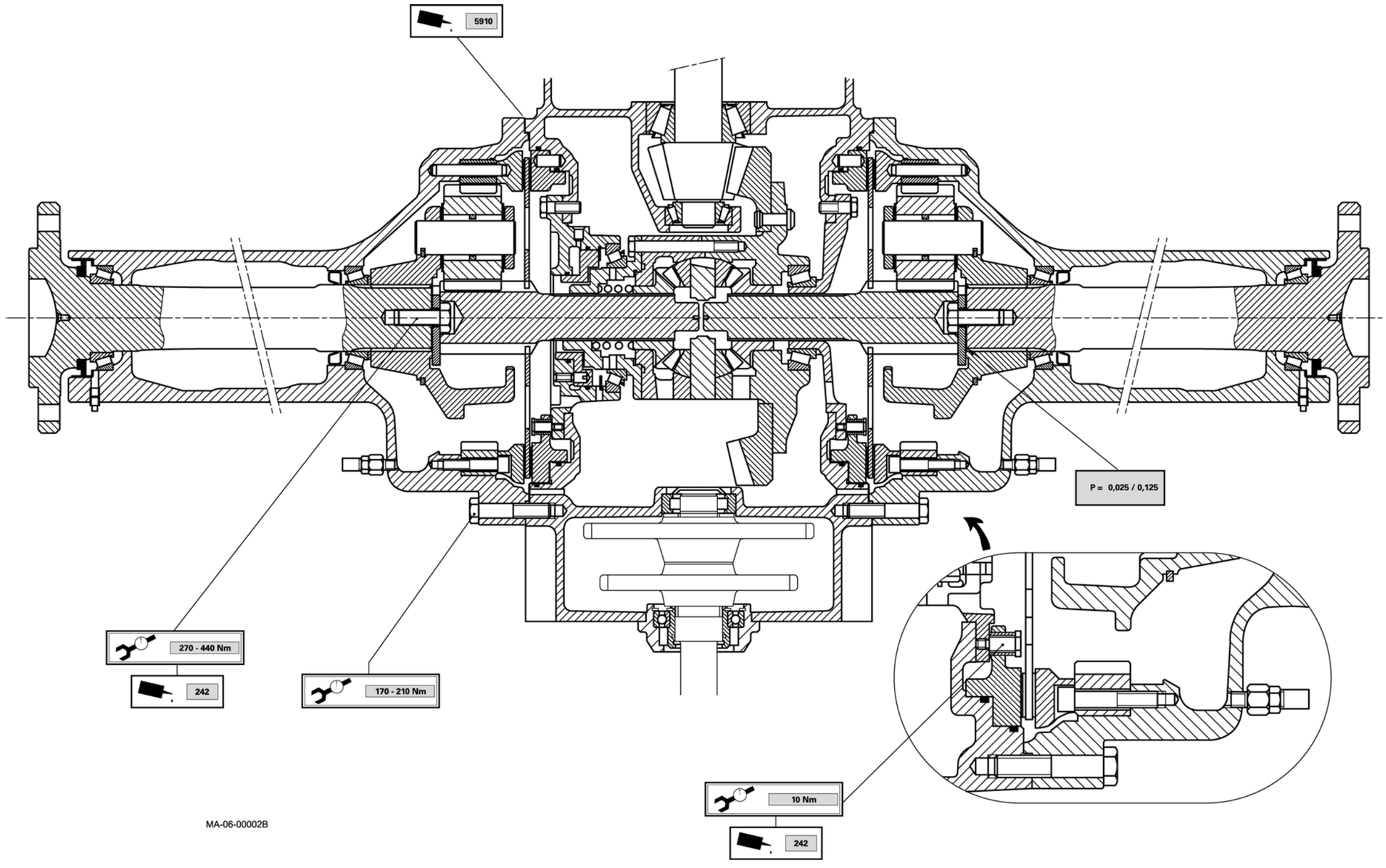


Fig. 2

6A11 - GPA 20 Normal Duty trumpet housings

CONTENTS

GPA 20 Normal Duty trumpet housings

A . General

Description

The trumpet housings support the right- and left-hand side axle shafts and contain the final drive units that transmit the rotation from the differential assembly.

Both trumpet housings are symmetrical and fitted on either side of the centre housing.

Construction

The axle shaft (2) is supported by two opposing taper roller bearings (5) (8). External tightness is assured via a three-lip seal (3) and internal tightness by a single-lip seal (7). The three-pinion final drive unit (14) planet carrier assembly (10) is integral in rotation with the shaft (2) via splines.

Reinforced pinion gears are fitted with two rows of needles (16) separated by a spacer (15) (). Planet carriers without reinforcement have a single row of needles (16). The internal surfaces of the planet carrier (10) are rough cast and therefore require adjustment using friction shims (13).

Shims (26) placed at the end of the shaft allow for preloading of taper roller bearings. The axle shaft (2) and planet carrier (10) are held in place by the washer (25) and screw (24). The final drive ring gear (22) is force fitted into the trumpet and held in place via three screws (17). It has three pins (21) ensuring centring of the brake plate (18).

Differential rotation is transmitted to the pinion gears of the drive unit via a sun gear shaft (23) on the teeth of which the brake disc (19) is placed.

The brake discs are lubricated by a continuous flow of oil from the lift control valve (Open Centre) or the lubricating circuit (Closed Centre).

Parts list

(1) Wheel stud
(2) Axle shaft
(3) Three-lipped seals
(4) Seal cage
(5) Bearing cup
(5A) Bearing cone
(6) Trumpet housing
(7) Seal
(8) Bearing cup
(8A) Bearing cone
(9) Tab washer
(10) Planet carrier
(11) Snap ring
(12) Pinion gear pin
(13) Friction shim(s)
(14) Pinion gear
(15) Spacer (reinforced planet carrier)
(16) Needle bearings
(17) Screw
(18) Brake plate
(19) Brake disc
(20) Screw
(21) Pin
(22) Final drive ring gear
(23) Sun gear
(24) Screw
(25) Washer
(26) Shim(s)
(27) Pin
(28) Plug

Overall view

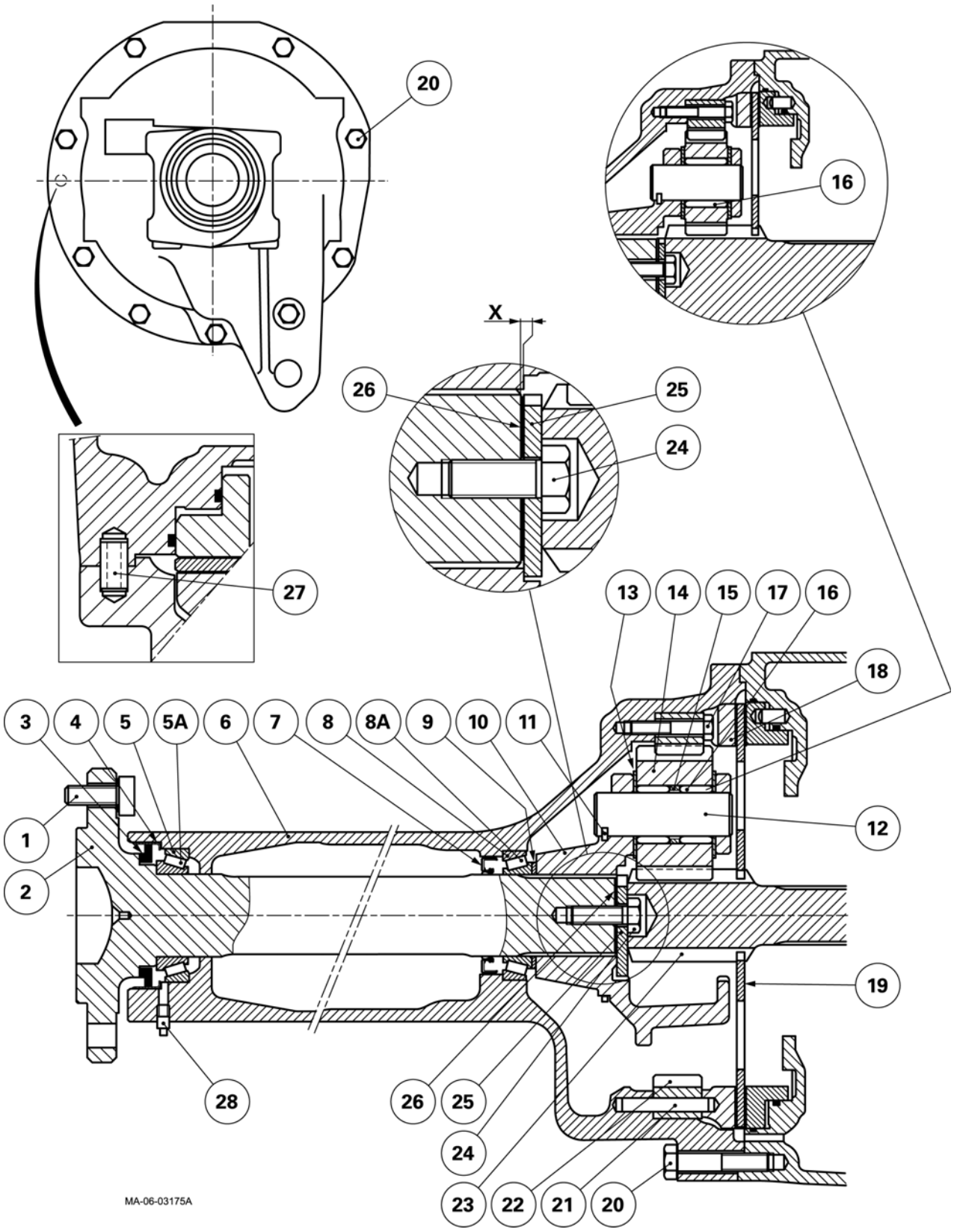


Fig. 1

Exploded view

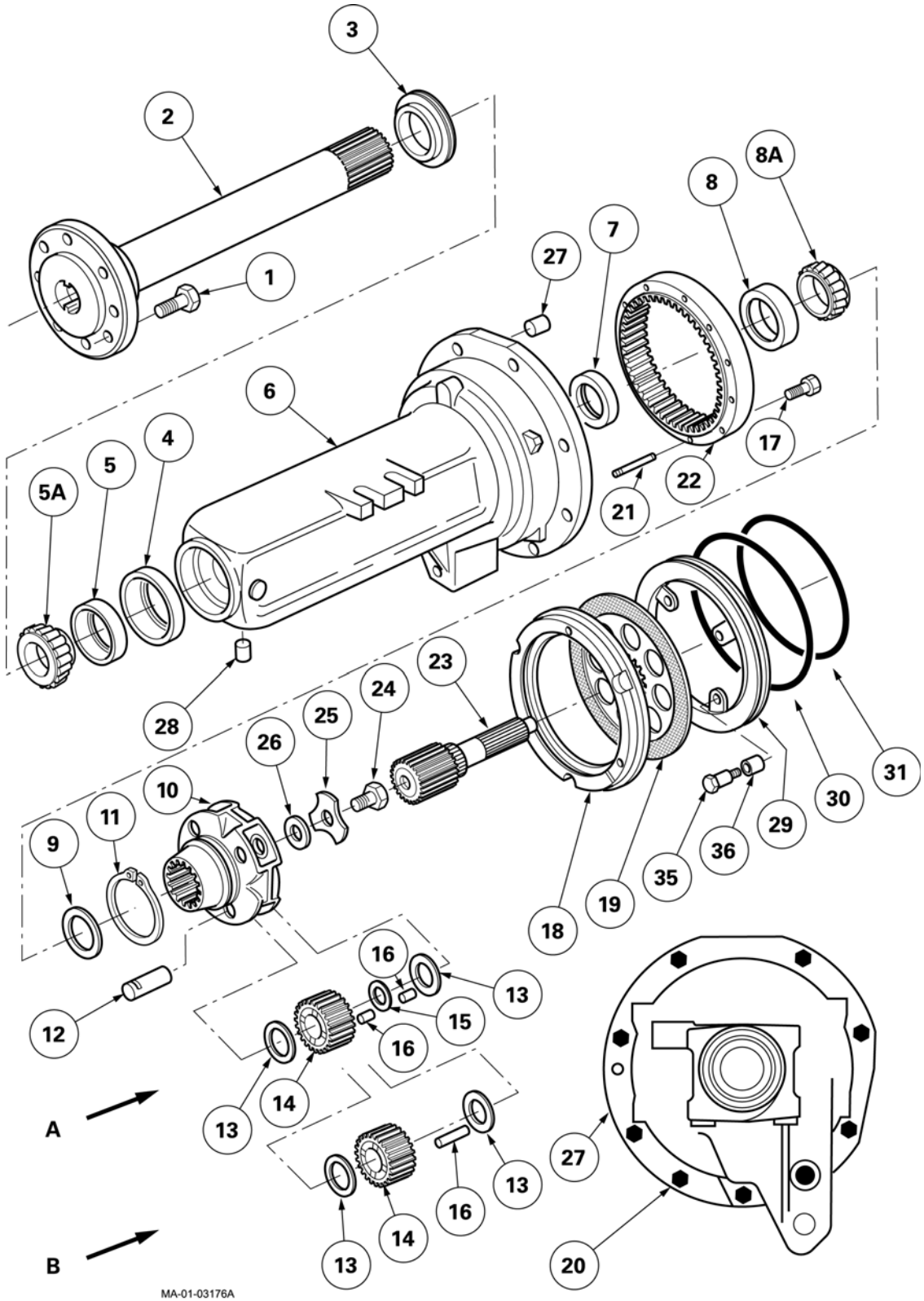


Fig. 2

B . Trumpet assembly

Removal

1. Immobilise the tractor. Apply the handbrake. Chock between the frame and the front axle.
2. Drain the rear axle.
3. With the help of a trolley jack, lift the concerned side of the tractor.
4. Position an axle stand.
5. Disassemble the wheel.
6. Remove the stabilising support.
7. Disconnect the draft sensor harness. On tractors fitted with an auto-hitch, the sensor is removed towards the outside of the tractor (Fig. 3).
8. Disconnect the hose (1) and / or the brake lubricating pipe(s) (11) (depending on the side) (Fig. 4).
9. Remove the cab attachment screws A (Fig. 5 - Fig. 6).
10. Raise the cab enough to allow trumpet housing removal (shim the cab).

    Important: Check that there is enough space between the bonnet and the windscreen (if the space is insufficient, remove the bodywork).
11. Remove the support shim B.

    Note: Remove screws C and shim B only when replacing the trumpet on tractors with high cabs (Fig. 6).
12. Install a suitable fixture under the trumpet and place it on a trolley jack.
13. For the left-hand trumpet, disconnect the feed pipe from the lift control valve (block channels).

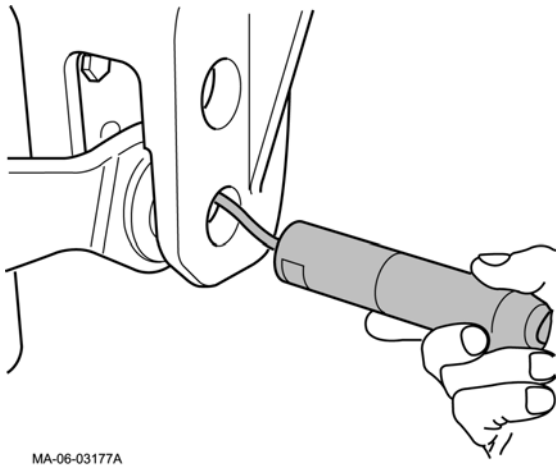


Fig. 3

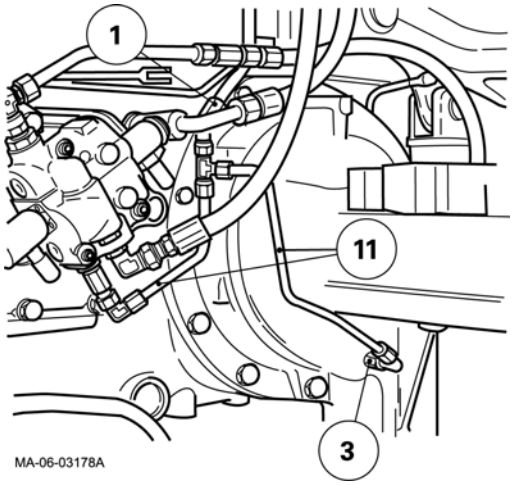


Fig. 4

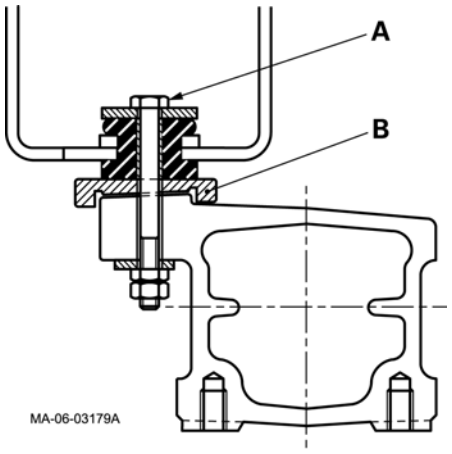


Fig. 5

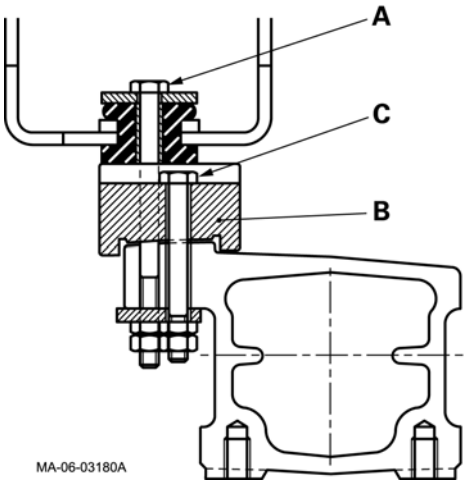


Fig. 6

14. Loosen the attachment screws (20).

15. With the help of an operator and in compliance with safety regulations, split the trumpet from rear axle housing.

16. Remove:

- . brake disc (19)
- . sun gear (23)
- . locating pin (27)

17. Remove the brake plate (18).

Refitting

18. Clean the mating faces on the rear axle housing and on the trumpet housing with a non-greasy solvent.

19. Apply a bead of oil resistant silicone (Silicomet type) to the inner edge of the centre housing (Fig. 7).

20. Check that the disc (19) slides freely on the sun gear (23) (Fig. 8)

21. Refit the locating pin (27), the sun gear (23) and the brake disc (19).

22. Screw two diametrically opposed guide studs into the centre housing.

23. Refit the brake plate (18) in the trumpet housing.

Note: In order to maintain the plate, apply a small amount of miscible grease to the face of the ring gear (22).

24. Couple the trumpet housing to the rear axle, following the safety procedures used during its removal.

Note: Turn the shaft (2) to engage the sun gear (23) in the pinion gears.

25. Clean the screws (20) and smear them with Plastex, Hylomar or an equivalent gasket seal paste.

26. Fit and tighten the screws (20) to a torque of 170 - 210 Nm.

27. Carry out operations 12 and 13 in reverse order.

28. Carry out operations 10 and 11 in reverse order.

29. Refit the cab attachment screws with the nuts and locknuts to a torque of:

- Nut: 27 - 35 Nm
- Locknut: 13 - 20 Nm (with Loctite 270)

30. Refit the draft sensor lightly smeared with Loctite Antiseize grease or equivalent.

31. Reconnect the draft sensor harness, the hose (1), and the tube(s) (11) on the restrictor (3) (Fig. 4) and reassemble the stabiliser support.

32. Top up the oil level in the rear axle.

33. Refit the wheel. Tightening torque 400 - 450 Nm.

34. Remove the axle stand.

35. Test the lift mechanism and braking circuit.

36. Check for tightness:

- between the trumpet and rear axle housing,
- of the lift control valve feed pipe (left-hand trumpet),
- of brake lubricating pipes.

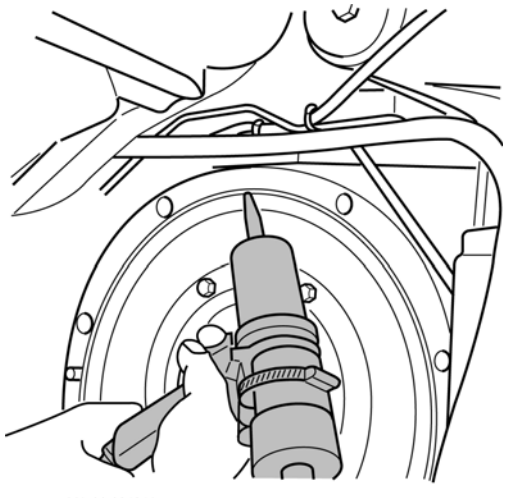


Fig. 7

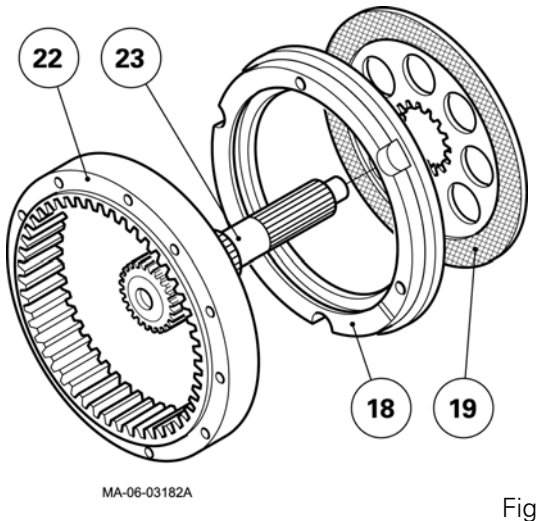


Fig. 8

C . Planet carrier

Disassembly

37. Remove the trumpet housing (see § B).
38. Remove screw (24).
39. Take off the lock washer (25) and the shim(s) (26) (Fig. 9).
40. Remove the planet carrier (10) (Fig. 9 depending on model).
41. Open the snap ring (11) (Fig. 10).
42. With a hammer, lightly tap on the three pins (12) (Fig. 10).
43. Take out the three pins (12) and the snap ring (11).
44. Remove the three pinion gears (14), needles (16), spacers (15) (reinforced plant carriers A) and shims (13).

Reassembly

45. Clean the planet carrier (10), the pins (12) and the pinion gears (14). Check the components.
46. Smear the needles (16) with miscible grease. In each pinion gear (14), fit the rows of needles.
47. Shim the pinion gears.
Note: Shims (13) are available in three different thicknesses.
48. Fit the pinion gears (14) with shims (13) of medium thickness on either side.
49. Engage the three pins (12).

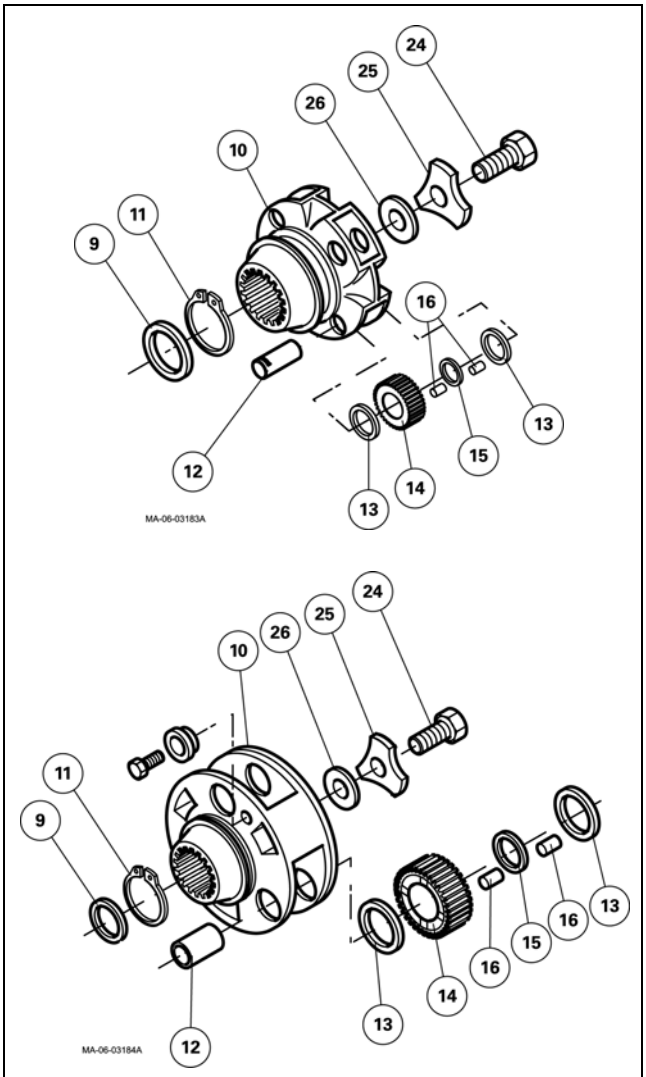


Fig. 9

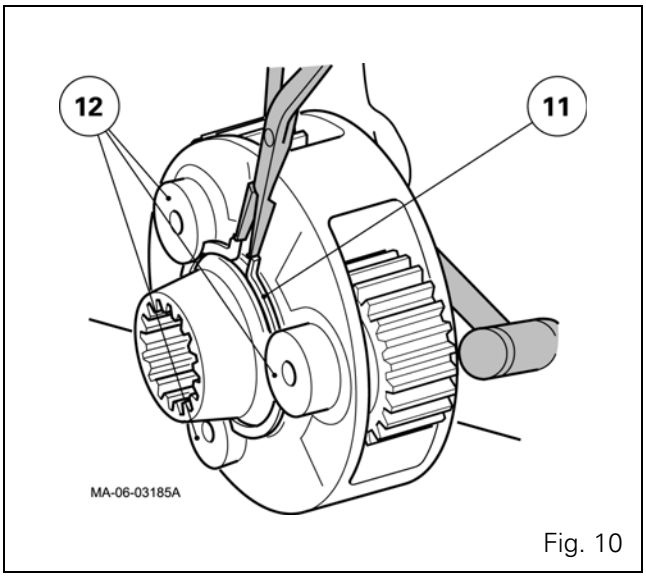


Fig. 10

50. Use a set of shims to determine a thickness of shims (13) to fit to obtain axial clearance between 0.15 and 0.55 mm on each pinion gear (Fig. 11).
51. Pull gently on the three pins, and fit the shims (13) selected at operation 50 (Fig. 12).
52. Drive out the three pins and the snap ring (11).
53. Open the snap ring (11) (Fig. 10).
54. Tap lightly on the three pins so that the snap ring fits into the groove of the planet carrier (Fig. 13).
55. Ensure that the tab washer (9) is present.
56. Refit the planet carrier.
57. Fit shims to obtain the required preload (see § E).
58. Refit the trumpet housing (see § B).

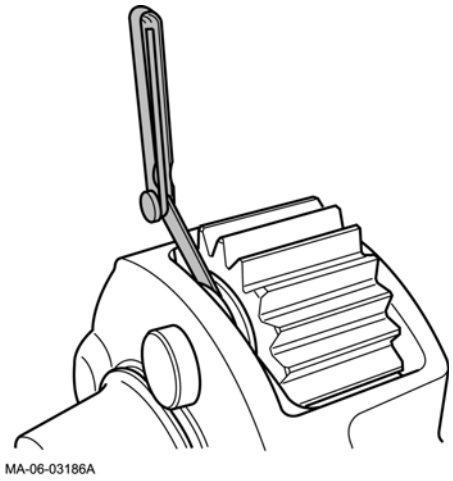


Fig. 11

D . Bearings and seals

Disassembly

59. Remove the trumpet housing from the rear axle housing (see § B).
60. Remove the planet carrier (see § C).
61. Remove:
- the tab washer (9)
- the cone (8A) (idle-mounted on shaft).

62. Take the shaft (2) out of the trumpet housing.
63. Extract the cone (5A).
64. Drive off the three-lipped seal (3)
65. Using an extractor, take out:
- the cup (5).
- the cage (4) from the seal (3)
- the cup (8).

66. Drive off the seal (7).

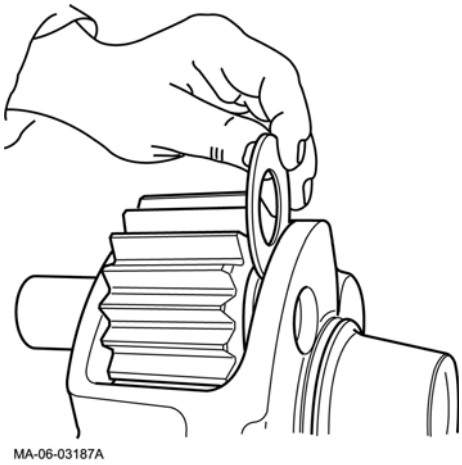


Fig. 12

Reassembly

Note: The ring gear (22) is force fitted in the trumpet housing (6). It is centred by the three pins (21) (Loctite 638) and tightened by the screws (17). Tighten to a torque of 79 - 90 Nm (Loctite 242).

67. Clean the seal mating faces and the location of cups and cones inside the trumpet and on the shaft. Seal, cup and cone mating faces should be free of burrs and dents.
68. Smear the external diameter of the seal (7) with Loctite 542 (metal cage).
Note: Follow the assembly order of the seal.

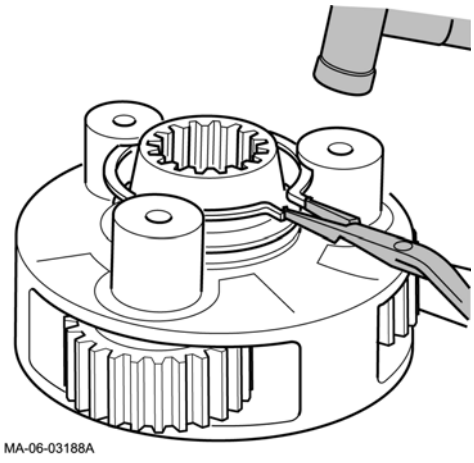


Fig. 13

69. Replacing the seal (7):

Without shaft replacement (2): to avoid the seal lip from bearing on the same place on the shaft, insert the seal 4 mm from the shoulder of the cup (8) (Fig. 14).

With shaft replacement (2): position the seal 5 mm from the shoulder of the cup (8) (Fig. 15).

70. Lubricate the cups (8) (5) and fit them home against the shoulder.

71. Fit the cage (4) into the base of the shoulder (Fig. 16).

72. Fit the three-lipped seal (3) home against the shoulder of the shaft.

Note: Follow the specific positioning of the seal (Fig. 16).

73. Lubricate the shaft (2) and fit the cone (5A) home against the shoulder.

74. Moderately grease the cone (5A) and seal lips (3) (7) (BP Agricharge grease or equivalent).

75. Protect the shaft splines (2) and insert it into the trumpet housing.

Note: The seal lips (3) must be directed outwards.

76. Take off the shaft protection and lightly lubricate the cone (8A).

77. Refit the cone (8A), washer (9) and planet carrier (10).

78. Fit shims to obtain the required preload (see § E).

79. Replace plug (28) with a grease nipple. Partially fill the trumpet cavity between the cone (5A) and the seal (3) with BP Agricharge grease or equivalent. Take off the grease nipple and tighten the plug again (Fig. 16).

80. Refit the trumpet housing (see § B).

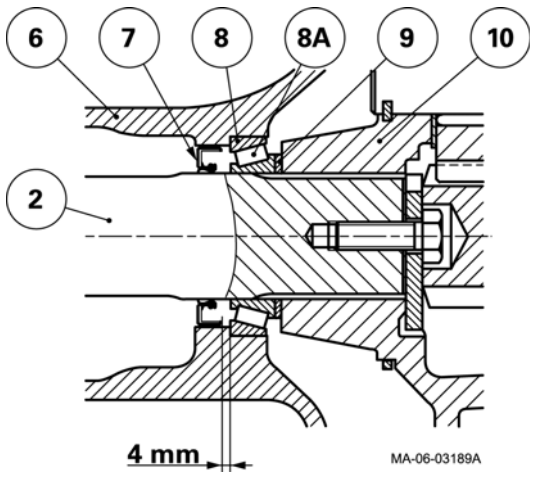


Fig. 14

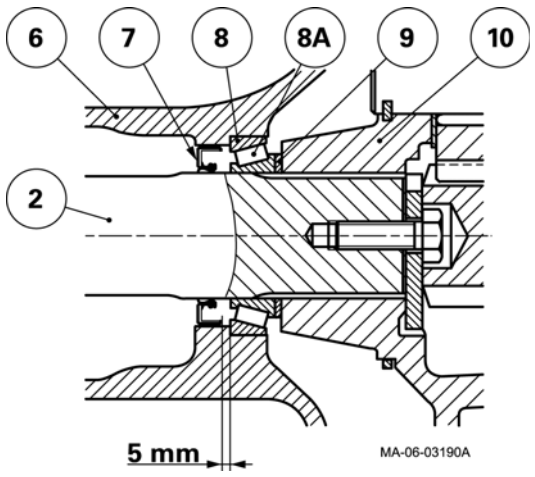


Fig. 15

E . Preloading the axle shaft bearings

81. Place trumpet assembly in vertical position.

82. Remove the screw (24) and washer (25).

83. Seat the cones (5A) (8A) in their cups by turning the trumpet on its axis.

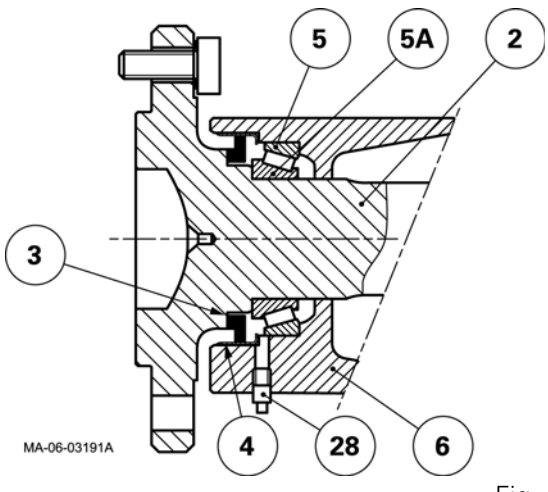


Fig. 16

84. Set a thickness of shims (26) greater than dimension X in order to obtain clearance (Fig. 17).

85. Fit the washer (25) and screw (24) and tighten to a torque of 270 - 440 Nm.

86. Using a dial gauge, check the clearance by moving the planet carrier axially (Fig. 18).

87. Remove the screw (24) and washer (25).

Depending on the dial gauge reading, take off the surplus shim thickness (26) in order to obtain a preload of:

P1 = 0.025 to 0.125 mm

88. Clean the tapping at the end of the shaft (2).

89. Refit the washer (25).

90. Clean the screw (24), smear it lightly with Loctite 241 and tighten it to a torque of 270 - 440 Nm.

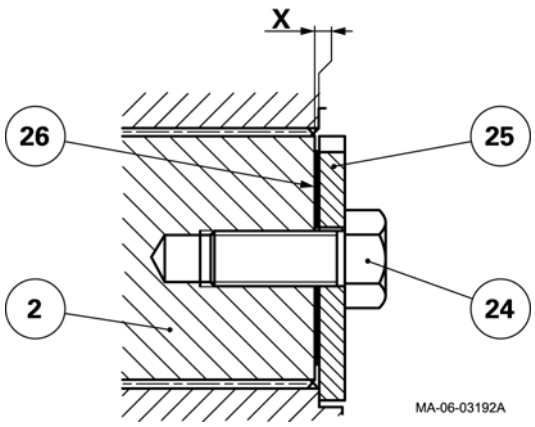


Fig. 17

F . Replacing a wheel stud

91. Drive off the defective stud with the help of a bronze drift and a hammer.

92. Use a brush and solvent to clean the streak marks left by the stud on the shaft flange.

93. Dry using compressed air.

94. Place several drops of Loctite 270 on the new stud serration.

95. Place the new stud over the serration marks left by the former stud.

96. After checking that splines are properly engaged, bring the stud head towards the inner flange of the axle shaft with a bronze hammer.

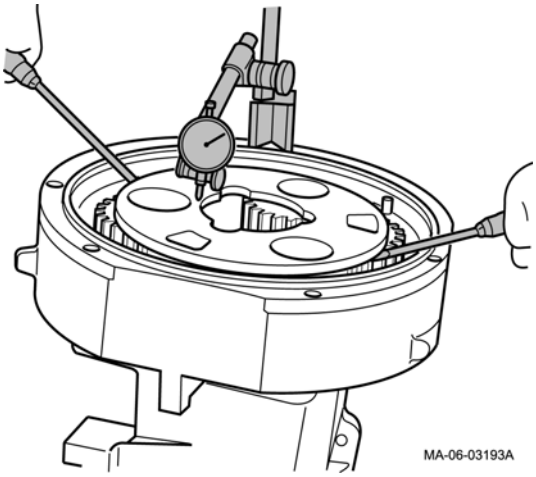


Fig. 18

6A12 - GPA20 Super Heavy Duty trumpet housings

CONTENTS

GPA20 Super Heavy Duty trumpet housings

A . General

Description

- The Super Heavy Duty trumpet housings support the right and left-hand side axle shafts and contain the final drive units that transmit the rotation from the differential assembly.
- Both trumpet housings are symmetrical and fitted on either side of the centre housing.
- The Super Heavy Duty trumpet housing is fitted only with a flanged shaft (Fig. 2).

Construction

- The axle shaft (2) is supported by two tapered roller bearings (7) (8) and (12) (13) fitted opposite one another.
- External tightness is ensured via a three-lipped seal (5) and internal tightness by a single lip seal (11). For operating in paddy fields or in particularly wet farming conditions, the external sealing of the shaft is reinforced by a second seal J fitted beside the three-lipped seal (5) according to the prescribed positioning values (Fig. 1).
- The planet carrier assembly of the final drive unit (25) has three gears (22). It is splined to the shaft (2) in rotation. Shims (26) placed at the end of the shaft are used to preload the tapered roller bearings. The shaft (2) and the planet carrier (25) are held in place by the washer (27) and the screw (28). The final drive ring gear (15) is force fitted into the trumpet housing. It has five pins (14),which ensure the centring of the brake plate (30).
- Differential rotation is transmitted to the planet gears of the final drive via a sun gear shaft (29) on the teeth of which the brake disc (35) is fitted.
- The brakes are lubricated via a port O drilled in the trumpet housing (Fig. 3).

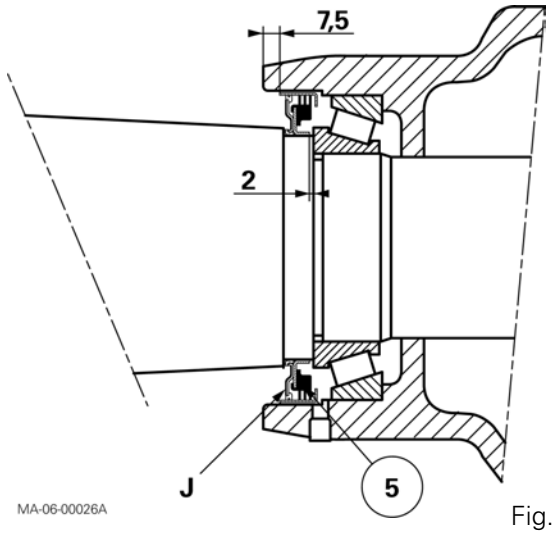


Fig. 1

Fig. 2

GPA20 Super Heavy Duty trumpet housings

Parts list

(1) Dowel
(2) Flanged shaft
(5) Three-lipped seal
(6) Cage
(7) Bearing cone
(8) Bearing cup
(9) Threaded plug
(10) Trumpet housing
(11) Seal
(12) Bearing cup
(13) Bearing cone
(14) Pins
(15) Ring gear
(16) Tab washer
(17) Spacer
(18) Screw
(19) Circlip
(20) Planet gear pins
(21) Washers
(22) Planet gears
(23) Needle rollers
(24) Spacers
(25) Planet carrier
(26) Shim(s)
(27) Lock washer
(28) Screw
(29) Sun gear
(30) Brake plate
(35) Brake disc
(36) Stud
(39) Screw
(40) Lock washer

View of assembly without lock washer

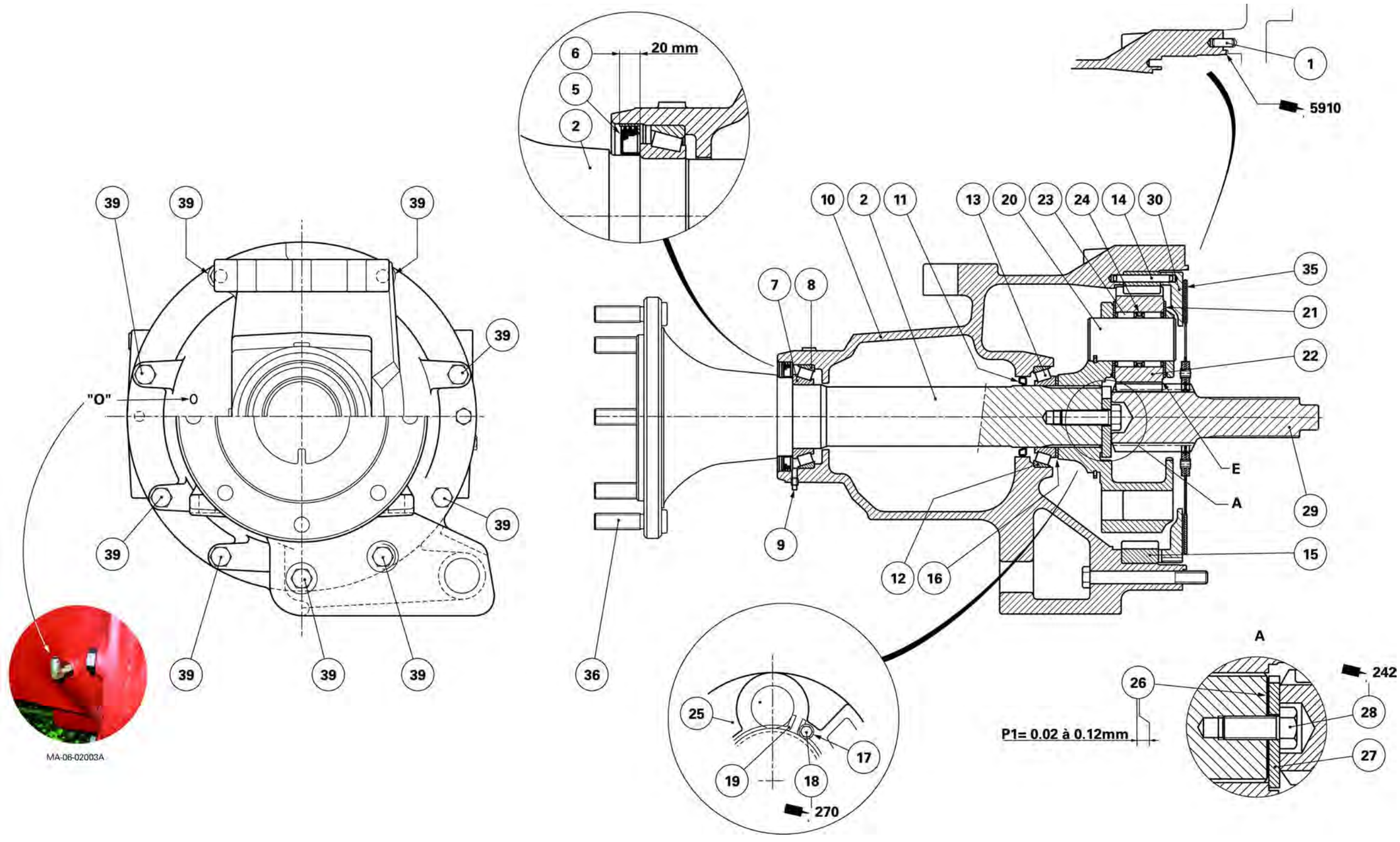


Fig. 3

Blown-up view of assembly without lock washer

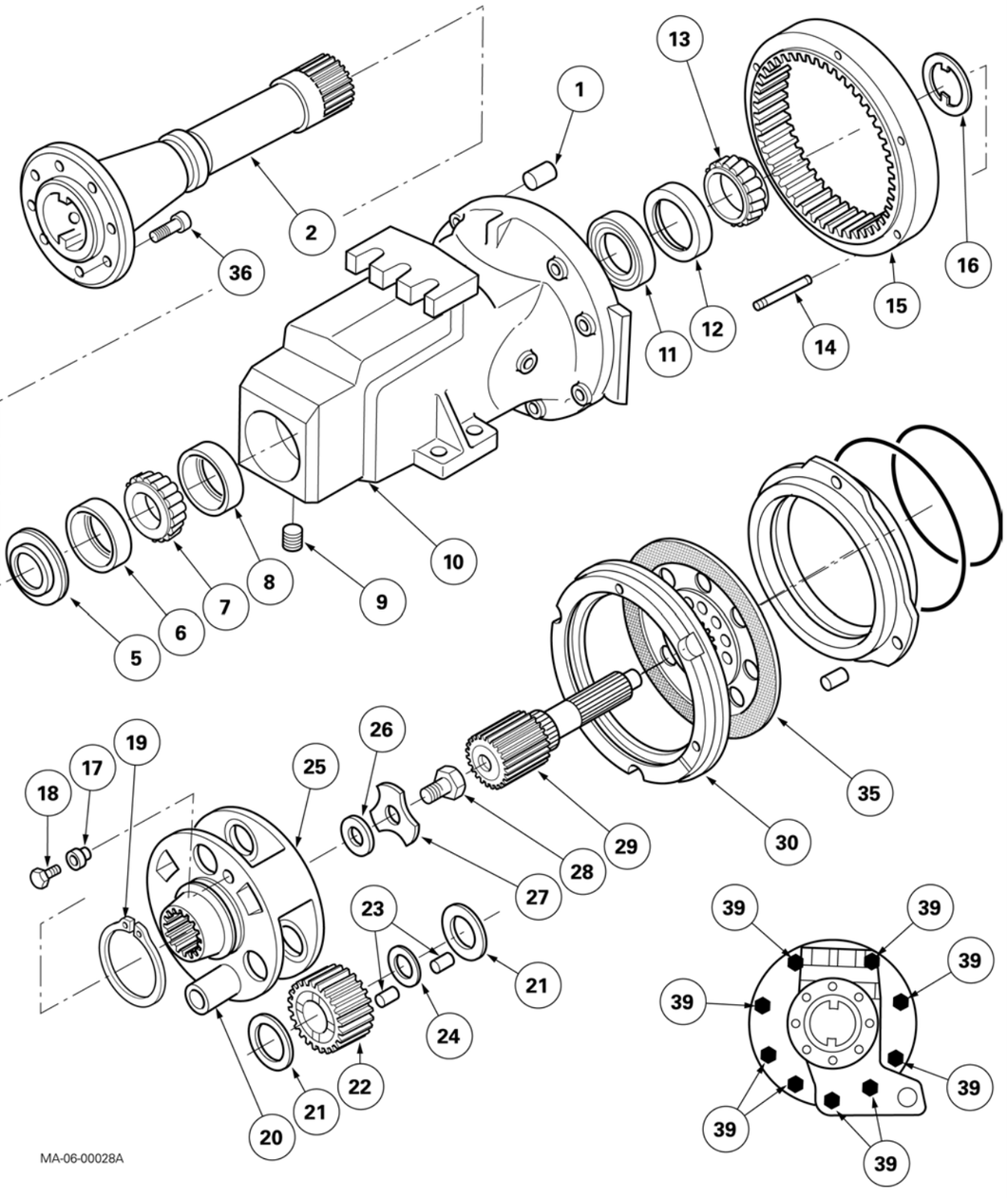


Fig. 4

View of assembly with lock washer

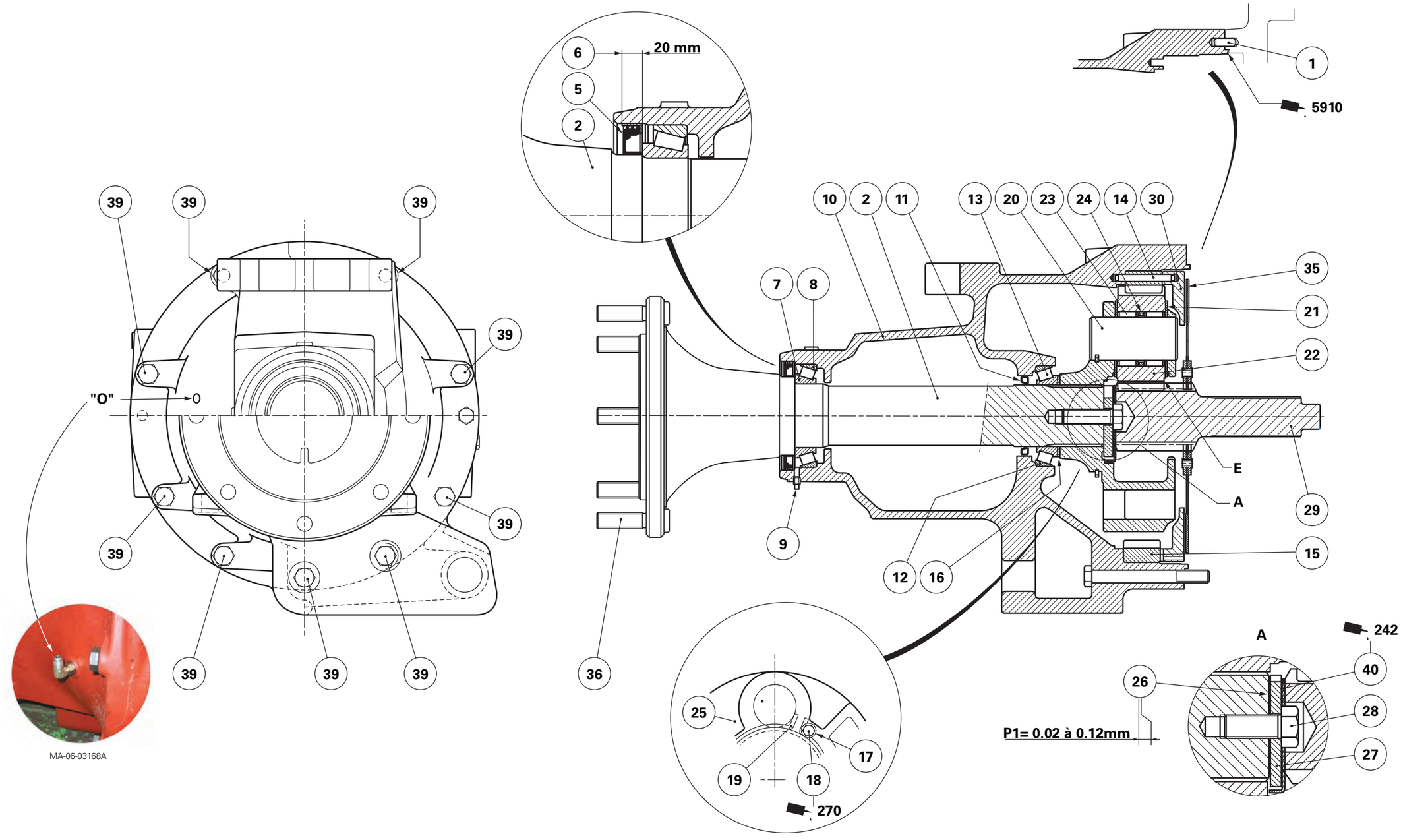


Fig. 5

Blown-up view of assembly with lock washer

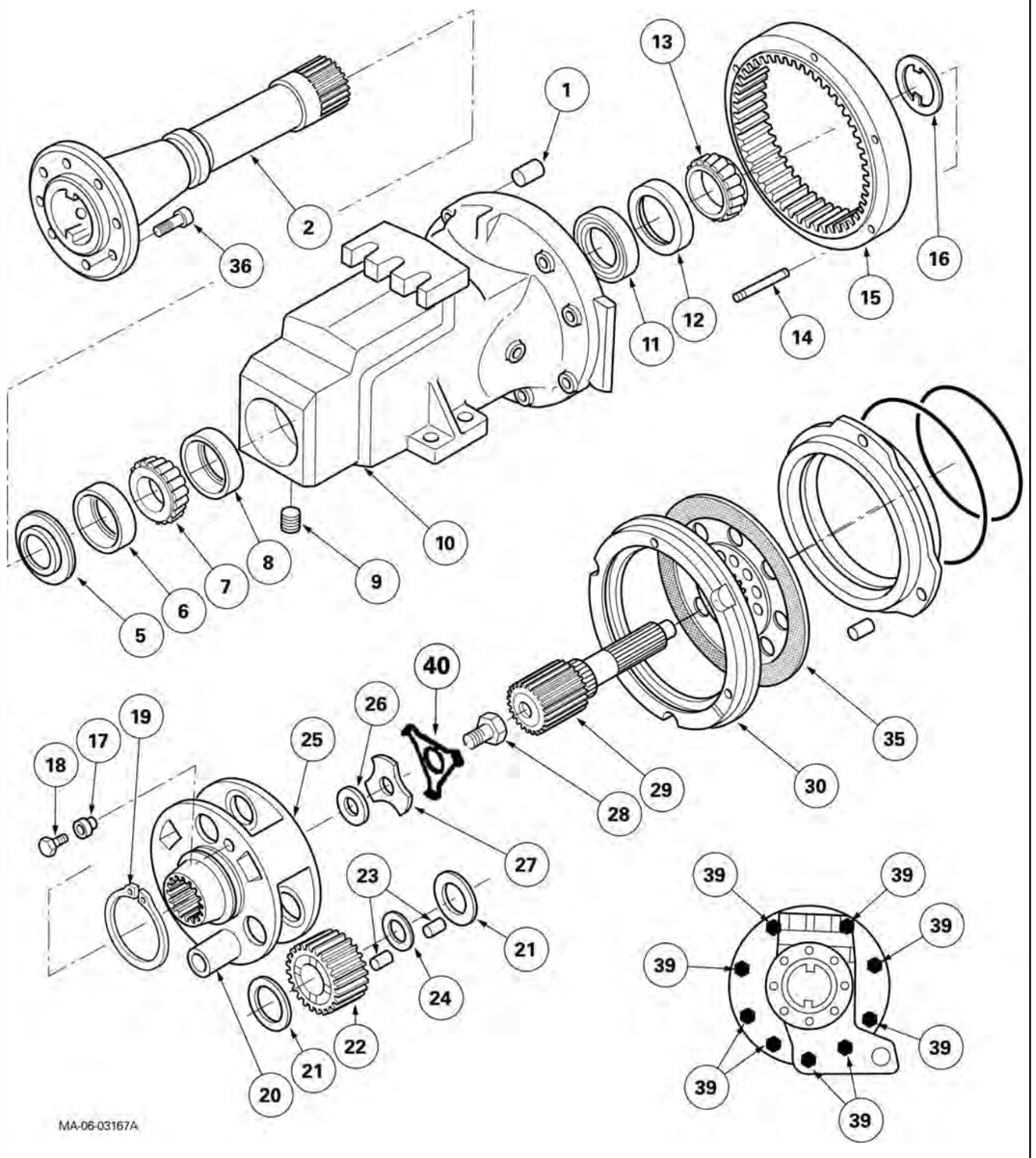


Fig. 6

B . Removing and refitting the trumpet housing assembly

Preliminary steps

1. Apply the hand brake if necessary. Chock between the frame and the front axle.

   NOTE: *Applying the hand brake is optional because the ParkLock device (depending on option) systematically immobilises the tractor when stationary.*
2. Drain the rear axle.
3. Using a trolley jack, lift the relevant side of the tractor.
4. Place an axle stand in position.
5. Remove the wheel.
6. Remove the stabilising support.
7. Remove the pin from the lift ram.
8. Disconnect the hose or the pipe used to lubricate the brakes on the trumpet housing.
9. Remove the cab screws on the trumpet housing.
10. Underneath the trumpet housing, position a suitable support on a trolley jack.

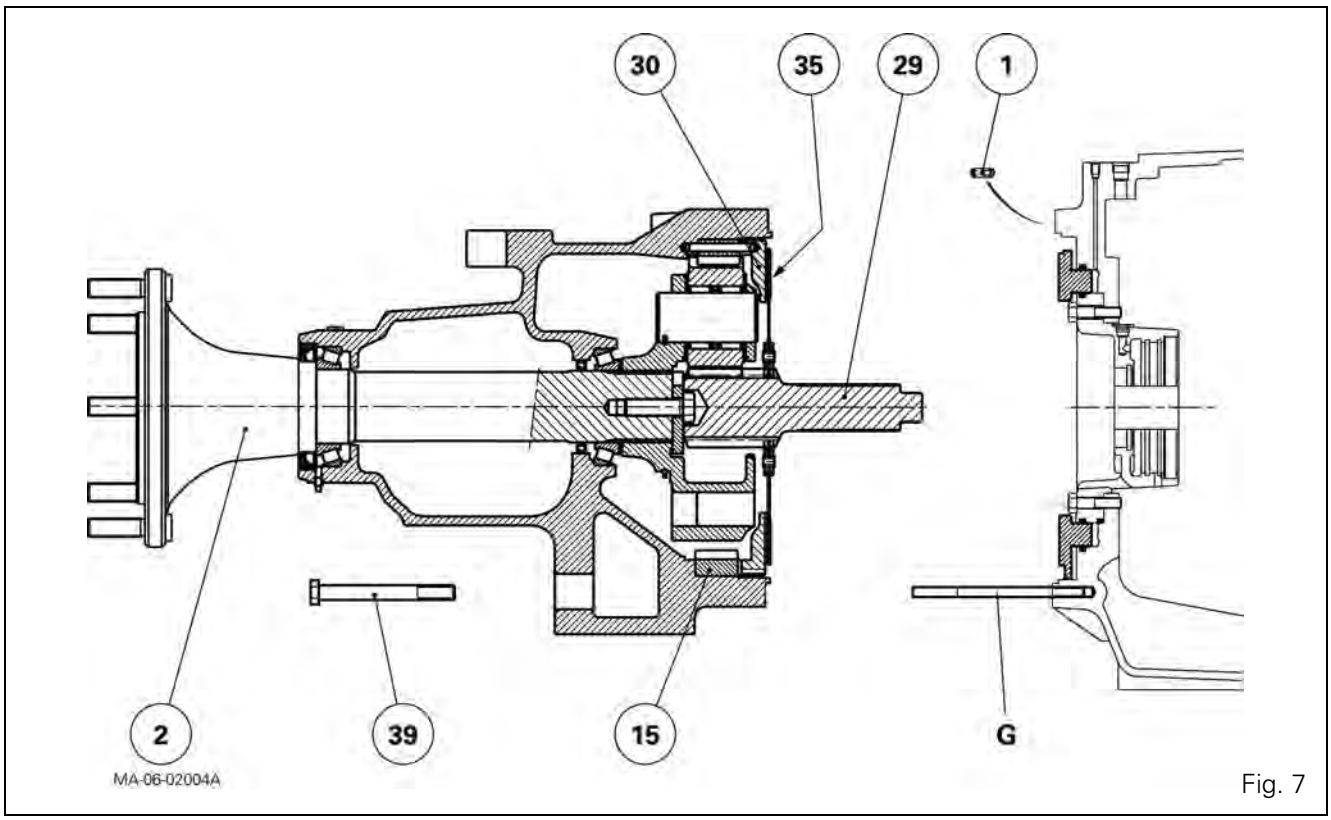


Fig. 7

Removal (Fig. 7)

11. Loosen and remove the screws (39).
12. Separate the trumpet housing from the rear axle housing.
13. Remove:
- the brake disc (35);
- the sun gear (29);
- the centring pin (1)

14. Remove the brake plate (30).

Refitting

15. Clean the mating faces on the housing and on the trumpet housing with a non-greasy solvent.
16. Apply a bead of Loctite 5910 or equivalent to the inside edge of the housing (Fig. 8).
17. Check that the disc (35) slides freely on the sun gear (29) (Fig. 9).
18. Refit the pin (1), the sun gear (29) and the disc (35).
19. Screw two diametrically opposed guide studs G to the rear axle housing (Fig. 7).
20. Refit the brake plate (30) in the trumpet housing.

NOTE: In order to hold the plate in place, apply three spots of miscible grease to the face of the ring gear (15).

21. Couple the trumpet housing to the rear axle housing.

REMINDER: *Turn the shaft (2) to facilitate the engagement of the sun gear (29) in the differential.*

22. Refit the screws (39) and tighten them to 220-300 Nm. Remove the guide studs simultaneously.

Final steps

23. Refit the components around the trumpet housing.
24. Refit the wheel. Remove the axle stand. Tighten the screws or nuts (depending on version) to the required torque (see chapter 6).
25. Top up the oil in the housing and check it using the sight glass located to the left of the PTO housing.
26. Remove the chocks between the frame and the front axle.
27. Check the linkage function. Test the braking by carrying out a road test.
28. Check tightness of:
- between the trumpet housing and the rear axle housing
- hose or the pipe used to lubricate the trumpet housing

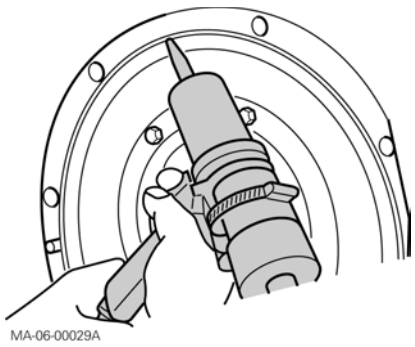


Fig. 8

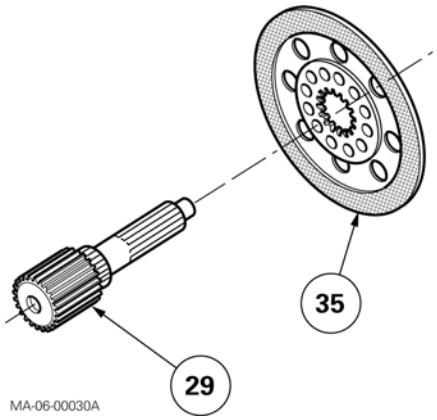


Fig. 9

C . Disassembling and reassembling the planet carrier

Assembly without lock washer (Fig. 10)

Disassembly

29. Remove the trumpet housing assembly (see § B). If possible, place the trumpet housing in a vertical position with the planet carrier facing upwards.
30. Remove screw (28).
31. Take off the lock washer (27) and the shim(s) (26) (Fig. 10).
32. Remove the planet carrier (25).
33. Take out the screw (18) and spacer (17).
34. Open the snap ring (19) (Fig. 12).
35. Using a hammer, tap gently on the three pins (20) (Fig. 12).
36. Remove the three pins and the snap ring.
37. Remove the three planet gears (22), needle rollers (23), spacers (24) and friction washers (21).

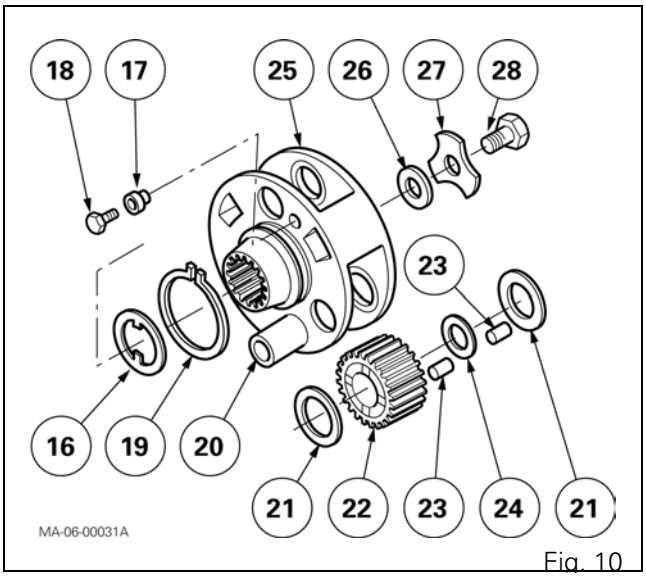


Fig. 10

Assembly with lock washer (Fig. 11)

Disassembly

38. Remove the trumpet housing assembly (see § B). If possible, place the trumpet housing in a vertical position with the planet carrier facing upwards.
39. Remove the lock washer (40).
Note: *The lock washer is fixed with Loctite 401.*
40. Remove screw (28).
41. Take off the lock washer (27) and the shim(s) (26) (Fig. 11).
42. Remove the planet carrier (25).
43. Take out the screw (18) and spacer (17).
44. Open the snap ring (19) (Fig. 12).
45. Using a hammer, tap gently on the three pins (20) (Fig. 12).
46. Remove the three pins and the snap ring.
47. Remove the three planet gears (22), needle rollers (23), spacers (24) and friction washers (21).

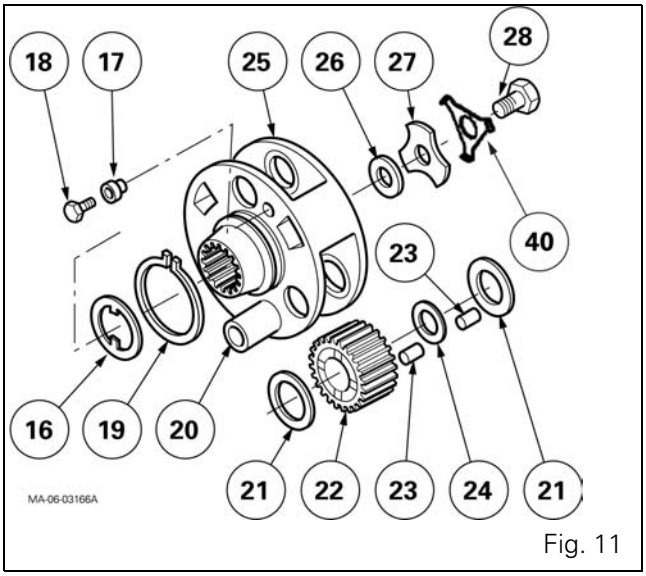


Fig. 11

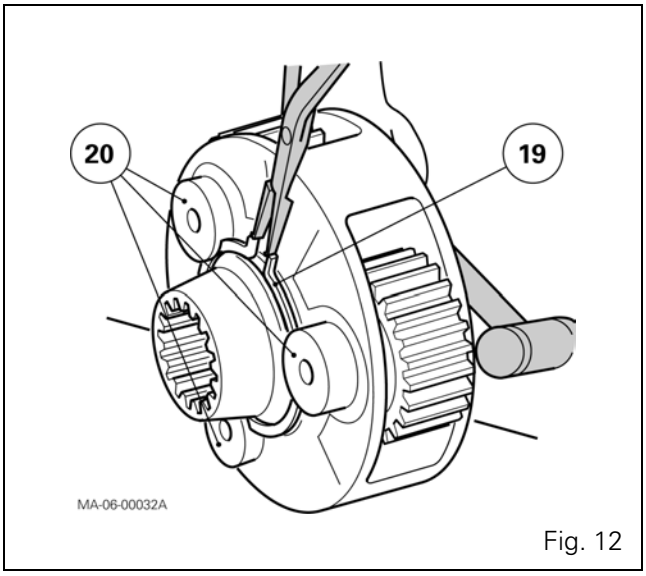


Fig. 12

Assembly with/without lock washer

Reassembly

48. Clean the planet carrier, the pins and the planet gears. Check the parts.

49. Smear the needle rollers with miscible grease. Fit each planet gear with two rows of needle rollers (23) separated by a spacer (24).

50. Position the planet gears and centre the friction washers (21) in the planet carrier.

***REMINDER**: Imprint E (Fig. 3) on one surface of the planet gears (punch mark or groove) must face the opposite way to the splined hub of the planet carrier.*

51. Engage the three pins (20) with the snap ring (19) (Fig. 13).

52. Open the snap ring (19) (Fig. 12).

53. Tap gently on the three pins so that the snap ring fits into the groove of the planet carrier (Fig. 13).

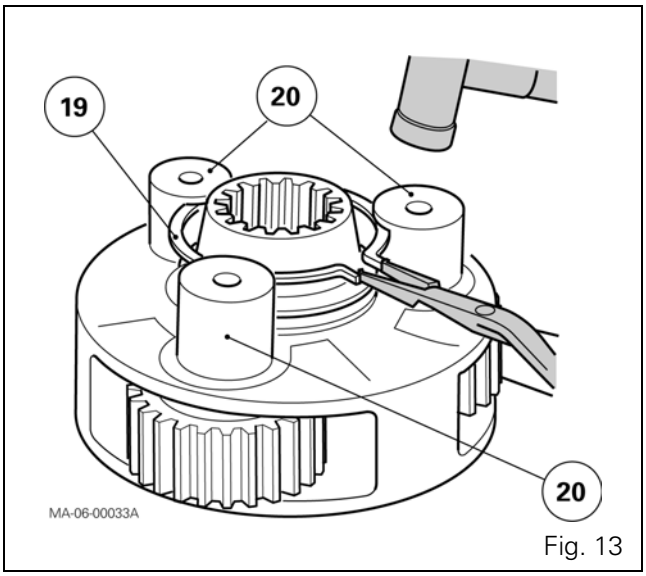


Fig. 13

54. Position one end of the snap ring against the pin (20) (Fig. 14).

55. Clean the screw thread (18) and the tapping on the planet carrier. Position the spacer (17). Fit and tighten the screw (Fig. 14) to 34-50 Nm, after lightly smearing its thread with Loctite 270 or equivalent.

56. Ensure that the tab washer (16) is present.

57. Refit the planet carrier.

58. Shim the bearings on the axle shaft to obtain the required preload (see § E).

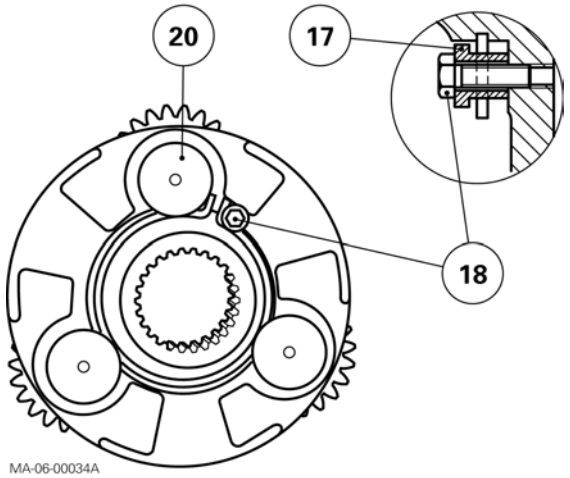


Fig. 14

D . Replacing bearings and seals

Disassembly

59. Remove the trumpet housing assembly from the rear axle housing (see § B).

60. Remove the planet carrier (see § C).

61. Remove:
- the tab washer (16);
- the bearing cone (13) (free fitted on the shaft)

62. Take the shaft (2) out of the trumpet housing with the help of another operator.

63. Remove the bearing cone (7).

64. Drive out the three-lipped seal (5).

65. Using a puller, take out:
- the cup (8)
- cage (6) from the seal
- the cup (12).

66. Drive out the seal (11).

Reassembly

67. Clean the seal mating faces and the location of bearing cups and bearing cones inside the trumpet housing and on the shaft.

The mating faces of the seals, the bearing cups and bearing cones must be free of burrs and dents.

68. Smear the external surface of the seal (11) with a film of oil.

REMINDER: *Follow the correct fitting direction of the seal.*

69. Replacing the seal (11):
- **Without replacement of the shaft (2):** So that the seal lip does not rest in the same place on the shaft, fit the seal 9 mm from the shoulder of the cup (Fig. 15).
- **With replacement of the shaft (2)**: Position the seal 8 mm from the shoulder of the cup (Fig. 16).

70. Lubricate the cups (8) (12) and fit them home against the shoulder.

71. Fit the cage (6) approximately 1 mm from the face of the trumpet housing (Fig. 17).

72. Fit the three-lipped seal (5) up against the shoulder of the shaft using a suitable fixture.

REMINDER: *Follow the correct fitting direction of the seal (Fig. 17).*

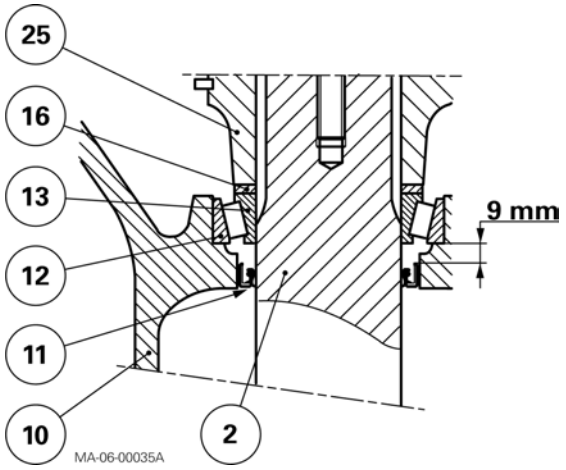


Fig. 15

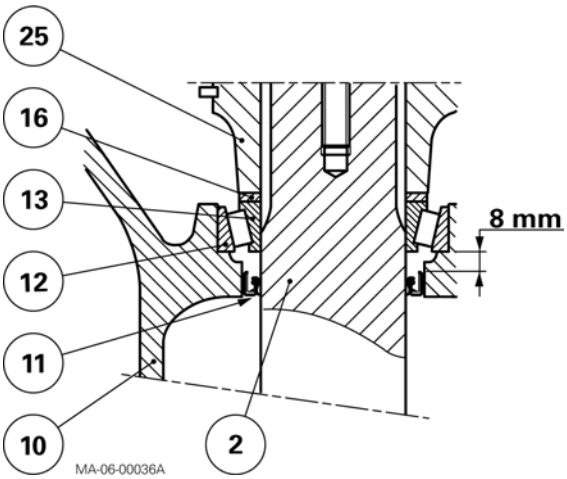


Fig. 16

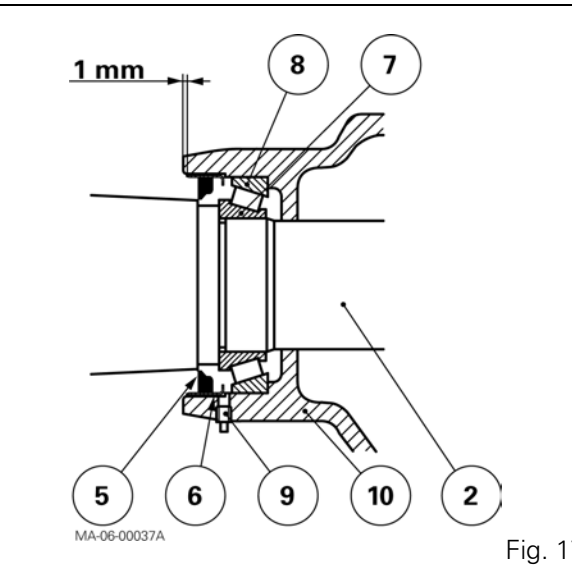


Fig. 17

73. Lubricate the shaft (2) and fit the cone (7) against the shoulder.

74. Moderately grease the cone (7) and the lips of seals (5) (11) (using BP Agricharge grease or equivalent).

75. Protect the lip of the seal (11) by temporarily masking the splines on the axle shaft with a fine, soft tape. Insert the prepared shaft into the trumpet housing.

NOTE: *The lips of the seal (5) must be fitted facing outwards.*

76. Remove the shaft protection and lightly lubricate the cone (13).

77. Slide the cone (13) and the tab washer (16) onto the shaft. Refit the planet carrier (see § C).

78. Shim the bearings on the axle shaft to obtain the required preload (see § E).

79. Temporarily replace the plug (9) with a grease nipple.

Partially fill the trumpet housing cavity between the cone (7) and the seal (5) with BP Agricharge grease or equivalent. Take off the grease nipple and retighten the plug (Fig. 17).

80. Refit the trumpet housing assembly (see § B).

E . Shimming the axle shaft bearings

81. Place the trumpet housing assembly in vertical position.

82. Depending on assembly, remove:
- the screw (28) and washer (27).
- the lock washer (40), the screw (28) and the washer (27).

83. Seat the bearing cones (7) (13) in their cups by turning the trumpet housing on its shaft.

84. Determine a thickness of shims (26) greater than value X (Fig. 18) in order to obtain a provisional clearance J between approximately 0.10 and 0.15mm (Fig. 18), so as to subsequently carry out definitive shimming with preload (see below).

85. Fit the washer (27) and temporarily tighten the screw (28).

Assembly without lock washer

86. Clean the thread of the screw (28) on the flanged shaft (Ø 82 mm) and lightly smear with Loctite 242 or equivalent, then tighten to 374-506 Nm.

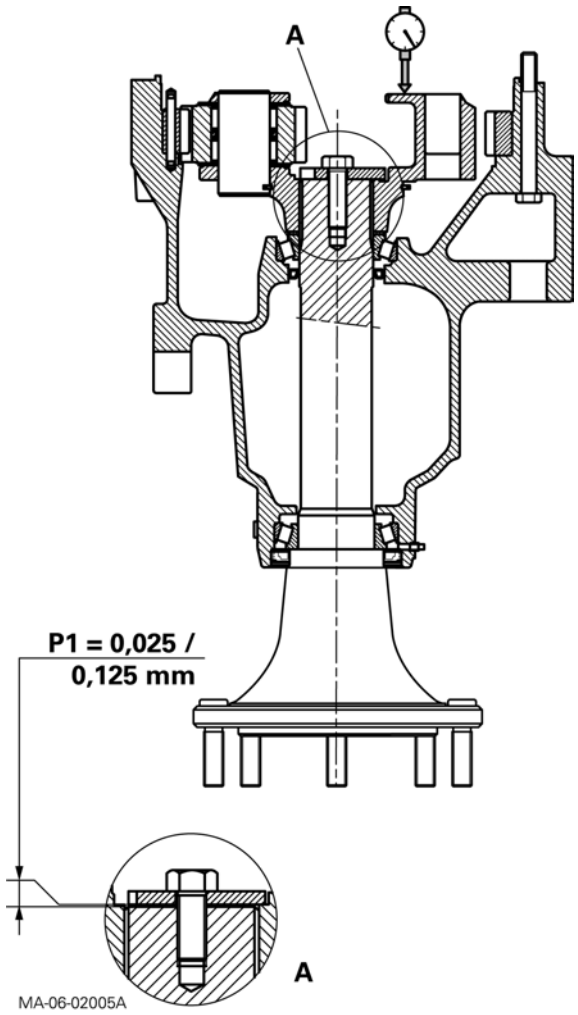


Fig. 18

87. Using a dial gauge, check the clearance by moving the planet carrier (25) axially (Fig. 19).

88. Remove the screw (28) and washer (27). Depending on the dial gauge reading, remove the surplus shim thickness (26) (Fig. 18) to order to obtain a preload (Fig. 20):

P1 = 0.025 to 0.125 mm

89. Clean the tapping at the end of the shaft (2).

90. Refit the washer (27).

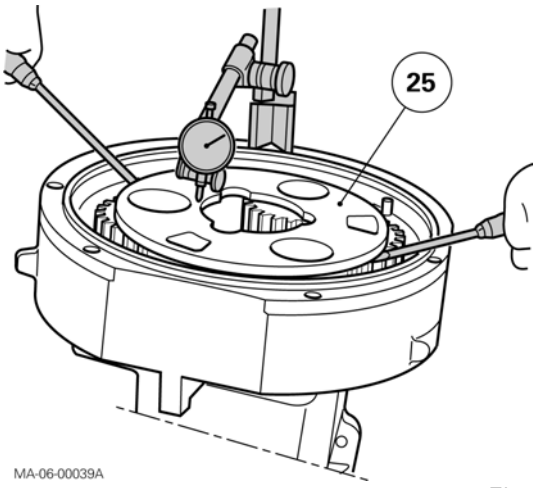


Fig. 19

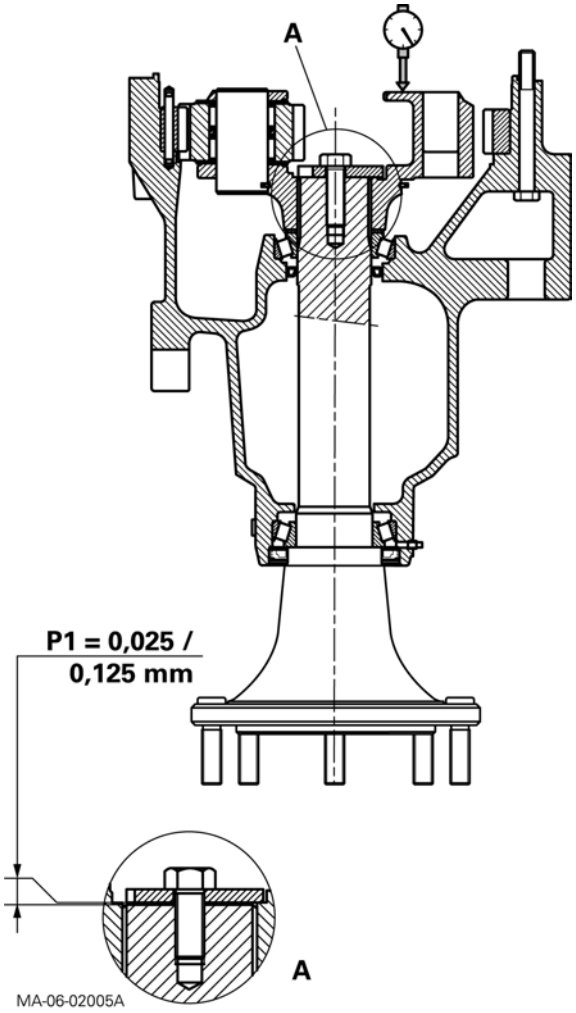


Fig. 20

Assembly with lock washer

91. Clean the screw (28) and tighten to 410 Nm.

92. Slide a lock washer (40) onto the head of the screw (28). Ensure its tabs B are correctly housed in moulded slots E of the planet carrier (25) (Fig. 21). If this is not the case, repeat the step with the second lock washer; if this is still not the case, repeat the step with the third. Depending on the result (either no washer is suitable or a washer is selected), proceed to step 93 or 94.

NOTE: *Three lock washers (40) are available from the spare parts catalogue. Each of the lock washers has a 10° angular offset.*

93. Case 1: A lock washer is selected

Apply three spots of Loctite 401 or equivalent to the mating face of the selected lock washer which is turned towards the tripod washer (27).

NOTE: *Loctite 401 prevents the lock washer (40) from moving when the trumpet housing is being refitted to the centre housing.*

94. Case 2: No lock washer is selected

Gently retighten the screw (24), taking care not to exceed the maximum torque of 560 Nm.

Repeat step 92.

IMPORTANT: *If required, repeat step 94 several times.*

95. Refit the trumpet housing assembly (see § B).

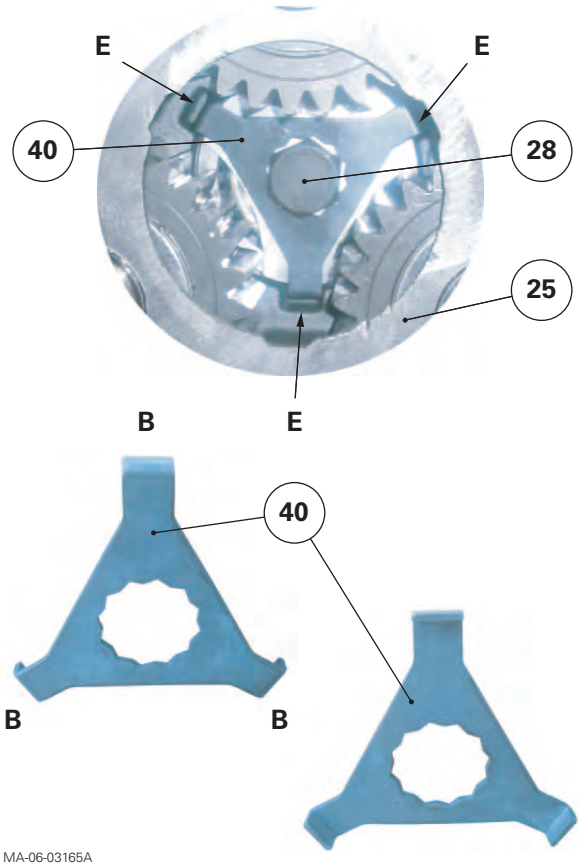


Fig. 21

F . Replacing a stud on the flanged shaft

96. Drive out the defective stud using a bronze drift and a hammer.

97. Use a brush and some solvent to clean the serration marks left by the stud on the shaft flange.

98. Dry using compressed air.

99. Apply a few drops of Loctite 270 to the new stud serration.

100. Fit the new stud over the serration marks left by the previous stud.

101. After checking that the splines are properly engaged, bring the stud head up against the inner flange of the axle shaft with a bronze drift.

GPA20 Super Heavy Duty trumpet housings

6A13 - GPA20 brake pistons

CONTENTS

GPA20 brake pistons

A . General

The brake pistons are housed in two lateral cavities of the rear axle housing, concentric with the mating face of each trumpet housing (see chapter 6).

They comprise a shouldered part and are guided by 3 locating pins force-fitted into the housing.

Sealing is ensured by two O'rings fitted in grooves of the rear axle housing. Each piston is controlled by a master cylinder provided with a tank on top whose level is maintained by a residual oil flow coming from the 17 bar valve or from the booster pump (depending on the hydraulic equipment).

Each piston acts directly on a friction disc with inserted hub, fitted to the trumpet input sun gear and a plate centred by pins and bearing on the ring gear of the final drive unit. When the brake is released, a self-adjusting device ensures a minimal clearance between the piston and the brake disc and maintains a constant pedal travel.

The brake discs are lubricated by an oil flow. This continuous flow from the lift valve (Open Centre) or from the lubricating system (Closed Centre and Twin Flow Load Sensing) is conveyed to the brake discs via a pipe and a restrictor coupling screwed onto the trumpet housing. The oil circulating between the discs and the pistons lubricates the braking surfaces when they are not in use and cools the brakes when they are being used.

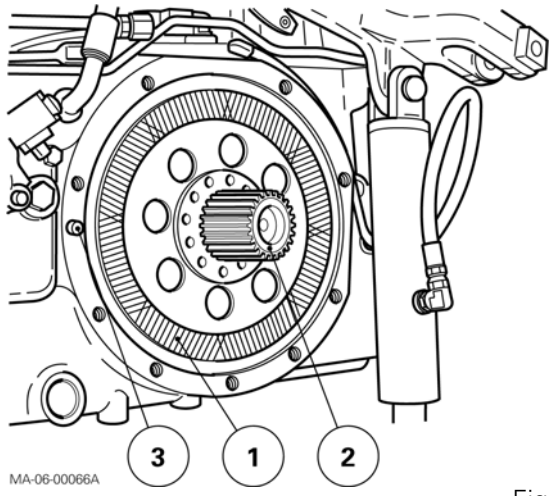


Fig. 1

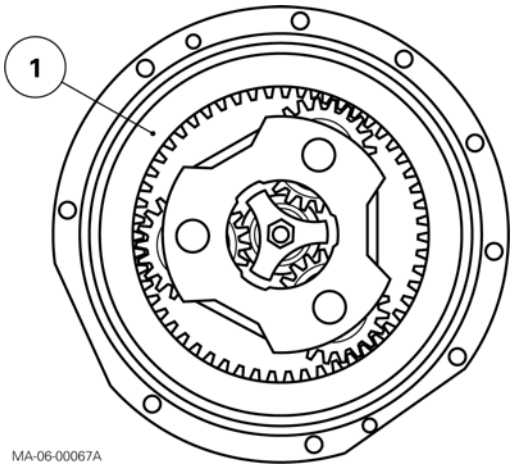


Fig. 2

B . Disassembly

1. Remove the trumpet housing (see chapter 6).
2. Remove the disc (1), the sun gear (2), and locating pin (3) (Fig. 1).
3. Remove the brake plate (1) (inside the trumpet housing) (Fig. 2).
4. Remove the screws (3) (Fig. 3) with a locally made bush.

   Take the piston (1) out of the housing with a jet of compressed air applied to the union (2) (Fig. 4).

   Note: To facilitate access to the union (2), if necessary, disconnect the 4-speed LSPTO control (if fitted) and position the union correctly.

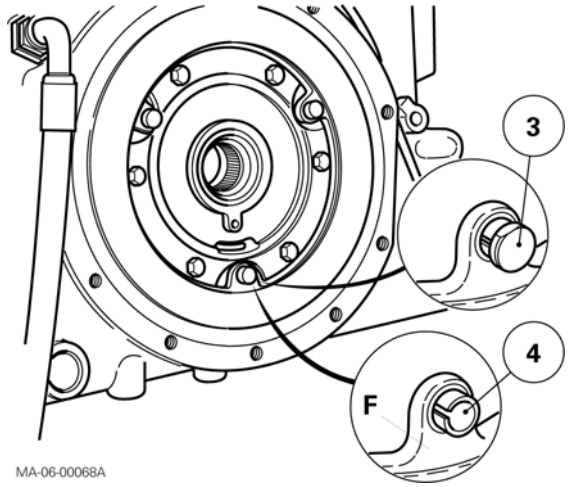


Fig. 3

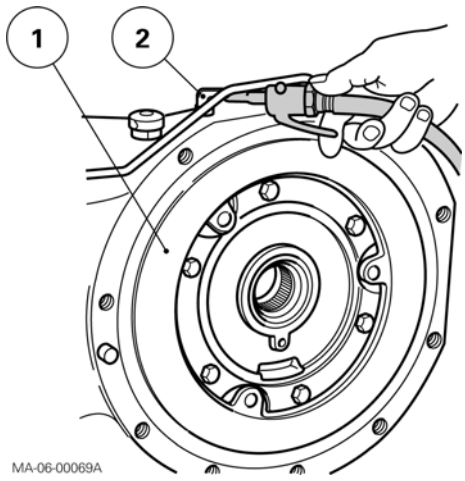


Fig. 4

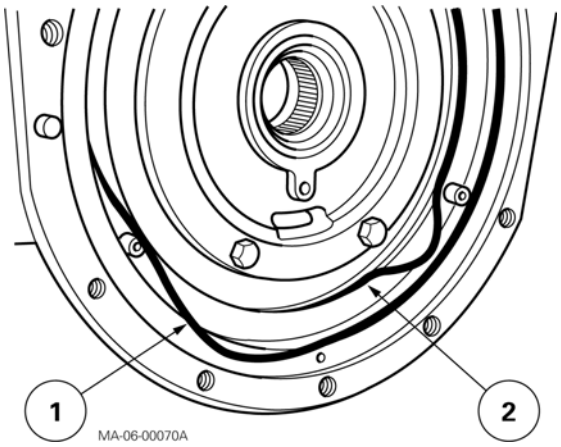


Fig. 5

5. Remove the O'rings (1) (2) on the housing and discard them (Fig. 5).

C . Reassembly

6. Check and clean all components. Replace any defective parts.

7. Fit the piston (1) without seals in the housing (2) (Fig. 6). Check that the piston slides freely in the bore in the housing and that it fits onto the locating pins (3) without any friction points. After carrying out this check, remove the piston.

8. Fit spring pins (4) about 8 mm from machined face F of the piston (Fig. 3). Fit new O'rings (1) (2) (Fig. 7) after smearing them with a moderate quantity of miscible grease so that they remain at the bottom of the groove.

9. Position the piston over the locating pins, then fit it in place using a plastic mallet, striking in alternate points around the circumference (Fig. 8).

Fit the screws (3) (Fig. 9) after lightly smearing them with Loctite 242 or equivalent and tighten them to a torque of 10 Nm with the locally made bush.

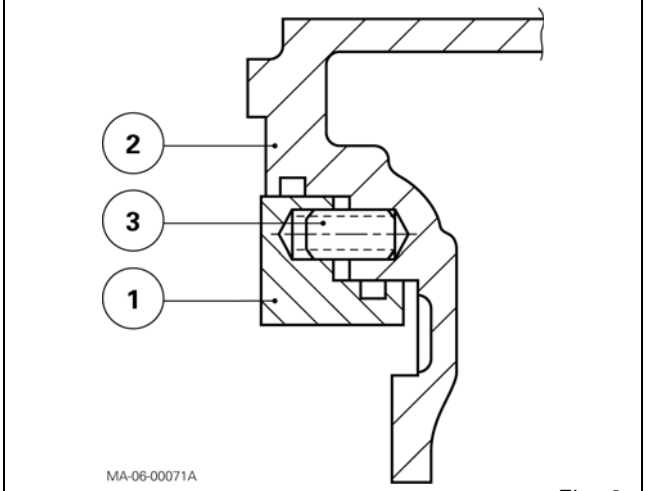


Fig. 6

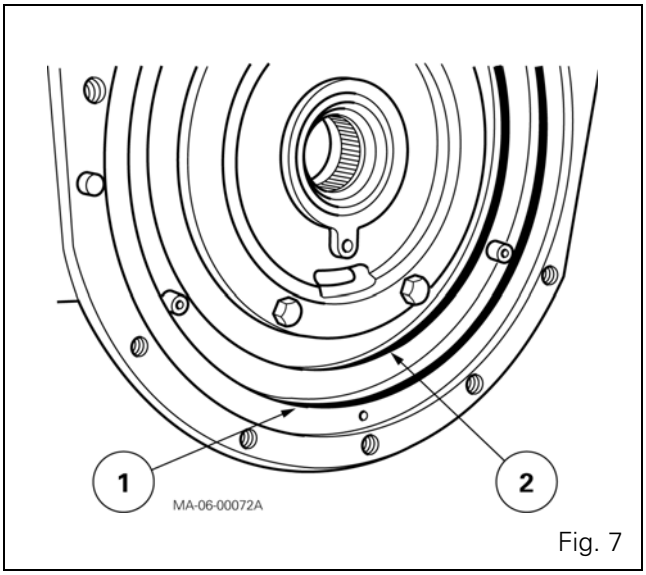


Fig. 7

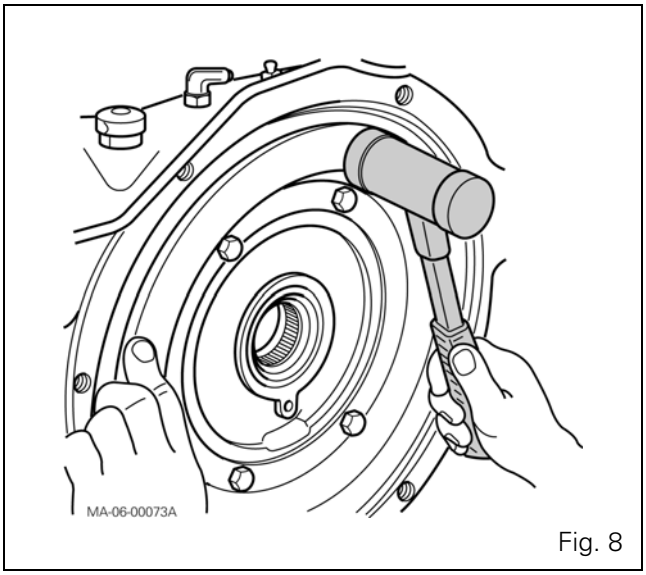


Fig. 8

Hydraulic test

Note: If work is carried out on the brake piston and O'rings, it is necessary to check for leaks.

10. Check the condition of the supply union fitted on the centre housing.

11. Fit a pressure gauge to the union (2) (Fig. 4).

12. Supply the circuit with compressed air at approx. 5 bar to ensure that the piston and O'rings are positioned correctly. Reduce pressure to 0.3 bar to carry out the test.

13. Close the pressure relief valve. For 1 minute, no reduction in pressure should be indicated at the pressure gauge.

14. Disconnect the pressure gauge. Remove the screws and the washers. Reconnect the brake hose.

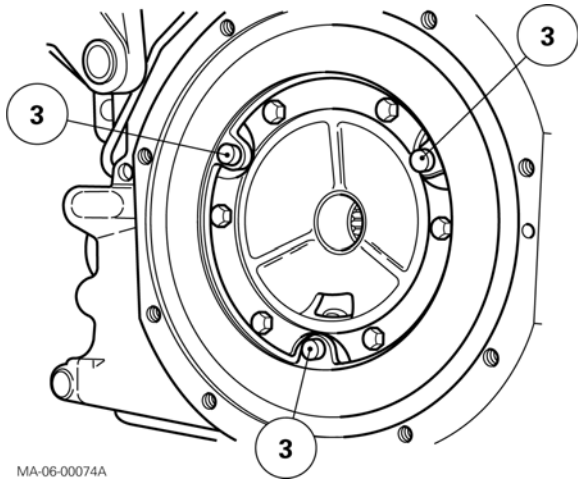


Fig. 9

Refitting the trumpet housing

15. Clean the mating faces on the rear axle housing and on the trumpet housing with a non-greasy solvent. Apply a bead of oil resistant silicone (Loctite 5910 or equivalent) to the inner edge of the centre housing (Fig. 10). Refit the sun gear (2), the disc (1), and locating pin (3) (Fig. 1).

Note: Check that the disc slides freely on the pinion gear.

16. Refit the trumpet housing (see chapter 6).

17. Bleed the main brake circuit and trailer brake circuit (if fitted) (see chapter 9).

18. Test:
- linkage
- braking on the road

19. Check for tightness:
- between the trumpet and rear axle housing
- of the lift control valve feed pipe.

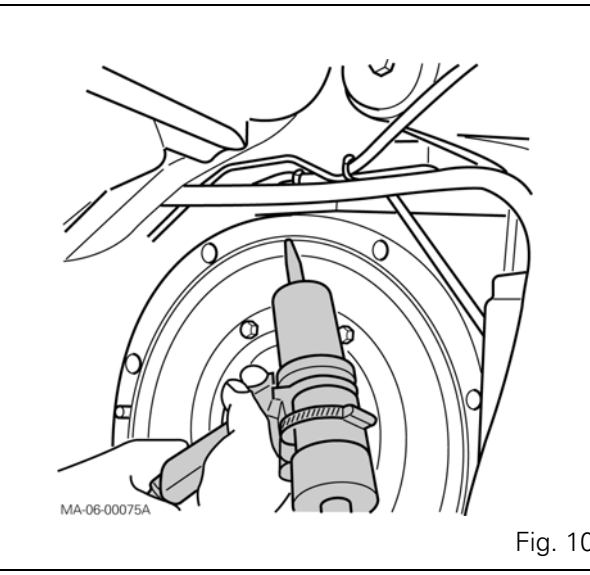


Fig. 10

6A14 - GPA20 handbrake unit and control

CONTENTS

GPA20 handbrake unit and control

A . General

The handbrake assembly is fitted on the drive pinion. It consists of a mechanism placed between three friction discs splined to the drive pinion.

The mechanism comprises two cast iron plates held by springs and separated by balls housed in ramps.

The three discs are fitted to the drive pinion as follows:
- two discs separated by an intermediate plate between the thrust plate (29) and the mechanism,
- a disc between the mechanism and the closing plate (24).

B . Operation

When the handbrake lever in the cab is pulled, the cam (14) is moved via the pin (20). The cam pushes the guide rod link (13) which causes the plates of the mechanism (31) to rotate and move apart. The discs (30) are thus compressed between the moving plates (31), the intermediate plate (34), the closing plate (24) and the thrust plate (29), preventing the drive pinion from rotating.

When the handbrake lever is released, the spring (17) moves the cam (14) to the rest position and the mechanism is closed by its springs.

Parts list

(1) Circlip
(2) Pinion
(3) Stud
(4) Nut
(5) Plate
(6) Pin
(7) Clevis
(8) Pin
(9) Cotter pin
(10) Left-hand cover
(11) Plug
(12) Seal
(13) Link
(14) Cam
(15) Circlip
(16) Finger
(17) Spring
(18) Locating pin
(19) Seal
(20) Control pin
(21) Snap ring
(22) Washer
(23) Finger
(24) Closing plate
(25) Screw
(26) Drive pinion
(27) Shim(s)
(28) Screw
(29) Thrust plate
(30) Discs
(31) Mechanism
(32) O'ring
(33) Retainer ring
(34) Intermediate plate

GPA20 handbrake unit and control

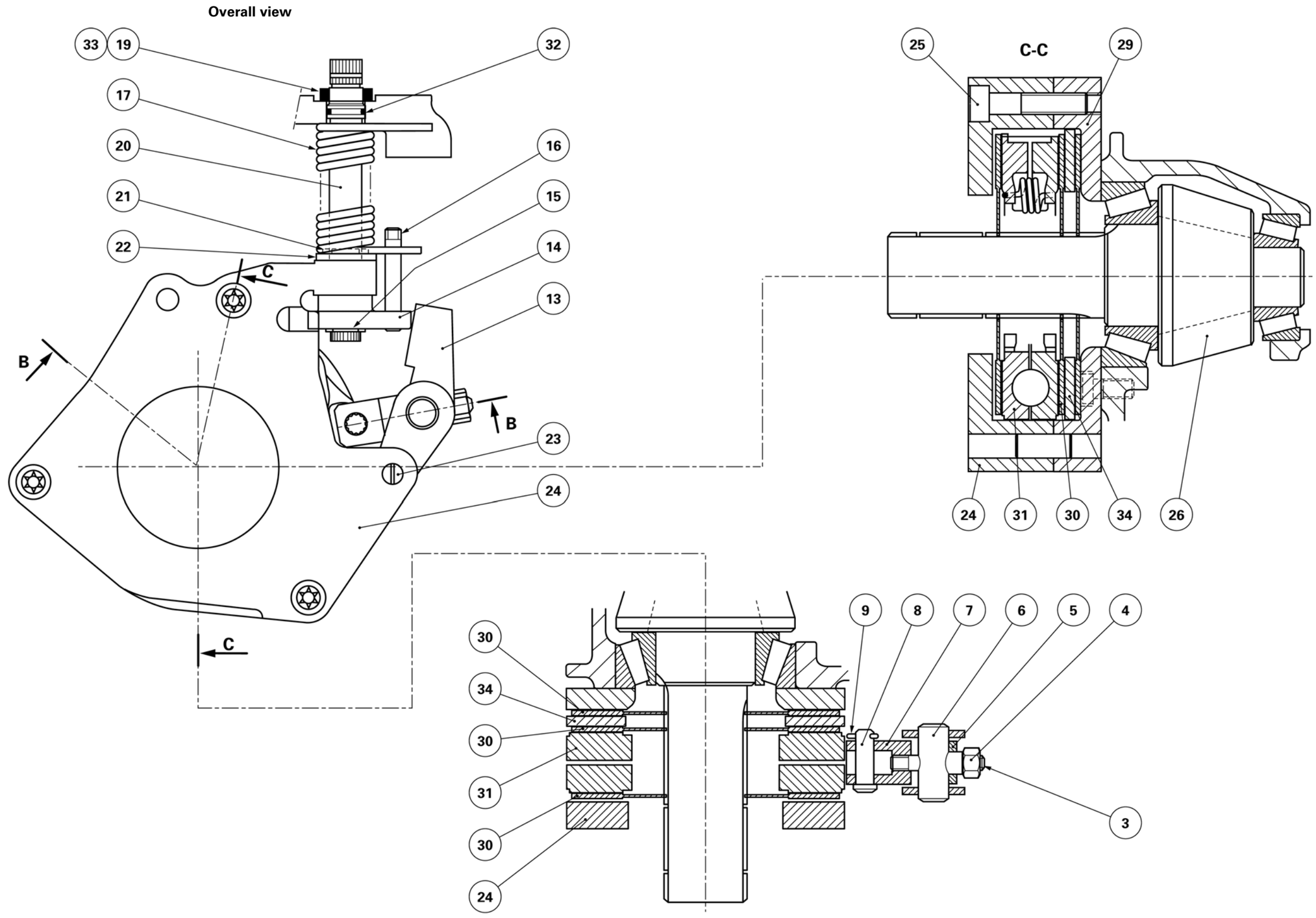

Overall view
33
19
32
17
20
16
21
15
22
14
C
13
B
B
23
24
C
C-C
25
29
24
31
30
34
26
30
34
30
31
30
24
9
8
7
6
5
4
3
B-B
MA-06-00104A

Fig. 1

Parts list

(1) Circlip
(2) Pinion
(3) Stud
(4) Nut
(5) Plate
(6) Pin
(7) Clevis
(8) Pin
(9) Cotter pin
(10) Left-hand cover
(11) Plug
(12) Seal
(13) Link
(14) Cam
(15) Circlip
(16) Finger
(17) Spring
(18) Locating pin
(19) Seal
(20) Control pin
(21) Snap ring
(22) Washer
(23) Finger
(24) Closing plate
(25) Screw
(26) Drive pinion
(27) Shim(s)
(28) Screw
(29) Thrust plate
(30) Discs
(31) Mechanism
(32) O'ring
(33) Retainer ring
(34) Intermediate plate

Exploded view - Three discs

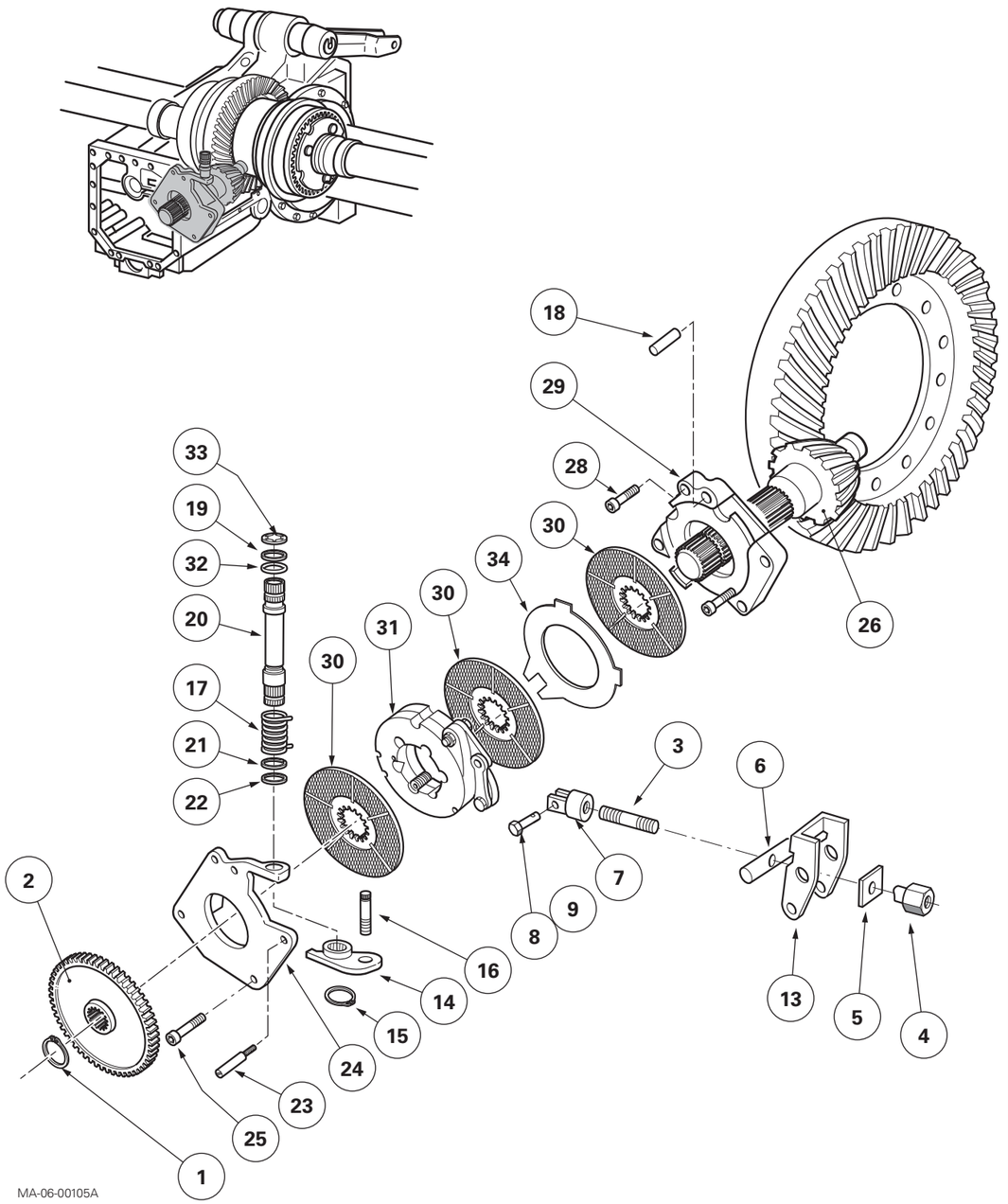


Fig. 2

C . Disassembly

Tractors with a creeper unit

Remark

Tractors with a creeper unit are equipped with the link shaft (3) (Fig. 4).

1. Drain the rear axle housing.
2. Chock:
- the front wheels of the tractor
- between the frame and the front axle (Fig. 3).

3. Raise the tractor using a jack.
4. Place stands.
5. Remove the rear wheels.
6. Remove the right-hand hydraulic cover (see chapter 9).
7. Remove the left-hand hydraulic cover (see chapter 9).
8. Remove the creeper fork.
9. Drive the double pin (4) out from the coupling sleeve (5). Slide the sleeve (5) and coupler (1) towards each other on the shaft (3) that links the drive pinion (26) and the gearbox ouptut shaft. Remove the shaft and sleeve assembly (Fig. 4).

On 4WD tractors

If the double pin is not accessible, slide the rear sleeve of the 4WD shaft forwards (link between shaft and 4WD unit). Turn the wheel shaft so as to position the shaft (3) correctly (Fig. 4).

10. Take off circlip (1) and remove the pinion (2) (if fitted).

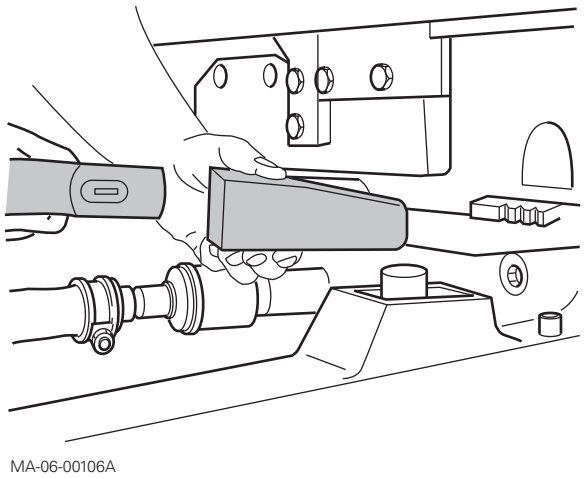

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Fig. 3

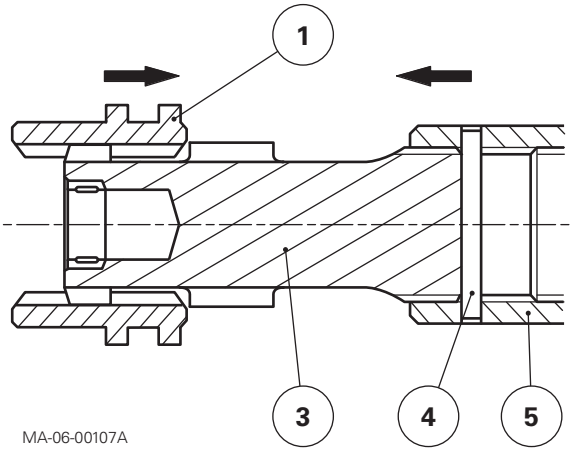

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Fig. 4

Tractors with no creeper unit

Remark

Tractors with no creeper unit are equipped with the link shaft (3) (Fig. 5).

The design of this shaft requires the tractor to be split between the gearbox and the rear axle (see chapter 2) to access the handbrake assembly.

11. Split the tractor between the gearbox and rear axle.

12. Remove the shaft (3) and sleeves (1) (5) assembly.

13. Remove the circlip (1) and pinion (2) (4WD).

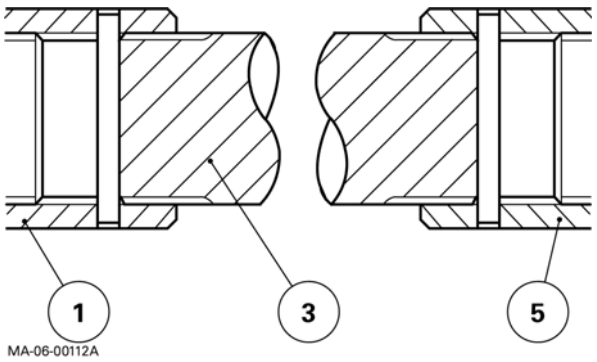


Fig. 5

Tractors with or without creeper unit

14. Take out the pin (1) and remove the control linkage (2) (Fig. 5).

15. Remove the retainer ring (33) and remove the seal (19).

16. Release the spring (17) using pliers.

17. Loosen the nut (4) to release the guide rod link (13) from the cam (14).

18. Take off circlip (15).

19. Remove the cam (14) with the finger (16).

20. Remove the closing plate (24) and the control shaft (20).

Note: Keep the mechanism (31) and the brake discs (30) rearwards. Extract the closing plate (24) (Fig. 7), tilting it to disengage it from the pin (18), finger (23) and drive pinion (26) and to release the shaft (20) from the housing.

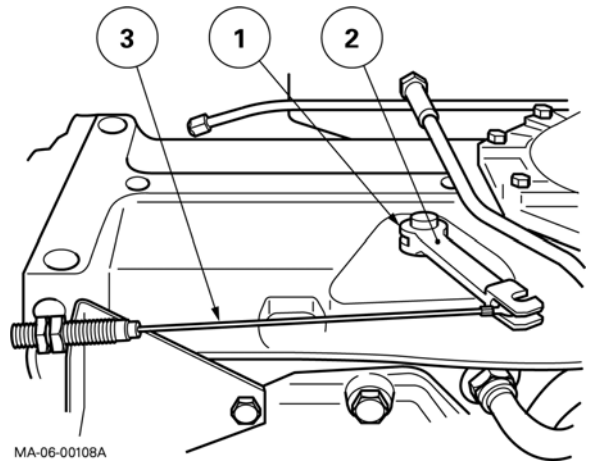


Fig. 6

21. Remove the spring (17) and the washer (22).

22. Remove the snap ring (21) (if necessary) on the control pin (20).

23. Remove the discs (30) and the mechanism (31).

If the mechanism has been replaced

24. Unscrew the nut (4), remove the plate (5) and the pin (6).

25. Take out the pin (9), remove the pin (8) and the clevis (7).

Note: The stud (3) is smeared with Loctite 270 or equivalent and locked in the clevis (7).

If replacement of the thrust plate (29) is necessary

26. Remove two diametrically opposed screws (28) and screw in two guide studs A (Fig. 8). The purpose of this operation is to hold the shims (27) (Fig. 9).

27. Loosen the two remaining screws.

28. Remove the thrust plate.

Note: Check that the shims have all remained on the housing.

The finger (16) smeared with Loctite 270 or equivalent is screwed into the cam (14). The finger (23) smeared with Loctite 270 is screwed into the thrust plate (29).

The locating pin (18) is fitted fully home on the shoulder of the closing plate (24).

D . Reassembly

29. Check and clean all components. Replace any defective parts.

If the thrust plate (29) has been replaced

30. Refit the plate.

31. Smear two screws (28) with Loctite 270 or equivalent then tighten to a torque of 90 - 120 Nm.

32. Remove the two guide studs.

33. Smear the two other screws (28) with Loctite 270 or equivalent then tighten to a torque of 90 - 120 Nm.

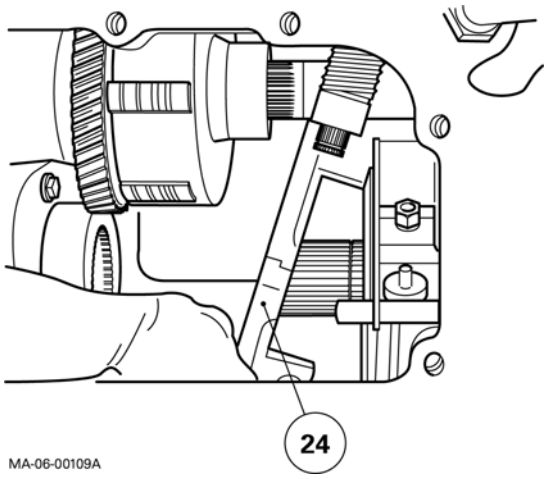


Fig. 7

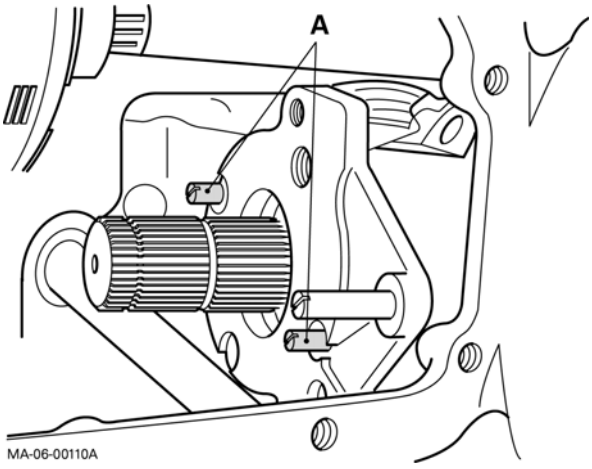


Fig. 8

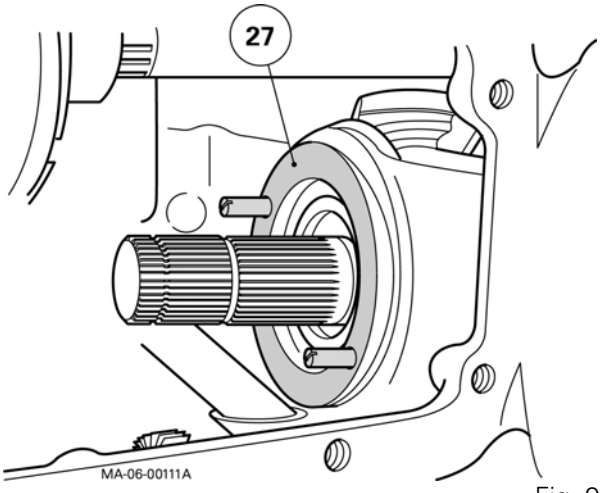


Fig. 9

If the mechanism has been replaced

34. Refit the clevis (7) prepared with the stud (3) and the pin (8). Replace the pin (9).

35. Fit the guide rod link (13) with its pin (6) on the stud (3) of the clevis.

36. Refit the plate (5), tighten the nut (4).

Note: The plate (5) is rectangular. It must be positioned horizontally so that the pin (6) fits correctly on the link (13) (Fig. 10).

37. Refit the discs (30), inserting the mechanism (31) between them.

Note: Fit the guide rod link (13) on the finger (23). Check that the discs slide freely on the shaft of the drive pinion (26).

38. Place the snap ring (21) (if removed) on the pin (20).

39. Fit the pin (20) in the closing plate (24) with the washer (22), the spring (17) and the seal (32).

40. Carry out operation 22 in reverse order.

41. Check that the discs (30) and the mechanism (31) are correctly positioned.

42. Fit and tighten the screws (25) to a torque of 90 - 120 Nm.

43. Fit the cam (14) with its finger (16).

44. Place circlip (15). Tension the spring (17), positioning its ends E as indicated in Fig. 11.

45. Lightly smear the pin (20) with AS 767 Anti-Seize grease or equivalent. Fit the seal (19) on the housing and compress it to 5.8 ± 0.15 mm using a retainer ring (33) (Fig. 12).

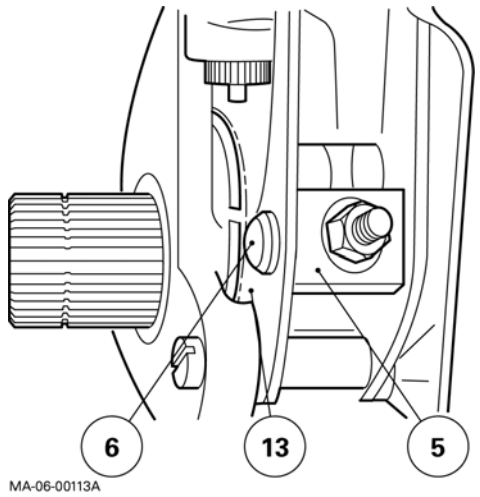


Fig. 10

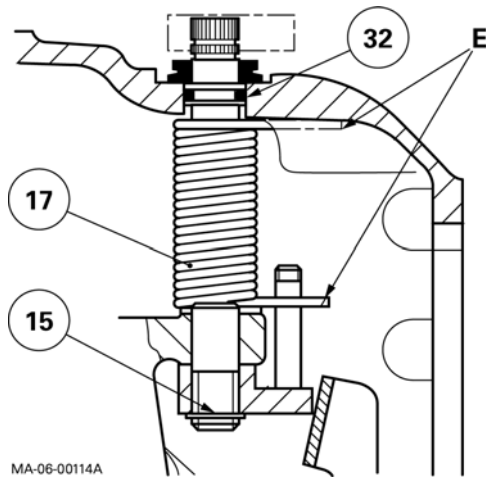


Fig. 11

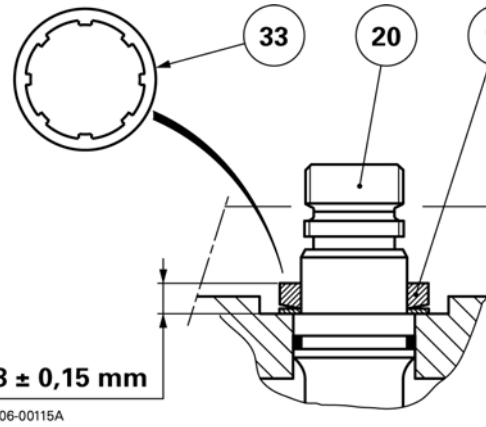


Fig. 12

Tractors with a creeper unit

46. Refit the pinion (2) (if fitted).

47. Position the circlip (1).

48. Refit the sleeve assembly (link shaft and coupler) and the creeper unit fork. Turn the groove of the sleeve towards the drive pinion. Replace the double pin. Adjust the fork (see chapter 5).

4WD tractor

If uncoupled, reposition the 4WD shaft link sleeve with the 4WD unit.

Tractors with no creeper unit

49. Refit the pinion (2) (if fitted).

50. Position the circlip (1).

51. Refit the sleeves / link shaft assembly. Turn the groove of the sleeve towards the drive pinion and towards the gearbox. Replace the pins. Couple the gearbox and rear axle (see chapter 2).

Tractors with or without creeper unit

52. Refit the left-hand cover (see chapter 9).

53. Position the guide rod link (2) (Fig. 13) with the cam (14) in contact with the guide rod link (13) to obtain a distance of 315 mm ± 12 mm between the cable fastening axis and the support (3). Fit the pin (1) (Fig. 13).

54. Adjust the mechanism (31) using the adjusting nut (4) so that cam (14) movement from rest position "A" to maximum position "B" is 60° (Fig. 13) or turn nut (4) to obtain a functional clearance of 0.5 mm to 0.6 mm, inserting a laminated shim between the discs (30) and the mechanism (31) (Fig. 13).

Note: the adjusting nut (4) is accessed via the plug port (11) on the left-hand cover (10).

Open Centre Fig. 14

Closed Centre Fig. 15

Twin Flow Load Sensing Closed Centre Fig. 16

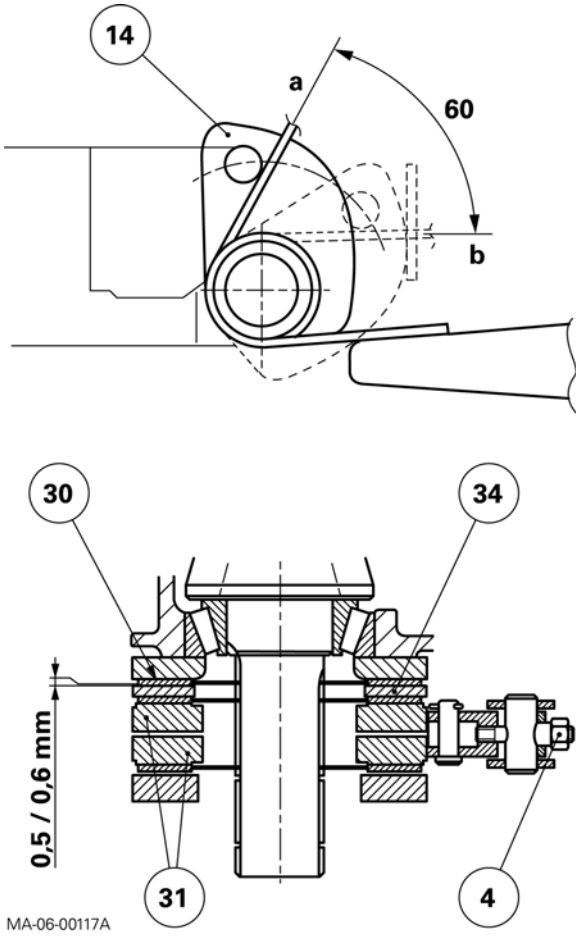


Fig. 13

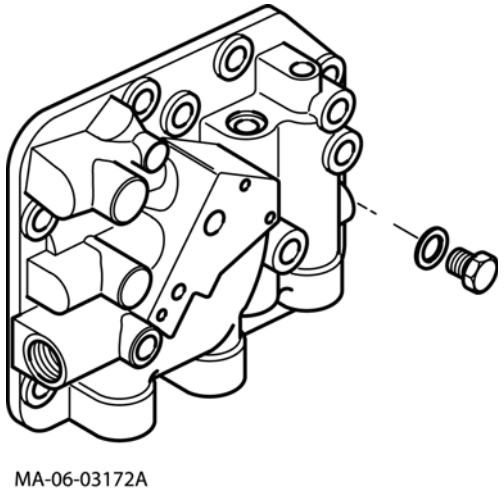


Fig. 14

55. Reconnect the control.

56. Adjust the handbrake control.

Carry out operations 71 to 73.

If the rear of the cab is raised, carry out operation 14 in reverse order. Fit the spacers. Position the cab. Tighten the nuts to a torque of 27 - 35 Nm and the locknuts smeared with Loctite 270 to 13 - 20 Nm.

57. Refit the right-hand hydraulic cover.

58. Raise the tractor using a jack.

59. Refit the wheels.

60. Remove the stands and the jack.

61. Tighten the wheel nuts to a torque of 400 - 450 Nm.

62. Remove the chocks at the front of the tractor and between the engine frame and the front axle.

63. Top up the rear axle housing oil level.

64. Check the operation of the electrical circuits, of the low pressure switch, of the solenoids, of the filter switch and of the clogging indicator.

65. Check the operation of the linkage and handbrake.

66. Check the mating faces, covers and hydraulic unions for leaks.

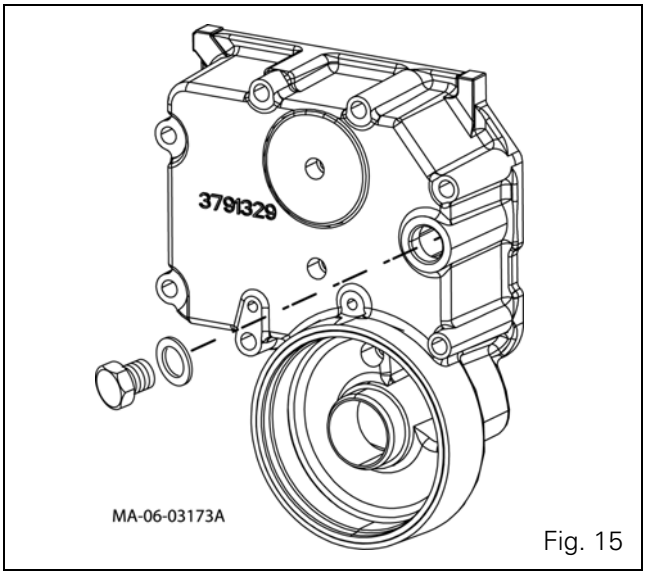


Fig. 15

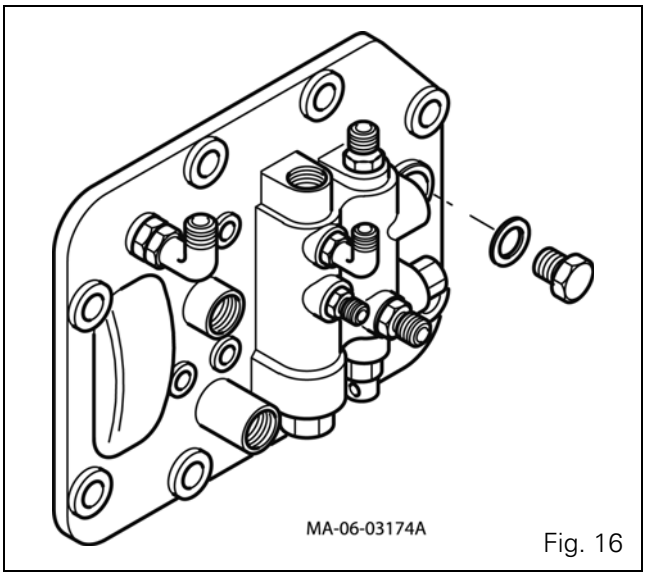


Fig. 16

E . Assembling and adjusting the control

67. Introduce the cable (1) from below towards the cab interior and fasten with the clip (2) (Fig. 17).

68. Fix the clevis (7) on the brake lever (4) with the pin (5), the washer (6) and the pin (3) (Fig. 17).

Note: Check that the cable is not pinched.

69. Fit the sheath end (2) in the clamp (1) (Fig. 17).

70. Attach the end of the cable (7) to the lever (6) (Fig. 17).

71. Place the handbrake lever in the released position. Adjust imperatively to obtain a distance of 315 mm ± 12 mm between the nut (5) and the cable end pin (7) (Fig. 17).

72. Tighten the locknut (3) on the washer (4) (Fig. 17).

Note: For correct alignment and movement of the sheath end (2) and cable (7), the nut (5) and locknut (3) are fitted in front of the bracket (1) (Fig. 18).

73. Check the operation of the control.

- Tighten the lever. Initial braking travel should be approximately 8 notches. The indicator light on the instrument panel should come on and the buzzer ring if a gear is engaged.
- Release the lever. The control must return freely to the rest position. In this position, the buzzer and the indicator light on the instrument panel should switch off.

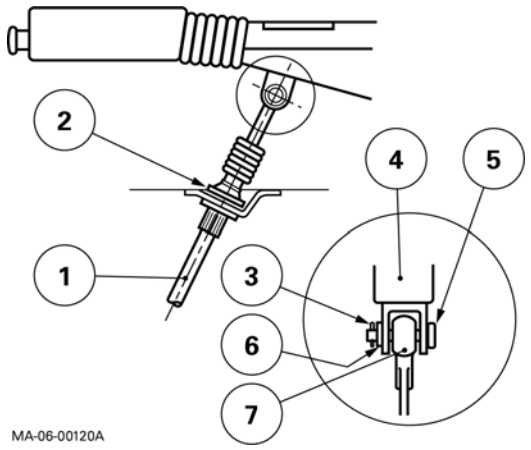


Fig. 17

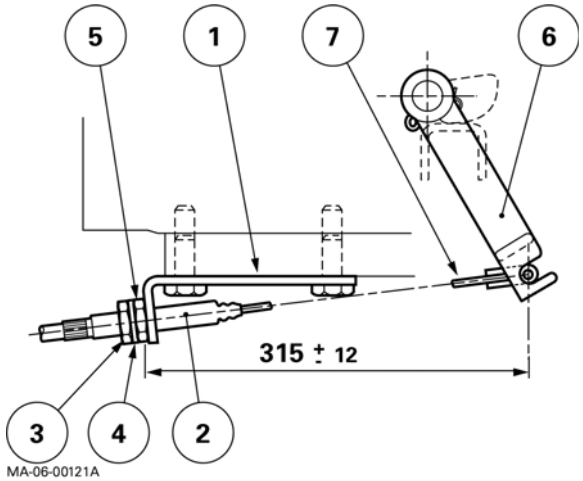


Fig. 18

6A15 - GPA20 differential

CONTENTS

GPA20 differential

A . General

The bevel gear rotation is provided by the output shaft of the gearbox and drives the rear axle.

The helical drive pinion is supported on either side of its teeth by two taper roller bearings fitted in opposition. The lubrication of the bearings (30) (37) is provided by a flow of transmission oil from the top PTO cover located at the rear of the tractor (see chapter 7).

The bearing cones are force fitted on the drive pinion and the rear cup, smeared with Loctite 603, is also force fitted into the rear axle housing. The front cup is free in its bore to allow for shimming of the drive pinion.

The ring gear is fixed to the differential unit by rivets. The differential assembly turns on two taper roller bearings supported by two lateral flanges centred by rings and screwed to the rear axle housing.

The differential assembly is formed by two half units holding four pinion gears and two sun gears.

The drive pinion is fitted in the rear axle housing.

On tractors, the bevel gear distance is adjusted by shim(s) fitted between the centre housing and bearing cup (37).

The pre-loading of the taper roller bearings (31) (33) and (30) (37) is obtained by shim(s) placed between the handbrake plate and the centre housing.

The pre-load shimming of the differential assembly is carried out by deflectors of different thicknesses placed behind the left-hand bearing cup (14). If needed, an additional shim (49) can be fitted between flange (9) and the deflector.

Differential lock

The left-hand flange contains the differential lock mechanism.

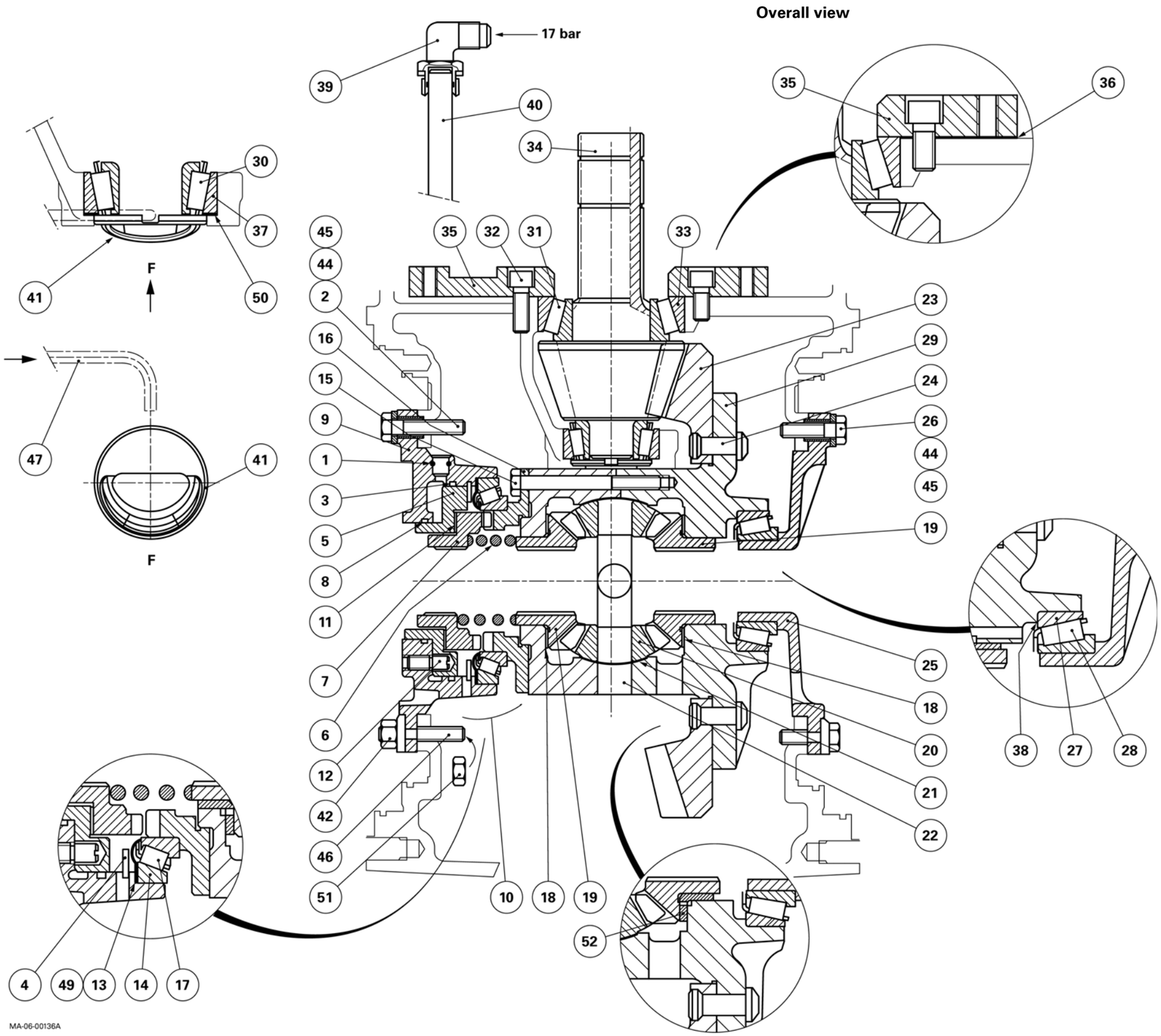
The system consists of a piston and a mobile coupler integral via splines with the input sun gear in the left-hand trumpet housing. The piston acts upon the mobile coupler when the pressure of the 17 bar hydraulic circuit supplies the solenoid valve fitted on the right-hand side cover. The piston (5) moves and pushes against the mobile coupler (7), compressing the spring (6).

The teeth of the mobile coupler engage with a fixed coupler (16) that is integral with the differential unit. In this position, the input sun gears of the left- and right-hand side trumpet housings turn at the same speed. When the pressure is released, the mobile coupler is forced backwards by the spring.

GPA20 differential

Parts list

(1) O'ring
(2) Screw
(3) O'ring
(4) Circlip
(5) Piston
(6) Spring
(7) Mobile coupler
(8) O'ring
(9) Left-hand flange
(10) Differential lock hydraulic assembly
(11) Friction washer
(12) Finger
(13) Deflector
(14) Bearing cup
(15) Screw
(16) Fixed coupler
(17) Bearing cone
(18) Washer
(19) Sun gear
(20) Pinion gear
(21) Washer
(22) Spider
(23) Ring gear
(24) Rivets
(25) Right-hand flange
(26) Screw
(27) Bearing cup
(28) Bearing cone
(29) Unit
(30) Bearing cone
(31) Bearing cone
(32) Screw
(33) Bearing cup
(34) Drive pinion
(35) Thrust plate
(36) Shim(s)
(37) Cup
(38) Shim(s)
(39) Union
(40) Differential lock supply pipe
(41)(1) Oil slave device
(42) Locking nut (differential support)
(44) Washer
(45) Locating ring (differential support)
(46) Stud
(47) Pipe
(48) Union
(49) Shim(s)
(50) Shim(s)
(51) Nut (holds lubricating pipe)
(52) Rings (GPA20 ≥ 125 ch)



GPA20 ≥ 125 ch assembly

Fig. 1

Exploded view

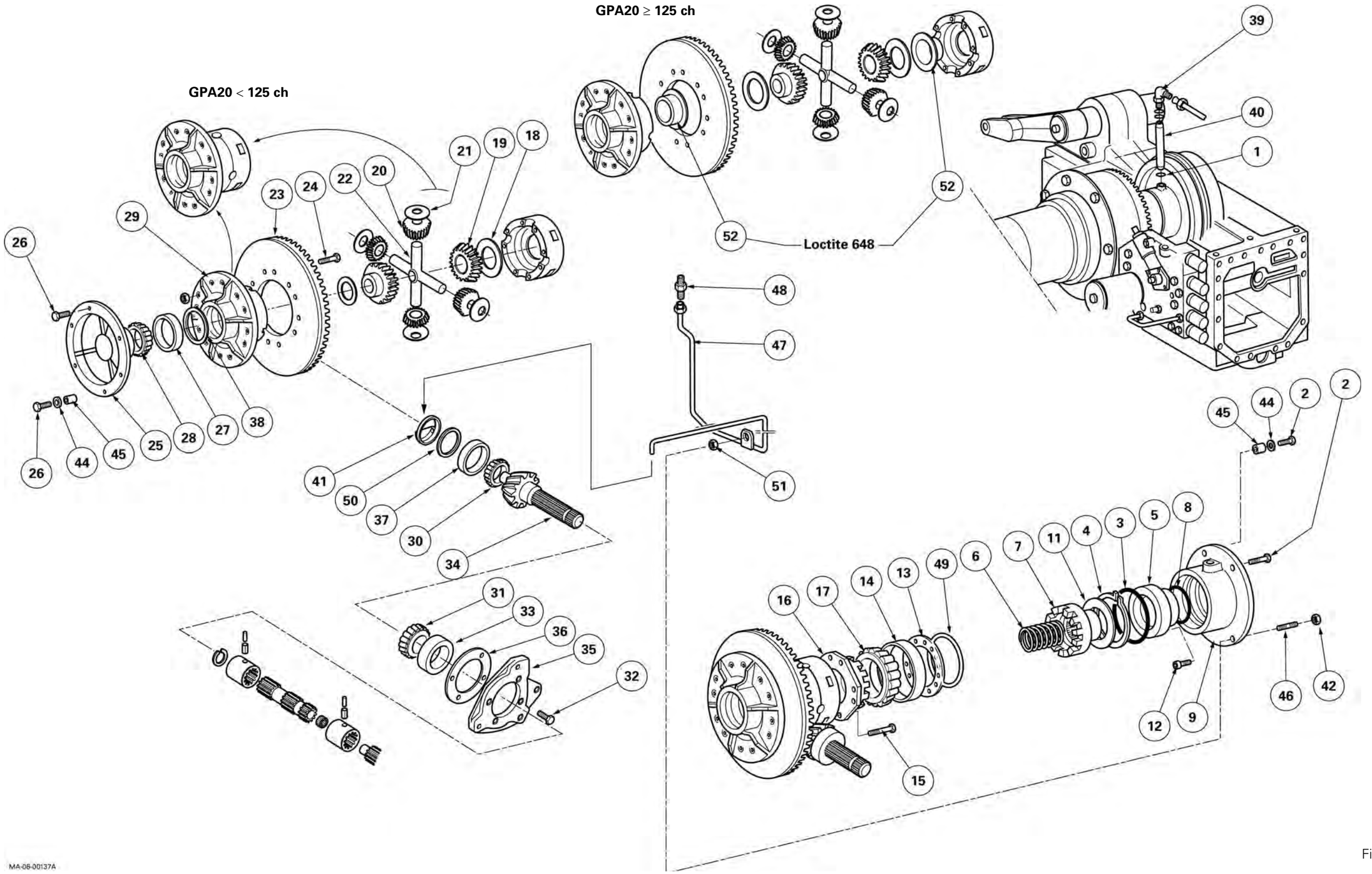


Fig. 2

A . Removing the left-hand flange and differential lock assembly

Note: It is possible to carry out maintenance on the differential lock hydraulic assembly (10) by removing only the left-hand trumpet housing.

1. Remove the left-hand trumpet housing (see chapter 6).

2. Disconnect the supply pipe (2), unscrew the union (39) and take out the pipe (40) (Fig. 1).

Remark

- If access to the union (39) is difficult on tractors fitted with 4-speed LSPTO, remove the control (1) (Fig. 1).

3. Remove the brake piston (see chapter 6).

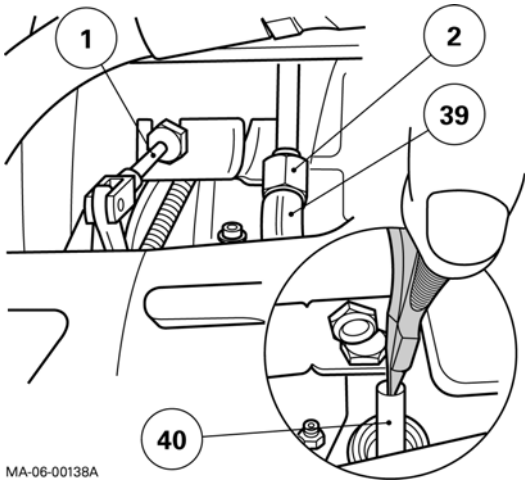


Fig. 1

Special points

Function of screw (2) and stud (46)

- Screw (2) (Fig. 2)
  - it contributes to holding the left-hand flange (9)
  - it holds the auxiliary spool valve oil return pipe (Open Centre and Closed Centre hydraulics) located inside the centre housing, by means of locknut (3) screwed to its end (Fig. 2).

  Remarks

  - To access nut (3) (Fig. 2), remove the auxiliary spool valve support and operate through the opening created.
  - If this operation has to be carried out on a tractor fitted with a 4-speed LSPTO, it is necessary to also remove the hitch support (see chapter 6) and the top PTO cover located at the rear of the tractor, the double pinion and control fork.
- Stud (46) (Fig. 2)
  - it also holds the left-hand flange (9) via nut (42),
  - it supports pipe (47) coming from the driving pinions on the PTO line. This pipe ensures lubrication of the pilot bearing located at the end of the drive pinion.

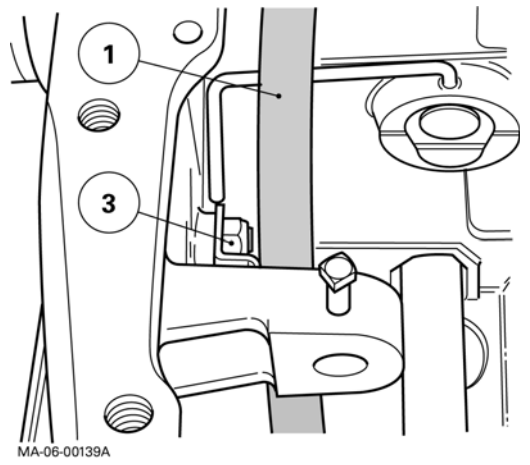


Fig. 2

Removal

4. Remove flange (9) and locating ring (45), and if necessary, friction washer (11), mobile coupler (7) and the spring.

B . Disassembling and reassembling the differential lock assembly

Disassembly

5. Take out cup (14), deflector (13) and shim (49) (if fitted).

Note: Carefully note the direction of assembly of the deflector and the location of the shim (49).

6. Take off circlip (4).

7. Drive out the piston (5) using a compressed air jet (Fig. 3).

8. Take off the O'rings (3) (8) (1).

9. Unscrew finger (12) (if necessary).

Reassembly

10. Check the components and replace any found to be defective.

11. Clean finger (12), smear it with Loctite 542, then fit it and tighten it on flange (9).

12. Smear the O'rings (3) (8) with miscible grease (Amber Technical or equivalent), and fit them home correctly into their respective grooves.

13. Using a plastic hammer, insert the piston (5) into the flange (9) (Fig. 4) while respecting the location of the finger (12).

14. Fit circlip (4), shim (49) (Fig. 2) (if necessary), and deflector (13), respecting its assembly direction, and cup (14) (Fig. 5).

Special point

- The shim (49) (if used) **must** be placed between flange (9) and deflector (13).

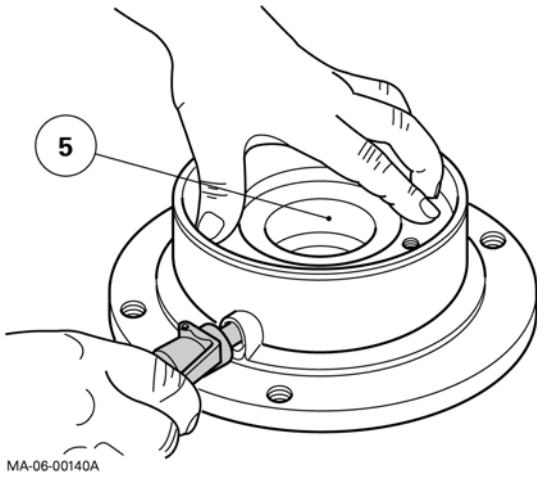


Fig. 3

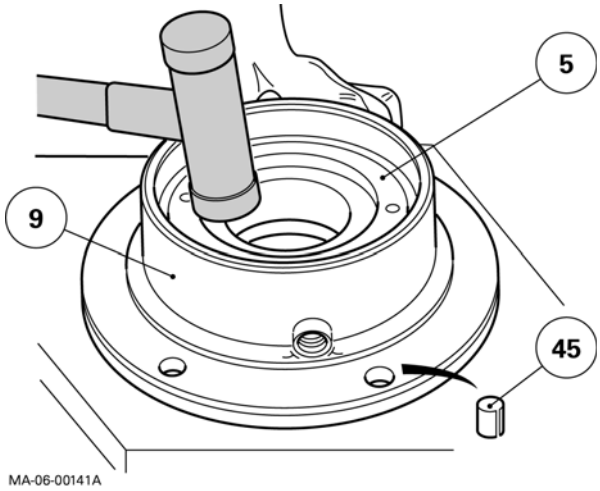


Fig. 4

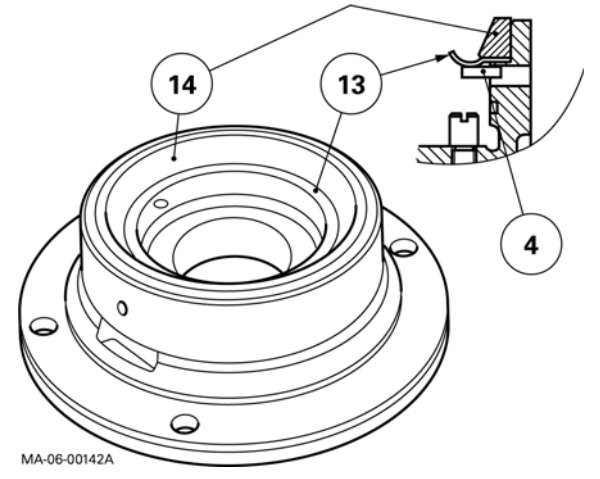


Fig. 5

C . Refitting the left-hand flange and the differential lock assembly

15. Fit the O'ring (1).

16. Assemble washer (11), mobile coupler (7) and spring (6).

17. Refit the assembly in the left-hand flange (9).

Flange fitting method (9) (Fig. 6)

18. Screw two guide studs "G" (L = 60 mm approx.) to the centre housing (Fig. 6).

Check for the presence of the ring (45) (Fig. 7). Position the flange assembly (9) turning it so that the oil passage is at the bottom.

Fit washer (44). Tighten alternately and uniformly the screw (2) and nut (42) to a torque of 85 - 100 Nm.

Reminder : See special points § A.

Replace the guide studs with two other screws and tighten them to the previously indicated torque.

19. Fit pipe (40) and union (39) (Fig. 1).

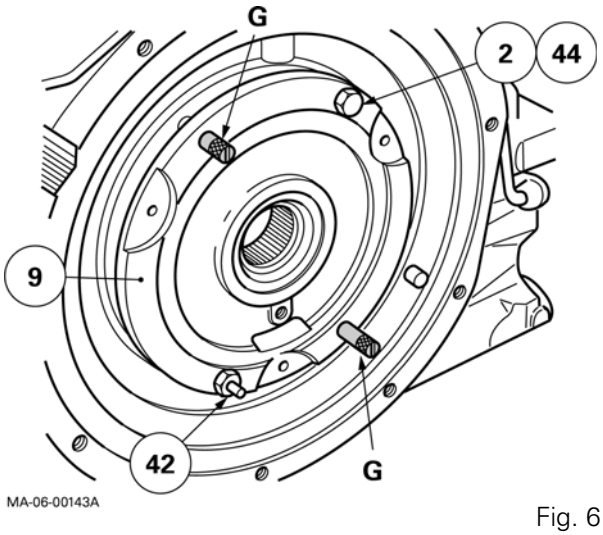


Fig. 6

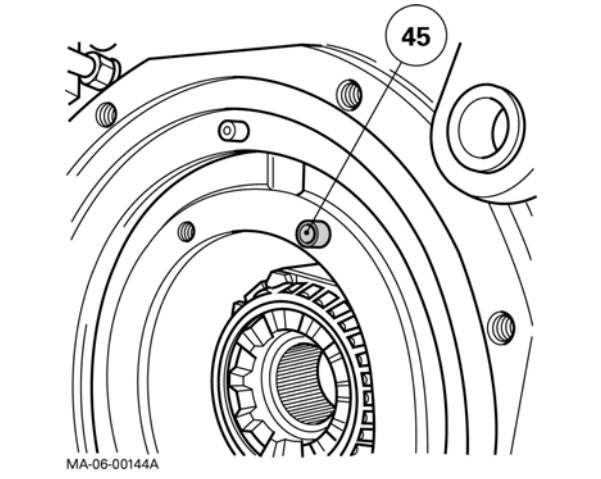


Fig. 7

Hydraulic test

If servicing has been carried out on piston (5), seals (3) (8), or flange (9), it is necessary to check the tightness of the assembly.

20. Fit a pressure gauge that has been previously tested for air tightness to the supply union (39) (Fig. 8).

21. Supply the circuit with compressed air at approximately 5 bar so as to correctly place the piston and O'rings in the left-hand flange (9).

Redue the pressure to 0.3 bar and carry out the tightness test.

22. Close the valve. For approximately 1 minute, no drop in pressure must be observed on the pressure gauge.

23. Disconnect the pressure gauge and reconnect the supply pipe (2) (Fig. 1).

If disassembled:

- reconnect the 4-speed LSPTO control and set the control (see chapter 7).

Refit the brake piston (see chapter 6).

24. Refit the left-hand trumpet housing (see chapter 6).

25. Start the engine.

Check the oil tightness of the supply pipe (2) (Fig. 1) and the correct operation of the differential lock.

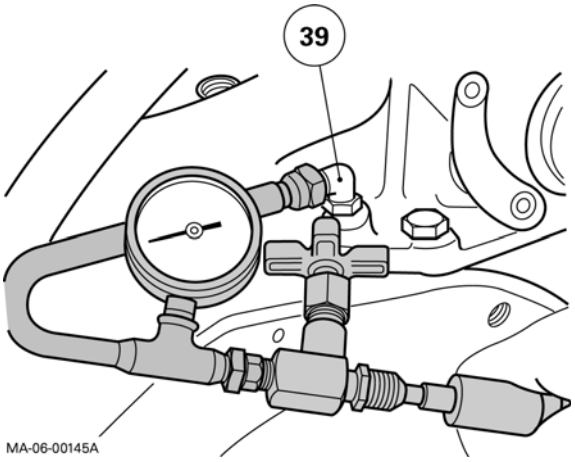


Fig. 8

D . Removing the differential assembly

Preliminary operations

26. Split the tractor between the gearbox and the rear axle (the cab remains integral with the gearbox) (Fig. 9).

27. Remove the wheels.

28. Separate the left- and right-hand trumpet housings from the centre housing (see chapter 6).

29. Remove the lift cover (see chapter 6).

30. Remove the hook support. Remove the top cover from the power take off, the driving pinion and the layshaft.

31. Take off the pipe (40) (Fig. 10).

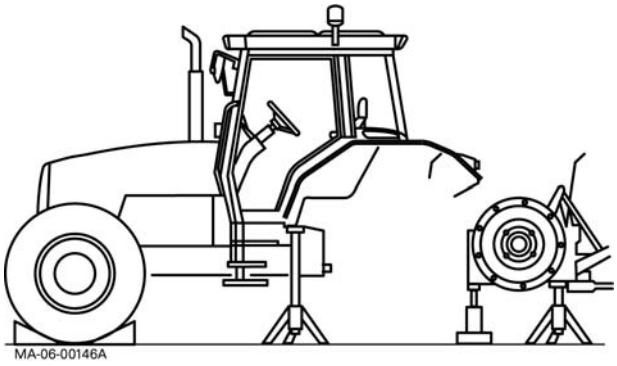


Fig. 9

Removal

32. Remove the brake pistons (see chapter 6).

33. Carefully place a sling on the differential assembly using a clamp (Fig. 11).

34. Before working on the screws (2) and the nut (42), consult special points § A. Loosen the screws (2) and nut (42) alternately to gradually release the spring (6).

35. Remove the flange (9), spring (6), coupler (7) and washer (11).

36. Take out the screws (26).

37. Take off the flange (25).

38. Take out the differential assembly from the centre housing (Fig. 11).

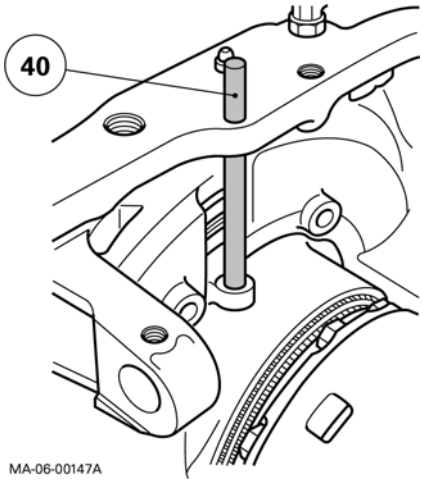


Fig. 10

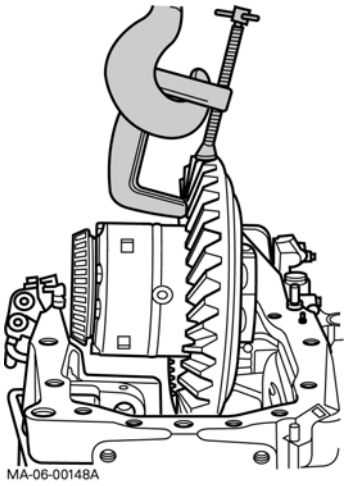


Fig. 11

E . Disassembling the differential assembly and the ring gear

Disassembling the differential assembly

39. Place the differential assembly on a workbench.

40. Extract the cones (17) (28) and cup (27), recover shim(s) (38).

41. Mark the location of the two half-housings (29) with paint lines at corresponding points. Take out the screws (15).

42. Remove the fixed coupler (16).

43. Separate the two half-housings (29).

Note: These components both bear the same number. They must always be fitted as pairs.

44. Remove washers (18), sun gears (19), pinion gears (20), washers (21) and spider (22) (Fig. 12).

Note: The replacement of the ring gear automatically requires replacement of the drive pinion. These components both bear the same number. They must always be fitted as pairs. In the factory, the ring gear and unit are assembled using rivets. During repairs, these rivets are replaced by nuts and screws.

Disassembling the ring gear (23)

45. Remove the ring gear from the unit.

46. Centre punch each rivet (24) (on toothed side of ring gear).

47. Using a 5 mm drill, drill out the rivets to a depth of 10 mm (Fig. 13).

48. Carry out a second drilling operation with a 12 mm drill to the same depth.

49. Drive out the rivets using a suitable drift punch (Fig. 14).

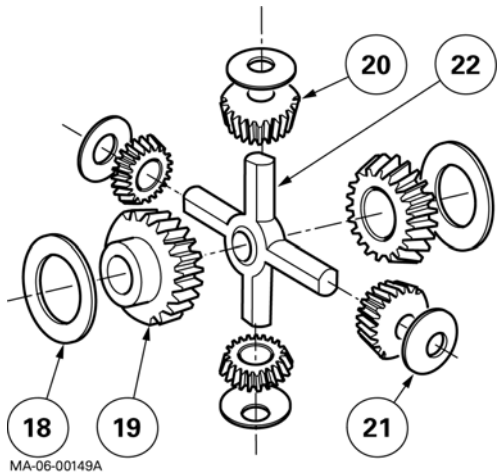


Fig. 12

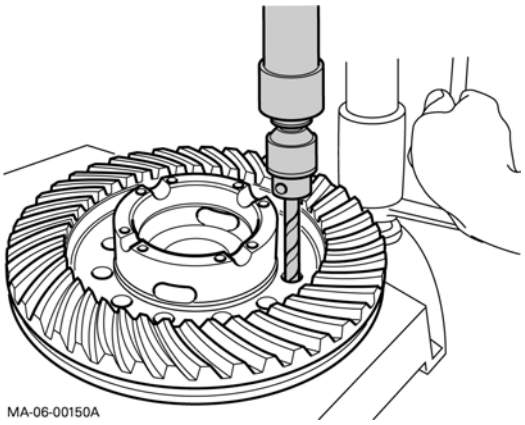


Fig. 13

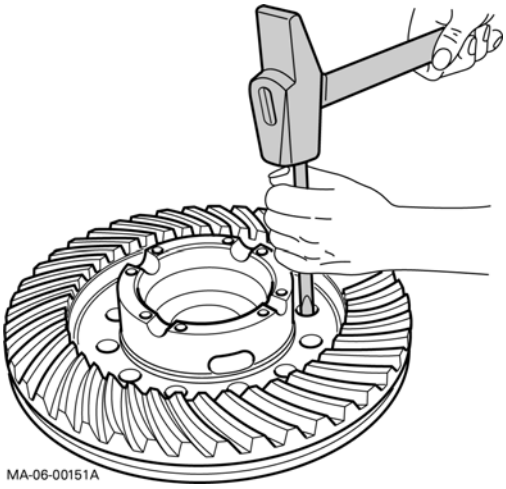


Fig. 14

F . Removing and disassembling the drive pinion

50. Disconnect the clogging indicator. Remove the 15 micron main filter with its support and the right-hand hydraulic cover (see chapter 9).

51. Remove the left-hand cover (see chapter 9).

52. Take off the circlip (1) (Fig. 15).

53. Remove the pinion (2) (if fitted) (Fig. 15).

54. Remove the handbrake mechanism assembly (see chapter 6).

Removing the drive pinion

55. Remove screws (32), thrust plate (35) and shims (36).

56. Remove the bearing cup (33) and the drive pinion complete with cones (30) (31).

57. Remove lubricating pipe (47). Remove and discard the oil slave device (41) (Fig. 17), extract cup (37) and recover the shim(s) (50).

Disassembling the drive pinion

58. Extract the bearing cones (30) (31).

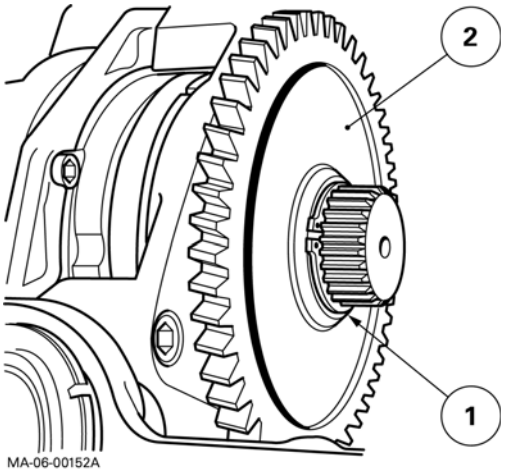


Fig. 15

G . Reassembling the ring gear and differential assembly

Refitting the ring gear

59. Check that the ring gear and drive pinion display the same serial number.

60. Clean the mating faces of the new ring gear (23) and unit (29), the nuts and the screws referenced in the spare parts catalogue.

61. Smear the first threads of the screws (1) (Fig. 16) with Loctite 270 and place them in the ring gear and unit.

62. Tighten and lock the nuts (2) (Fig. 16) to a torque of 150 - 160 Nm.

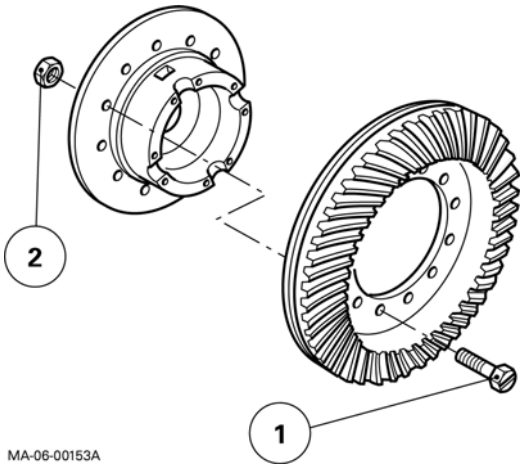


Fig. 16

Reassembling the differential assembly

63. Check the components and replace any found to be defective.

64. Reassemble the differential assembly. Carry out operations 42 to 44 in reverse order.

65. Smear the screws (15) with Loctite 270 then tighten to a torque of 85 - 130 Nm.

Note: The clearance J1 between the pinion gears and sun gears must be from 0.08 mm to 0.30 mm.

66. Insert bearing cones (17) (28) respectively in the bottom of the shoulder of the fixed coupler (16) and the left-hand flange (25), using a press and a suitable fixture.

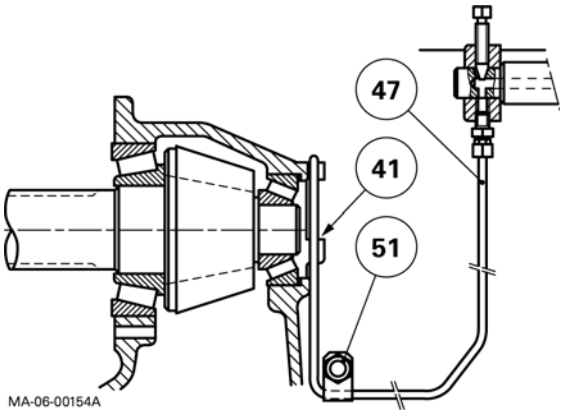


Fig. 17

Special point

- Place shim(s) (38) in the half-housing (29) to preset the backlash and then insert bearing cup (27) (see § J).

H . Adjusting the bevel gear distance, refitting and shimming the drive pinion

Preparation

67. Check the components and replace any defective parts.

68. Using a press and an appropriate fixture, insert cone (30) at the bottom of the shoulder on the drive pinion.

Reminders

- The bevel gear distance **must** be adjusted before the pre-load shimming of the drive pinion bearings.
- The thickness of shim(s) E (50) (Fig. 18) necessary to position the drive pinion is calculated using the following formula:

  E = Z + T - (X + Y)

  E = 184.955 + T - (X +90.520).

  when:

  Z: Nominal drive pinion dimension = 184.955 mm

  T: Correction of the nominal dimension engraved on the end of the drive pinion; this may be a positive or negative value.

  X: Dimension of the centre housing stamped on the rear right-hand side of the housing, behind the lift ram.

  Y: Dimension of the drive pinion with bearing = 90.520 mm.

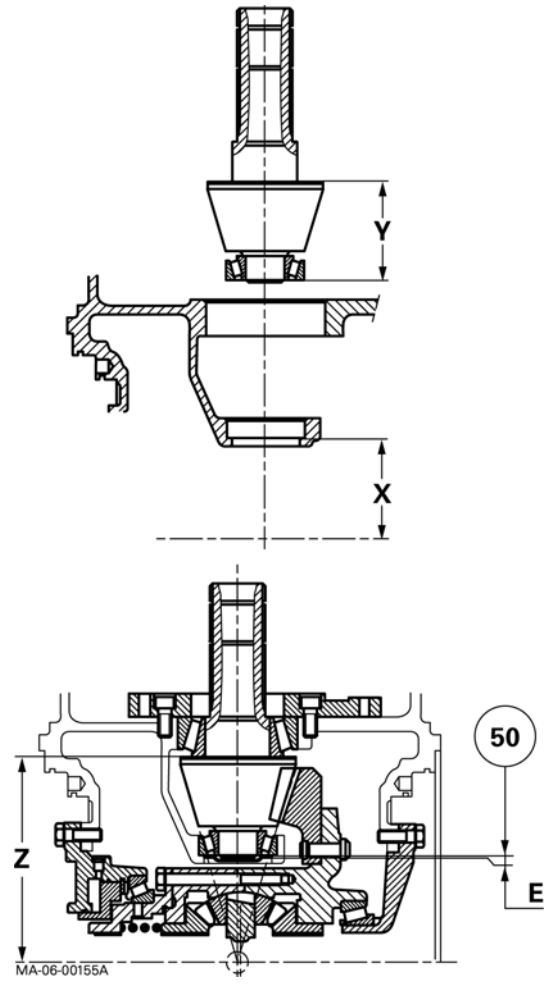


Fig. 18

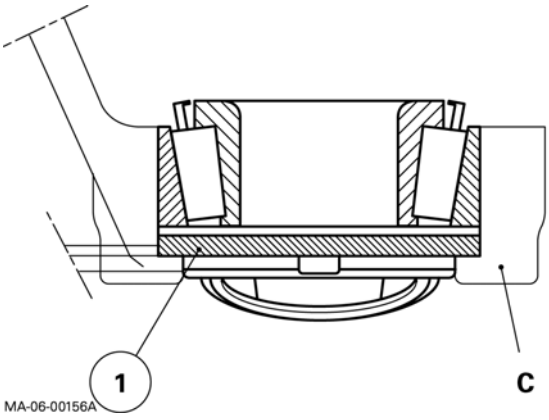


Fig. 19

Refitting

69. Using a press and a suitable fixture, insert the bearing cone (31) fully into the drive pinion shoulder.

70. Fit shims (50), their thickness determined by the previously stated formula.

71. Lightly smear the external diameter of the cup (37) with Loctite 603 or equivalent and insert it to make contact with shims (50) using a suitable fixture. Eliminate any traces of Loctite.

Note: Bearing cones and cups must be clean and lubricated after fitting.

72. Fit the drive pinion and bearing cup (33).

Shimming the drive pinion

Preparing for shimming

73. Set a thickness of shims greater than the protruding dimension "A" on the bearing cup (33) measured in relation to the housing face (Fig. 20) to obtain a provisional clearance of 0.10 mm to 0.15 mm maximum for the pre-load shimming that follows.

74. Screw two diametrically opposed guide studs on to the housing. Place the shims (36) determined in operation 73 and fit the thrust plate (35).

75. Fit and tighten screws (32) to 90 - 120 Nm after removing the guide studs.

Shimming - 1st method

76. Place the dial gauge feeler pin on the end of the drive pinion (Fig. 22).

77. Pull hard on the pinion through the front of the centre housing and turn it alternately from left to right in order to correctly seat the bearing cones in their cups.

78. With the assistance of another operator, set the dial gauge to zero.

79. Repeat the operation 77, this time by pushing.

80. Depending on the clearance measured, select a definitive thickness of shims in order to obtain the following preload:

P1 = 0.03 to 0.09 mm (Fig. 21)

Remark

- If possible, shim towards the maximum tolerance.

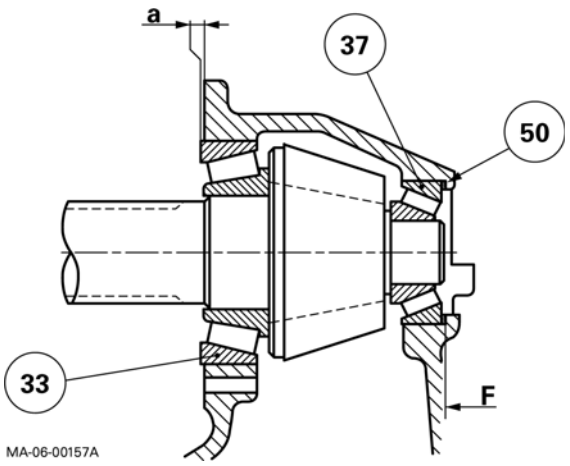


Fig. 20

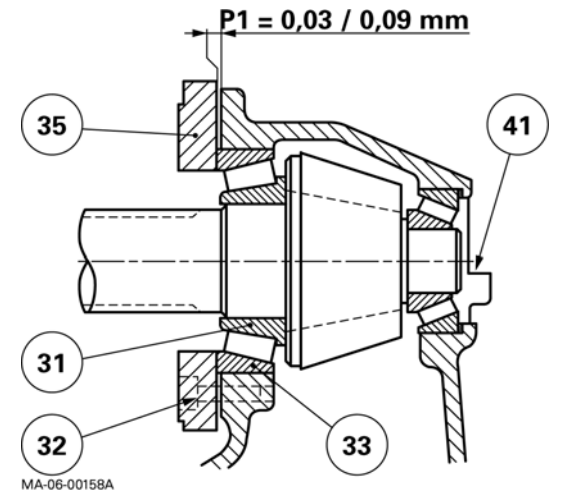


Fig. 21

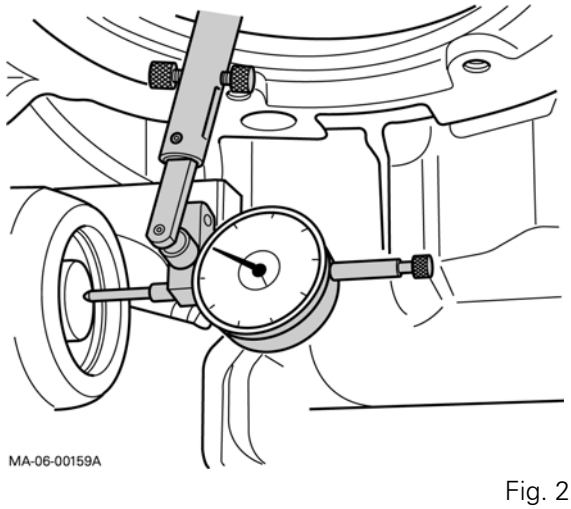


Fig. 22

81. Take out the two diametrically opposed screws (32) and replace them with two guide studs.

Remove the two other screws and thrust plate (35).

82. Fit the shims selected in operation 80 and replace the thrust plate.

83. Fit the screws (32) lightly smeared with Loctite 270 or its equivalent and tighten to a torque of 90 - 120 Nm, having first removed the guide studs.

Shimming - 2nd method

Remark

- The principle consists of removing or adding shims (36) in order to obtain a rotation torque of between 0.8 Nm to 2 Nm, measured with a dial type torque wrench as the drive pinion is rotated at approximately 1 to 5 rpm.

Reminder

- Where possible, shim to obtain the maximum torque value.
- During the final assembly sequence, the screws (32) are similarly smeared with Loctite 270 or equivalent and tightened to a torque of 90 - 120 Nm.

84. Position the oil slave device (41) (Fig. 1) in the housing, its external diameter lightly smeared with Loctite 648 or equivalent.

Remark

- The slave device must be inserted flush with the face "F", the notch turned upwards so as to not interrupt the hydraulic flow (Fig. 20). Eliminate any traces of Loctite after assembly, tighten and lock the nut (51), used to hold the pipe (47).

I . Refitting and shimming of the differential assembly

Refitting

85. Carefully place the differential assembly in the housing (Fig. 23).

On the right-hand flange (25)

Remark

- The fitting of the right-hand flange (25) on the centre housing is similar to that of the left hand flange (9). The positioning is ensured by the locating ring (45).

86. Use the assembly method described in § C.

On the left-hand flange (9)

Preparing for shimming

87. Remove bearing cup (14) and deflector (13) from the flange (9).

88. Place the bearing cup on the cone (17).

89. Fit tool ref. 3376847M91 to the housing using two screws (2) tightened to a torque of 85 - 100 Nm (Fig. 24).

Note: For GPA20 type rear axles, use the shortest finger "D" of the tool (see § K, Fig. 34).

90. Tighten the central screw to 10 Nm (Fig. 24).

Note: Check that the ring gear is not constrained by the drive pinion and turn it several times to correctly seat the bearing cones in their cups. Check the tightening torque of the central screw of the tool once again.

91. Assemble and moderately tighten the hexagonal calibrated spacers "A" (Fig. 24) in the other two holes.

Important:

- Check that they are in contact with the housing.

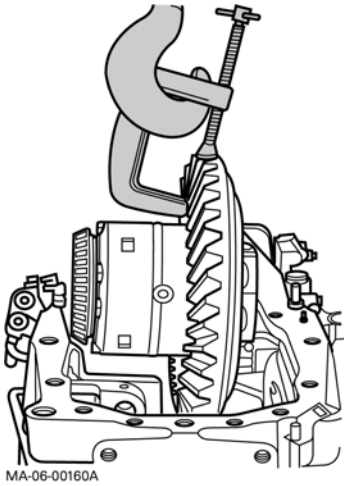


Fig. 23

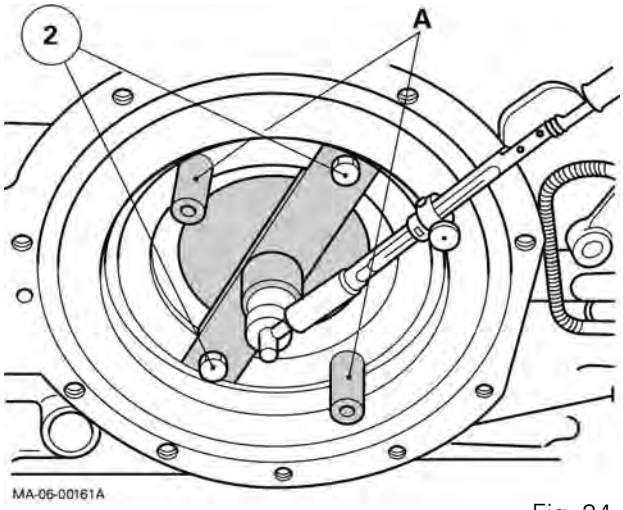


Fig. 24

Shimming

92. Carry out shimming to obtain:
P2 = 0 to 0.25 mm(Fig. 25)

93. Place a steel ruler edge against the two calibrated spacers (Fig. 26).

94. Using a set of laminated shims, measure the clearance J between the finger of the tool and the ruler "B" (Fig. 26).

95. Calculate dimension "C" between bearing cup (14) and the mating face of the flange (9) (Fig. 27).
C = (114 + J) - 70

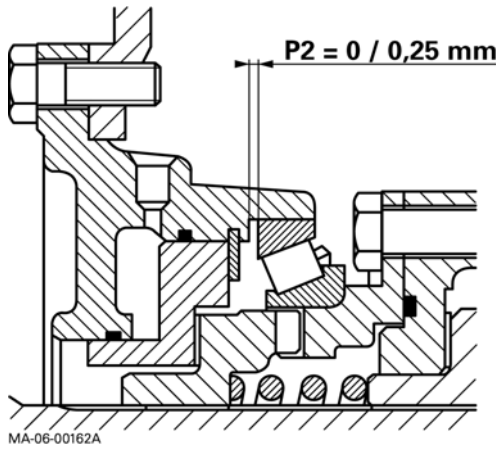


Fig. 25

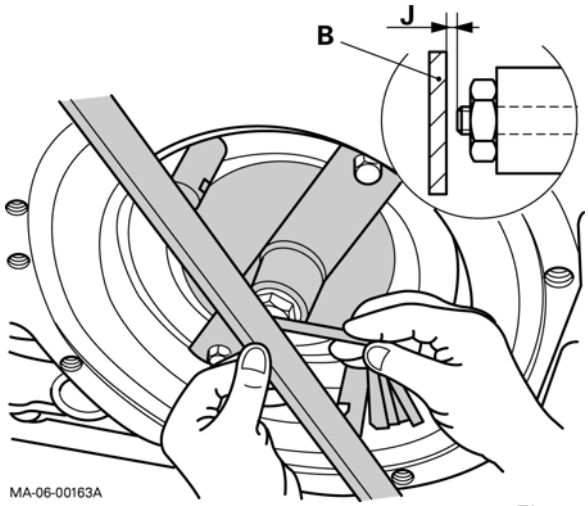


Fig. 26

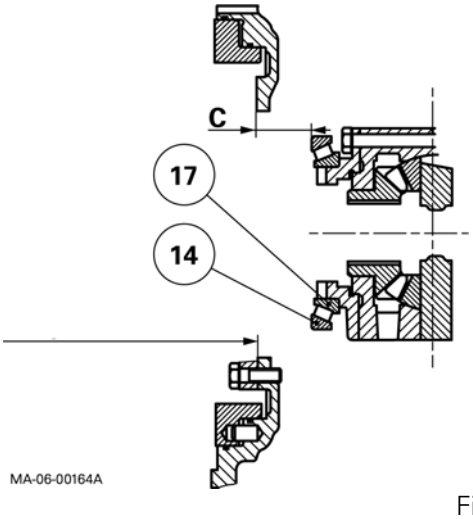


Fig. 27

96. On flange (9), measure dimension "Y" using a depth gauge and a ruler (Fig. 28).

97. Select the thickness E of deflector (13) and shim (49) (if used) (see table) to obtain:

E = P2 + (C - Y)

Note: To carry out P2 shimming, there are 9 deflectors available each having a different thickness.

Remark

- If possible, shim to the maximum tolerance.

98. Remove the shimming tool and cup (14).

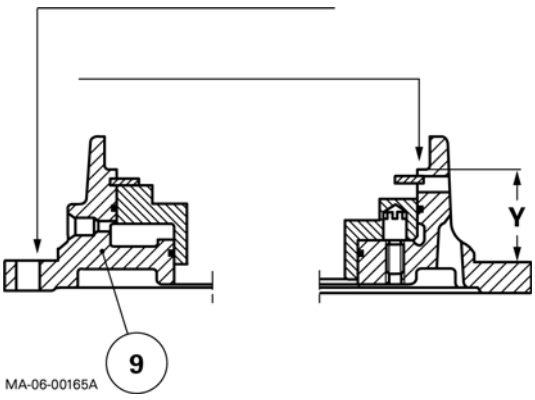
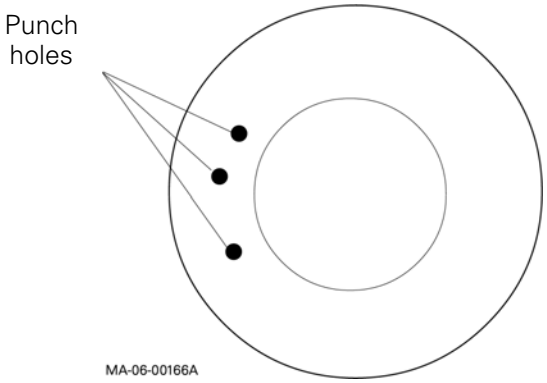


Fig. 28



	Reference	Number of centring punch holes	mm
Deflectors	187 689 M2	0	0.73 - 0.78
	892 173 M2	1	0.864 - 0.914
	892 172 M2	2	0.991 - 1.041
	892 171 M2	3	1.118 - 1.168
	892 170 M2	4	1.245 - 1.295
	191 124 M2	5	1.37 - 1.42
	191 125 M2	6	1.49 - 1.54
	521 401 M2	7	0.61 - 0.66
	1 686 054 M2	8	0.50
Shim	3794031H1		0.70

99. In flange (9), place deflector (13) and shim (49) (if used) selected during operation 97, and bearing cup (14).

Note: The shim (49) (if used) must be placed between flange (9) and deflector (13). Ensure correct direction of assembly of the deflector (Fig. 29).

100. Refit flange (9). Carry out operations 16 to 18 § C.

101. Fit the pipe (40).

102. Check the backlash (see § J).

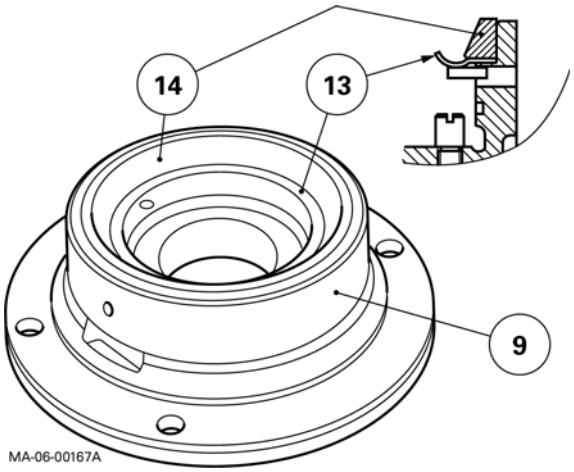


Fig. 29

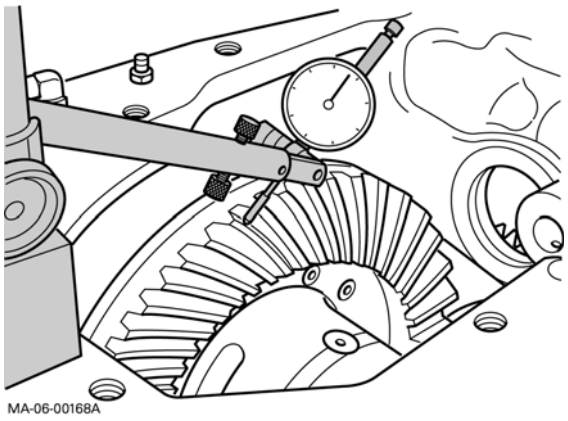


Fig. 30

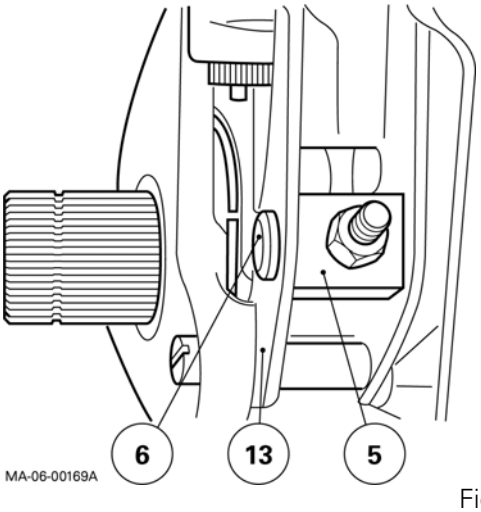


Fig. 31

J . Adjusting and checking the backlash

Reminder

- The backlash between the ring gear and drive pinion ensures reliability of the bevel gear and the correct operation of the assembly.
- This clearance must be checked or adjusted after:
  - adjusting the bevel gear distance
  - shimming the differential unit.

Preparation

103. Remove the differential assembly (see § D).

104. Using a standard reversible flange extractor, remove bearing cup (27) (Fig. 32).

Pre-adjustment

105. Prepare a thickness of shims (38) of 0.30 mm.

Remarks

- Do not take into consideration the DC (ring gear offset, e.g.: -0.20) embossed on the external diameter of the ring gear after the pairing number (Fig. 32).
- The pre-adjustment can be followed by an adjustment, if the backlash is incorrect during the final check.

106. Fit the previously prepared shim(s) in the cavity of half-housing (29). Lubricate and insert cup (27) (Fig. 32).

107. Refit and shim the differential assembly unit (see § I).

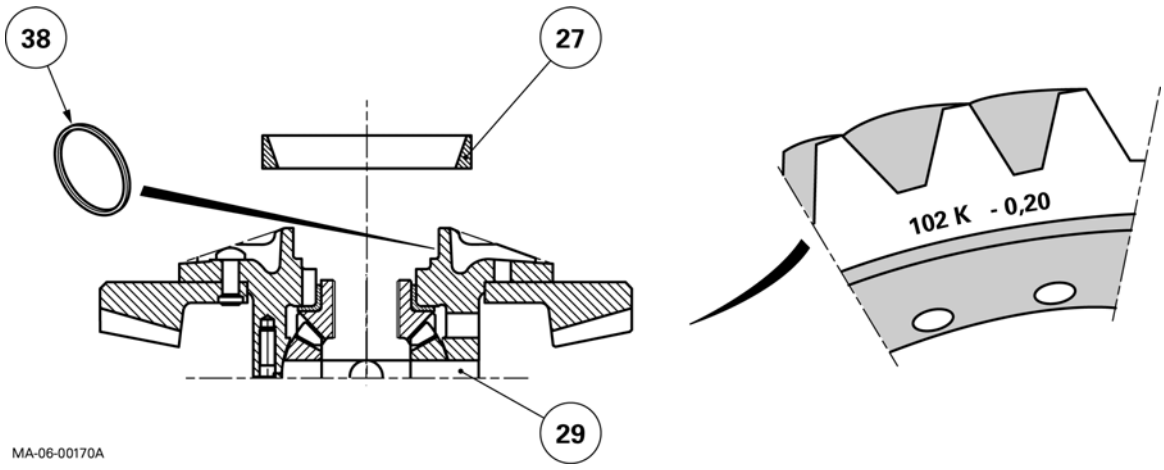


Fig. 32

Checking J2 backlash

J2 = 0.15 to 0.40 mm

108. Place the dial gauge feeler pin half-way along a ring gear tooth (Fig. 30).

109. Check that the backlash remains between 0.15 and 0.40 mm. Carry out this check at three points of the ring gear separated approximately by 120°.

Important

- If the backlash is incorrect, select and fit a new thickness of shim(s).
- Then offset the ring gear (23) in the desired direction, by increasing the value of shims (38) and reducing the value of the deflector by the same amount (13) or vice versa, in order to obtain the required backlash. This is obviously done without modifying the pre-loading of the differential unit.

Note: If possible, set J2 backlash to its minimum value.

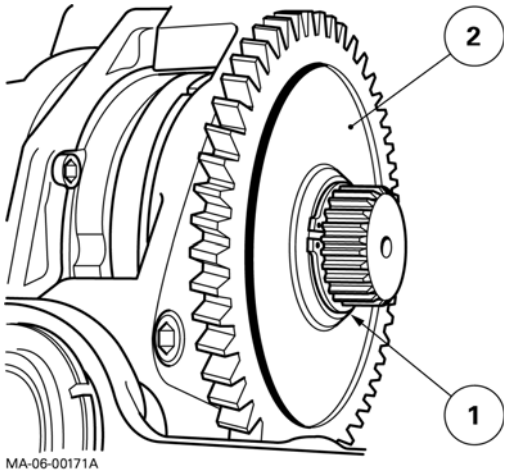


Fig. 33

Final operations

110. Refit the handbrake mechanism assembly (see chapter 6).

Note: Plate (5) is rectangular. It must be positioned horizontally, along its length, so that the shaft (6) is correctly positioned in the guide rod link (13) (Fig. 31).

111. Refit the pinion (2) (if fitted) and circlip (1) (Fig. 33).

112. Refit the left-hand cover (see chapter 9).

Fit the handbrake control support, the GSPTO support (if fitted on the cover), remove the guide studs, fit and tighten the screws to a torque of 72 - 96 Nm.

113. Position the guide rod link and adjust the handbrake mechanism (see chapter 6).

114. Refit the right-hand hydraulic cover (see chapter 9).

115. Refit the layshaft, the driving pinion and the 3rd point linkage support.

Tractors with 2-speed power take off

- See chapter 7

Tractors with 4-speed power take off

- See chapter 7

116. Refit the lift cover (see chapter 6) and the brake pistons (see chapter 6).

117. Refit the left- and right-hand trumpet housings (see chapter 6)

118. Refit the stabiliser supports.

119. Refit the hook (see chapter 6).

120. Refit the wheels.

121. Couple the tractor between the gearbox and rear axle.

122. Tighten the wheel nuts to a torque of 400 - 450 Nm.

123. Top up the oil level in the housings and check it on the gauge located at the rear of the rear axle. Remove the safety chocks. Refit the body (if removed).

124. Start. Bleed the main brakes and trailer brake (if fitted). Carry out a road test. Check the correct operation of controls and electrical circuits.

125. Check the oil tightness of the trumpet housing mating faces with the housing, covers and hydraulic unions.

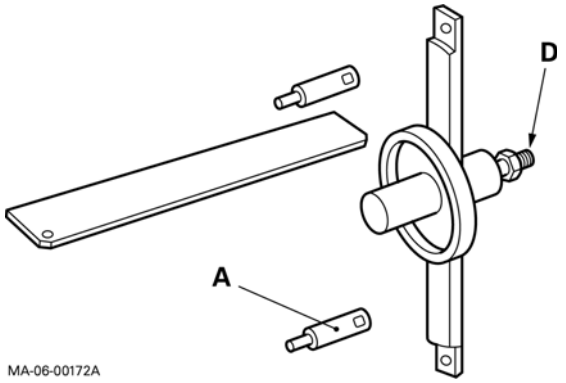


Fig. 34

K . Service tool

Tool available in AGCO SA SA network

- 3376847 M91 - Shimming tool (Fig. 34)

GPA20 differential

6A16 - GPA20 Hitch / Linkage

CONTENTS

A . General

The lift cover is fitted on the upper face of the rear axle housing. Via two bushes (8), it supports the shaft (4), which has the two lift arms (5) (11) splined to it.

A cam (9), screwed on the shaft, inside the cover, shows the different positions taken by the lift arms. This information is recorded and sent by a sensor (26) to the Electronic Linkage Control (ELC) system.

To ensure correct clearance between the lift arms and the cover, shims (12) are fitted on the left-hand end of the shaft.

Two friction washers (30) are fitted between the lift arms and the linkage cover to avoid their direct contact.

The rear face of the linkage cover supports the auxiliary spool valves. The ground speed sensor (15) is screwed in the front of the cover, which also supports the 4-speed PTO control linkage (21), if fitted.

Parts list

(1) Washer
(2) Screw
(3) Lockwasher
(4) Lift shaft
(5) Right-hand lift arm
(6) Nylon ring
(7) O'ring
(8) Ring
(9) Cam
(10) Lift cover
(11) Left-hand lift arm
(12) Shim(s)
(13) Ring
(14) Set screw
(15) Ground speed sensor
(16) Nut
(17) Cup plug (2-speed PTO)
(18) Screw (4-speed PTO)
(19) Control finger (4-speed PTO)
(20) O'ring (4-speed PTO)
(21) Linkage (4-speed PTO)
(22) Screw (4-speed PTO)
(23) Elbow union
(24) Screw
(25) Nut
(26) Position sensor
(27) Cup plug (version without linkage)
(28) Threaded plug (version without linkage)
(29) Seal
(30) Friction washers

Overall view

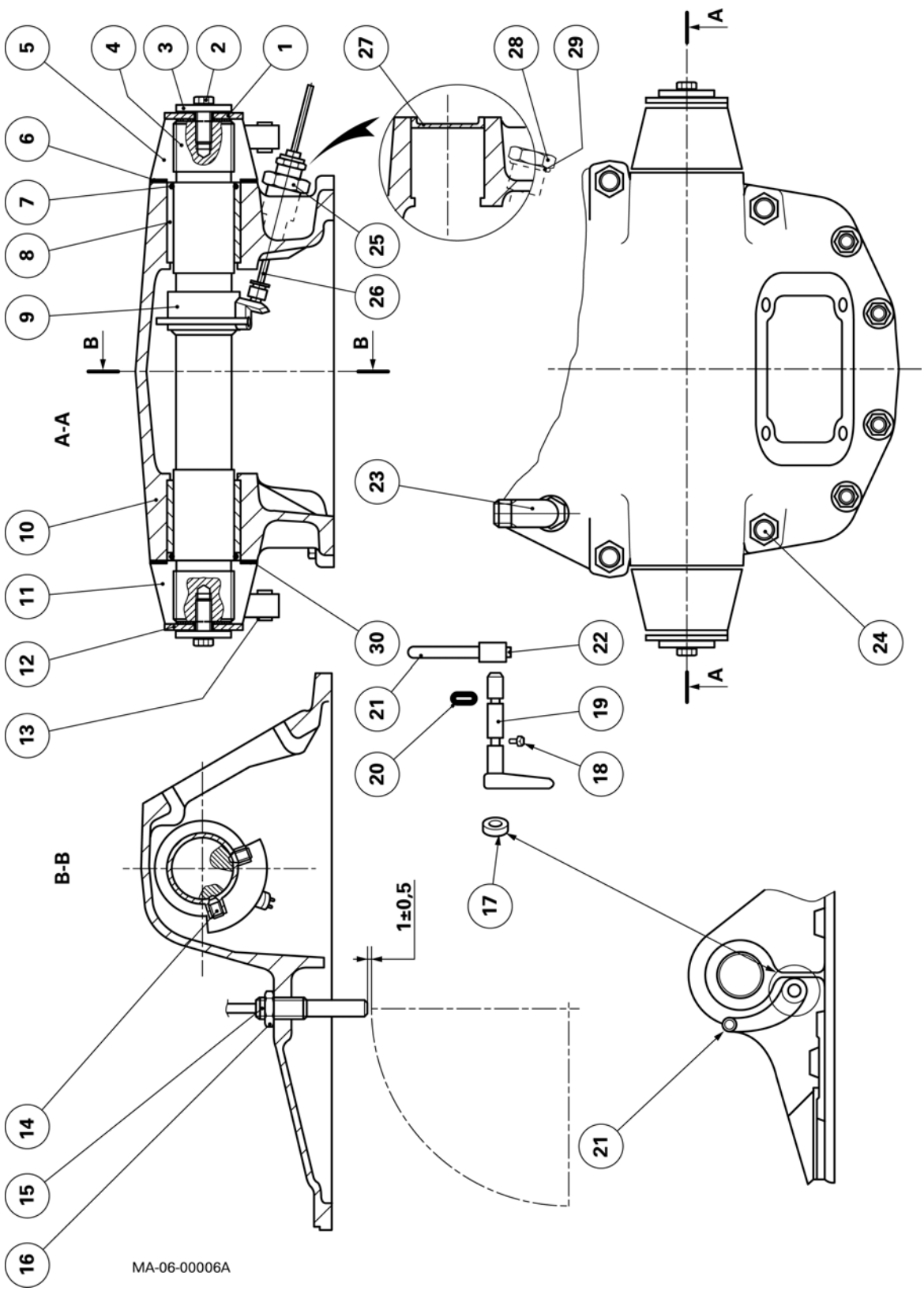


Fig. 1

Exploded view

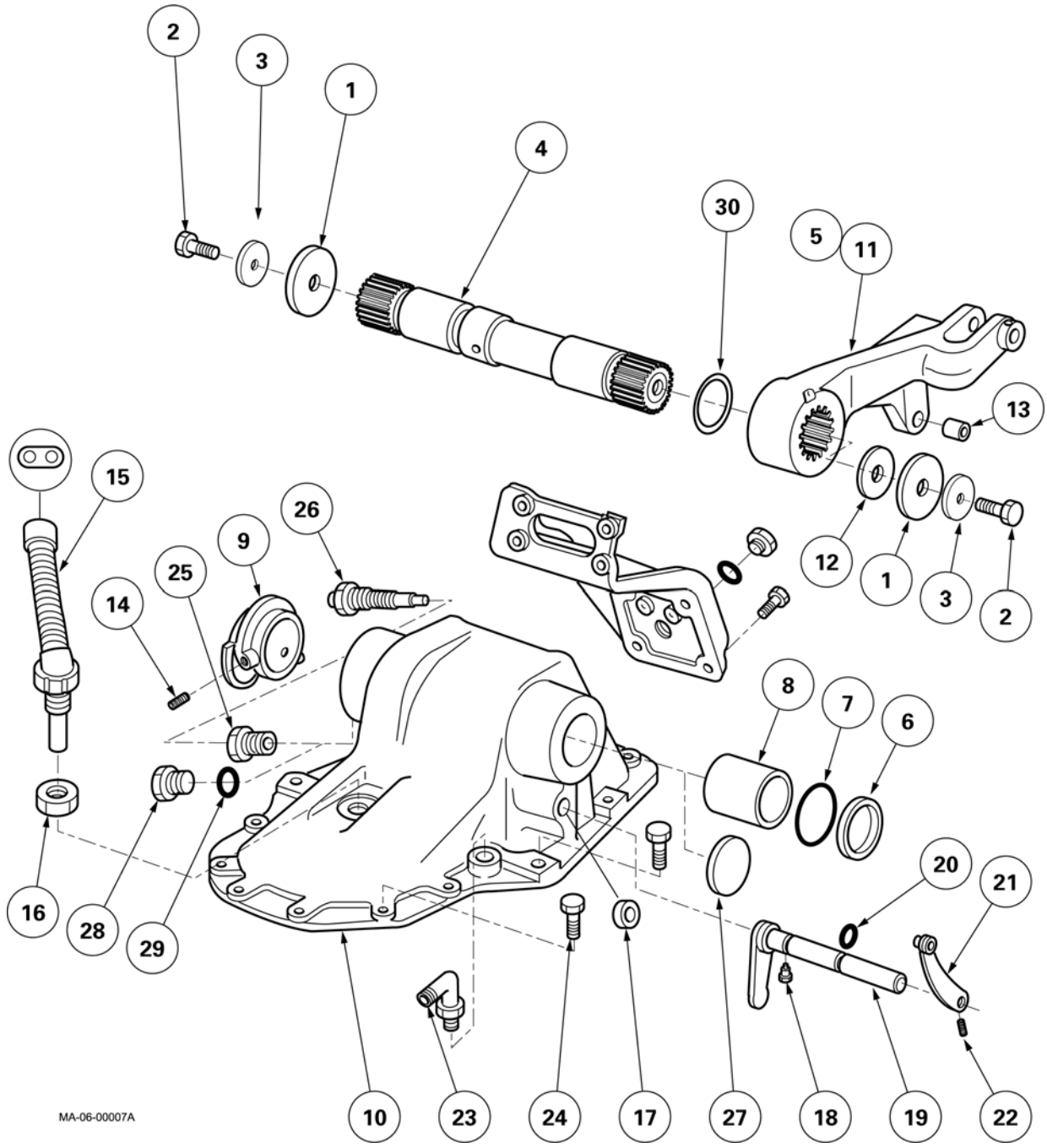


Fig. 2

B . Removing the cover

1. According the hydraulic circuit type, disconnect:
- hydraulic unions
- spool valve cable controls
- hydraulic spool valve controls
- trailer power take-off
- lift rams supply pipes.

2. Disconnect the ground speed sensor harness and the position sensor harness.

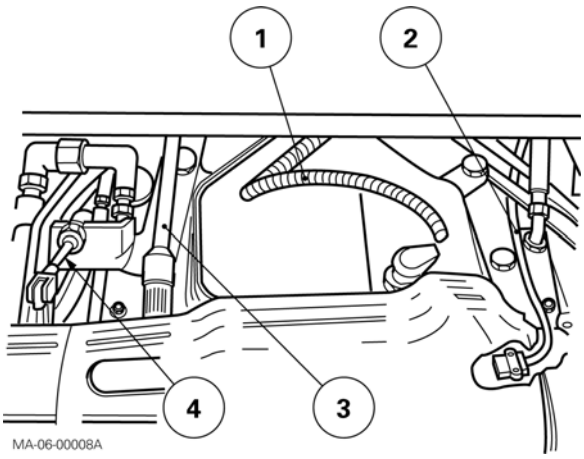


Fig. 3

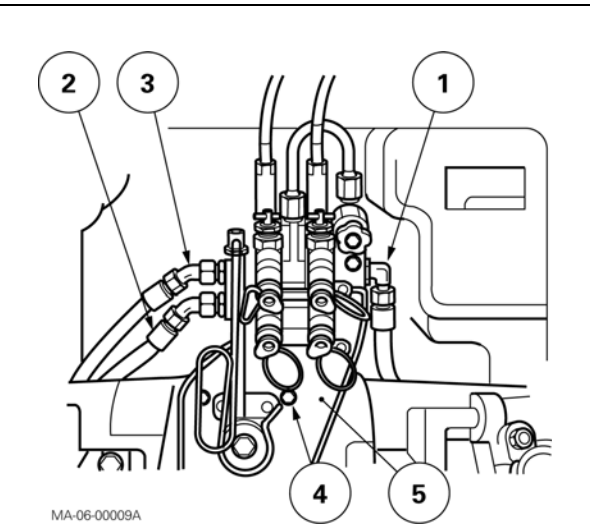


Fig. 4

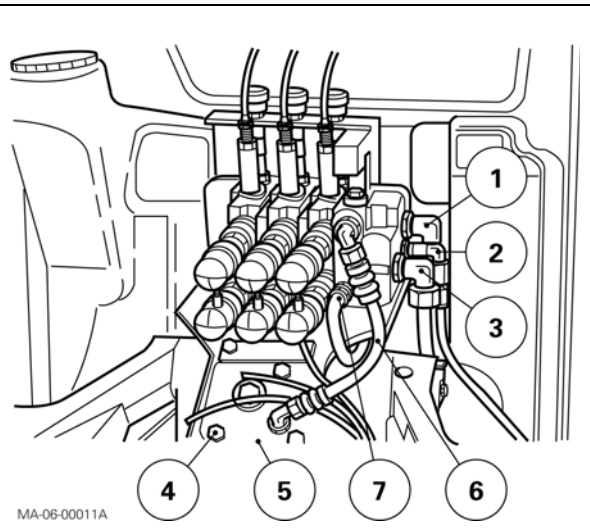


Fig. 5

3. Unscrew the four screws attaching the spool valve support to the lift cover.
   Remove the spool valve and support assembly.
4. Disconnect the pipe on the differential lock union (23), the control cable (21) (4-speed PTO, if fitted) (Fig. 3).
5. Disconnect the pipe (1) at both ends and remove the support (2) for the trailer brake take-off if fitted (Fig. 6).
6. Remove the upper pins from the rams and lift rods.
7. Remove the attachment screws (24) from the cover (10).
   Note: The PTO control cable support (if fitted) is fixed by the screws of the cover.
8. Sling the cover and remove it.

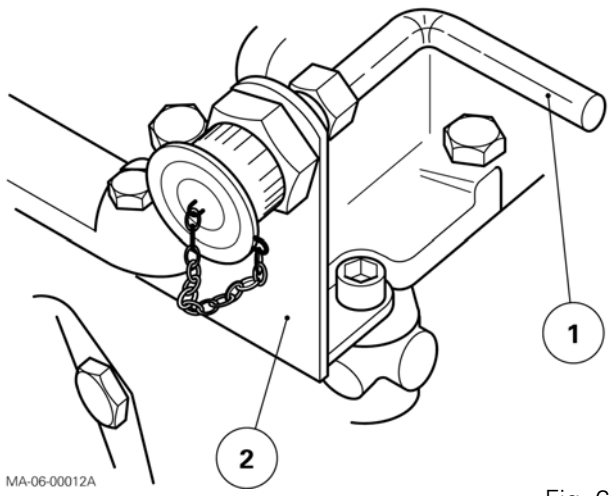


Fig. 6

C . Disassembling the cover

9. Place the cover on a workbench.
10. Remove the elbow union (23).
11. Unscrew the nut (16) and remove the ground speed sensor (15).
12. Unscrew the nut (25) and remove the position sensor (26).

For tractors fitted with 4-speed LSPTO (Fig. 7), carry out operations 13 to 16.

13. Unscrew the Allen screw (22) from the guide rod link (21).
14. Take out the screw (18).
15. Remove the control finger (19).
16. Remove the O'ring (20).
17. Take out the screw (2) from the lift arms (Fig. 1) and remove the lockwashers.
18. Remove the lift arms (5) (11) and the washers (30).
19. Remove the nylon rings (6) and the O'rings (7).
20. Remove the set screws (14) from the cam (9).
21. Extract the lift shaft (4) from the cover.
22. Remove the cam (9).
23. Remove the rings (8) (Fig. 8).
24. Remove the cup plug (17) (2-speed PTO).

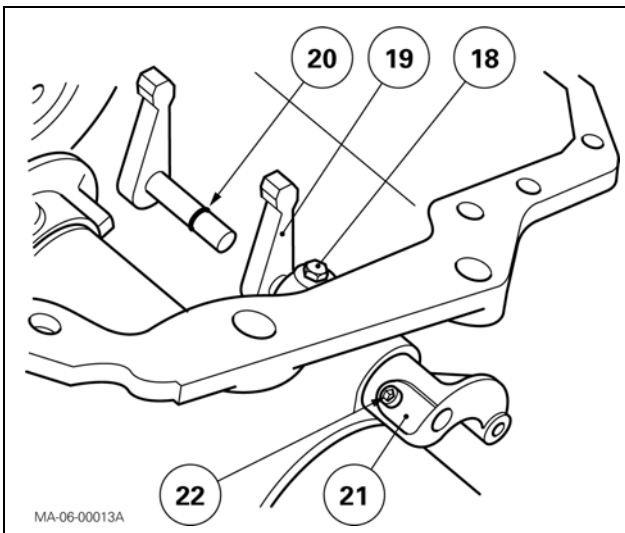


Fig. 7

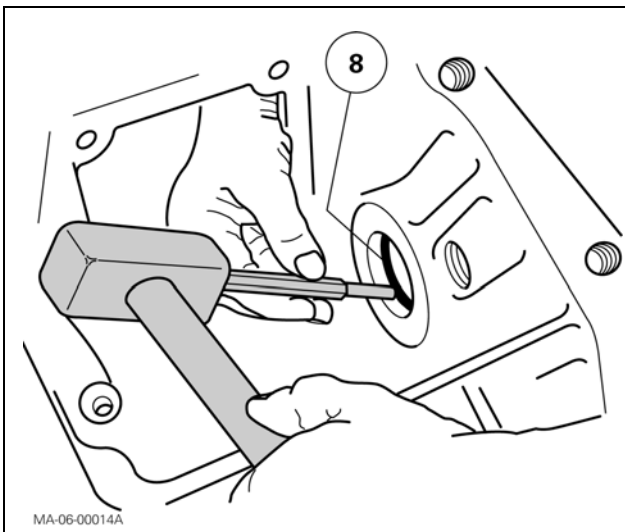


Fig. 8

D . Reassembling the cover

Note: Fit the rings (13) up against face "A" (Fig. 9).

25. Check and clean all components. Replace any defective parts.

26. Clean the mating faces of the lift cover and of the spool valve support.

27. Fit the rings (8) home in the cover.

28. Fit the cup plug (17) smeared with Loctite 542 flush with the cover (2-speed PTO).

29. Fit the lift shaft (4) and the cam (9) in the cover (Fig. 10).

Note: Ensure that the direction assembly of the shaft and the cam position are correct.

30. Tighten the set screws (14) smeared with Loctite 242 or equivalent to a torque of 5 Nm (Fig. 10).

Note: Apply this torque so as not to deform the cam.

31. Position the O'rings (7) and the nylon rings (6).

Note: Protect the splines of the shaft. Lubricate the O'rings before fitting (Fig. 11).

32. Grease the splines of the shaft (4) (Anti-Seize Grease or equivalent).

33. Fit the the washer (30), lift arm (5) (sensor side), washer (1), lockwasher (3) and screw (2).

Note: Grease the face of the cover (Anti-Seize Grease or equivalent) before fitting the arms.

34. Tighten the screw (2) to a torque of 360 - 470 Nm.

Note: If work has been carried out but it was not necessary to carry out J1 shimming (e.g.: replacement of seals), shims (12) must be fitted at the left-hand end (factory assembly) to secure the cam in the correct position and to avoid adjusting the sensor (26).

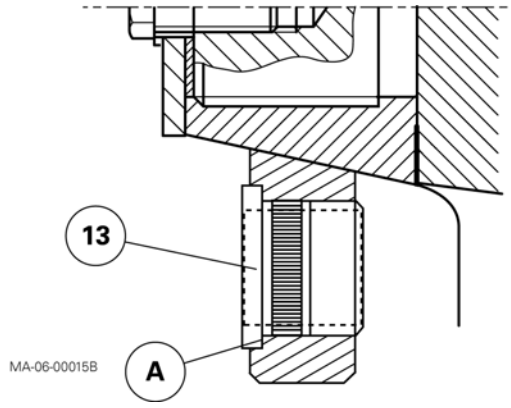


Fig. 9

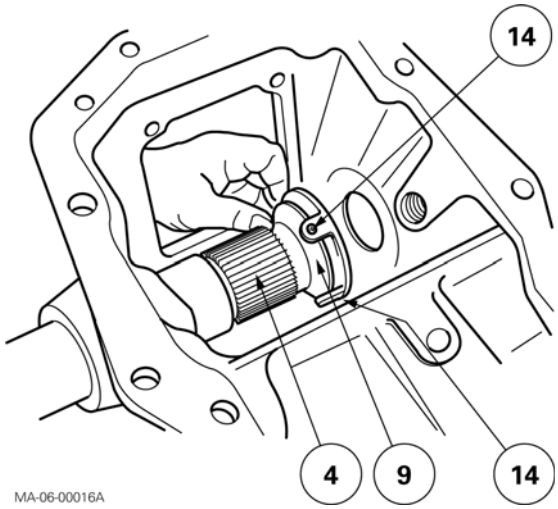


Fig. 10

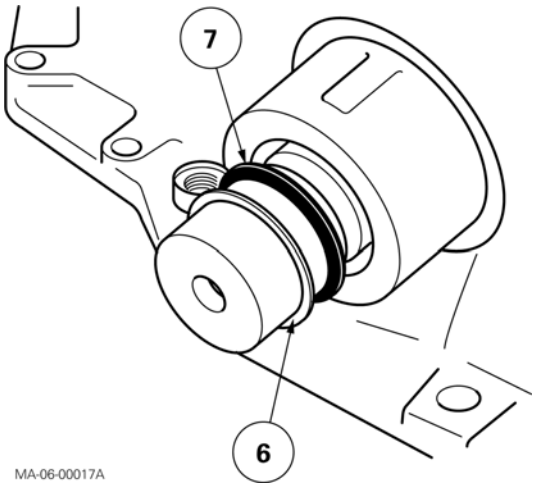


Fig. 11

35. Carry out shimming of the shaft (4) (Fig. 13) to obtain the following clearance:

J1 = 0.30 to 0.40 maximum

Fit the washer (30), arm (11), washer (1) and screw (2).

Note: Grease the mating face of the cover (Anti-Seize Grease or equivalent) before fitting the arm.

36. Tighten the screw to position the lift arms (5) and (11) correctly on the shaft.

37. Remove the screw (2) and the washer (1) at the left end of the shaft.

38. Measure the distance between face "A" of the shaft and face "B" of the arm using a depth gauge (Fig. 12 and Fig. 13).

39. Measure dimension "X" to determine the thickness of shims "Y" needed to obtain (Fig. 13):

J1 = 0.30 to 0.40 maximum

Y = X + J1

40. Fit the shims (12) selected previously (Fig. 13), the washer (1), the lockwasher (3) and the screw (2).

41. Tighten the screw (2) to a torque of 360 - 470 Nm.

For tractors fitted with 4-speed PTO, carry out operations 42 to 45.

42. Refit the finger (19) (Fig. 14).

43. Fit the O'ring (20) from the external side of the cover (Fig. 14).

44. Smear the screws (18) (22) with Loctite 242 or equivalent and tighten.

45. Check that the control functions smoothly.

46. Fit the elbow union (23).

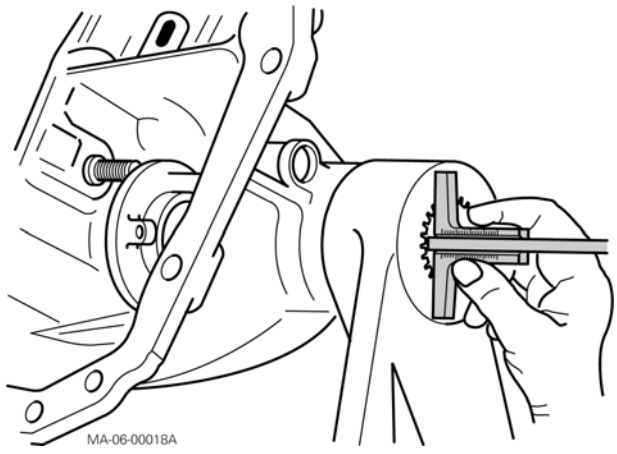


Fig. 12

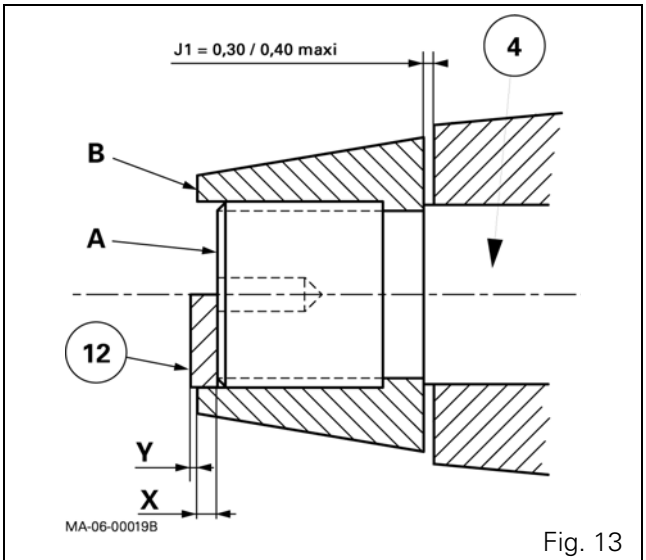


Fig. 13

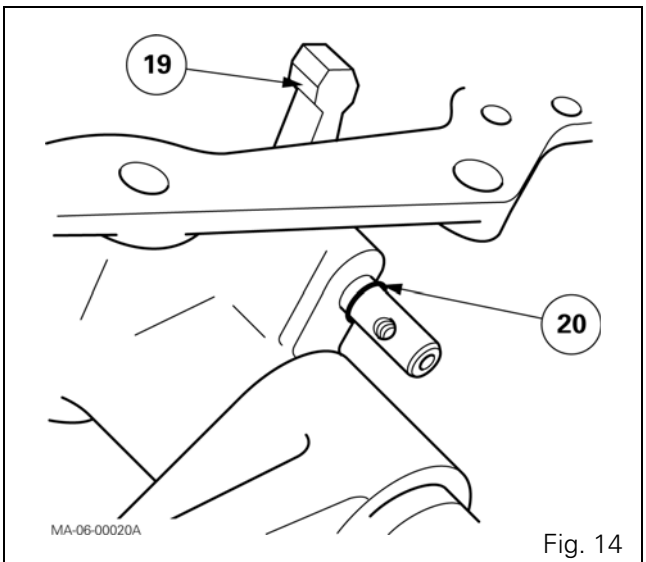


Fig. 14

E . Refitting the cover

47. Clean the mating face of the cover on the rear axle housing.

48. Smear the mating face with a sealing product (Master Joint 5206 Loctite or equivalent).

49. Sling the cover and refit it.

Note: when refitting the cover, ensure that the differential lock feed pipe and the 4-speed PTO control finger engage correctly in their respective positions (Fig. 15).

50. Fit the PTO control cable support (depending on the option) and the attachment screws (24) of the cover (10). Tighten to the following torque:

- screws Ø 12 = 72 -96 Nm
- screws Ø 16 = 240 -320 Nm

51. Refit the upper pins to the lift rams and lift rods.

52. Refit (Fig. 1):

- the feed pipe on the differential lock union (23)
- the cable onto the control (21) (4-speed PTO, if fitted).

53. Fit the ground speed sensor (15) with Loctite 577 Sensor Sealing or equivalent (Fig. 16).

54. Screw home the speed sensor without forcing it until it touches the differential ring gear.

55. Unscrew the sensor 3/4 of a turn to obtain a clearance of approx. 1 mm between the sensor and the ring gear (Fig. 16).

56. Tighten the nut (16) to a maximum torque of 5 Nm (Fig. 16).

57. Connect the sensor harness.

58. Fix the harness with a clip retainer.

59. Clean the mating face of the spool valve support.

60. Smear the mating face of the spool valve support with a sealing compound (Master Joint 5206 Loctite or equivalent).

61. Refit the spool valve and support assembly.

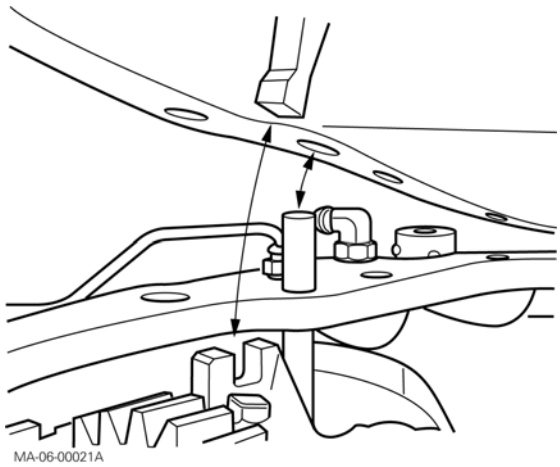


Fig. 15

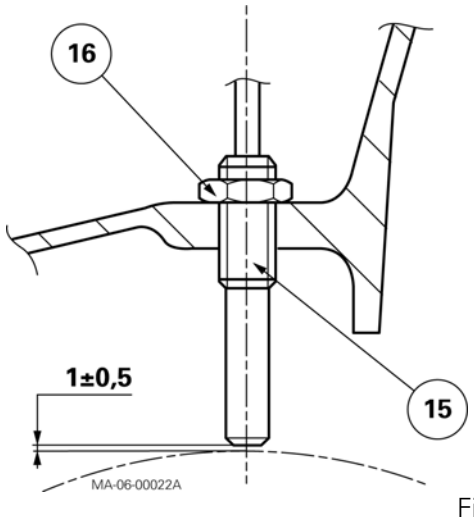


Fig. 16

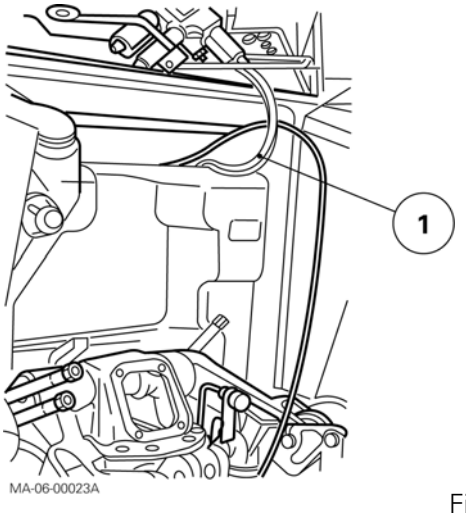


Fig. 17

62. Smear the thread of the two lower screws (4) with Loctite 5206 or equivalent. Tighten the screws (4) of the spool valve support cover to a torque of 50 - 70 Nm.

63. Carry out operation 1 in reverse order according to the hydraulic circuit type.

64. Adjust the 4-speed PTO control.

65. Fit and adjust the position sensor.

66. Smear the thread of the sensor (26) with a sealing compound (Hylomar or equivalent), then screw in the sensor a few turns.

67. Start the engine.

68. Using the external control or pushing on the end of the lifting solenoid valve, make sure that the lift arms are in the fully raised position (continuous pumping). Stop the engine.

69. Screw in the sensor (without forcing it) up against the cam (9). Connect the sensor to the female connector of the test harness (3378077M1) (Fig. 18). Connect the other test harness connector to the tractor harness. Connect terminals 1 and 2 to the MF 3005 multimeter.

Start the engine.

Lower the hitch by 3 to 5 cm between the hook and ground.

Unscrew the sensor to obtain a voltage between **6.92 and 6.96 volts.**

Reconnect the tractor harness.

Stop the engine.

The position sensor can also be adjusted using Wintest.

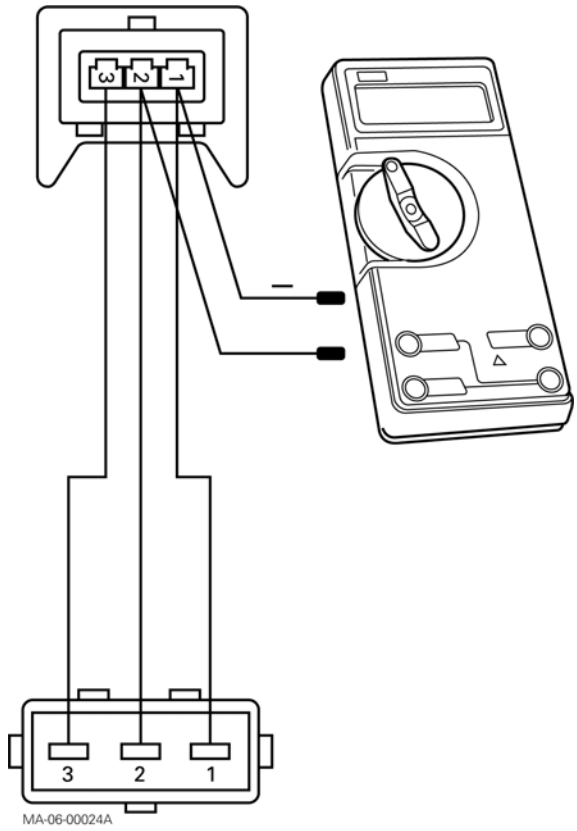
70. Tighten the nut (25) to a torque of 25 Nm using a locally made wrench (Fig. 19).

71. Check for tightness:

- the mating faces of the lift cover and the spool valve support
- the hydraulic unions.

Version without lift

- The ports of the shaft (4) are plugged with cup plugs (27) sealed with Loctite 542.
- The position sensor (26) is replaced with a threaded plug (28) equipped with a seal (29).



1 : Ground
2 : Signal
3 : Sensor power supply 9.5 V

Fig. 18

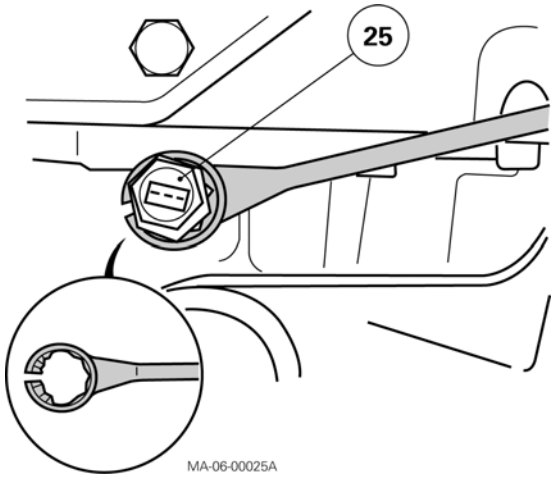


Fig. 19

F . Rear hitch

On 6400 series tractors, the hitch comprises several components, depending on the options and the country:

- a hook or ball joint 3rd-point hitch,
- two lower links with ball joints, automatic hitch or telescopic end-pieces (depending on version),
- two levelling units,
- 2 tube type blades
- a perforated bar

G . Description of the hitch

a : 3rd point drawbar and supports depending on the hydraulic equipment (Open Centre or Closed Centre) (Fig. 1)

b : levelling units (Fig. 2)

c : ball joint lower bars (Fig. 3)

d : lower bars with automatic hooks (Fig. 3)

e : lower bars with telescopic end-pieces (Fig. 3)

f : Tube type stabilisers (Fig. 4)

g : perforated bar (Fig. 5)

Special point

- For the adjustment of tube type stabilisers, see the Operator Instruction Book 3378163M1.

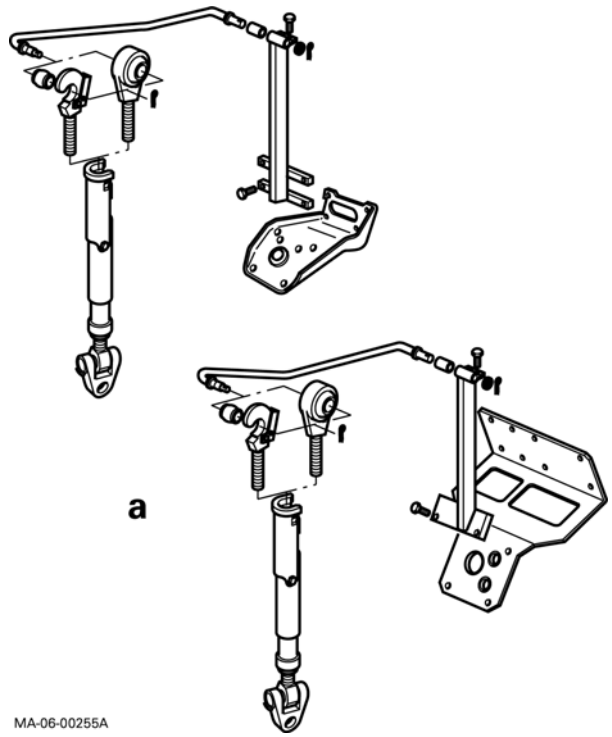


Fig. 1

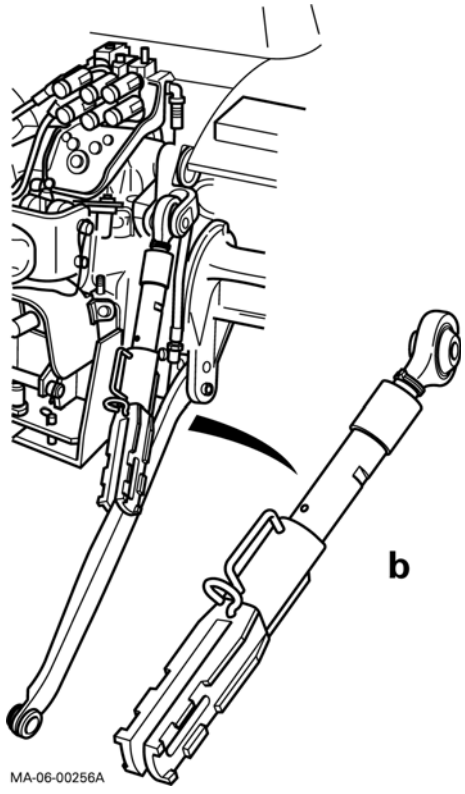


Fig. 2

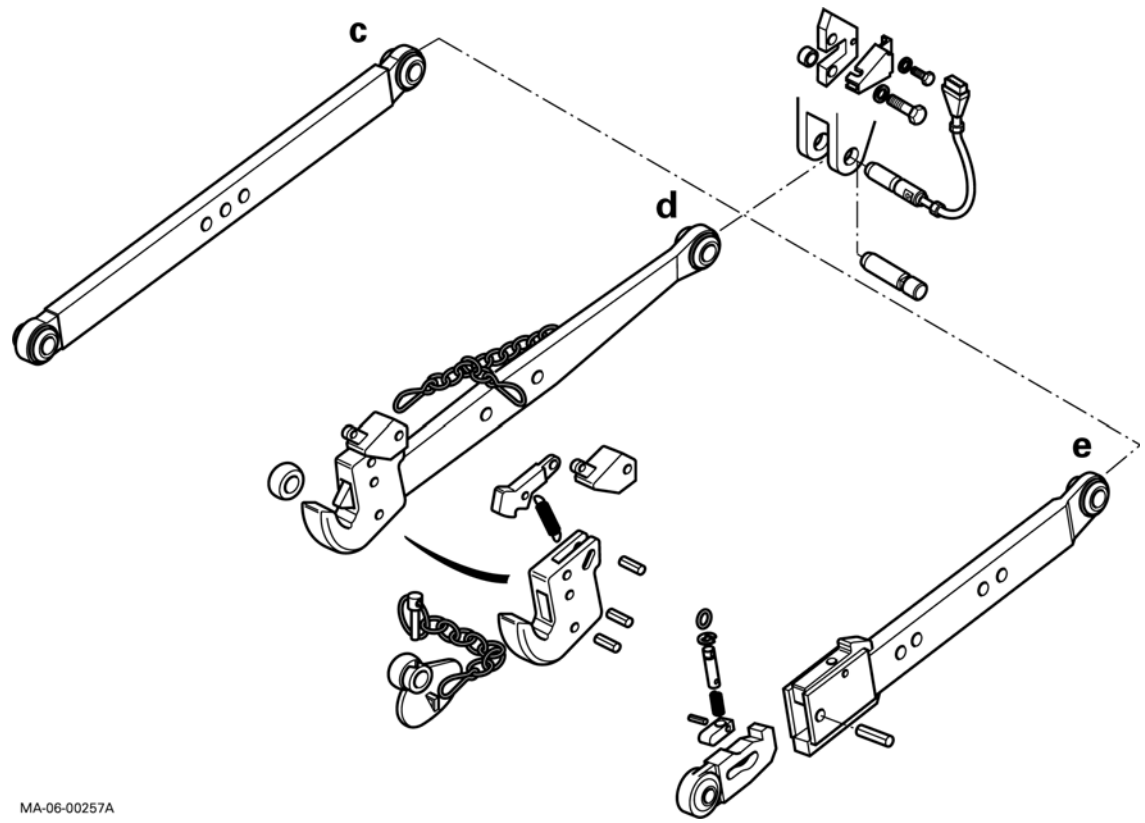


Fig. 3

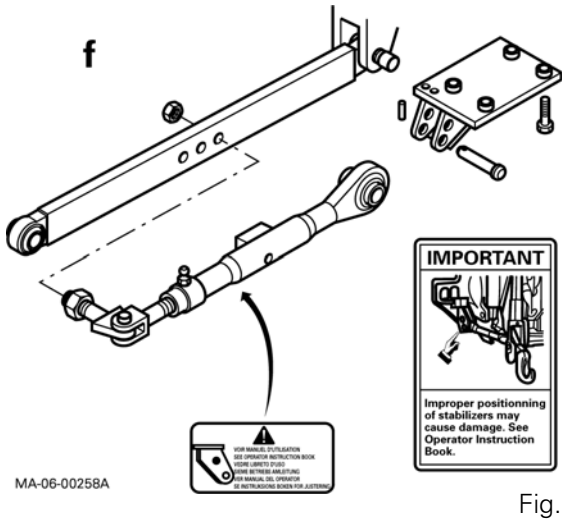


Fig. 4

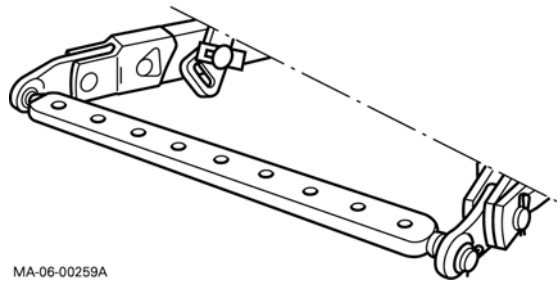


Fig. 5

H . Disassembling and reassembling a lift ram

Preliminary operations

1. Run the engine and lower the lower drawbars to their maximum using the ELC.
2. Disconnect the feed pipe, and remove and drain the cylinder of its oil.

Disassembly (Fig. 6)

3. Remove the 90° union (1) fitted with its O'ring.
4. Pull the shaft of the ram (5) until the snap ring (4) appears in port O of the union.
5. Insert a screwdriver into this port and while turning the cylinder ram push the snap ring into the V-shaped recess.
6. Remove the ram and the snap ring (4). Drive off scraper seal (2) and sealing ring (3) (systematically discard these three parts).

Reassembly

Special point

- Carefully clean all components. Replace any components found to be scratched or distorted. In case of jamming or serious scratching of the functional components, replace the hydraulic ram.

7. Dry all components using compressed air.
8. Lubricate the components with clean transmission oil.
9. Carry out the assembly of the ram. Carry out operations 2 to 6 in reverse order.

Special points

- Always fit a new snap ring and new seals.
- Use a suitable fixture to fit the parts home without damaging the seals.
- Fit the ram into the ram body with care.

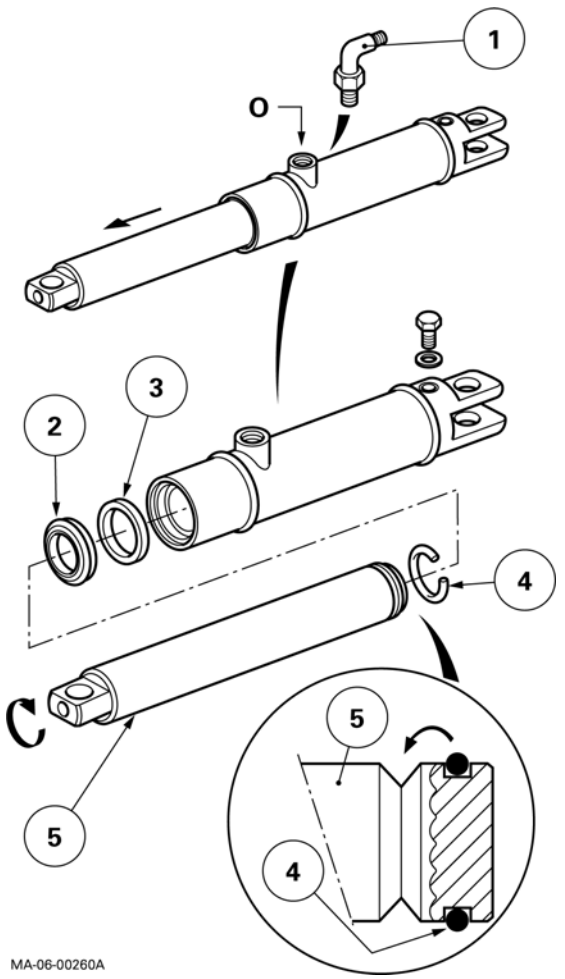


Fig. 6

Final operations

10. Lubricate the upper and lower pins of the ram with "Anti-Seize" grease and refit them. Reconnect the feed pipe.
11. Run the engine. Using the ELC, move the lower hitch bars from high to low position and vice versa.
12. Check that the hitch is operating correctly and that there are no oil leaks around either cylinder or ram.

6A17 - GPA20 Auto-hitch

CONTENTS

A . General

Tractors may be fitted with one of four types of brackets or a Dromone auto-hitch, depending on the options and the country concerned:

- bracket for a standard swinging drawbar
- bracket for a roller swinging bar
- short- or long-ladder bracket.

Assembly fits available

- A stud welded to the short ladder bracket to attach trailers placing heavy weight on the end of the beam. A lock holds the trailer eye-bolt.
- Standing swinging drawbar or roller swinging bar
- Standard or automatic clevis.

B . Presentation of brackets and Dromone auto-hitch (Fig. 1)

Brackets

a : Bracket for a standard swinging drawbar
b : Bracket for a roller swinging bar
c : Short-ladder bracket fitted with a stud to attach the trailer eye-bolt
d : Long-ladder bracket

Clevises

e : Lemoine standard clevis
f : Cramer automatic clevis

Swinging drawbars

g : Standard swinging drawbar
h : Roller swinging drawbar

Hook

i : Dromone auto-hitch

Tightening torques

(1) M14 screws: 150 -200 Nm
(2) M16 screws: 300 - 400 Nm, with Loctite 270 or equivalent
(3) M18 screws: 320 - 430 Nm, Grade 10.9
(4) M18 screws: 275 - 365 Nm, Grade 8.8

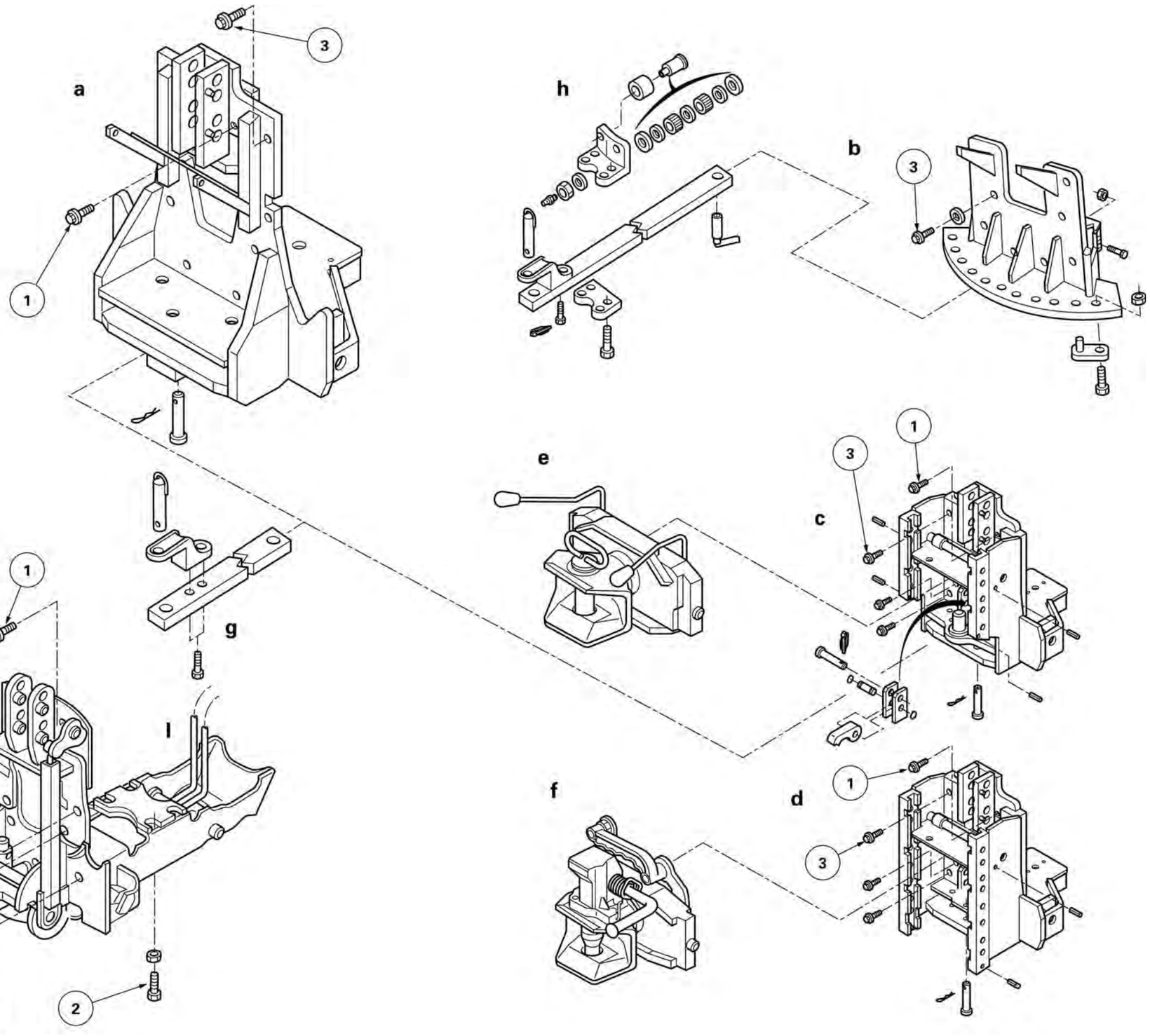


Fig. 1

A . Adjusting auto-hitch tie-rods and the control

Adjusting the tie-rods

1. On the bracket, disconnect the lower clevises of the tie-rods and the control cable.
2. Start the engine.
3. With the help of another operator, activate the internal or external lift control (depending on option) so that the lift arms are in the maximum raise position (continuous pumping).
4. Compress the lower part of the hook along the tractor axis "F" (Fig. 1) using a trolley jack, in order to obtain a dimension X of 6 to 14 mm between the top of the main bracket and the top of the mobile plate (Fig. 2).
5. Adjust the length of the rods by turning their sliding square section (1) in order to engage the clevises (2) on the pins (3) of the bracket (Fig. 2).
6. Fit the pins.
7. Remove the jack.
8. Reconnect the control.
9. Check the operation of the mobile plate by operating the lever (1) (Fig. 3) on the console inside the cab.

   Note: If the lock does not operate correctly, the control must be adjusted.

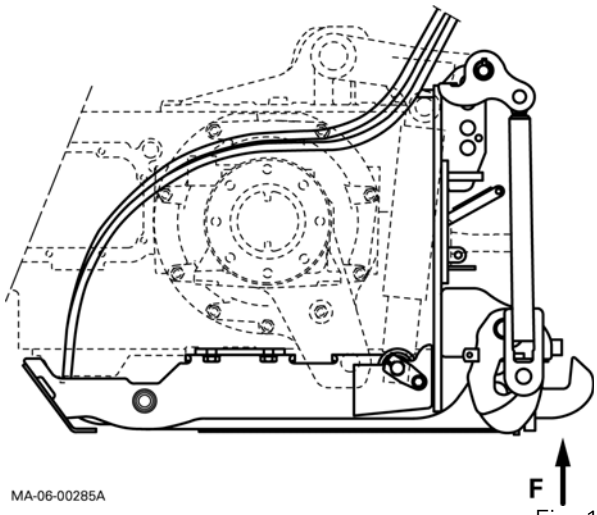


Fig. 1

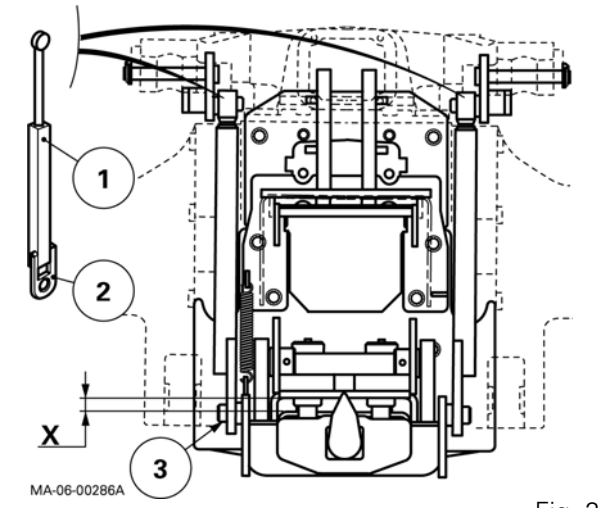


Fig. 2

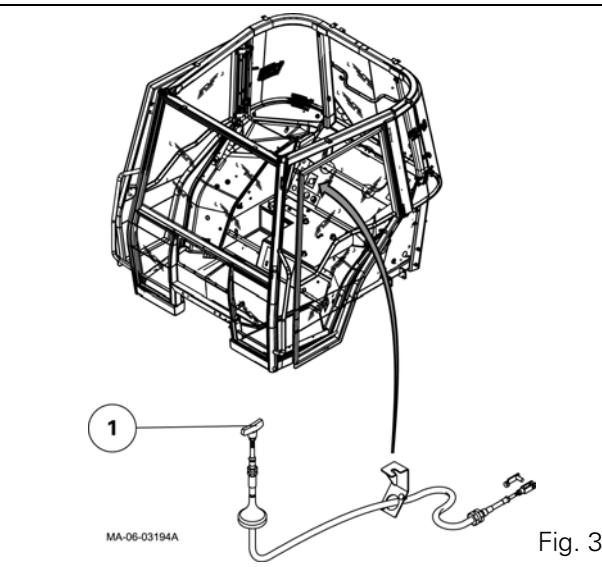


Fig. 3

Adjusting the control

On the lever (Fig. 4)

10. Place the lever (1) in "neutral" position.

11. Screw the handle flush with the threaded end of the cable.

12. Tighten nut.

13. Adjust the sheath end on the bracket with an equal length of thread showing on each side of the nuts.

Note: Check that the cable is not constrained.

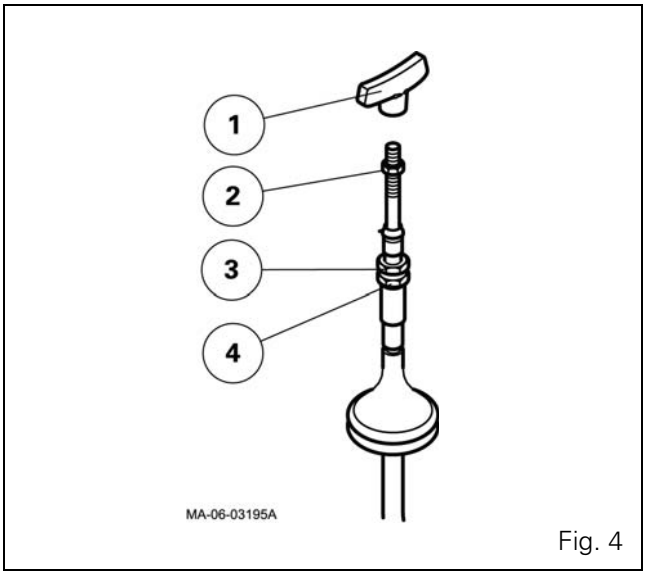


Fig. 4

On the auto-hitch (Fig. 5)

14. Screw the clevis (1) flush with the threaded end of the cable (2).

15. Fit the clevis on link B using the clip (3) and check that the link is in the locked position. Tighten nut (4).

16. Assemble the sheath end (5) in the bracket (6) and tighten the nuts (7) (8) so that there is no play in the cable (2) and the cable is not pinched.

Note: During adjustment, check that guide rod link B remains locked.

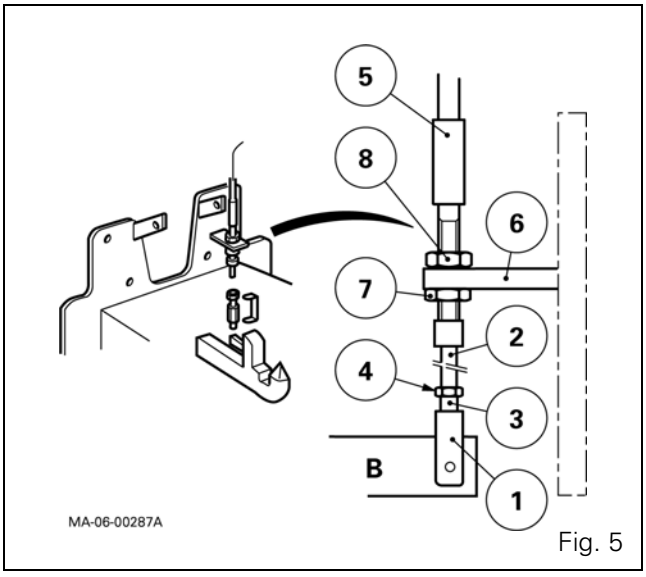


Fig. 5

B . Operating principle of the Dromone retractable hook

Construction (Fig. 6)

The auto-hitch assembly comprises a main bracket (1) fixed to the centre housing, a mobile plate (2) that can be raised or lowered by the lift control and a retractable hook (3) operated by a double acting hydraulic ram (4).

Operation

Plate lowered

- When the two manual valves (1) (Fig. 7) are open and auxiliary lever N°. 1 (Fig. 8) located on the console is activated, the high pressure passing through the special unions linked to the quick-disconnect couplings of the spool valve concerned (Fig. 7) supplies the double acting ram (4) that is integral with the retractable hook (3) (Fig. 9).
- The hook may then carry out a forward and rearward movement in order to hook the trailer, depending on the position of the auxiliary lever.

Plate raised

- In this configuration, the locking safety of the retractable hook is ensured at maximum retraction, with the plate (2) (Fig. 6) previously raised and engaged.
- The principle consists of two mechanical locks located at the rear of the main bracket. When the previously stated conditions are met, the locks engage in their respective recesses provided in the retractable hook and prohibit any untimely movement.

  When entering the safety position, the locks must produce a click that is audible to the operator during maximum retraction of the hook.

Note: During hook retraction, the operator in the driving seat should check that the gear and handbrake levers are in the neutral position. This facilitates the tractor / trailer hooking manoeuvre and frees it from any constraints.

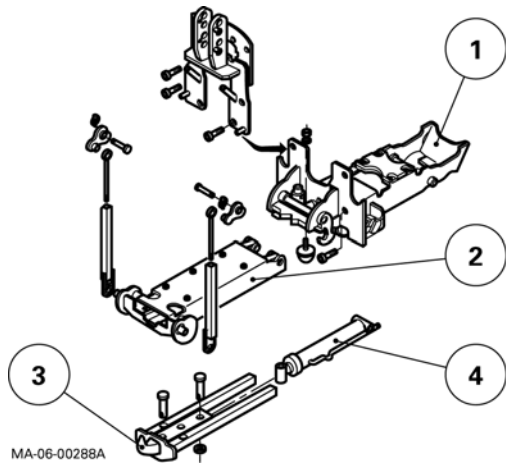


Fig. 6

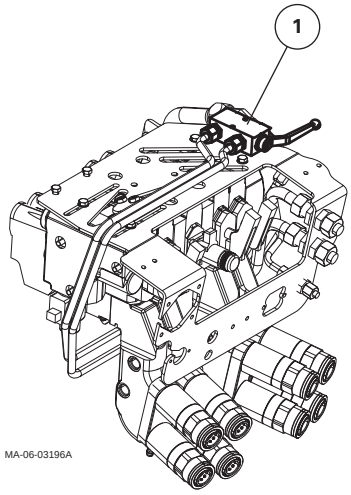


Fig. 7

Fig. 8

Special point

- When the valves are closed, the ram is hydraulically isolated from the auxiliary spool valve. This allows normal use of the spool valve.

Remark

Operation is identical for all tractors.

Note: Periodically grease the safety lock mechanism and the mobile plate control cable.

Checking the safety locking

- Open the valves and check that the locks engage correctly by acting upon the auxiliary lever of the spool valve concerned, placing it in both positions.
- The hook must not extend beyond the plate (2) (Fig. 6). If it does, investigate the cause of the problem.

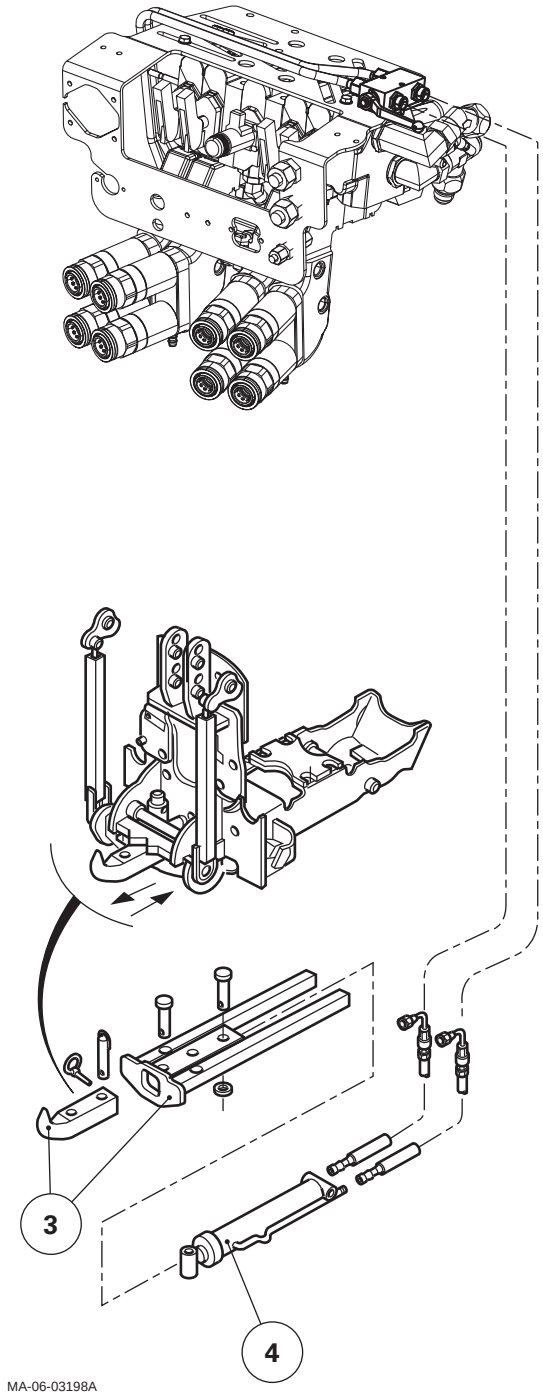


Fig. 9

6A18 - GPA20 rear wheels / hubs

CONTENTS

A . General

GPA20 transmissions are fitted with Heavy Duty (HD) trumpets with a flanged axle shaft.

The wheel disc is made from steel. The rear wheel track can be adjusted by turning the rim and/or disc (depending on model).

B . Description of assembly with flanged axle shaft and tightening torque for nuts

Heavy Duty trumpet

- Flanged shaft (3)
- "Steel" disc

Tightening torque

- Nuts (1) – M22 x 1.5: 400 -450 Nm

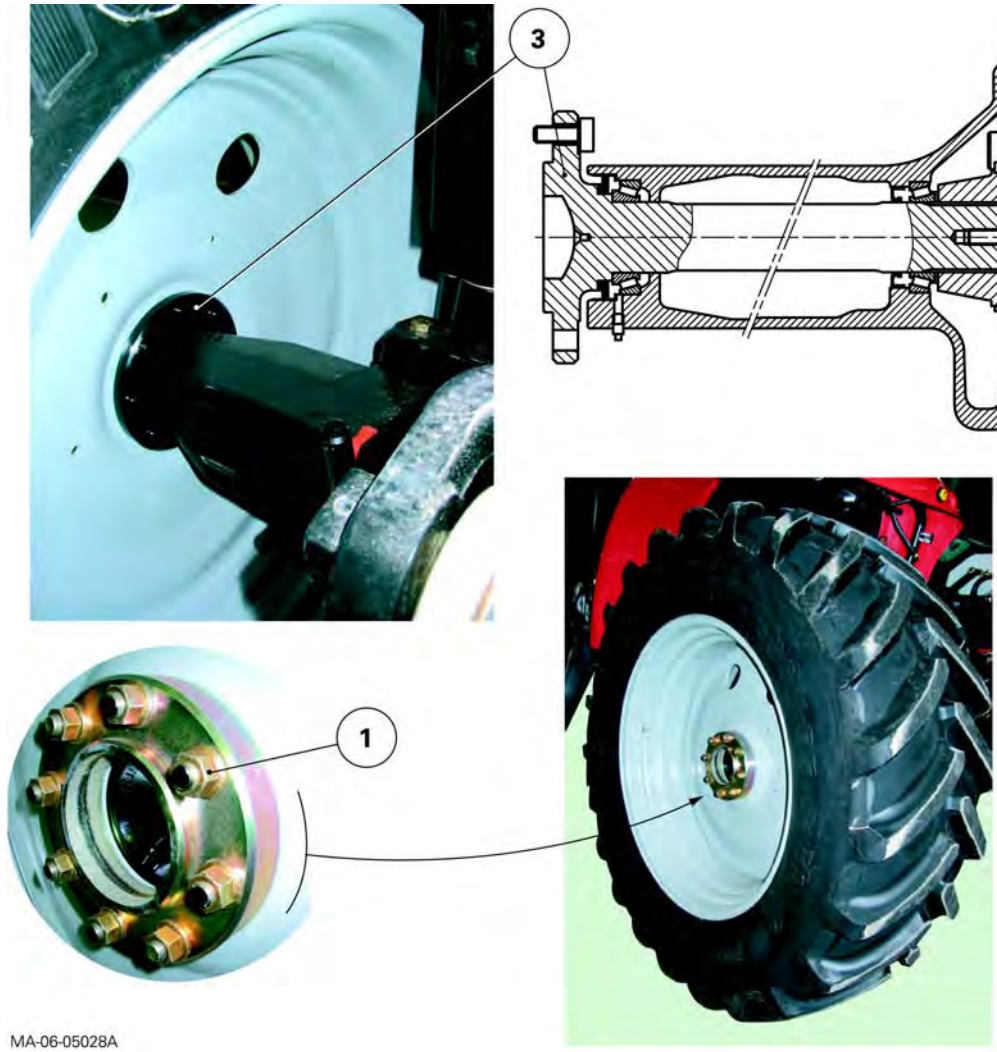


Fig. 1

C . Changing wheel track

Preliminary operation

1. Engage the parking brake in order to immobilise the tractor. Thoroughly chock the front wheels.

Adjusting the tractor rear wheel track

2. Unlock the wheel nuts (1) (Fig. 2) and lift the relevant side of the tractor.

3. Remove the nuts and the wheel.

Adjustment

4. According to the wheel track required for the flanged shaft, change the position of the rim and/or disc (depending on model).

Reminder

The rim spacer (2) (if fitted) can be positioned in different ways (Fig. 2):

- either on the outside of the rim disc,
- or for functional purposes between the shaft flange and the disc.

5. Refit the wheel and tighten the nuts (see § B).

D . Replacing a wheel stud

6. Drive off the defective stud with the help of a bronze drift and a hammer.

7. Clean the stud and its housing on the flange.

8. Dry using compressed air.

9. Place several drops of Loctite 270 or equivalent on the new stud serration.

10. Place the stud in the flange housing, and use a bronze sledgehammer and suitable hammer to knock it in until its head meets the inside flange of the wheel shaft.

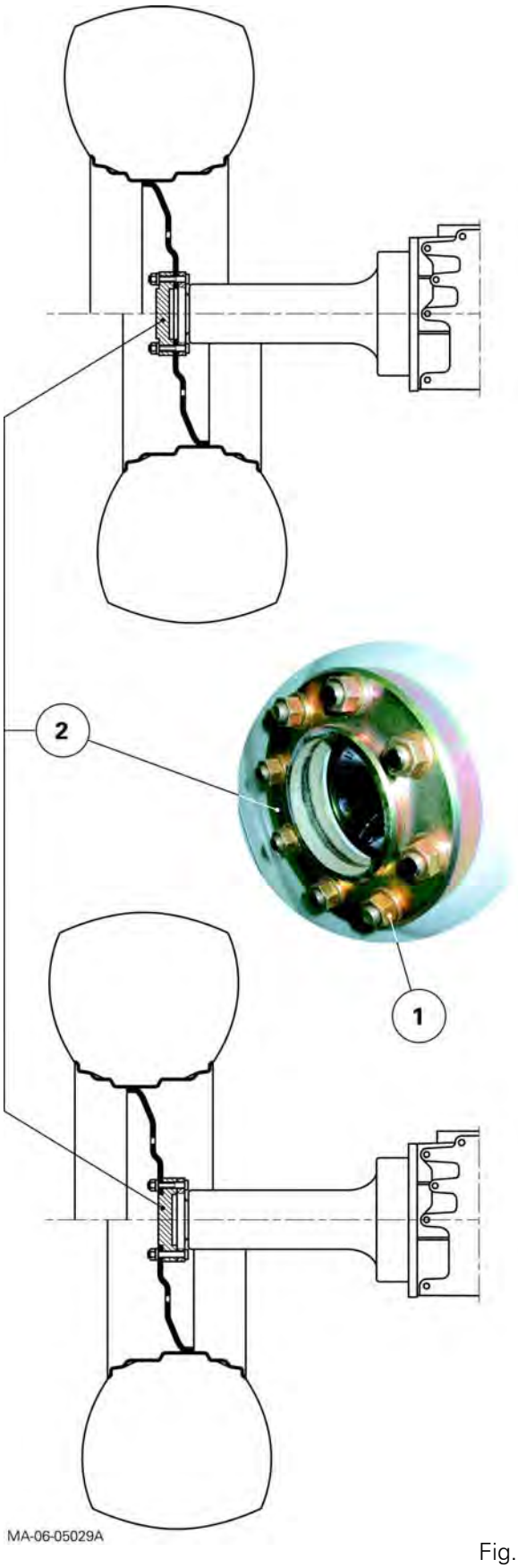


Fig. 2

6B10 - GPA40 - General - Operation

CONTENTS

A . General

The GPA40 rear axle comprises four housings:

- **the centre housing**

  On the inside, it supports:
  - the rear differential assembly and ring gear (see chapter 6);
  - the pinion (see chapter 6);
  - the PTO clutch (see chapter 7)

    NOTE: *On tractors fitted with GTA1540 transmission, the sensor located at the top of the centre housing, towards the front, measures the engine speed at the PTO clutch input;*
  - the 4WD clutch (see chapter 8);
  - the hand brake control mechanism (see chapter 6);
  - the annular pistons and main brake discs (see chapter 6)

    NOTE: *On tractors fitted with GTA1540 transmission (50 kph), the braking surface of the annular pistons and brake discs is optimised. A mechanical device controls the return of the annular pistons and cancels out any play resulting from the friction of the discs on the annular pistons when braking;*
  - the ParkLock device (depending on option) (see chapter 9);
  - the creeper unit control mechanism (optional) (see chapter 5).

  On the outside, it supports:
  - the right and left-hand hydraulic cover plates (see chapter 9);
  - the supports fitted to the upper part of the centre housing holding the support and linkage arms (see chapter 6).

    NOTE: *On tractors fitted with GTA1540 transmission, the centre housing is reinforced where the linkage support and rear PTO housing are attached. This is the case regardless of the tractor speed (40 or 50 kph).*

- **the PTO housing**

  It supports:
  - all variants of the PTO transmission (see chapter 7);
  - the PTO brake (see chapter 7).

- **the right and left-hand trumpet housings**

  These are fitted to either side of the centre housing and house the rear wheel drive system (see chapter 6).

  NOTE: *On tractors fitted with GTA1540 transmission, the number of tapped holes used to attach the trumpet housing to the centre housing differs according to the type of trumpet housing:*
  - *Normal Duty and Heavy Duty trumpet housings: 9 tapped holes;*
  - *sealed Heavy Duty trumpet housings: 15 tapped holes;*
  - *trumpet housings with composite final drive: 15 tapped holes.*

  The trumpet housings are sealed by special seals located:
  - for Heavy Duty and sealed Heavy Duty trumpet housings: in the trumpet housings and between the trumpet housings and centre housing;
  - for Normal Duty trumpet housings: between the trumpet housings and centre housing;
  - for trumpet housings with a composite final drive: between the trumpet housings and centre housing.

In this section, only a partial description is given of each component, as more specific and detailed descriptions are given in their respective sections.

B . Layout of the main components

2-speed PTO version

Fig. 1: Tractors fitted with GTA1040 transmission
Fig. 2: Tractors fitted with GTA1540 transmission

Parts list (Fig. 1)

(1) Lubrication pipes (PTO clutch, hand brake discs, PTO transmission and 4WD clutch)
(2) Centre housing
(3) PTO housing
(4) Crownwheel and pinion and rear differential
(5) Hand brake mechanism
(6) Creeper unit control mechanism (depending on option).
(7) PTO clutch
(8) 540-1000 rpm driven gears
(9) 4WD clutch
(10) ParkLock device (depending on option)
(12) Interchangeable end fitting
(13) 540-1000 rpm driving gears

2-speed PTO version for tractors fitted with GTA1040 transmission

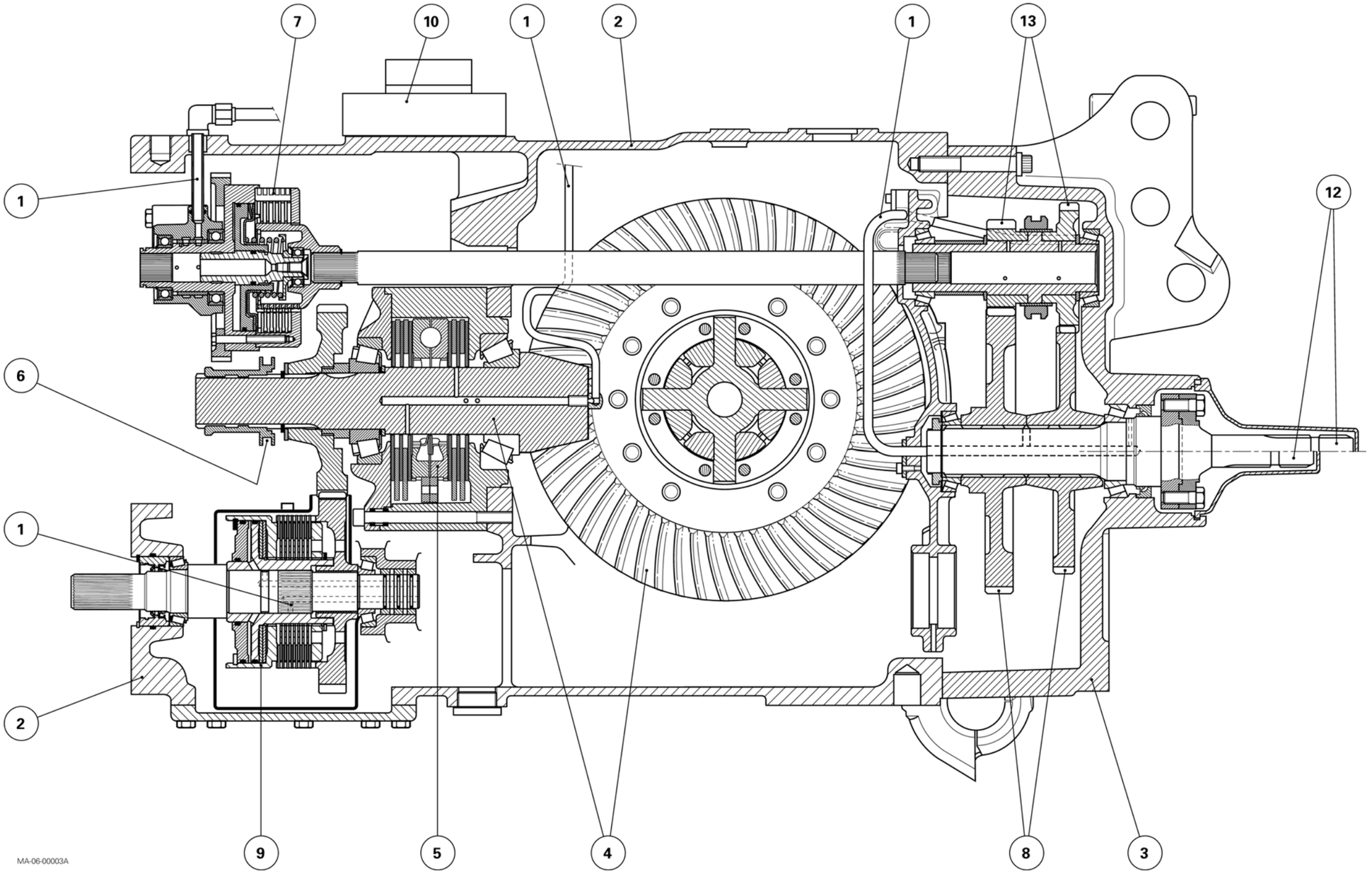


Fig. 1

Parts list (Fig. 2)

(1) Lubrication pipes (PTO clutch, hand brake discs, PTO transmission and 4WD clutch)
(2) Centre housing
(3) PTO housing
(4) Crownwheel and pinion and rear differential
(5) Hand brake mechanism
(6) Creeper unit control mechanism (depending on option).
(7) PTO clutch
(8) 540-1000 rpm driven gears
(9) 4WD clutch
(10) ParkLock device (depending on option)
(12) Interchangeable end fitting
(13) 540-1000 rpm driving gears

2-speed PTO version for tractors fitted with GTA1540 transmission

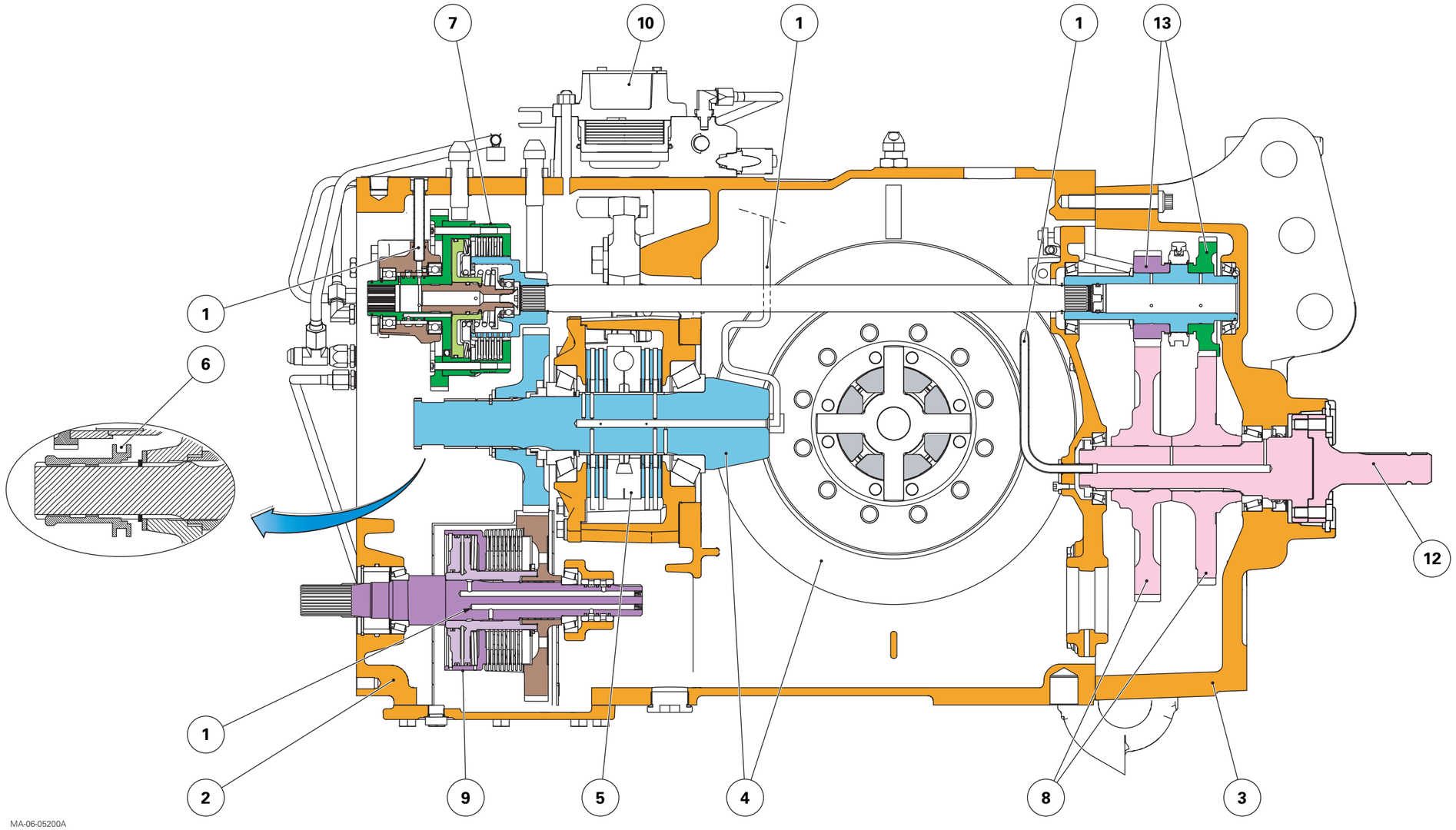


Fig. 2

3-speed PTO version

Fig. 3: Tractors fitted with GTA1040 transmission
Fig. 4: Tractors fitted with GTA1540 transmission

Parts list (Fig. 3)

(1) Lubrication pipes (PTO clutch, hand brake discs, PTO transmission and 4WD clutch)
(2) Centre housing
(3) PTO housing
(4) Crownwheel and pinion and rear differential
(5) Hand brake mechanism
(6) Creeper unit control mechanism (depending on option).
(7) PTO clutch
(8) 540 E driven gear
(9) 4WD clutch
(10) ParkLock device (depending on option)
(12) Interchangeable end fitting
(13) 540 E driving gear

3-speed PTO version for tractors fitted with GTA1040 transmission

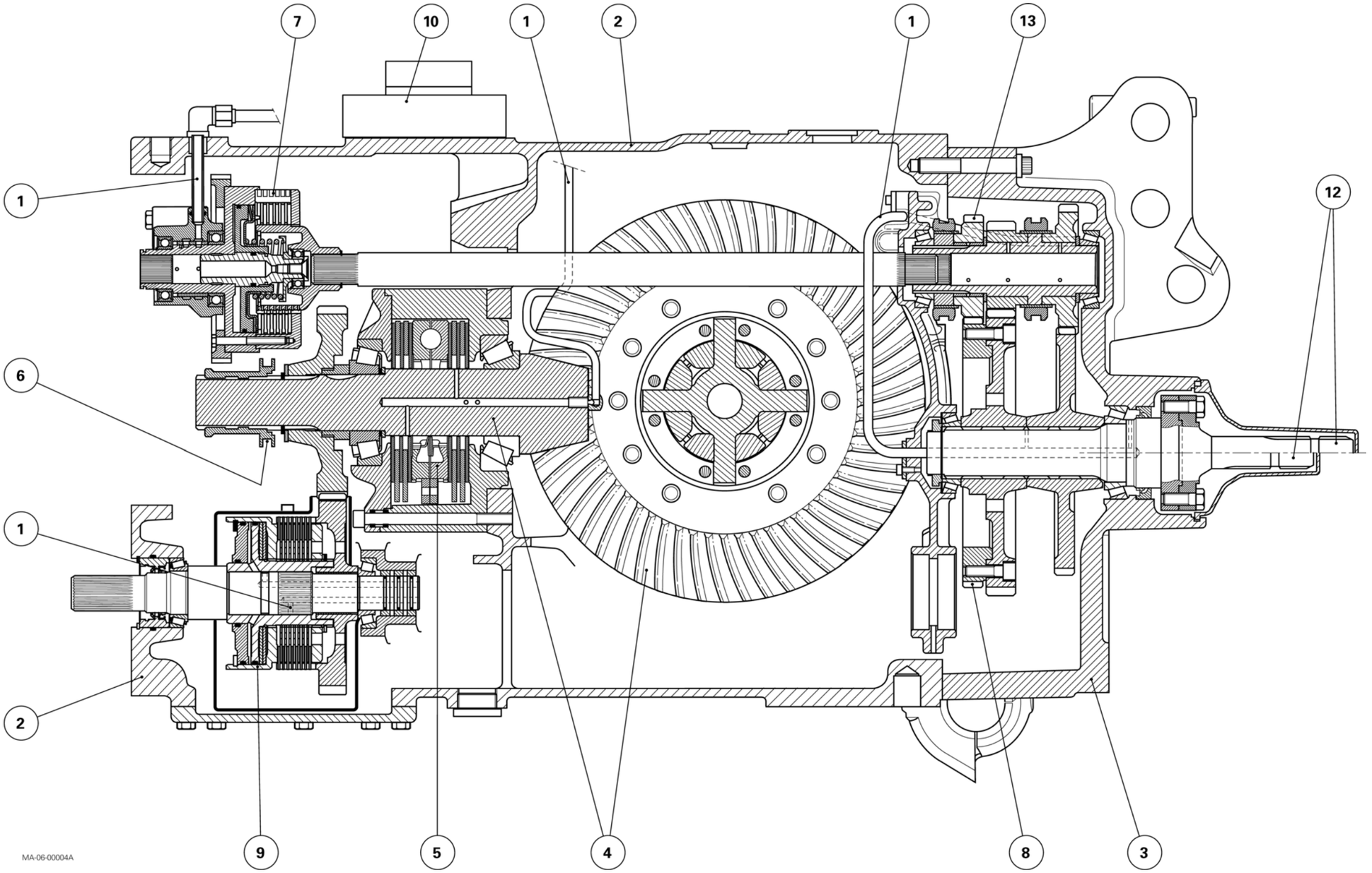


Fig. 3

Parts list (Fig. 4)

(1) Lubrication pipes (PTO clutch, hand brake discs, PTO transmission and 4WD clutch)
(2) Centre housing
(3) PTO housing
(4) Crownwheel and pinion and rear differential
(5) Hand brake mechanism
(6) Creeper unit control mechanism (depending on option).
(7) PTO clutch
(8) 540 E driven gear
(9) 4WD clutch
(10) ParkLock device (depending on option)
(12) Interchangeable end fitting
(13) 540 E driving gear

3-speed PTO version for tractors fitted with GTA1540 transmission

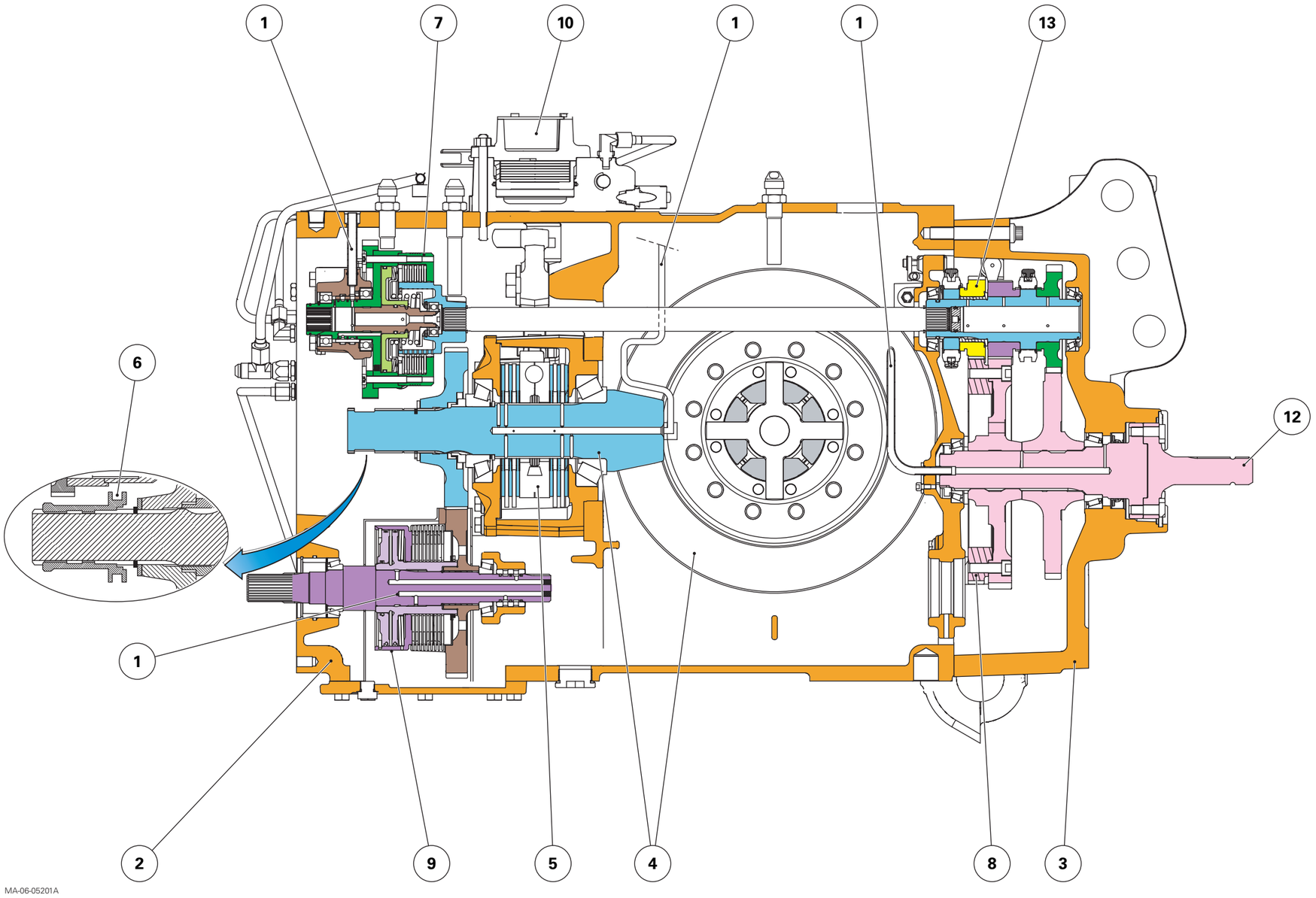


Fig. 4

GSPTO version

Fig. 5: Tractors fitted with GTA1040 transmission

Fig. 6: Tractors fitted with GTA1540 transmission (40 kph only)

Parts list (Fig. 5)

(1) Lubrication pipes (PTO clutch, hand brake discs, PTO transmission and 4WD clutch)
(2) Centre housing
(3) PTO housing
(4) Crownwheel and pinion and rear differential
(5) Hand brake mechanism
(6) Creeper unit control mechanism (depending on option).
(7) PTO clutch
(9) 4WD clutch
(10) ParkLock device (depending on option)
(11) GSPTO (depending on option)
(12) Interchangeable end fitting

GSPTO version for tractors fitted with GTA1040 transmission

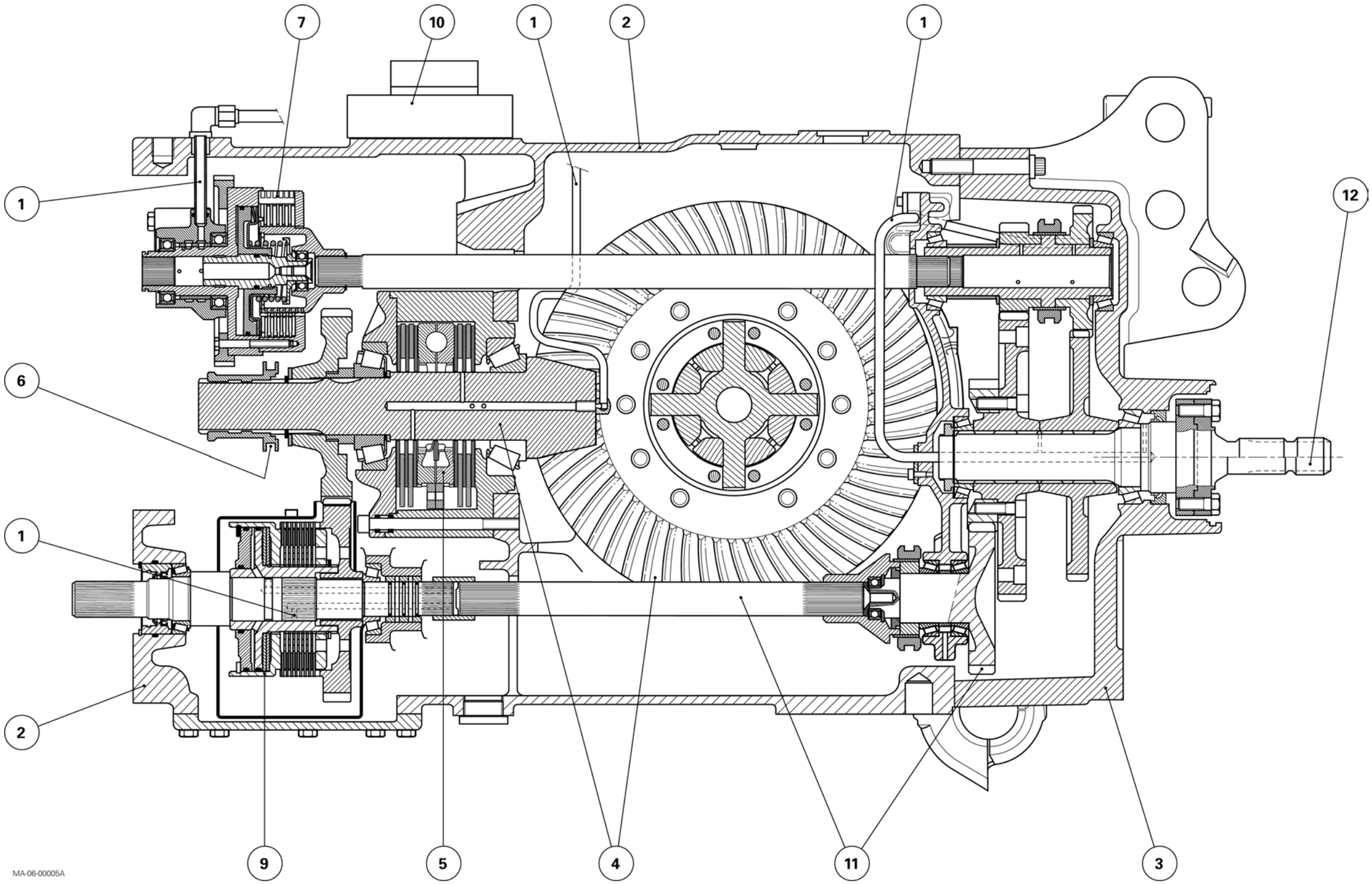


Fig. 5

Parts list (Fig. 6)

(1) Lubrication pipes (PTO clutch, hand brake discs, PTO transmission and 4WD clutch)
(2) Centre housing
(3) PTO housing
(4) Crownwheel and pinion and rear differential
(5) Hand brake mechanism
(6) Creeper unit control mechanism (depending on option).
(7) PTO clutch
(9) 4WD clutch
(10) ParkLock device (depending on option)
(11) GSPTO (40 kph only)
(12) Interchangeable end fitting

GSPTO version for tractors fitted with GTA1540 transmission

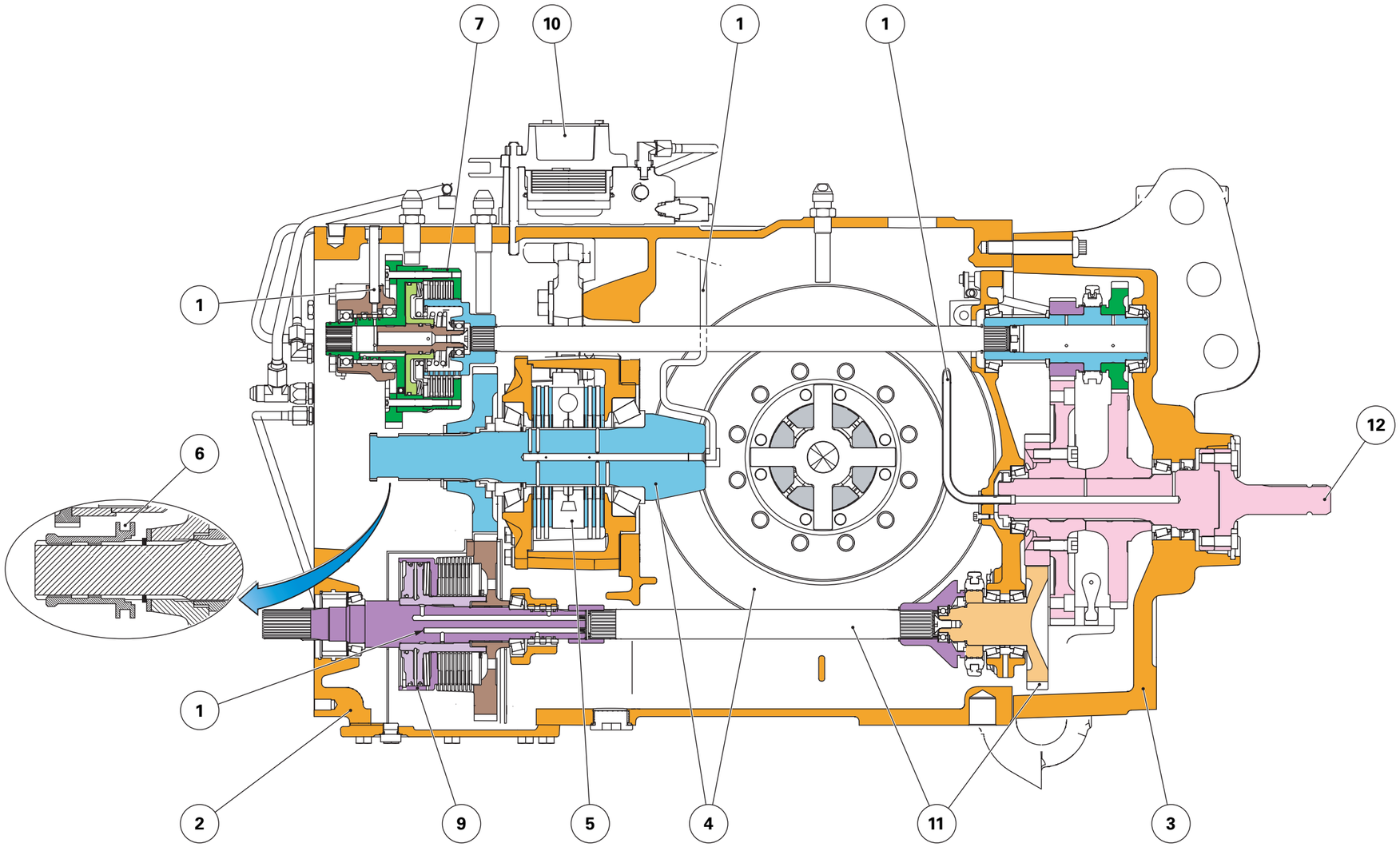


Fig. 6

C . Specifications for 40 kph GPA40 rear axle

Fig. 7, Fig. 8: Tractors fitted with GTA1040 transmission

Fig. 9 to Fig. 11: Tractors fitted with GTA1540 transmission

Tractors fitted with GTA1040 transmission

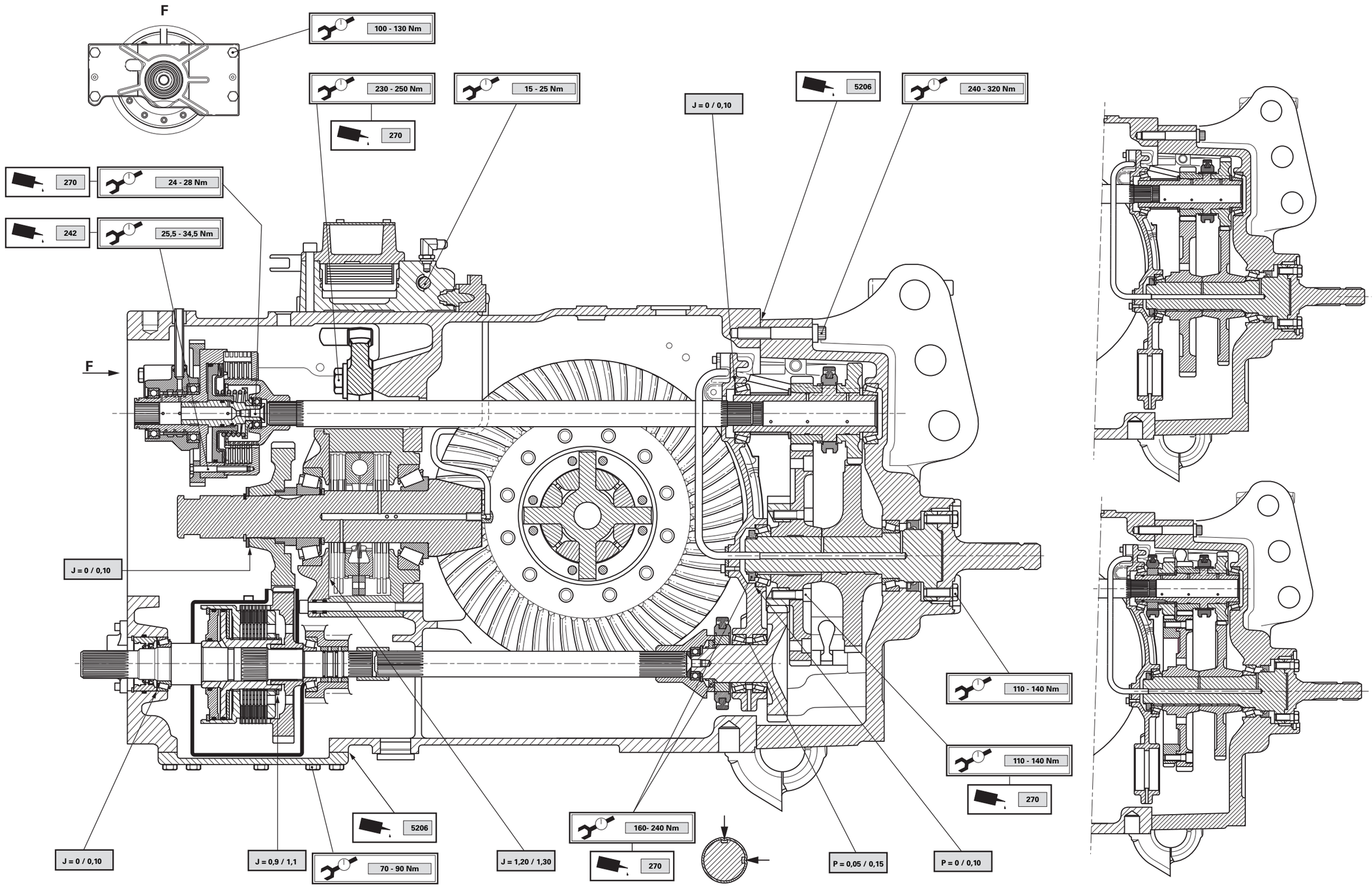


Fig. 7

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Tractors fitted with GTA1040 transmission

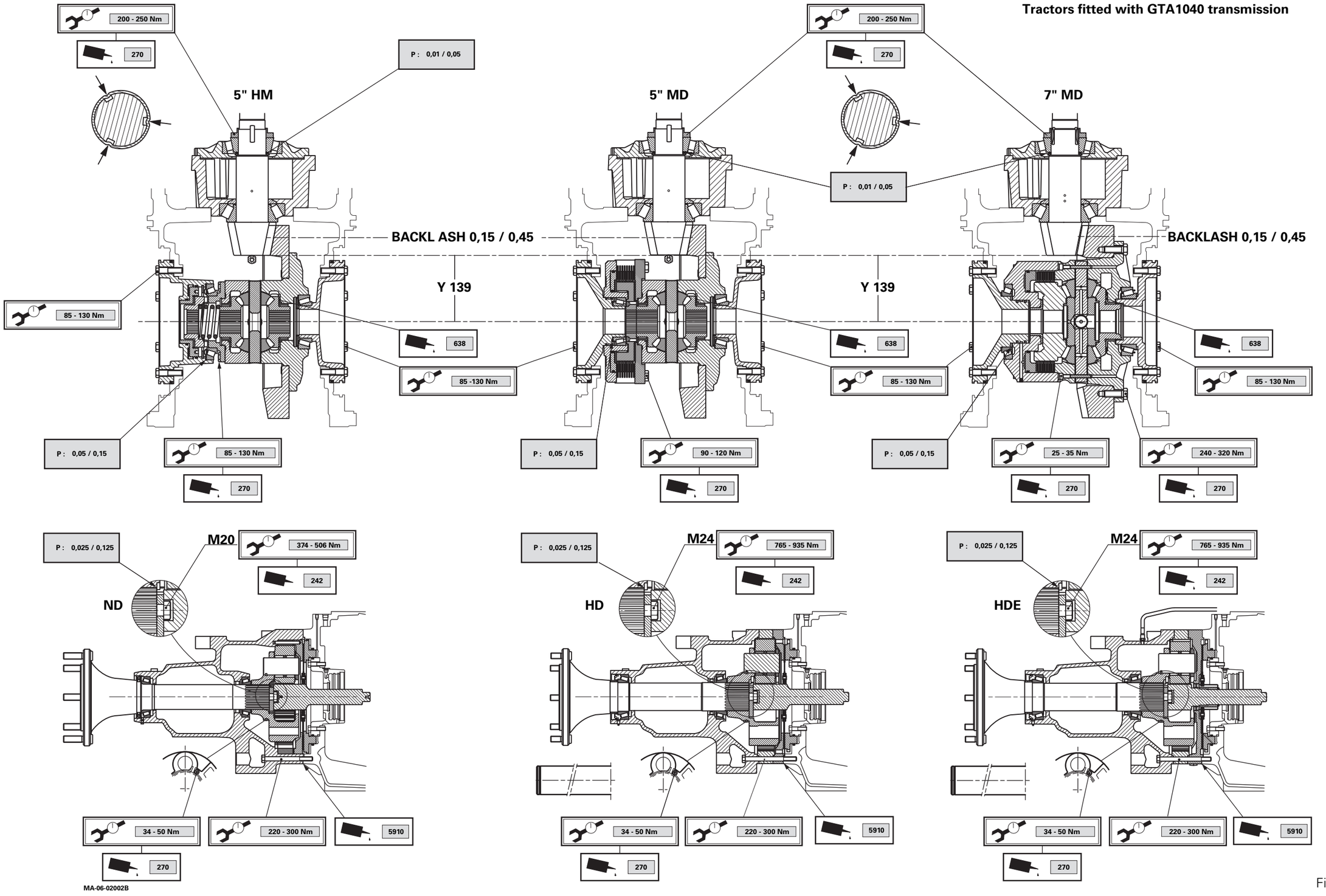

Fig. 8

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Tractors fitted with GTA1540 transmission

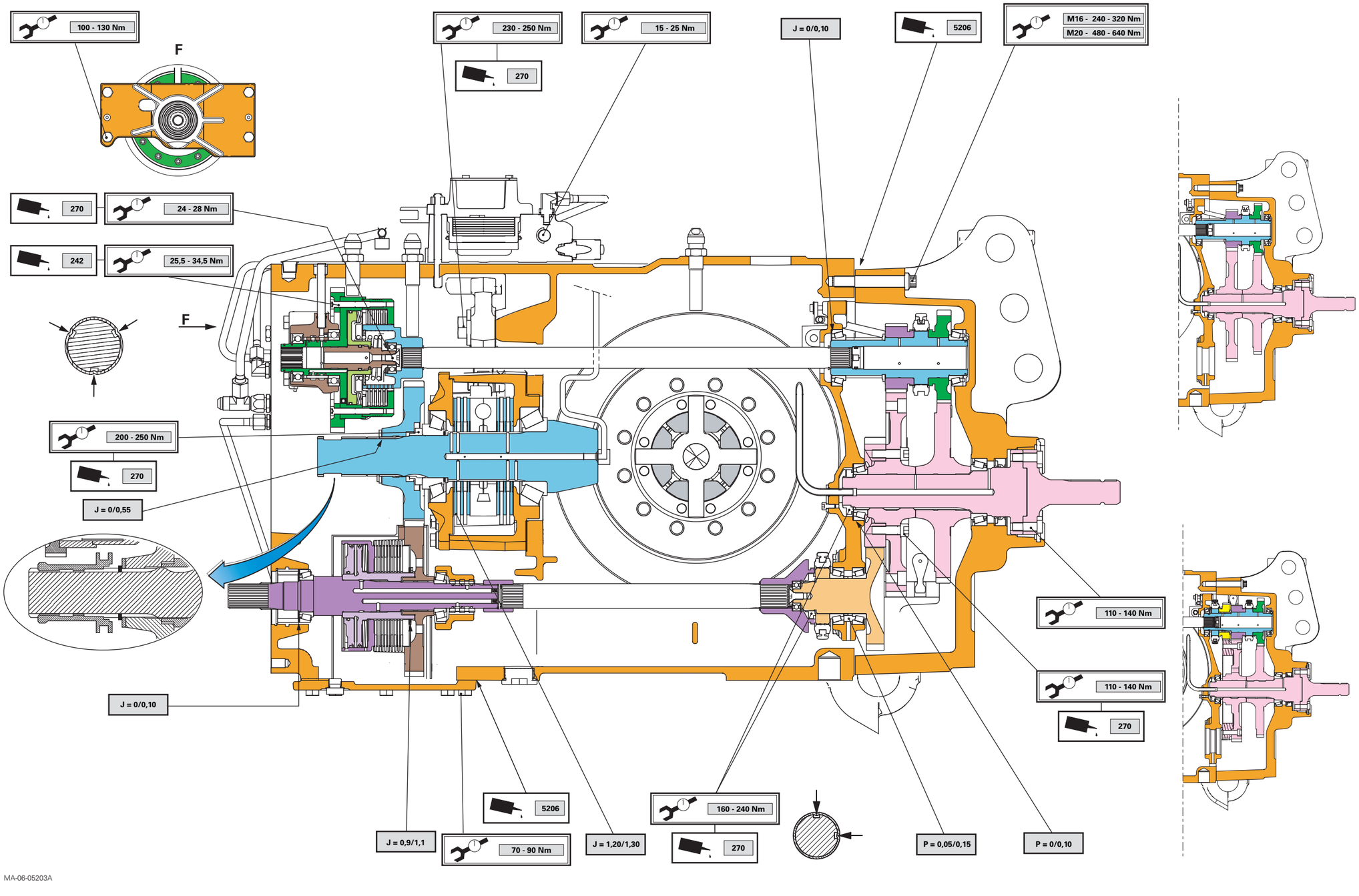

Fig. 9

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Tractors fitted with GTA1540 transmission

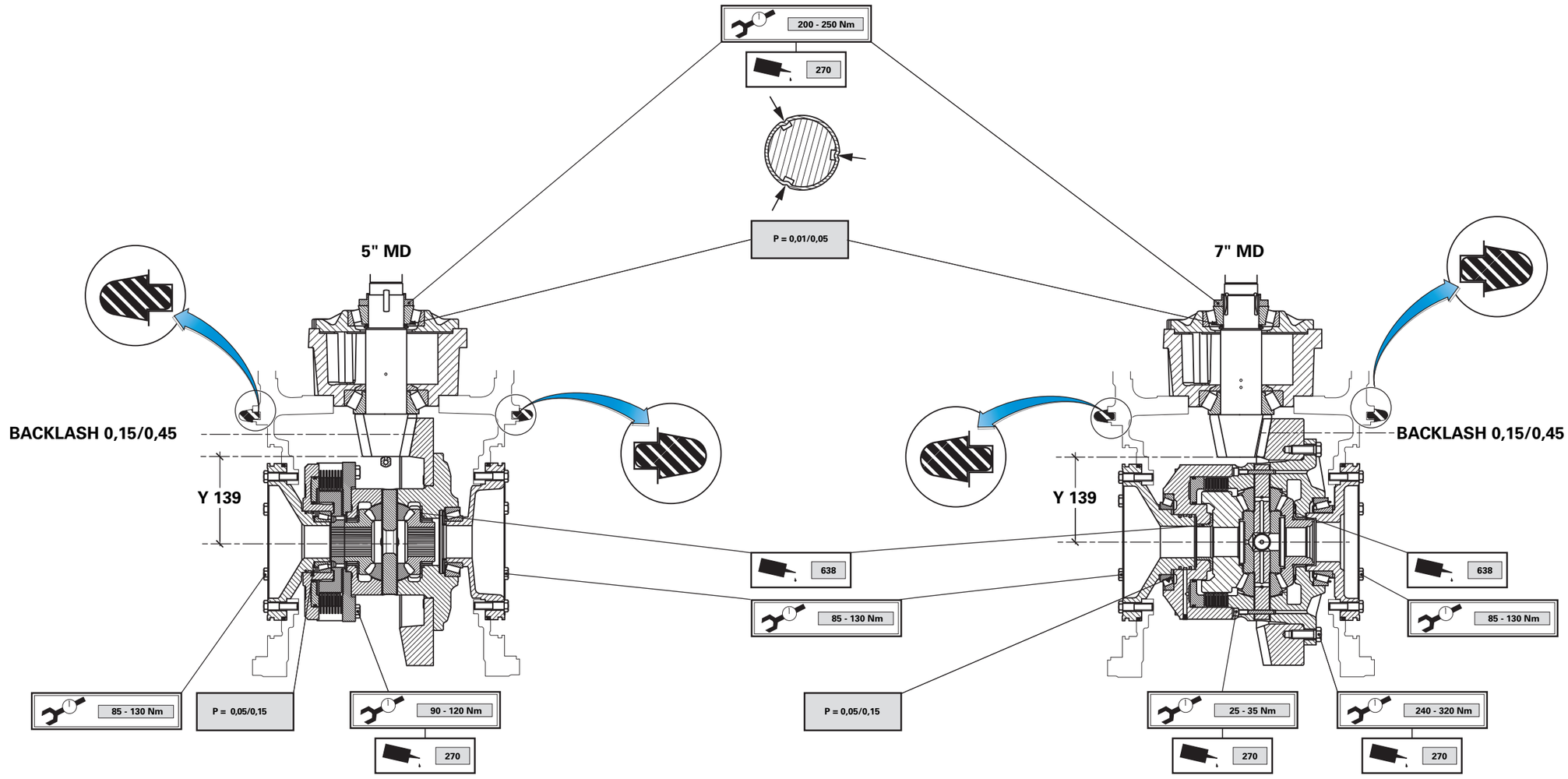

Fig. 10

Legend (Fig. 11)

1 Normal Duty trumpet housing

2 Heavy Duty trumpet housing

3 Heavy Duty sealed trumpet housing

4 Trumpet housing with composite final drive

Tightening torques

On tractors fitted with GTA1540 transmission, the tightening of the M20 or M24 screw (depending on assembly) to a torque of **A** or **B** (Fig. 11) respectively is carried out in a specific manner explained in the sections of chapter 6 regarding the different types of trumpet housings concerned.

IMPORTANT: *This method must be strictly adhered to in order to ensure that this screw, which fixes the axle shaft to the planet carrier, is tightened and locked correctly.*

Tractors fitted with GTA1540 transmission

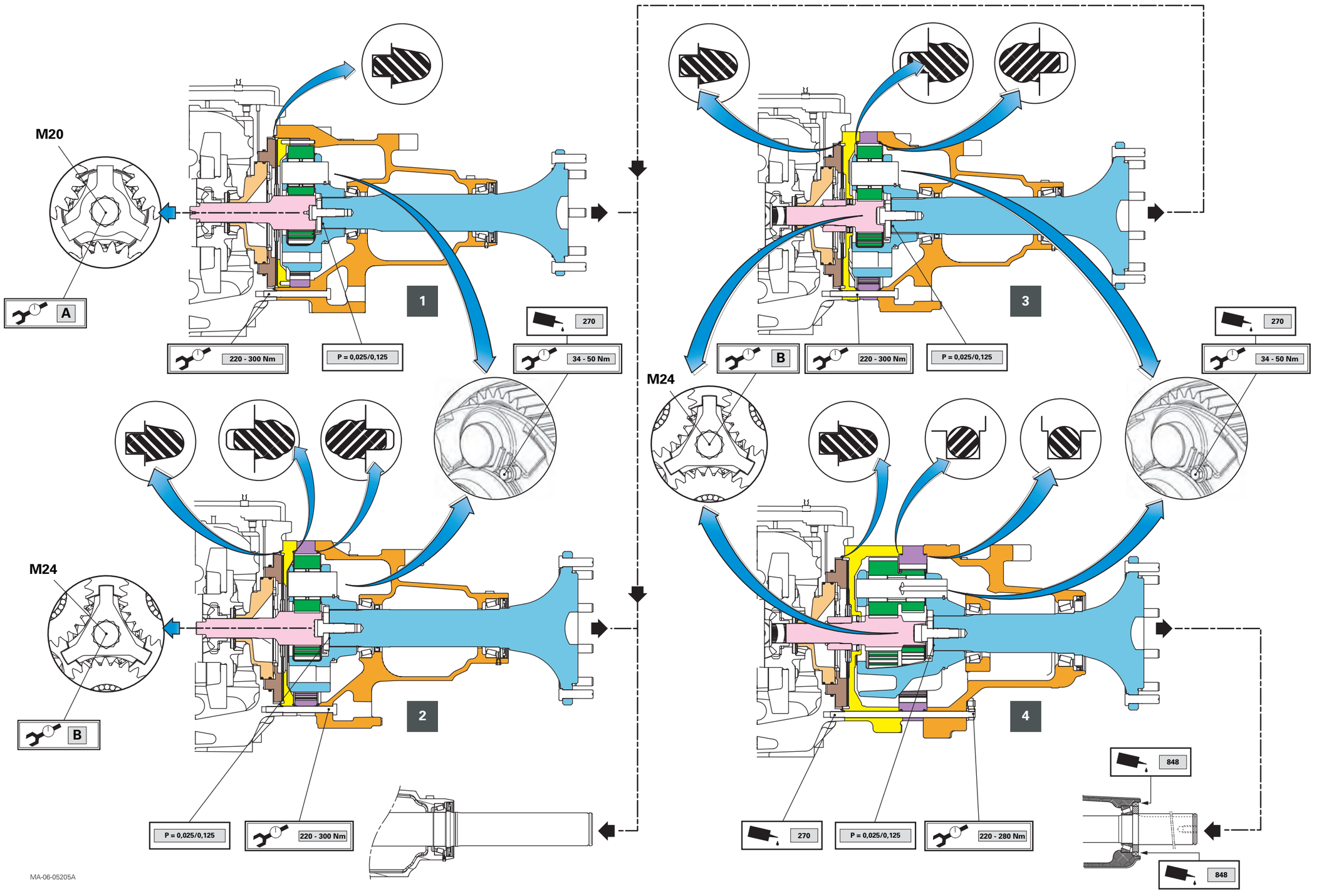

Fig. 11

D . Specifications for 50 kph GPA40 rear axle

See Fig. 12 to Fig. 14

NOTE: *The 50 kph GPA40 rear axle is only available on tractors fitted with GTA1540 transmission.*

Tractors fitted with GTA1540 transmission

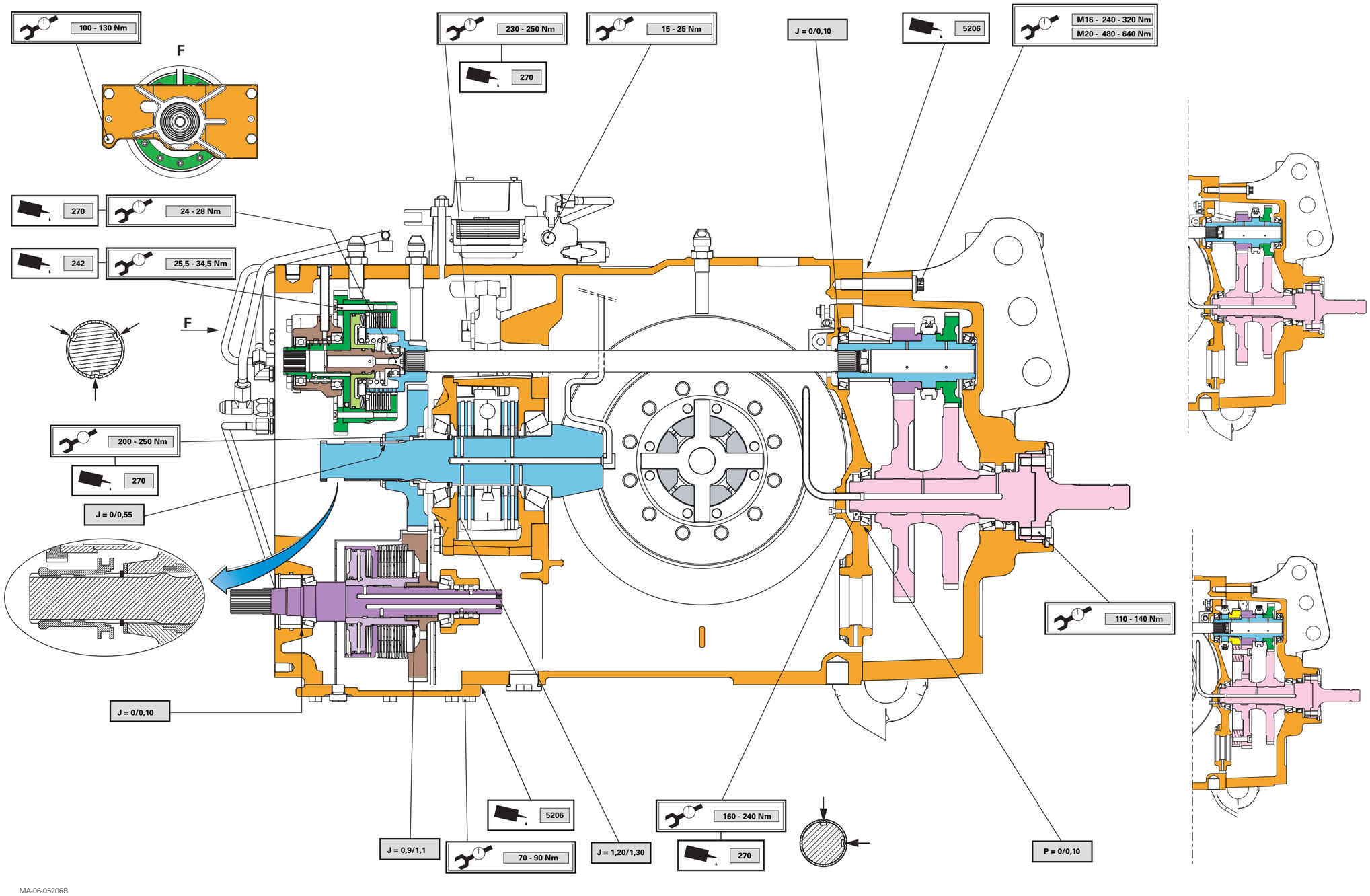

Fig. 12

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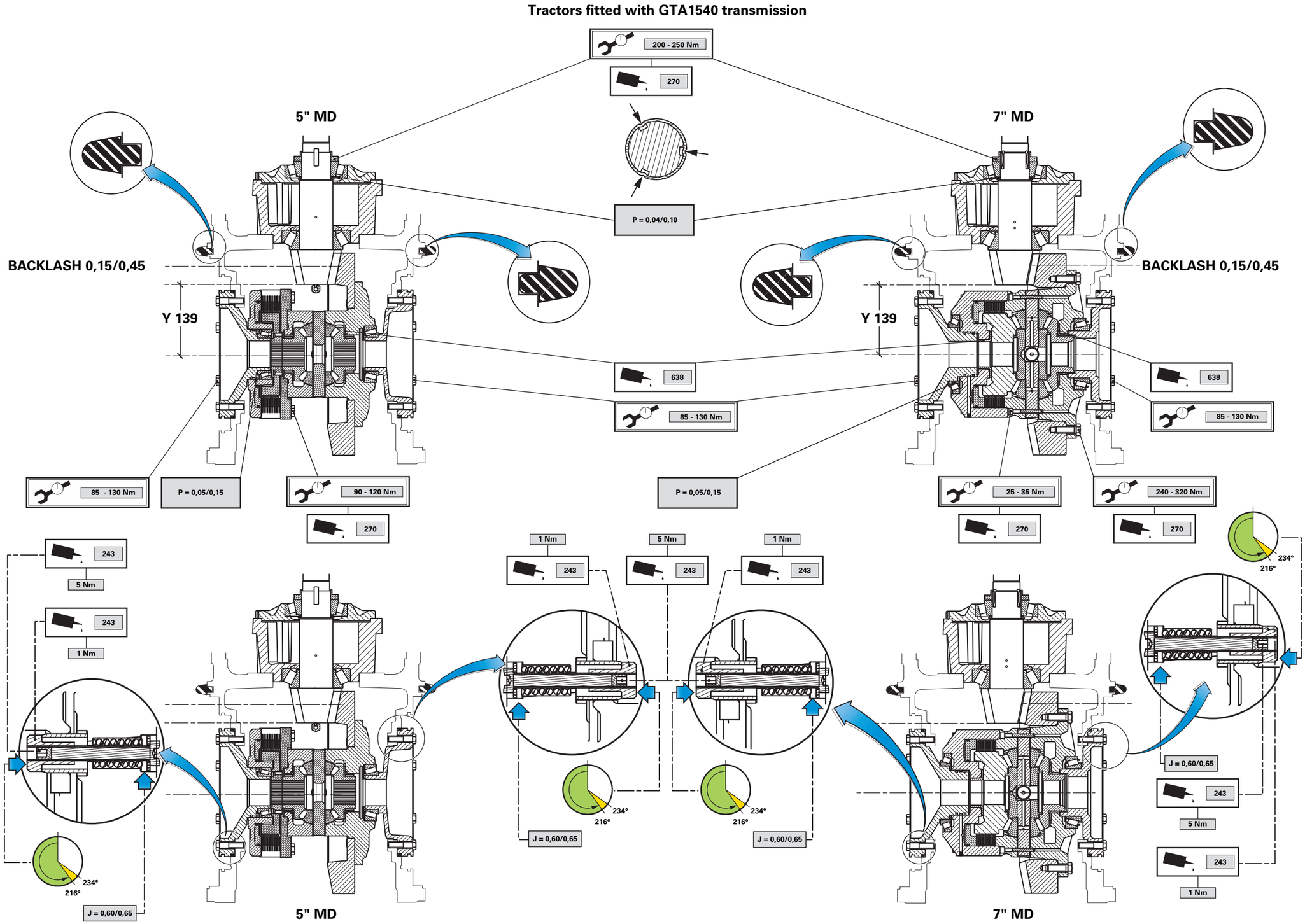

Tractors fitted with GTA1540 transmission
200 - 250 Nm
270
P = 0,04/0,10
5" MD
7" MD
BACKLASH 0,15/0,45
Y 139
638
85 - 130 Nm
85 - 130 Nm
P = 0,05/0,15
90 - 120 Nm
270
25 - 35 Nm
240 - 320 Nm
243
5 Nm
1 Nm
234°
216°
J = 0,60/0,65
MA-06-05207A
5" MD
7" MD

Fig. 13

Legend (Fig. 14)

1 Normal Duty trumpet housing

2 Heavy Duty trumpet housing

3 Heavy Duty sealed trumpet housing

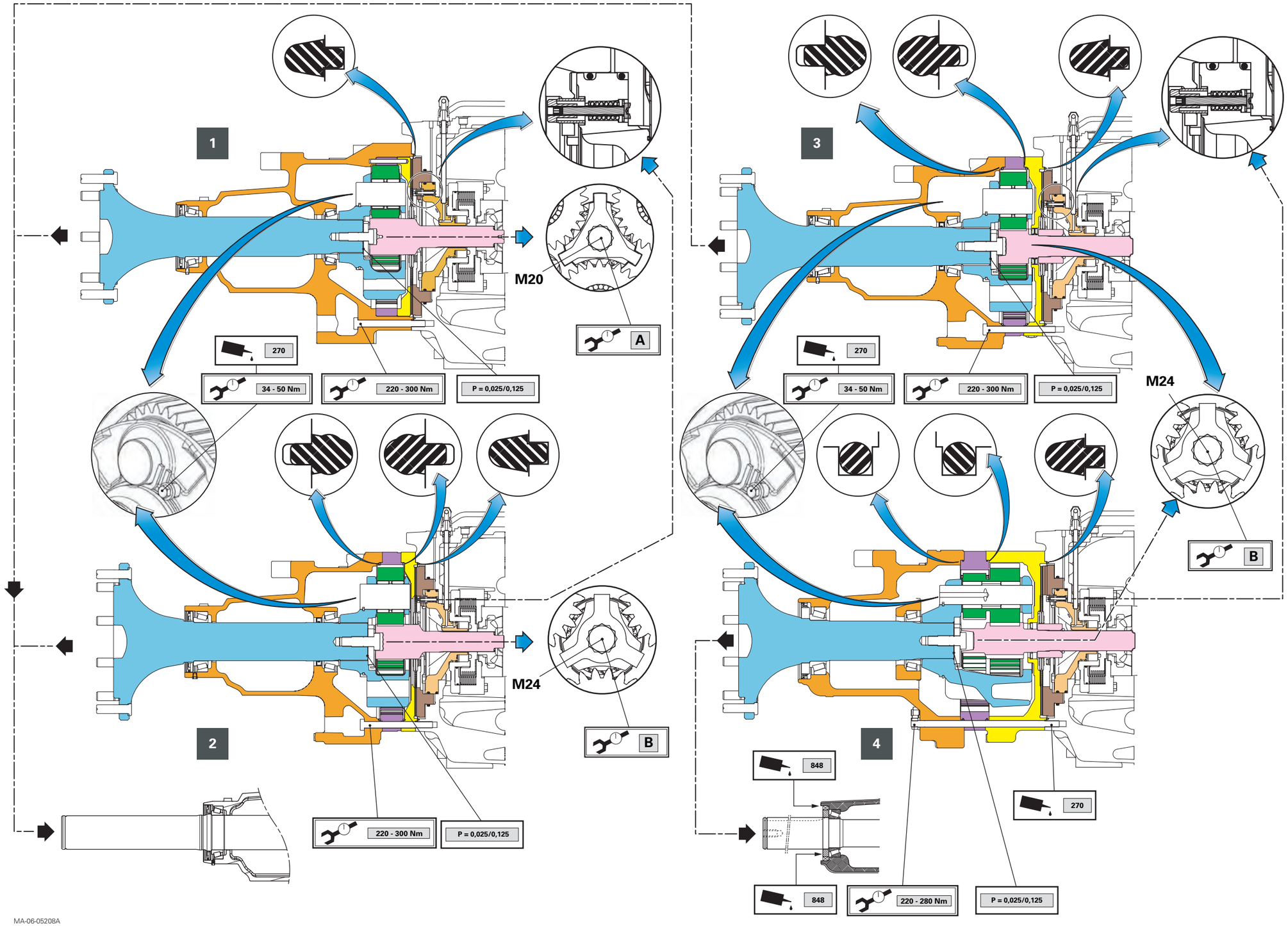
4 Trumpet housing with composite final drive

Tightening torques

On tractors fitted with GTA1540 transmission, the tightening of the M20 or M24 screw (depending on assembly) to a torque of **A** or **B** (Fig. 14) respectively is carried out in a specific manner explained in the sections of chapter 6 regarding the different types of trumpet housings concerned.

IMPORTANT: *This method must be strictly adhered to in order to ensure that this screw, which fixes the axle shaft to the planet carrier, is tightened and locked correctly.*

Tractors fitted with GTA1540 transmission



MA-06-05208A

Fig. 14

6B11 - GPA40 - Normal Duty trumpet housings

CONTENTS

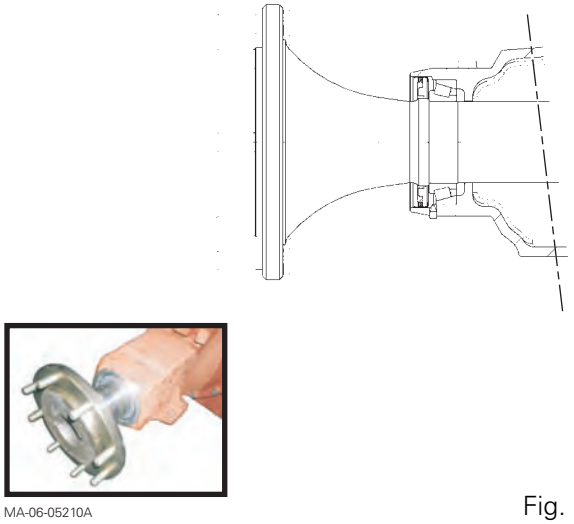
GPA40 - Normal Duty trumpet housings

A . General

The Normal Duty (ND) trumpet housings on tractors fitted with GTA1040 or GTA1540 transmission support the right and left-hand axle shafts. They contain the final drive units that transmit the rotation from the differential assembly.

Tractors fitted with GTA1540 transmission may be fitted with trumpet housings with a flanged axle shaft or straight axle shaft (Fig. 1, Fig. 2).

The two trumpet housings are symmetrical. They are fitted either side of the centre housing.



MA-06-05210A

Fig. 1

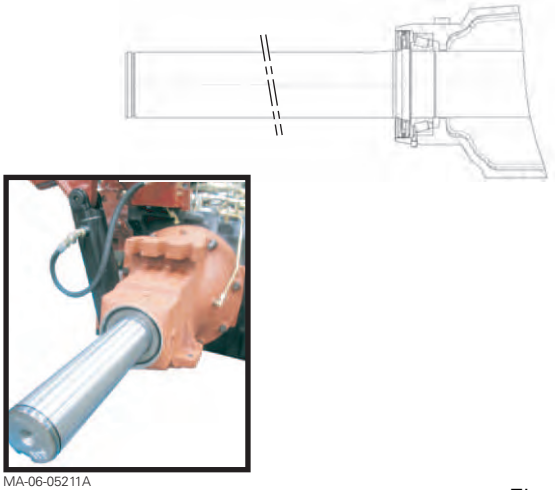


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Fig. 2

Construction

The axle shaft (2) is supported by two tapered roller bearings (7) (8) and (12) (13) fitted opposite one another.

External tightness is ensured via a three-lipped seal (5) and internal tightness by a single lip seal (11).

The planet carrier assembly of the final drive unit (25) has three planet gears (22). It is splined to the axle shaft (2) in rotation. The shims (26) fitted at the end of the shaft allow for preloading of the tapered roller bearings.

The final drive ring gear (15) is force fitted into the trumpet housing. It has five pins (14),which ensure the centring of the brake plate (30).

Differential rotation is transmitted to the planet gears of the final drive via a sun gear shaft (29) on the teeth of which the brake disc (35) is fitted.

The brakes are lubricated via a port O drilled in the trumpet housing (Fig. 3, Fig. 5).

On tractors fitted with GTA1540 transmission (50 kph), the brake discs (35) and plates (30) have a larger braking surface area.

On tractors fitted with GTA1540 transmission, the axle shaft (2) and planet carrier (25) are held in place by the tripod washer (27), the M20 screw (28) and the lock washer (1) (Fig. 5).

On tractors fitted with GTA1040 transmission, the axle shaft (2) and the planet carrier (25) are held in place by the tripod washer (27) and the M20 screw (28) smeared with Loctite (Fig. 3).

GPA40 - Normal Duty trumpet housings

Parts lists

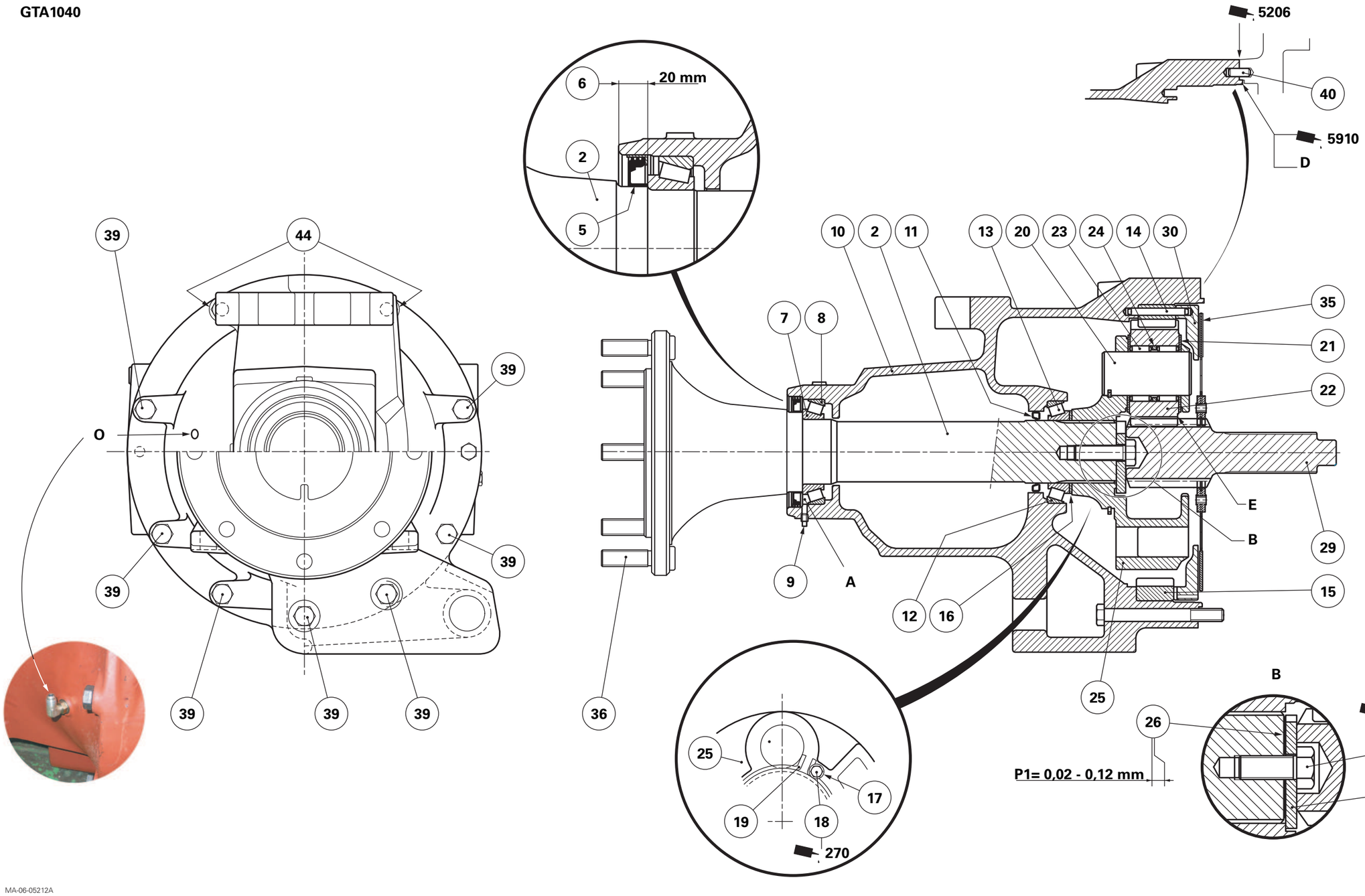
Tractors fitted with GTA1040 transmission (Fig. 3, Fig. 4)

(2) Flanged axle shaft
(5) Three-lipped seal
(6) Friction cage
(7) Bearing cone
(8) Bearing cup
(9) Threaded plug
(10) Trumpet housing
(11) Single lip seal
(12) Bearing cup
(13) Bearing cone
(14) Pins
(15) Ring gear
(16) Tab washer
(17) Spacer
(18) Screw
(19) Circlip
(20) Planet gear pins
(21) Washers
(22) Planet gears
(23) Needle rollers
(24) Spacers
(25) Planet carrier
(26) Shim(s)
(27) Tripod washer
(28) M20 screw
(29) Sun gear
(30) Brake plate
(35) Brake disc
(36) Wheel stud
(39) Screw
(40) Dowel
(44) M16 stud, washers and nuts

Legend
A Grease chamber
B Details
D Silicone seal
E Imprint on planet gears
O Brake lubricating port

View of the assembly

GTA1040



MA-06-05212A

Fig. 3

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Blown-up view

GTA1040

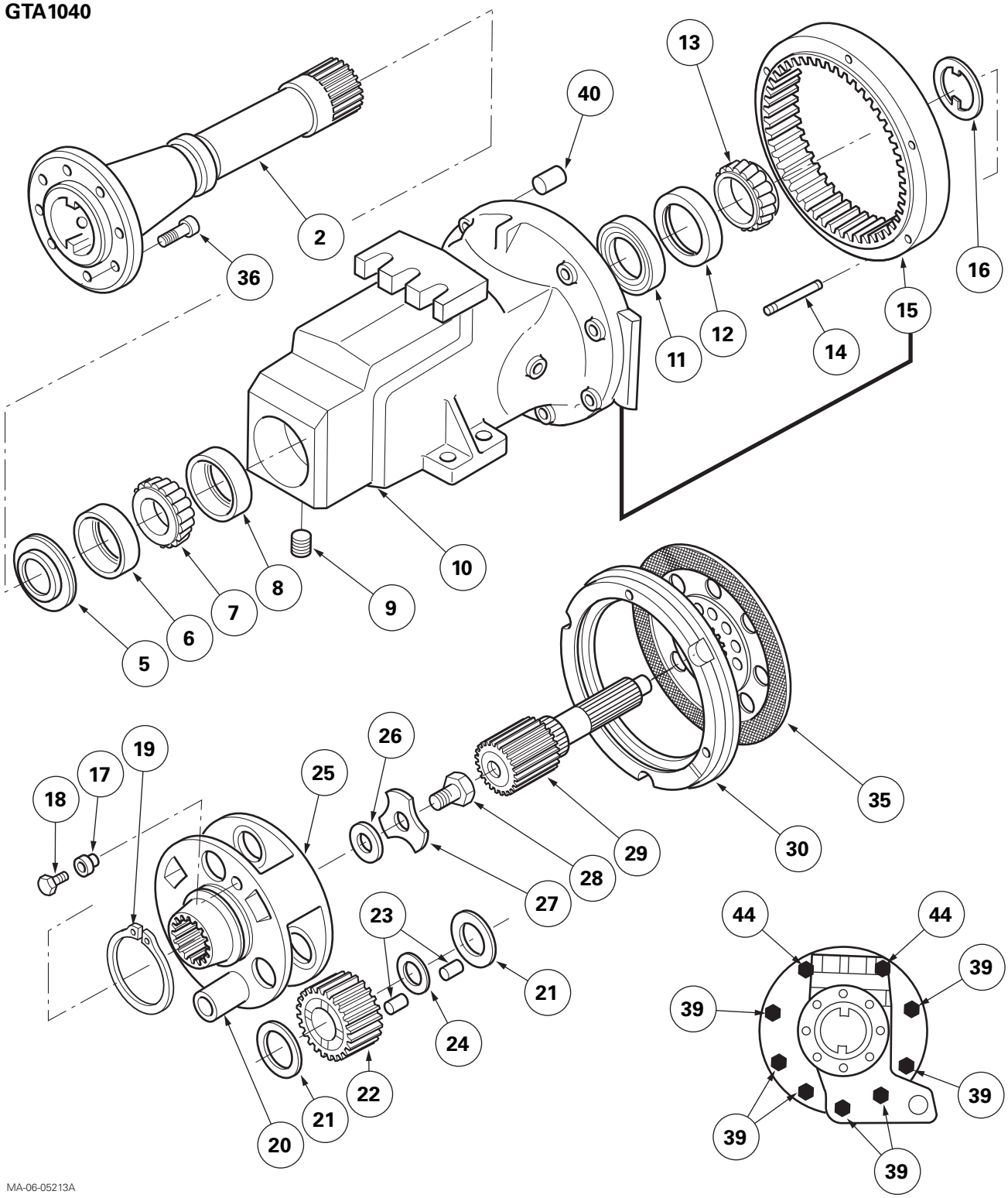

Fig. 4

Tractors fitted with GTA1540 transmission
(Fig. 5, Fig. 6)

(1) Lock washer
(2) Straight axle shaft
(2) Flanged axle shaft
(3) HNBR seal
(5) Three-lipped seal
(6) Friction cage
(7) Bearing cone
(8) Bearing cup
(9) Threaded plug
(10) Trumpet housing
(11) Single lip seal
(12) Bearing cup
(13) Bearing cone
(14) Pins
(15) Ring gear
(16) Tab washer
(17) Spacer
(18) Screw
(19) Circlip
(20) Planet gear pins
(21) Washers
(22) Planet gears
(23) Needle rollers
(24) Spacers
(25) Planet carrier
(26) Shim(s)
(27) Tripod washer
(28) M20 screw
(29) Sun gear
(30) Brake plate
(35) Brake disc
(36) Wheel stud
(39) Screw
(40) Dowel
(44) M16 stud, washers and nuts

Legend

A Grease chamber
E Imprint on planet gears
O Brake lubricating port

View of the assembly

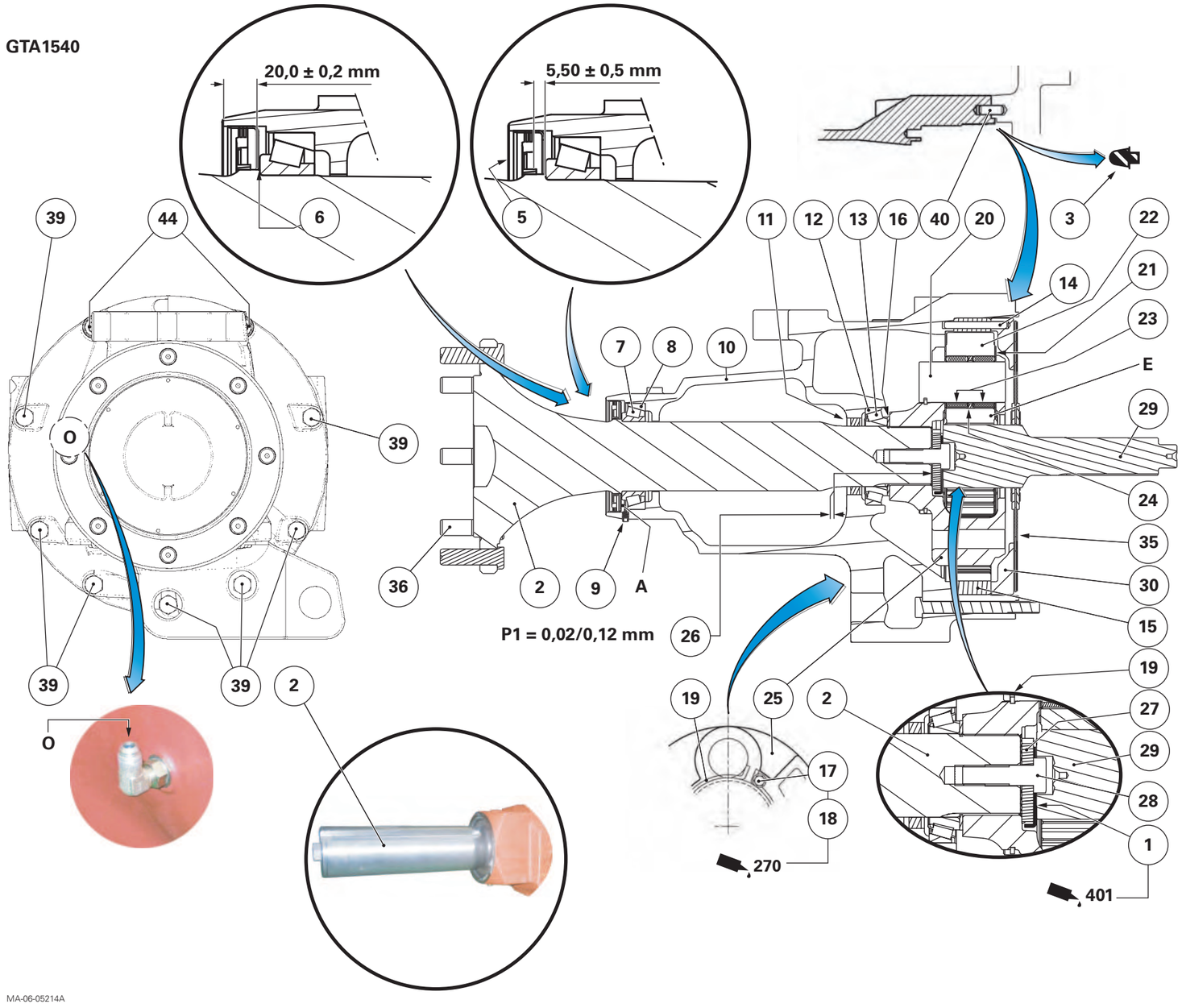

Fig. 5

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Blown-up view

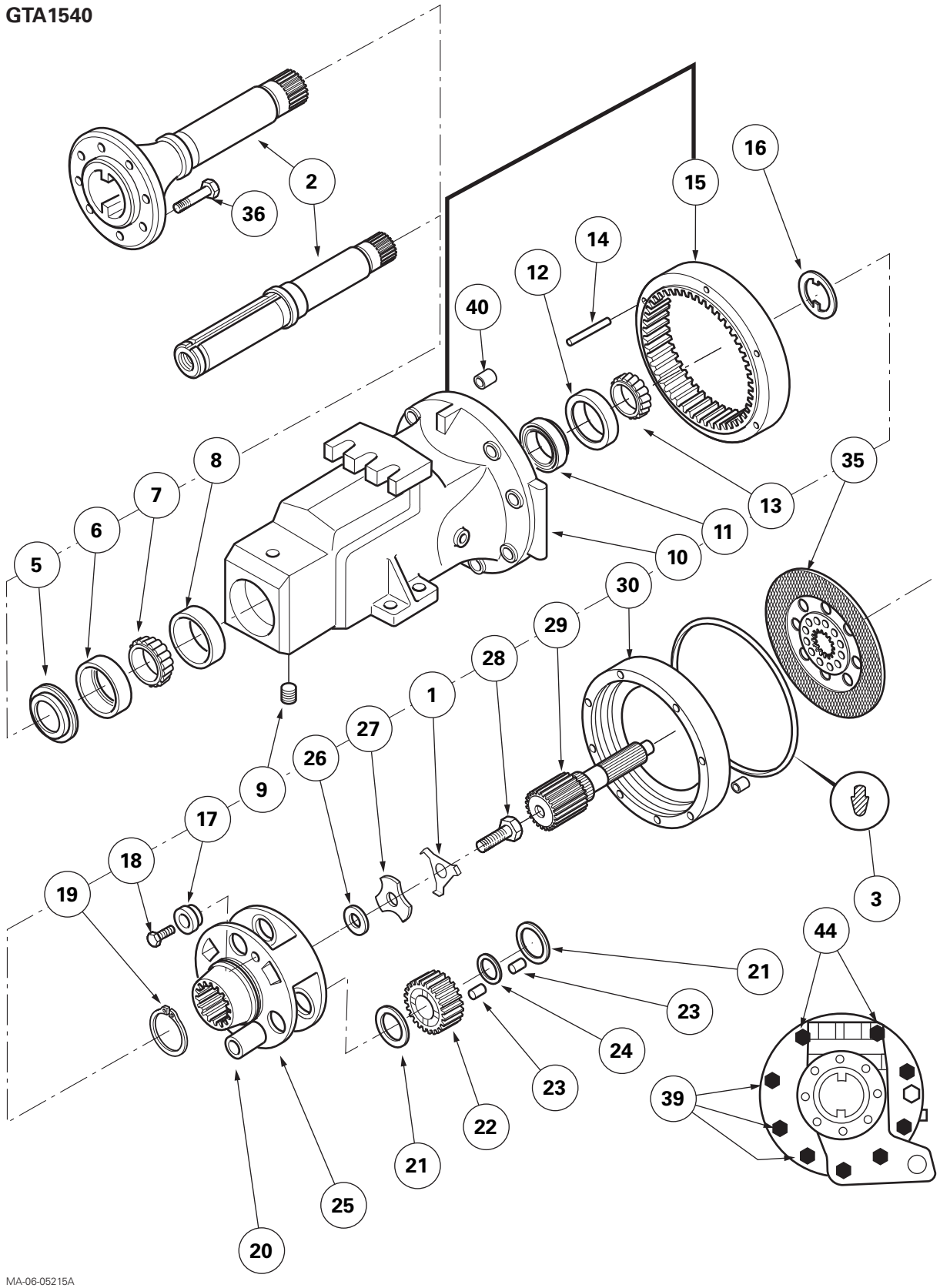

Fig. 6

B . Removing and refitting the trumpet housing assembly

Fig. 7: Tractors fitted with GTA1040 transmission
Fig. 8: Tractors fitted with GTA1540 transmission

Removal

1. Drain the centre housing.
2. Immobilise the tractor.
   If the tractor is not fitted with a ParkLock device, engage the hand brake.
   Chock between the frame and the front axle.
3. Remove the wheel concerned.
   Place an axle stand in position.
4. Visually anticipate the separation of the trumpet housing from the centre housing, checking that the trumpet housing and cab will not obstruct each other. If this is not the case, proceed as follows:
   - Unscrew the cab attachment screws on the trumpet housing support.
   - Raise the rear of the cab slightly until the trumpet housing separates from the centre housing.
   - Chock the cab.

   NOTE: *If the tractor is fitted with a suspended cab, refer to chapter 12.*
5. Remove:
   - the stabilising support;
   - the lower pivot pin of the lift ram.
6. If necessary, remove the guard (draft sensor harness) from the trumpet housing.
7. Support the trumpet housing with a suitable fixture and a trolley jack or a hydraulic table.
8. Remove:
   - the screws (39);
   - the nuts screwed to the M16 studs (44);
   - the washers.
9. Split the trumpet housing assembly from the centre housing.
   Remove:
   - the brake disc (35);
   - the sun gear (29);
   - the dowel (40) (if necessary);
   - the brake plate (30).

   IMPORTANT: *Take care not to press down the brake pedal after removing the trumpet housing, or immobilise brake piston P on the centre housing using the retaining tool (see chapter 6).*

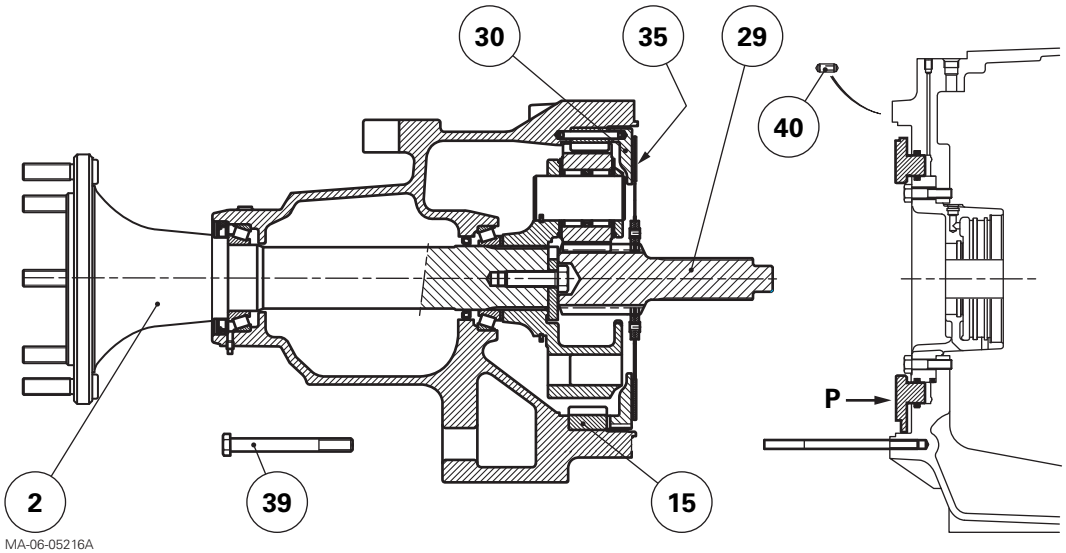
30
35
29
40
P
2
39
15
MA-06-05216A

Fig. 7

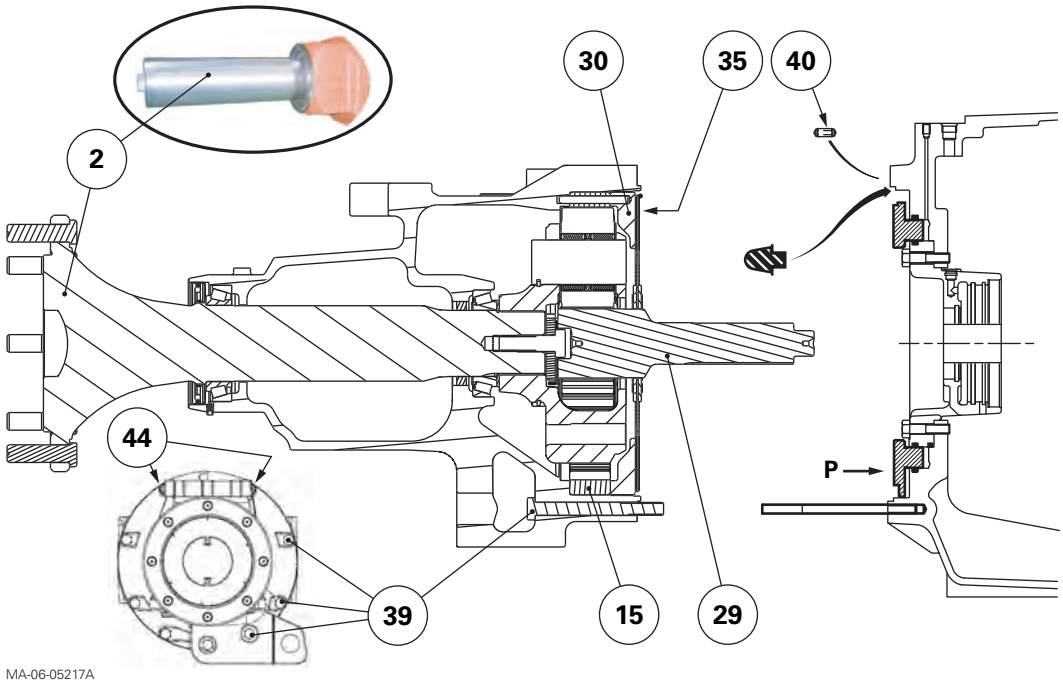
30
35
40
2
44
P
39
15
29
MA-06-05217A

Fig. 8

Refitting

Tractors fitted with GTA1040 transmission

10. Clean the mating faces of the trumpet housing and centre housing with solvent. Remove all traces of the previous sealing product. Dry the components.

11. Evenly smear the mating face of the trumpet housing (10) against the centre housing with a sealing product (Loctite 5206 or equivalent) (Fig. 9).

12. Evenly fill angle D of the centre housing (1) (Fig. 9) with a silicone seal (Loctite 5910 or equivalent).

IMPORTANT: *The diameter of the seal must be:*

- *uniform;*
- *of small section.*

The seal must not have gaps. The join must be located at the top of the centre housing.

13. On the trumpet housing, refit the brake plate (30), applying three spots of miscible grease to ensure that it sticks to the ring gear (15).

14. On the centre housing, refit the dowel (if removed).

15. On the trumpet housing or the centre housing (as required), refit the sun gear (29) and the brake disc (35). Ensure that the latter slides freely on the sun gear splines (Fig. 10).

16. Proceed to step 25.

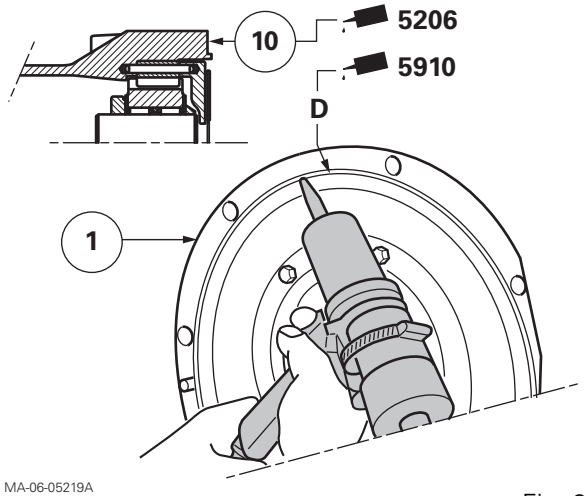

Fig. 9

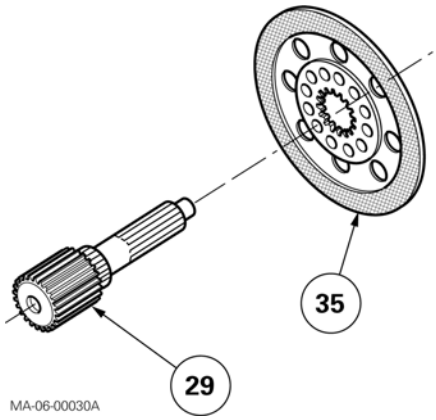

Fig. 10

Tractors fitted with GTA1540 transmission

17. Clean the mating faces of the trumpet housing and centre housing with solvent. Check that the groove of the seal on the centre housing is free of dirt. Dry the components.

18. Fit a new HNBR seal (3) to service tool ref. xxxx (Fig. 11) (see § G).

IMPORTANT: *The HNBR seal (3) has no spurs P (Fig. 11). Do not confuse it with the NBR seal (4) (Fig. 11). These two seals are not exposed to the same temperatures when the transmission is operating (e.g. the HNBR seal (3) is exposed to higher temperatures when the brake is engaged). Their components are therefore different and they must be fitted correctly in their respective positions.*

19. Attach the tool fitted with the HNBR seal (3) to the centre housing. Manually exert high pressure around the tool while simultaneously turning it so that the seal fits correctly into the groove of the centre housing (1) (Fig. 12).

IMPORTANT: *It is strongly recommended that the HNBR seal (3) is fitted using the service tool. Fitting it without the tool will stretch the seal and cause a loop to form in the final assembly phase.*

20. Remove the service tool.

Ensure the HNBR seal (3) is positioned correctly on the centre housing.

21. Apply three spots of miscible grease to the relevant mating face of the brake plate (30) and stick the plate against the ring gear (15) of the trumpet housing.

IMPORTANT 1: *The brake plates (30) on tractors fitted with GTA 1540 transmission (50 kph) have a notch E (Fig. 13), which must be positioned facing upwards.*

IMPORTANT 2: *Tractors fitted with GTA1540 transmission (50 kph) are assisted by a return travel limit mechanism on the brake pistons (see chapter 6 and the relevant section). As a result, before replacing the brake plates (30), it is advisable to push the brake pistons fully into their cavity so that this return travel limit mechanism once again returns the brake pistons correctly after the operation.*

22. On the centre housing, refit the dowel (if removed).

23. On the trumpet housing or the centre housing (as required), refit the sun gear (29) and the brake disc (35). Ensure that the latter slides freely on the sun gear splines (Fig. 10).

IMPORTANT: *Tractors fitted with GTA1540 transmission (50 kph) are assisted by a return travel limit mechanism on the brake pistons (see chapter 6 and the relevant section). As a result, before replacing the brake discs (35), it is advisable to push the brake pistons fully into their cavity so that this return travel limit mechanism once again returns the brake pistons correctly after the operation.*

24. Proceed to step 25.

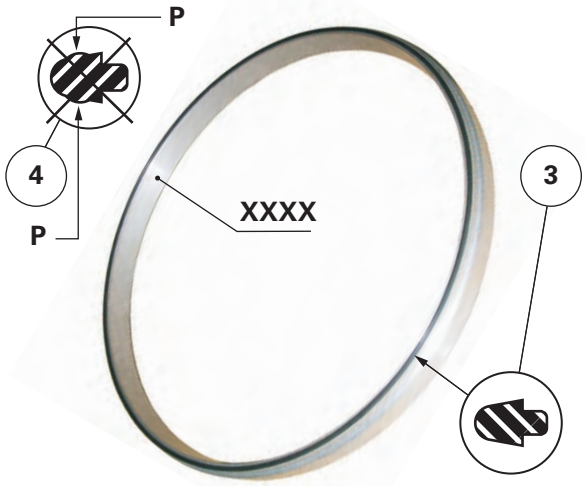

Fig. 11

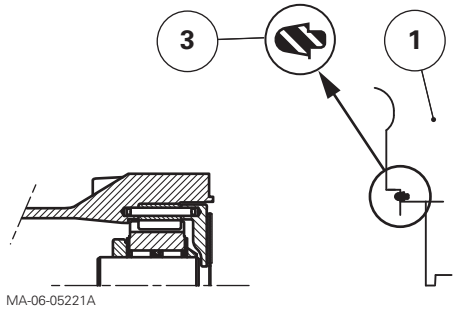

Fig. 12

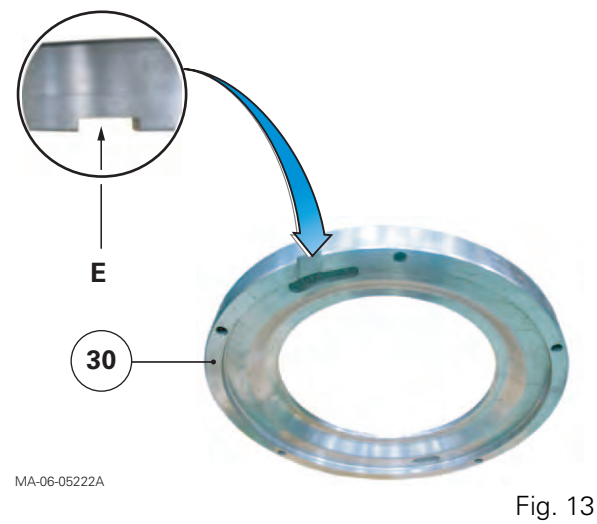

Fig. 13

Tractors fitted with GTA1040 or GTA1540 transmission

25. Support the trumpet housing using the equipment used for removal.

Engage the splines of the sun gear (29) in the differential or planet carrier (as required). If they do not engage, rotate the axle shaft and push the trumpet housing horizontally to couple it with the centre housing.

26. Tighten:

- the M16 screws (39) to 220-300 Nm;
- the M16 nuts (44) to 220-280 Nm.

27. If required, refit the guard (draft sensor harness).

28. Refit:

- the lower pivot pin of the lift ram;
- the stabilising support.

29. If it was necessary to lift the cab, reposition it on the trumpet housing support(s). Screw in the cab attachment screws.

NOTE: *If the tractor is fitted with a suspended cab (see chapter 12).*

30. Refit any parts removed from around the trumpet housing.

Refit the wheel.

Tighten the screws and nuts to their indicated torque, depending on the version (see chapter 6).

31. Top up the centre housing oil level. Check it using the sight glass located to the left of the PTO housing.

32. Remove the shims between the frame and the front axle.

33. Check the linkage operation.

34. Carry out a road test on the brake system.

35. Check the tightness of the trumpet housing, the hydraulic unions and the plugs.

C . Removing and refitting, disassembling and reassembling the planet carrier

Removal

Tractors fitted with GTA1040 transmission

36. Remove the trumpet housing assembly (see § B). If possible, place it in a vertical position with the planet carrier facing upwards.

37. Immobilise the axle shaft (2) or the planet carrier (25).

38. Remove (Fig. 14):

- the M20 screw (28);
- the tripod washer (27);
- the shim(s) (26);
- the planet carrier (25) of the ring gear (15).

NOTE: *The spare parts catalogue does not allow for the replacement of the ring gear as a separate part. If this part is faulty, replace the trumpet housing/ring gear assembly.*

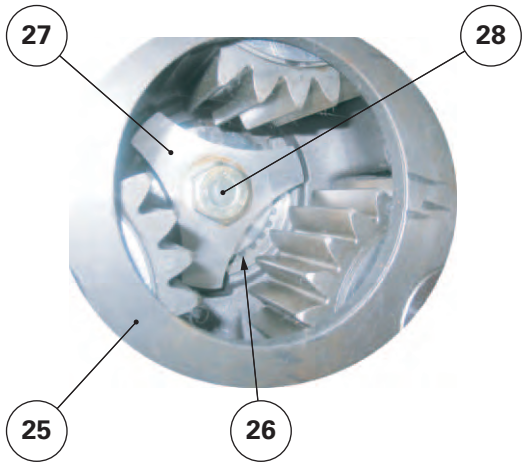

Fig. 14

Tractors fitted with GTA1540 transmission

39. Remove the trumpet housing assembly (see § B). If possible, place it in a vertical position with the planet carrier facing upwards.

40. Immobilise the axle shaft (2) or the planet carrier (25).

41. Remove (Fig. 15):

- the lock washer (1)

  NOTE: *The lock washer is fixed with Loctite 401;*
- the M20 screw (28);
- the tripod washer (27);
- the shim(s) (26);
- the planet carrier (25) of the ring gear (15).

NOTE: *The spare parts catalogue does not allow for the replacement of the ring gear as a separate part. If this part is faulty, replace the trumpet housing/ring gear assembly.*

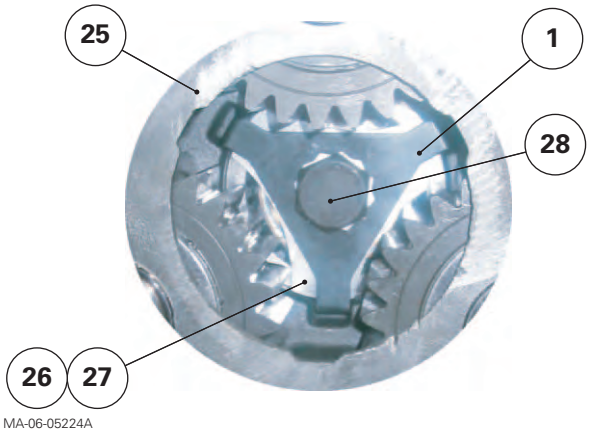

Fig. 15

Disassembly

Tractors fitted with GTA1040 or GTA1540 transmission

42. Remove (Fig. 16):
- the screw (18);
- the spacer (17);
- the snap ring (19) by moving its two ends apart.

43. Using a hammer, tap gently on the three pins (20).

44. Remove the three pins and the snap ring.

45. Remove:
- the three planet gears (22);
- the needle rollers (23);
- the spacers (24);
- the friction washers (21).

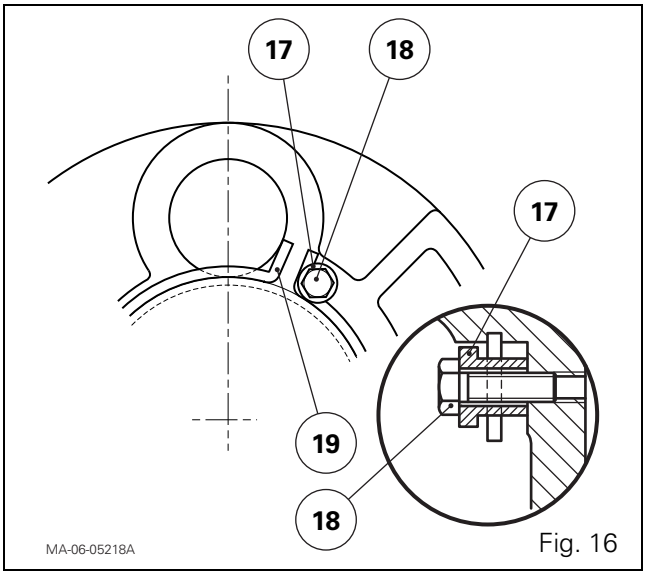

Fig. 16

Reassembly

Tractors fitted with GTA1040 or GTA1540 transmission

46. Clean the planet carrier, the pins and the planet gears. Check the parts.

47. Smear the needle rollers with miscible grease.
Fit each planet gear with two rows of needle rollers (23) separated by a spacer (24).

48. Fit the planet gears. Centre the friction washers (21) in the planet carrier.
IMPORTANT: *Imprint E (Fig. 17) on one surface of the planet gears (22) (punch mark or groove) must face the opposite way to the splined hub of the planet carrier.*

49. Engage the three pins (20) with the snap ring (19) (Fig. 18).

50. Open the snap ring (19) (Fig. 19).

51. Tap gently on the three pins so that the snap ring fits into the groove of the planet carrier (Fig. 18).

52. Manually check the axial clearance of each planet gear.

53. Position one end of the snap ring against the pin (20) (Fig. 20).

54. Clean the thread of the screw (18) and the tapped hole for this screw in the planet carrier (Fig. 20). Fit the spacer (17). Fit and tighten the screw to 34-50 Nm, after lightly smearing its thread with Loctite 270 or equivalent.

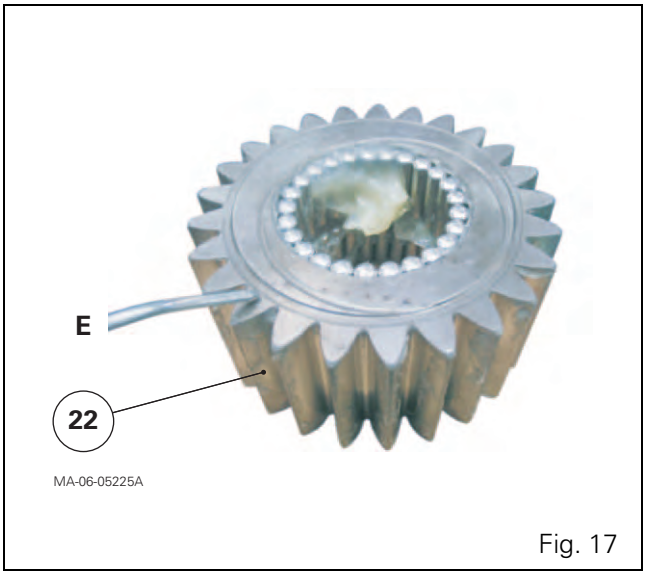

Fig. 17

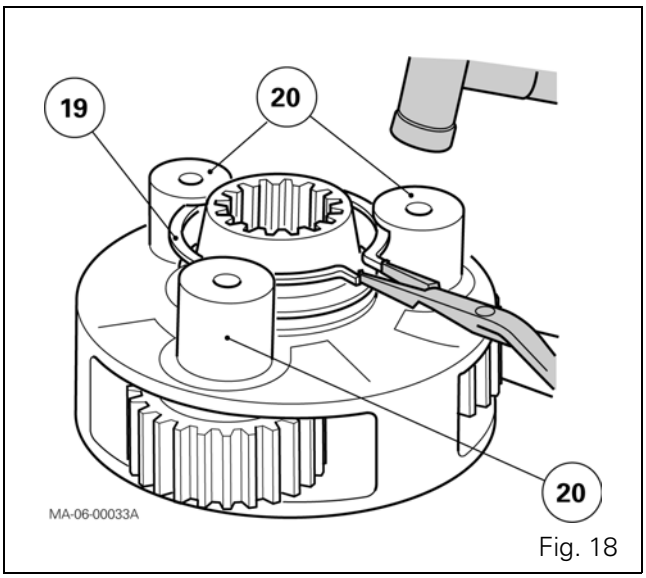

Fig. 18

Refitting

Tractors fitted with GTA1040 transmission

55. Check that the tab washer (16) is present.

56. Refit the planet carrier (25).

If necessary, shim the tapered roller bearings of the axle shaft (see § E).

57. Immobilise the axle shaft (2) or the planet carrier (25).

58. Refit the shim(s) (26) and the tripod washer (27).

59. Screw in and tighten the M20 screw (28) (Fig. 21) to 374-506 Nm after lightly smearing its thread with Loctite 270 or equivalent.

60. Refit the trumpet housing assembly (see § B).

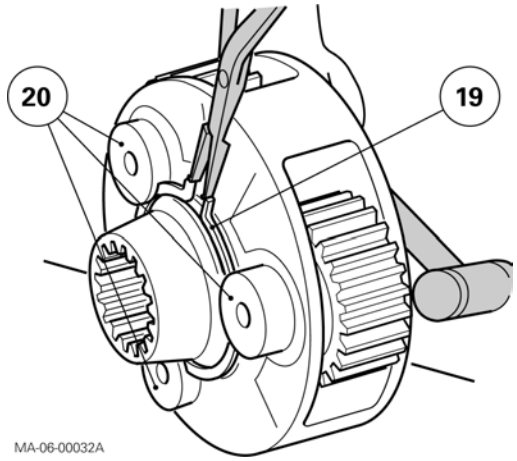

Fig. 19

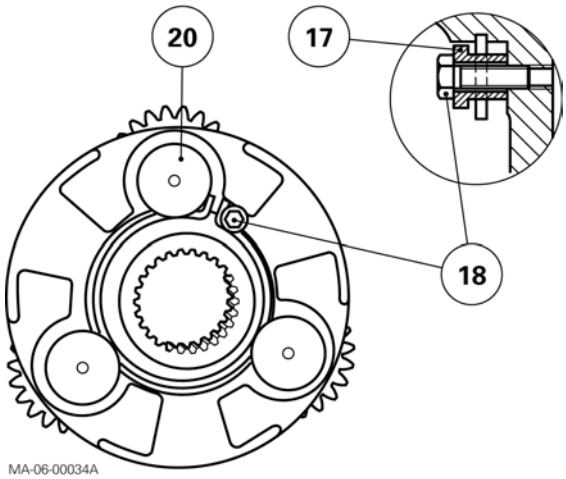

Fig. 20

Fig. 21

Tractors fitted with GTA1540 transmission

61. Check for the presence of the tab washer (16).

62. Refit the planet carrier (25).

If necessary, shim the tapered roller bearings of the axle shaft (see § E).

63. Immobilise the axle shaft (2) or the planet carrier (25).

64. Refit the shim(s) (26) and the tripod washer (27).

65. Screw in and tighten the M20 screw (28) to 410 Nm.

66. Slide a lock washer (1) onto the head of the M20 screw (28). Ensure its tabs B are correctly housed in moulded slots E of the planet carrier (25) (Fig. 22). If this is not the case, repeat the step with the second lock washer; if this is still not the case, repeat the step with the third. Depending on the result (either no washer is suitable or a washer is selected), proceed to step 67 or 68.

NOTE: *Three lock washers (1) are available from the spare parts catalogue. Each of the lock washers has a 10° angular offset.*

67. Case 1: A lock washer is selected

Apply three spots of Loctite 401 or equivalent to the mating face of the selected lock washer which is turned towards the tripod washer (27).

NOTE: *Loctite 401 prevents the lock washer (1) from moving when the trumpet housing is being refitted to the centre housing.*

When the trumpet housing is refitted, the sun gear (29) holds the lock washer in place.

68. Case 2: No lock washer is selected

Gently retighten the M20 screw (28), taking care not to exceed the maximum torque of 560 Nm.

Repeat step 66.

IMPORTANT: *If required, repeat step 68 several times.*

69. Refit the trumpet housing assembly (see § B).

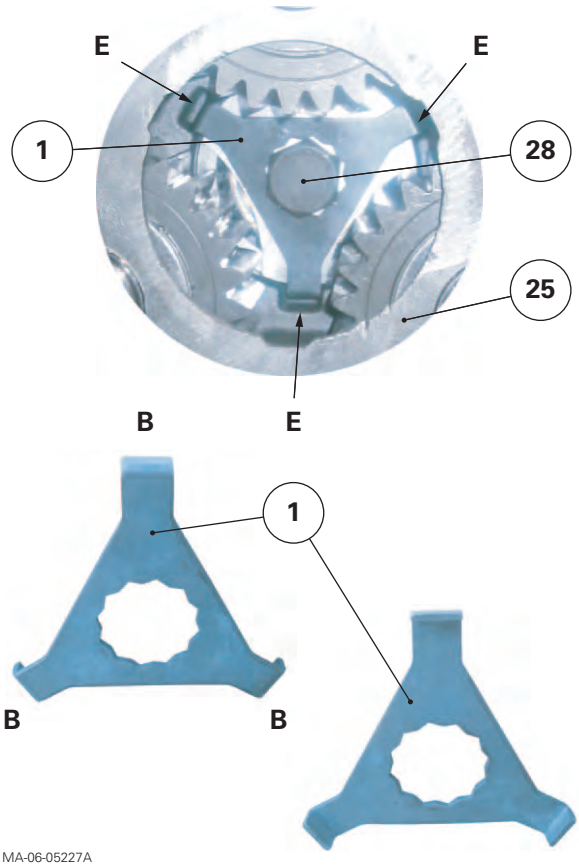

Fig. 22

D . Replacing tapered roller bearings and seals

Disassembly

Tractors fitted with GTA1040 or GTA1540 transmission

70. Remove:
- the trumpet housing assembly (see § B);
- the planet carrier (25) (see § C).

71. Remove:
- the tab washer (16);
- the axle shaft (2);
- the bearing cone (13).

72. If necessary, extract:
- the bearing cone (7);
- the seals (5) (11) and discard them.

73. Using a suitable puller or a makeshift tool, extract or drive out:
- the bearing cups (8) (12);
- the friction cage (6).

Reassembly

Tractors fitted with GTA1040 or GTA1540 transmission

74. Clean and check all components. Replace those that are defective.

75. Smear the external surface of the seal (11) with a film of clean transmission oil.

76. Using a suitable fitting drift, fit the seal (11) to within approximately 8 mm of the shoulder of the cup (12) on the trumpet housing, positioning its lip towards the bearing cone (Fig. 23).

IMPORTANT: *If a groove has been worn into the axle shaft at the location of the old seal (11), offset the new seal slightly so that its lip ensures the axle shaft is completely sealed beyond the worn groove.*

77. Fit:
- the bearing cups (8) (12) against their respective shoulders;
- the friction cage (6) according to the distance indicated:
  - Fig. 24 (tractors fitted with GTA1040 transmission);
  - Fig. 25 (tractors fitted with GTA1540 transmission).

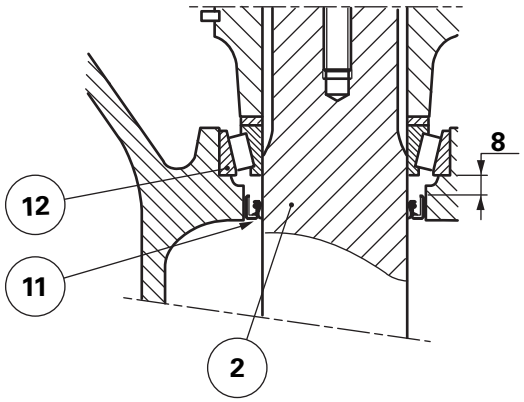

Fig. 23

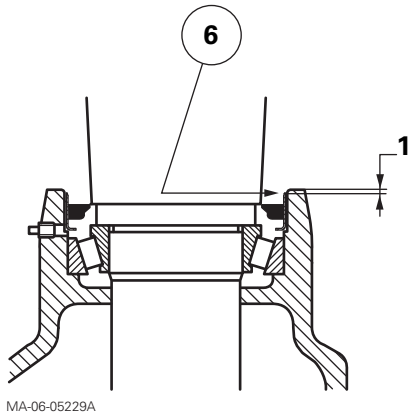

Fig. 24

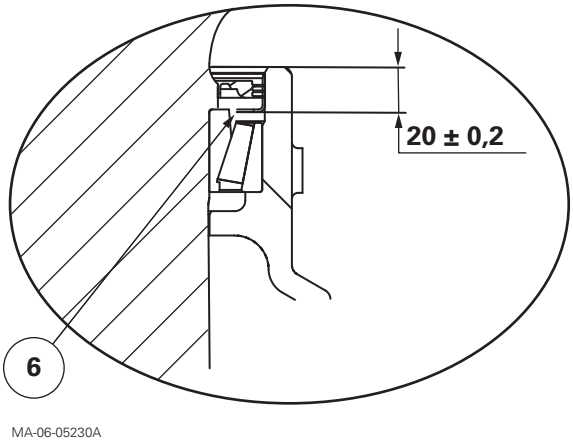

Fig. 25

78. For tractors fitted with:
- GTA1040 transmission, proceed to step 79;
- GTA1540 transmission, proceed to step 81.

Tractors fitted with GTA1040 transmission

79. Fit the new three-lipped seal (5) level with shoulder E of the flanged axle shaft or straight axle shaft (Fig. 26).

80. Proceed to step 83.

Tractors fitted with GTA1540 transmission

81. Fit the new three-lipped seal (5):
- 4.0 ± 0.5 mm from shoulder E of the flanged axle shaft (Fig. 27);
- 5.5 ± 0.5 mm from shoulder E of the straight axle shaft (Fig. 27).

82. Proceed to step 83.

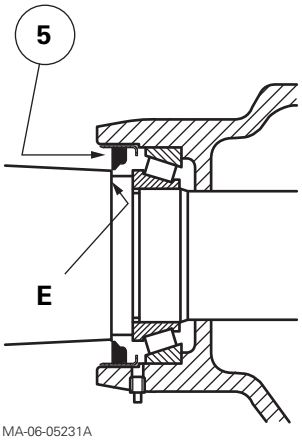

Fig. 26

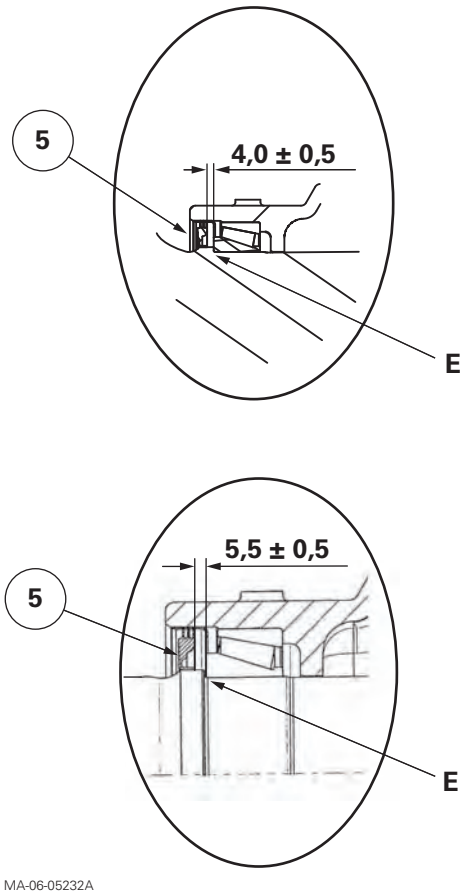

Fig. 27

Tractors fitted with GTA1040 or GTA1540 transmission

83. Fit the bearing cone (7) against its shoulder on the flanged axle shaft or straight axle shaft using a suitable tool.

84. Lightly smear the bearing cone (7) and the lips of the seals (5) (11) with bearing grease.

85. Protect the seal lip (11) by temporarily masking the splines on the axle shaft with a flexible protection.

Insert the prepared axle shaft into the trumpet housing fitted with the seal (11) and the bearing cones (8) (12), positioning the three lips of the seal (5) towards the outside of the trumpet housing.

86. Refit:

- the bearing cone (13);
- the tab washer (16).

87. Refit:

- the planet carrier (25). If necessary, shim the tapered roller bearings (see § E);
- the trumpet housing assembly (see § B).

88. Temporarily replace the plug (9) with a grease nipple. Partially fill cavity A (Fig. 28) with BP Agricharge grease or equivalent. Remove the grease nipple. Screw in the plug.

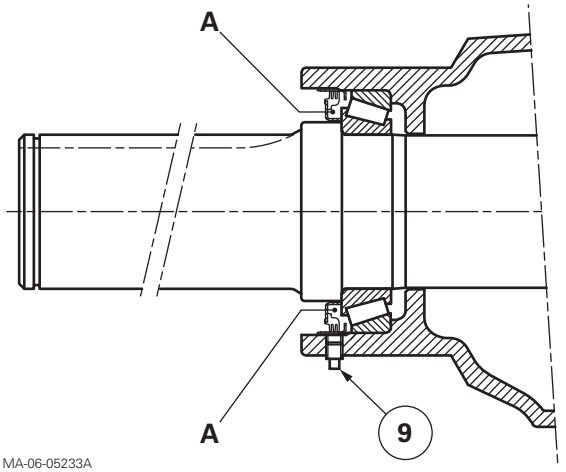

Fig. 28

E . Shimming the tapered roller bearings of the axle shaft

If the following parts are to be replaced, the shimming of the tapered roller bearings on the axle shaft must be checked or carried out:

- the flanged or straight axle shaft (2);
- the tapered roller bearings (7) (8) and (12) (13);
- the trumpet housing (10);
- the tab washer (16);
- the planet carrier (25).

NOTE: *The preload shimming of the tapered roller bearings on the axle shaft is carried out using shim(s) (26) fitted between the end of the axle shaft (2) and the tripod washer (27) (Fig. 30).*

IMPORTANT: *In order to correctly shim the tapered roller bearings, fit the trumpet housing in a vertical position (Fig. 29).*

Preparing for shimming

Tractors fitted with GTA1040 or GTA1540 transmission

89. Fit:
- the bearing cone (13);
- the tab washer (16);
- the planet carrier (25).

90. Fit shim(s) (26) with a thickness greater than the space between the end of the axle shaft (2) and the mating face of the tripod washer (27) on the planet carrier (Fig. 30). This should give a temporary clearance J.

91. Fit the tripod washer (27).

Temporarily lock the M20 screw (28) at:
- 374 Nm (tractors fitted with GTA1040 transmission);
- 410 Nm (tractors fitted with GTA1540 transmission).

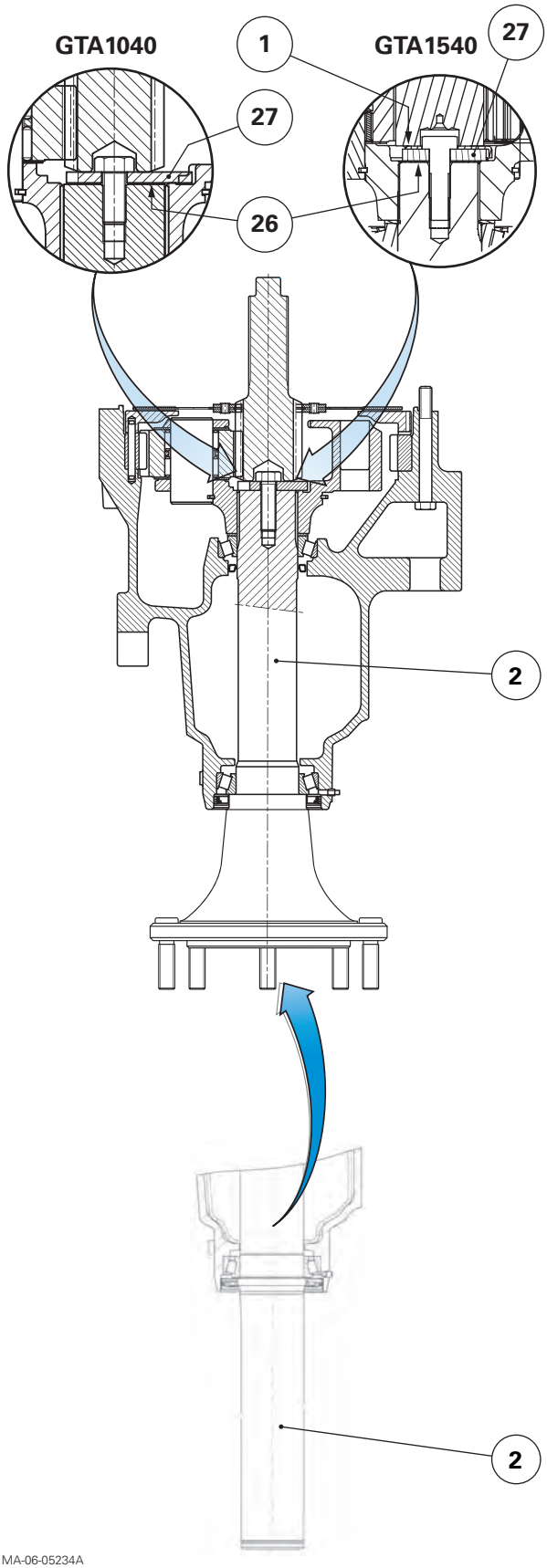

Fig. 29

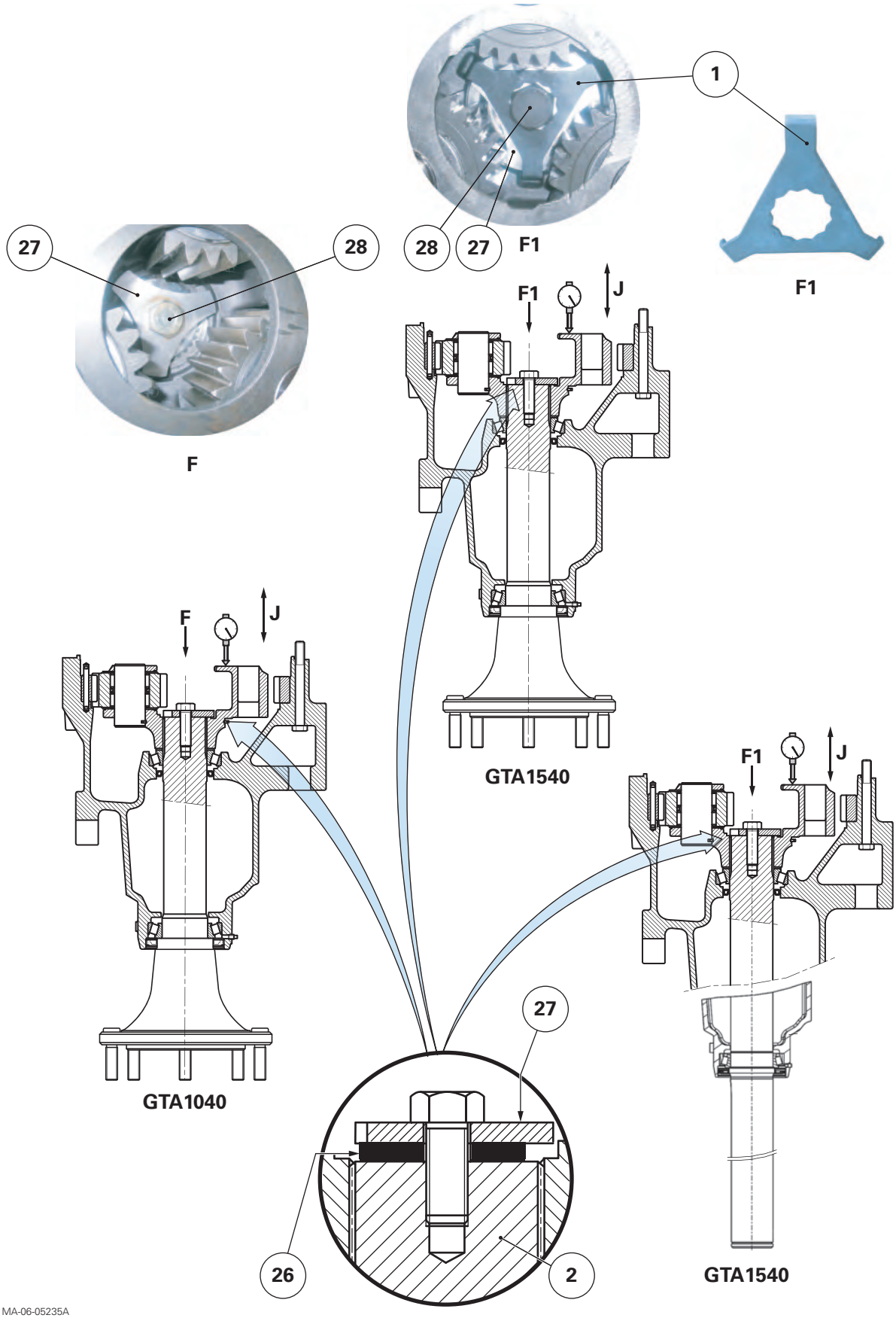
1
F1
28
27
F1
27
28
F
F1
J
GTA1540
F
J
GTA1040
F1
J
27
26
2
GTA1540
MA-06-05235A

Fig. 30

Shimming

Tractors fitted with GTA1040 or GTA1540 transmission

92. Tap the rim of the planet carrier with a plastic hammer while turning the trumpet housing by several turns.

93. Fit a dial gauge on the trumpet housing (10) with its feeler pin positioned near the centre of the planet carrier (25) (Fig. 31). Set the dial gauge needle to zero.

94. Using suitable levers, move the planet carrier vertically (Fig. 31). Measure clearance J indicated on the dial gauge.

Repeat the step several times.

Calculate the average of the clearance J readings.

95. Reduce the shim (26) thickness according to value J + (0.02 to 0.12) to obtain a preload P1 = 0.02 to 0.12 mm (Fig. 32).

NOTE: *If possible, shim to the maximum tolerance.*

96. For tractors fitted with:

- GTA1040 transmission, proceed to step 97;
- GTA1540 transmission, proceed to step 98.

Tractors fitted with GTA1040 transmission

97. Definitively fit the tripod washer (27) (Fig. 32).

Lightly smear the thread of the M20 screw (28) (Fig. 32) with Loctite 270 or equivalent. Tighten this screw to a torque of 374-506 Nm.

Tractors fitted with GTA1540 transmission

98. Definitively fit the tripod washer (27) (Fig. 32).

99. Tighten the M20 screw (28) (Fig. 32) to 410 Nm.

From the three possible lock washers, select the lock washer (1) which will be fitted definitively (see steps 66 to 68).

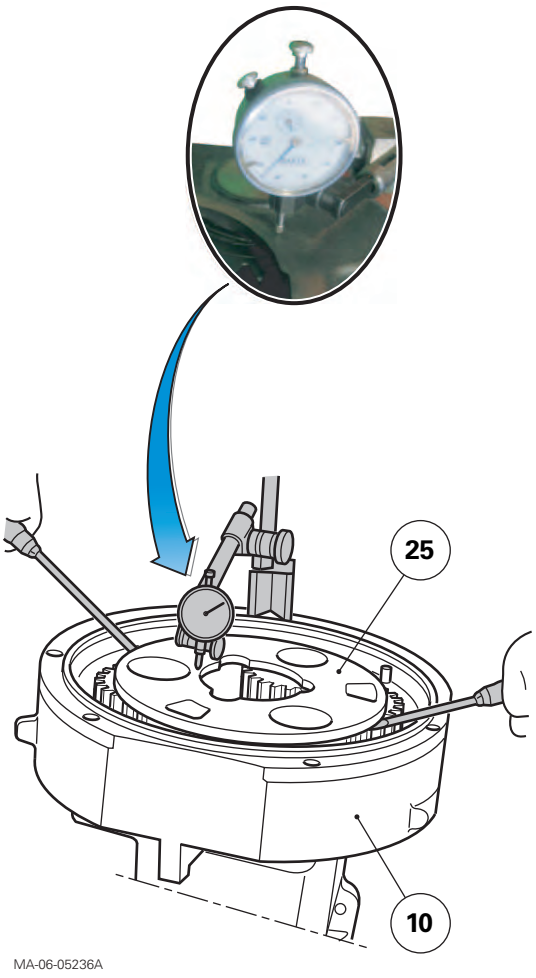

Fig. 31

F . Replacing a stud on the flanged axle shaft

100. If necessary, remove the wheel from the relevant flanged axle shaft.

101. Drive out the defective stud.

102. Clean the new stud and its housing in the flange.

103. Lightly smear the ribbed part of the new stud with Loctite 270 or equivalent and fit it using a bronze drift and a suitable hammer.

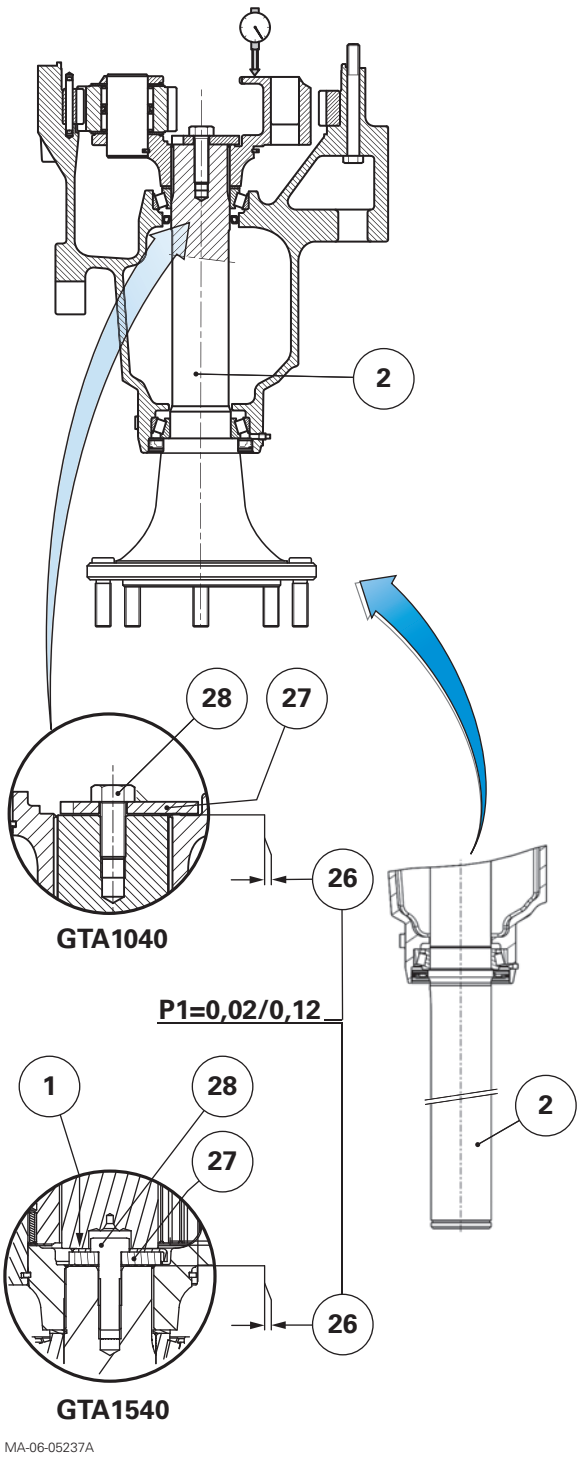

Fig. 32

G . Service tools

Tools available in the AGCO network

- xxxx: Seal fitting ring (3) (Fig. 33)

Fig. 33

6B12 - GPA40 - Heavy Duty trumpet housings

CONTENTS

GPA40 - Heavy Duty trumpet housings

A . General

The Heavy Duty (HD) trumpet housings on tractors fitted with GTA1040 or GTA1540 transmission support the right and left-hand axle shafts. They contain the final drive units that transmit the rotation from the differential assembly.

Tractors fitted with GTA 1040 or GTA1540 transmission may be fitted with trumpet housings with flanged axle shafts or straight axle shafts (Fig. 1, Fig. 2).

The two trumpet housings are symmetrical. They are fitted either side of the centre housing.

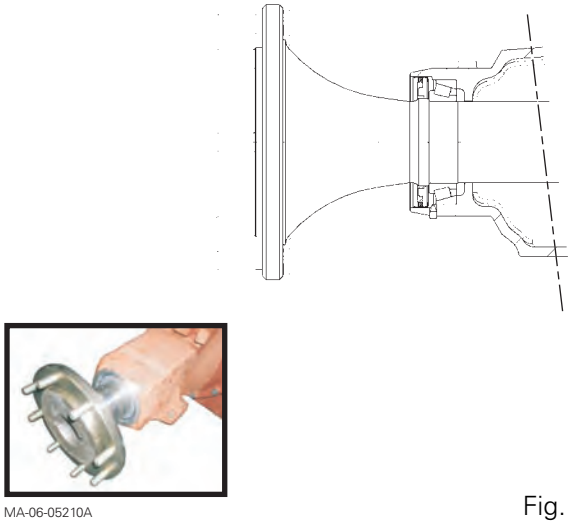

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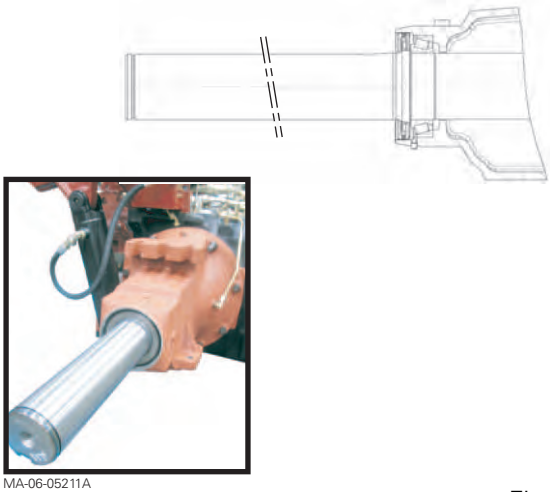
Fig. 1



MA-06-05211A

Fig. 2

GPA40 - Heavy Duty trumpet housings

Construction

The axle shaft (2) is supported by two tapered roller bearings (7) (8) and (12) (13) fitted opposite one another.

External tightness is ensured via a three-lipped seal (5) and internal tightness by a single lip seal (11).

On tractors fitted with GTA1540 transmission, the tightness of the ring gear (15) is ensured by two NBR seals (4) fitted on either side of the ring gear.

On tractors fitted with GTA1040 transmission, the oil tightness of the ring gear (15) is ensured by two silicone seals (Silicomet type) and two seals smeared with Loctite.

The ring gear (15) is fitted between the trumpet housing (10) and the brake plate (30). It comprises a ring and a pin to ensure its central position and that of the brake plate.

The planet carrier assembly of the final drive unit (25) has three planet gears (22). It is splined to the shaft (2) in rotation. The shims (26) fitted at the end of the shaft allow for preloading of the tapered roller bearings.

Differential rotation is transmitted to the planet gears of the final drive via a sun gear shaft (29) on the teeth of which the brake disc (35) is fitted.

The brakes are lubricated via a port O drilled in the brake plate (30) (Fig. 3, Fig. 5).

On tractors fitted with GTA1540 transmission (50 kph), the brake discs (35) and plate (30) have a larger braking surface area.

On tractors fitted with GTA1540 transmission, the axle shaft (2) and planet carrier (25) are held in place by the tripod washer (27), the M24 screw (28) and the lock washer (1) (Fig. 5).

On tractors fitted with GTA1040 transmission, the axle shaft (2) and the planet carrier (25) are held in place by the tripod washer (27) and the M24 screw (28) smeared with Loctite (Fig. 3).

Parts lists

Tractors fitted with GTA1040 transmission (Fig. 3, Fig. 4)

(2) Straight axle shaft
(2) Flanged axle shaft
(5) Three-lipped seal
(6) Friction cage
(7) Bearing cone
(8) Bearing cup
(9) Threaded plug
(10) Trumpet housing
(11) Single lip seal
(12) Bearing cup
(13) Bearing cone
(14) Pin
(15) Ring gear
(16) Tab washer
(17) Spacer
(18) Screw
(19) Circlip
(20) Planet gear pin
(21) Washer
(22) Planet gear
(23) Needle rollers
(24) Spacer
(25) Planet carrier
(26) Shim(s)
(27) Tripod washer
(28) M24 screw
(29) Sun gear
(30) Brake plate
(34) Ring (straight axle shaft)
(35) Brake disc
(36) Wheel stud
(39) Screw
(40) Screw
(44) M16 stud, washers and nuts
(45) Locating ring

Legend

A Grease chamber
B Silicone seal
C Silicone seal
D Silicone seal
O Brake lubricating port

View of the assembly

GTA1040

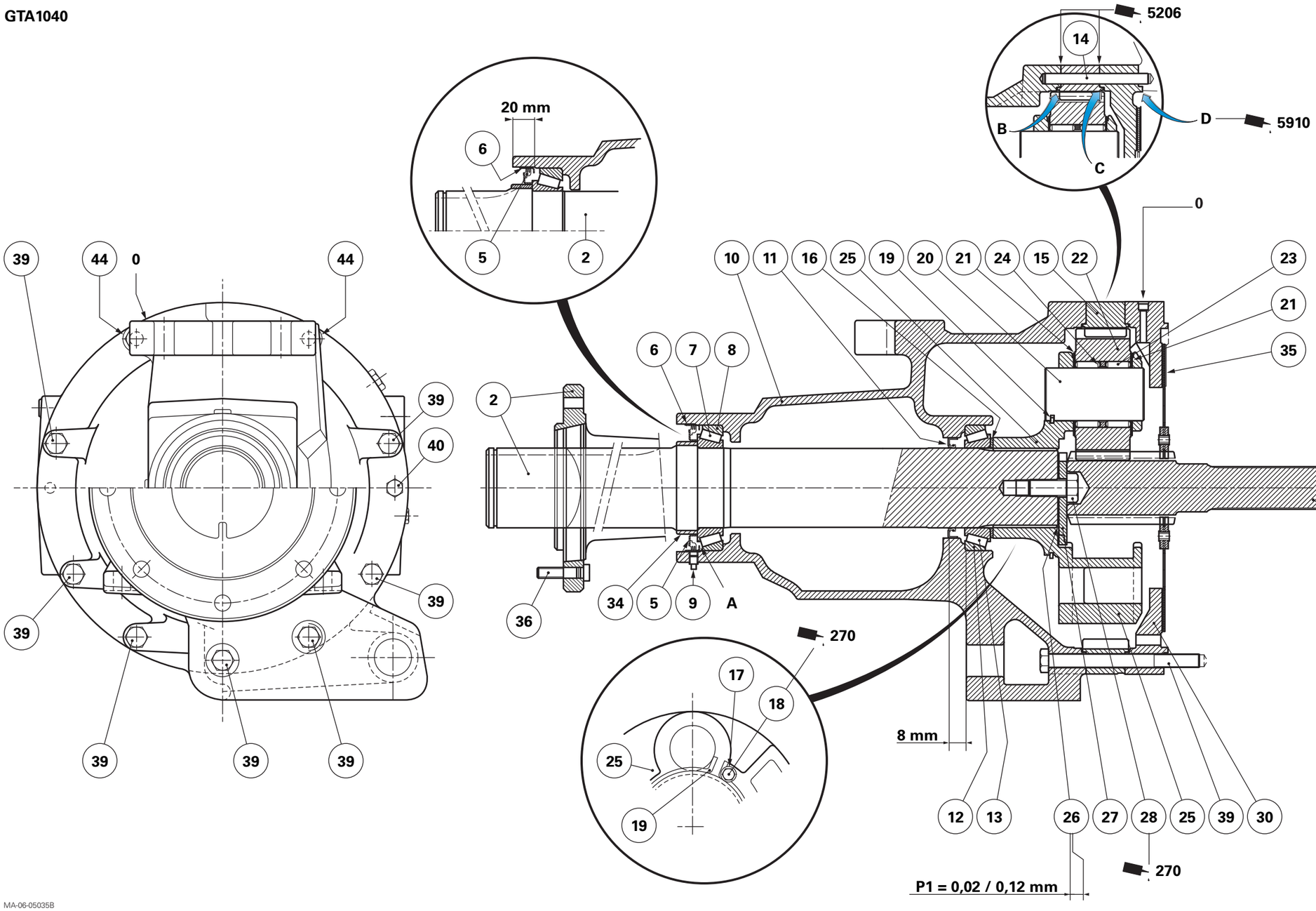


Fig. 3

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Blown-up view

GTA1040

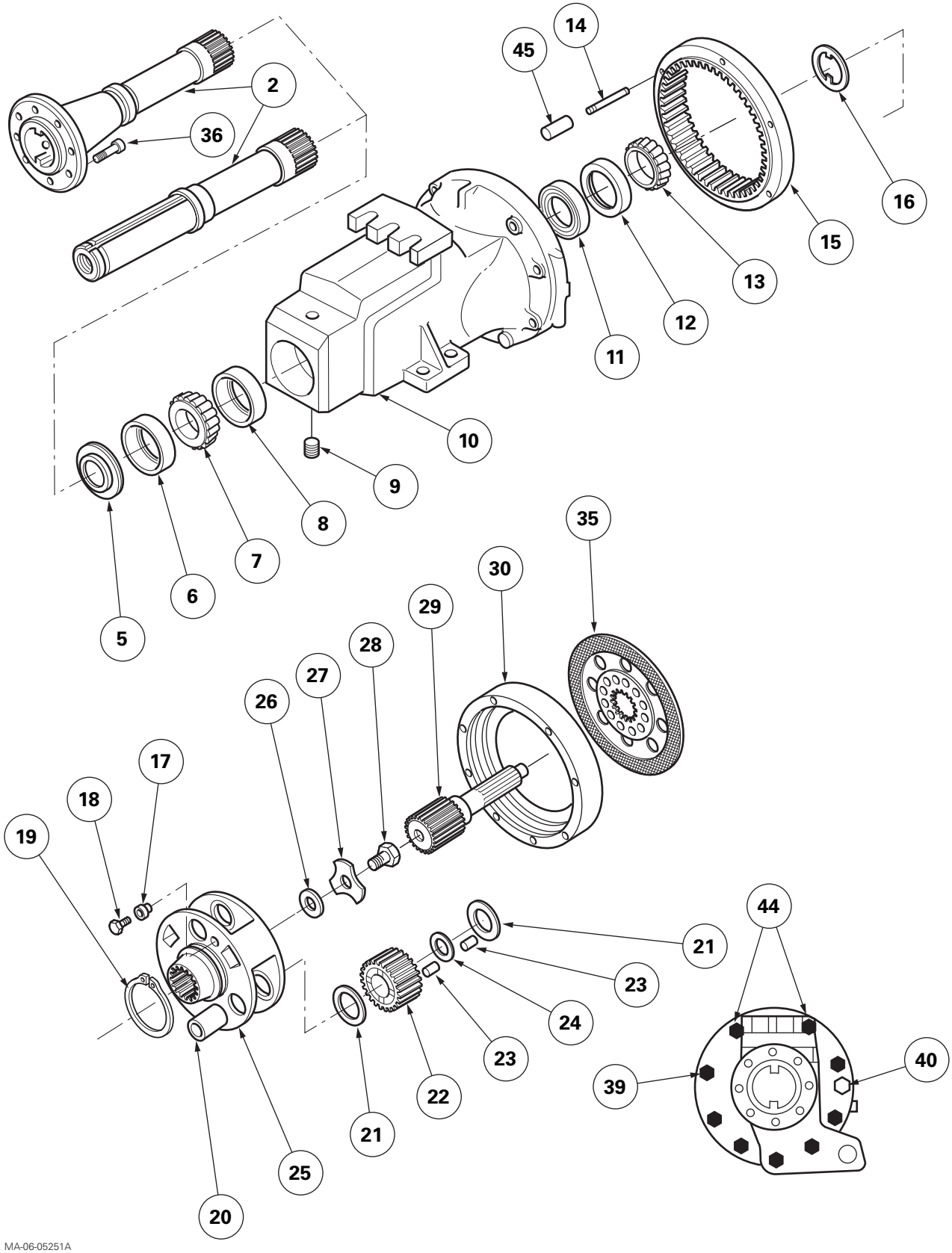

Fig. 4

Tractors fitted with GTA1540 transmission
(Fig. 5, Fig. 6)

(1) Lock washer
(2) Straight axle shaft
(2) Flanged axle shaft
(3) HNBR seal
(4) NBR seal
(5) Three-lipped seal
(6) Friction cage
(7) Bearing cone
(8) Bearing cup
(9) Threaded plug
(10) Trumpet housing
(11) Single lip seal
(12) Bearing cup
(13) Bearing cone
(14) Pin
(15) Ring gear
(16) Tab washer
(17) Spacer
(18) Screw
(19) Circlip
(20) Planet gear pins
(21) Washer
(22) Planet gear
(23) Needle rollers
(24) Spacer
(25) Planet carrier
(26) Shim(s)
(27) Tripod washer
(28) M24 screw
(29) Sun gear
(30) Brake plate
(35) Brake disc
(39) Screw
(40) Screw
(44) M16 stud, washers and nuts
(45) Locating ring

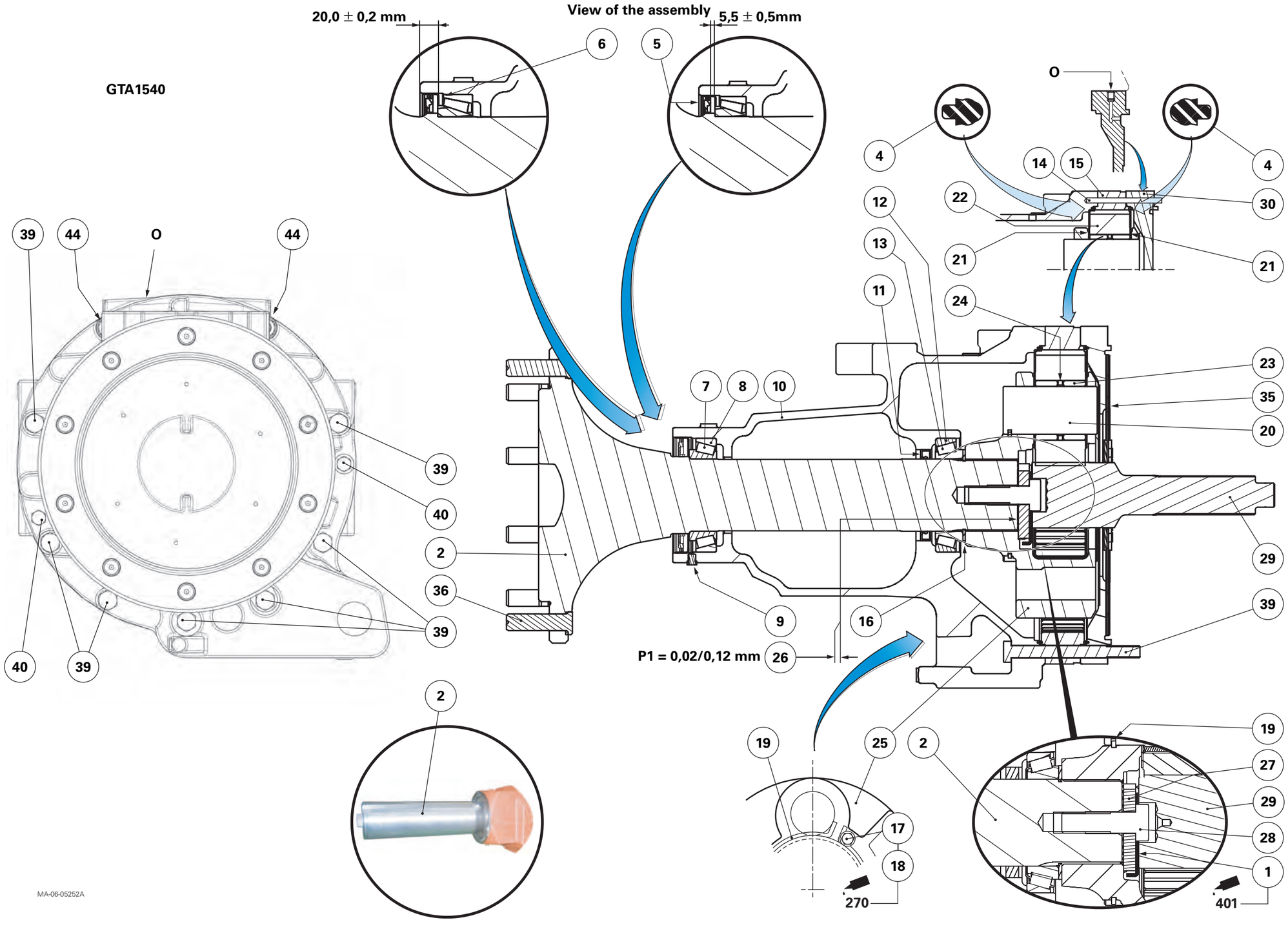
GTA1540
20,0 ± 0,2 mm
View of the assembly
5,5 ± 0,5mm
6
5
O
4
14
15
4
12
22
30
13
21
21
11
24
39
44
O
44
23
35
20
7
8
10
39
40
2
36
39
29
39
9
16
P1 = 0,02/0,12 mm
26
40
39
2
19
25
2
19
27
29
17
28
18
1
270
401
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Fig. 5

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Blown-up view

GTA1540

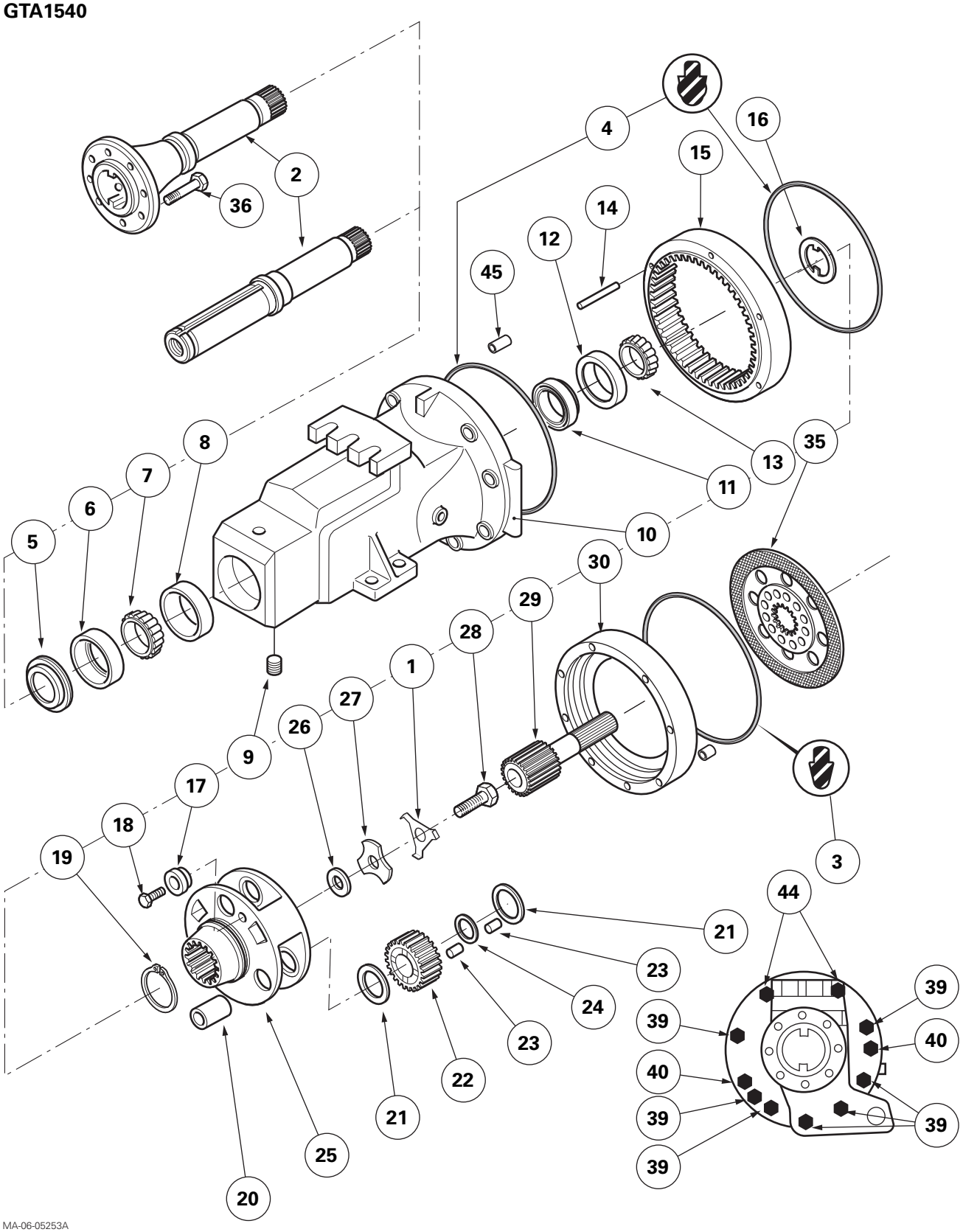

Fig. 6

B . Removing and refitting the trumpet housing assembly

Fig. 7: Tractors fitted with GTA1040 transmission
Fig. 8: Tractors fitted with GTA1540 transmission

Removal

1. Drain the centre housing.
2. Immobilise the tractor.
   If the tractor is not fitted with a ParkLock device, engage the hand brake.
   Chock between the frame and the front axle.
3. Remove the wheel concerned.
   Place an axle stand in position.
4. Visually anticipate the separation of the trumpet housing from the centre housing, checking that the trumpet housing and cab will not obstruct each other. If this is not the case, proceed as follows:
   - Unscrew the cab attachment screws on the trumpet housing support.
   - Raise the rear of the cab slightly until the trumpet housing separates from the centre housing.
   - Chock the cab.

   NOTE: *If the tractor is fitted with a suspended cab, refer to chapter 12.*
5. Remove:
   - the stabilising support;
   - the lower pivot pin of the lift ram.
6. If necessary, remove the guard (draft sensor harness) from the trumpet housing.
7. Support the trumpet housing with a suitable fixture and a trolley jack or a hydraulic table.
8. Remove:
   - the screws (39);
   - the nuts screwed to the M16 studs (44);
   - the washers.

   IMPORTANT: *Do not unscrew the screw(s) (40).*
9. Split the trumpet housing assembly from the centre housing.
   Remove:
   - the brake disc (35);
   - the sun gear (29).

   NOTE: *The brake plate (30) remains attached to the trumpet housing.*

   IMPORTANT: *Take care not to press down the brake pedal after removing the trumpet housing, or immobilise brake piston P on the centre housing using the retaining tool (see chapter 6).*

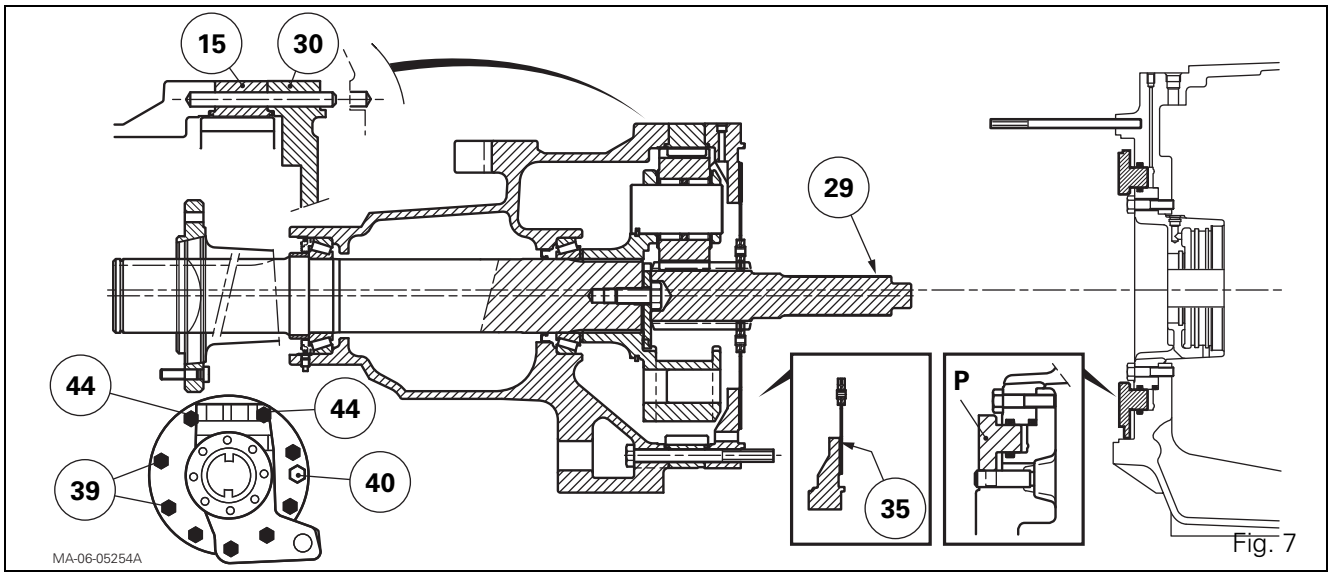
15
30
29
44
44
39
40
35
P
MA-06-05254A

Fig. 7

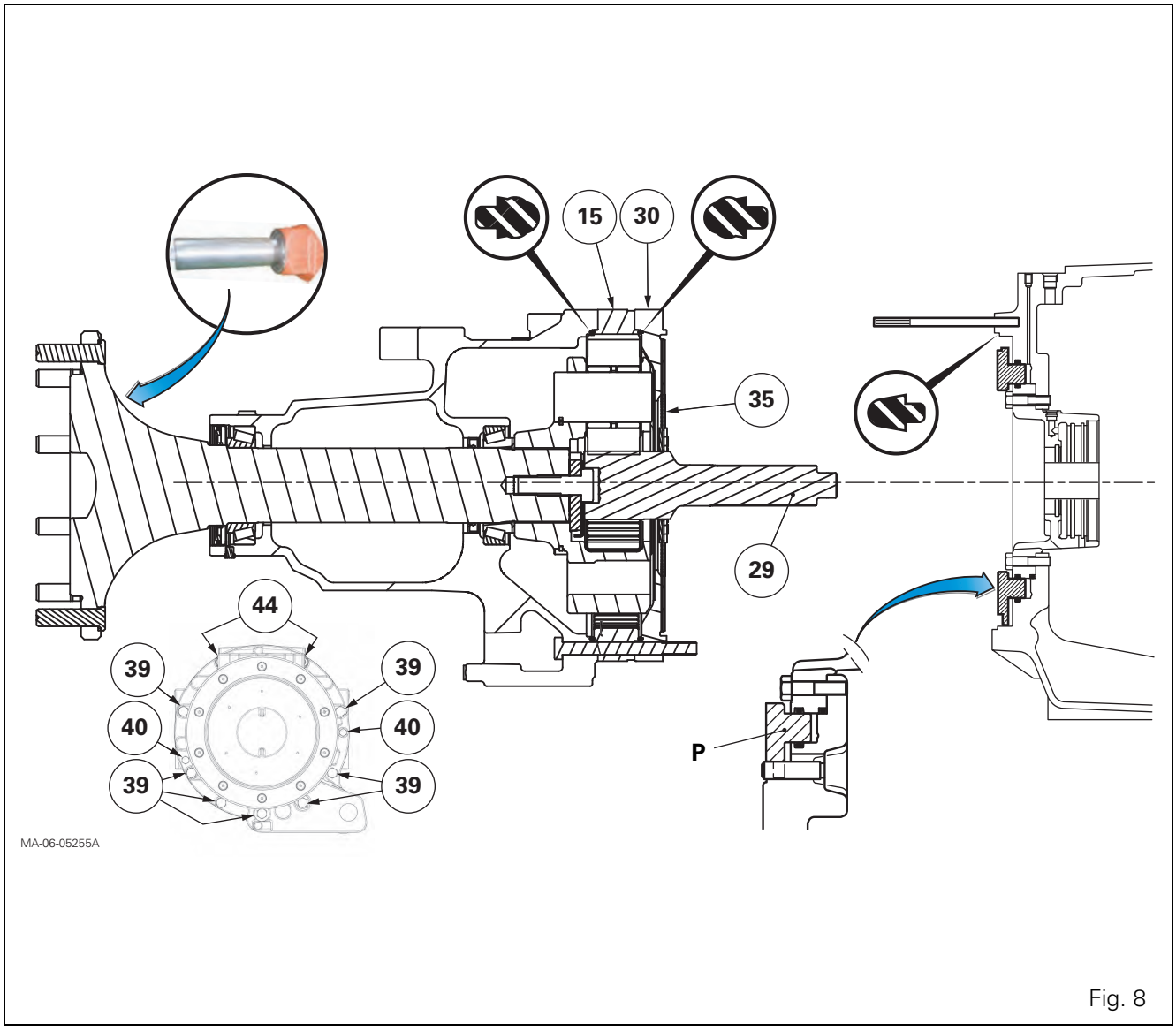
15
30
35
29
44
39
39
40
40
39
39
P
MA-06-05255A

Fig. 8

Refitting

Tractors fitted with GTA1040 transmission

10. Clean the mating faces of the trumpet housing and centre housing with solvent. Remove all traces of the previous sealing product. Dry the components.

11. Evenly smear the mating face of the brake plate (30) on the centre housing with a sealing product (Loctite 5206 or equivalent) (Fig. 9).

12. Evenly fill angle D of the centre housing (1) (Fig. 9) with a silicone seal (Loctite 5910 or equivalent).

IMPORTANT: *The diameter of the seal must be:*

- *uniform;*
- *of small section.*

The seal must not have gaps. The join must be located at the top of the centre housing.

13. On the trumpet housings or centre housing (as required), refit the sun gear (29) and the brake disc (35). Ensure that the latter slides freely on the sun gear splines (Fig. 12).

14. Proceed to step 22.

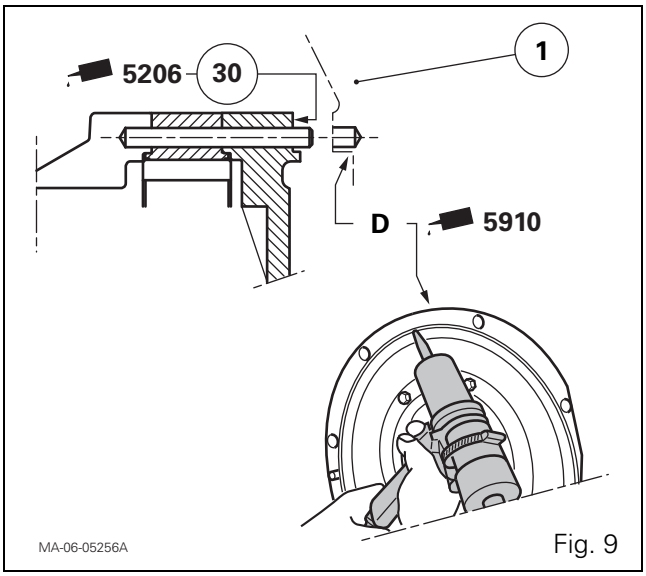

Fig. 9

Tractors fitted with GTA1540 transmission

15. Clean the mating faces of the trumpet housing and centre housing with solvent. Check that the groove of the seal (3) on the centre housing is free of dirt. Dry the components.

16. Fit a new HNBR seal (3) to service tool ref. xxxx (Fig. 10) (see § H).

IMPORTANT: *The HNBR seal (3) has no spurs P (Fig. 10). Do not confuse it with the NBR seal (4) (Fig. 10). These two seals are not exposed to the same temperatures when the transmission is operating (e.g. the HNBR seal (3) is exposed to higher temperatures when the brake is engaged). Their components are therefore different and they must be fitted correctly in their respective positions.*

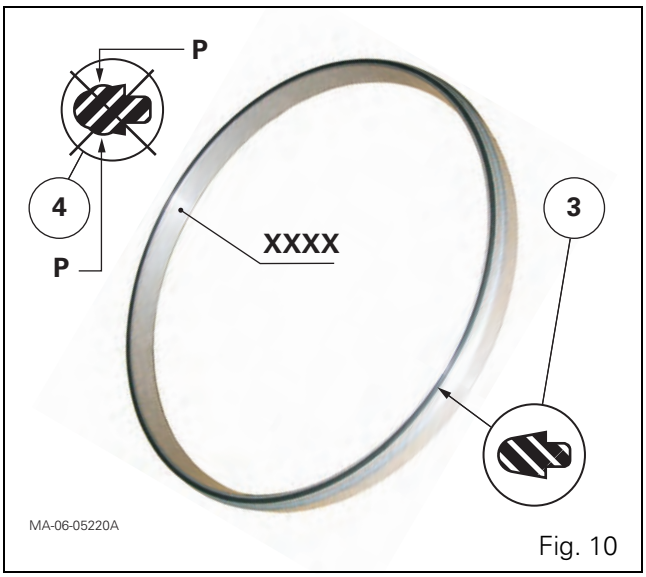

Fig. 10

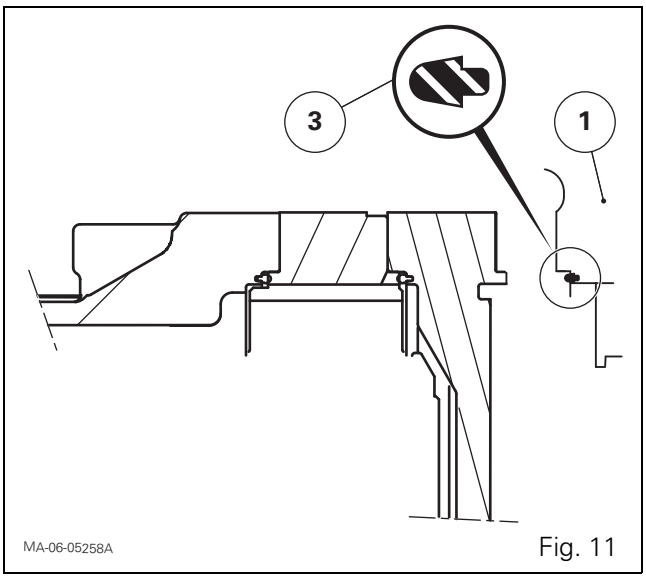

Fig. 11

17. Attach the tool fitted with the HNBR seal (3) to the centre housing. Manually exert high pressure around the tool while simultaneously turning it so that the seal fits correctly into the groove of the centre housing (1) (Fig. 11).

IMPORTANT: *It is strongly recommended that the HNBR seal (3) is fitted using the service tool. Fitting it without the tool will stretch the seal and cause a loop to form in the final assembly phase.*

18. Remove the service tool.

Ensure the HNBR seal (3) is positioned correctly on the centre housing.

19. Check the tightness of screws (40) attaching the brake plate (30) to the trumpet housing (10).

IMPORTANT: *Tractors fitted with GTA1540 transmission (50 kph) are assisted by a limited return mechanism on the brake pistons (see chapter 6 and the relevant section). As a result, before replacing the brake plates (30), it is advisable to push the brake pistons fully into their cavity so that this return travel limit mechanism once again returns the brake pistons correctly after the operation.*

20. On the trumpet housing or the centre housing (as required), refit the sun gear (29) and the brake disc (35). Ensure that the latter slides freely on the sun gear splines (Fig. 12).

IMPORTANT: *Tractors fitted with GTA1540 transmission (50 kph) are assisted by a limited return mechanism on the brake pistons (see chapter 6 and the relevant section). As a result, before replacing the brake discs (35), it is advisable to push the brake pistons fully into their cavity so that this limited return mechanism once again returns the brake pistons correctly after the operation.*

21. Proceed to step 22.

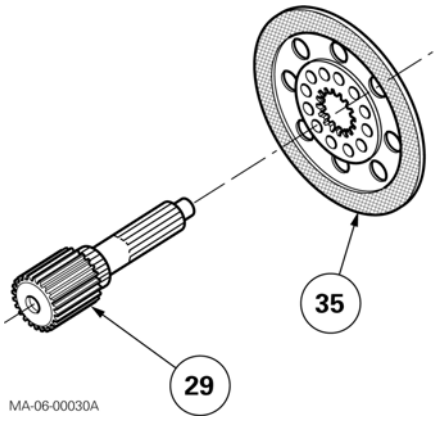

Fig. 12

Tractors fitted with GTA1040 or GTA1540 transmission

22. Support the trumpet housing using the equipment used for removal.

Engage the splines of the sun gear (29) in the differential or planet carrier (as required). If they do not engage, rotate the axle shaft and push the trumpet housing horizontally to couple it with the centre housing.

23. Tighten:

- the M16 screws (39) to 220-300 Nm;
- the M16 nuts (44) to 220-280 Nm.

24. If required, refit the guard (draft sensor harness).

25. Refit:

- the lower pivot pin of the lift ram;
- the stabilising support.

26. If it was necessary to lift the cab, reposition it on the trumpet housing support(s). Screw in the cab attachment screws.

NOTE: *If the tractor is fitted with a suspended cab (see chapter 12).*

27. Refit any parts removed from around the trumpet housing.

Refit the wheel.

Tighten the screws and nuts to their indicated torque, depending on the version (see chapter 6).

28. Top up the centre housing oil level. Check it using the sight glass located to the left of the PTO housing.

29. Remove the shims between the frame and the front axle.

30. Check the linkage operation.

31. Carry out a road test on the brake system.

32. Check the tightness of the trumpet housing, the hydraulic unions and the plugs.

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C . Removing and refitting the brake plate and ring gear assembly

Removal

Tractors fitted with GTA1040 or GTA1540 transmission

33. Remove the trumpet housing assembly (see § B). If possible, place the trumpet housing in a vertical position with the sun gear (29) facing upwards (Fig. 13).

34. Remove (Fig. 14, Fig. 15):

- the sun gear (29);
- the screw(s) (40);
- the brake plate (30);
- the planet carrier (25) (see § D);
- the ring gear (15).

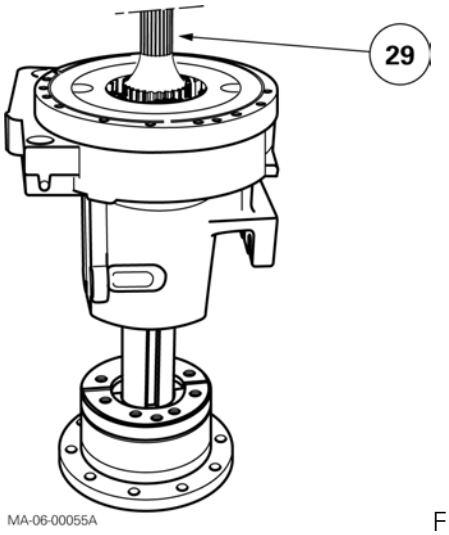
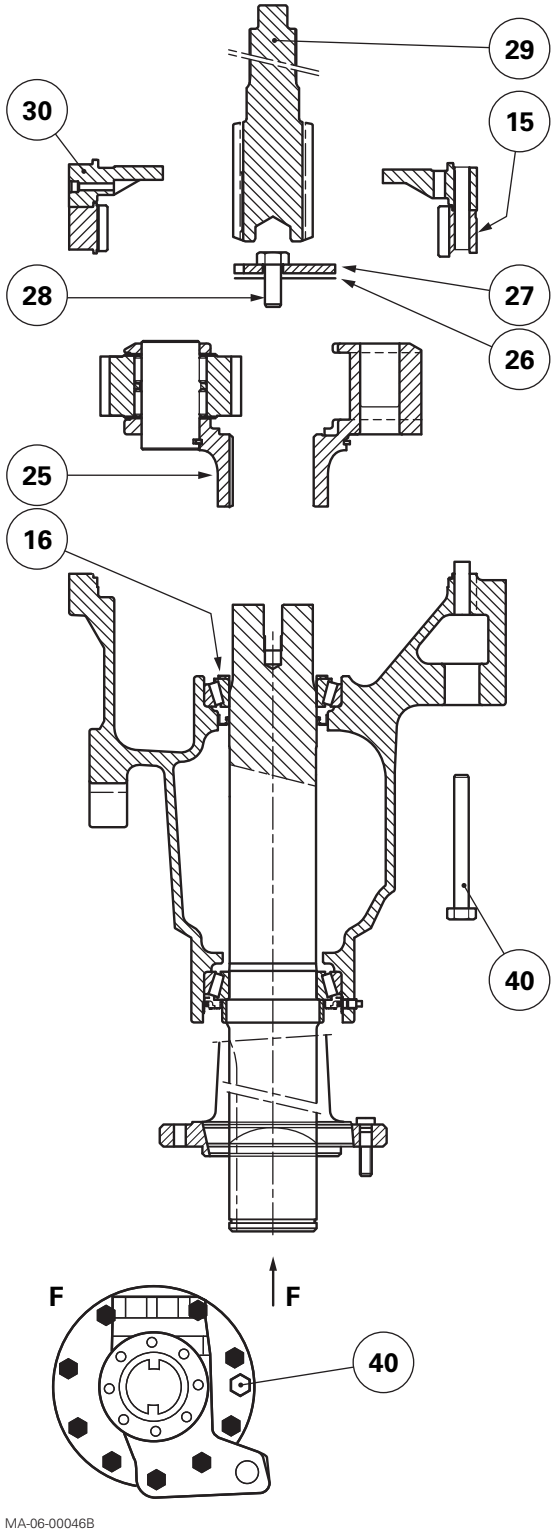


Fig. 13


29
30
15
28
27
26
25
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40
F
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Fig. 14

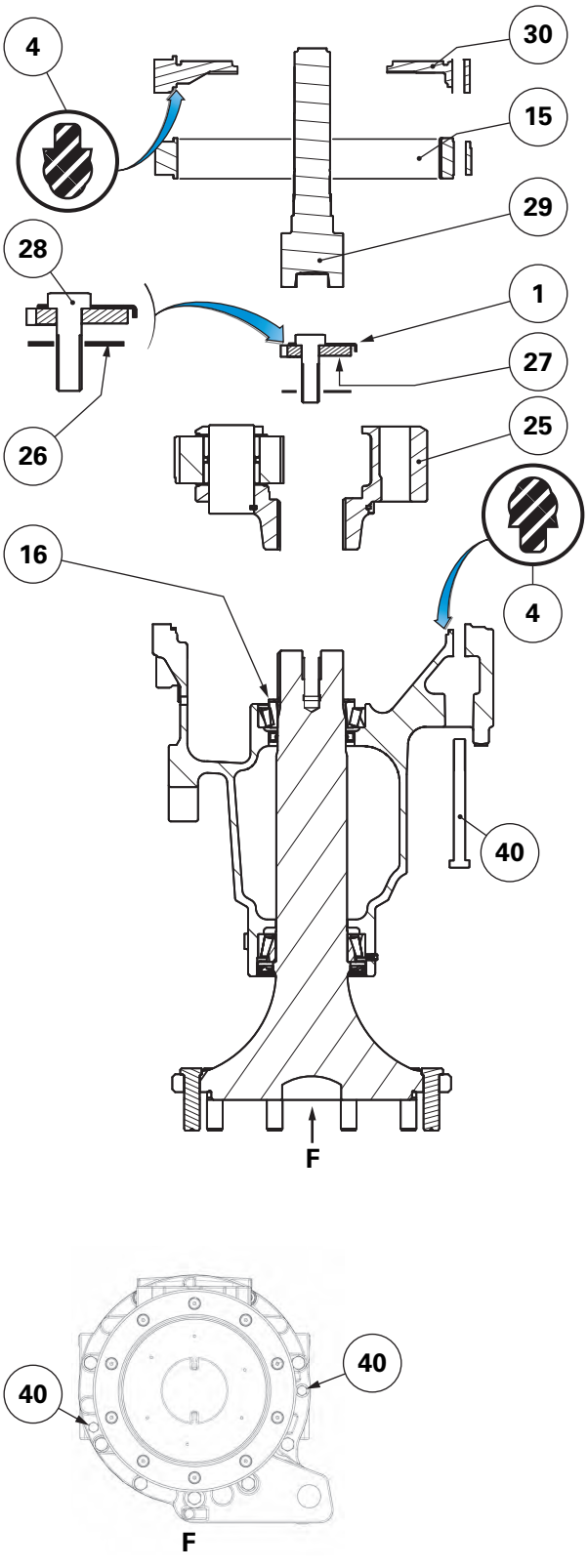
4
30
15
29
28
1
27
26
25
16
4
40
F
40
40
F
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Fig. 15

Refitting

Tractors fitted with GTA1040 transmission

35. Clean the mating faces of the trumpet housing (10), the ring gear and the brake plate with solvent. Remove all traces of the previous sealing product. Dry the components.

36. Smear (Fig. 16):

- the mating faces of the trumpet housing (10) and the brake plate (30) with Loctite 5206 sealant or equivalent;
- angles B and C of the trumpet housing (10) and the brake plate (30) with a silicone seal (Loctite 5910 or equivalent).

IMPORTANT: *Observe the order of application of the sealing product.*

The diameter of the silicone seals must be:

- *uniform;*
- *of small section.*

The seals must not have gaps. The join must be located at the top of the trumpet housing.

NOTE: *The top position is determined by the horizontal position of the trumpet housing on the centre housing.*

37. Proceed to step 44.

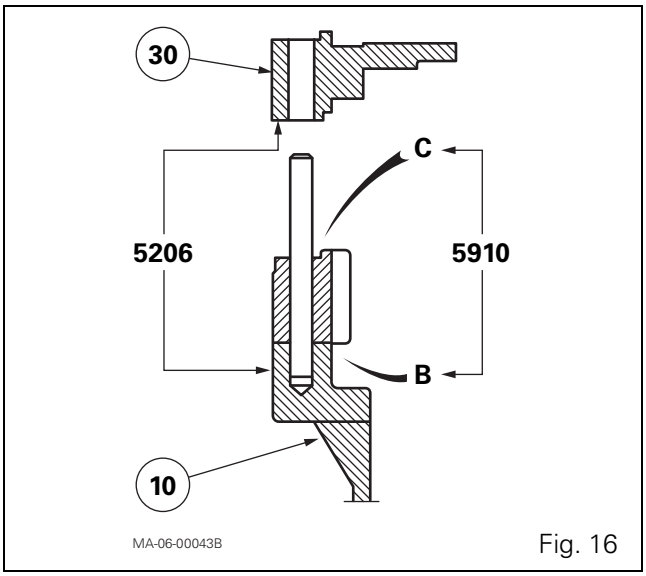

Fig. 16

Tractors fitted with GTA1540 transmission

38. Clean the mating faces of the trumpet housing (10), the ring gear and the brake plate with solvent. Dry the components.

Check that the grooves of the seals (4) on the parts mentioned above are free of dirt.

39. Fit a new NBR seal (4) to service tool ref. xxx (Fig. 17 and § H).

IMPORTANT: *The NBR seal (4) is fitted with four spurs P on each of its sides. Do not confuse it with the HNBR seal (3) (Fig. 17). These two seals are not exposed to the same temperatures when the transmission is operating (example: the NBR seal (4) is exposed to lower temperatures because it is further from the brake mechanism). Their components are therefore different and they must be fitted correctly in their respective positions.*

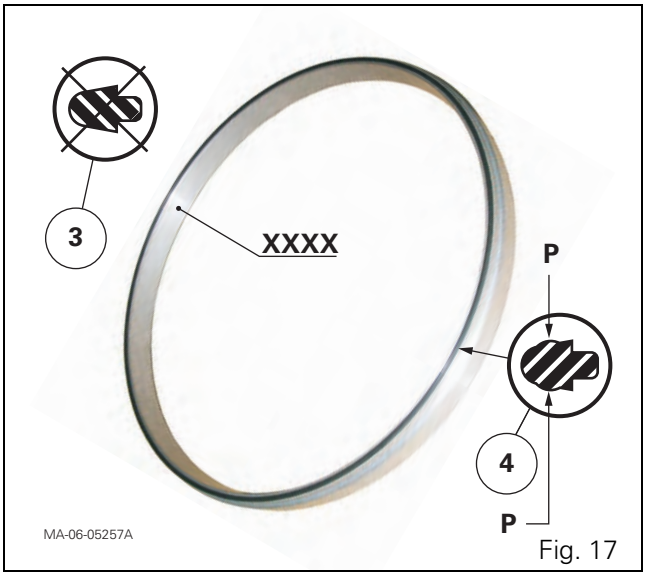

Fig. 17

40. Position the tool fitted with the NBR seal (4) on the trumpet housing (10). Manually exert high pressure around the tool while simultaneously turning it so that the seal fits correctly into the groove of the trumpet housing (10) (Fig. 18).

IMPORTANT: *It is strongly recommended that the NBR seal (4) is fitted using the service tool. Fitting it without the tool will stretch the seal and cause a loop to form in the final assembly phase.*

41. Remove the service tool.

Check that the NBR seal (4) is correctly positioned on the trumpet housing.

42. Fit the second NBR seal (4) on the brake plate (30) (Fig. 18). Use the same assembly method as with the first seal in order to correctly house the second seal in the groove of the brake plate (30) (Fig. 18) (see steps 39 to 41).

43. Proceed to step 44.

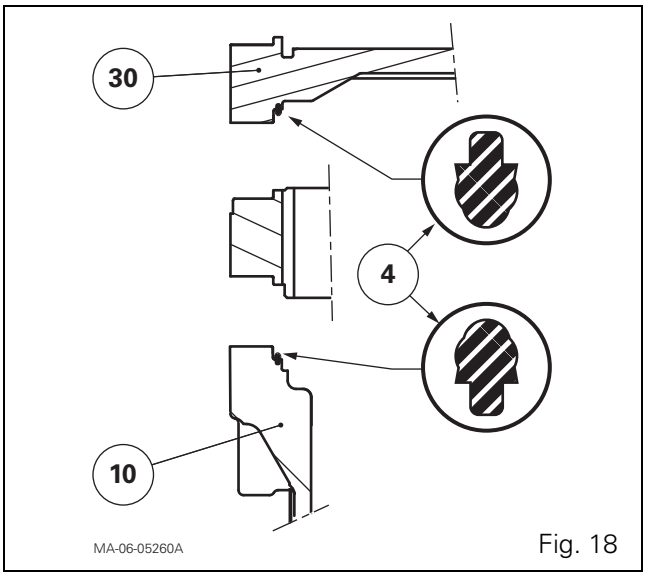

Fig. 18

Tractors fitted with GTA1040 or GTA1540 transmission

44. Check that the locating ring (45) is present on the trumpet housing (10).

45. Refit:

- the ring gear (15);
- the planet carrier (25) (see § D);
- the brake plate (30);
- the pin (14).

46. Tighten the screw(s) (40). Tighten to a torque of 100-130 Nm.

47. Refit the sun gear (29).

D . Removing and refitting, disassembling and reassembling the planet carrier

Removal

Tractors fitted with GTA1040 transmission

48. Remove:
- the trumpet housing assembly (see § B). If possible, place it in a vertical position with the planet carrier facing upwards;
- the brake plate (30) (see § C).

49. Immobilise the axle shaft (2) or the planet carrier (25).

50. Remove (Fig. 19):
- the M24 screw (28);
- the tripod washer (27);
- the shim(s) (26);
- the planet carrier (25);
- the ring gear (15) (see § C).

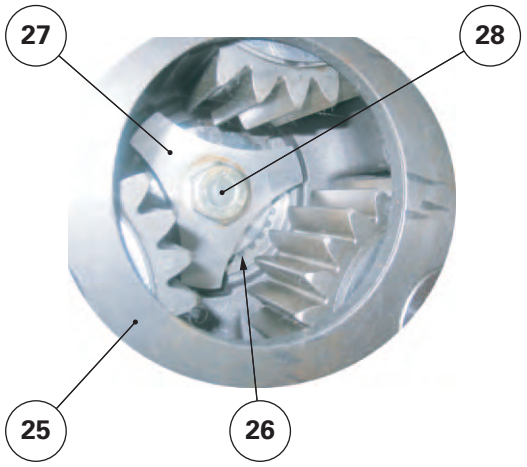

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Fig. 19

Tractors fitted with GTA1540 transmission

51. Remove:
- the trumpet housing assembly (see § B). If possible, place it in a vertical position with the planet carrier facing upwards;
- the brake plate (30) (see § C).

52. Immobilise the axle shaft (2) or the planet carrier (25).

53. Remove (Fig. 20):
- the lock washer (1)

  NOTE: *The lock washer is fixed with Loctite 401;*
- the M24 screw (28);
- the tripod washer (27);
- the shim(s) (26);
- the planet carrier (25);
- the ring gear (15) (see § C).

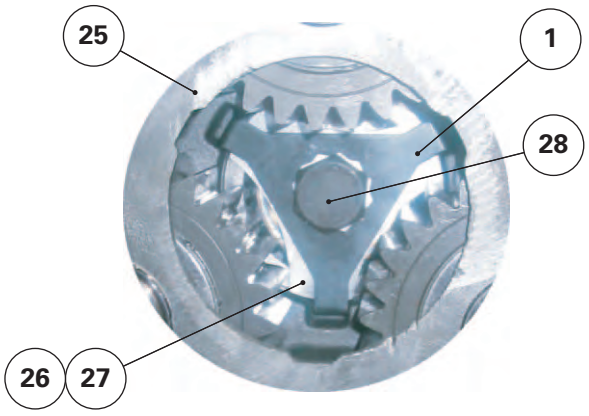

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Fig. 20

Disassembly

Tractors fitted with GTA1040 or GTA1540 transmission

54. Remove (Fig. 21):
- the screw (18);
- the spacer (17);
- the snap ring (19) by moving its two ends apart.

55. Remove:
- the pins (20);
- the friction washers (21);
- the planet gears (22).

56. Recover:
- the bearing needles (23);
- the spacer (24).

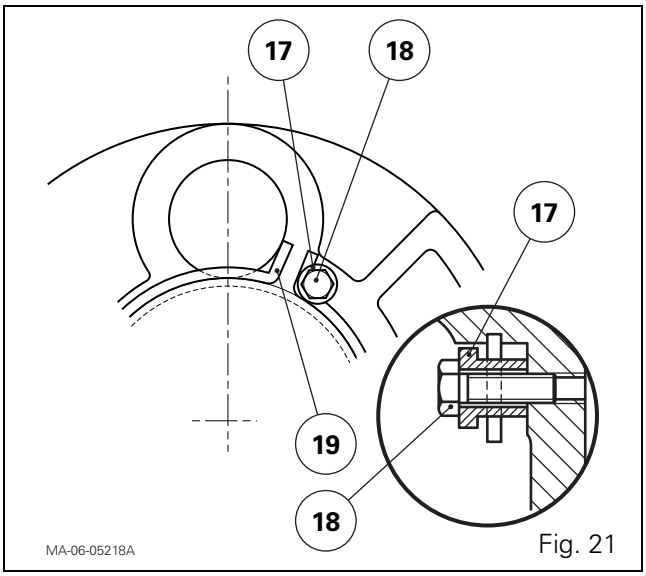

Fig. 21

Reassembly

Tractors fitted with GTA1040 or GTA1540 transmission

57. Fit each planet gear with two rows of needle rollers previously smeared with miscible grease.

NOTE: *A spacer (24) separates each row of needle rollers.*

58. Refit the planet gears.

Perform steps 55 and 56 in reverse order.

Manually check the axial clearance of each planet gear.

59. Refit:
- the snap ring (19);
- the spacer (17).

60. Lightly smear the thread of the screw (18) with Loctite 270 or equivalent. Screw in and tighten to 34-50 Nm.

Refitting

Tractors fitted with GTA1040 transmission

61. Check that the tab washer (16) is present.

62. Refit the ring gear (15) (see § C).
Refit the planet carrier (25). If necessary, shim the tapered roller bearings of the axle shaft (see § F).

63. Immobilise the axle shaft (2) or the planet carrier (25).

64. Refit the shim(s) (26) and the tripod washer (27).

65. Screw in and tighten the M24 screw (28) (Fig. 22) to 765-935 Nm after lightly smearing its thread with Loctite 270 or equivalent.

66. Refit:
- the brake plate (30) (see § C);
- the trumpet housing assembly (see § B).

Fig. 22

Tractors fitted with GTA1540 transmission

67. Check that the tab washer (16) is present.

68. Refit the ring gear (15) (see § C).

Refit the planet carrier (25). If necessary, shim the tapered roller bearings of the axle shaft (see § F).

69. Immobilise the axle shaft (2) or the planet carrier (25).

70. Refit the shim(s) (26) and the tripod washer (27).

71. Screw in and tighten the M24 screw (28) to 640 Nm.

72. Slide a lock washer (1) onto the head of the M24 screw (28). Ensure its tabs B are correctly housed in moulded slots E of the planet carrier (25) (Fig. 23). If this is not the case, repeat the step with the second lock washer; if this is still not the case, repeat the step with the third. Depending on the result (either no washer is suitable or a washer is selected), proceed to step 73 or 74.

NOTE: *Three lock washers (1) are available from the spare parts catalogue. Each of the lock washers has a 10° angular offset.*

73. Case 1: A lock washer is selected

Apply three spots of Loctite 401 or equivalent to the mating face of the selected lock washer which is turned towards the tripod washer (27).

NOTE: *Loctite 401 prevents the lock washer (1) from moving when the trumpet housing is being refitted to the centre housing.*

When the trumpet housing is refitted, the sun gear (29) holds the lock washer in place.

74. Case 2: No lock washer is selected

Gently retighten the M24 screw (28), taking care not to exceed the maximum torque of 960 Nm.

Repeat step 72.

IMPORTANT: *If required, repeat step 74 several times.*

75. Refit:

- the brake plate (30) (see § C);
- the trumpet housing assembly (see § B).

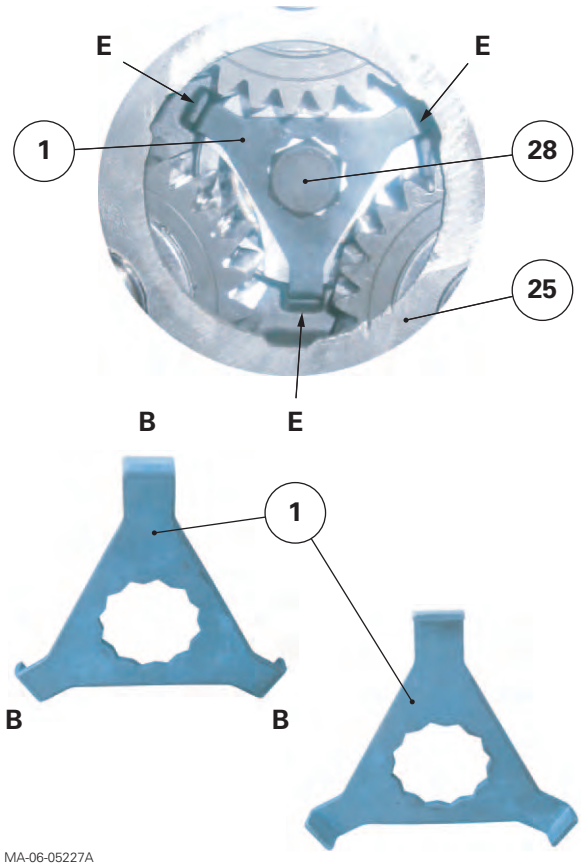

Fig. 23

E . Replacing tapered roller bearings and seals

Disassembly

Tractors fitted with GTA1040 or GTA1540 transmission

76. Remove:
- the trumpet housing assembly (see § B);
- the brake plate (30) (see § C);
- the planet carrier (25) (see § D);
- the ring gear (15) (see § C).

77. Remove:
- the tab washer (16);
- the axle shaft (2);
- the bearing cone (13).

78. If necessary, extract:
- the bearing cone (7);
- the seals (5) (11) and discard them.

79. Using a suitable puller or a makeshift tool, extract or drive out:
- the bearing cups (8) (12);
- the friction cage (6).

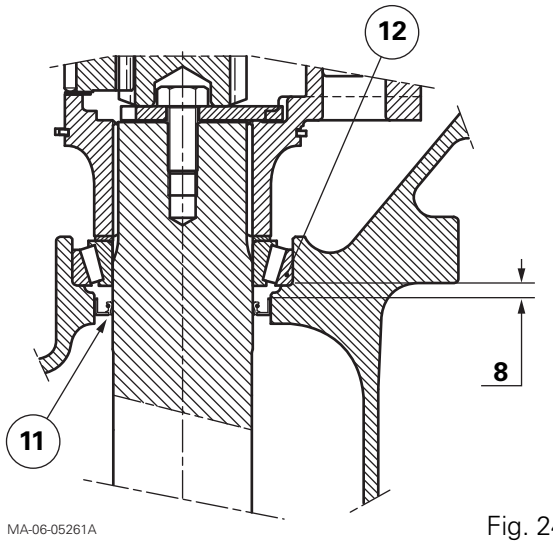

Fig. 24

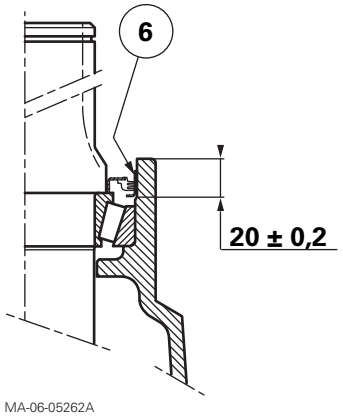

Fig. 25

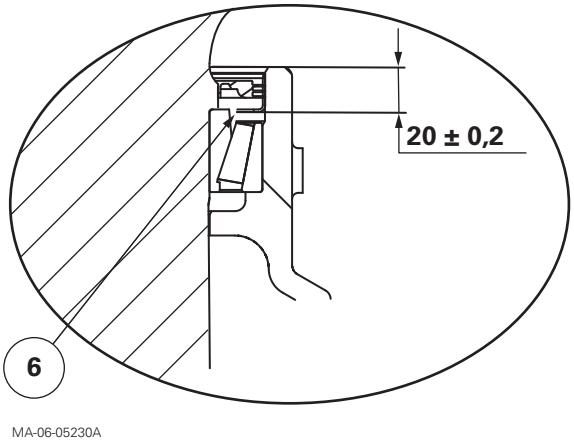

Fig. 26

Reassembly

Tractors fitted with GTA1040 or GTA1540 transmission

80. Clean and check all components. Replace those that are defective.

81. Smear the external surface of the seal (11) with a film of clean transmission oil.

82. Using a suitable fitting drift, fit the seal (11) to within approximately 8 mm of the shoulder of the cup (12) on the trumpet housing (Fig. 24), positioning its lip towards the final drive unit.

IMPORTANT: *If a groove has been worn into the axle shaft at the location of the old seal (11), offset the new seal slightly so that its lip ensures the axle shaft is completely sealed beyond the worn groove.*

83. Fit:

- the bearing cups (8) (12) against their respective shoulders;
- the friction cage (6) according to the distance indicated:
  - Fig. 25 (tractors fitted with GTA1040 transmission);
  - Fig. 26 (tractors fitted with GTA1540 transmission).

84. For tractors fitted with:

- GTA1040 transmission, proceed to step 85;
- GTA1540 transmission, proceed to step 87.

Tractors fitted with GTA1040 transmission

85. Fit the new three-lipped seal (5) level with shoulder E (Fig. 27) of the flanged axle shaft or straight axle shaft.

86. Proceed to step 89.

Tractors fitted with GTA1540 transmission

87. Fit the new three-lipped seal (5):

- 4.0 ± 0.5 mm from shoulder E of the flanged axle shaft (Fig. 28);
- 5.5 ± 0.5 mm from shoulder E of the straight axle shaft (Fig. 28).

88. Proceed to step 89.

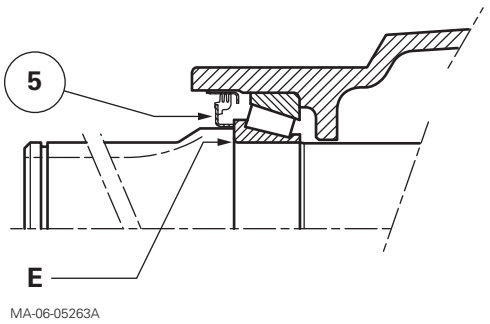

Fig. 27

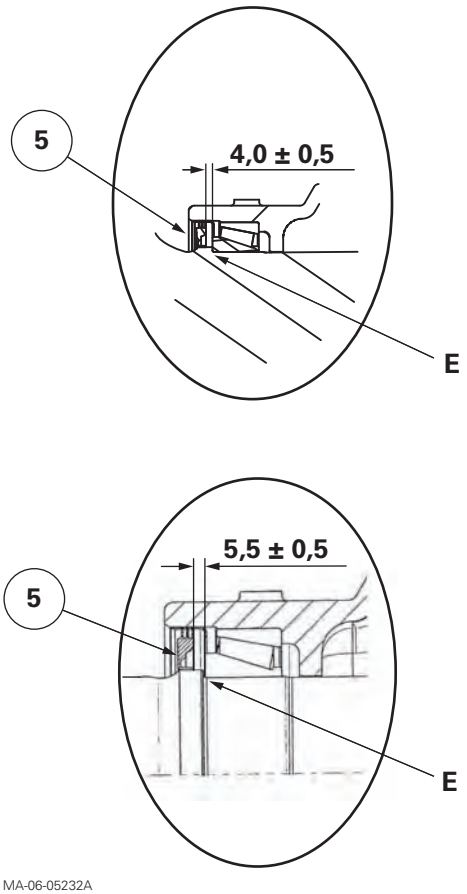

Fig. 28

Tractors fitted with GTA1040 or GTA1540 transmission

89. Fit the bearing cone (7) against its shoulder on the flanged axle shaft or straight axle shaft using a suitable tool.

90. Lightly smear the bearing cone (7) and the lips of the seals (5) (11) with bearing grease.

91. Protect the seal lip (11) by temporarily masking the splines on the axle shaft with a flexible protection.

Insert the prepared axle shaft into the trumpet housing fitted with the seal (11) and the bearing cones (8) (12), positioning the three lips of the seal (5) towards the outside of the trumpet housing.

92. Refit:

- the bearing cone (13);
- the tab washer (16);
- the ring gear (15) (see § C).

93. Refit:

- the planet carrier (25). If necessary, shim the tapered roller bearings (see § F);
- the brake plate (30) (see § C);
- the trumpet housing assembly (see § B).

94. Temporarily replace the plug (9) with a grease nipple. Partially fill cavity A (Fig. 29) with BP Agricharge grease or equivalent. Remove the grease nipple. Screw in the plug.

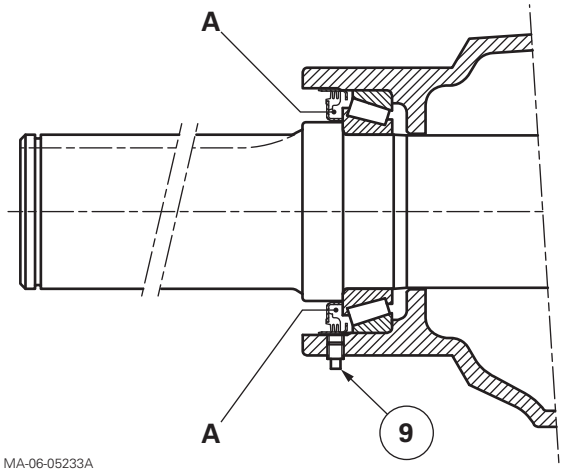

Fig. 29

F . Shimming the tapered roller bearings of the axle shaft

If the following parts are to be replaced, the shimming of the tapered roller bearings on the axle shaft must be checked or carried out:

- the flanged or straight axle shaft (2);
- the tapered roller bearings (7) (8) and (12) (13);
- the trumpet housing (10);
- the tab washer (16);
- the planet carrier (25).

NOTE: *The preload shimming of the tapered roller bearings on the axle shaft is carried out using shim(s) (26) fitted between the end of the axle shaft (2) and the tripod washer (27) (Fig. 30).*

IMPORTANT: *In order to correctly shim the tapered roller bearings, fit the trumpet housing in a vertical position (Fig. 30).*

Preparing for shimming

Tractors fitted with GTA1040 or GTA1540 transmission

95. Fit:
- the bearing cone (13);
- the tab washer (16);
- the planet carrier (25).

96. Fit shim(s) (26) with a thickness greater than the space between the end of the axle shaft (2) and the mating face of the tripod washer (27) on the planet carrier (Fig. 31, Fig. 32). This should give a temporary clearance J.

97. Fit the tripod washer (27).

Temporarily lock the M24 screw (28) at:
- 765 Nm (tractors fitted with GTA1040 transmission);
- 640 Nm (tractors fitted with GTA1540 transmission).

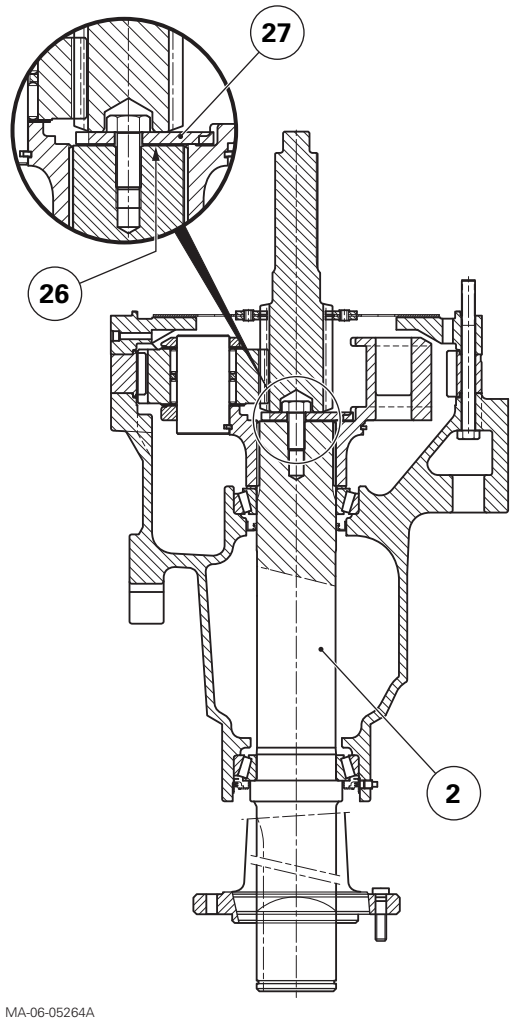

Fig. 30

GTA1040

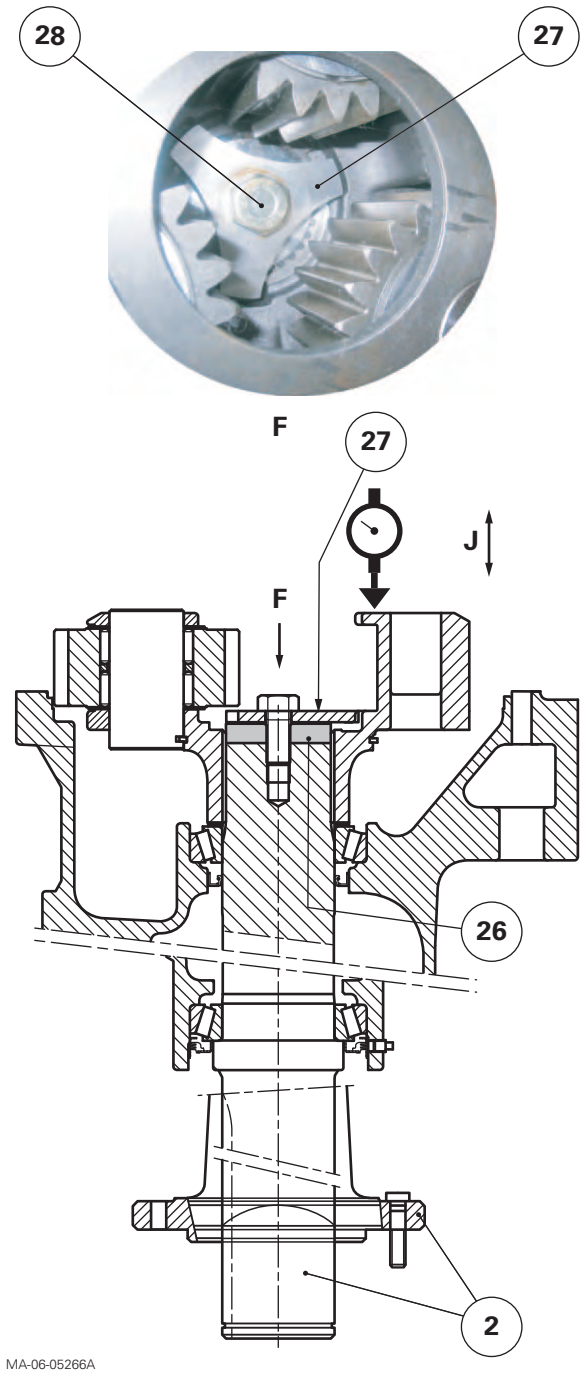

Fig. 31

GTA1540

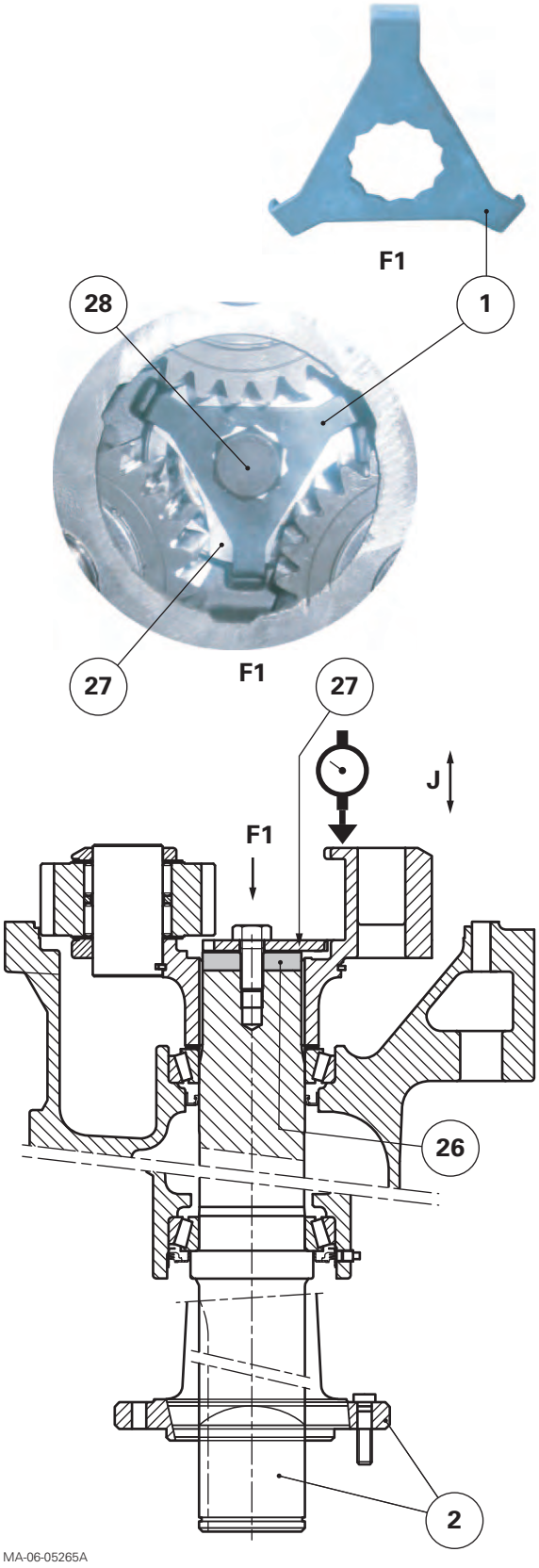

Fig. 32

Shimming

Tractors fitted with GTA1040 or GTA1540 transmission

98. Press firmly on the planet carrier while turning the trumpet housing by several turns.

99. Fit a dial gauge on the trumpet housing with its feeler pin positioned near the centre of the planet carrier (Fig. 31 to Fig. 33). Set the dial gauge needle to zero.

100. Using suitable levers, move the planet carrier vertically (Fig. 33). Measure clearance J indicated on the dial gauge.

Repeat the step several times.

Calculate the average of the clearance J readings.

101. Reduce the shim (26) thickness according to value J + (0.02 to 0.12) to obtain a preload P1 = 0.02 to 0.12 mm (Fig. 34).

NOTE: *If possible, shim to the maximum tolerance.*

102. For tractors fitted with:

- GTA1040 transmission, proceed to step 103;
- GTA1540 transmission, proceed to step 104.

Tractors fitted with GTA1040 transmission

103. Definitively fit the tripod washer (27) (Fig. 31).

Lightly smear the thread of the M24 screw (28) (Fig. 31) with Loctite 270 or equivalent. Tighten this screw to a torque of 765-935 Nm.

Tractors fitted with GTA1540 transmission

104. Definitively fit the tripod washer (27) (Fig. 32).

105. Tighten the M24 screw (28) (Fig. 32) to 640 Nm.

From the three possible lock washers, select the lock washer (1) which will be fitted definitively (see steps 72 to 74).

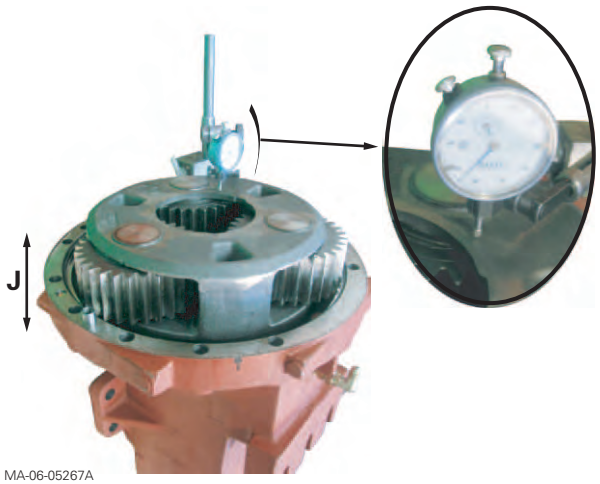

Fig. 33

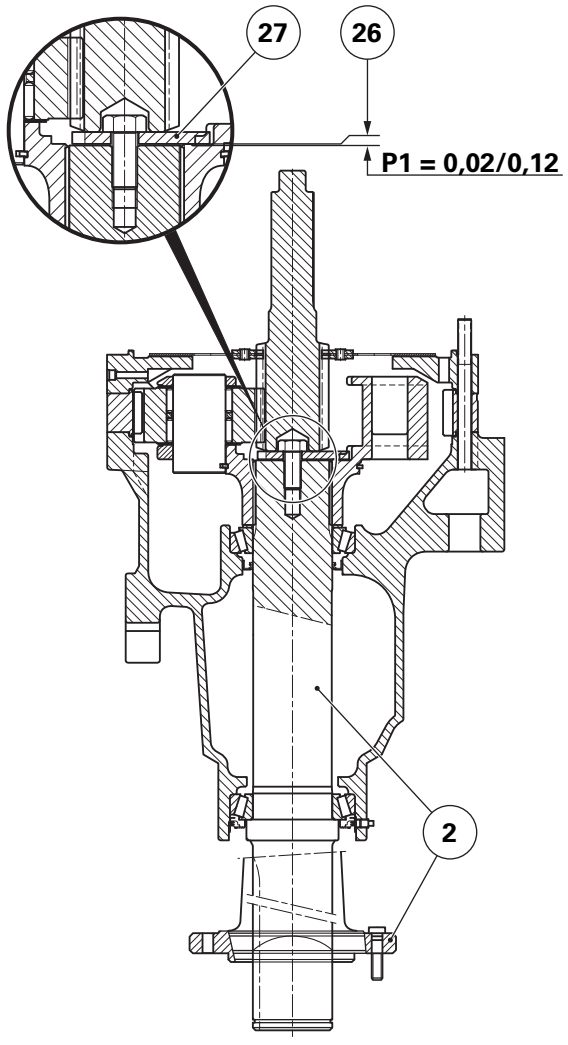

Fig. 34

G . Replacing a stud on the flanged axle shaft

106. If necessary, remove the wheel from the relevant flanged axle shaft.

107. Drive out the defective stud.

108. Clean the new stud and its housing in the flange.

109. Lightly smear the ribbed part of the new stud with Loctite 270 or equivalent and fit it using a bronze drift and a suitable hammer.

H . Service tools

Tools available in the AGCO network

- xxxx: Seal (3) (4) fitting ring (Fig. 35)

Fig. 35

GPA40 - Heavy Duty trumpet housings

6B13 - GPA40 - Sealed Heavy Duty trumpet housings

CONTENTS

GPA40 - Sealed Heavy Duty trumpet housings

A . General

The sealed Heavy Duty trumpet housings of tractors fitted with GTA1040 or GTA1540 transmission have a compartment separating them completely from the centre housing. They support the left and right-hand axle shafts. They contain the final drive units that transmit the rotation from the differential assembly.

Tractors fitted with GTA 1040 or GTA1540 transmission may be fitted with trumpet housings with flanged axle shafts or straight axle shafts.

The final drive unit is housed in a sealed area, thanks to the compartment mentioned above. It contains oil with SAE 85W/140 viscosity grade.

The two trumpet housings are symmetrical. They are fitted either side of the centre housing.

Construction

The axle shaft (2) is supported by two tapered roller bearings (7) (8) and (12) (13) fitted opposite one another.

The tightness of the final drive unit compartment is ensured by the single lip seal (11) and the compartment (30) fitted with seals (31) mounted back-to-back.

On tractors fitted with GTA1540 transmission, the tightness of the ring gear (15) is ensured by two NBR seals (4) fitted on either side of the ring gear.

On tractors fitted with GTA1040 transmission, the oil tightness of the ring gear (15) is ensured by two silicone seals (Silicomet type) and two seals smeared with Loctite.

The three-lipped seal (5) protects the outer tapered roller bearing (7) (8).

The preload on the tapered roller bearings is obtained using shim(s) (26) fitted at the end of the axle shaft (2).

The planet carrier (25), which is splined to the axle shaft (2), is made up of three planet gears (22) that engage with the ring gear (15) and the sun gear (29).

The sun gear (29) drives the brake disc (35) via a splined hub (32) held in place by the snap ring (33).

The compartment (30) is centred by pin (14). It also acts as a plate to the braking mechanism. Port O located on the upper part of the compartment allows for the lubrication of the brakes.

On tractors fitted with GTA1540 transmission (50 kph), the brake discs (35) and plates (30) have a larger braking surface area.

On tractors fitted with GTA1540 transmission, the axle shaft (2) and planet carrier (25) are held in place by the tripod washer (27), the M24 screw (28) and the lock washer (1) (Fig. 3).

On tractors fitted with GTA1040 transmission, the axle shaft (2) and the planet carrier (25) are held in place by the tripod washer (27) and the M24 screw (28) smeared with Loctite (Fig. 1).

The mechanical elements of the trumpet housing operate in a sealed environment. The presence of a union and vent pipe (38) on top of the trumpet housing is therefore necessary to maintain the atmospheric pressure of the housing.

GPA40 - Sealed Heavy Duty trumpet housings

Parts lists

Tractors fitted with GTA1040 transmission (Fig. 1, Fig. 2)

(2) Straight axle shaft
(2) Flanged axle shaft
(5) Three-lipped seal
(6) Friction cage
(7) Bearing cone
(8) Bearing cup
(9) Threaded plug
(10) Trumpet housing
(11) Single lip seal
(12) Bearing cup
(13) Bearing cone
(14) Pins
(15) Ring gear
(16) Tab washer
(17) Spacer
(18) Screw
(19) Circlip
(20) Planet gear pin
(21) Washer
(22) Planet gear
(23) Needle rollers
(24) Spacer
(25) Planet carrier
(26) Shim(s)
(27) Tripod washer
(28) M24 screw
(29) Sun gear
(30) Brake plate (compartment)
(31) Lip seals
(32) Splined hub
(33) Snap ring
(35) Brake disc
(38) Union and vent pipe
(39) Screw
(40) Screw
(41) Filler plug
(42) Oil level plug
(43) Magnetic drain plug
(44) M16 stud, washers and nuts
(45) Locating ring

Legend

A Grease chamber
B Silicone seal
C Silicone seal
D Silicone seal
O Brake lubricating port

GTA1040

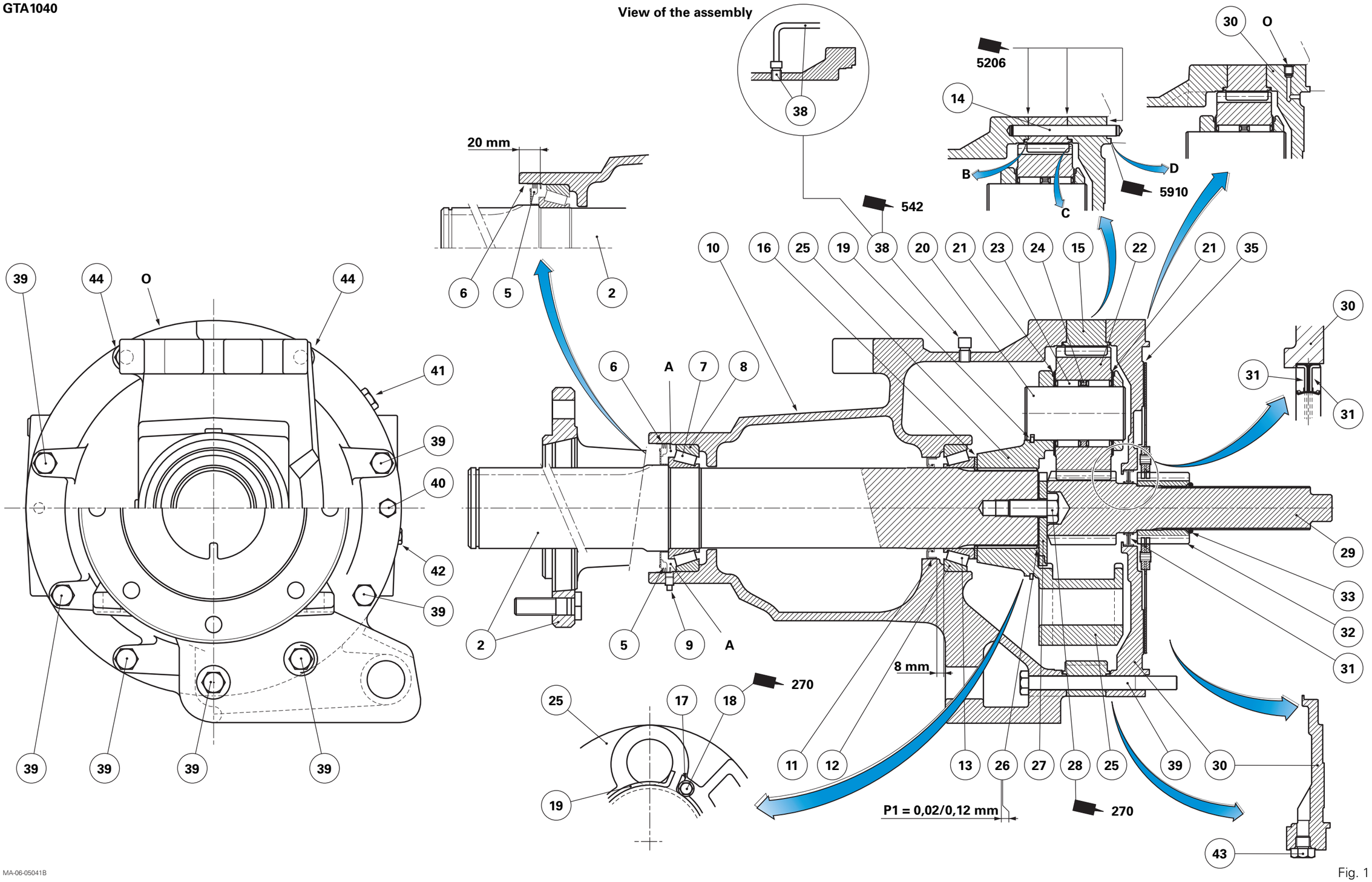

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Fig. 1

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Blown-up view

GTA1040

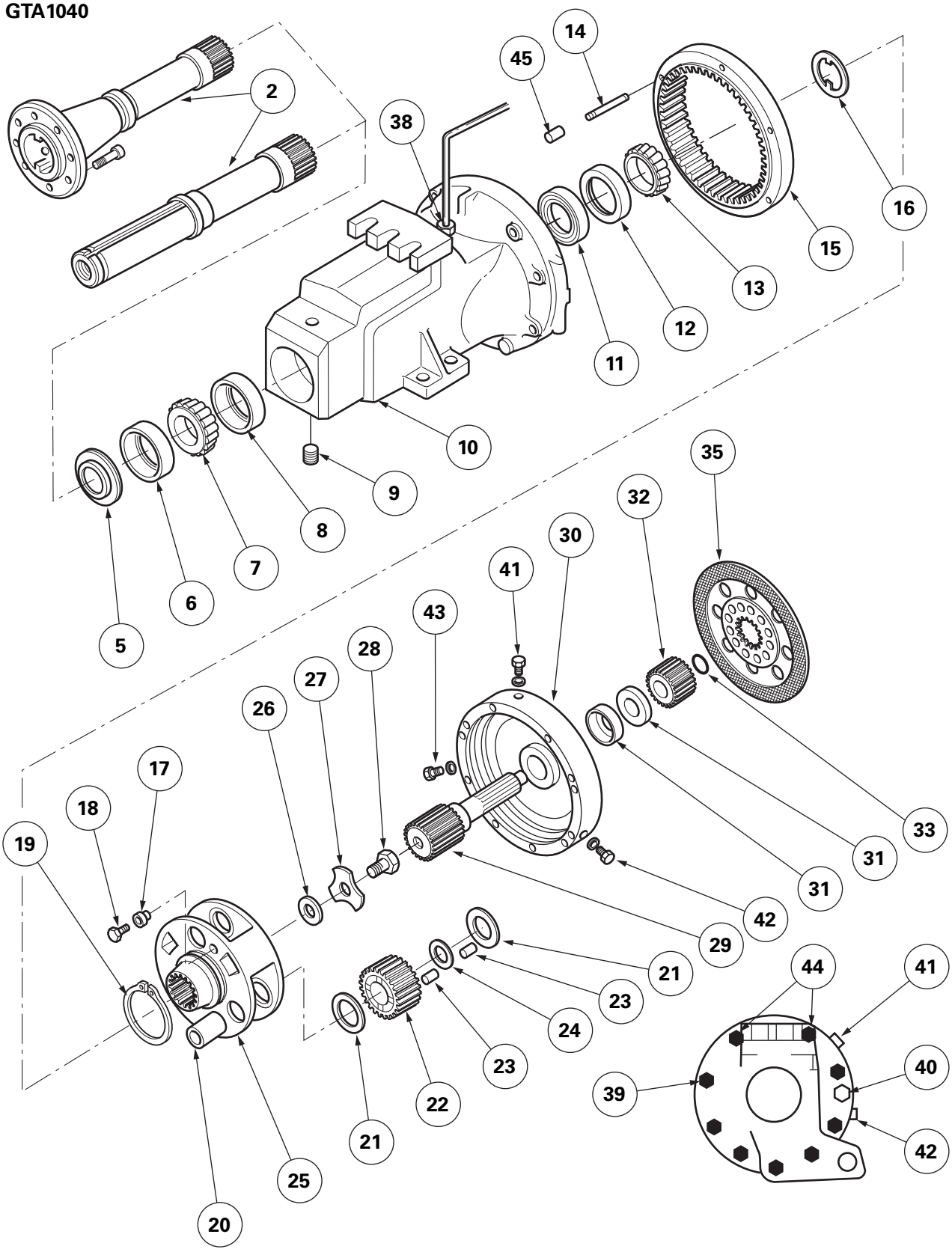

Fig. 2

Tractors fitted with GTA1540 transmission
(Fig. 3, Fig. 4)

(1) Lock washer
(2) Straight axle shaft
(2) Flanged axle shaft
(3) HNBR seal
(4) NBR seal
(5) Three-lipped seal
(6) Friction cage
(7) Bearing cone
(8) Bearing cup
(9) Threaded plug
(10) Trumpet housing
(11) Single lip seal
(12) Bearing cup
(13) Bearing cone
(14) Pins
(15) Ring gear
(16) Tab washer
(17) Spacer
(18) Screw
(19) Circlip
(20) Planet gear pin
(21) Washer
(22) Planet gear
(23) Needle rollers
(24) Spacer
(25) Planet carrier
(26) Shim(s)
(27) Tripod washer
(28) M24 screw
(29) Sun gear
(30) Brake plate (compartment)
(31) Lip seals
(32) Splined hub
(33) Snap ring
(35) Brake disc
(38) Union and vent pipe
(39) Screw
(40) Screw
(41) Oil filler and level plug
(43) Magnetic drain plug
(44) M16 stud, washers and nuts
(45) Locating ring

Legend

A Grease chamber
O Brake lubricating port

View of the assembly

GTA1540

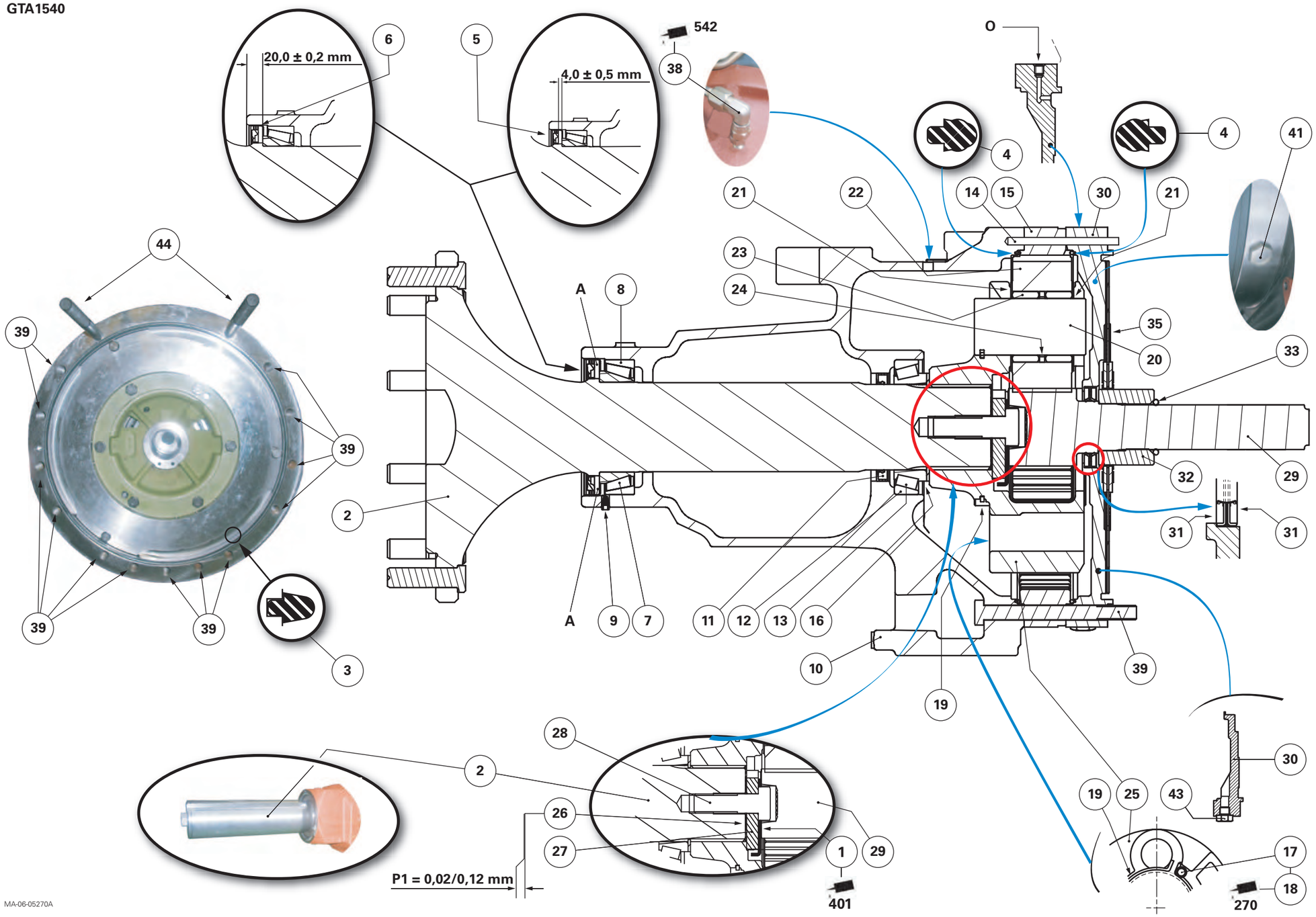

Fig. 3

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Blown-up view

GTA1540

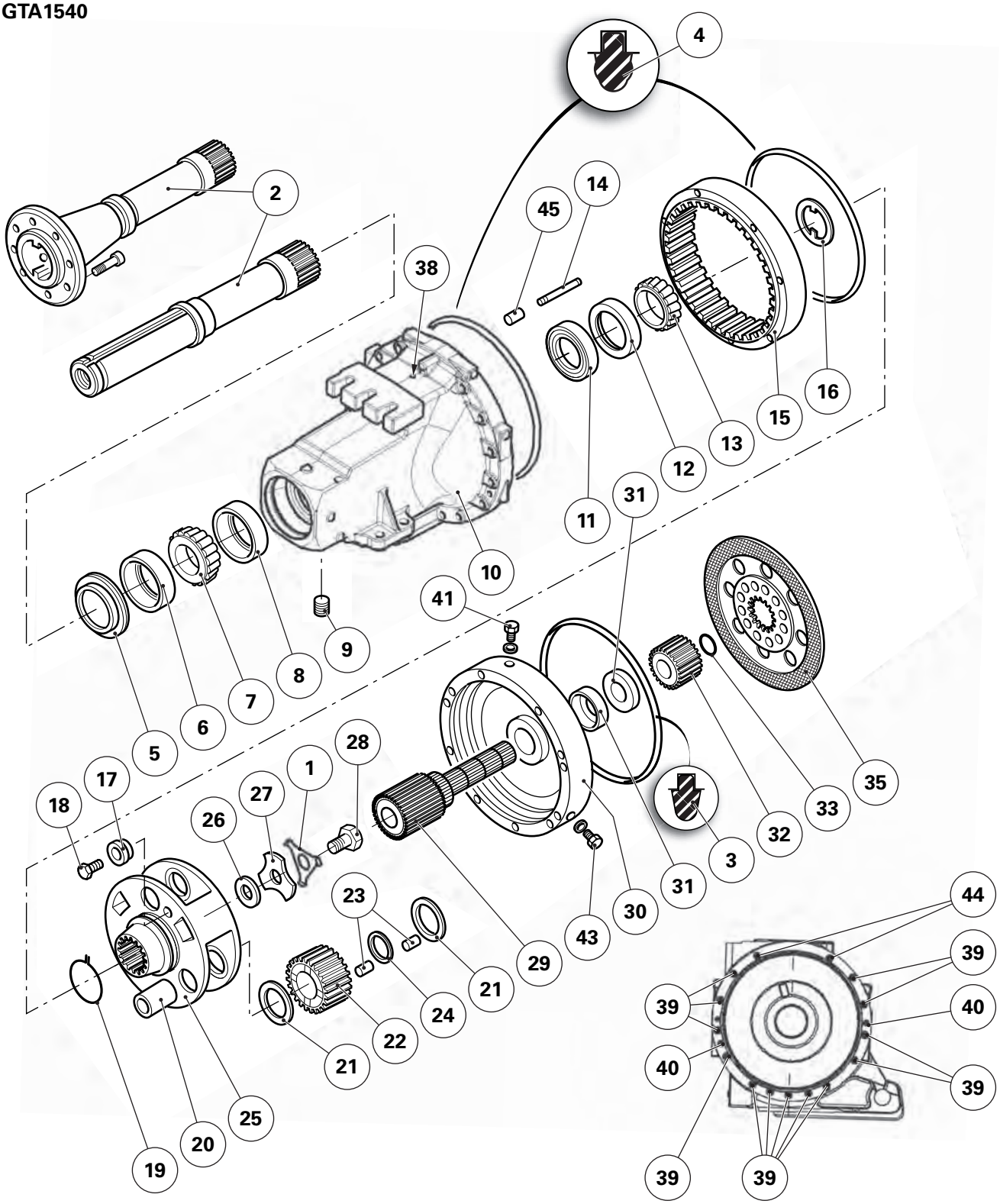

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Fig. 4

B . Removing and refitting the trumpet housing assembly

Fig. 5: Tractors fitted with GTA1040 transmission
Fig. 6: Tractors fitted with GTA1540 transmission

Removal

1. Drain the centre housing.
   IMPORTANT: *The oil used for the mechanical and hydraulic components of the transmission and the oil used for lubricating the moving parts in the final drive unit are not the same. They have different viscosities. If the oils are not to be changed, they must not be mixed when drained.*
2. Immobilise the tractor.
   If the tractor is not fitted with a ParkLock device, engage the hand brake.
   Chock between the frame and the front axle.
3. Remove the wheel concerned.
   Place an axle stand in position.
4. Visually anticipate the separation of the trumpet housing from the centre housing, checking that the trumpet housing and cab will not obstruct each other. If this is not the case, proceed as follows:
   - Unscrew the cab attachment screws on the trumpet housing support.
   - Raise the rear of the cab slightly until the trumpet housing separates from the centre housing.
   - Chock the cab.

   NOTE: *If the tractor is fitted with a suspended cab, refer to chapter 12.*
5. Remove:
   - the stabilising support;
   - the lower pivot pin of the lift ram.
6. If necessary, remove the guard (draft sensor harness) from the trumpet housing.
7. Support the trumpet housing with a suitable fixture and a trolley jack or a hydraulic table.
8. Remove:
   - the screws (39);
   - the nuts screwed to the M16 studs (44);
   - the washers.

   IMPORTANT: *Do not unscrew the screw(s) (40).*
9. Split the trumpet housing assembly from the centre housing.
   Remove the brake disc (35).
   NOTE: *The sun gear (29), the compartment (30), the ring gear (15) and the splined hub (32) remain attached to the trumpet housing.*
   IMPORTANT: *Take care not to press down the brake pedal after removing the trumpet housing, or immobilise brake piston P on the centre housing using the retaining tool (see chapter 6).*

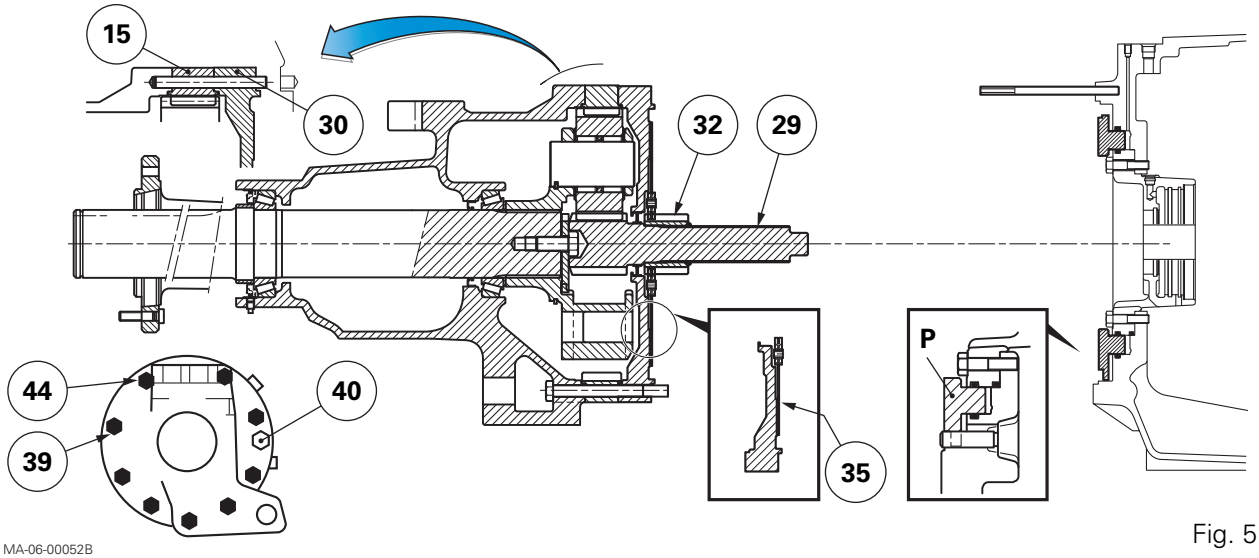
15
30
32
29
44
40
39
35
P
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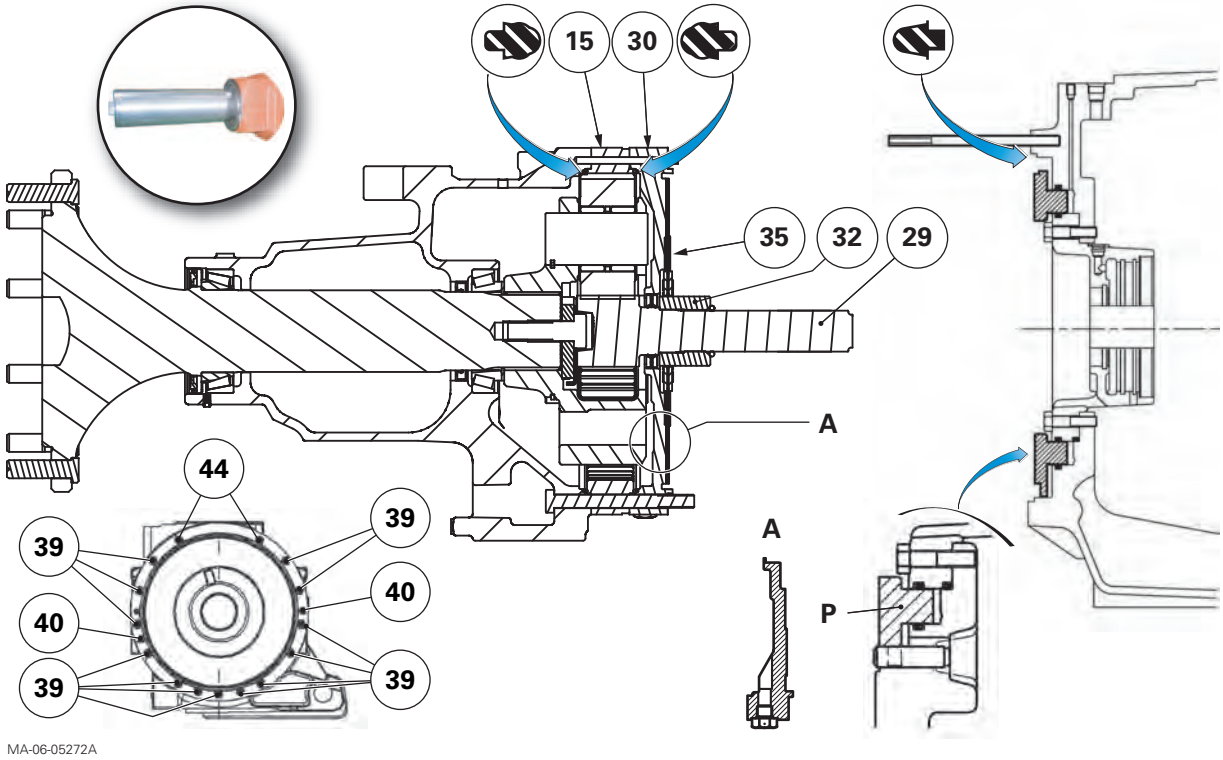
Fig. 5


15
30
35
32
29
A
44
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40
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39
A
P
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Fig. 6

Refitting

Tractors fitted with GTA1040 transmission

10. Clean the mating faces of the trumpet housing and centre housing with solvent. Remove all traces of the previous sealing product. Dry the components.

11. Evenly smear the mating face of the compartment (30) with a sealing product (Loctite 5206 or equivalent) (Fig. 7).

12. Evenly fill angle D of the centre housing (1) (Fig. 7) with a silicone seal (Loctite 5910 or equivalent).

IMPORTANT: *The diameter of the seal must be:*

- *uniform;*
- *of small section.*

The seal must not have gaps. The join must be located at the top of the centre housing.

13. Check the tightness of screws (40) attaching the brake plate (30) to the trumpet housing (10).

14. Refit the brake disc (35), previously ensuring that it slides freely on the splines of its splined hub (32).

15. Proceed to step 23.

Tractors fitted with GTA1540 transmission

16. Clean the mating faces of the trumpet housing and centre housing with solvent. Check that the groove of the seal (3) on the centre housing is free of dirt. Dry the components.

17. Fit a new HNBR seal (3) to service tool ref. xxxx (Fig. 8) (see § H).

IMPORTANT: *The HNBR seal (3) has no spurs P (Fig. 8). Do not confuse it with the NBR seal (4) (Fig. 8). These two seals are not exposed to the same temperatures when the transmission is operating (e.g. the HNBR seal (3) is exposed to higher temperatures when the brake is engaged). Their components are therefore different and they must be fitted correctly in their respective positions.*

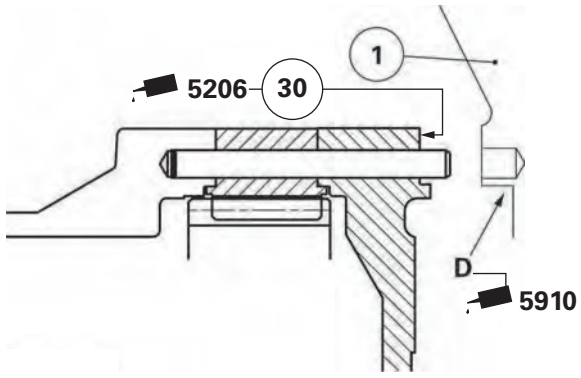

Fig. 7

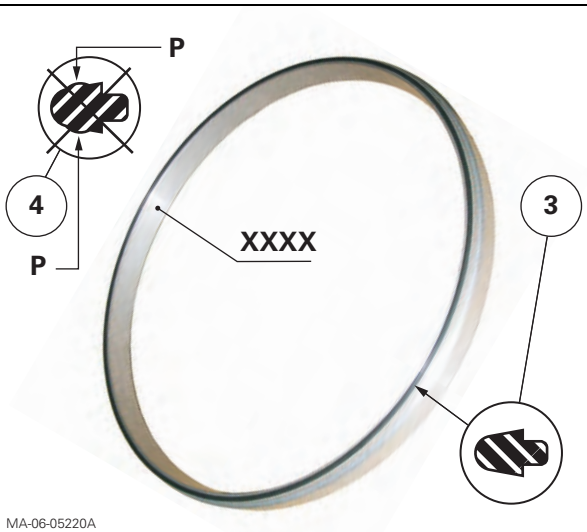

Fig. 8

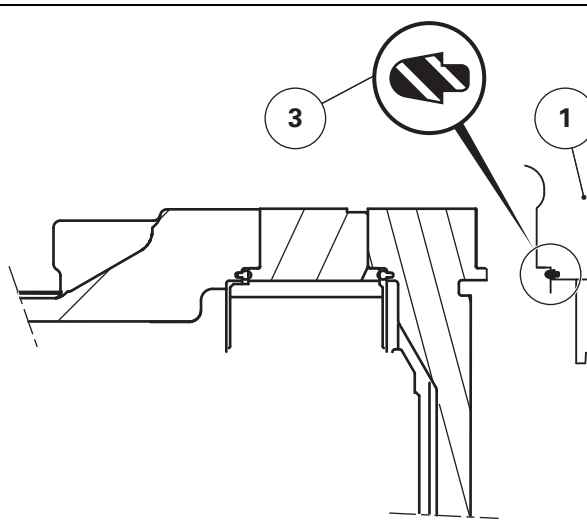

Fig. 9

18. Attach the tool fitted with the HNBR seal (3) to the centre housing. Manually exert high pressure around the tool while simultaneously turning it so that the seal fits correctly into the groove of the centre housing (1) (Fig. 9).

IMPORTANT: *It is strongly recommended that the HNBR seal (3) is fitted using the service tool. Fitting it without the tool will stretch the seal and cause a loop to form in the final assembly phase.*

19. Remove the service tool.

Ensure the HNBR seal (3) is positioned correctly on the centre housing.

20. Check the tightness of screws (40) attaching the brake plate (30) to the trumpet housing (10).

IMPORTANT: *Tractors fitted with GTA1540 transmission (50 kph) are assisted by a limited return mechanism on the brake pistons (see chapter 6 and the relevant section). As a result, before replacing the brake plates (30), it is advisable to push the brake pistons fully into their cavity so that this return travel limit mechanism once again returns the brake pistons correctly after the operation.*

21. Refit the brake disc (35), previously ensuring that it slides freely on the splines of its splined hub (32).

IMPORTANT: *Tractors fitted with GTA1540 transmission (50 kph) are assisted by a limited return mechanism on the brake pistons (see chapter 6 and the relevant section). As a result, before replacing the brake discs (35), it is advisable to push the brake pistons fully into their cavity so that this limited return mechanism once again returns the brake pistons correctly after the operation.*

22. Proceed to step 23.

Tractors fitted with GTA1040 or GTA1540 transmission

23. Support the trumpet housing using the equipment used for removal.

Engage the splines of the sun gear (29) in the differential. If they do not engage, rotate the axle shaft and push the trumpet housing horizontally to couple it with the centre housing.

24. Tighten:

- the M16 screws (39) to 220-300 Nm;
- the M16 nuts (44) to 220-280 Nm.

25. If required, refit the guard (draft sensor harness).

26. Refit:

- the lower pivot pin of the lift ram;
- the stabilising support.

27. If it was necessary to lift the cab, reposition it on the trumpet housing support(s). Screw in the cab attachment screws.

NOTE: *If the tractor is fitted with a suspended cab (see chapter 12).*

28. Refit any parts removed from around the trumpet housing.

Refit the wheel.

Tighten the screws and nuts to their indicated torque, depending on the version (see chapter 6).

29. Top up the oil levels of the housings (centre housing and final drive). Check the oil level using the sight glass located to the left of the rear PTO housing. Also check the oil level of the final drive unit concerned. Top up if required.

IMPORTANT*: Sealed Heavy Duty trumpet housings do not have a separate oil level plug; a single plug combines the oil filling and level functions. The oil level of the final drive unit can therefore be measured:*

- *either using a makeshift rod 2.5 to 3 mm in diameter (with an elbow as required) as a gauge inserted into the M18 tapped port of the filler plug. The oil level is correct when it is 111 mm short of the inner rim of the tapped port of the filler plug;*
- *or by simply draining the final drive unit and measuring the volume of drained oil, which should be 4.1 l per final drive unit.*

30. Check the linkage operation.

31. Carry out a road test on the brake system.

32. Check the tightness of the trumpet housing, the hydraulic unions and the plugs.

C . Removing and refitting the compartment and ring gear assembly

Removal

Tractors fitted with GTA1040 or GTA1540 transmission

33. Remove the trumpet housing assembly (see § B). Drain the final drive unit.

34. If possible, place the trumpet housing in a vertical position with the sun gear (29) facing upwards (Fig. 9).

35. Remove (Fig. 10, Fig. 11):
- the screw(s) (40);
- the snap ring (33);
- the splined hub (32).

36. Remove (Fig. 10, Fig. 11):
- the compartment (30), having previously placed a flexible protection over the splines of the sun gear (29);
- the sun gear (29);
- the planet carrier (25) (see § E);
- the ring gear (15).

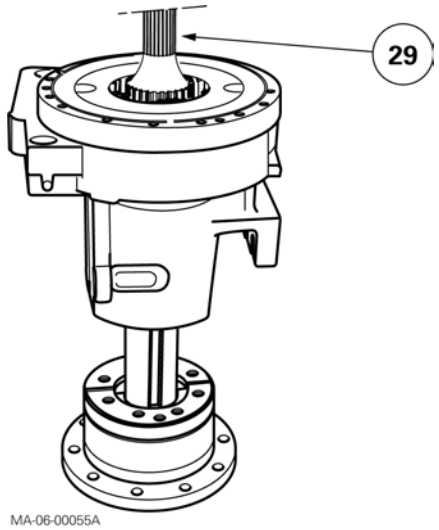

Fig. 9

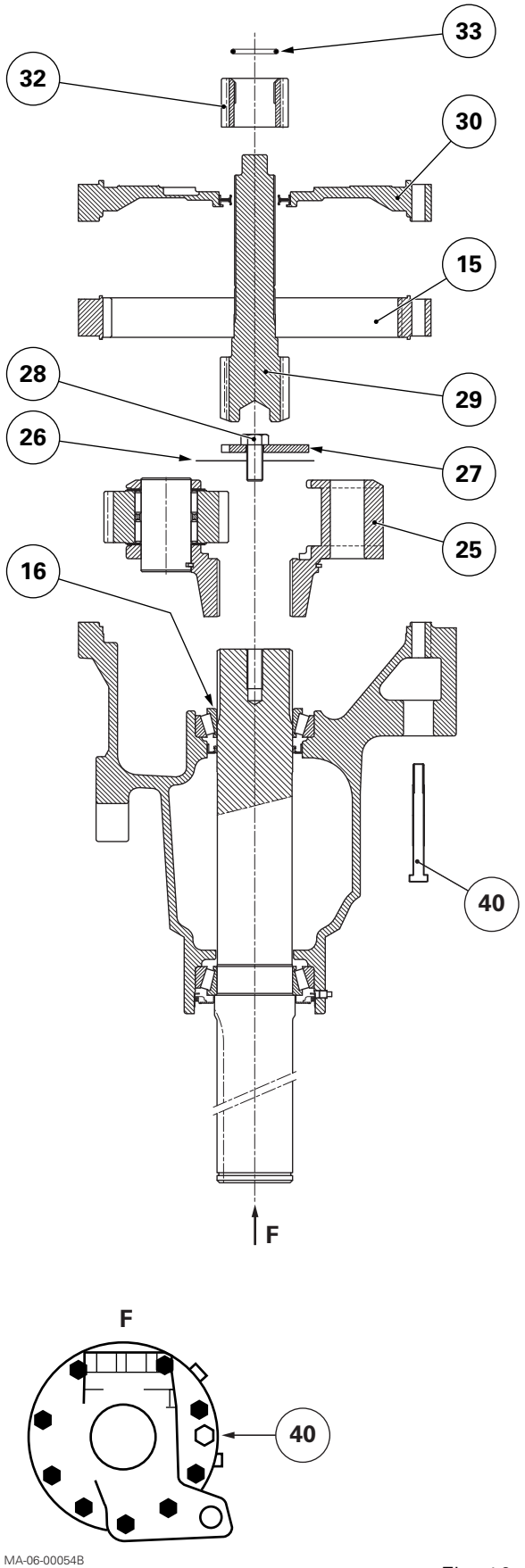
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Fig. 10

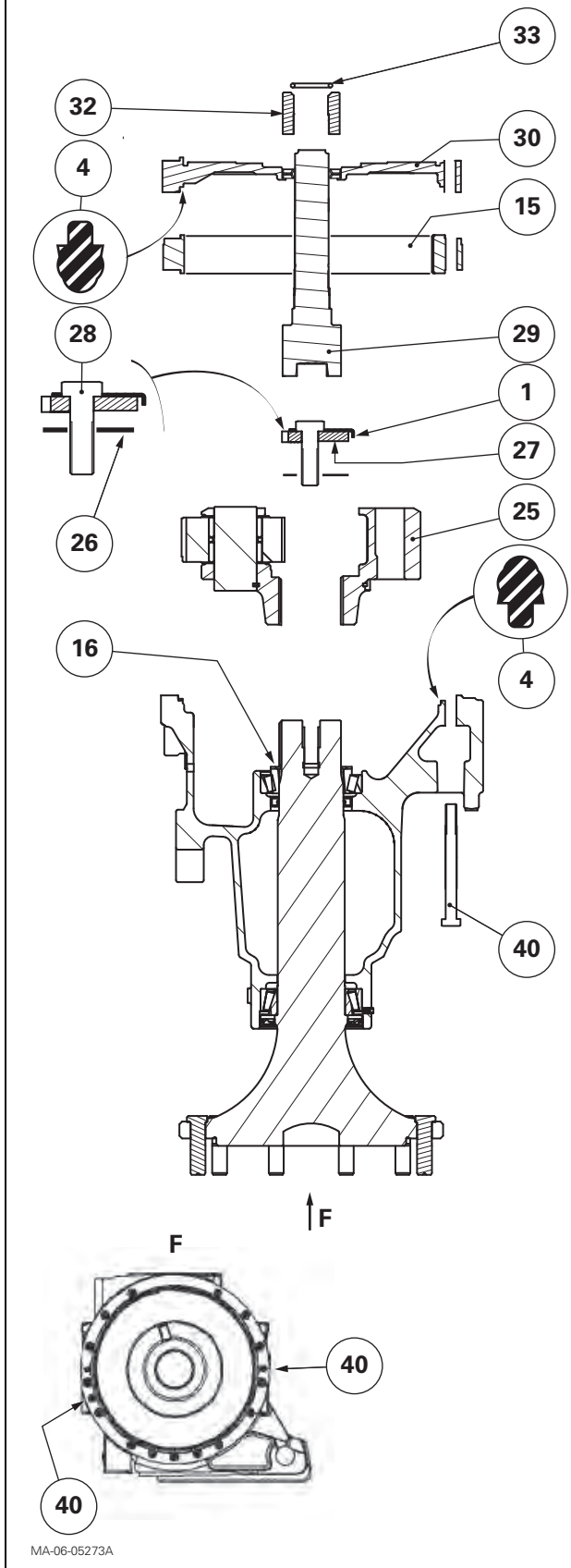
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Fig. 11

Refitting

Tractors fitted with GTA1040 transmission

37. Clean the mating surfaces of the trumpet housing (10), the ring gear and compartment with solvent. Remove all traces of the previous sealing product. Dry the components.

38. Smear (Fig. 12):

- the mating faces of the trumpet housing (10) and compartment (30) with Loctite 5206 sealant or equivalent;
- angles B and C of the trumpet housing (10) and compartment (30) with a silicone seal (Loctite 5910 or equivalent).

IMPORTANT: *Observe the order of application of the sealing product.*

The diameter of the silicone seals must be:

- *uniform;*
- *of small section.*

The seals must not have gaps. The join must be located at the top of the trumpet housing.

NOTE: *The top position is determined by the horizontal position of the trumpet housing on the centre housing.*

39. Proceed to step 46.

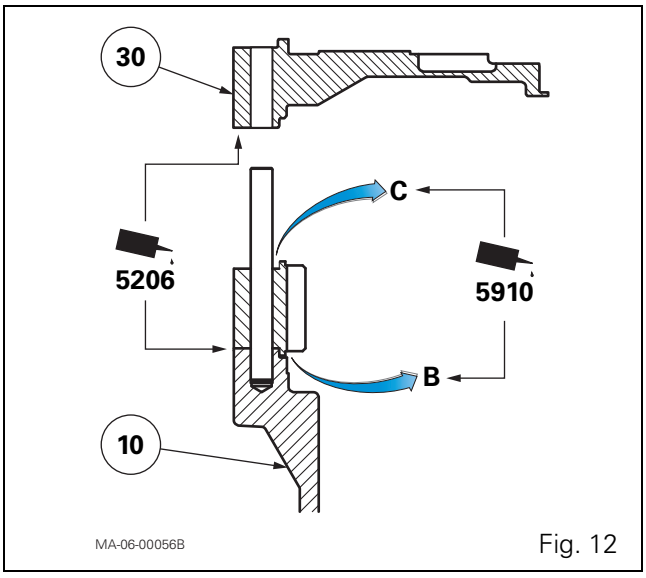


Fig. 12

Tractors fitted with GTA1540 transmission

40. Clean the mating faces of the trumpet housing, the ring gear and the compartment with solvent. Dry the components.

Check that the grooves of the seals (4) on the parts mentioned above are free of dirt.

41. Fit a new NBR seal (4) to service tool ref. xxx (Fig. 13 and § H).

IMPORTANT: *The NBR seal (4) is fitted with four spurs P on each of its sides. Do not confuse it with the HNBR seal (3) (Fig. 13). These two seals are not exposed to the same temperatures when the transmission is operating (example: the NBR seal (4) is exposed to lower temperatures because it is further from the brake mechanism). Their components are therefore different and they must be fitted correctly in their respective positions.*

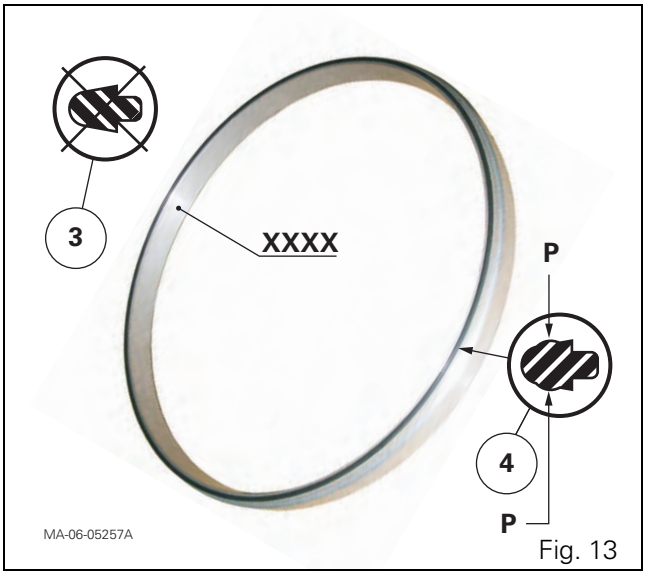


Fig. 13

42. Position the tool fitted with the NBR seal (4) on the trumpet housing (10). Manually exert high pressure around the tool while simultaneously turning it so that the seal fits correctly into the groove of the trumpet housing (10) (Fig. 14).

IMPORTANT: *It is strongly recommended that the NBR seal (4) is fitted using the service tool. Fitting it without the tool will stretch the seal and cause a loop to form in the final assembly phase.*

43. Remove the service tool.

Check that the NBR seal (4) is correctly positioned on the trumpet housing.

44. Fit the second NBR seal (4) on the compartment (30) (Fig. 14). Use the same assembly method as with the first seal in order to correctly house the second seal in the groove of the compartment (30) (Fig. 14) (see steps 41 to 43).

45. Proceed to step 46.

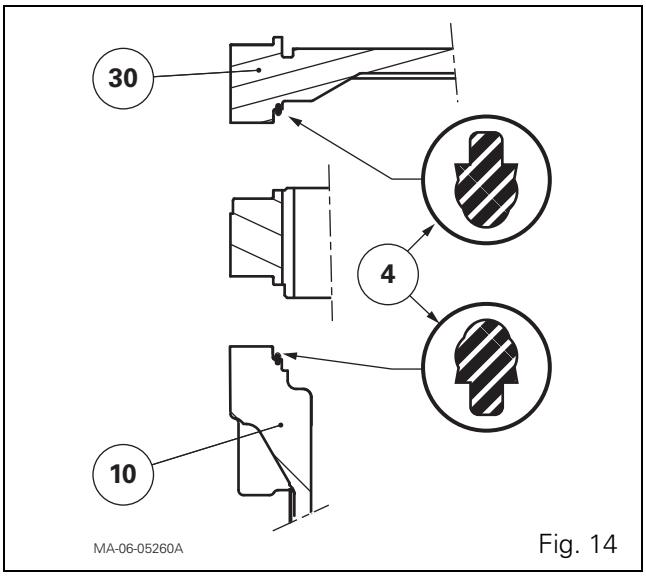


Fig. 14

Tractors fitted with GTA1040 or GTA1540 transmission

46. Check that the locating ring (45) is present on the trumpet housing (10).

47. Refit:

- the ring gear (15);
- the planet carrier (25) (see § E);
- the sun gear (29).

48. Slide guard xxx (see § H) over the splines of the sun gear.

49. Refit:

- the compartment (30) fitted with its seals (31);
- the pin (14).

50. Remove the guard.

51. Refit:

- the splined hub (32);
- the snap ring (33).

52. Tighten the screw(s) (40). Tighten to a torque of 100-130 Nm.

D . Replacing compartment seals

Disassembly

53. Remove:
- the trumpet housing assembly (see § B);
- the compartment (30) (see § C);
- the planet carrier (25) (see § E);
- the ring gear (15) (see § C).

54. Drive out the lip seals (31) from the compartment (30) (Fig. 15). Discard them.

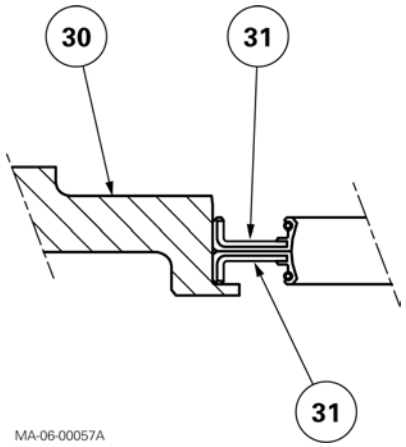


Fig. 15

Reassembly

55. Clean the components.
Check the condition of the mating faces of the seals against the compartment.

56. Using a suitable fitting drift and support, fit the lip seals (31) back to back in the groove of the compartment (30) as per Fig. 15.

57. Refit:
- the ring gear (15) (see § C);
- the planet carrier (25) (see § E);
- the compartment (30) (see § C);
- the trumpet housing assembly (see § B). Check that the union (38) and its vent pipe are not blocked or pinched (Fig. 16). Reconnect the vent pipe to the union.

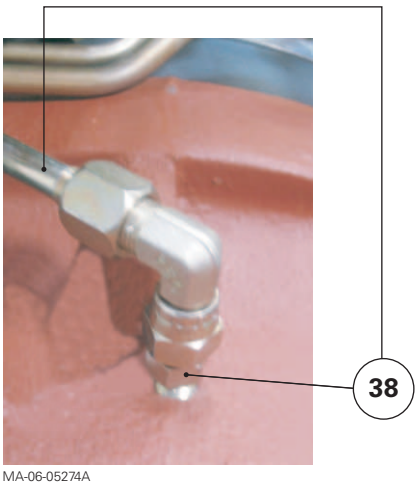


Fig. 16

E . Removing and refitting, disassembling and reassembling the planet carrier

Removal

Tractors fitted with GTA1040 transmission

58. Remove:
- the trumpet housing assembly (see § B);
- the compartment (30) (see § C).

59. Immobilise the axle shaft (2) or the planet carrier (25).

60. Remove (Fig. 17):
- the M24 screw (28);
- the tripod washer (27);
- the shim(s) (26);
- the planet carrier (25);
- the ring gear (15) (see § C).

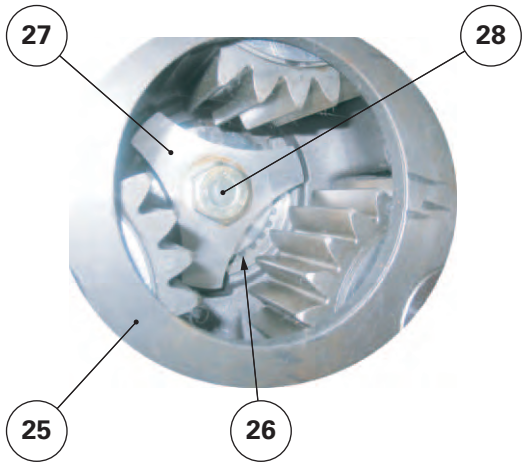


Fig. 17

Tractors fitted with GTA1540 transmission

61. Remove:
- the trumpet housing assembly (see § B);
- the compartment (30) (see § C).

62. Immobilise the axle shaft (2) or the planet carrier (25).

63. Remove (Fig. 18):
- the lock washer (1)

  NOTE: *The lock washer is fixed with Loctite 401;*
- the M24 screw (28);
- the tripod washer (27);
- the shim(s) (26);
- the planet carrier (25);
- the ring gear (15) (see § C).

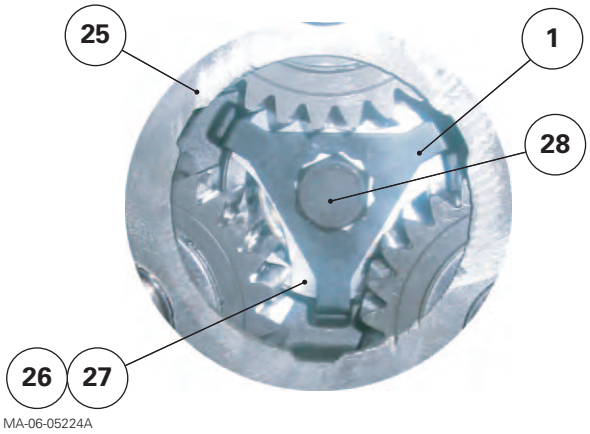


Fig. 18

Disassembly

Tractors fitted with GTA1040 or GTA1540 transmission

64. Remove (Fig. 19):
- the screw (18);
- the spacer (17);
- the snap ring (19) by moving its two ends apart.

65. Remove:
- the pins (20);
- the friction washers (21);
- the planet gears (22).

66. Recover:
- the bearing needles (23);
- the spacer (24).

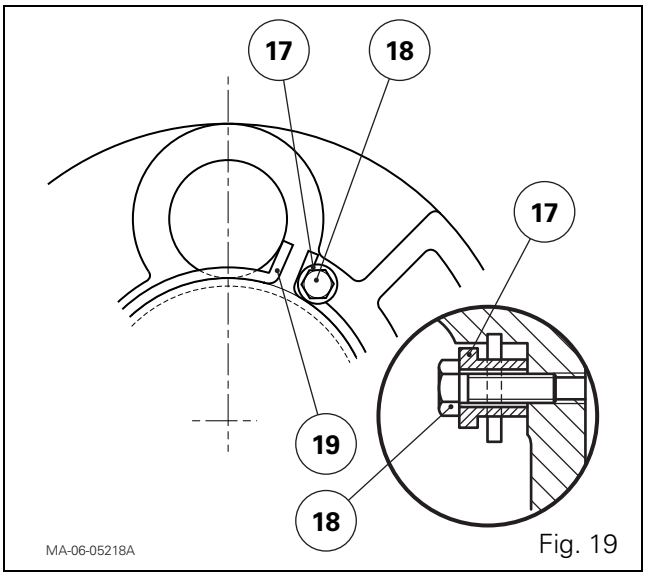


Fig. 19

Reassembly

Tractors fitted with GTA1040 or GTA1540 transmission

67. Fit each planet gear with two rows of needle rollers previously smeared with miscible grease.

NOTE: *A spacer (24) separates each row of needle rollers.*

68. Refit the planet gears.

Perform steps 65 and 66 in reverse order.

Manually check the axial clearance of each planet gear.

69. Refit:
- the snap ring (19);
- the spacer (17).

70. Lightly smear the thread of the screw (18) with Loctite 270 or equivalent. Screw in and tighten to 34-50 Nm.

Refitting

Tractors fitted with GTA1040 transmission

71. Check that the tab washer (16) is present.

72. Refit the ring gear (15) (see § C).

Refit the planet carrier (25). If necessary, shim the tapered roller bearings (see § G).

73. Immobilise the axle shaft (2) or the planet carrier (25).

74. Refit the shim(s) (26) and the tripod washer (27).

75. Screw in and tighten the M24 screw (28) (Fig. 20) to 765-935 Nm after lightly smearing its thread with Loctite 270 or equivalent.

76. Refit:

- the compartment (30) (see § C);
- the trumpet housing assembly (see § B).

Fig. 20

Tractors fitted with GTA1540 transmission

77. Check that the tab washer (16) is present.

78. Refit the ring gear (15) (see § C).

Refit the planet carrier (25). If necessary, shim the tapered roller bearings (see § G).

79. Immobilise the axle shaft (2) or the planet carrier (25).

80. Refit the shim(s) (26) and the tripod washer (27).

81. Screw in and tighten the M24 screw (28) to 640 Nm.

82. Slide a lock washer (1) onto the head of the M24 screw (28). Ensure its tabs B are correctly housed in moulded slots E of the planet carrier (25) (Fig. 21). If this is not the case, repeat the step with the second lock washer; if this is still not the case, repeat the step with the third. Depending on the result (either no washer is suitable or a washer is selected), proceed to step 83 or 84.

NOTE: *Three lock washers (1) are available from the spare parts catalogue. Each of the lock washers has a 10° angular offset.*

83. Case 1: A lock washer is selected

Apply three spots of Loctite 401 or equivalent to the mating face of the selected lock washer which is turned towards the tripod washer (27).

NOTE: *Loctite 401 prevents the lock washer (1) from moving when the trumpet housing is being refitted to the centre housing.*

When the trumpet housing is refitted, the sun gear (29) holds the lock washer in place.

84. Case 2: No lock washer is selected

Gently retighten the M24 screw (28), taking care not to exceed the maximum torque of 960 Nm.

Repeat step 82.

IMPORTANT: *If required, repeat step 84 several times.*

85. Refit:

- the compartment (30) (see § C);
- the trumpet housing assembly (see § B).

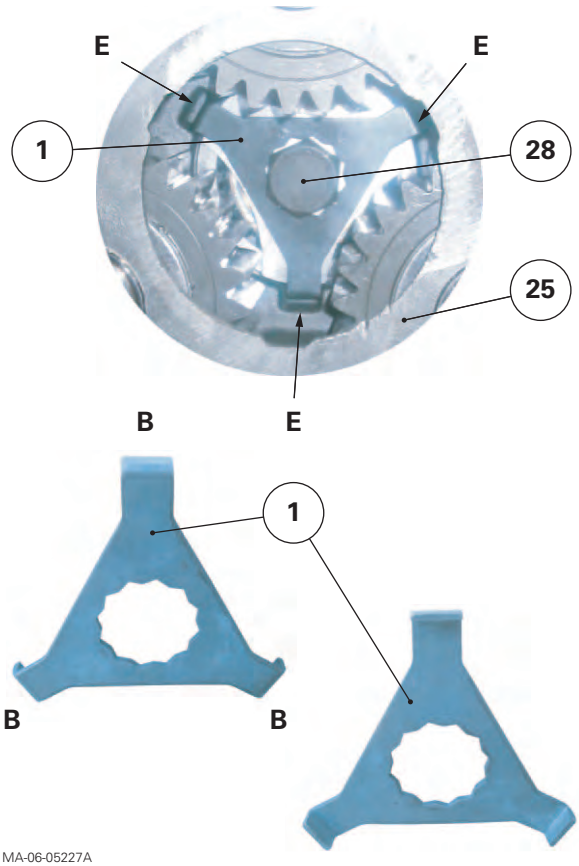


Fig. 21

F . Replacing tapered roller bearings and seals

Disassembly

Tractors fitted with GTA1040 or GTA1540 transmission

86. Remove:
- the trumpet housing assembly (see § B);
- the compartment (30) (see § C);
- the planet carrier (25) (see § E);
- the ring gear (15) (see § C).

87. Remove:
- the tab washer (16);
- the axle shaft (2);
- the bearing cone (13).

88. If necessary, extract:
- the bearing cone (7);
- the seals (5) (11) and discard them.

89. Using a suitable puller or a makeshift tool, extract or drive out:
- the bearing cups (8) (12);
- the friction cage (6).

Reassembly

Tractors fitted with GTA1040 or GTA1540 transmission

90. Clean and check all components. Replace those that are defective.

91. Smear the external surface of the seal (11) with a film of clean transmission oil.

92. Using a suitable fitting drift, fit the seal (11) to within approximately 8 mm of the shoulder of the cup (12) on the trumpet housing (Fig. 22), positioning its lip towards the final drive unit.

IMPORTANT: *If a groove has been worn into the axle shaft at the location of the old seal (11), offset the new seal slightly so that its lip ensures the axle shaft is completely sealed beyond the worn groove.*

93. Fit:

- the bearing cups (8) (12) against their respective shoulders;
- the friction cage (6) according to the distance indicated:
  - Fig. 23 (tractors fitted with GTA1040 transmission);
  - Fig. 24 (tractors fitted with GTA1540 transmission).

94. For tractors fitted with:

- GTA1040 transmission, proceed to step 95;
- GTA1540 transmission, proceed to step 97.

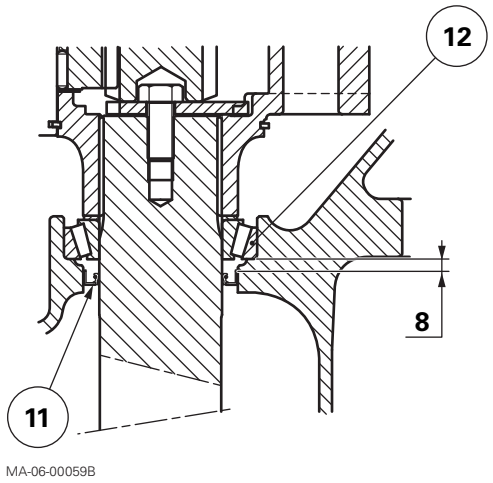


Fig. 22

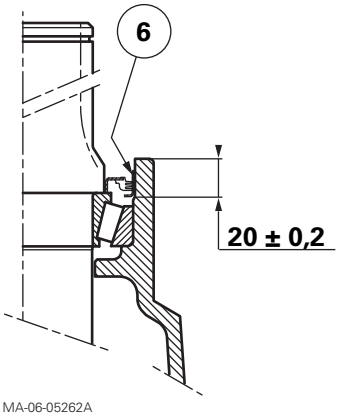


Fig. 23

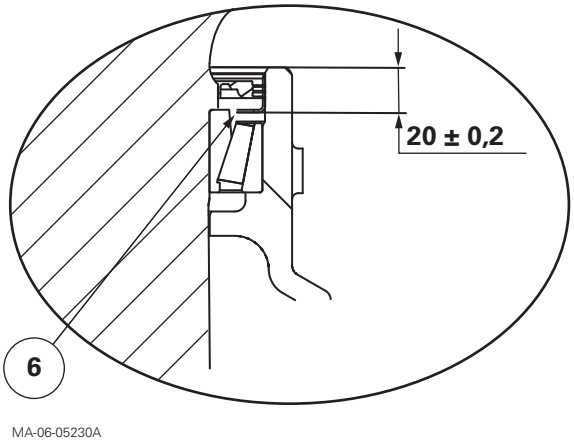


Fig. 24

Tractors fitted with GTA1040 transmission

95. Fit the new three-lipped seal (5) level with shoulder E (Fig. 25) of the flanged axle shaft or straight axle shaft.

96. Proceed to step 99.

Tractors fitted with GTA1540 transmission

97. Fit the new three-lipped seal (5):

- 4.0 ± 0.5 mm from shoulder E of the flanged axle shaft (Fig. 26);
- 5.5 ± 0.5 mm from shoulder E of the straight axle shaft (Fig. 26).

98. Proceed to step 99.

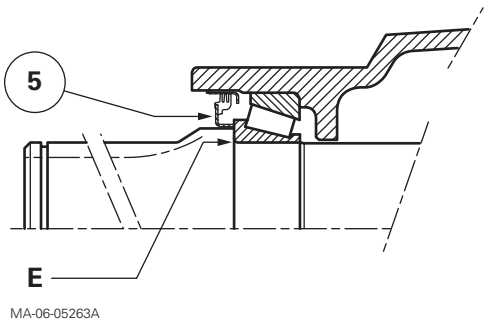


Fig. 25

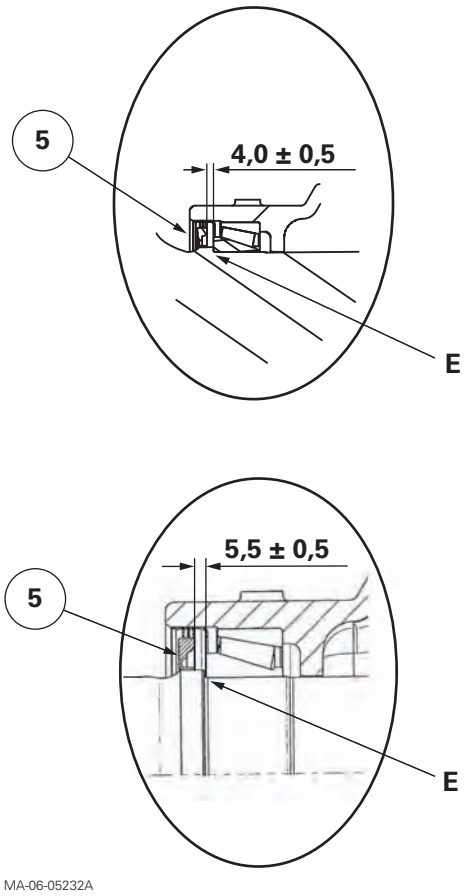


Fig. 26

Tractors fitted with GTA1040 or GTA1540 transmission

99. Fit the bearing cone (7) against its shoulder on the flanged axle shaft or straight axle shaft using a makeshift inertia tool.

100. Lightly smear the bearing cone (7) and the lips of the seals (5) (11) with bearing grease.

101. Protect the seal lip (11) by temporarily masking the splines on the axle shaft with a flexible protection.

Insert the prepared axle shaft into the trumpet housing fitted with the seal (11) and the bearing cones (8) (12), positioning the three lips of the seal towards the outside of the trumpet.

102. Refit:

- the bearing cone (13);
- the tab washer (16);
- the ring gear (15) (see § C).

103. Refit:

- the planet carrier (25). If necessary, shim the tapered roller bearings (see § G);
- the compartment (30) (see § C);
- the trumpet housing assembly (see § B).

104. Temporarily replace the plug (9) with a grease nipple. Partially fill cavity A (Fig. 27) with BP Agri-charge grease or equivalent. Remove the grease nipple. Screw in the plug.

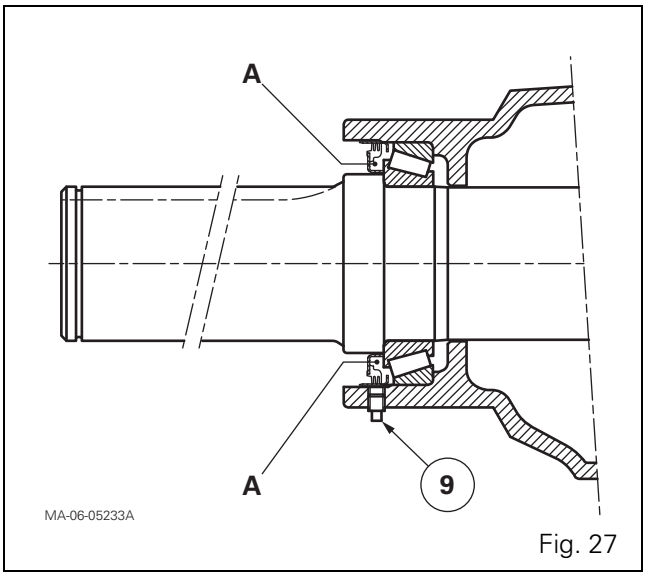


Fig. 27

G . Shimming the tapered roller bearings of the axle shaft

If the following parts are to be replaced, the shimming of the tapered roller bearings on the axle shaft must be checked or carried out:

- the flanged or straight axle shaft (2);
- the tapered roller bearings (7) (8) and (12) (13);
- the trumpet housing (10);
- the tab washer (16);
- the planet carrier (25).

NOTE: *The preload shimming of the tapered roller bearings on the axle shaft is carried out using shim(s) (26) fitted between the end of the axle shaft (2) and the tripod washer (27) (Fig. 28).*

IMPORTANT: *In order to correctly shim the tapered roller bearings, fit the trumpet housing in a vertical position (Fig. 28).*

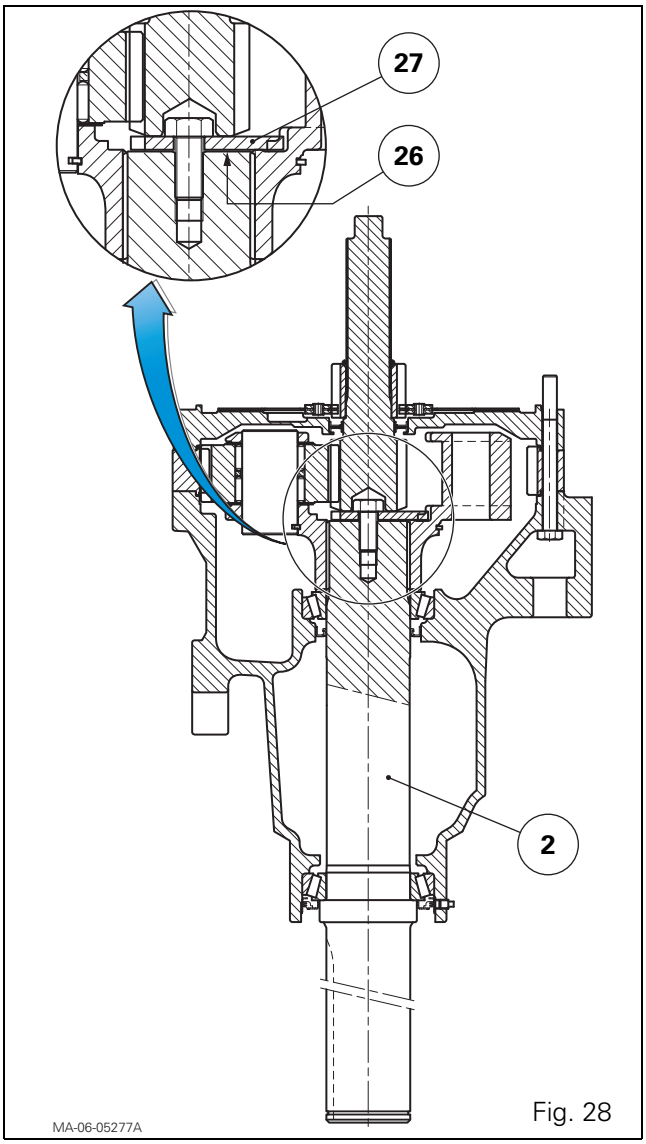


Fig. 28

Preparing for shimming

Tractors fitted with GTA1040 or GTA1540 transmission

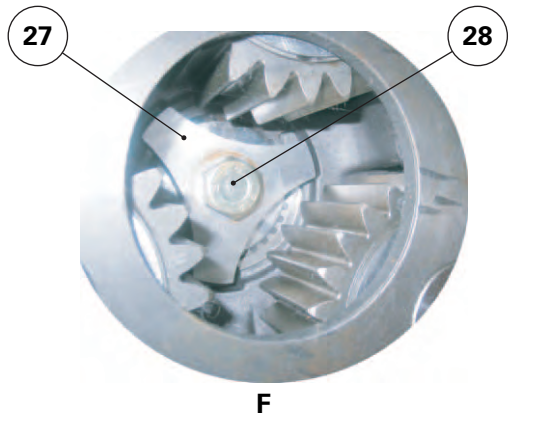
105. Fit:
- the bearing cone (13);
- the tab washer (16);
- the planet carrier (25).

106. Fit shim(s) (26) with a thickness greater than the space between the end of the axle shaft (2) and the mating face of the tripod washer (27) on the planet carrier (Fig. 29, Fig. 30). This should give a temporary clearance J.

107. Fit the tripod washer (27).

Temporarily lock the M24 screw (28) at:
- 765 Nm (tractors fitted with GTA1040 transmission);
- 640 Nm (tractors fitted with GTA1540 transmission)

GTA1040



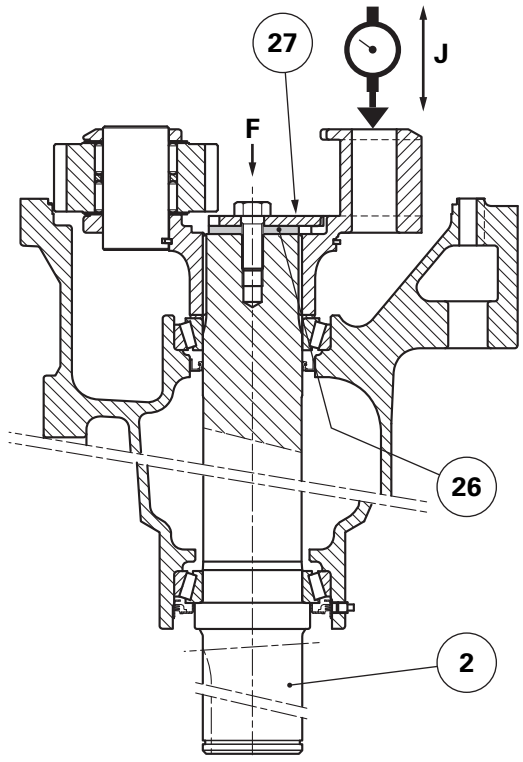
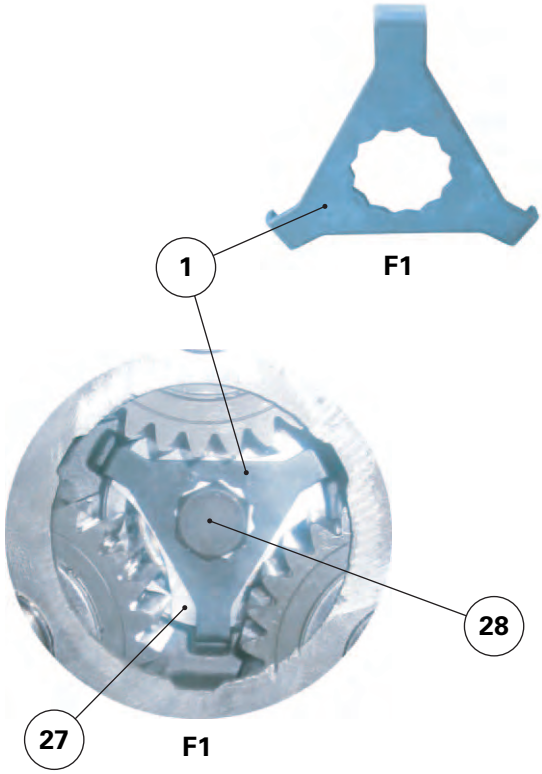


Fig. 29

GTA1540



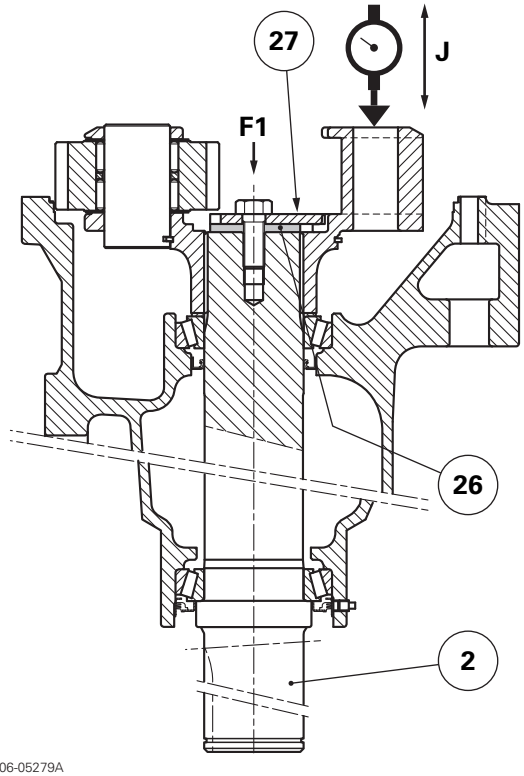


Fig. 30

Shimming

Tractors fitted with GTA1040 or GTA1540 transmission

108. Press firmly on the planet carrier while turning the trumpet housing by several turns.

109. Fit a dial gauge on the trumpet housing with its feeler pin positioned near the centre of the planet carrier (Fig. 29 to Fig. 31). Set the dial gauge needle to zero.

110. Using suitable levers, move the planet carrier vertically (Fig. 31). Measure clearance J indicated on the dial gauge.

Repeat the step several times.

Calculate the average of the clearance J readings.

111. Reduce the shim (26) thickness according to value J + (0.02 to 0.12) to obtain a preload P1 = 0.02 to 0.12 mm (Fig. 32).

NOTE: *If possible, shim to the maximum tolerance.*

112. For tractors fitted with:

- GTA1040 transmission, proceed to step 113;
- GTA1540 transmission, proceed to step 114.

Tractors fitted with GTA1040 transmission

113. Definitively fit the tripod washer (27) (Fig. 29).

Lightly smear the thread of the M24 screw (28) (Fig. 29) with Loctite 270 or equivalent. Tighten this screw to a torque of 765-935 Nm.

Tractors fitted with GTA1540 transmission

114. Definitively fit the tripod washer (27) (Fig. 30).

115. Tighten the M24 screw (28) (Fig. 30) to 640 Nm.

From the three possible lock washers, select the lock washer (1) which will be fitted definitively (see steps 82 to 84).

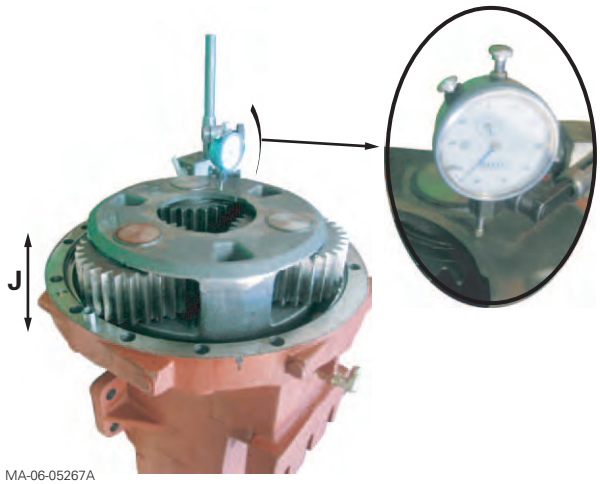


Fig. 31

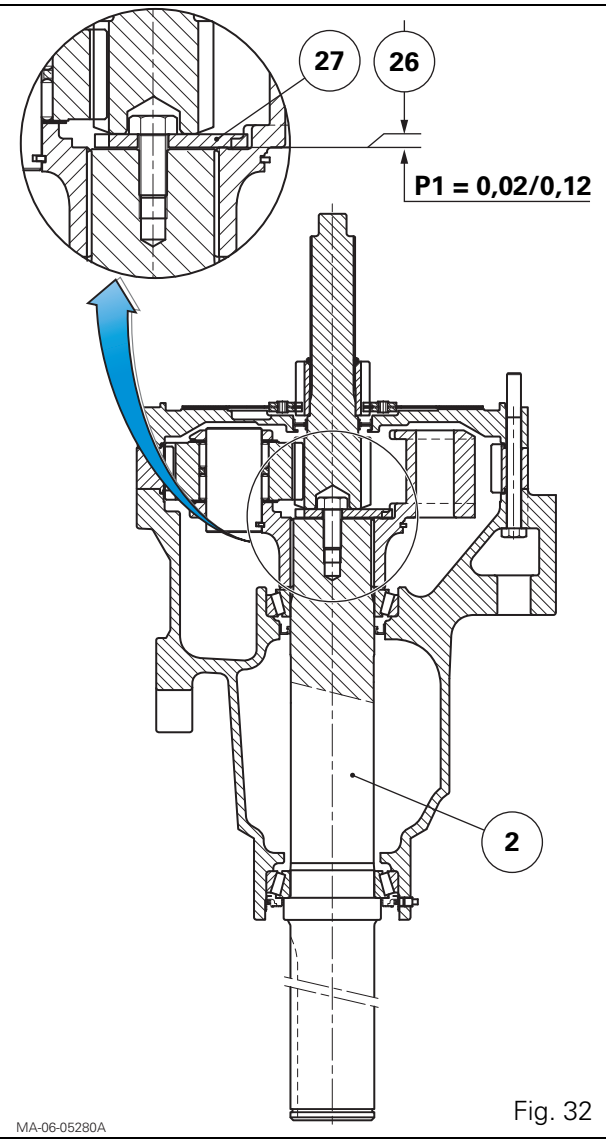


Fig. 32

H . Service tools

Tools available in the AGCO network

- xxxx: Lip seal guard (31) (Fig. 33)
- xxxx: Seal (3) (4) fitting ring (Fig. 34)

Fig. 33

Fig. 34

GPA40 - Sealed Heavy Duty trumpet housings

6B1a - GPA40 - Trumpet housings with composite final drive

CONTENTS

GPA40 - Trumpet housings with composite final drive

A . General

The trumpet housings with a composite final drive unit of tractors fitted with GTA1040 or GTA1540 transmission have a spacer separating them completely from the centre housing. They support the left and right-hand axle shafts. They contain the composite final drive units that transmit the rotation from the differential assembly.

Tractors fitted with GTA1040 or GTA1540 transmission may be fitted with trumpet housings with a composite final drive unit and a flanged axle shaft or straight axle shaft.

The composite final drive unit is housed in a sealed compartment, thanks to the spacer mentioned above. It contains oil with SAE 85W/140 viscosity grade.

The two trumpet housings are symmetrical. They are fitted either side of the centre housing.

Construction

The axle shaft (2) is supported by two tapered roller bearings (7) (8) and (12) (13) fitted opposite one another.

The tightness of the composite final drive unit compartment is ensured by the cassette seal (5) and spacer (30) fitted with seals (31) mounted back-to-back.

The ring gear (15) is sealed by two "O" rings (4) fitted either side of the ring gear.

The planet carrier (25), which is splined to the axle shaft (2), is made up of three double planet gears (22) that engage with the ring gear (15) and the sun gear (29).

The sun gear (29) drives the brake disc (35) via a splined hub (32) held in place by the snap ring (33).

The preload on the tapered roller bearings is obtained using the shim(s) (26) fitted at the end of the axle shaft (2).

The shimming of the double planet gears (22) is carried out using the shim(s) (6) fitted against the 17-tooth gear of the double planet gears. An axial hole and a radial hole on the pin (20) allow for the lubrication of the needle roller bearings (23) on the double planet gears (22).

The spacer (30) is centred by the pin (14). It also acts as a plate to the braking mechanism. Port O located on the upper part of the spacer allows for the lubrication of the brakes.

On tractors fitted with GTA1540 transmission (50 kph), the brake discs (35) and plates (30) have a larger braking surface area.

On tractors fitted with GTA1540 transmission, the axle shaft (2) and planet carrier (25) are held in place by the tripod washer (27), the M24 screw (28) and the lock washer (1) (Fig. 3).

On tractors fitted with GTA1040 transmission, the axle shaft (2) and the planet carrier (25) are held in place by the tripod washer (27) and the M24 screw (28) smeared with Loctite (Fig. 1).

The mechanical elements of the trumpet housing operate in a sealed environment. The presence of a union and vent pipe (38) on top of the trumpet housing is therefore necessary to maintain the atmospheric pressure of the housing.

Parts lists

Tractors fitted with GTA1040 transmission (Fig. 1, Fig. 2)

(2) Straight axle shaft (Ø = 110 mm)
(4) "O" rings
(5) Cassette seal
(6) Shim(s)
(7) Bearing cone
(8) Bearing cup
(9) Washers
(10) Trumpet housing
(11) Nuts
(12) Bearing cup
(13) Bearing cone
(14) Pin
(15) Ring gear
(16) Tab washer
(17) Spacer
(18) Screw
(19) Circlip
(20) Planet gear pins
(21) Washers
(22) Double planet gears
(23) Needle rollers
(24) Spacer
(25) Planet carrier
(26) Shim(s)
(27) Tripod washer
(28) M24 screw
(29) Sun gear
(30) Spacer (brake plate)
(31) Lip seals
(32) Splined hub
(33) Snap ring
(34) M16 studs (L = 335 mm)
(35) Brake disc
(36) M16 studs (L = 320 mm)
(37) M16 stud (L = 330 mm)
(38) Union and vent pipe
(39) Dowel
(40) Screw
(41) Oil filler and level plug
(42) Ring
(43) Magnetic drain plug
(45) M16 stud (L = 350 mm)

Legend

D Silicone seal
O Brake lubricating port

GTA1040

View of the assembly

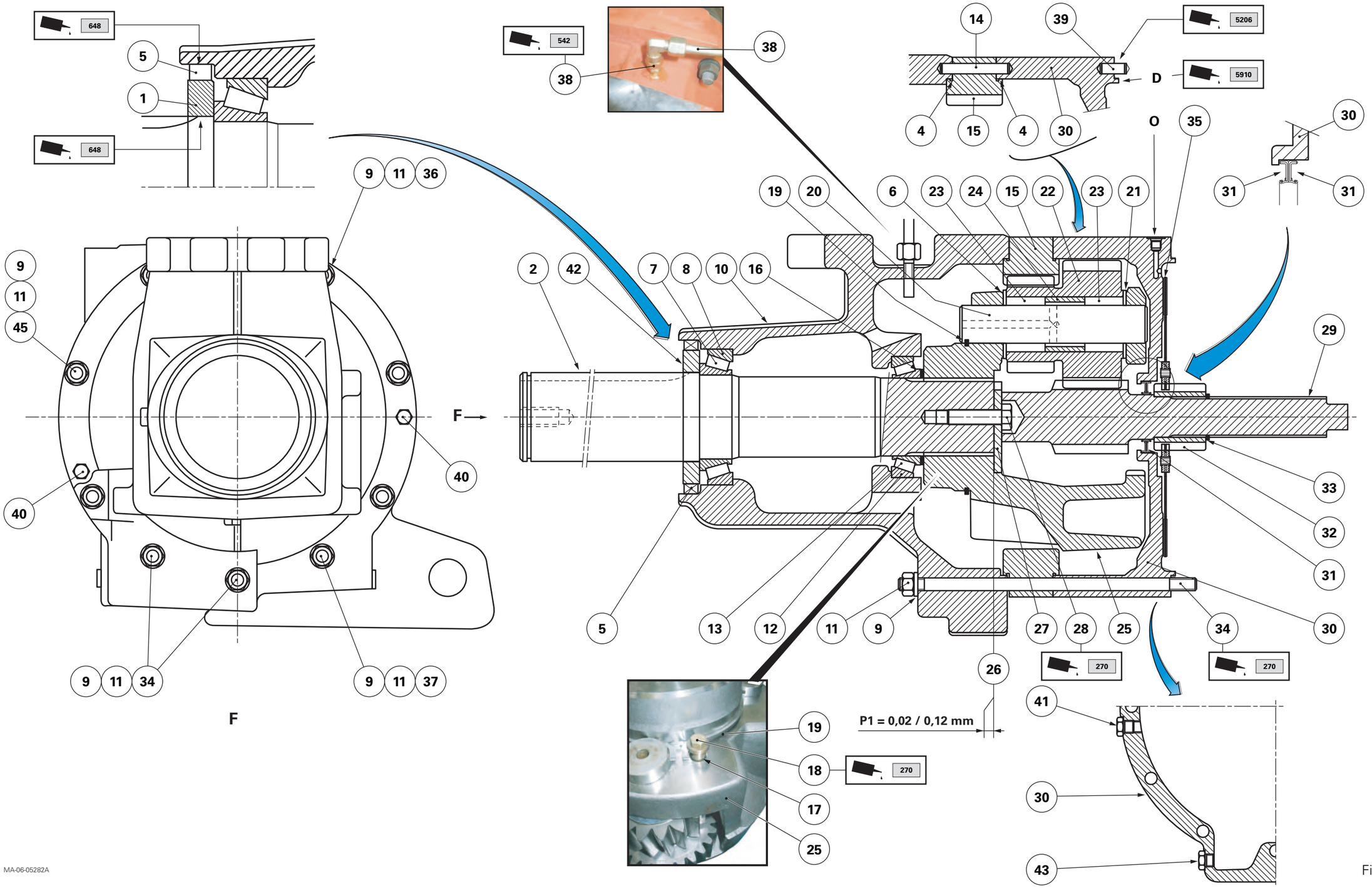


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Fig. 1

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Blown-up view

GTA1040

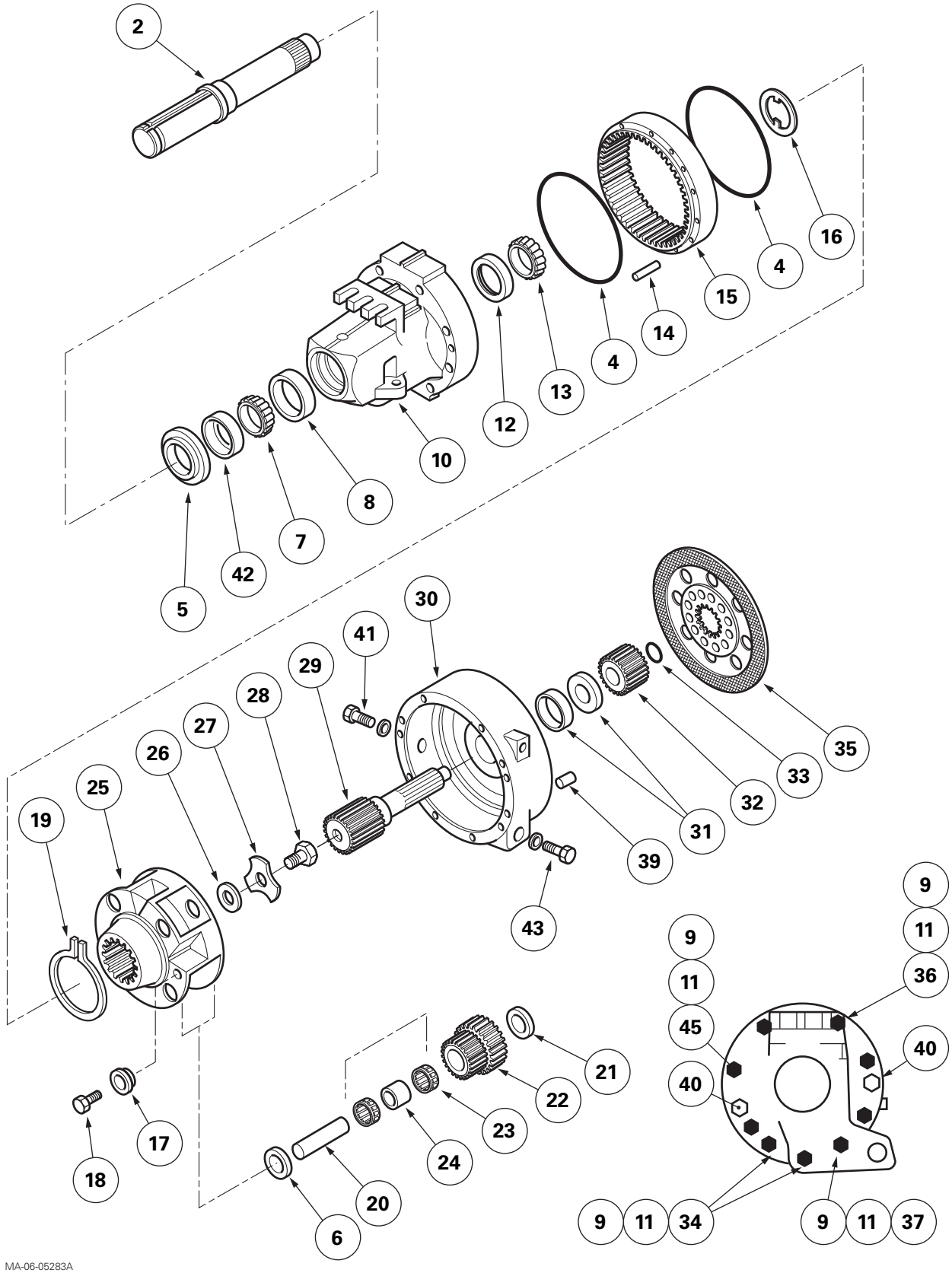

Fig. 2

Tractors fitted with GTA1540 transmission (Fig. 3, Fig. 4)

(1) Lock washer
(2) Flanged axle shaft
(2) Straight axle shaft (Ø = 110 mm)
(3) HNBR seal
(4) "O" rings
(5) Cassette seal
(6) Shim(s)
(7) Bearing cone
(8) Bearing cup
(9) Washers
(10) Trumpet housing
(11) Nuts
(12) Bearing cup
(13) Bearing cone
(14) Pin
(15) Ring gear
(16) Tab washer
(17) Spacer
(18) Screw
(19) Circlip
(20) Planet gear pins
(21) Washers
(22) Double planet gears
(23) Needle rollers
(24) Spacer
(25) Planet carrier
(26) Shim(s)
(27) Tripod washer
(28) M24 screw
(29) Sun gear
(30) Spacer (brake plate)
(31) Lip seals
(32) Splined hub
(33) Snap ring
(34) M16 studs (L = 335 mm)
(35) Brake disc
(36) M16 studs (L = 320 mm)
(37) M16 stud (L = 330 mm)
(38) Union and vent pipe
(39) Dowel
(40) Screw
(41) Oil filler and level plug
(42) Ring
(43) Magnetic drain plug
(45) M16 stud (L = 350 mm)

Legend

C Centre housing
O Brake lubricating port

View of the assembly

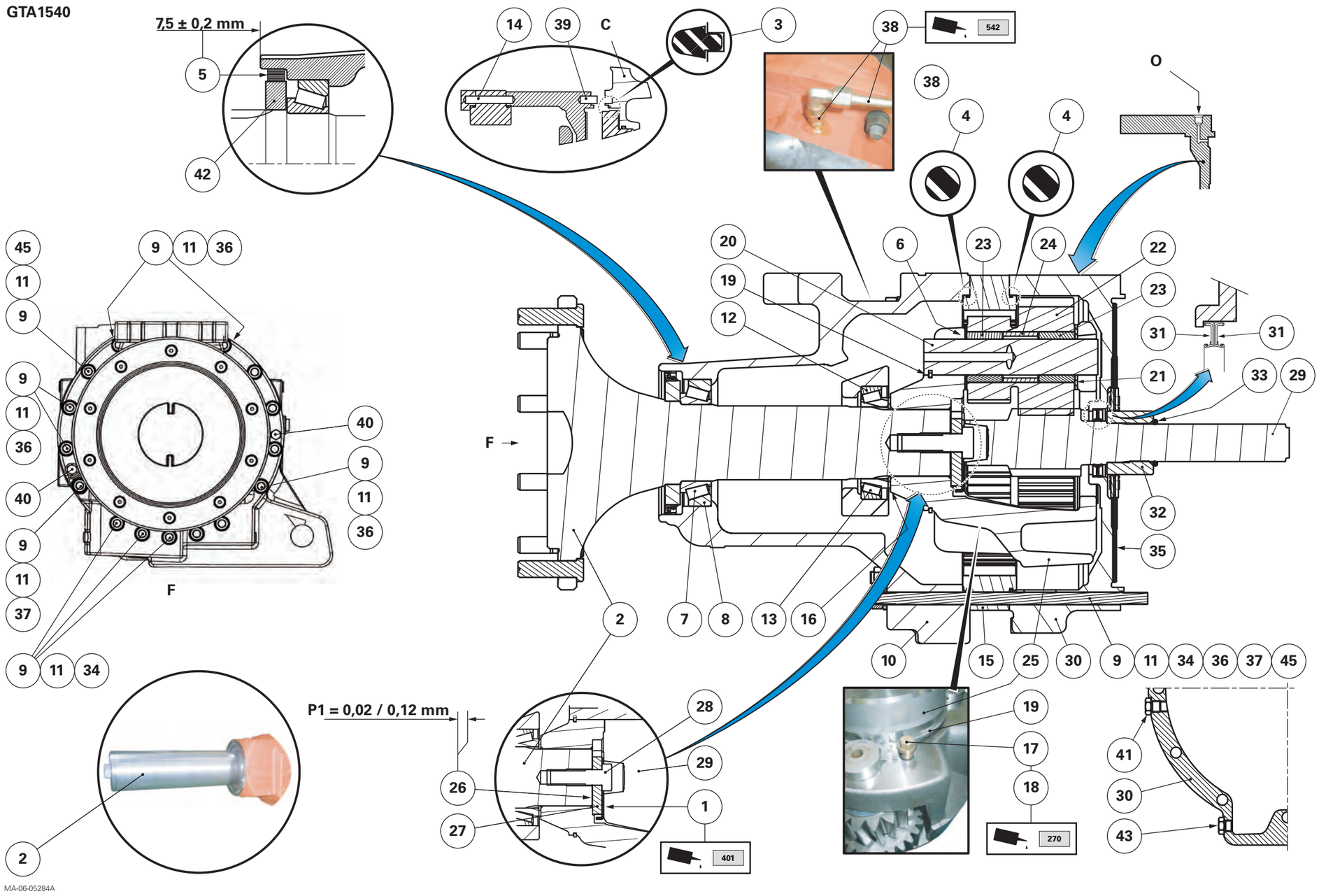

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Fig. 3

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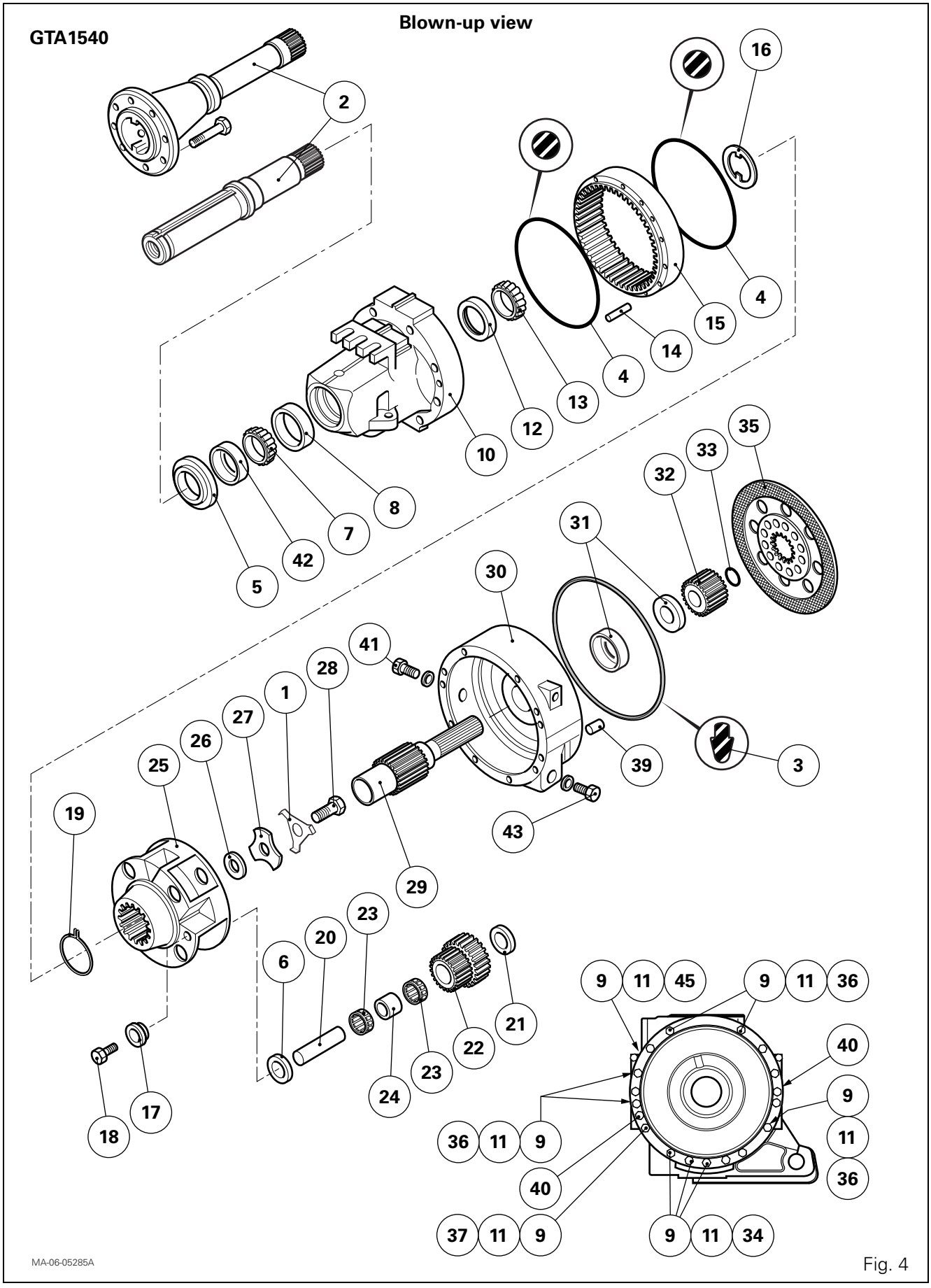
GTA1540
Blown-up view
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4
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12
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41
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Fig. 4

B . Epicyclic gear train kinematics

The kinematics of the epicyclic gear train are as follows (Fig. 5):

1) Ring gear (15) locked
2) Drive input via the sun gear (29)
3) Drive transmitted to:
   - the double gears (22) (planet gears);
   - the planet carrier (25)
4) Drive output via the axle shaft (2)

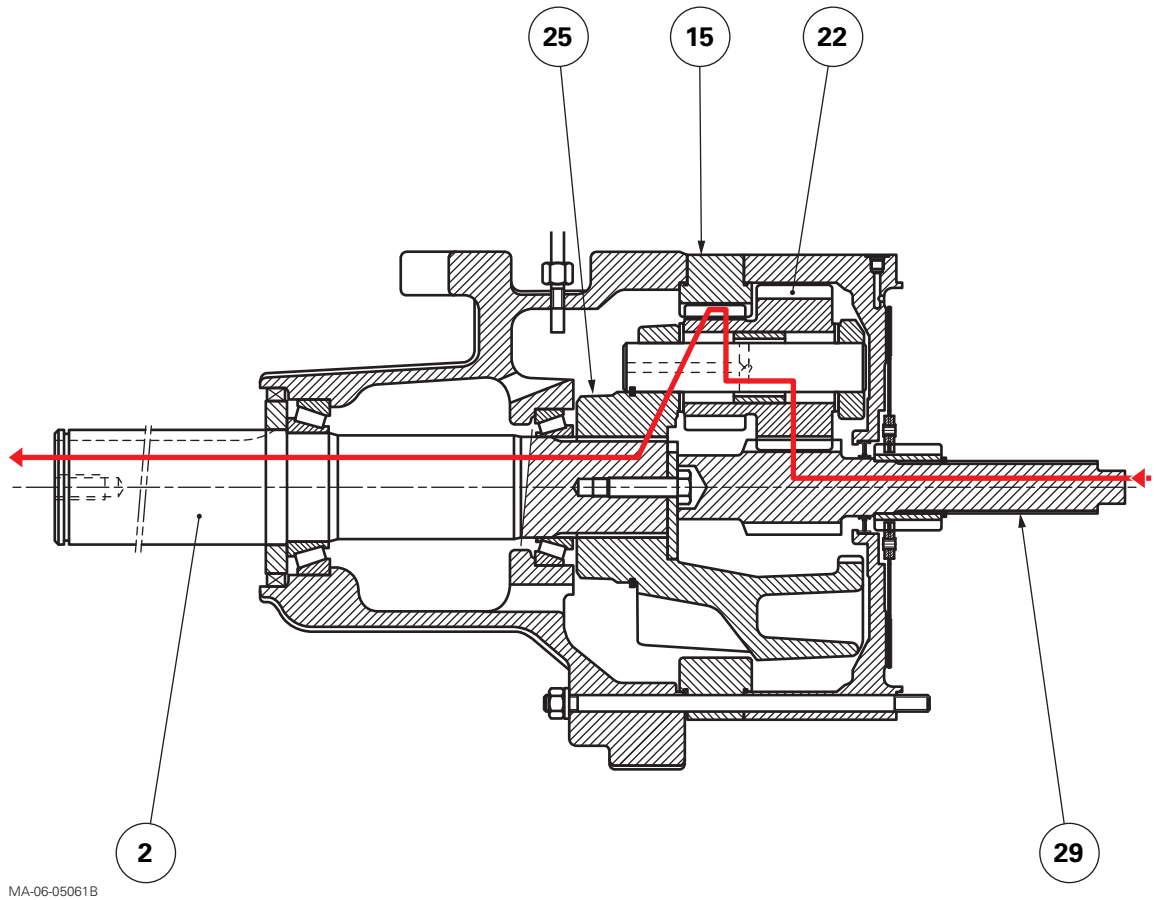
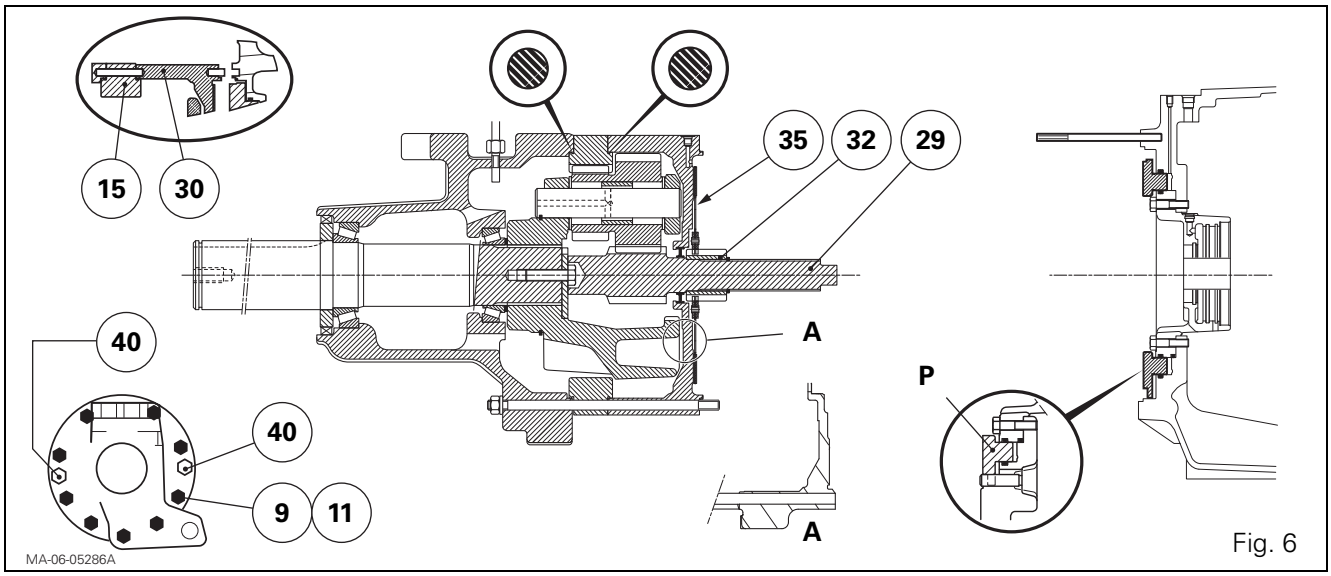


Fig. 5

C . Removing and refitting the trumpet housing assembly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A
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Fig. 6

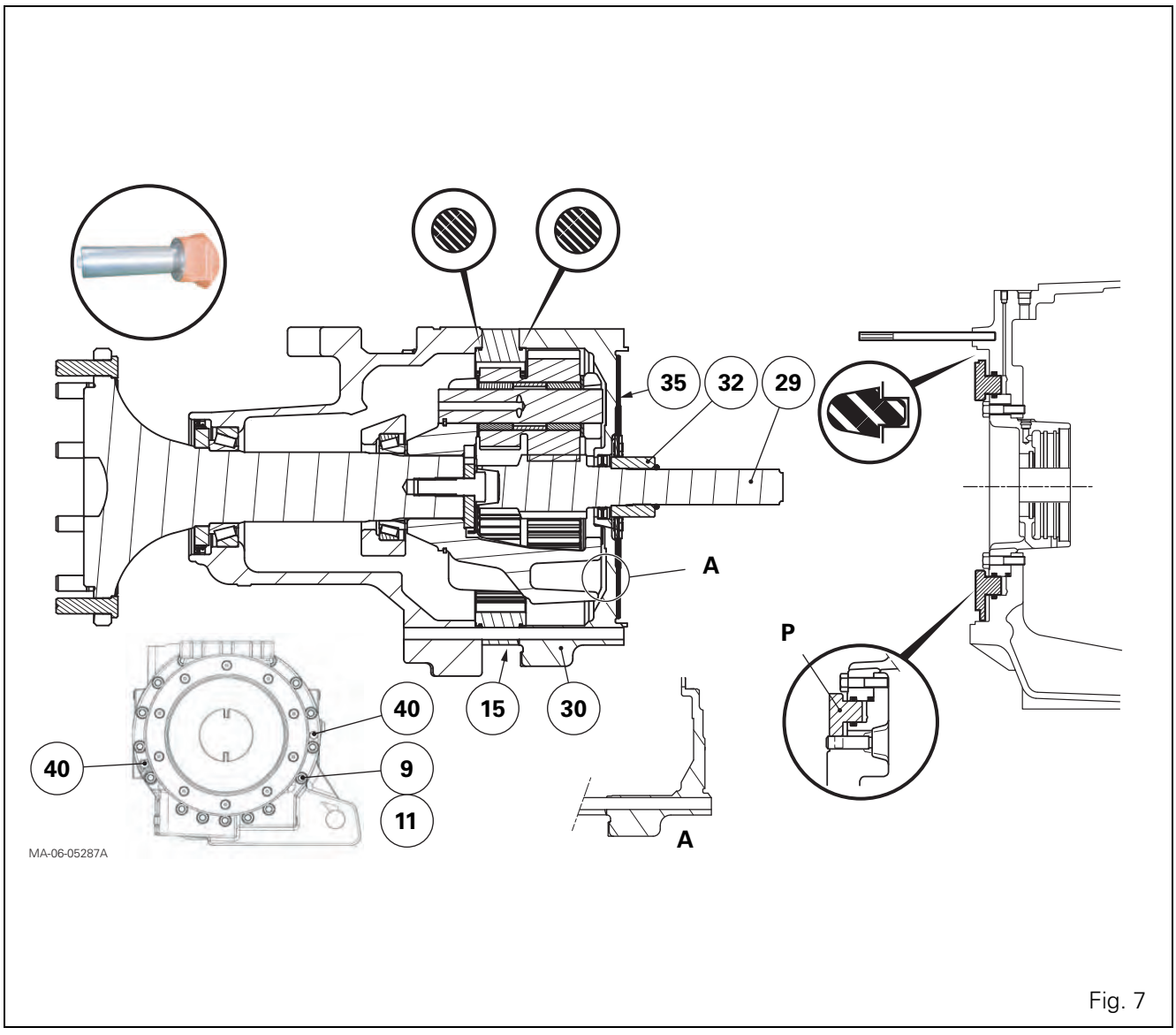
35
32
29
A
40
15
30
40
9
11
A
P
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Fig. 7

Removal

1. Drain the centre housing.

   IMPORTANT: *The oil used for the mechanical and hydraulic components of the transmission and the oil used for lubricating the moving parts in the composite final drive unit are not the same. They have different viscosities. If the oils are not to be changed, they must not be mixed when drained.*
2. Immobilise the tractor.

   If the tractor is not fitted with a ParkLock device, engage the hand brake.

   Chock between the frame and the front axle.
3. Remove the wheel concerned.

   Place an axle stand in position.
4. Visually anticipate the separation of the trumpet housing from the centre housing, checking that the trumpet housing and cab will not obstruct each other. If this is not the case, proceed as follows:
   - Unscrew the cab attachment screws on the trumpet housing support.
   - Raise the rear of the cab slightly until the trumpet housing separates from the centre housing.
   - Chock the cab.

   NOTE: *If the tractor is fitted with a suspended cab, refer to chapter 12.*
5. Remove the stabilising support.
6. Drive out the snap ring (1, Fig. 8).
7. Make a note of the position of the shim and washers on the lower pivot pin (2, Fig. 8) of the lift ram. Remove the lower pivot pin towards the exterior, recovering the shim and washers.
8. If necessary, remove the guard (draft sensor harness) from the trumpet housing.
9. Support the trumpet housing with a suitable fixture and a trolley jack or a hydraulic table.
10. Remove:
    - the M16 nuts (11);
    - the washers (9).

    IMPORTANT: *Do not unscrew the screws (40).*
11. Split the trumpet housing from the centre housing.

    Remove the brake disc (35).

    NOTE: *The sun gear (29), the spacer (30), the ring gear (15) and the splined hub (32) remain attached to the trumpet housing.*

    IMPORTANT: *Take care not to press down the brake pedal after removing the trumpet housing, or immobilise brake piston P on the centre housing using the retaining tool (see chapter 6).*

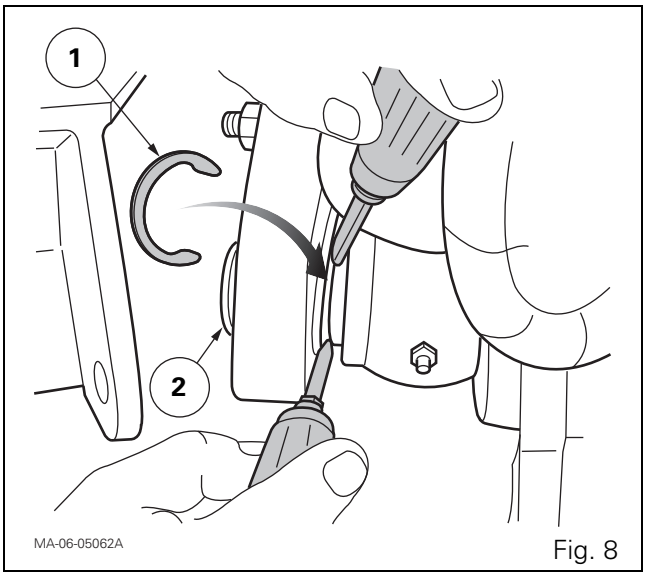

Fig. 8

Refitting

Tractors fitted with GTA1040 or GTA1540 transmission

12. If necessary, replace the defective studs, observing their length and position (Fig. 9 and table below).

Studs	Specifications
(34)	M16 x 335 mm
(36)	M16 x 320 mm
(37)	M16 x 330 mm
(45)	M16 x 350 mm

Specifications of M16 studs (Fig. 9)

Lightly smear the thread of the new stud(s) (centre housing side) with Loctite 270 or equivalent (Fig. 9). Screw them in and lock them securely.

13. For tractors fitted with:
- GTA1040 transmission, proceed to step 14;
- GTA1540 transmission, proceed to step 20.

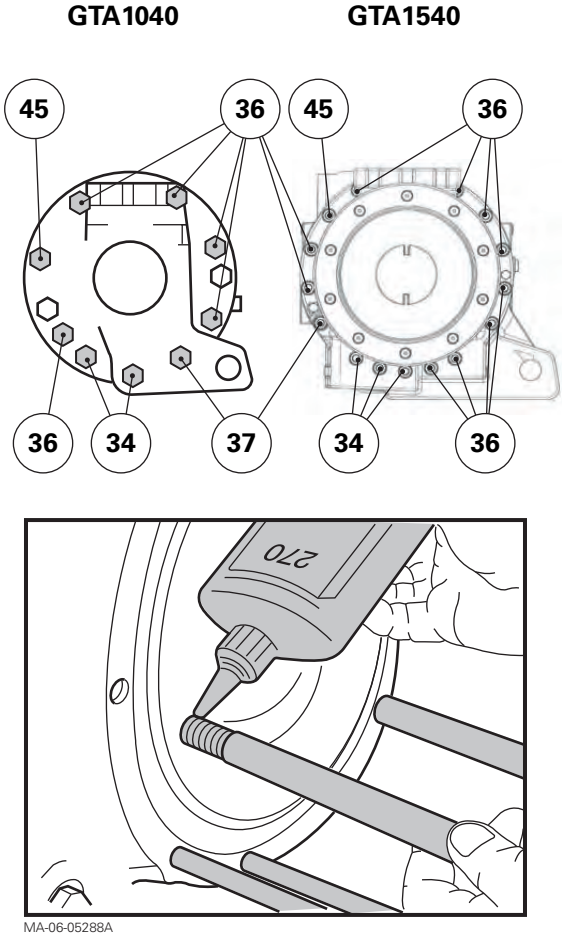

Fig. 9

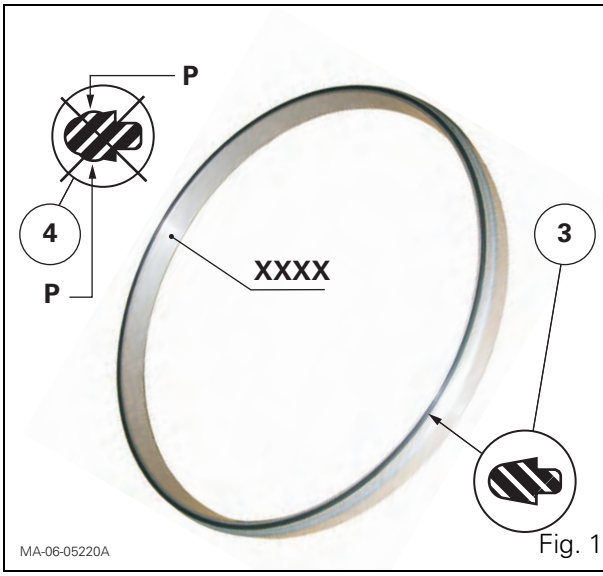

Fig. 10

Tractors fitted with GTA1040 transmission

14. Clean the mating faces of the trumpet housing (10) and centre housing with solvent. Remove all traces of the previous sealing product. Dry the components.

15. Evenly smear the mating face of the spacer with a sealing product (Loctite 5206 or equivalent) (Fig. 11).

16. Evenly fill angle D of the centre housing (1) (Fig. 11) with a silicone sealant (Loctite 5910 or equivalent).

IMPORTANT: *The diameter of the seal must be:*

- *uniform;*
- *of small section.*

The seal must not have gaps. The join must be located at the top of the centre housing.

17. Check the tightness of the screws (40) attaching the spacer (30) to the trumpet housing (10).

18. Refit the brake disc (35), previously ensuring that it slides freely on the splines of its splined hub (32).

19. Proceed to step 27.

Tractors fitted with GTA1540 transmission

20. Clean the mating faces of the trumpet housing and centre housing with solvent. Check that the groove of the seal on the centre housing is free of dirt. Dry the components.

21. Fit a new HNBR seal (3) to service tool ref. xxxx (Fig. 10) (see § K).

IMPORTANT: *The HNBR seal (3) has no spurs P (Fig. 10). Do not confuse it with the NBR seal (4) (Fig. 10). The NBR seal (4) is not fitted to this type of trumpet housing, but it is worthwhile noting that it is referenced in the spare parts catalogue and is not a substitute for the HNBR seal (3) (Fig. 10). Their components are therefore different.*

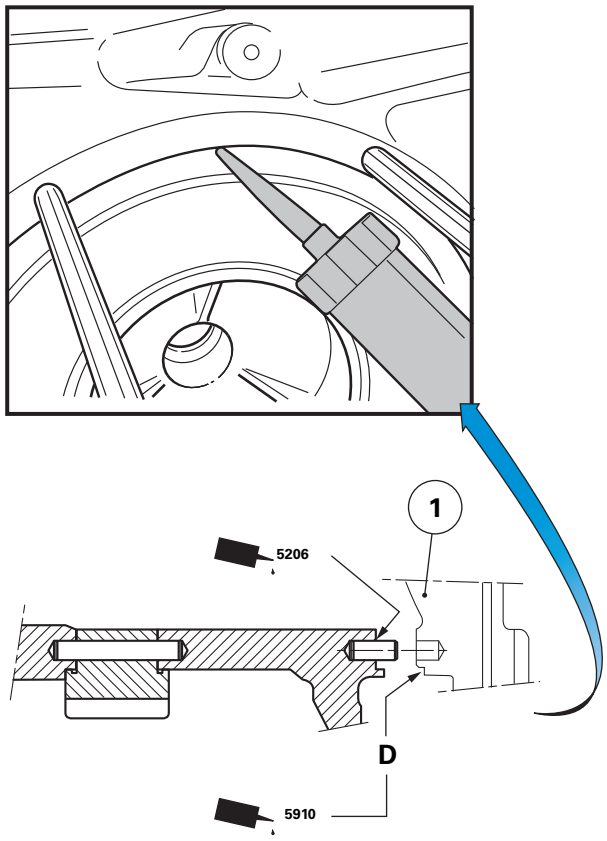

Fig. 11

22. Attach the tool fitted with the HNBR seal (3) to the centre housing. Manually exert high pressure around the tool while simultaneously turning it so that the seal fits correctly into the groove of the centre housing (1) (Fig. 12).

IMPORTANT: *It is strongly recommended that the HNBR seal (3) is fitted using the service tool. Fitting it without the tool will stretch the seal and cause a loop to form in the final assembly phase.*

23. Remove the service tool.

Ensure the HNBR seal (3) is positioned correctly on the centre housing.

24. Check the tightness of screws (40) attaching the brake plate (30) to the trumpet housing (10).

IMPORTANT: *Tractors fitted with GTA1540 transmission (50 kph) are assisted by a return travel limit mechanism on the brake pistons (see chapter 6 and the relevant section). As a result, before replacing the brake plates (30), it is advisable to push the brake pistons fully into their cavity so that this return travel limit mechanism once again returns the brake pistons correctly after the operation.*

25. Refit the brake disc (35), ensuring that it slides freely on the splines of its splined hub (32).

IMPORTANT: *Tractors fitted with GTA1540 transmission (50 kph) are assisted by a return travel limit mechanism on the brake pistons (see chapter 6 and the relevant section). As a result, before replacing the brake discs (35), it is advisable to push the brake pistons fully into their cavity so that this return travel limit mechanism once again returns the brake pistons correctly after the operation.*

26. Proceed to step 27.

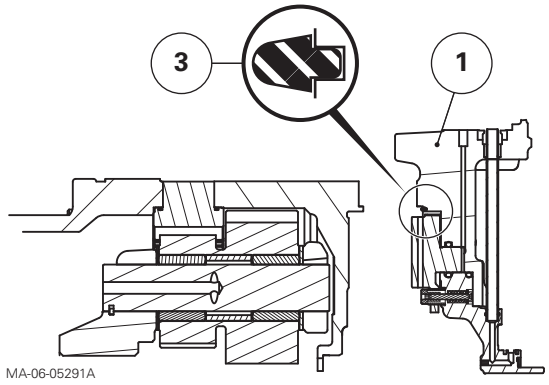

Fig. 12

Tractors fitted with GTA1040 or GTA1540 transmission

27. Check (Fig. 13) that the dowel (39) is present.

28. Support the trumpet housing using the equipment used for removal.

Engage the splines of the sun gear (29) in the differential. If they do not engage, rotate the axle shaft and push the trumpet housing horizontally to couple it with the centre housing.

29. Fit a washer (9) on each stud. Screw in the nuts (11). Tighten to a torque of 247-253 Nm.

30. Refit:

- the lower pivot pin of the lift ram;
- the stabilising support.

31. If it was necessary to lift the cab, reposition it on the trumpet housing support(s). Screw in the cab attachment screws.

NOTE: *If the tractor is fitted with a suspended cab (see chapter 12).*

32. Refit any parts removed from around the trumpet housing.

Refit the wheel.

Tighten the screws and nuts to their indicated torque, depending on the version (see chapter 6).

33. Top up the oil levels of the housings (centre housing and composite final drive housing). Check the oil level using the sight glass located to the left of the rear PTO housing. Also check the oil level of the composite final drive unit. Top up if required.

IMPORTANT*: Trumpet housings with a composite final drive unit do not have a separate oil level plug; a single plug combines the oil filling and level functions. The oil level of the final drive unit can therefore be measured:*

- *either using a makeshift rod 2.5 to 3 mm in diameter (with an elbow as required) as a gauge inserted into the M18 tapped port of the filler plug. The oil level is correct when it is 49 mm short of the inner rim of the tapped port of the filler plug;*
- *or by simply draining the composite final drive unit and measuring the volume of drained oil, which should be 9 l per composite final drive unit.*

34. Check the linkage operation.

35. Carry out a road test on the brake system.

36. Check the tightness of the trumpet housing, the hydraulic unions and the plugs.

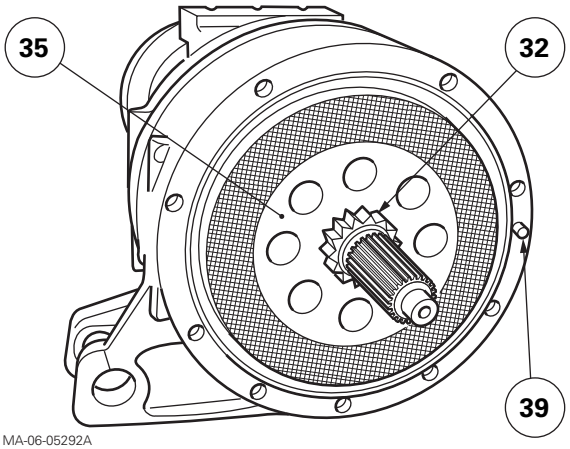

Fig. 13

D . Removing and refitting the spacer and ring gear assembly

Removal

Tractors fitted with GTA1040 or GTA1540 transmission

37. Remove the trumpet housing assembly (see § C). Drain the final drive unit.

38. If possible, place the trumpet housing in a vertical position with the sun gear (29) facing upwards (Fig. 14).

39. Remove (Fig. 15, Fig. 16):
- the screws (40);
- the snap ring (33);
- the splined hub (32).

40. Remove (Fig. 15, Fig. 16):
- the spacer (30), having previously placed a flexible protection over the splines of the sun gear (29);
- the sun gear (29);
- the planet carrier (25) (see § G);
- the ring gear (15).

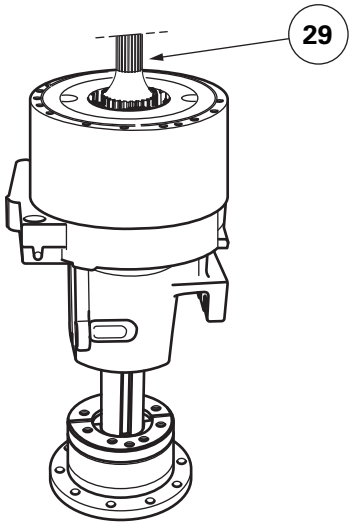

Fig. 14

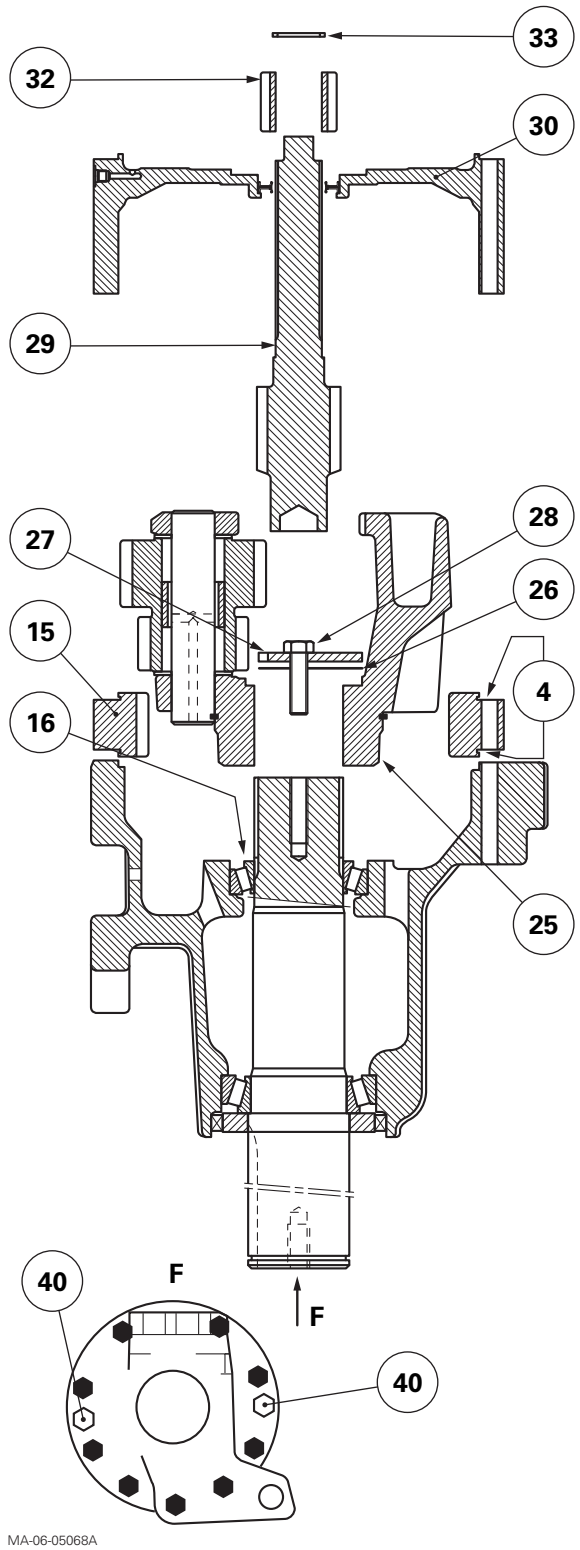
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Fig. 15

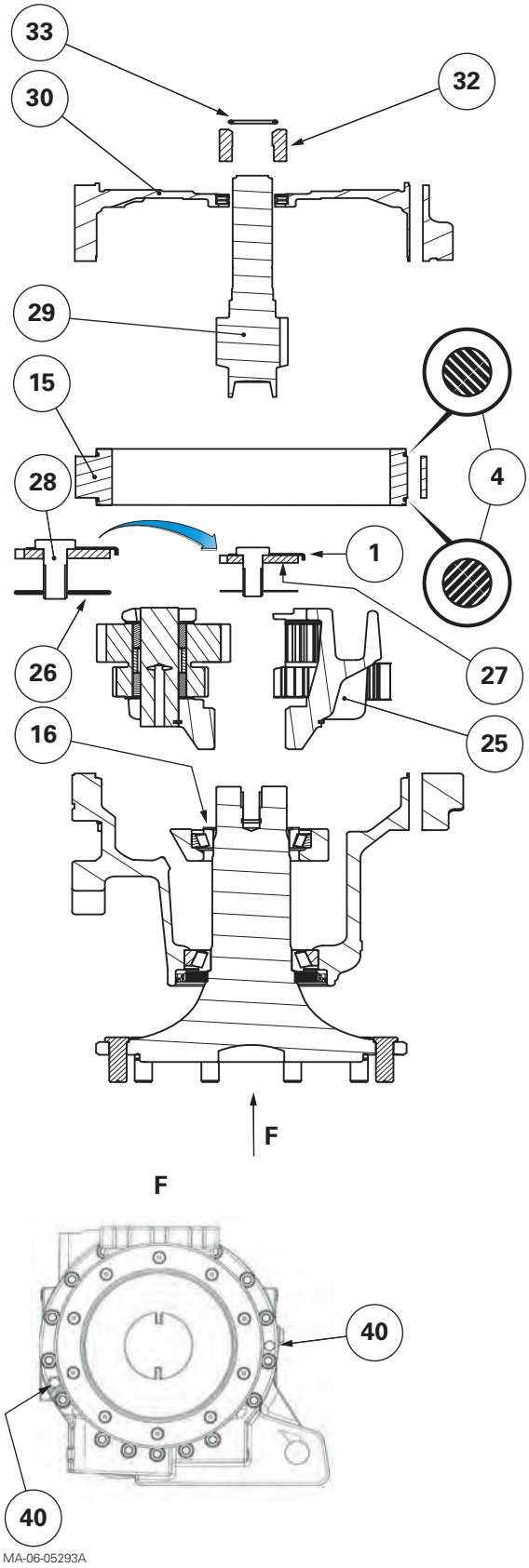
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Fig. 16

Refitting

Tractors fitted with GTA1040 or GTA1540 transmission

41. Clean the mating faces of the trumpet housing, the ring gear and the spacer with solvent. Remove all traces of the previous sealing product. Dry the components.

42. Check that the pin (14) is present (Fig. 17).

43. Fit a new "O" ring (4) into each B and C angle of the ring gear (15) (Fig. 17). Refit the ring gear.

44. Refit:
- the planet carrier (25) (see § G);
- the sun gear (29).

45. Slide guard xxx (see § K) over the splines of the sun gear.

46. Refit:
- the spacer (30);
- the hub (32);
- the snap ring (33).

47. Screw in the screws (40). Tighten to a torque of 100-130 Nm.

48. Remove the guard.

49. Refit the trumpet housing assembly (see § C).

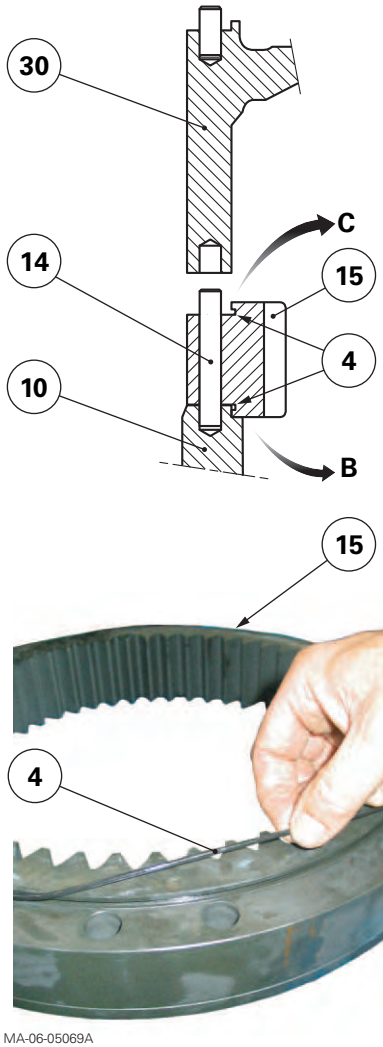


Fig. 17

E . Replacing the spacer seals

Disassembly

50. Remove:
- the trumpet housing assembly (see § C);
- the splined hub (32);
- the spacer (30) (see § D);
- the planet carrier (25) (see § G);
- the ring gear (15) (see § D).

51. Drive out the lip seals (31) from the spacer (30) (Fig. 18). Discard them.

Reassembly

52. Clean the components.

Check the condition of the mating faces of the seals against the spacer.

53. Using a suitable fitting drift and support, fit the lip seals (31) back to back in the groove of the spacer (30) as per Fig. 18.

54. Refit:
- the ring gear (15) fitted with new "O" rings (4) (see § D);
- the planet carrier (25) (see § G);
- the spacer (30) (see § D);
- the splined hub (32);
- the trumpet housing assembly (see § C). Check that the union (38) and its vent pipe are not blocked or pinched (Fig. 19). Reconnect the vent pipe to the union.

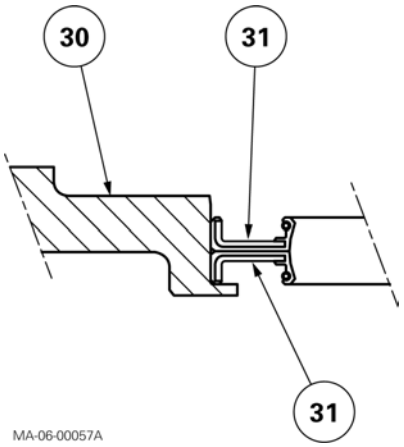


Fig. 18

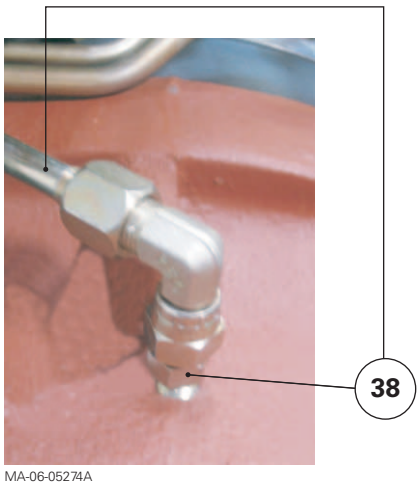


Fig. 19

F . Replacing the cassette seal

Tractors fitted with a flanged axle shaft

Removal

55. Remove:
- the trumpet housing assembly (see § C);
- the splined hub (32);
- the spacer (30) (see § D);
- the planet carrier (25) (see § G);
- the ring gear (15) (see § D);
- the axle shaft (2) (Fig. 20).

56. Extract the cassette seal (5) from the trumpet housing (Fig. 20) using a makeshift tool.

IMPORTANT: *Take care not to scratch the trumpet housing or ring (42) rim (Fig. 20).*

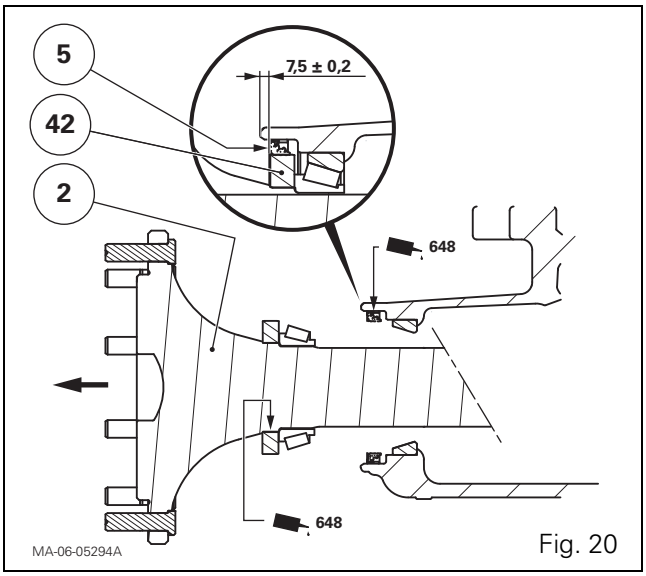


Fig. 20

Refitting

57. Clean the location of the cassette seal (5) on the trumpet housing and on the ring (42) (Fig. 20).

IMPORTANT: *The internal surface of the ring should be smeared with Loctite 648 or equivalent (Fig. 20).*

58. Lightly smear the external surface of the cassette seal with Loctite 648 or equivalent (Fig. 20).

59. Fit the cassette seal into the trumpet housing according to the distance indicated in Fig. 20. Wipe any excess Loctite from around the seal.

60. Lightly lubricate the internal surface of the cassette seal with clean transmission oil.

61. Refit:
- the axle shaft (2) (Fig. 20).
- the ring gear (15) fitted with new seals (4) (see § D);
- the planet carrier (25) (see § G);
- the spacer (30) (see § D);
- the splined hub (32);
- the trumpet housing assembly (see § C).

62. Refit the wheel(s).

Remove the axle stand(s).

Screw in the wheel screws or nuts depending on version (see chapter 6).

63. Top up the oil level in the composite final drive unit (see § C).

64. Carry out a road test.

65. Check the tightness of the cassette seal.

Tractors fitted with a straight axle shaft

Removal

66. Drain the composite final drive unit.

67. Immobilise the tractor. Chock the front wheels.

68. Disassemble the wheel(s) concerned.

Position an axle stand under the trumpet housing(s).

69. Extract the cassette seal (5) from the trumpet housing (Fig. 21) using a makeshift tool.

IMPORTANT: *Take care not to scratch the trumpet housing or ring (42) rim (Fig. 21).*

Refitting

70. Clean the location of the cassette seal (5) on the trumpet housing and on the ring (42) (Fig. 21).

IMPORTANT: *The internal surface of the ring should be smeared with Loctite 648 or equivalent (Fig. 21).*

71. Lightly smear the external surface of the cassette seal with Loctite 648 or equivalent (Fig. 21).

72. Fit the cassette seal in the trumpet housing using tool ref. 3378151M1 (see § K). Wipe any excess Loctite from around the seal.

NOTE: *The tool is designed to fit the cassette seal in the correct position.*

73. Refit the wheel(s).

Remove the axle stand(s).

Screw in the wheel screws or nuts depending on version (see chapter 6).

74. Top up the oil level in the composite final drive unit (see § C).

75. Carry out a road test.

76. Check the tightness of the cassette seal.

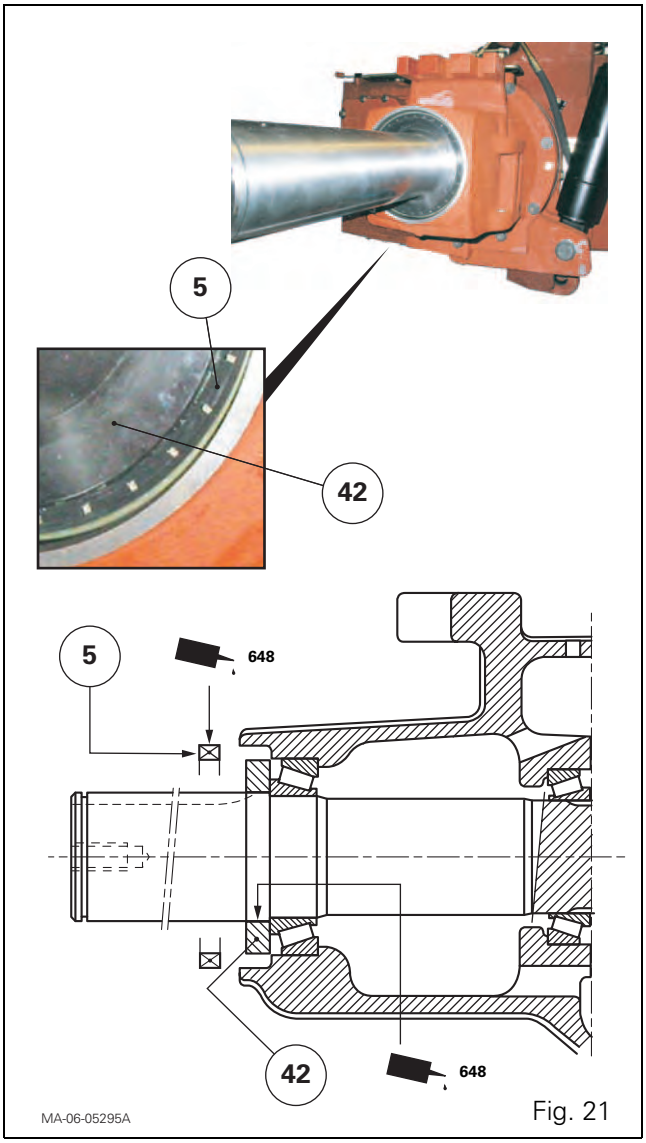


Fig. 21

G . Removing and refitting, disassembling and reassembling the planet carrier

Removal

Tractors fitted with GTA1040 transmission

77. Remove:
- the trumpet housing assembly (see § C);
- the spacer (30) (see § D).

78. Immobilise the axle shaft (2) or the planet carrier (25).

79. Remove (Fig. 22):
- the M24 screw (28);
- the tripod washer (27);
- the shim(s) (26);
- the planet carrier (25) (Fig. 23) using a suitable sling;
- the ring gear (15) (see § D).

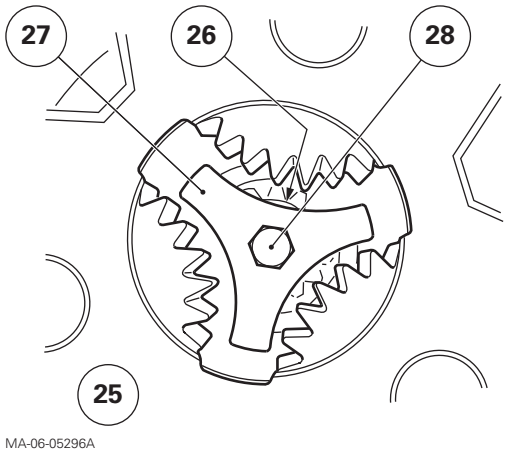


Fig. 22

Tractors fitted with GTA1540 transmission

80. Remove:
- the trumpet housing assembly (see § C);
- the spacer (30) (see § D).

81. Immobilise the axle shaft (2) or the planet carrier (25).

82. Remove (Fig. 24):
- the lock washer (1)

  NOTE: *The lock washer is fixed with Loctite 401;*
- the M24 screw (28);
- the tripod washer (27);
- the shim(s) (26);
- the planet carrier (25) using a suitable sling;
- the ring gear (15) (see § D).

Fig. 23

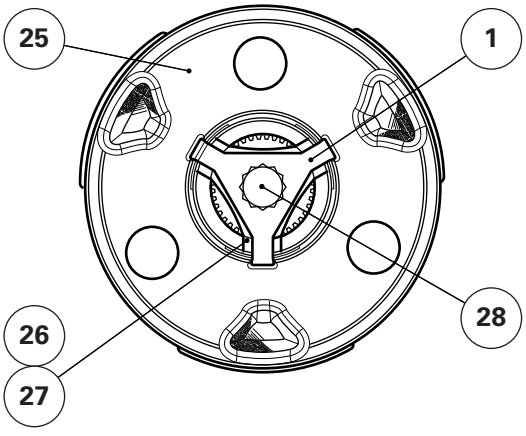


Fig. 24

Disassembly

Tractors fitted with GTA1040 or GTA1540 transmission

83. Remove (Fig. 25, Fig. 26):
- the screw (18);
- the spacer (17);
- the snap ring (19) by moving its two ends apart.

84. Remove (Fig. 27):
- the pins (20);
- the friction washers (21);
- the shims (6);
- the planet gears (22).

85. Recover:
- the needle rollers (23);
- the spacer (24).

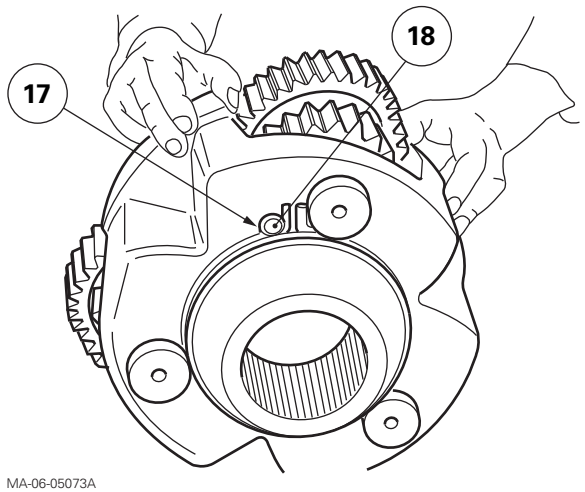


Fig. 25

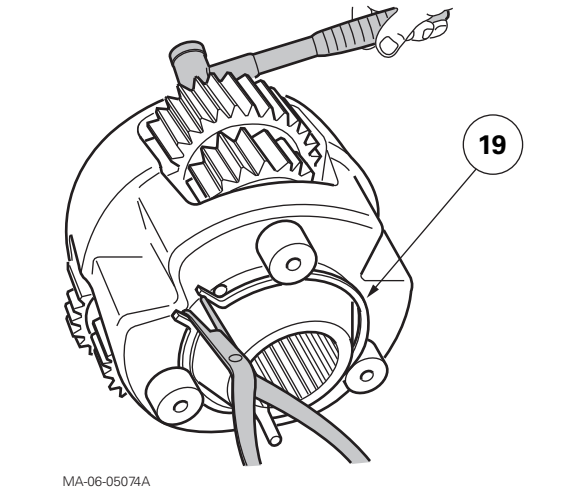


Fig. 26

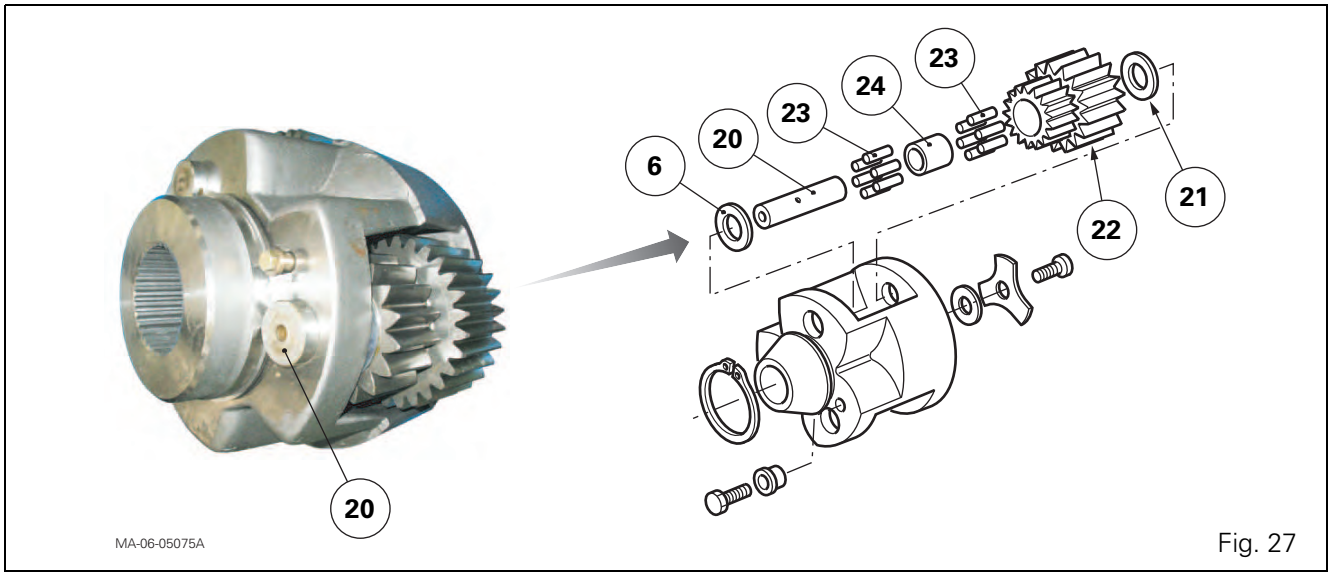


Fig. 27

Reassembly

Tractors fitted with GTA1040 or GTA1540 transmission

86. Fit each double planet gear with two rows of needle rollers previously smeared with miscible grease.

NOTE: *A spacer (24) separates each row of needle rollers.*

87. If necessary, shim the double planet gears (22) (see § H).

88. Fit:

- the double planet gears (22) in the planet carrier (25), positioning the 17-tooth gear of the double planet gears towards the snap ring (19);
- the washers (21);
- the shim(s) (6).

89. Engage the three pins (20) in the double planet gears, positioning their lubricating port O towards the snap ring (19) (Fig. 28). Tap lightly and alternately on the pins to correctly position the snap ring in its groove (Fig. 28).

IMPORTANT: *If the axial clearance of one or more double planet gear(s) is below 0.15 mm or above 0.60 mm, shim the planet gear(s) concerned (see § H).*

90. Refit the spacer (17) (Fig. 29).

91. Lightly smear the thread of the screw (18) with Loctite 270 or equivalent. Screw in and tighten the screw to 34-50 Nm.

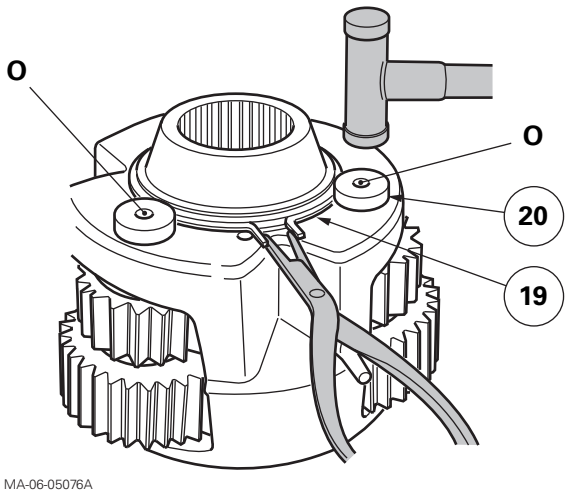


Fig. 28

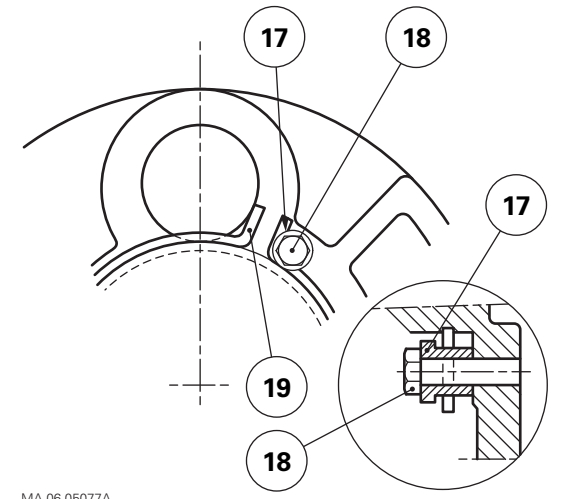


Fig. 29

Refitting

Tractors fitted with GTA1040 transmission

92. Check that the tab washer (16) is present.

93. Refit the ring gear (15) (see § D).

94. Refit the planet carrier (25) (Fig. 30), positioning the mark on each double planet carrier (22) as shown in Fig. 31.

IMPORTANT: *Each double planet gear (22) is marked (punched) on the surface of the 29-tooth gear. This mark corresponds to the alignment of a tooth on gear A with a tooth on gear B. Each mark must point towards the centre prior to fitting the sun gear (29) onto the double planet gears.*

95. If necessary, shim the tapered roller bearings (see § J).

96. Immobilise the axle shaft (2) or the planet carrier (25).

97. Refit the shim(s) (26) and the tripod washer (27).

98. Screw in and tighten the M24 screw (28) (Fig. 31) to 765-935 Nm after lightly smearing its thread with Loctite 270 or equivalent.

99. Refit:

- the spacer (30) (see § D);
- the trumpet housing assembly (see § C).

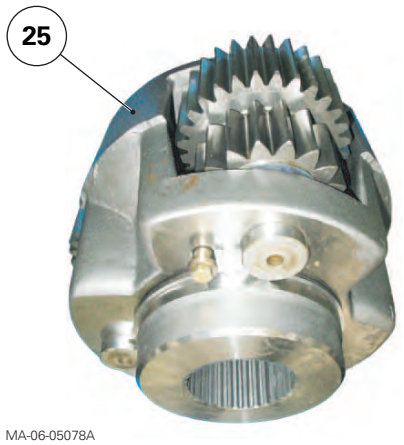


Fig. 30

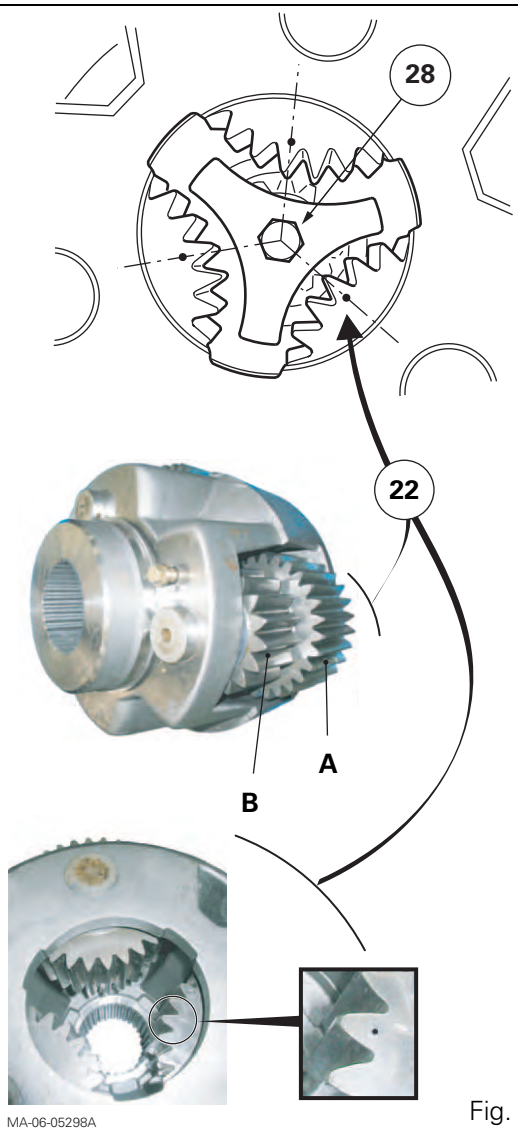


Fig. 31

Tractors fitted with GTA1540 transmission

100. Check that the tab washer (16) is present.

101. Refit the ring gear (15) (see § D).

102. Refit the planet carrier (25), repeating steps 94 and 95.

103. Immobilise the axle shaft (2) or the planet carrier (25).

104. Refit the shim(s) (26) and the tripod washer (27).

105. Screw in and tighten the M24 screw (28) to 750 Nm.

106. Slide a lock washer (1) onto the head of the M24 screw (28). Ensure its tabs B are correctly housed in moulded slots E of the planet carrier (25) (Fig. 32). If this is not the case, repeat the step with the second lock washer; if this is still not the case, repeat the step with the third. Depending on the result (either no washer is suitable or a washer is selected), proceed to step 107 or 108.

NOTE: *Three lock washers (1) are available from the spare parts catalogue. Each of the lock washers has a 10° angular offset.*

107. Case 1: A lock washer is selected

Apply three spots of Loctite 401 or equivalent to the mating face of the selected lock washer which is turned towards the tripod washer (27).

NOTE: *Loctite 401 prevents the lock washer (1) from moving when the trumpet housing is being refitted to the centre housing.*

When the trumpet housing is refitted, the sun gear (29) holds the lock washer in place.

108. Case 2: No lock washer is selected

Gently retighten the M24 screw (28), taking care not to exceed the maximum torque of 960 Nm.

Repeat step 106.

IMPORTANT: *If required, repeat step 108 several times.*

109. Refit:

- the spacer (see § D);
- the trumpet housing assembly (see § C).

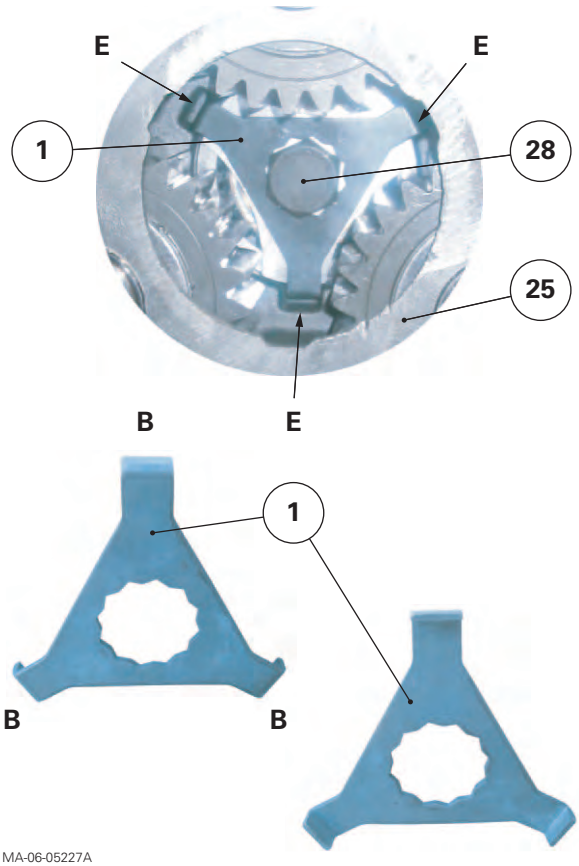


Fig. 32

H . Shimming the double planet gears

The shimming of the double planet gears is carried out using the shim(s) (6) fitted onto the pin (20), against the 17-tooth gear.

110. Temporarily fit (Fig. 33):
- the double planet gears (22) in the planet carrier, positioning the 17-tooth gear towards the circlip (19);
- the washers (21) against the 29-tooth gear;
- the 0.5 mm shims (6) against the 17-tooth gear.

111. Engage the three pins (20) in the double planet gears, positioning their lubricating port O towards the snap ring (19) (Fig. 33).

112. Using a set of thickness shims, gauge the space between the temporary shims (6) and the double planet gears (22) (Fig. 33). Depending on the measurement, determine a definitive shim thickness in order to obtain a clearance of J = 0.15 to 0.60 mm for each planet gear (Fig. 34).

NOTE 1: *Shims measuring 0.5 and 1.5 mm in thickness are available from the spare parts catalogue.*

NOTE 2: *If possible, shim to the minimum tolerance.*

113. Gently remove the pins (20) (Fig. 34).

Position the previously selected shims (6) as shown in Fig. 34.

IMPORTANT: *Fit the thickest shim against the row of needle rollers.*

114. Drive out the pins while positioning the snap ring (19) at the same time.

Fit the spacer (17).

Lightly smear the thread of the screw (18) with Loctite 270 or equivalent. Tighten this screw to a torque of 34-50 Nm.

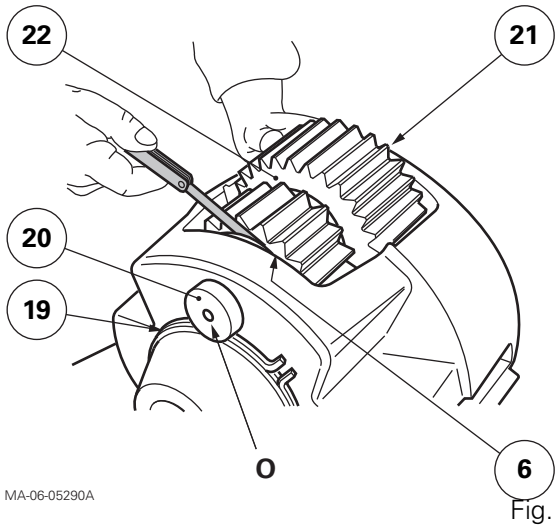


Fig. 33

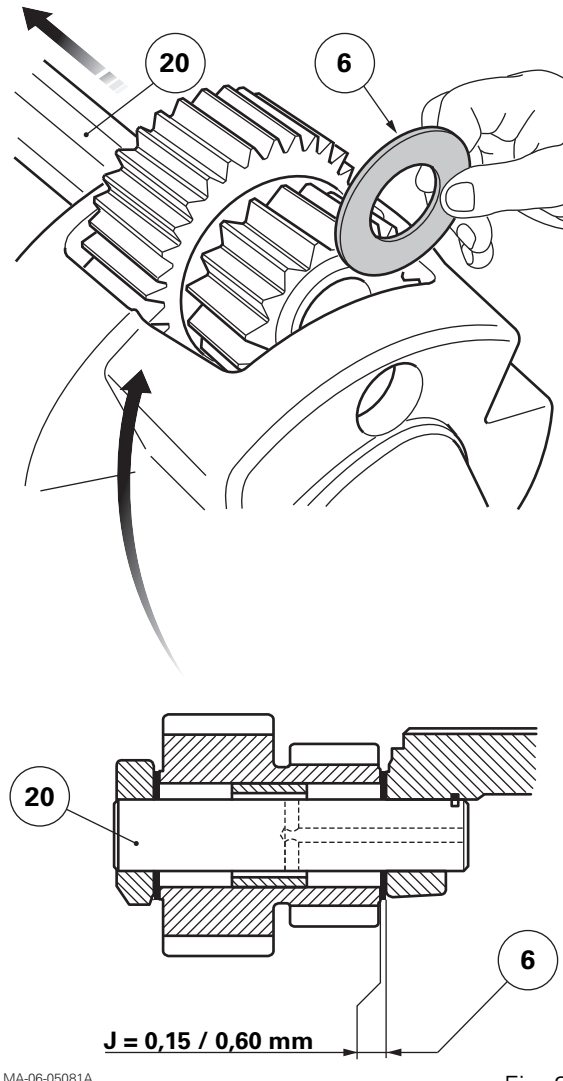


Fig. 34

I . Replacing tapered roller bearings

Disassembly

Tractors fitted with GTA1040 or GTA1540 transmission

115. Remove:
- the trumpet housing assembly (see § C);
- the spacer (30) (see § D);
- the planet carrier (25) (see § G);
- the ring gear (15) (see § D).

116. Remove:
- the tab washer (16);
- the axle shaft (2);
- the bearing cone (13).

117. If necessary, extract:
- the bearing cone (7);
- the ring (42) (see § F);
- the cassette seal (see § F).

118. Using a suitable puller or a makeshift tool, extract the bearing cups (8) (12).

Reassembly

Tractors fitted with GTA1040 or GTA1540 transmission

119. Clean and check all components. Replace those that are defective.

120. Fit the bearing cups (8) (12) against their respective shoulders.

121. If necessary, fit:
- the cassette seal (5) in the trumpet housing (see § F);
- the ring (42) on the axle shaft (see § F).

122. Fit the bearing cone (7) against the shoulder of the axle shaft.

123. Insert the prepared axle shaft into the trumpet housing fitted with the cassette seal (5) and bearing cups (8) (12).

124. Refit:
- the bearing cone (13);
- the tab washer (16);
- the ring gear (15) (see § D).

125. Refit:
- the planet carrier (25). If necessary, shim the tapered roller bearings (see § J);
- the spacer (30) (see § D);
- the trumpet housing assembly (see § C).

J . Shimming the tapered roller bearings of the axle shaft

If the following parts are to be replaced, the shimming of the tapered roller bearings on the axle shaft must be checked or carried out:

- the flanged or straight axle shaft (2);
- the tapered roller bearings (7) (8) and (12) (13);
- the trumpet housing (10);
- the tab washer (16);
- the planet carrier (25).

NOTE: *The preload shimming of the tapered roller bearings on the axle shaft is carried out using the shim(s) (26) fitted between the end of the axle shaft (2) and the tripod washer (27) (Fig. 35).*

IMPORTANT: *In order to correctly shim the tapered roller bearings, fit the trumpet housing in a vertical position (Fig. 35).*

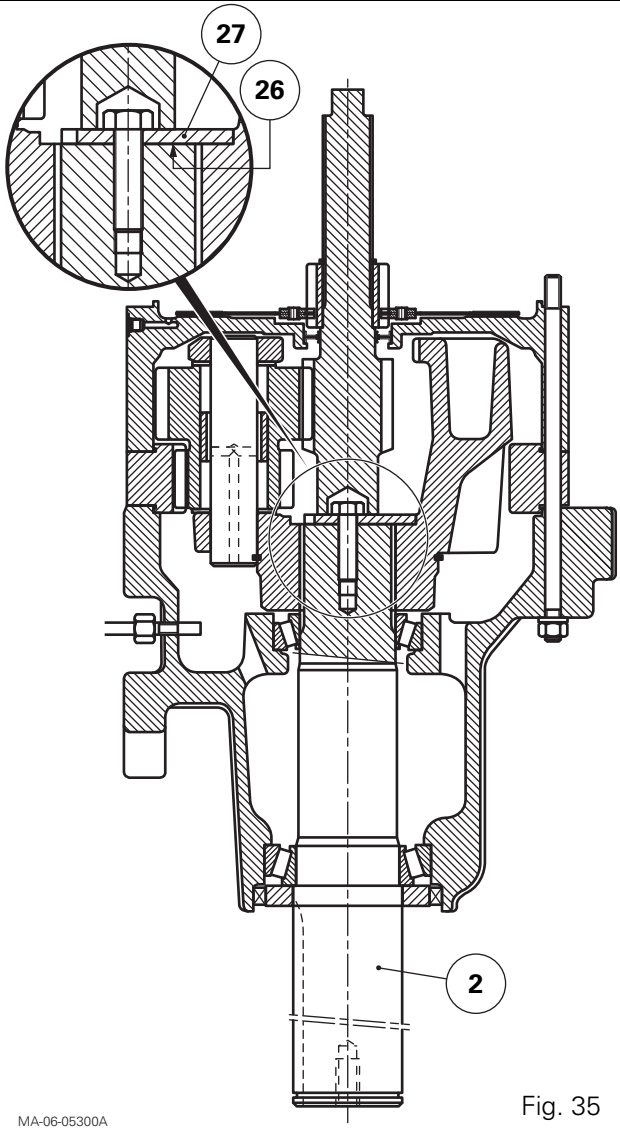


Fig. 35

Preparing for shimming

Tractors fitted with GTA1040 or GTA1540 transmission

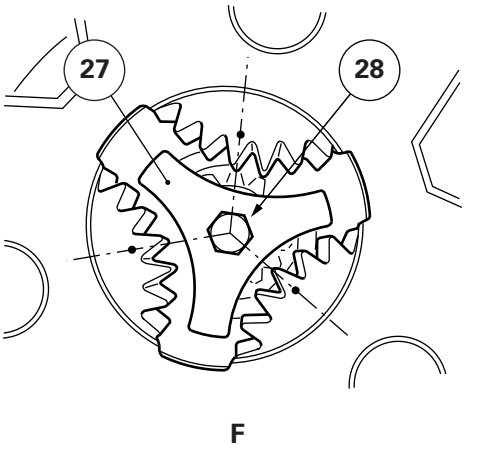
126. Fit:
- the bearing cone (13);
- the tab washer (16);
- the planet carrier (25).

127. Fit the shim(s) (26) with a thickness greater than the space between the end of the axle shaft (2) and the mating face of the tripod washer (27) on the planet carrier (Fig. 36, Fig. 37). This should give a temporary clearance J.

128. Fit the tripod washer (27).

Temporarily lock the M24 screw (28) at:
- 765 Nm (tractors fitted with GTA1040 transmission);
- 750 Nm (tractors fitted with GTA1540 transmission).

GTA1040



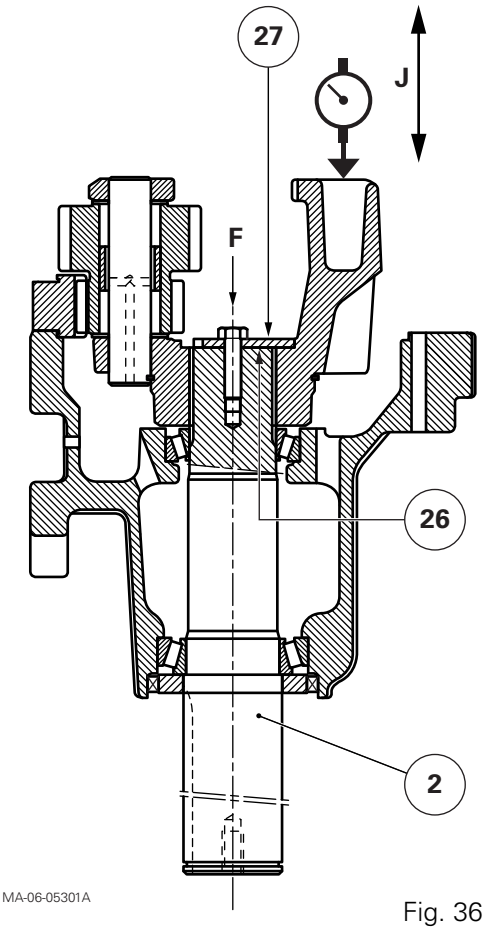


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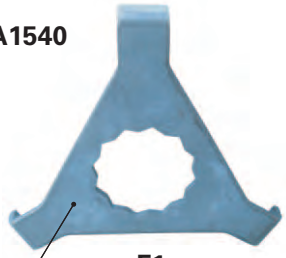
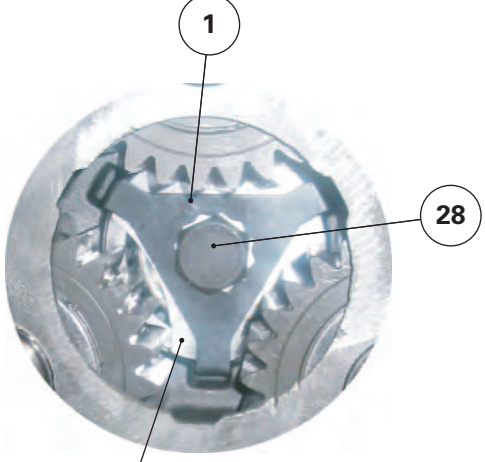
Fig. 36

GTA1540





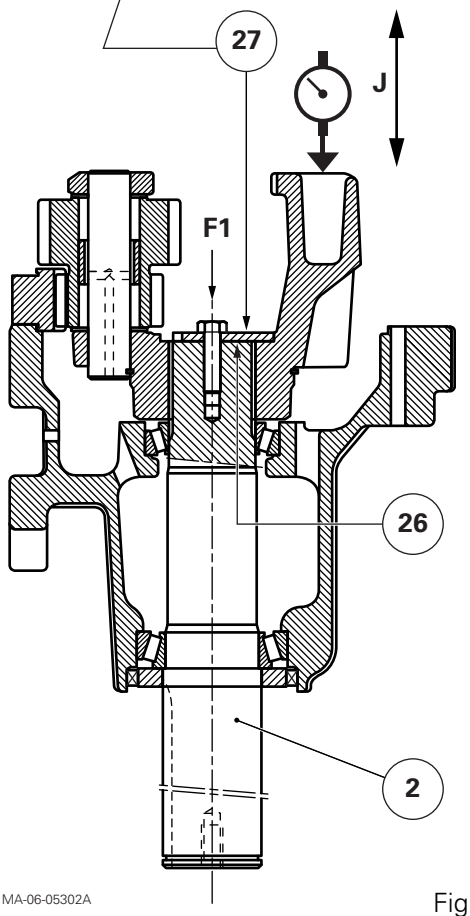


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Fig. 37

Shimming

Tractors fitted with GTA1040 or GTA1540 transmission

129. Press firmly on the planet carrier while turning the trumpet housing by several turns.

130. Fit a dial gauge on the trumpet housing with its feeler pin positioned near the centre of the planet carrier (Fig. 36 to Fig. 38). Set the dial gauge needle to zero.

131. Using suitable levers, move the planet carrier vertically (Fig. 38). Measure clearance J indicated on the dial gauge.

Repeat the step several times.

Calculate the average of the clearance J readings.

132. Reduce the shim (26) thickness according to value J + (0.02 to 0.12) to obtain a preload P1 = 0.02 to 0.12 mm (Fig. 39).

NOTE: *If possible, shim to the maximum tolerance.*

133. For tractors fitted with:

- GTA1040 transmission, proceed to step 134;
- GTA1540 transmission, proceed to step 135.

Tractors fitted with GTA1040 transmission

134. Definitively fit the tripod washer (27) (Fig. 36).

Lightly smear the thread of the M24 screw (28) (Fig. 36) with Loctite 270 or equivalent. Tighten this screw to a torque of 765-935 Nm.

Tractors fitted with GTA1540 transmission

135. Definitively fit the tripod washer (27) (Fig. 37).

136. Tighten the M24 screw (28) (Fig. 37) to 750 Nm.

From the three possible lock washers, select the lock washer (1) which will be fitted definitively (see steps 106 to 108).

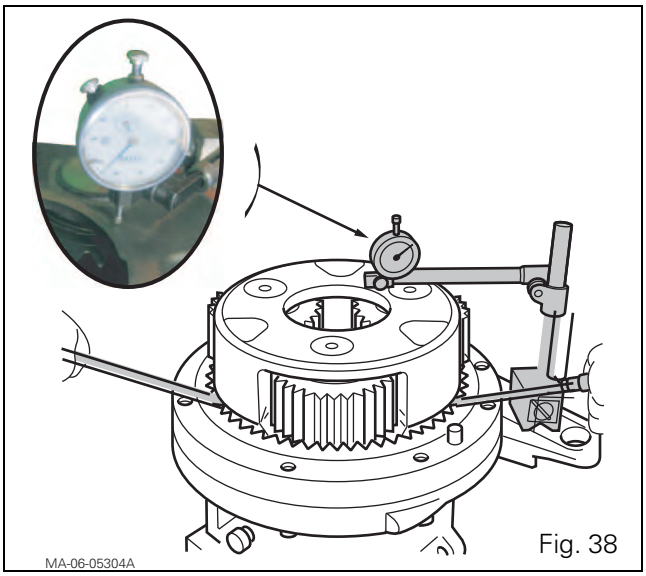

Fig. 38

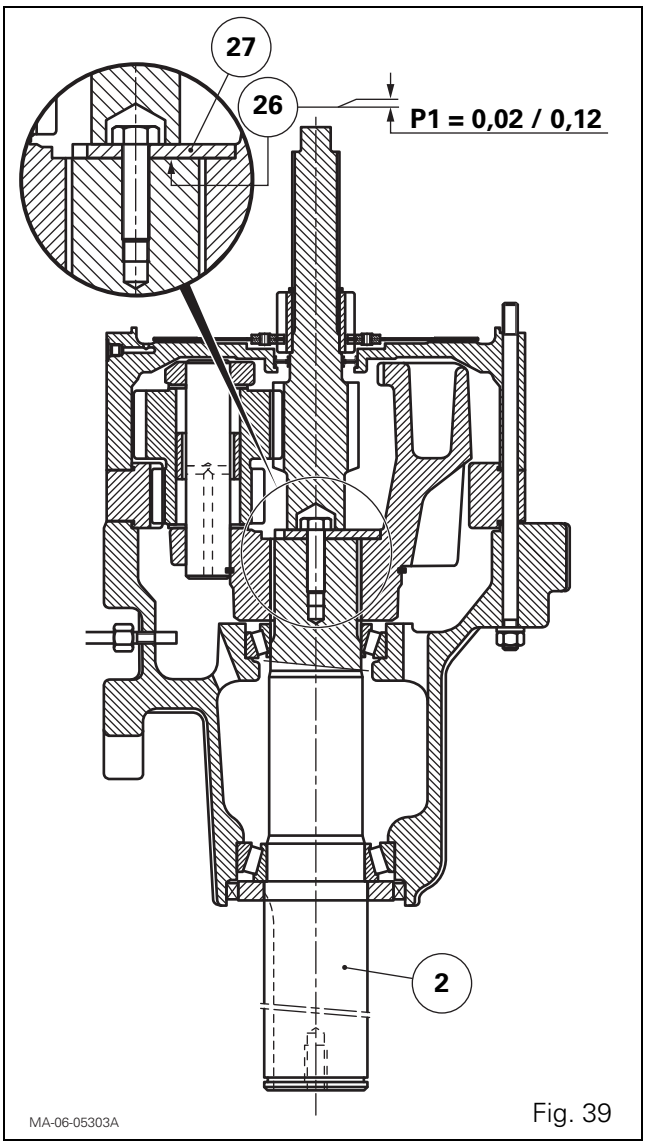

Fig. 39

K . Service tools

Tools available in the AGCO network

- xxxx: Lip seal guard (31) (Fig. 40)
- xxxx: Seal fitting ring (3) (Fig. 41)
- 3378151M1: Tool for fitting cassette seal (5) to straight axle shaft (Fig. 42)

Fig. 40

Fig. 41

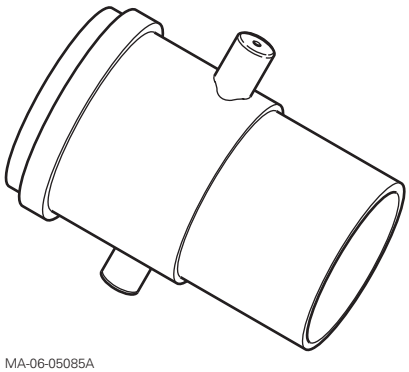

Fig. 42

GPA40 - Trumpet housings with composite final drive

6B14 - GPA40 - Brake pistons

CONTENTS

GPA40 - Brake pistons

A . General

The brake pistons (2) (Fig. 1) are housed in two cavities formed by the centre housing and the left and right-hand differential supports.

They are:

- concentric with the mating face of each trumpet housing;
- guided by three stop pins (6) force fitted into the centre housing.

Each brake piston has two ring faces F and F1, which have different cross sections (Fig. 2).

Face F is under hydraulic pressure:

- from the master cylinders (tractors fitted with GTA1040 and GTA1540 transmission (40 kph));
- from a block/valves assembly (tractors fitted with GTA1540 transmission (50 kph).

Face F1 compresses the brake disc, which is splined to the input sun gear of the trumpet housing, against the compartment or spacer, depending on the trumpet housing type. The compartment or spacer also acts as a brake plate.

The pistons are sealed by "O"rings (3) (4) (Fig. 1) mounted respectively into the grooves of the centre housing and the differential supports. A seal J placed in the angle of each support (Fig. 1) prevents the pressure in the piston chamber from escaping into the centre housing.

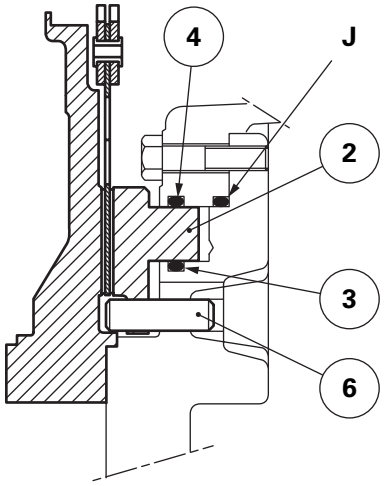

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Fig. 1

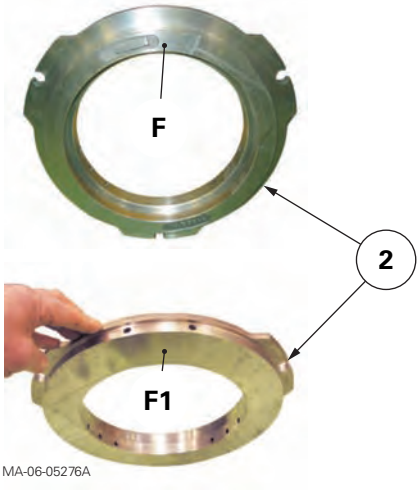

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Fig. 2

Tractors fitted with GTA1040 or GTA1540 transmission (40 kph)

Each brake piston is controlled by a master-cylinder assisted hydraulically by the 21 bar low-pressure system (pressure P).

When the brake is released, minimal clearance is ensured between the brake piston and disc.

The brakes are self-adjusting. They maintain constant pedal clearance.

Tractors fitted with GTA1540 transmission (50 kph)

For tractors fitted with GTA1540 transmission (50 kph) and depending on the legal requirements of certain countries where the tractor is registered with a maximum speed of 50 kph, the hydraulic control of the brakes is fitted with (Fig. 3):

- a block/valves assembly (1) fitted to the front bulkhead of the cab and activated by the brake pedals (see chapter 9);
- an electronically controlled 50 kph accumulator and a hydraulic braking unit (5) (see chapter 11) located on the right-hand side of the transmission;
- brake pistons (2) and discs (35) fitted in the centre housing cavities and designed with a greater braking surface S than that of the brake pistons and discs on 40 kph tractors;
- a return travel limit mechanism (3) for each brake piston.

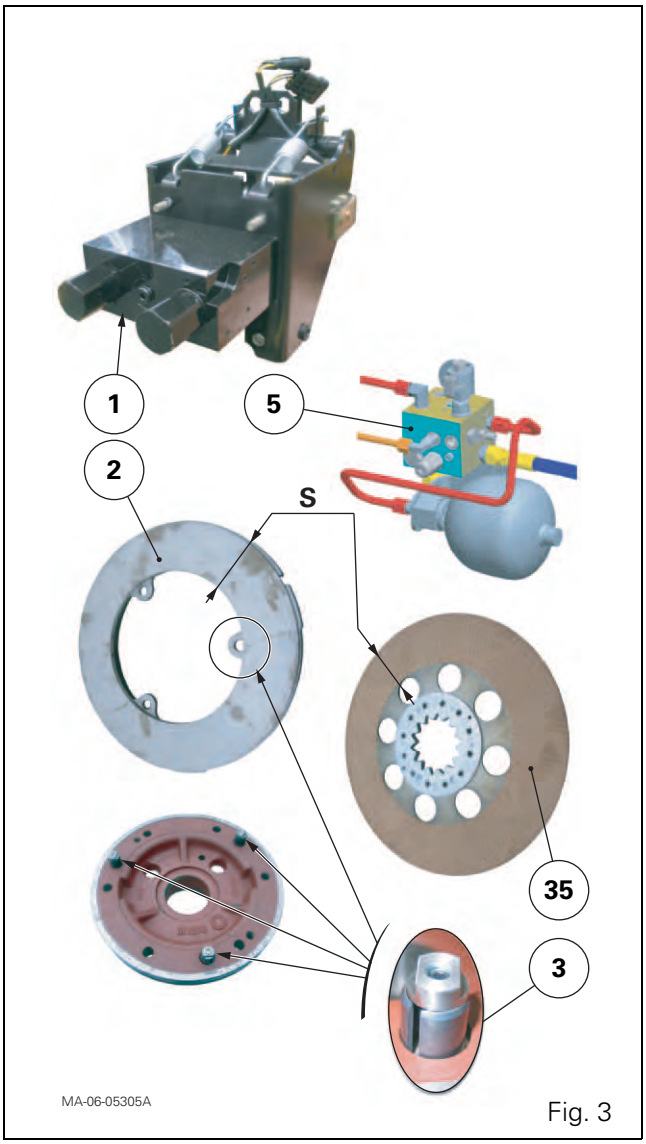


Fig. 3

Operation of the return travel limit mechanism of the brake pistons

Brakes active (Fig. 4)

When the brake pistons (2) are pressurised by the block/valves assembly (1) and the 50 kph hydraulic braking unit (5) (Fig. 3), they compress the brake discs and drive the elements (4) (1) (7) and (6) of the return travel limit mechanism. At the same time, the springs (5) compress by 0.60 to 0.65 mm depending on space E in order to fit the flat washers (6) against the differential supports.

Any wear to the brake discs (35) is automatically corrected by the "tight" sliding of the brake discs (2) on the Mecanindus pins (4).

Brakes inactive (Fig. 5)

When the brake pedal is released and the hydraulic pressure drops in the brake piston chamber (2), the springs (5) decompress to the limit of E (0.60 to 0.65 mm), thus separating the pistons (2) of the brake discs by the same value.

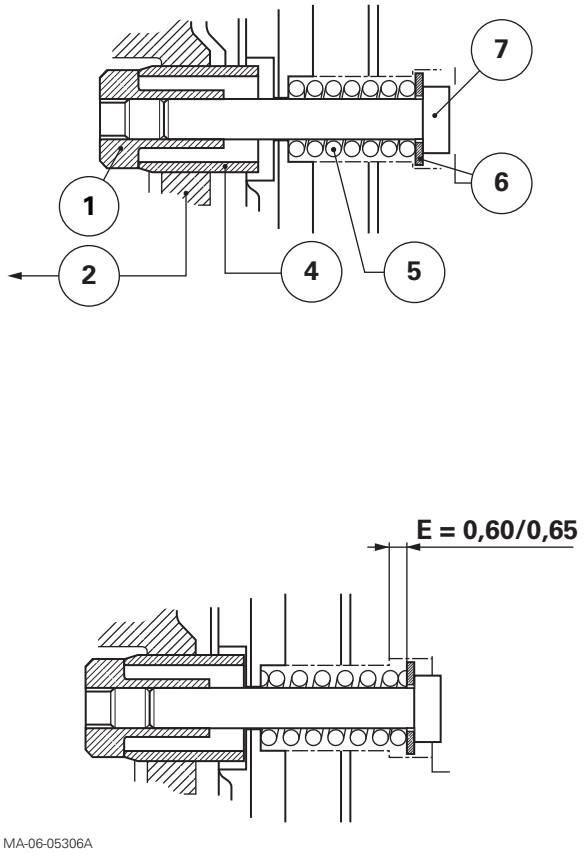


Fig. 4

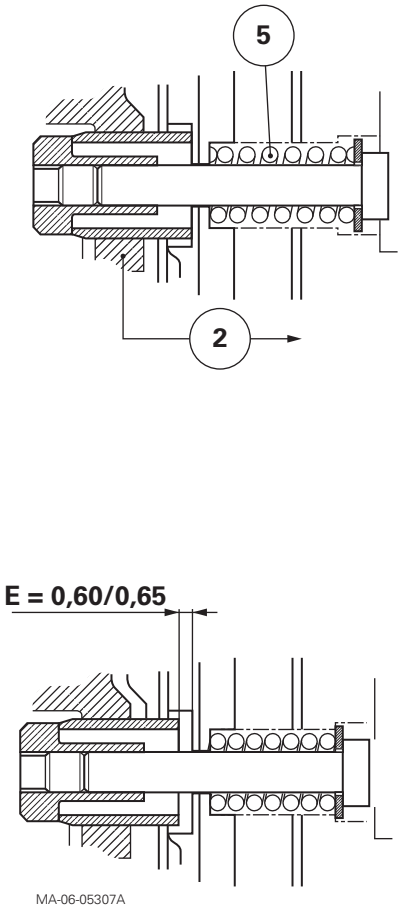


Fig. 5

Lubrication

The brake discs are cooled during use by a flow of oil coming from the lubrication system and flowing towards the hydraulic manifold (1) and port O (Fig. 6) via the right-hand hydraulic cover plate.

Oil flows between the brake discs and pistons and lubricates their braking surfaces when they are not in use.

On Normal Duty trumpet housings, the brake discs are lubricated by union R screwed directly onto each trumpet housing (Fig. 7).

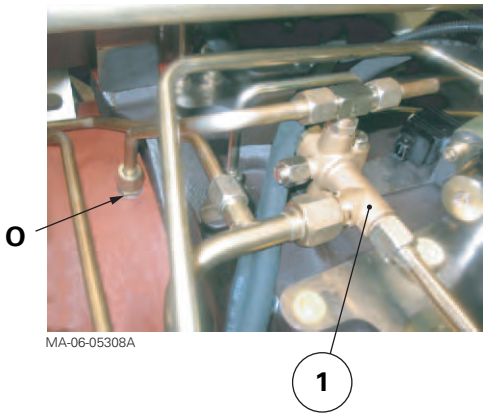


Fig. 6

Parts list (Fig. 7)

(2) Brake piston
(3) "O" ring
(4) "O" ring
(6) Stop pins
(30) Compartment or spacer (depending on type of trumpet housing)
(35) Brake disc

Legend

A Brake mechanism without compartment (the trumpet housing is thrust directly against the centre housing)

B Brake mechanism with single compartment

C Brake mechanism with sealed compartment

D Brake mechanism with spacer

J Seals
O Port for lubrication of brake discs
P Pressure emitted by the master cylinder(s) (40 kph tractors) or a block/valve assembly (1) (Fig. 3) (50 kph tractors)
R Union

View of the assembly

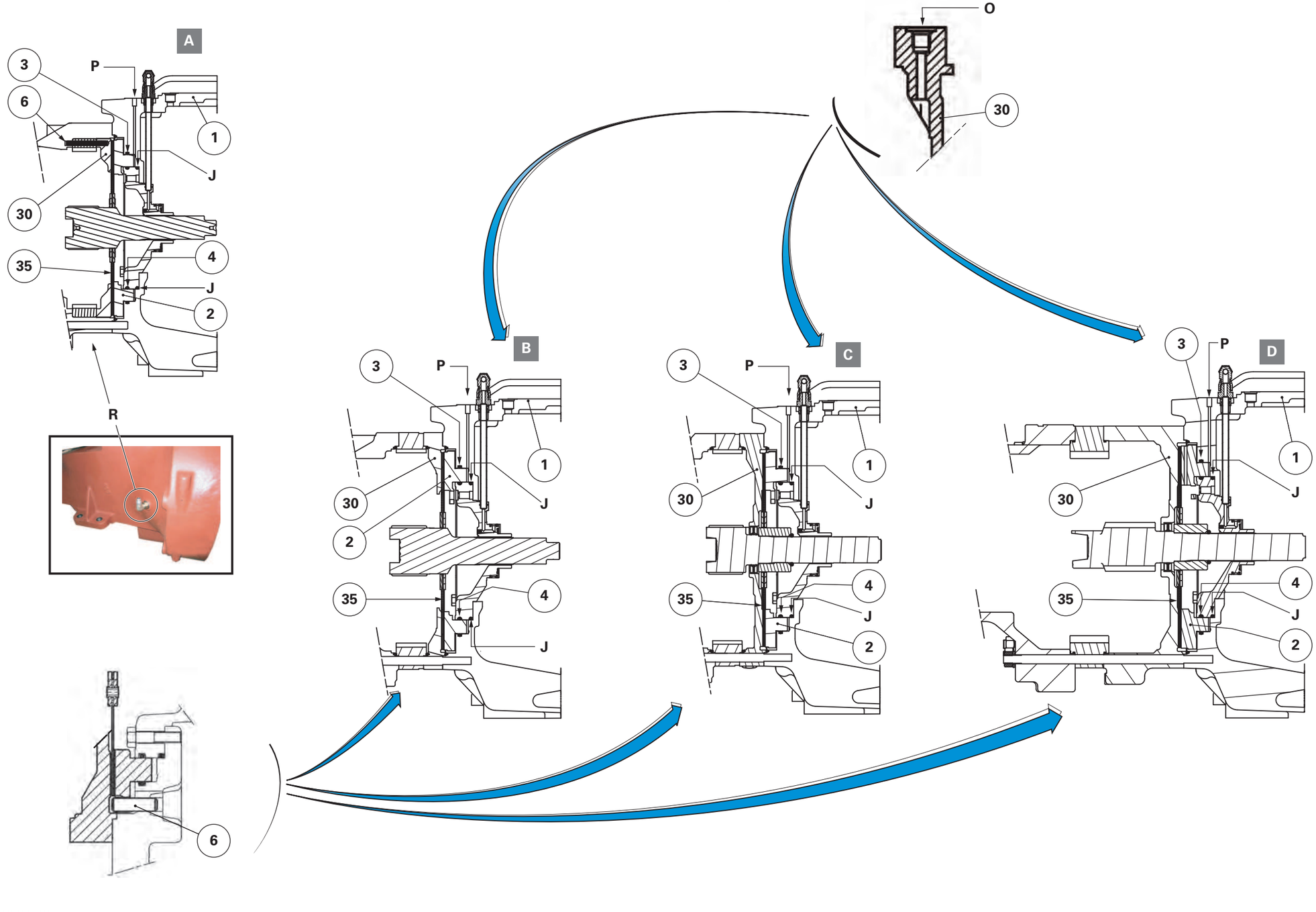


Fig. 7

Parts list (Fig. 8)

(2) Brake piston
(3) "O" ring
(4) "O" ring
(6) Stop pins
(30) Compartment or spacer (depending on type of trumpet housing)
(32) Hub (Heavy Duty sealed trumpet housing versions and trumpet housings with composite final drive)
(35) Brake disc

Legend

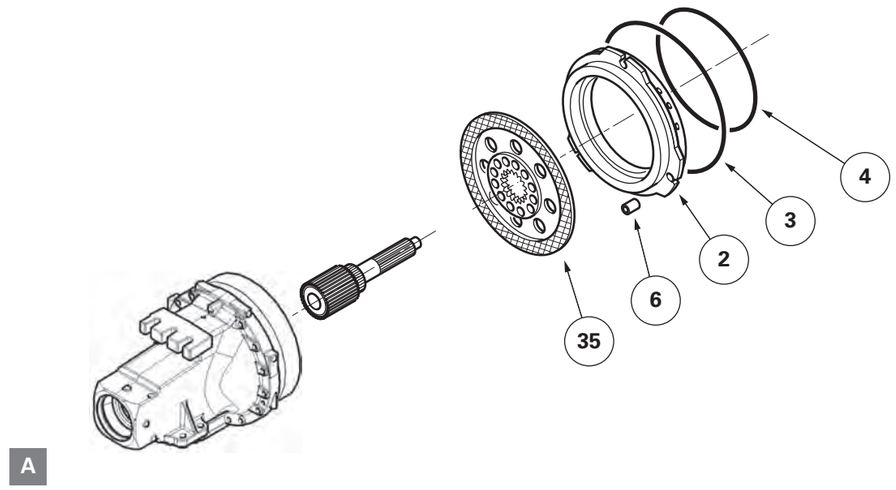
A Brake mechanism without compartment (the trumpet housing is thrust directly against the centre housing)

B Brake mechanism with single compartment

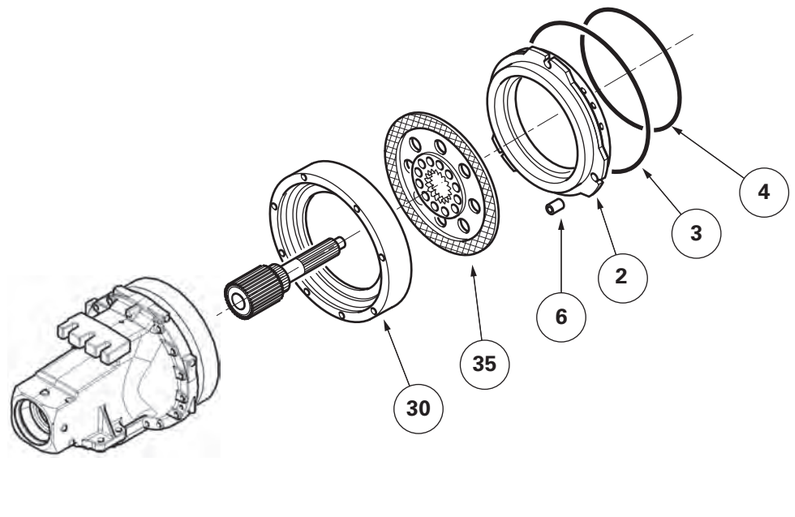
C Brake mechanism with sealed compartment

D Brake mechanism with spacer

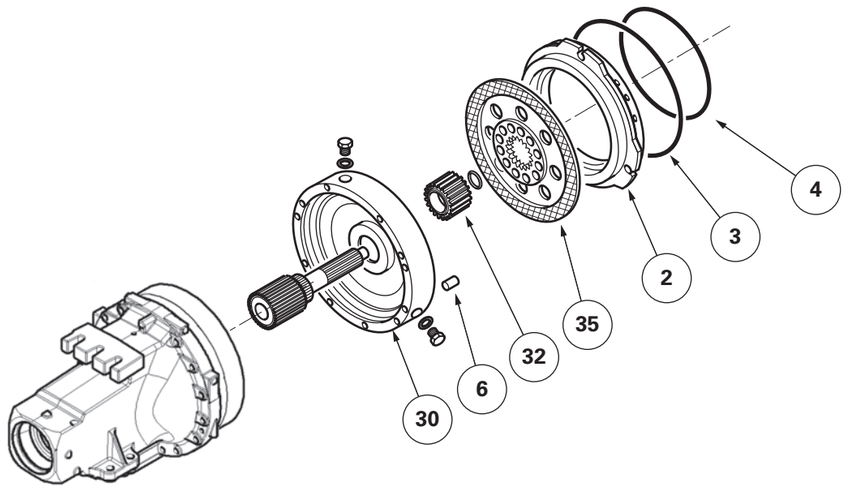
Blown-up view



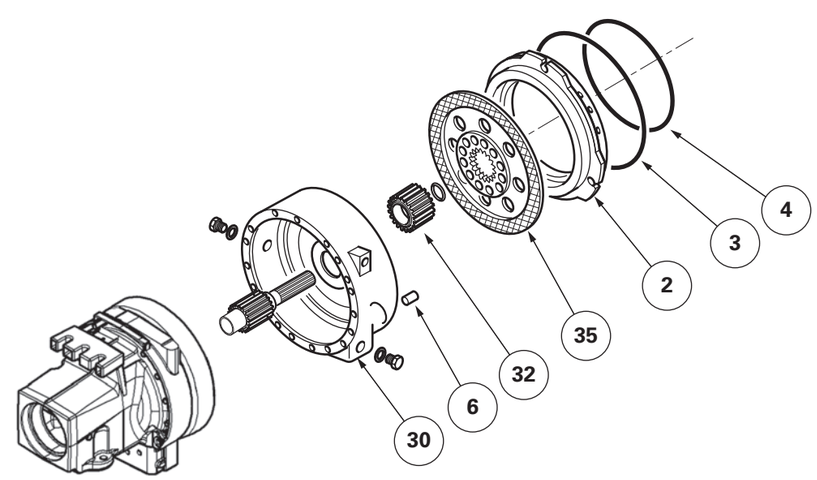
A



B



C



D

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Fig. 8

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B . Removing and refitting a brake piston

Removal

1. Remove the trumpet housing(s) (see chapter 6).
2. Disconnect the brake supply pipe (1) located above the centre housing (Fig. 9) that comes from the brake master cylinder.

   NOTE: *For tractors fitted with GTA1540 transmission (50 kph), the brake supply pipe (1) (Fig. 9) comes from the block/valves (1) fitted to the cab's front bulkhead (Fig. 3).*
3. Using a manual hydraulic pump connected to the union (3) (Fig. 9), drive out the piston (2) from the centre housing (Fig. 10).

   CAUTION: Proceed with care to avoid oil being splashed out.

   IMPORTANT 1: *Do not drive out the piston (2) using a screwdriver as a lever on the rim of the centre housing marked with an arrow (Fig. 10) (risk of breaking the centre housing).*

   IMPORTANT 2: *For tractors fitted with GTA1540 transmission (50 kph), monitor the piston as it exits its return travel limit mechanism (3) (Fig. 10).*
4. Remove the "O" rings (3) (4) fitted respectively on the centre housing and the differential support (Fig. 11).

   NOTE: *"O" rings J (Fig. 12), located between the differential supports and the centre housing (Fig. 7), seal the brake piston chambers. If seal(s) is/are to be replaced, remove the differential support(s) (see chapter 6).*

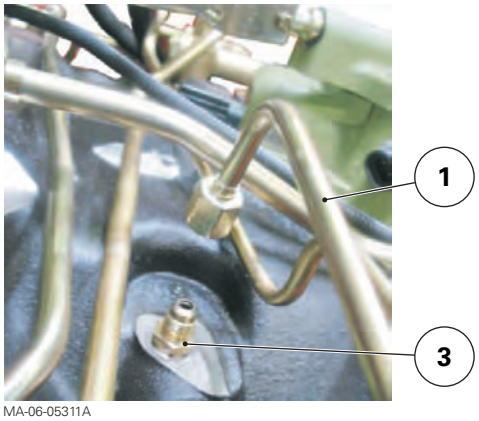

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Fig. 9

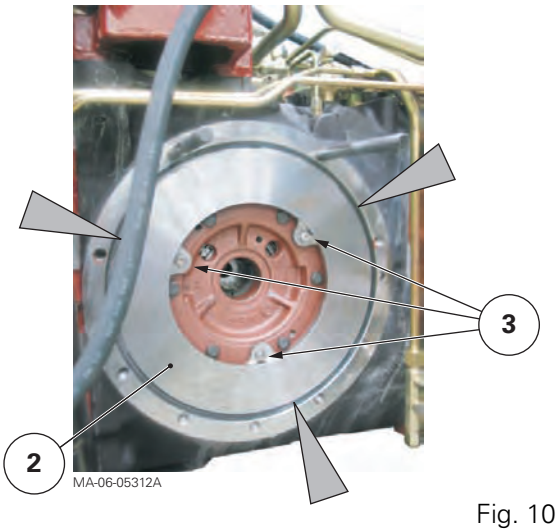

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Fig. 10

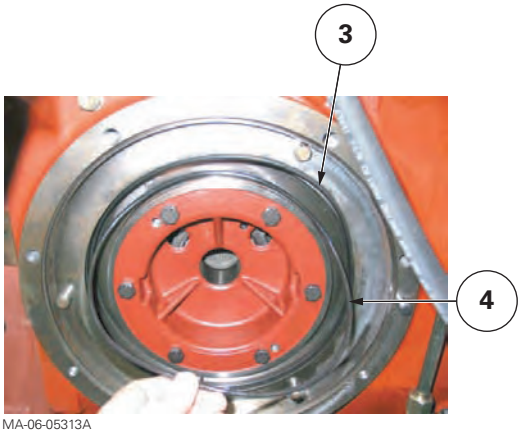

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Fig. 11

Refitting

5. Clean and check all components. Replace those that are defective.

IMPORTANT: *In particular, check the wear on the brake plate, the sealed compartment or the spacer (depending on type of trumpet housing).*

6. If removed, refit the differential support(s) fitted with a new "O" ring J (see chapter 6).

7. Before the final refitting of the piston (2), test fit the piston in the centre housing, temporarily excluding the "O" rings (3) (4). This temporary fitting allows you to check that the piston can move freely in its bore and on its stop pins. During fitting, any friction points must be eliminated and problem parts must be identified.

8. Remove all impurities from the piston chamber.

Definitively refit the piston, but only after a satisfactory test fitting has been carried out.

9. Lubricate the new "O" rings (3) (4) with clean transmission oil. Fit them into their respective grooves (Fig. 13) (centre housing and differential support).

10. If possible, turn the brake piston so that the majority of the lubricating ports around its rim are facing upwards (depending on piston type).

11. Fit the piston into the centre housing by aligning its pin housings with the stop pins (6).

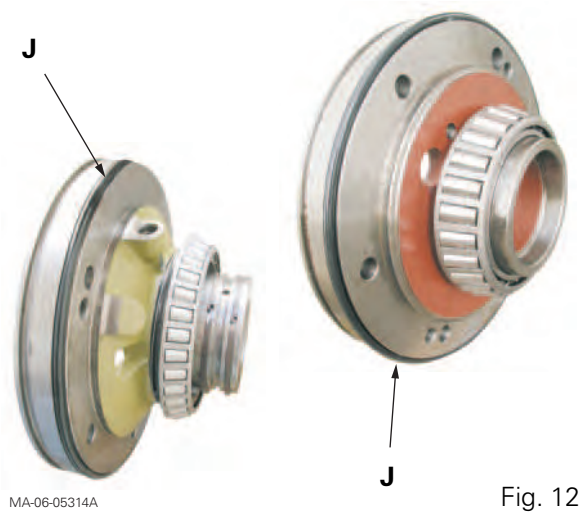


Fig. 12

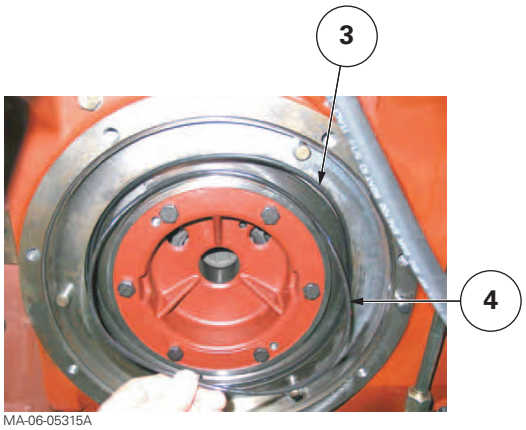


Fig. 13

12. Fit the piston (2) using a makeshift tool (see § D) and two screws V of suitable length. These two screws are tightened gradually and alternately during the fitting process (Fig. 14).

IMPORTANT: *For tractors fitted with GTA1540 transmission (50 kph), carefully monitor the fitting of the piston inside its return travel limit mechanism (3) (Fig. 10). If necessary, fit by gently tapping with a plastic hammer in diametrically opposed positions around the piston rim.*

The return travel limit mechanism (3) means you have to push the brake pistons right back to the bottom of their cavity (pushing the brake pistons is made easier by gently unscrewing the centre housing and the bleed valves or pipes coming from the block/valve assembly). In this way, the mechanism (3) can once again return the brake pistons correctly if one or more of the following components has been replaced:

- *brake discs;*
- *brake plates, compartment (single or sealed) or spacer (depending on the type of trumpet housing);*
- *brake pistons and/or "O" rings (3) (4).*

13. Remove the tool.

14. Check that there are no seal fragments on the piston circumference.

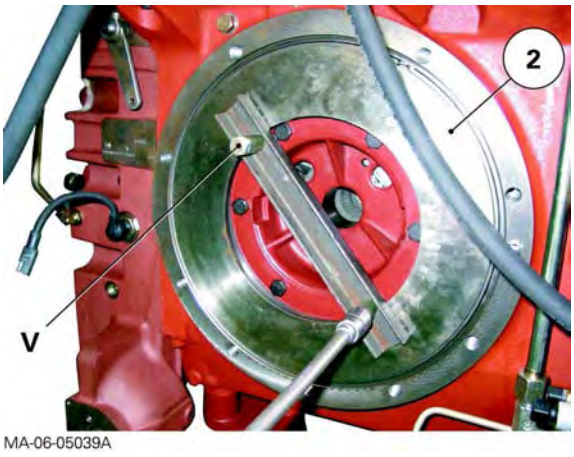


Fig. 14

Brake piston leak test

The brake piston leak test can only be carried out correctly if the pressure gauge and compressed air supply line are completely sealed.

NOTE: *Fig. 15 shows a simplified pressure gauge design. Other more complex pressure gauges can also be used.*

15. Fit the tool used for step 12 (see § D) to retain the piston (2) against the centre housing (Fig. 15).

16. Connect the pressure gauge to the union (3) (Fig. 15).

17. Supply the brake piston with compressed air at approximately 3 bar to position the seals (3) (4) in their respective groove.

18. Close the valve.

Disconnect the compressed air source.

Open the valve.

19. Supply the system again at approximately 0.3-0.4 bar to test the tightness of the seals (3) (4).

20. Close the valve.

21. Check that the pressure gauge needle remains still for approximately one minute.

22. Shut the compressed air inlet when the test proves satisfactory.

23. Remove:

- the pressure gauge;
- the piston retaining tool.

24. Reconnect the brake supply pipe.

25. Refit the trumpet housing(s) (see chapter 6).

26. Thoroughly bleed the brake system (see chapter 9).

27. Road test the main brakes.

28. Check tightness of:

- the trumpet housing seals;
- the unions and the pipes (brake supply and lubrication pipes).

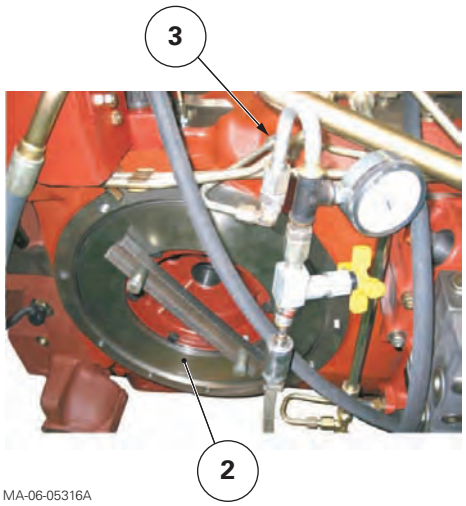


Fig. 15

C . Disassembling, reassembling and adjusting the return travel limit mechanism of the brake piston on 50 kph tractors

On tractors fitted with GTA1540 transmission (50 kph), each brake piston (2) is assisted by a return travel limit mechanism. This mechanism, which comprises three assemblies (3) (Fig. 16), allows:

- the piston to release itself from the brake disc by approx. 0.7 mm when the brakes are inactive;
- the "drag" effect to be minimised.

The three assemblies (3) occupy an equidistant position on each differential support S (Fig. 16).

An assembly comprises (Fig. 16):

- an M6 x 40 screw (7);
- a flat washer (6);
- a spring (5);
- a Mecanindus pin (4);
- a shouldered nut with flat sections (1);
- a locking screw (8).

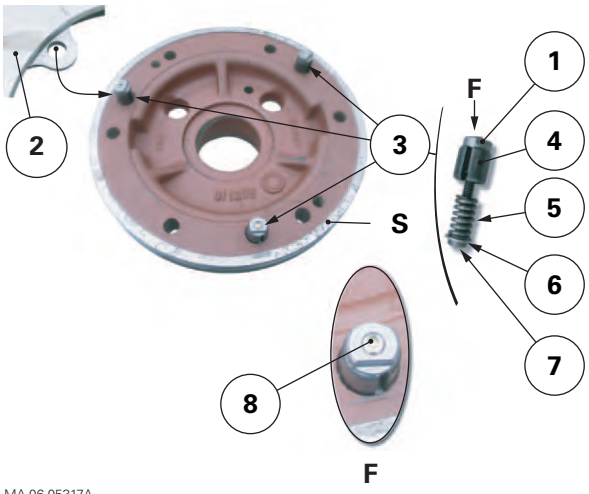


Fig. 16

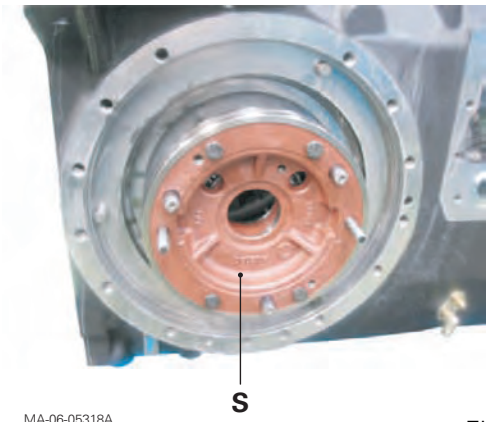


Fig. 17

Disassembly

The differential support(s) must be removed in order to disassemble the brake piston's return travel limit mechanism.

29. Remove:
- the brake piston(s) (2) (see § B);
- differential support(s) S (Fig. 17) (see chapter 6).

30. Place the differential support(s) on a workbench.

31. On faces F and F1 of differential support(s) S, remove an assembly (3) including (Fig. 18):
- the locking screw (8);
- the shouldered nut with flat sections (1) (support the M6 screw (7));
- the Mecanindus pin (4);
- the M6 screw (7);
- the flat washer (6);
- the spring (5).

Repeat step 31 for the other two assemblies (3).

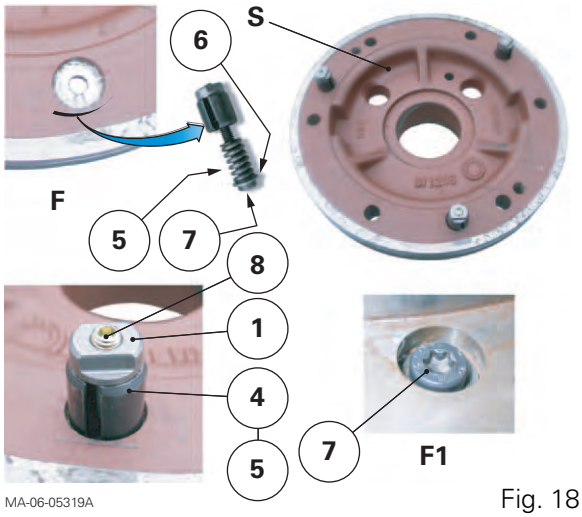


Fig. 18

Reassembly

32. Clean and check all components. Replace those that are defective.

33. On faces F and F1 (Fig. 18) of differential support(s) S, refit (Fig. 19):
- the M6 screw (7);
- the flat washer (6);
- the spring (5);
- the Mecanindus pin (4);
- the shouldered nut with flat sections (1), with its thread lightly smeared with Loctite 243 or equivalent.

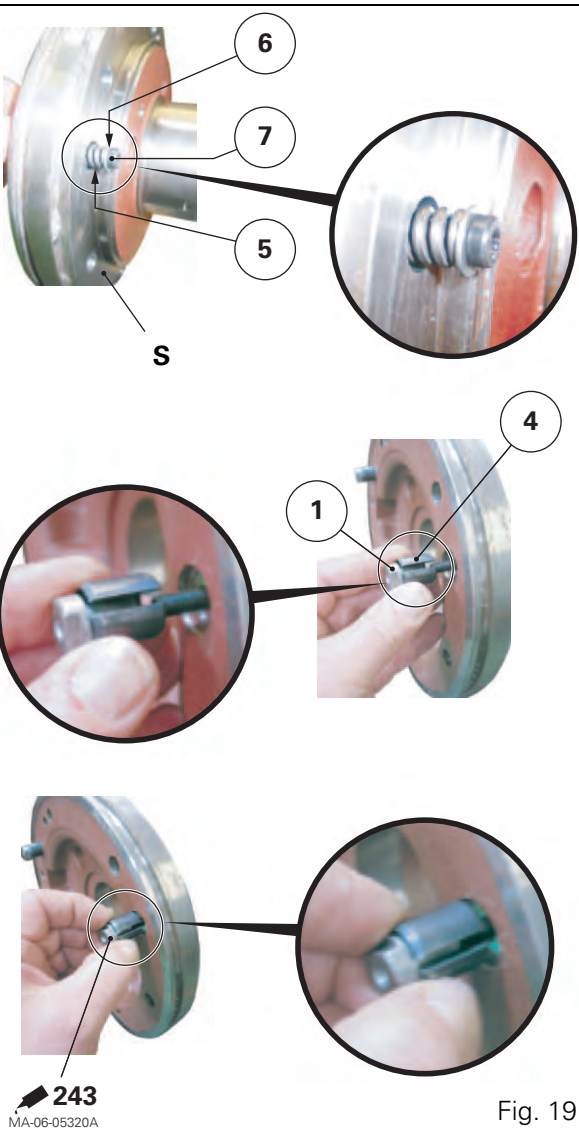


Fig. 19

Settings

34. Adjust each assembly (3) of the brake piston's return travel limit mechanism (Fig. 20), proceeding as follows for each assembly (Fig. 20):

- Tighten the shouldered nut (1) with flat sections (M6, 100 pitch) to a torque of approximately 1 Nm (spring coils almost joined).
- Slacken off this nut between approximately half and three quarters of a turn: this corresponds to an anti-clockwise rotation of 216° to 234° or 60% to 65% of a turn.

NOTE: *By adjusting each assembly (3) of the return travel limit mechanism in this way, a gap E of approx. 0.60 to 0.65 mm is achieved between the piston (2) and the brake disc (35) (Fig. 21) when the main brake is inactive.*

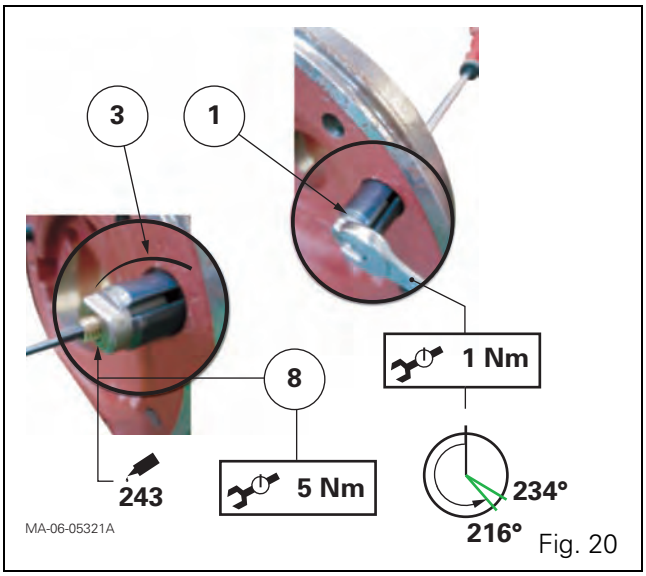


Fig. 20

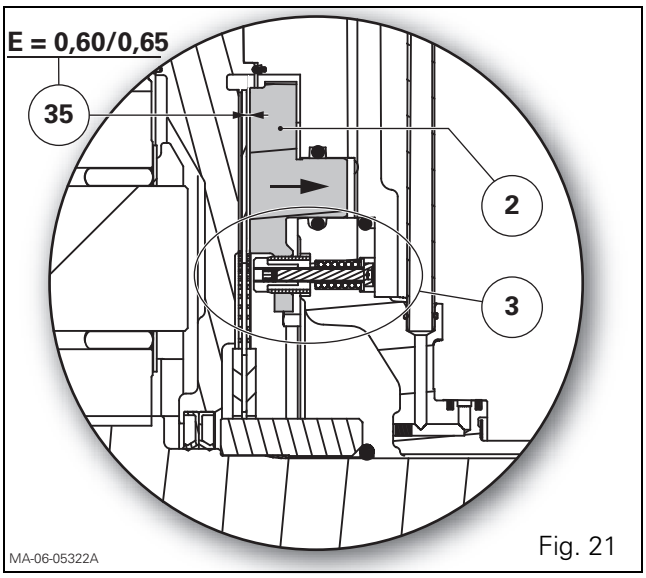


Fig. 21

D . Service tools

Makeshift tool

- Brake piston fitting and retaining tool (Fig. 22)
  a: protection zone (rubber or plastic protection fitted)

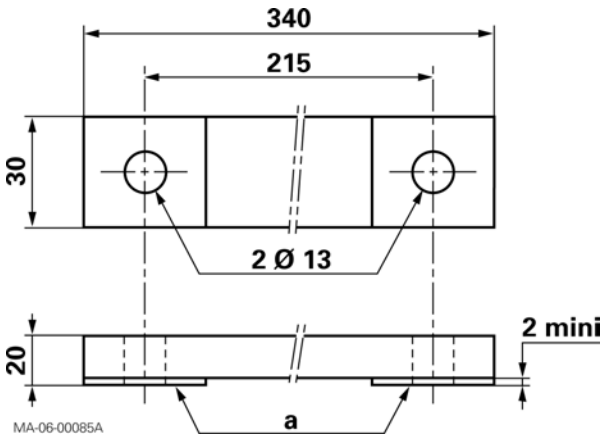


Fig. 22

6B15 - GPA40 - Pinion

CONTENTS

GPA40 - Pinion

A . General

Construction

The crownwheel and pinion, driven by the gearbox output shaft, drives the rear axle.

The helical pinion is supported by two tapered roller bearings fitted opposite one another.

The bearing cone (7) is force fitted onto the pinion. The bearing cup (2) is fitted tightly into the cover plate (13). The bearing cup (10) is fitted tightly into the hand brake unit.

The bearing cone (1), freely mounted on the pinion, allows the fitting of shims (3) required for shimming. The pinion supports the 4WD drive gear (17). Its position can be adjusted using the shim(s) (12) fitted between the centre housing compartment and the hand brake unit (15). The preload on the tapered roller bearings is obtained using the shim(s) (3) fitted between the bearing cone (1) and the thrust washer (4).

On tractors fitted with GTA1040 transmission, the pinion fitting and adjusting principle is the same for the three current types of differential:

- 5" hydromechanical differential (see chapter 6);
- 5" multidisc differential (see chapter 6);
- 7" multidisc differential (see chapter 6).

On tractors fitted with GTA1540 transmission, the pinion fitting and adjusting principle is the same for the two current types of differential:

- 5" multidisc differential (see chapter 6);
- 7" multidisc differential (see chapter 6).

Lubrication

The oil is directed via a pipe to the axial channel and the radial holes of the pinion to lubricate the hand brake mechanism and the tapered roller bearings. The pipe is connected to the hydraulic manifold located above the centre housing.

GPA40 - Pinion

Parts lists (Fig. 1, Fig. 2)

(1) Bearing cone
(2) Bearing cup
(3) Shim(s)
(4) Thrust washer
(5) Allen screws
(6) Hand brake mechanism
(7) Bearing cone
(8) Allen screw
(9) Pinion
(10) Bearing cup
(11) Washer
(12) Shim(s)
(13) Hand brake unit cover plate
(14) Locating pin
(15) Hand brake unit
(17) 4WD drive gear
(18) Nut
(45) Centre housing
(62) Lubrication pipe

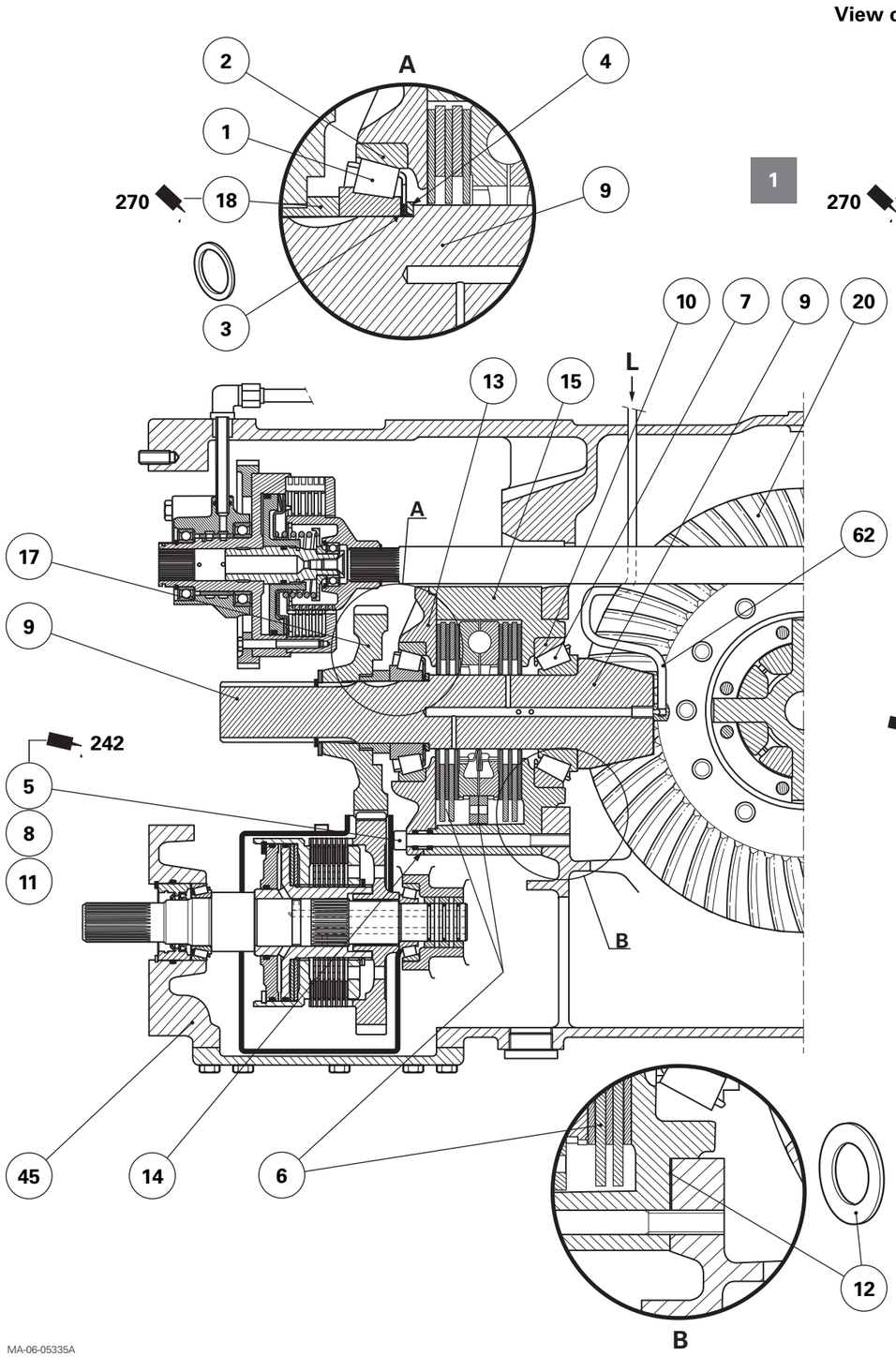
Legend

1 GTA1040 transmission

2 GTA1540 transmission

A Details
B Details
L Lubrication

View of the assembly



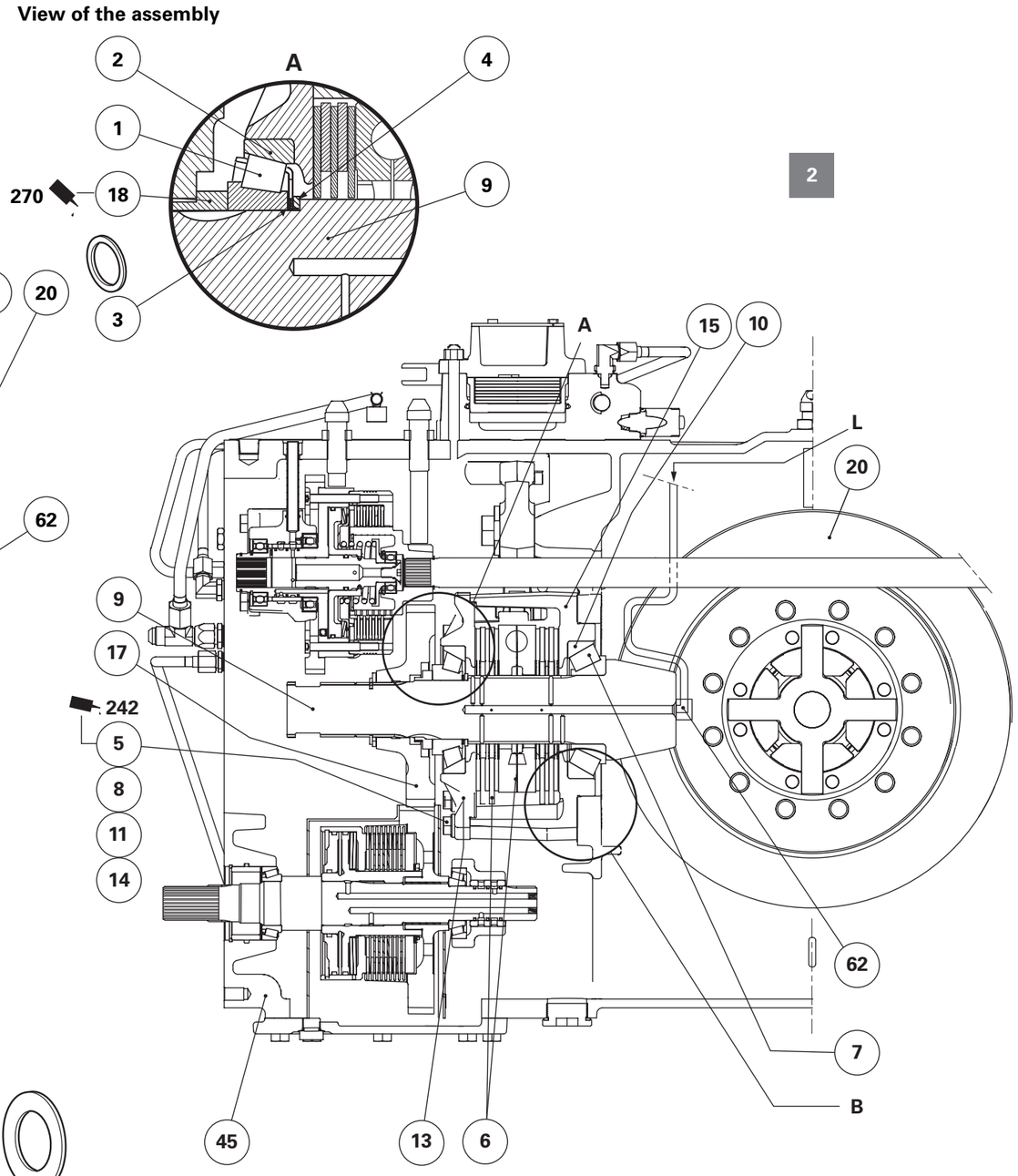


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Fig. 1

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Blown-up view

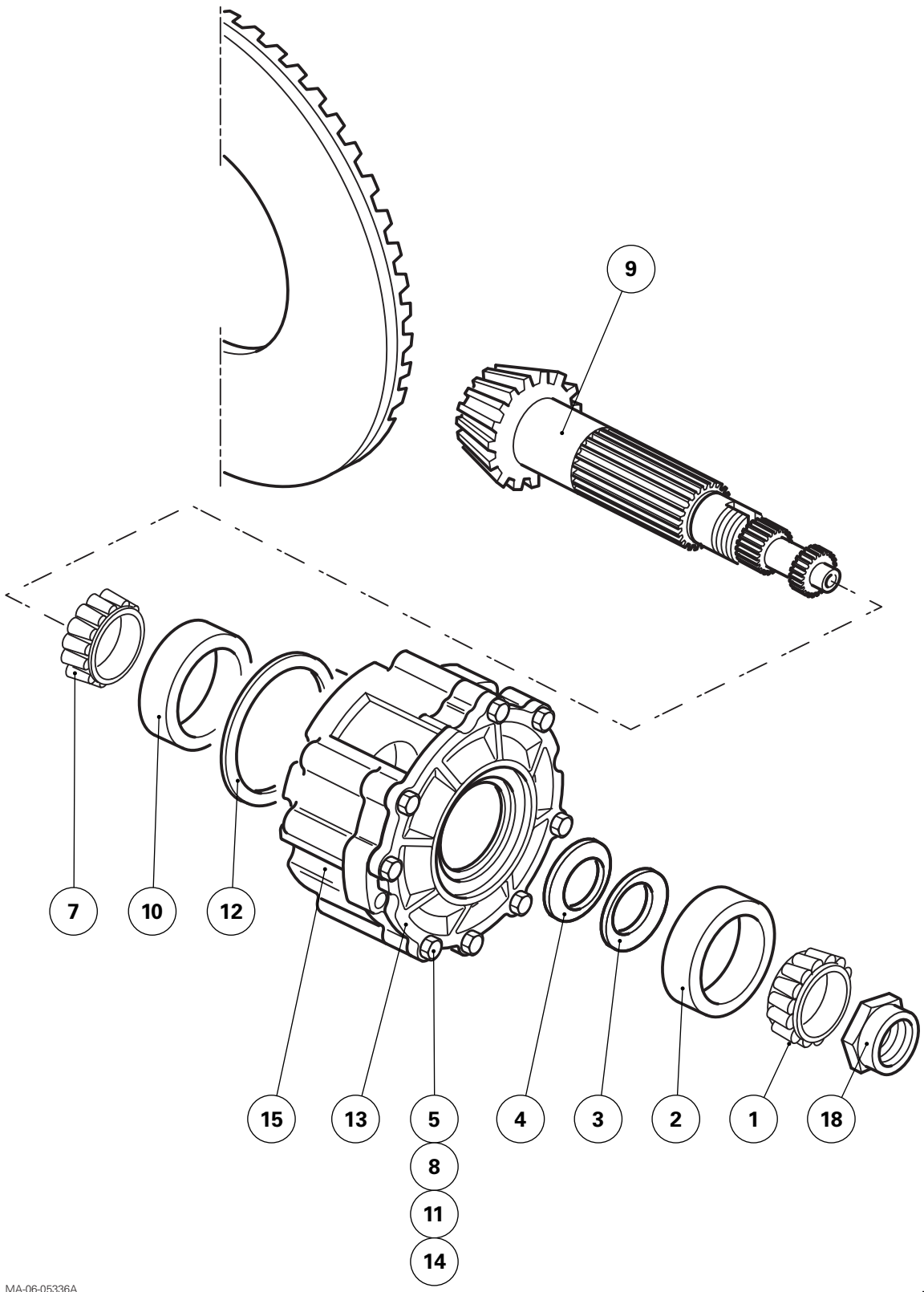

Fig. 2

B . Removing and refitting the pinion/hand brake unit assembly, and removing and refitting the pinion

Preliminary steps

1. Disconnect the tractor between the gearbox and the rear axle (see chapter 2).
2. Remove the right-hand hydraulic cover plate (LS 110 l/min hydraulics, see chapter 9).
3. Remove the left-hand hydraulic cover plate (LS 110 l/min hydraulics, see chapter 9).
4. Remove the rear power take-off clutch (see chapter 7).
5. Remove the 4WD shaft and its clutch (Fig. 5) (see chapter 8):

   1 GTA1040 transmission

   2 GTA1540 transmission
6. Remove the creeper unit control mechanism (if fitted) (see chapter 5).
7. Remove the circlip (5) and the thrust washer (2) (Fig. 5). Visually note the position of the shim(s) (6) and remove it/them (Fig. 5). Remove the 4WD gear (17), sliding it along the pinion (Fig. 5).

Removing the pinion/hand brake unit assembly

The pinion/hand brake unit assembly must be removed in order to work efficiently on the pinion.

8. Loosen and immobilise the nut (18) using wrench ref. 3378118M1 (Fig. 3 and § D).
9. Using special socket ref. 3378119M1 (Fig. 3 and § D), turn the pinion clockwise to unlock the nut without unscrewing it completely.

   NOTE: *The nut is not removed completely until the hand brake unit is on the workbench for stripping.*
10. Unscrew the eight M12 hexagonal head screws (8). Remove their washers (11) (Fig. 4).
11. Unscrew the M20 screw (1) from the hand brake actuator lever (Fig. 4).
12. Unscrew the two M12 Allen screws (5) that attach the hand brake unit (15) to the centre housing compartment (Fig. 4).

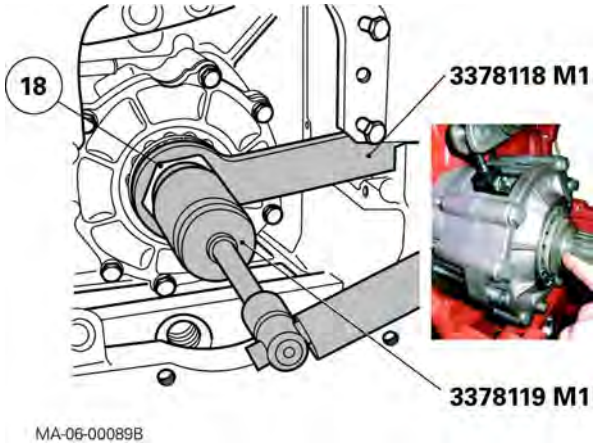

Fig. 3

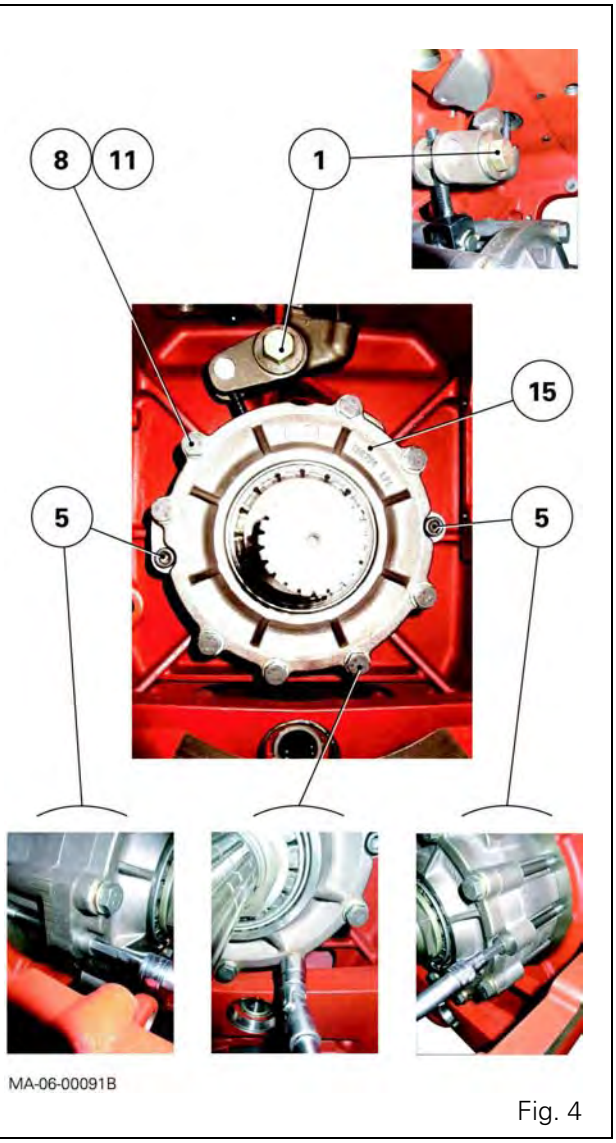

Fig. 4

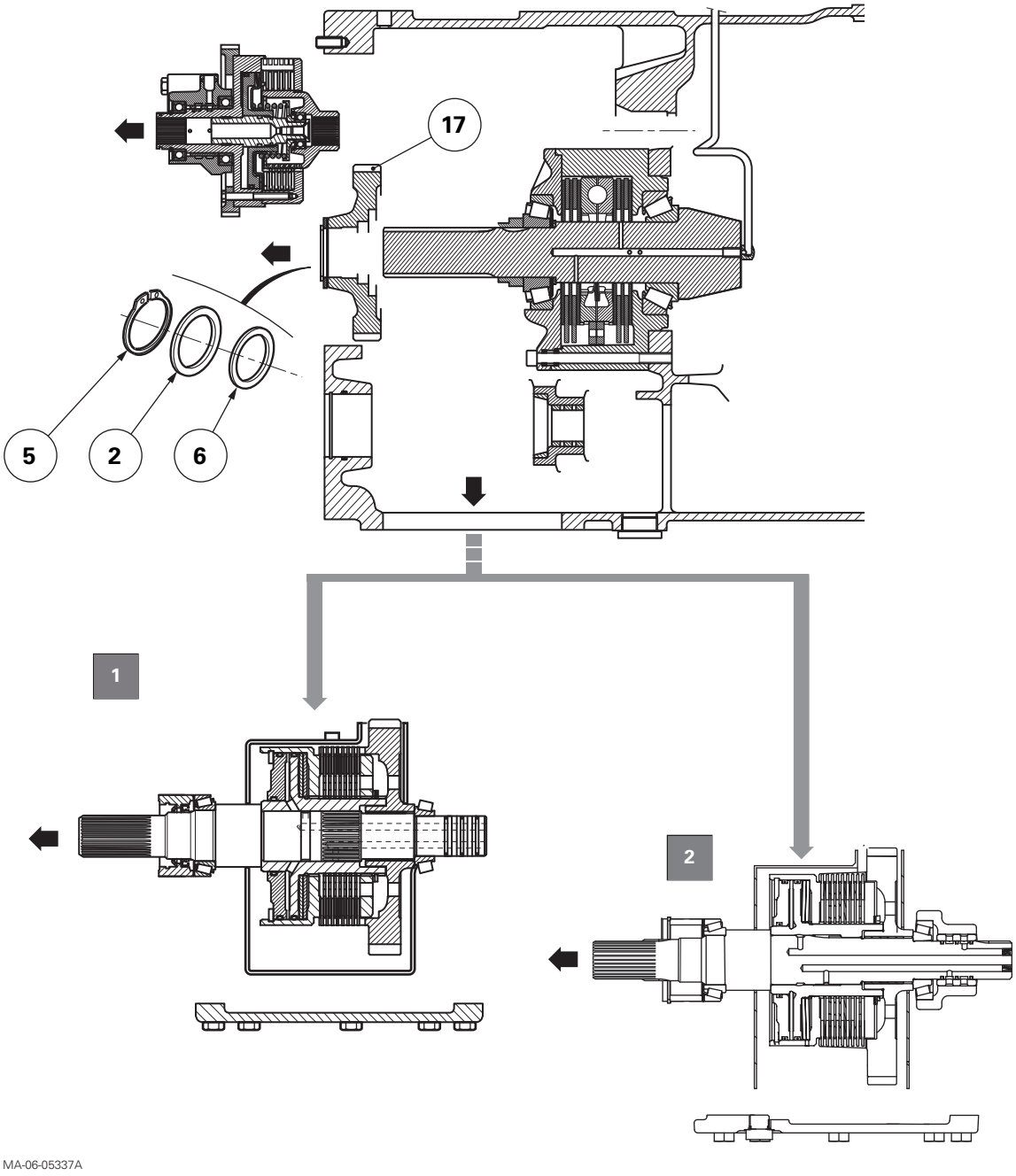

Fig. 5

13. Slide tool ref. 3378465 M1 onto the pinion splines (Fig. 6 and § D).
Moderately tighten the tool's three screws V in groove R of the pinion (Fig. 6).

14. Sling the tool using a makeshift handling bar and a suitable lifting device (Fig. 6, Fig. 7).

15. Carefully pull the pinion/hand brake unit assembly forwards and release it from the centre housing (Fig. 7).

16. Recover the shims (12) (internal diameter approx. 175 mm) on the hand brake unit assembly.
NOTE: *The shims inserted between the hand brake unit and the centre housing compartment are used for adjusting the taper distance.*

17. Separate the sling and tool from the pinion/hand brake unit assembly.

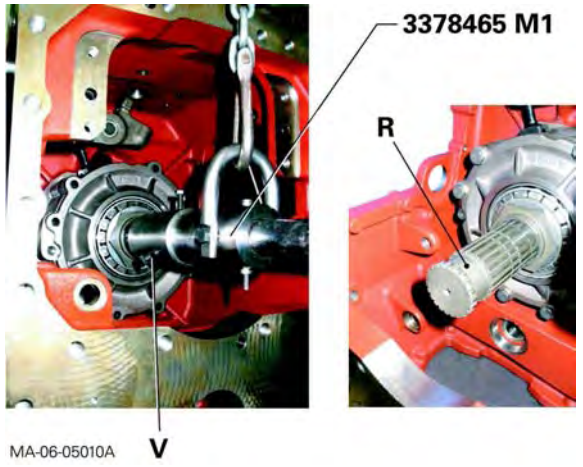

Fig. 6

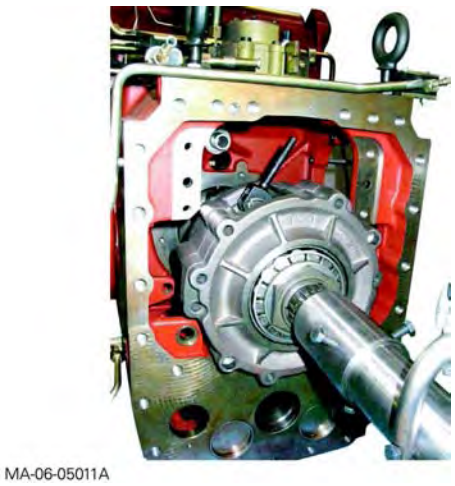

Fig. 7

Disassembling the pinion

18. Place the pinion/hand brake unit assembly vertically on the workbench.

19. Completely unscrew the nut (18) and discard it (Fig. 8).

20. Remove:
- the tapered roller bearing cone (1);
- the shim(s) (3);
- the thrust washer (4), marking its position.

21. Remove the cover plate (13) and the hand brake mechanism (6) (Fig. 8).

22. Remove the pinion, separating it from the hand brake unit (15).

23. If necessary, extract the tapered roller bearing cone (7) from the pinion.

Remove:
- the bearing cup (2) from the cover plate (13)
- the locating pin (14) from the hand brake unit (15).

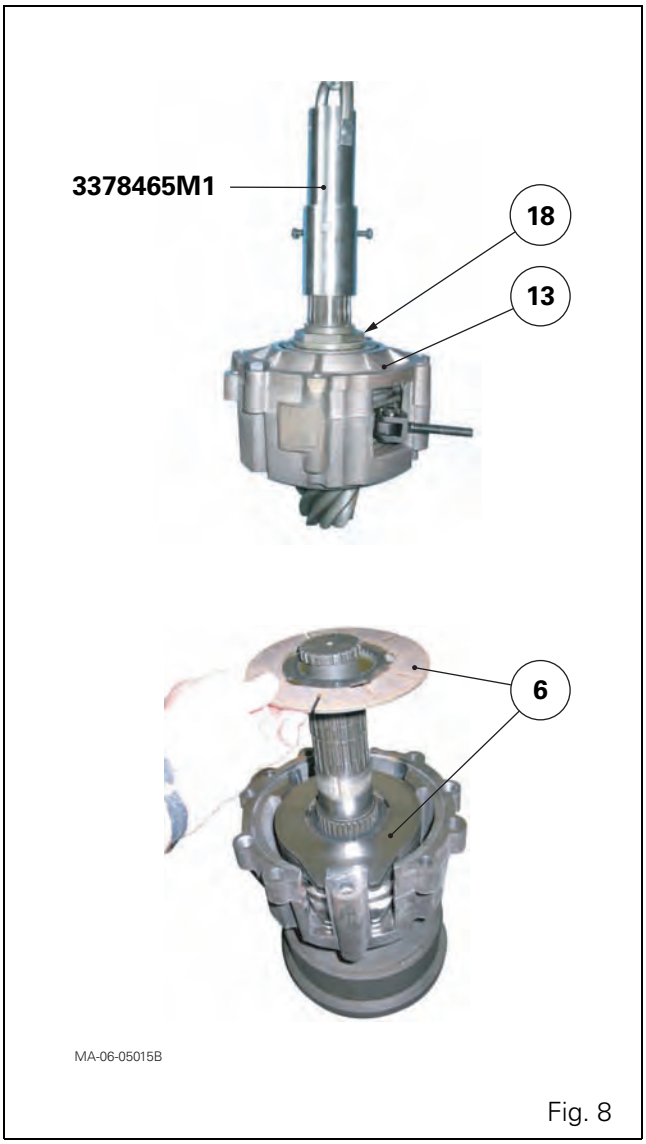

Fig. 8

Reassembling the pinion

The shimming with preload on the pinion's tapered roller bearings and the adjustment of the pinion/hand brake unit assembly position (see § C) must be checked after one or more of the following parts are replaced:
- the centre housing;
- the pinion

IMPORTANT: *If the pinion has to be replaced, refer to chapter 6 for details on refitting the new ring gear/differential assembly;*
- the head bearing (tapered bearing cone (7) and the cup (10));
- the hand brake unit (15);
- the unit cover plate (13);
- the end bearing (tapered bearing cone (1) and cup (2)).

24. Clean and check all components. Replace those that are defective.

25. If disassembled, use a press and a suitable fixture to fit the tapered roller bearing cone (7) against the pinion shoulder. Fit the tapered roller bearing cone (10) against the shoulder of the hand brake unit.

26. Check that the elements are properly supported by their respective bases.

27. Place the hand brake unit (15) vertically on the workbench, having fitted the pinion beforehand.

28. Reassemble the hand brake mechanism inside the unit (15) (see chapter 6).

29. Fit the tapered roller bearing cup (2) against the cover plate shoulder (13).

30. Fit the cover plate (13) after checking that the locating pin (14) is present.

31. On the pinion, slide the thrust washer (4) against shoulder E (Fig. 9) together with the shim(s) (3) used to preload the tapered roller bearings.

IMPORTANT: *The shim(s) (3) required for shimming by preloading the tapered roller bearings (1) (2) and (7) (10) must be inserted between the thrust washer (4) and the tapered roller bearing cone (1).*

32. Fit the tapered roller bearing cone (1) after lubricating the cone with clean transmission oil. Tighten the new nut (18) without locking it.

IMPORTANT 1: *If necessary, carry out the shimming with preload on the pinion tapered roller bearings and the adjustment of the position of the pinion/hand brake unit assembly (see § C).*

IMPORTANT 2: *The new nut (18) will be definitively locked when the pinion/hand brake unit assembly (15) is refitted to the centre housing.*

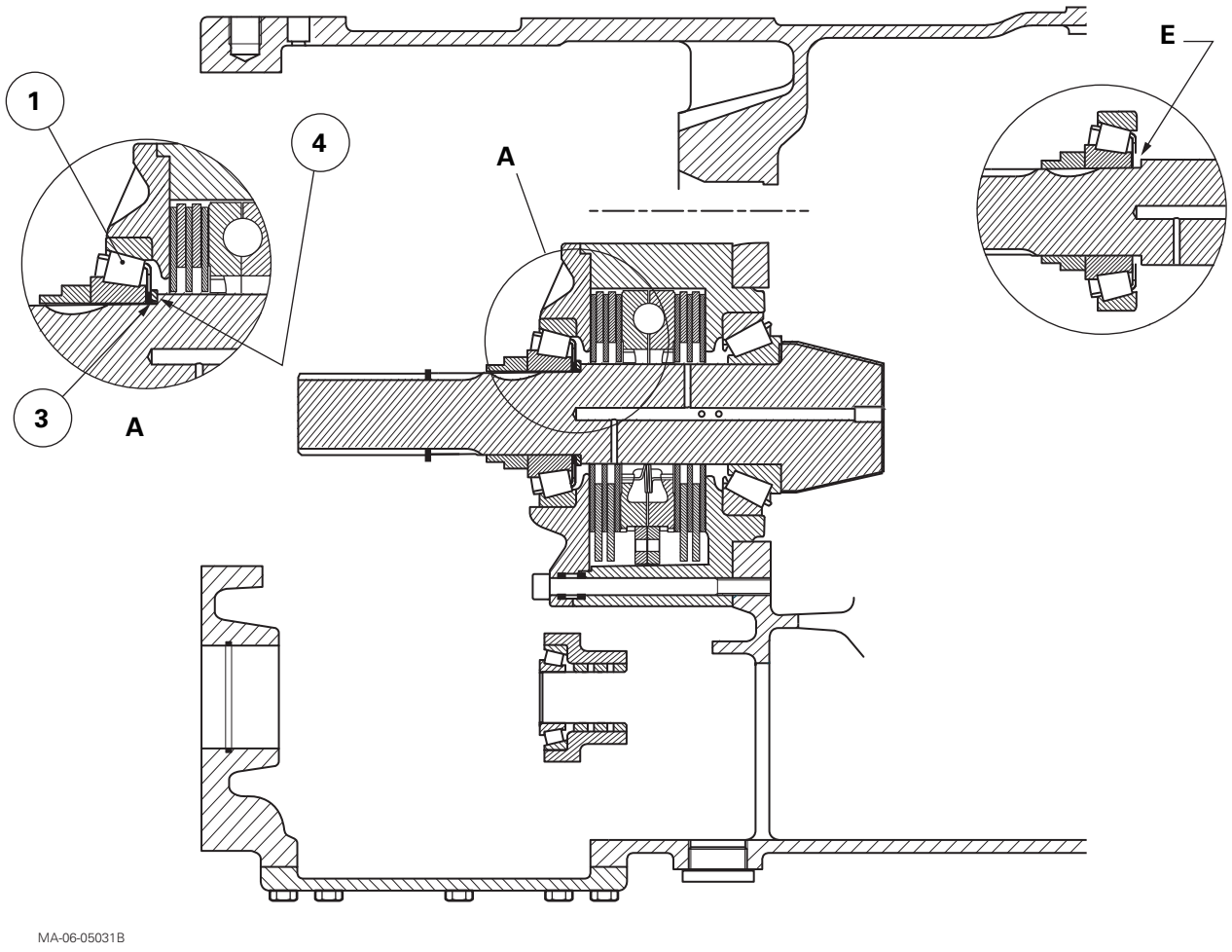

Fig. 9

Refitting the pinion/hand brake unit assembly

33. Clean and check all components. Replace those that are defective.

34. Position the shim(s) (12) on the fitting area of the hand brake unit (15).

35. Using tool ref. 3378465M1 (see § D), refit the pinion/hand brake unit assembly against face F of the centre housing compartment (Fig. 10). During the refitting process, refit the hand brake actuator lever at the same time (see Fig. 4 and chapter 6).

36. Press the hand brake unit towards the centre housing compartment, in preparation for fitting.

37. Align the three fixing holes on the hand brake unit with the compartment holes by screwing a guide stud into a tapped hole located at the top of the centre housing.

38. Clean the thread of the screws (5) (8) and lightly smear with Loctite 242 or equivalent.

39. Screw in the Allen screws (5).

40. Screw in the hexagonal head screws (8) fitted with their washers (11) while removing the guide stud at the same time.

41. Tighten the diametrically opposed screws (5) (8) (Fig. 11) uniformly and step-by-step to a tightening torque of 100-130 Nm.

NOTE: *This tightening method ensures that the hand brake unit (15) is fitted gradually and smoothly into the centre housing compartment and that the shim(s) (12) are applied appropriately.*

42. Adjust the hand brake mechanism (see chapter 6).

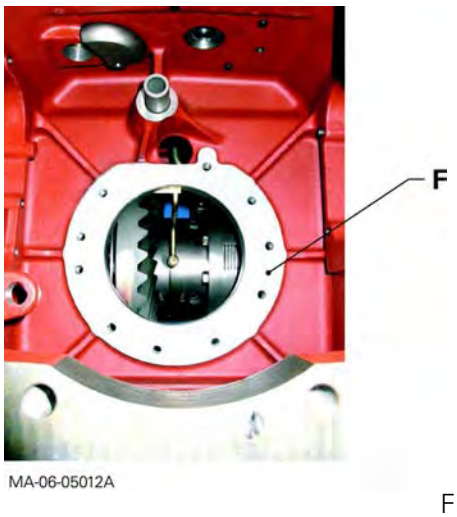

Fig. 10

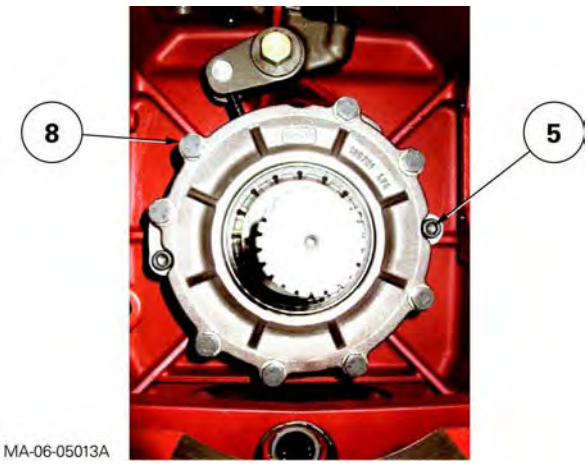

Fig. 11

Final steps

43. Degrease the threads of the new nut (18) and the pinion.

44. Lightly smear the thread of the nut with Loctite 270 or equivalent.

Lock the nut with wrench ref. 3378118 M1 (Fig. 12).

Using socket ref. 3378119 M1, turn the pinion anti-clockwise to a tightening torque of 200-250 Nm (Fig. 12).

IMPORTANT: *Ensure that the torque wrench is properly positioned in order to obtain the correct tightening torque for the nut.*

45. Remove tools.

46. Using a suitable punch, lock the nut by bending its collar, without breaking it, into the three pinion grooves.

47. Slide the 4WD gear (17) over the pinion splines.

Fit the following, observing the correct fitting order (Fig. 5):

- the shim(s) (6) then
- the thrust washer (2) then
- the circlip (5).

Check the axial clearance of the 4WD gear (17): it should be between 0 and 0.55 mm.

NOTE: *As far as possible, shim to the minimum tolerance.*

48. Refit the left-hand hydraulic cover plate (LS 110 l/min equipment, see chapter 9).

49. Refit the right-hand hydraulic cover plate (LS 110 l/min equipment, see chapter 9).

50. Refit the creeper unit control mechanism (if fitted) (see chapter 5).

51. Refit the 4WD clutch and its shaft (Fig. 5) (see chapter 8).

52. Refit the power take-off clutch (see chapter 7).

53. Reconnect the tractor between the gearbox and the rear axle (see chapter 2).

54. Carry out a road test.

55. Check tightness of:

- Mating faces;
- Hydraulic unions

Fig. 12

C . Shimming the pinion and adjusting the position of the pinion/hand brake unit assembly

Preparing for shimming

56. Fit the tapered roller bearing cone (7) (if removed) against the pinion shoulder using a press and a suitable fixture.

57. Fit:
- the tapered roller bearing cup (10) against the shoulder of the hand brake unit (15);
- the tapered roller bearing cup (2) against the cover plate shoulder (13).

58. Firmly tighten tool ref. 3378464M1 in a vice (Fig. 13).

IMPORTANT: *The pinion's tapered roller bearings are shimmed outside of the centre housing using the service tool 3378464M1 (see § D). The hand brake unit must be bare (free of discs and intermediate plates).*

59. Fit the unit (15) and the cover plate (13) to the tool (Fig. 13) using the screws (8) tightened step-by-step in diametric opposition to a torque of 100 - 130 Nm.

60. Determine a shim (3) thickness in order to achieve a temporary clearance of approximately 0.15 to 0.20 mm, as a preliminary step to shimming with preload P1.

61. Insert the pinion fitted with the tapered roller bearing cone (7) into the hand brake unit (15).

Slide the following onto the pinion (Fig. 13):
- the thrust washer (4) against shoulder E;
- the shim(s) (3) determined in step 60.

62. Fit the tapered roller bearing cone (1).

63. Using wrench ref. 3378118M1 and socket ref. 3378119M1 (see § D), tighten the nut (18) temporarily to a torque of 200-250 Nm.

Shimming

Pinion/hand brake unit assembly adjustments must be made in the following order:

1) Adjusting the preload on tapered roller bearings (1) (2) and (7) (10)

   This adjustment is to be carried out in two phases:
   - Phase 1: This phase consists of using a dial gauge and following the conventional method by applying a firm axial push and pull force on the pinion in order to carry out shimming P1.
   - Phase 2: This phase is mandatory. It is intended to fine-tune shimming P1 by measuring and adjusting (if necessary) the rotational torque of the tapered roller bearings (1) (2) and (7) (10) using a dial-type torque wrench.
2) Adjusting the position of the pinion/hand brake unit assembly

Adjusting the preload on tapered roller bearings (1) (2) and (7) (10)

Phase 1

64. Place a dial gauge on the base of the tool. Position its feeler pin on the flat end of the pinion (Fig. 13, Fig. 14).

65. Pull the pinion firmly by its front section while turning it alternately to the right and left in order to correctly position the tapered roller bearing cone (7) in the cup (10).

66. Set the dial gauge to zero.

67. Repeat step 65, pushing firmly in order to correctly position the tapered roller bearing cone (1) in the cup (2).

68. Depending on the clearance reading on the dial gauge, select another shim (3) thickness to obtain a preload (Fig. 13, detail A): P1 = 0.01 to 0.05 mm.

NOTE: *As far as possible, shim to the maximum tolerance.*

69. Loosen the nut (18). Remove the tapered roller bearing cone (1).

70. Slide the shim(s) selected at step 68 between the thrust washer (4) and the tapered roller bearing cone (1) (Fig. 13, detail B).

71. Using wrench ref. 3378118M1 and socket ref. 3378119M1, gradually tighten the nut (18) to 200-250 Nm.

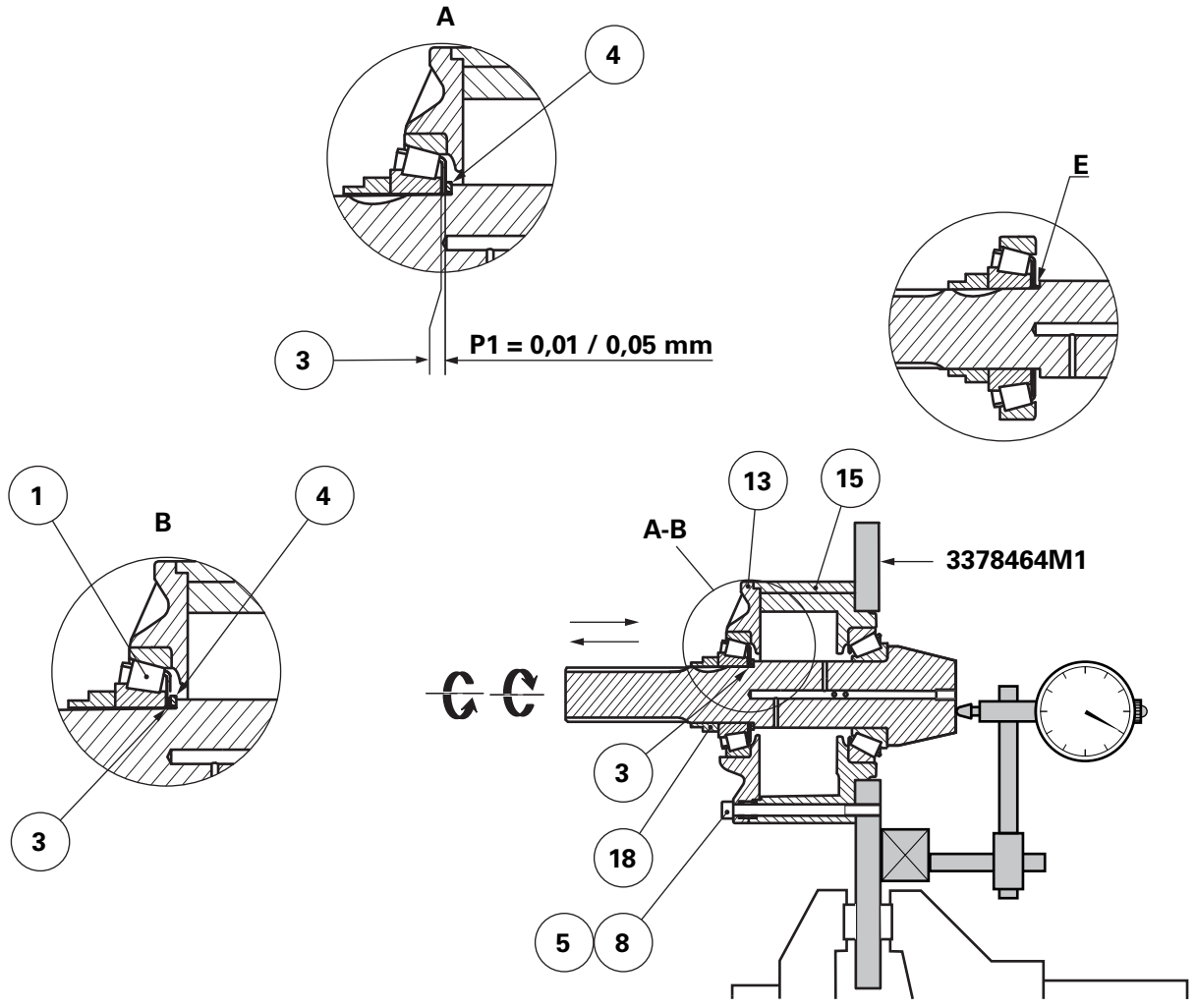
A
4
3
P1 = 0,01 / 0,05 mm
E
1
B
4
3
13
15
A-B
3378464M1
3
18
5
8
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Fig. 13

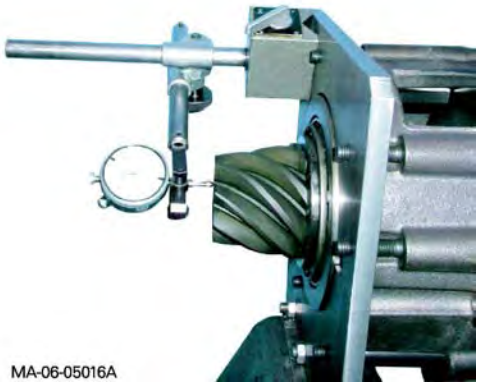
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Fig. 14

Phase 2

72. Keep the pinion/hand brake unit assembly fixed to tool ref. 3378464M1.

73. Now adjust or check the rotational torque of the pinion's tapered roller bearings.

74. Using a dial-type torque wrench and socket ref. 3378119M1, and one or two suitable adaptor(s) (if necessary), turn the pinion gently and smoothly a few turns without stopping and without changing speed. Read off the rotational torque on the torque wrench dial (Fig. 15): it should be between 1 and 5 Nm.

IMPORTANT: *The adjustment principle consists of adding or removing one or more shim(s) (3) to obtain the rotational torque specified above. If possible, adjust it to the maximum tolerance.*

75. If it is necessary to unscrew the nut (18) to add or remove the shim(s) (3), retighten this nut to 200-250 Nm in preparation for measuring the distance concerning the position of the pinion/hand brake unit assembly in the centre housing.

Adjusting the position of the pinion/hand brake unit assembly

IMPORTANT: *After adjusting the rotational torque of the pinion's tapered roller bearings, adjust the position of the pinion/hand brake unit assembly.*

NOTE: *To adjust the position of the pinion/hand brake unit assembly, keep the assembly fixed to the service tool (Fig. 16).*

76. The shim (12) thickness required to position the pinion/hand brake unit assembly are calculated using the formula below (Fig. 16, Fig. 17):

E = Y2-0.08 + (Y1-0.01)-Z where

E = Shim thickness to be fitted

Y1 = Distance measured between the pinion end and the mating face of the hand brake unit (Fig. 16)

Y2 = Theoretical nominal value of the pinion: 139 mm

Z = Theoretical nominal value between the mating face of the hand brake unit on the centre housing and the centre line of the differential ring gear axis (20): 239.35 mm

(-0.01 mm) = Anticipated variation in the taper distance following deformation of the hand brake unit during tightening on the centre housing.

(-0.08 mm) = Anticipated variation in the taper distance under load in forward travel.

77. Using a suitable depth gauge, measure distance Y1 (Fig. 16).

78. Apply the formula and determine the shim (12) thickness to fit in order to obtain the correct taper distance.

NOTE: *The internal diameter of the shims (12) measures approximately 175 mm. They are centred on the rear bore of the hand brake unit.*

79. Release the pinion/hand brake unit assembly from the service tool.

80. Visually note the position of the shims (3) (12). Prepare the elements for the hand brake mechanism and refit the pinion/hand brake unit assembly (see § B).

Fig. 15

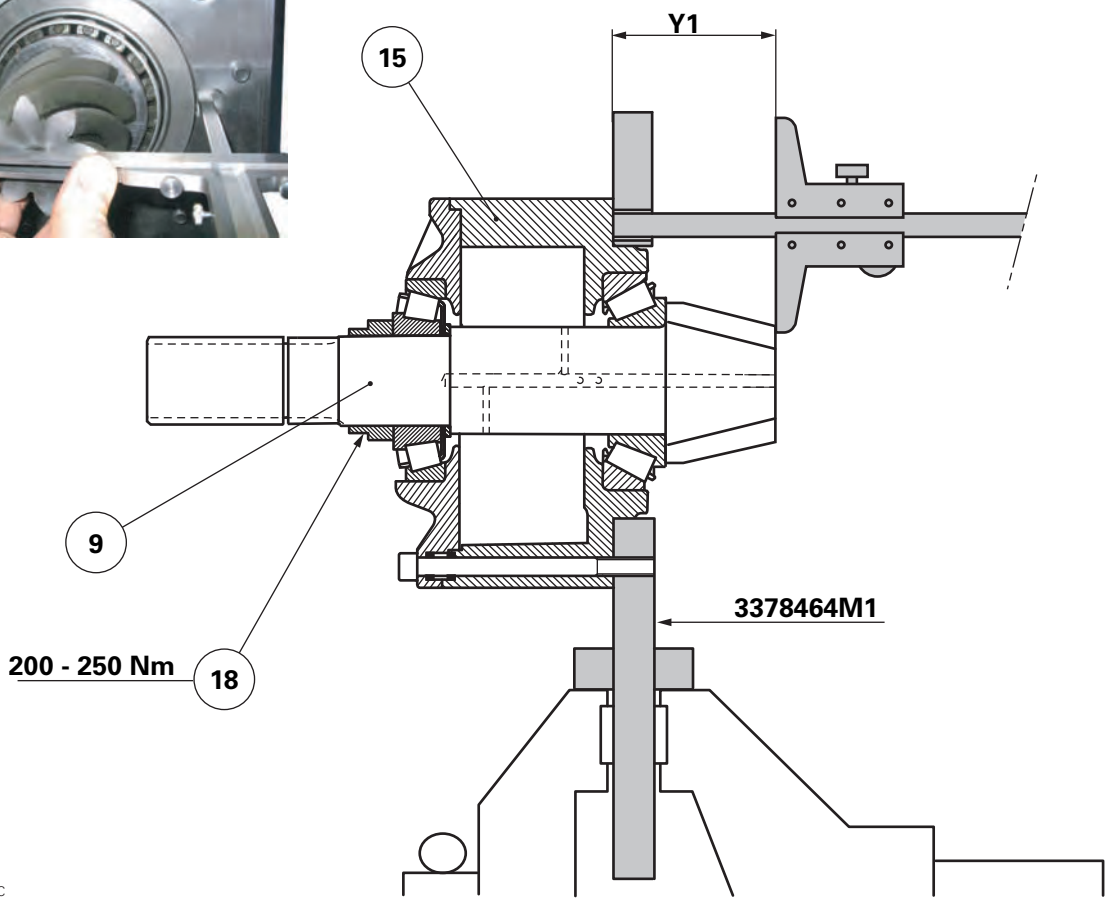

Fig. 16

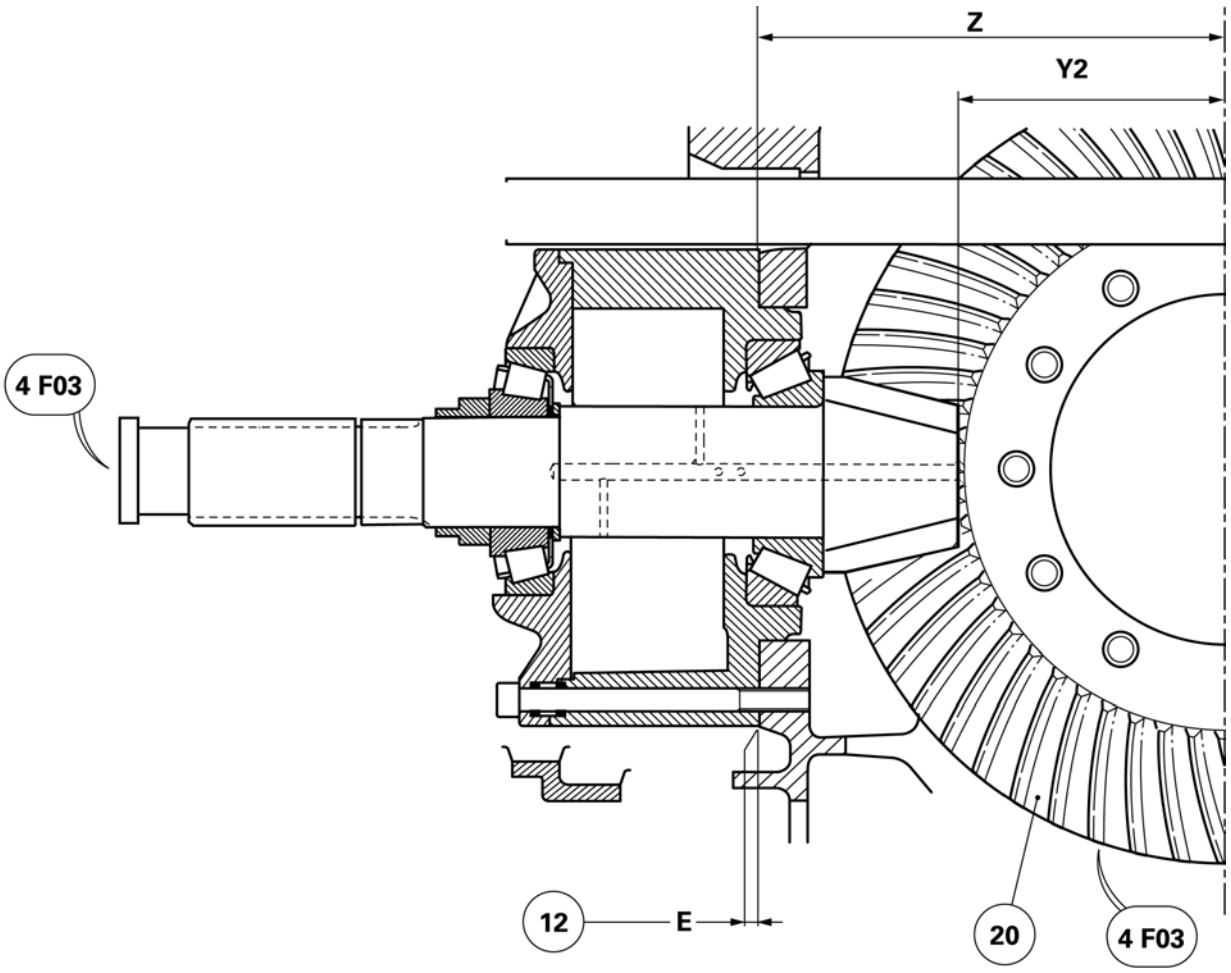

Fig. 17

D . Service tools

Tools available in the AGCO network

- 3378118M1: Locking wrench for pinion nut (Fig. 18)
- 3378119M1: Pinion tightening socket (Fig. 19)
- 3378464M1: Support for pinion adjustment (Fig. 20)
- 3378465M1: Sleeve for removing and refitting the pinion/hand brake unit assembly (Fig. 21)
  V: Screw for holding the tool in the pinion groove

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Fig. 18

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Fig. 19

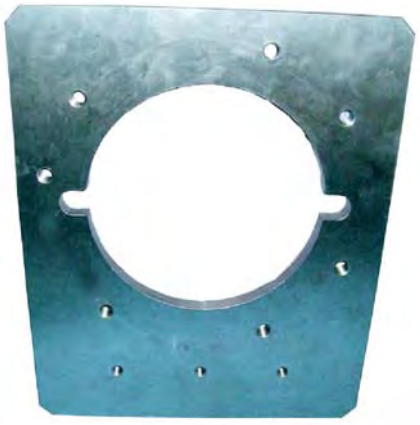

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Fig. 20

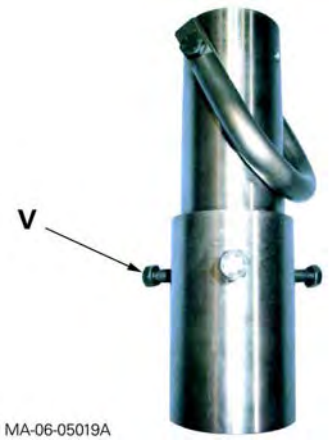

Fig. 21

6B16 - GPA40 - Hand brake unit and control

CONTENTS

GPA40 - Hand brake unit and control

A . General

The mechanical hand brake control assembly (secondary brake) is fitted to the pinion (9), located in the centre housing (Fig. 1).

It consists of six discs (11) and four intermediate plates (26) distributed equally on the mechanism (16) (Fig. 1).

The mechanism is composed of two cast-iron plates that can be expanded thanks to balls fitted in rails.

The discs are splined to the pinion.

The intermediate plates are fixed to the unit by lugs.

The mechanism is controlled by a rod (3) which acts on an actuator lever (24) connected to the mechanism's adjustable tie rod (23) (Fig. 1).

The mechanism is adjusted via a nut (21) (Fig. 1). This nut can be reached by removing the hexagon socket plug (2) located above the centre housing.

Lubrication (Fig. 1)

The lubrication pipe (57) carries the oil from the hydraulic manifold above the centre housing to the central channel and the radial holes in the pinion, in order to lubricate the discs and the intermediate plates of the hand brake mechanism.

Operation (Fig. 1)

When the hand brake lever in the cab is pulled, the cable activates the rod (3). This pivots and pulls the actuator lever (24), separating the mechanism plates (16). This, in turn, compresses the discs in the unit (13) (15) and locks the pinion.

When the hand brake lever is released, the mechanism is at rest and the discs and intermediate plates are free.

Sealing (Fig. 1)

The tightness between the cam (22) pin and the centre housing is ensured by two "O" rings (1).

GPA40 - Hand brake unit and control

Parts list (Fig. 1)

(1) "O" rings
(2) Plug and seal
(3) Control rod
(4) Support
(5) Screw
(6) Washer
(7) Cotter pin
(8) Spacer
(9) Pinion
(11) Discs
(12) Snap ring
(13) Unit cover plate
(15) Hand brake unit
(16) Mechanism
(17) Washer
(20) Pin
(21) Adjustment nut
(22) Cam
(23) Tie rod
(24) Actuator lever
(25) Pin
(26) Intermediate plates
(32) Spring
(57) Lubrication pipe

Legend

B Shaft and bearing for 4WD tractors fitted with GTA1040 transmission
C Shaft and bearing for 4WD tractors fitted with GTA1540 transmission
L Lubrication

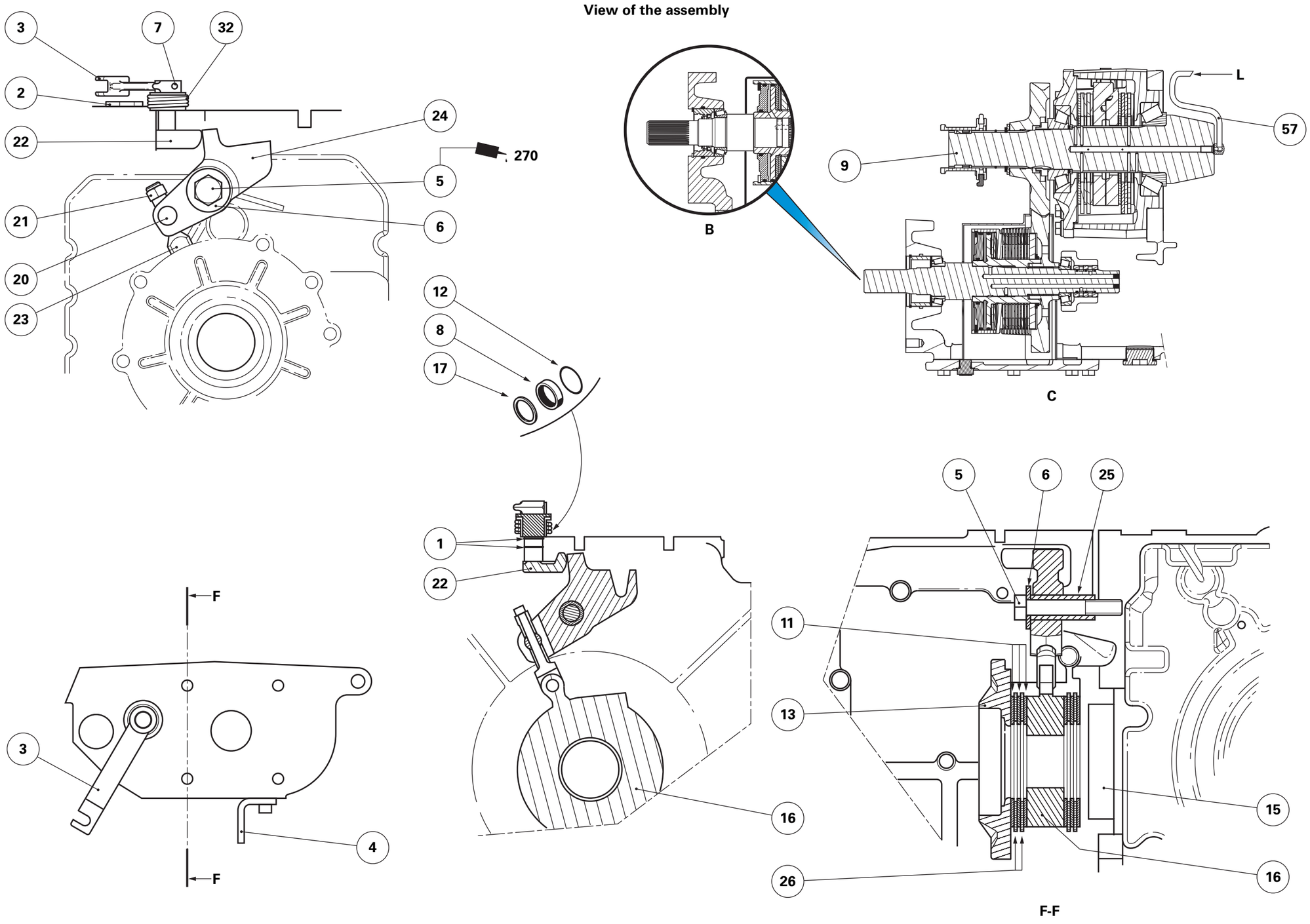
View of the assembly
3
7
32
2
24
22
270
5
21
6
20
12
23
8
17
B
L
57
9
C
1
22
5
6
25
11
13
16
15
26
16
F
F
4
F-F
MA-06-05348A

Fig. 1

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Parts list (Fig. 2)

(1) "O" rings
(2) Plug and seal
(3) Control rod
(4) Support
(5) Screw
(6) Washer
(7) Cotter pin
(8) Spacer
(9) Pinion
(11) Discs
(12) Snap ring
(13) Unit cover plate
(15) Hand brake unit
(16) Mechanism
(17) Washer
(20) Pin
(21) Adjustment nut
(22) Cam
(23) Tie rod
(24) Actuator lever
(25) Pin
(26) Intermediate plates
(32) Spring
(58) ParkLock device (if fitted)
(59) Support (tractors without ParkLock device)

GPA40 - Hand brake unit and control

Blown-up view

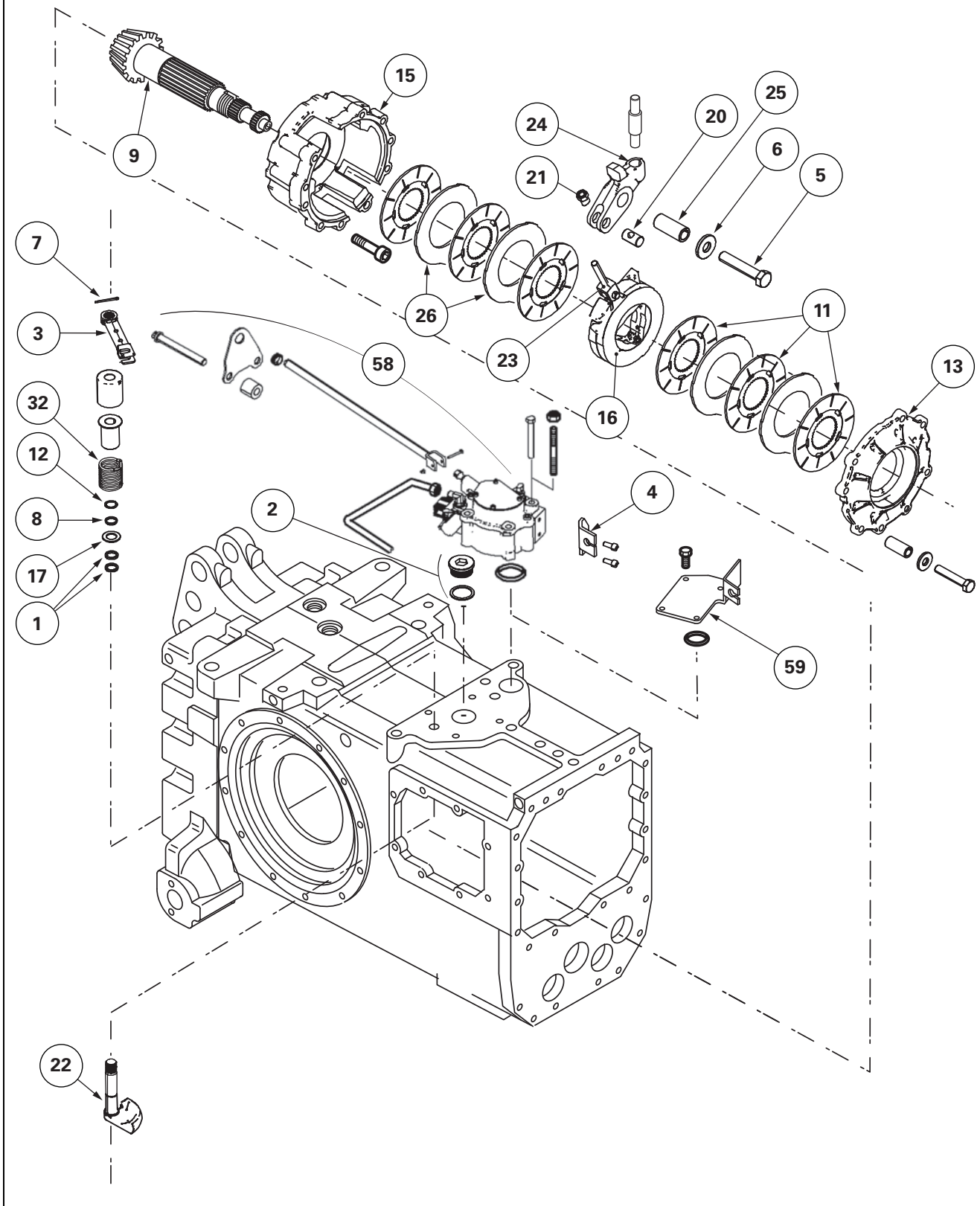

Fig. 2

B . Removing and refitting, disassembling and reassembling the hand brake unit and its control

Removing and disassembling the hand brake mechanism involves splitting the tractor between the gearbox and the rear axle.

Preliminary steps

1. Disconnect the tractor between the gearbox and the rear axle (see chapter 2).
2. Remove:
   - the right-hand hydraulic cover plate (see chapter 9);
   - the left-hand hydraulic cover plate (see chapter 9);
   - the power take-off clutch (see chapter 7);
   - the 4WD clutch (see chapter 8);
   - the creeper unit control mechanism (if fitted) (see chapter 9).
3. Remove (Fig. 3):
   - the circlip (5);
   - the thrust washer (2);
   - the shim(s) (6).

   Remove the 4WD driving gear (17) (Fig. 3).
4. Mechanically disengage the ParkLock function (if fitted) using the special screw (see chapter 9).
5. Remove (Fig. 4):
   - the nut (21);
   - the push rod (10);
   - the M20 screw (5);
   - the washer (6);
   - the actuator lever (24).

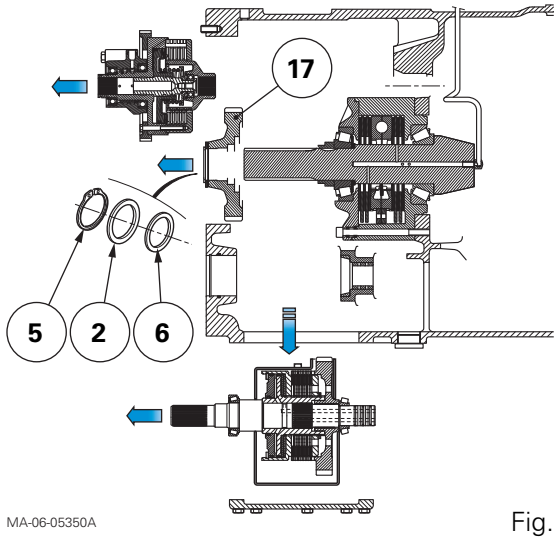

Fig. 3

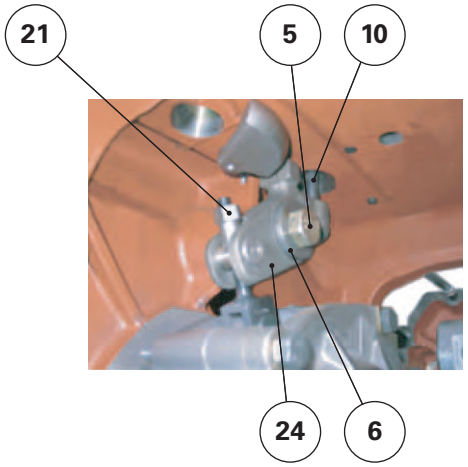

Fig. 4

Removing the hand brake unit

6. Remove the pinion/hand brake unit assembly (Fig. 5) (see chapter 6).
7. Completely unscrew the nut (18) (Fig. 5) using socket ref. 3378118M1 and special socket ref. 3378119M1 (see chapter 6).

   Remove the following parts, making a note of their position (Fig. 5):
   - the tapered roller bearing cone (1);
   - the shim(s) (3);
   - the thrust washer (4).

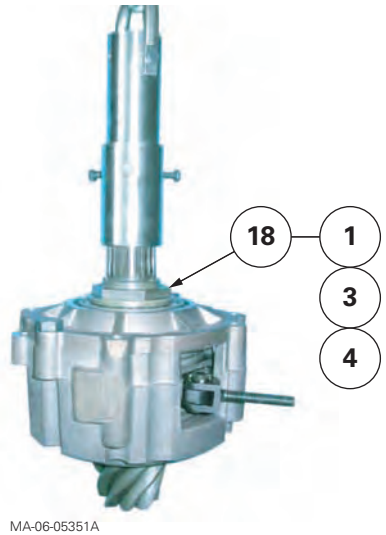

Fig. 5

Disassembling the hand brake unit

8. Place the pinion/hand brake unit assembly on a workbench.

9. Remove the cover plate (13) from the hand brake unit (15) (Fig. 1).

10. Visually note the hand brake unit components and remove (Fig. 1):
- the mechanism assembly (16);
- the actuator lever (24);
- the discs (11);
- the intermediate plates (26).

Disassembling the control (Fig. 1)

11. Note the angular position of the rod (3) in relation to the splined pin on the cam (22).

12. Remove:
- the cotter pin (7);
- the control rod (3);
- the spring (32);
- the snap ring (12);
- the spacer (8);
- the washer (17).

13. Pull the cam (22) downwards to release it from the centre housing.

14. Discard the "O" rings (1).

Reassembling the control

15. Clean and check all components. Replace those that are defective.

16. Lightly smear the pin and the cam (22) with AS767 graphite grease or equivalent.

17. Fit a new "O" ring (1) into the groove on the centre housing.

18. Refit the cam (22) inside the centre housing. Slide the second "O" ring onto its pin (1).

19. Refit:
- the washer (17);
- the spacer (8);
- the new snap ring (12).

20. Manually check the movement of the cam (22).

Reassembling the hand brake unit

21. Clean and check all components. Replace those that are defective.

IMPORTANT: *If the unit (15) and the cover plate (13) display any faults such as discoloration due to abnormal overheating or wear to the friction surface areas, a new unit/cover plate assembly should be fitted. In this case, it is necessary to shim the tapered roller bearings again and to re-adjust the position of the pinion/hand brake unit assembly (see chapter 6).*

22. Place the hand brake unit, fitted with its pinion, vertically on a makeshift support S (Fig. 6).

23. Insert three discs and two intermediate plates into the unit, starting with a disc.

Position the mechanism.

Insert the three other discs and the two other intermediate plates (Fig. 6), first placing a disc against the mechanism.

24. Check that the locating pin for the cover plate (13) is present on the unit (15). Refit the cover plate, fitted with its tapered roller bearing cup, onto the hand brake unit.

25. Temporarily tighten the cover plate (13) using the two locally obtained short screws (M16).

IMPORTANT: *The discs and intermediate plates must not be under load.*

26. Finish assembling the unit/cover plate assembly by refitting the following (see chapter 6):

- the thrust washer (4);
- the shim(s) (3) used to preload the pinion tapered roller bearings;
- the front tapered roller bearing cone (1).

27. Partially screw on the nut (18) (see chapter 6) using wrench ref. 3378118M1 and special socket ref. 3378119M1.

IMPORTANT: *The final tightening torque for the pinion nut (18) will be applied after the pinion/hand brake unit assembly has been refitted in the centre housing.*

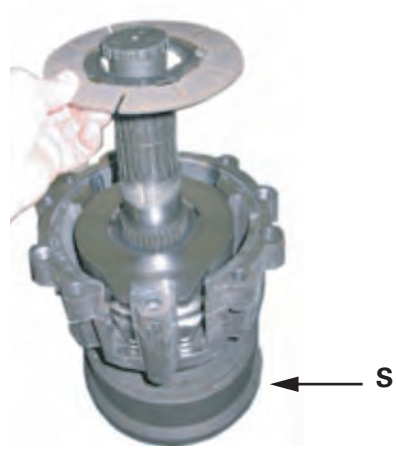

Fig. 6

Refitting the hand brake unit

28. Refit the pinion/unit assembly in the centre housing complete with its hand brake mechanism (see chapter 6). At the same time, guide the actuator lever (24) onto its pin.

NOTE: *The actuator lever pin is fitted tightly onto the centre housing.*

29. Fix the pinion/hand brake unit assembly to the centre housing compartment. Tighten the screws to the appropriate torque (see section on the GPA40 pinion in chapter 6).

30. Lightly smear the thread of the pinion nut (18) with Loctite 270 or equivalent. Tighten the nut to the appropriate torque (see section on the GPA40 pinion in chapter 6).

Final steps

31. Lightly smear the thread of the M20 screw (5) with Loctite 270 or equivalent. Fit the washer (6) onto the screw and slide the screw into the hollow actuator lever pin (Fig. 7). Tighten the screw to 230-250 Nm.

32. Refit (Fig. 7):
- the push rod (10) (tractors fitted with a ParkLock device);
- the nut (21).

33. Align the 4WD gear (17) as required and slide it onto the pinion splines (Fig. 8).

34. In the following order, fit (Fig. 8):
- the shim(s) (6);
- the thrust washer (2);
- the circlip (5).

35. Adjust the hand brake mechanism and control (see § D).

36. Refit:
- depending on the option, the creeper unit control mechanism (see chapter 5);
- the 4WD clutch (see chapter 8);
- the power take-off clutch (see chapter 7);
- the left-hand hydraulic cover plate (see chapter 9);
- the right-hand hydraulic cover plate (see chapter 9).

37. Reconnect the tractor between the gearbox and the rear axle (see chapter 2).

38. Check that the hand brake lever operates correctly (see step 57).

39. Mechanically re-engage the ParkLock function (if fitted) using the special screw (see chapter 9).

40. Carry out a road test to check:
- engagement of the ParkLock device (if fitted);
- tractor movement with the hand brake off;
- creeper unit operation (if fitted);
- sealing of the hydraulic cover plate mating faces (right-hand, left-hand and 4WD).

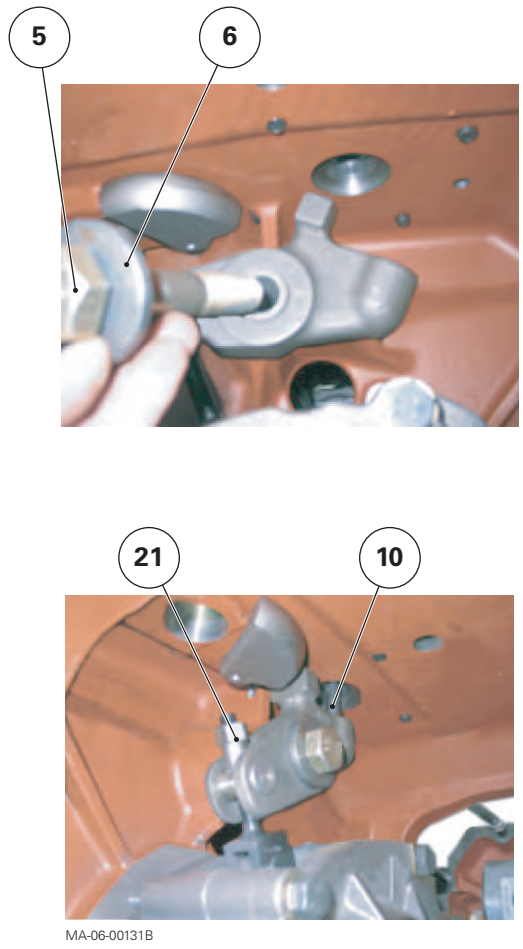

Fig. 7

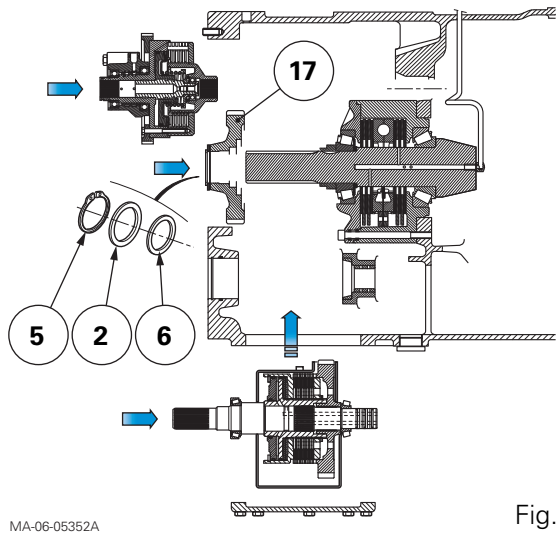

Fig. 8

C . Layout of components

Fig. 9 only shows components (11) (13) (15) (16) and (26) of the hand brake mechanism with their location inside the centre housing and on the pinion (9).

IMPORTANT: *Under no circumstances should this illustration be interpreted as a working support document for removing/refitting one or more of these components. The horizontal position of each component would make assembly more difficult due to the weight of the components and their lack of alignment.*

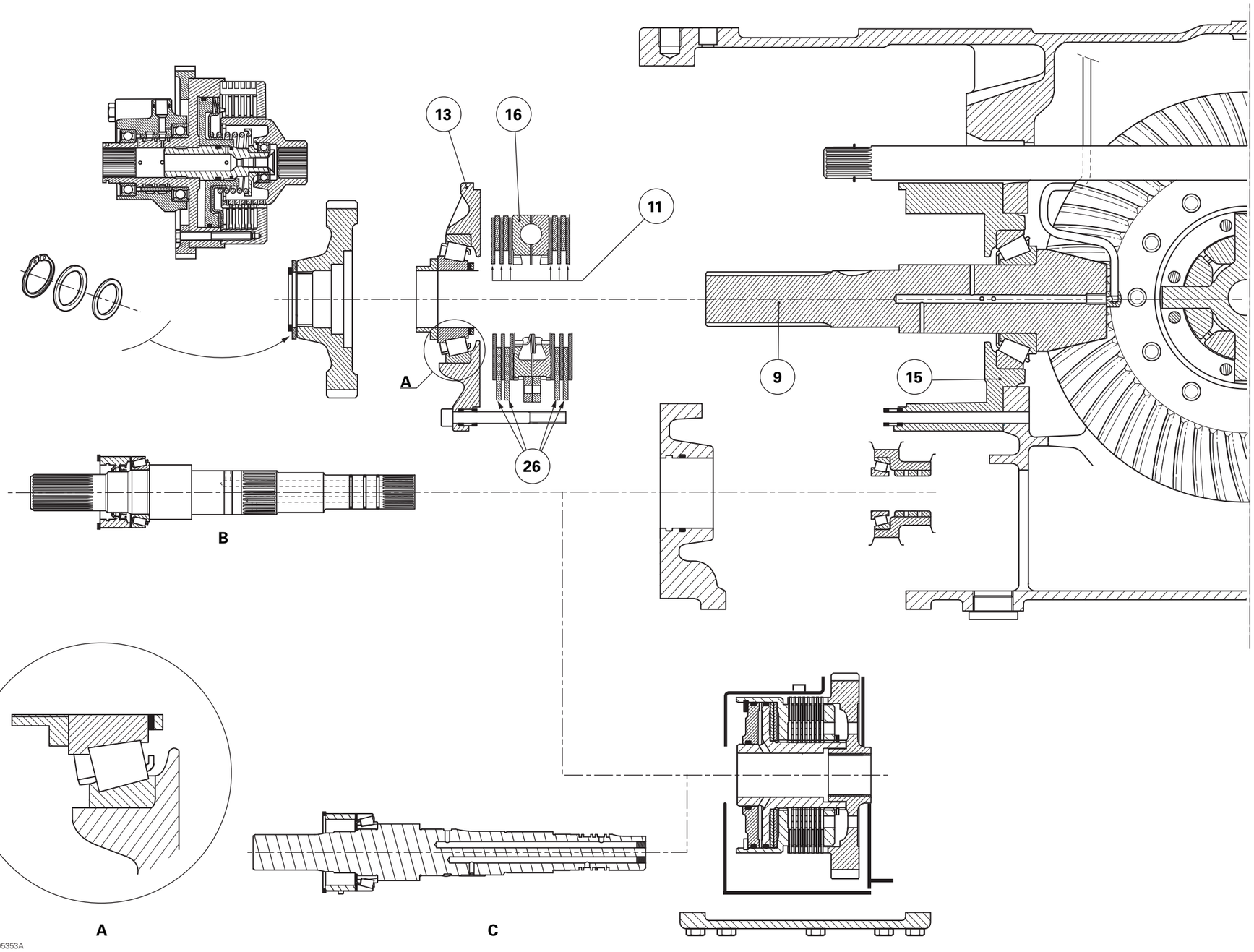

Fig. 9

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D . Adjusting the hand brake

Adjusting the mechanism (16)

Version without ParkLock device (Fig. 10)

41. Ensure the cam (22) is in contact with the actuator lever (24).

42. Using a set of shims, adjust the mechanism (16), turning the nut (21) to obtain a clearance (J) of 1.0 to 1.2 mm between the discs (11) and the intermediate plates (26) on either side of the mechanism.

***NOTE**: When the tractor is not split between the gearbox and the rear axle, and it is necessary to adjust clearance J, remove the right-hand hydraulic cover plate (see chapter 9). If necessary, remove the plug (2) to gain access to the adjustment nut (21).*

43. After adjusting the mechanism (16), activate the hand brake control a few times and measure and adjust clearance J again (if necessary). In the "brake off" position, manually check the movement of the discs (11) and the intermediate plates (26).

Version with ParkLock device (Fig. 11)

44. Before adjusting the mechanism (16) on tractors fitted with a ParkLock device (PL, Fig. 11), neutralise the force exerted by the Belleville washers on this mechanism. To do this, turn the ParkLock special screw clockwise until tight (see chapter 9).

45. Temporarily remove the cam (22) from the actuator lever (24).

46. Using shims, adjust the mechanism (16) by turning the nut (21) to obtain clearance J of 1.0 to 1.2 mm between the discs (11) and the intermediate plates (26) on either side of the mechanism.

***NOTE**: When the tractor is not split between the gearbox and the rear axle, and it is necessary to adjust clearance J, remove the right-hand hydraulic cover plate (see chapter 9). If necessary, remove the plug (2) to gain access to the adjustment nut (21).*

47. After adjusting the mechanism (16), activate the hand brake control a few times and measure and adjust clearance J again (if necessary). In the "brake off" position, manually check the movement of the discs (11) and the intermediate plates (26).

Adjusting the control

Version without ParkLock device (Fig. 10)

48. Position the rod (3) at an angle on the splined pin of the cam (22) so as to obtain a distance of 174 ± 9 mm (GTA1540 with an increased gross vehicle weight rating (GVWR)) or 179 ± 9 mm (GTA1040) under a load of 10 daN measured in the centre line of the cam (22) between the attachment axis of the cable on the rod and the external edge of the cable support (4).

IMPORTANT: *To optimise the effectiveness of the hand brake control, the adjustment distance that was 179 ± 9 mm becomes 174 ± 9 mm for tractors fitted with GTA1540 transmission with an increased gross vehicle weight rating (GVWR).*

Version with ParkLock device (Fig. 11)

49. Before adjusting the hand brake control on tractors fitted with a "PL" ParkLock device (Fig. 11), neutralise the force exerted by the Belleville washers on this mechanism. To do this, turn the ParkLock special screw clockwise until tight (see chapter 9).

Position the rod (3) at an angle on the splined pin of the cam (22) so as to obtain a distance of 174 ± 9 mm (GTA1540 with an increased gross vehicle weight rating (GVWR)) or 179 ± 9 mm (GTA1040) under a load of 10 daN measured in the centre line of the cam (22) between the attachment axis of the cable on the rod and the external edge of the cable support (4).

IMPORTANT: *To optimise the effectiveness of the hand brake control, the adjustment distance that was 179 ± 9 mm becomes 174 ± 9 mm for tractors fitted with GTA1540 transmission with an increased gross vehicle weight rating (GVWR).*

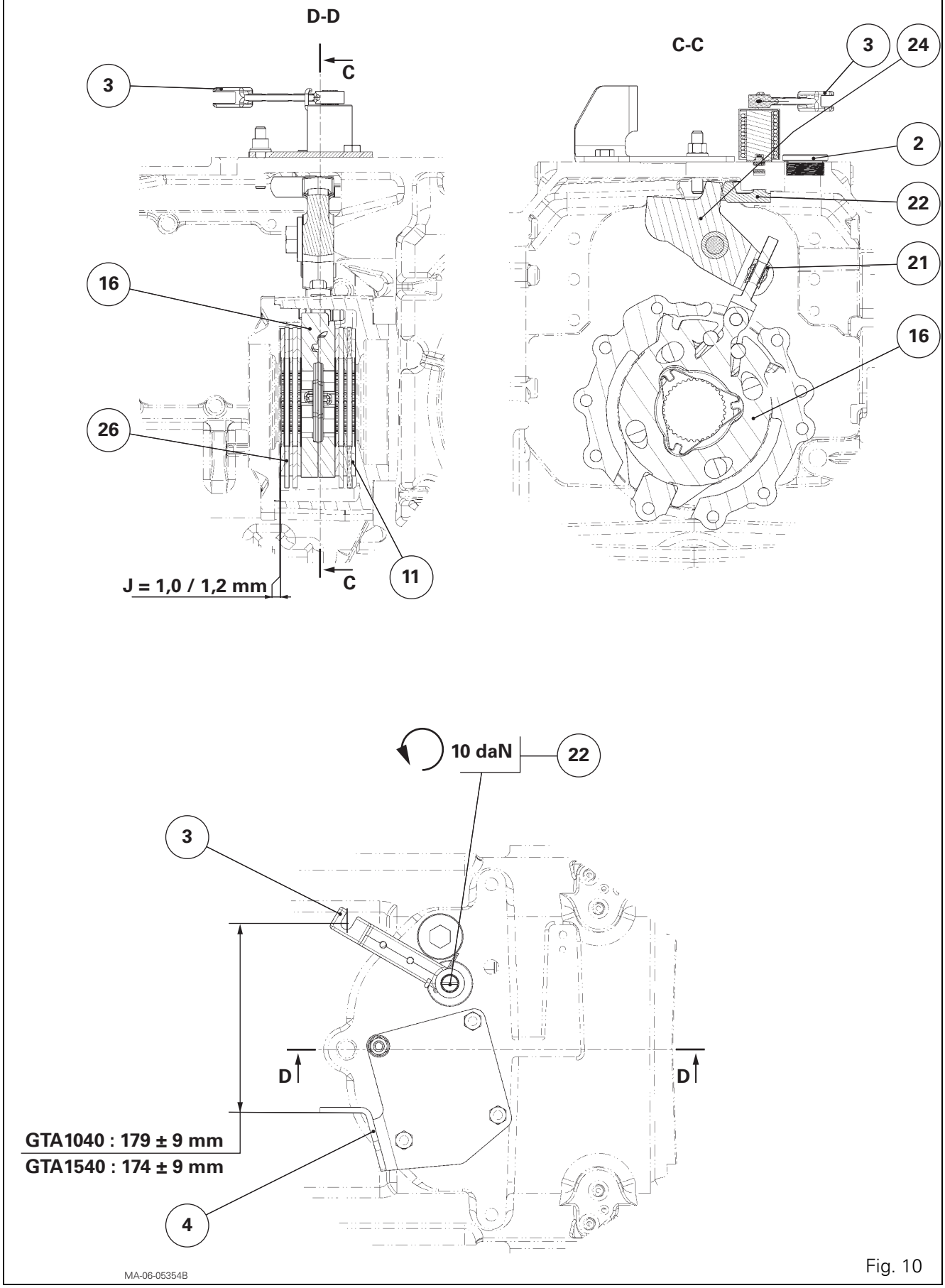
D-D
C
3
16
26
J = 1,0 / 1,2 mm
C
11
C-C
3
24
2
22
21
16
10 daN
22
3
D
D
GTA1040 : 179 ± 9 mm
GTA1540 : 174 ± 9 mm
4
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Fig. 10

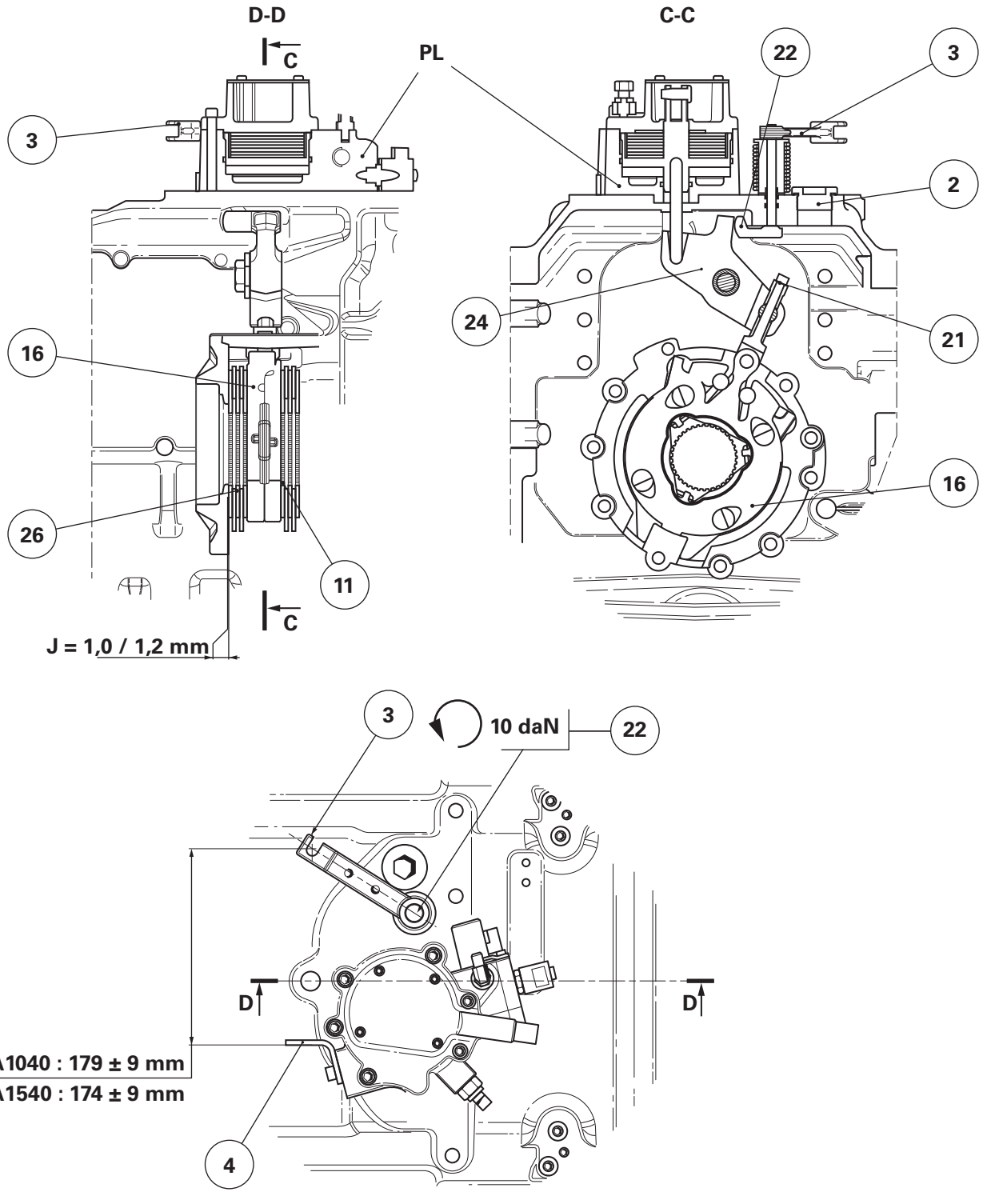
D-D
C
PL
3
16
26
11
C
J = 1,0 / 1,2 mm
C-C
22
3
2
24
21
16
3
10 daN
22
D
D
GTA1040 : 179 ± 9 mm
GTA1540 : 174 ± 9 mm
4
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Fig. 11

E . Removing and refitting the hand brake lever, and adjusting the control cable

Removal

50. Remove the guard from the hand brake lever.

51. Disconnect (Fig. 12):

- the switch (1) (if necessary);
- depending on the type of operation, either the hand brake cable (2) on the control rod (3) or the hand brake lever.

52. Unscrew the screw from base S (Fig. 12).

Remove the complete hand brake lever from the cab floor.

Refitting

53. Refit the complete hand brake lever to the cab floor. Perform steps 50 to 52 in reverse order.

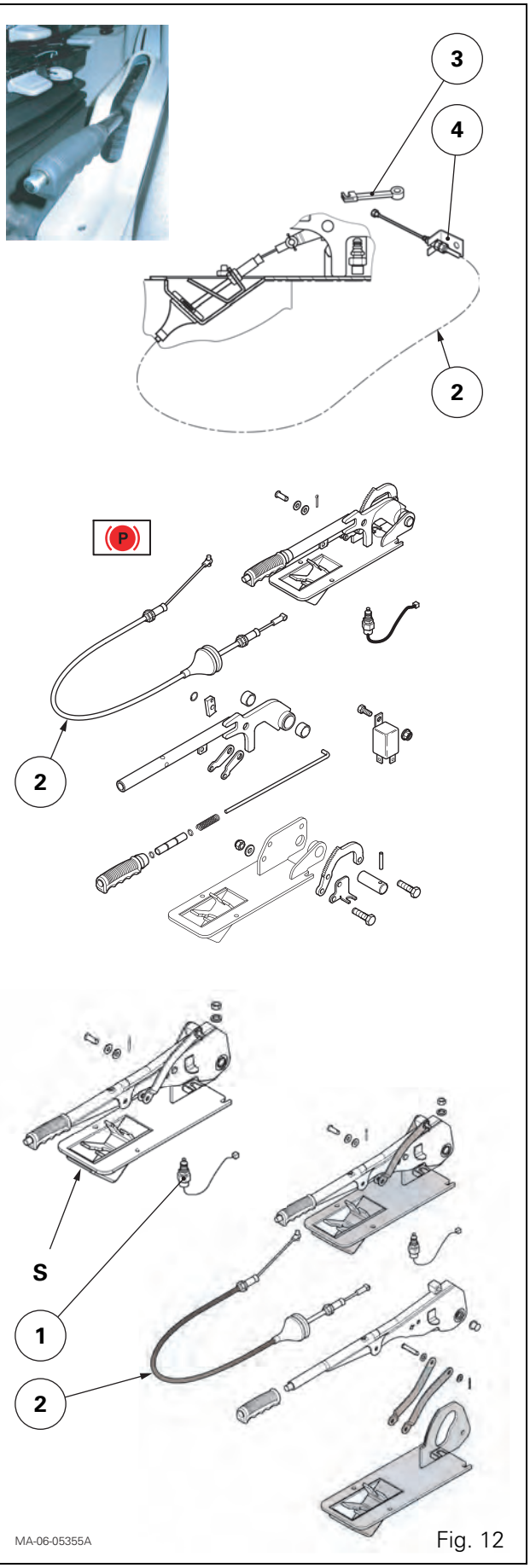

Fig. 12

Adjusting the control cable

54. Check that the lock washer (1) is present between the two nuts (2) (Fig. 13).

55. Turn the nuts (2) to adjust the cable according to the distance indicated in Fig. 13.

56. Connect the control cable to the support (4) and the rod (3) (Fig. 12), observing the position of the nuts against the support (4) (Fig. 13).

IMPORTANT: *The control cable is "float" mounted on the support (4), which allows the cable to be aligned when it is under tension.*

57. Check the hand brake lever travel:

- Tractors without ParkLock device
  - Firmly activate the hand brake lever several times to pack the hand brake mechanism components down (discs, mechanism, intermediate plates, cable stop). Then check the travel of the hand brake lever: the tractor should be immobilised after approximately ten notches.
  - If necessary, adjust the mechanism (16) and the control (see § D).
- Tractors with ParkLock device
  - Start the tractor engine to disengage the ParkLock device.
  - Firmly activate the hand brake lever several times to pack the hand brake mechanism components down (discs, mechanism, intermediate plates, cable stop). Then check the travel of the hand brake lever: the tractor should be immobilised after approximately ten notches.
  - If necessary, adjust the mechanism (16) and the control (see § D).

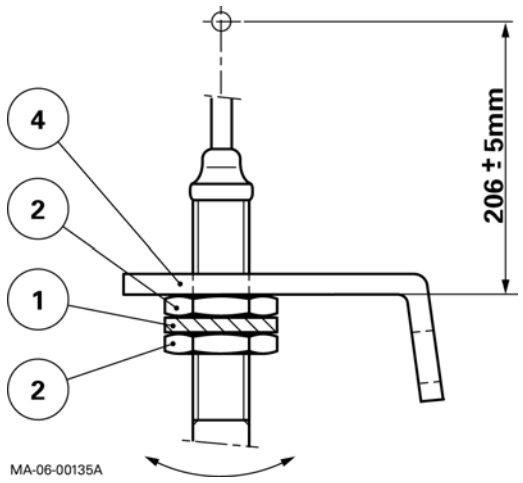

Fig. 13

6B18 - GPA40 - 5" differential and multidisc lock

CONTENTS

GPA40 - 5" differential and multidisc lock

A . General

On tractors fitted with GTA1040 or GTA1540 transmission, the 5" multidisc differential is fitted with a hydraulically controlled multidisc locking device. This is located on the left inside the centre housing. The main components of the differential lock are housed inside a detachable unit and fixed via screws to the left-hand differential half-unit (23).

The 5" dimension is determined by the space between two planet gears mounted on their spider (Fig. 1).

On tractors fitted with GTA1540 transmission (50 kph), the differential supports (27) (38) are fitted with a mechanical device (Fig. 2) that controls the return of each brake piston (see chapter 6).

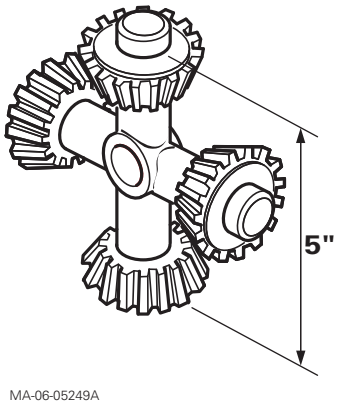

Fig. 1

Construction

The ring gear is fixed to the differential unit using rivets. The ring gear/differential assembly is driven by the pinion and turns on two tapered roller bearings supported by two lateral supports, which are centred by locating pins (40) and fixed to the centre housing using screws.

The differential comprises two half-units (23) which hold four planet gears (29) and two sun gears (30).

The preload shimming of the ring gear/differential assembly is carried out using the shim(s) (55) fitted between the bearing cone (54) and the left-hand differential support (38).

The backlash between the pinion and the ring gear is obtained using the shim(s) (59) inserted between the bearing cup (32) and the right-hand differential half-unit (23).

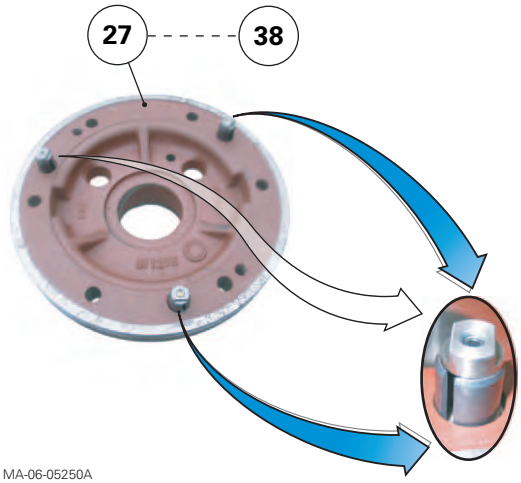

Fig. 2

The multidisc locking device incorporates:

- a unit (46) holding the discs (49) and the intermediate plates (48);
- a hub (53) splined to the input sun gear of the left-hand trumpet housing;
- a cover plate (52) fitted with the piston (58) and supported by the tapered roller bearings (54) (57).

  The piston chamber is located inside the cover plate and communicates with a channel from the left-hand differential support, which allows the 17 bar (GTA1040 transmission) or 21 bar low pressure (GTA1540 transmission) to act on the piston (58). Two rings (56) ensure the system is sealed.

Operation

Clutch engaged position (engaged)

When the differential lock solenoid valve is activated, the hydraulic pressure is delivered via the channels of the left-hand differential support (38) and the cover plate (52), and then enters the piston chamber (58). The piston then compresses the intermediate plates (48) and the discs (49) that are attached to the unit (46) and the hub (53) via lugs and splines.

In this position with the clutch engaged, the input sun gears of the left and right-hand trumpet housings turn at the same speed.

Clutch disengaged position (disengaged)

When the hydraulic pressure is released, the piston withdraws and the discs and intermediate plates decompress, allowing the sun gears and planet gears to carry out their differential function.

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Parts list (Fig. 3)

(20) Oil deflector
(21) Rivet
(22) Ring gear
(23) Differential half-unit
(24) Rivets
(27) Right-hand differential support
(28) Spherical washer
(29) Planet gear
(30) Sun gear
(31) Bearing cone
(32) Bearing cup
(33) Spider
(34) "O" rings
(35) Friction ring
(36) Differential lock assembly
(37) "O" ring
(38) Left-hand differential support
(39) Screw
(40) Locating pin
(41) Screw
(42) Transfer pipe
(43) "O" ring
(44) Union
(45) Centre housing
(46) Differential lock disc unit
(47) Screw
(48) Intermediate plates
(49) Discs
(50) "O" ring
(51) "O" ring
(52) Cover plate
(53) Hub
(54) Bearing cone
(55) Shim(s)
(56) Seal rings
(57) Bearing cup
(58) Piston
(59) Shim(s)
(60) Rivet
(61) Friction ring

Legend

A Details
B Details
P 17 bar pressure (GTA1040 transmission) or 21 bar pressure (GTA1540 transmission)

View of the assembly

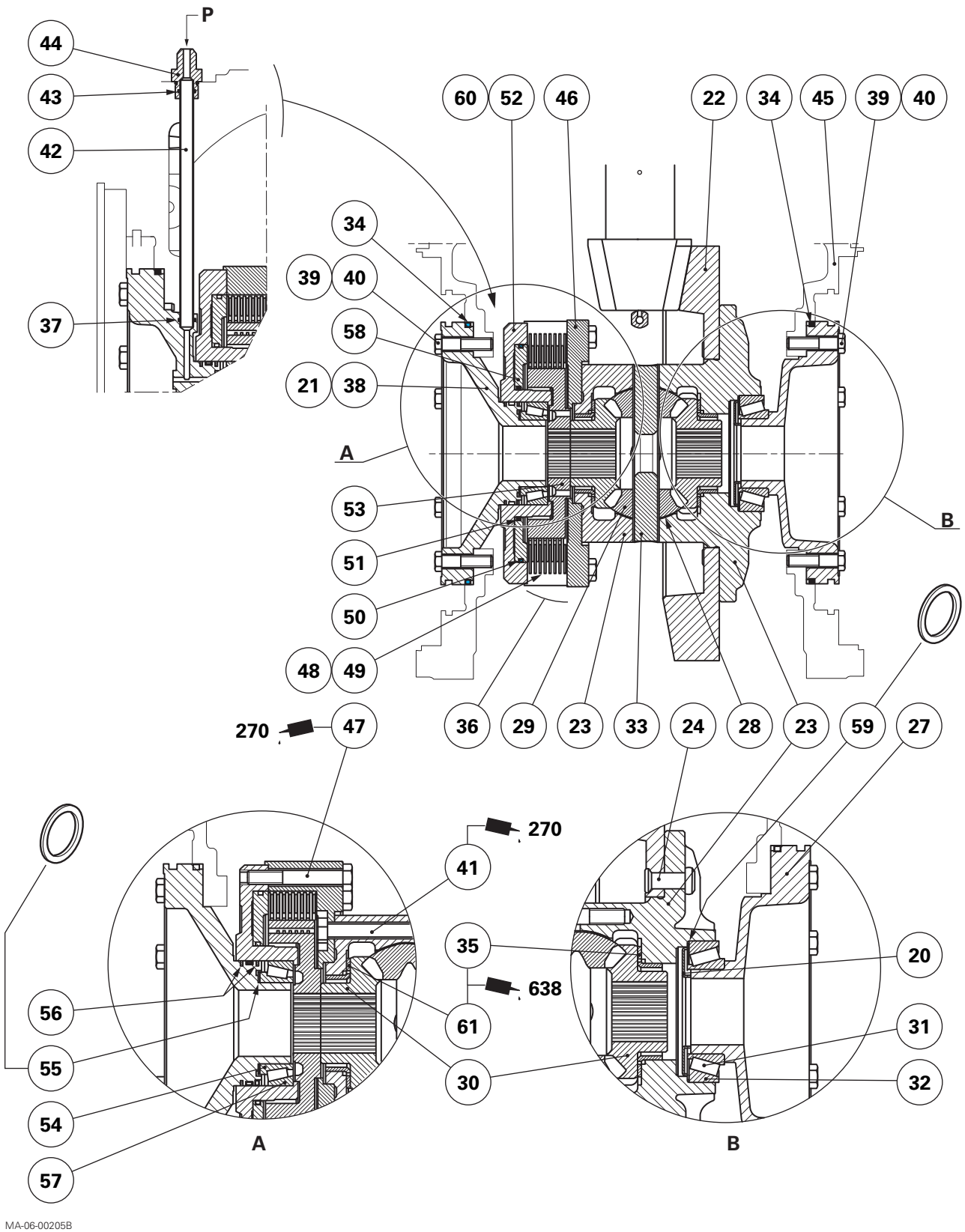

Fig. 3

Parts list (Fig. 4)

(20) Oil deflector
(22) Ring gear
(23) Differential half-unit
(24) Rivets
(27) Right-hand differential support
(28) Spherical washer
(29) Planet gear
(30) Sun gear
(31) Bearing cone
(32) Bearing cup
(33) Spider
(34) "O" rings
(35) Friction ring
(37) "O" ring
(38) Left-hand differential support
(39) Screw
(40) Locating pin
(41) Screw
(42) Transfer pipe
(43) "O" ring
(44) Union
(46) Differential lock disc unit
(47) Screw
(48) Intermediate plates
(49) Discs
(50) "O" ring
(51) "O" ring
(52) Cover plate
(53) Hub
(54) Bearing cone
(55) Shim(s)
(56) Seal rings
(57) Bearing cup
(58) Piston
(59) Shim(s)
(61) Friction ring

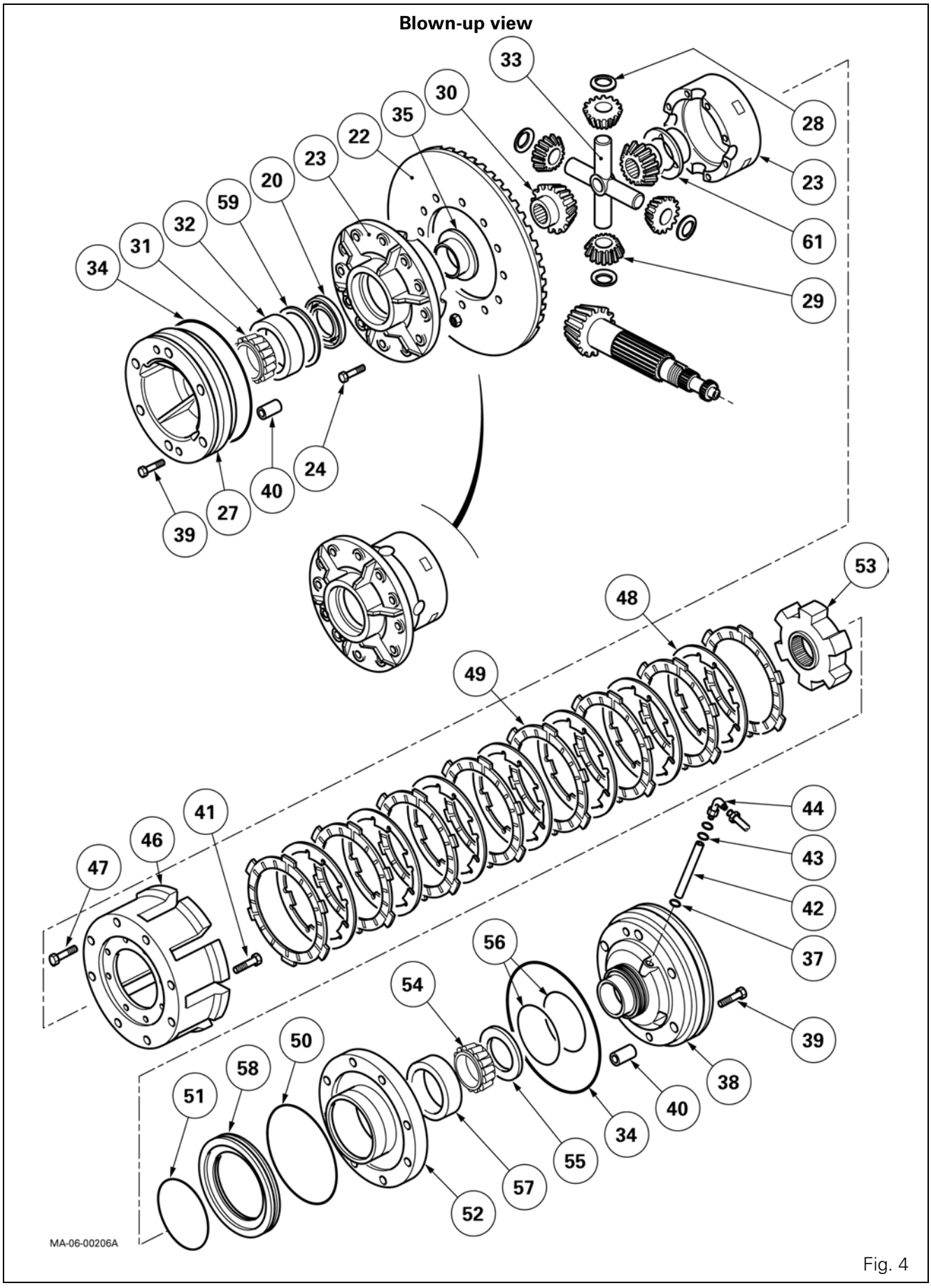
Blown-up view
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Fig. 4

B . Removing and refitting the left-hand differential support and seal rings

Removing the left-hand differential support (38) provides direct access to the seal rings of the hydraulic supply line for the differential locking device.

Preliminary steps

1. Remove the trumpet housing concerned (see chapter 6).
2. Disconnect the differential lock supply pipe.
   Remove the 90° elbow union (44) (Fig. 5) located on the top left of the centre housing.
3. Raise the transfer pipe (42) (Fig. 5) in order to free it from the hydraulic chamber of the left-hand differential support.
4. Drive out the brake piston (see chapter 6).
5. To prevent the ring gear and crownwheel and pinion causing any interference with the end of the forward speed sensor, remove or deactivate the forward speed sensor located on top of the ring gear, to the right of the centre housing.

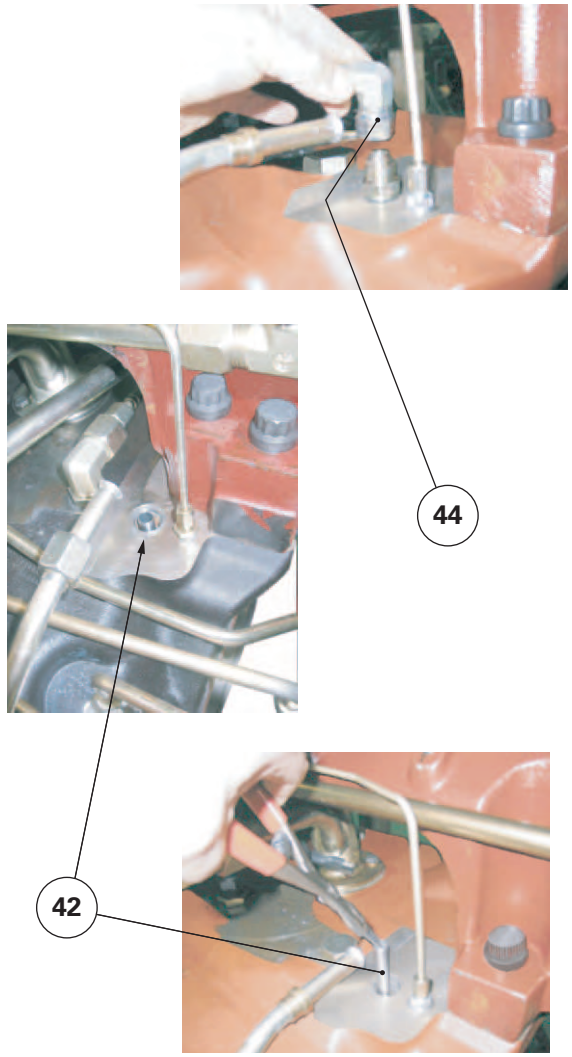

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Fig. 5

Removing the left-hand differential support

6. Select two original screws (39) fitted opposite one another on the left-hand differential support. Unscrew them.

7. In their place, screw in two guide studs G (M12, length approx. 120 mm) (Fig. 6) until one of their ends is against the cover plate (52) of the differential unit (Fig. 7).

NOTE: *Guide studs G are used to support and retain the differential assembly in the same axis as before the left-hand differential support was removed.*

They also allow the left-hand support to be correctly refitted to the centre housing at a later stage without chipping or breaking the seal rings (56).

8. Use two locally obtained extraction screws V (M12, length approx. 120 mm) (Fig. 6). Screw them into the tapped holes of the left-hand differential support in preparation for its removal.

9. Gradually and alternately screw in the two screws V until the left-hand differential support is completely extracted. This support is fitted tightly into the bore of the centre housing.

10. Remove the left-hand differential support. Recover or discard the "O" ring (34). This seal seals the brake piston chamber.

Check that the following are present on the support:

- the bearing cone (54);
- the shim(s) (55) (not to be discarded or lost), used to preload the tapered roller bearings of the ring gear/differential assembly.

11. Check that the locating pin (40) is present on the centre housing.

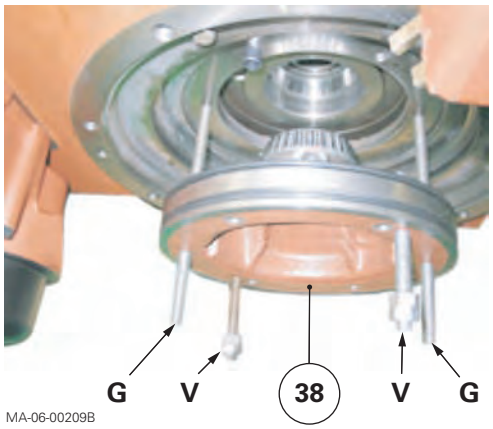

Fig. 6

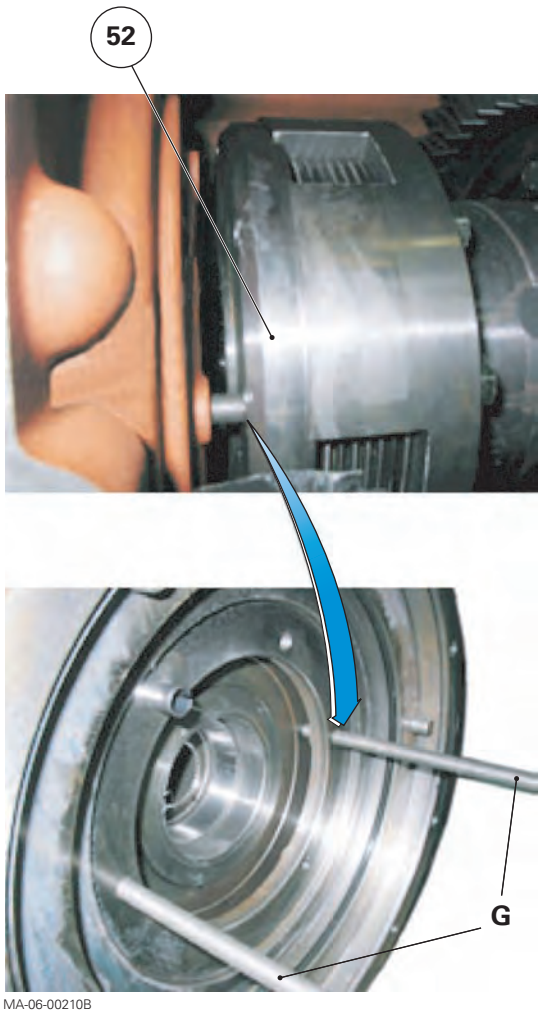

Fig. 7

Removing the seal rings

12. Remove the seal rings from the left-hand differential support. If these are to be re-used, visually note the position of the seal rings in relation to their respective grooves.

13. Check:

- their flexibility, manually without damaging them;
- their profile, visually.

In case of any uncertainty as to their condition, systematically discard the seal rings.

Refitting the seal rings

14. Clean the components and pay special attention to the seal ring grooves, without using metal or sharp tools.

15. Check each component and, if necessary, replace any defective parts.

16. Test-fit the seal rings (56) (new or re-used) in the grooves of the left-hand differential support (38) (Fig. 8).

NOTE: *For re-used seal rings, take note of the visual marks made during step 12.*

17. Check that the seal rings turn correctly and freely. Remove them.

18. Lightly smear the seal rings (new or re-used) with miscible grease. Definitively fit them into the grooves of the left-hand differential support, ensuring that:

- they are seated correctly at the base of the groove;
- their ends overlap correctly (Fig. 8).

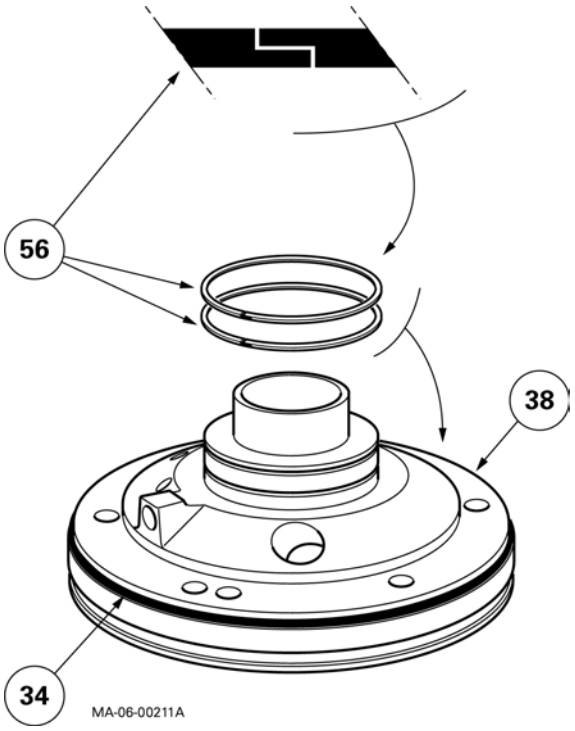

Fig. 8

Refitting the left-hand differential support

19. Check that the following parts are present on the left-hand differential support:
- the "O" ring (37) inside the hydraulic port of the transfer pipe (42) on the differential lock;
- the "O" ring (34) (Fig. 8);
- the seal rings (56) correctly positioned at the base of the groove of the left-hand differential support;
- the bearing cone (54) and the shims (55) recovered during removal to preload the tapered roller bearings of the ring gear/differential assembly.

IMPORTANT 1: *If the left-hand differential support and/or the tapered roller bearings (bearing cone and cup) are to be replaced, it will be necessary to carry out the shimming on the ring gear/differential assembly again (see § I).*

IMPORTANT 2*: If guide studs G used during removal have been removed for any reason, it is advisable to refit them so that the ring gear/differential assembly is returned to the same position as previously. To do this, use shimming tool ref. 3378117M1 (see § J) to centre and reposition the ring gear/differential assembly in the housing, turning the central screw of the tool until the bearing cone (54) is positioned in the cup (57). Fit guide studs G as in step 7. Once the ring gear/differential assembly is correctly centred, remove the tool.*

20. Check that the locating pin (40) is present on the centre housing (Fig. 9).

21. Slide the left-hand differential support onto guide studs G.

Start fitting the support using a soft hammer. Continue fitting it using the original four screws (39).

22. Remove guide studs G. Fit the two remaining screws. Gradually tighten the six screws equally in diametrically opposed pairs to a final tightening torque of 85-130 Nm.

23. Manually check that the ring gear/differential assembly rotates freely.

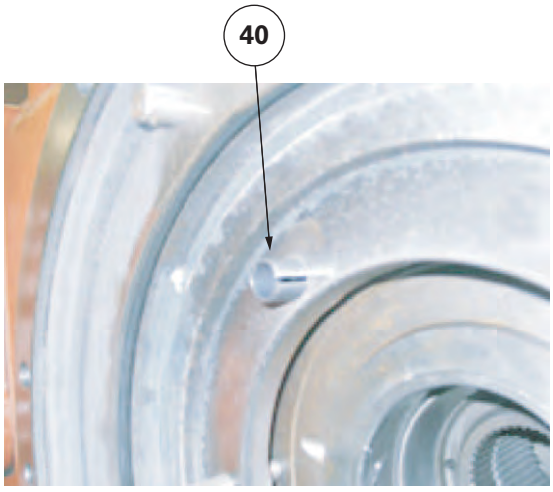

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Fig. 9

Final steps

24. Fit and adjust the forward speed sensor, after lightly smearing its thread with Loctite Form A Gasket 2 (Sensor Sealing or equivalent) (see chapter 11).
25. Clean out any dirt from the brake piston chamber on the centre housing.
26. Using a makeshift tool, fit the brake piston into the centre housing cavity (see chapter 6).
27. Engage the transfer pipe (42) in the left-hand differential support.
28. Screw in the elbow union (44). Reconnect the differential lock supply pipe.
29. Check the tightness of the brake piston chamber (see chapter 6).
30. Refit the trumpet housing (see chapter 6).
31. Bleed the main brakes (see chapter 9).
32. Check the tightness of the hydraulic systems.
33. Carry out a road test on the brake system.
34. Carry out a test on the differential locking device.

C . Removing and refitting the right-hand differential support

The right-hand differential support performs no hydraulic function. However, it has a number of characteristics in common with the left-hand differential support.

It is also:

- fitted tightly into the bore of the centre housing;
- positioned by a pin (40);
- fitted with two tapped holes for its removal;
- fitted with a groove to house the "O" ring (34) used to seal the brake piston chamber.

It supports the right-hand tapered roller bearing cone (31) of the ring gear/differential assembly.

Preliminary steps

35. Remove the trumpet housing concerned (see chapter 6).

36. Drive out the brake piston (see chapter 6).

37. To prevent the ring gear and crownwheel and pinion causing any interference with the end of the forward speed sensor, remove or deactivate the forward speed sensor located on top of the ring gear, to the right of the centre housing.

Removing the right-hand differential support

38. Select two original screws (39) fitted opposite one another on the right-hand differential support (27). Unscrew them.

39. In their place, screw in two guide studs G (M12, length approx. 120 mm) (Fig. 10) until one of their ends is against the differential half-unit (23) (Fig. 11).

NOTE: *Guide studs G are used to support and retain the ring gear/differential assembly in the same position as before the right-hand differential support was removed. They also allow the right-hand support on the centre housing to be correctly refitted at a later stage.*

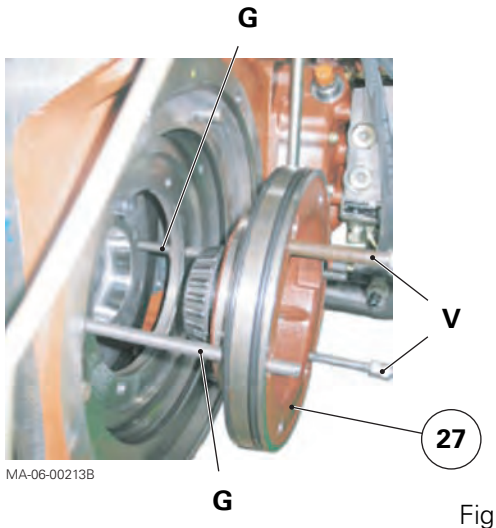

Fig. 10

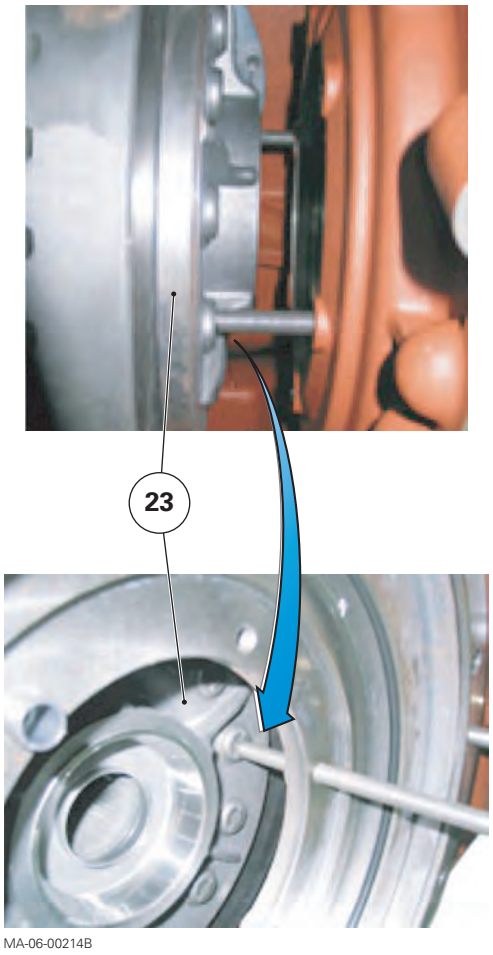

Fig. 11

40. Use two locally obtained extraction screws V (M12, length approx. 120 mm) (Fig. 10). Screw them into the tapped holes of the right-hand differential support in preparation for its removal.

41. Gradually and alternately screw in the two screws until the right-hand differential support is completely extracted. This support is fitted tightly into the bore of the centre housing.

42. Remove the right-hand differential support. Recover or discard the "O" ring (34). This seal seals the brake piston chamber.

Refitting the right-hand differential support

43. Check that the following parts are present on the right-hand differential support (27):

- the "O" ring (34) (Fig. 12);
- the bearing cone (31).

The tapered roller bearing cone (31) is fitted firmly onto the right-hand differential support.

IMPORTANT 1: *If the right-hand differential support and/or the tapered roller bearing (bearing cone and cup) are to be replaced, it will be necessary to carry out the shimming of the ring gear/differential assembly again (see §I) and to check or adjust the backlash between the ring gear and the pinion again (see §H).*

IMPORTANT 2*: If guide studs G used during removal have been removed for any reason, it is advisable to refit them so that the ring gear/differential assembly is returned to the same position as previously.*

44. Check that the locating pin (40) is present on the centre housing (Fig. 13).

45. Slide the right-hand differential support onto guide studs G.

Start fitting the support using a soft hammer. Continue fitting it using the original four screws (39).

46. Remove guide studs G. Fit the two remaining screws. Gradually tighten the six screws equally in diametrically opposed pairs to a final tightening torque of 85-130 Nm.

47. Manually check that the ring gear/differential assembly rotates freely.

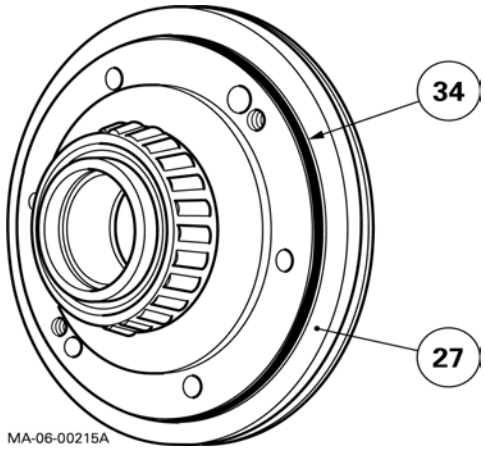

Fig. 12

Fig. 13

Final steps

48. Fit and adjust the forward speed sensor, after lightly smearing its thread with Loctite Form A Gasket 2 (Sensor Sealing or equivalent) (see chapter 11).

49. Clean out any dirt from the brake piston chamber on the centre housing.

50. Using a makeshift tool, fit the brake piston into the centre housing cavity (see chapter 6).

51. Check the tightness of the brake piston chamber (see chapter 6).

52. Refit the trumpet housing (see chapter 6).

53. Bleed the main brakes (see chapter 9).

54. Check the tightness of the hydraulic systems.

55. Carry out a road test on the brake system.

D . Removing and refitting the ring gear/differential assembly

Preliminary steps

56. Separate the power take-off (PTO) housing from the rear axle (see chapter 2).

57. Mark the direction in which intermediate shaft A of the power take-off (optional) is fitted and remove it from its clutch and the centre housing.

58. Remove the trumpet housings (see chapter 6).

59. Disconnect the differential lock supply pipe. Remove the 90° elbow union (44) located on the top left of the centre housing.

60. Raise the transfer pipe (42) in order to free it from the hydraulic chamber of the left-hand differential support.

61. Remove the forward speed sensor located on top of the ring gear, to the right of the centre housing.

62. Using the 3 mm Allen key, remove the screw (2) holding the pipe (1) clip. Take care not to lose the Nylstop locknut (Fig. 14).

63. Release and remove the internal pipe (1) from the centre housing (Fig. 15). Recover the "O" ring at its upper end.

64. Remove the brake pistons (see chapter 6), pairing them with their respective hydraulic chamber on the centre housing.

Removal

65. Using the tool for removing the ring gear/differential assembly (see §J) and with the assistance of an operator, hold the ring gear/differential assembly in the centre line of the left and right-hand differential unit supports.

66. Extract the left-hand differential support (see § B).

67. Extract the right-hand differential support (see § C).

68. Remove the differential unit assembly through the rear opening of the centre housing (Fig. 16).

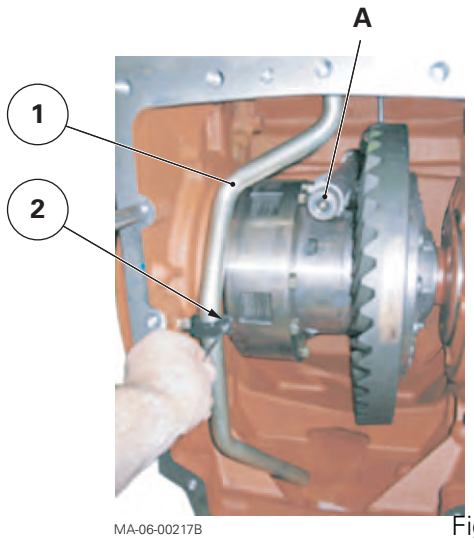

Fig. 14

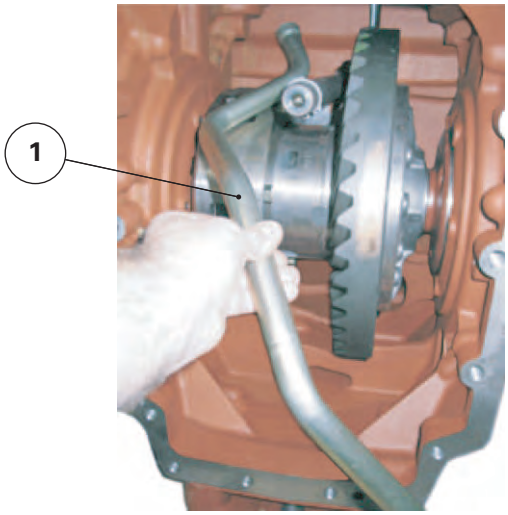

Fig. 15

Refitting

69. Using the same tool as previously, align the ring gear/differential assembly in the centre line of the bores of the right-hand support (27) and left-hand support (38).

70. Fit the right-hand differential support (see §C).

71. Fit the left-hand differential support (see §B).

72. Manually check the rotation of the ring gear/differential assembly.

Final steps

73. Check that the brake piston hydraulic chambers on the centre housing are clean.

74. Using a makeshift tool, fit the brake pistons into their respective chambers in the centre housing (see chapter 6).

75. Individually check the tightness of each brake piston (see chapter 6).

76. Refit the internal oil return pipe for the auxiliary spool valves and linkage spool valves.

77. Fit and adjust the forward speed sensor, after lightly smearing its thread with Loctite Form A Gasket 2 (Sensor Sealing or equivalent) (see chapter 11).

78. Refit the trumpet housings (see chapter 6).

79. If necessary, refit the power take-off intermediate shaft.

80. Assemble the power take-off housing on the rear axle (see chapter 2).

81. Check the operation of all controls (mechanical, hydraulic and electronic).

82. Carry out a road test.

83. Check the tightness of the mating faces and hydraulic unions.

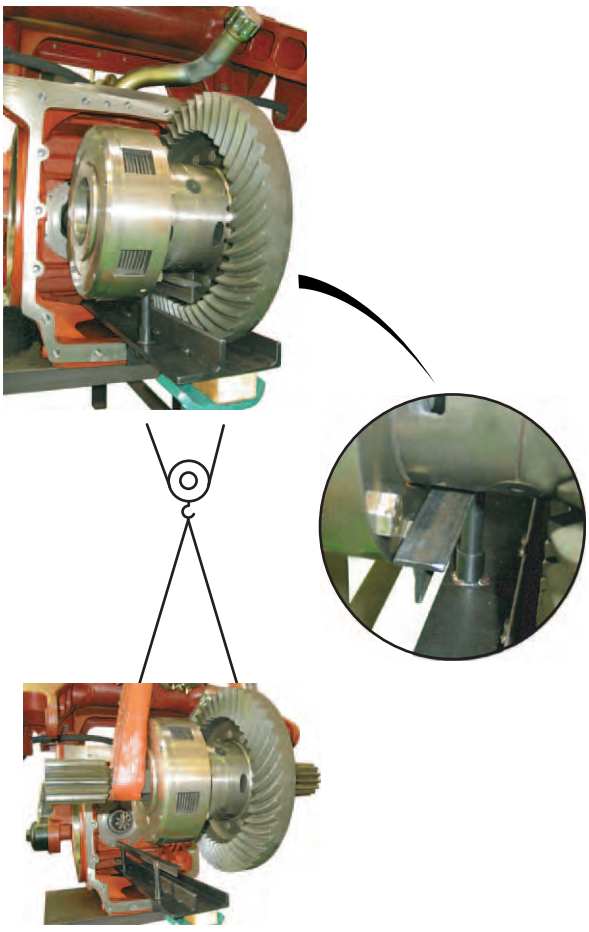

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Fig. 16

E . Disassembling and reassembling the multidisc differential lock

Preliminary steps

84. Carry out the preliminary steps of § D.

85. Remove the ring gear/differential assembly (see § D).

Disassembly (Fig. 17)

86. Position the ring gear/differential assembly with the multidisc locking device facing upwards.

87. Loosen and remove the screws (47).

88. Remove the cover plate (52).

89. Remove the discs (49), the intermediate plates (48) and the hub (53).

90. Remove the screws (41) and the unit (46).

91. Gently tap the cover plate (52) on a wooden block and remove the piston (58).

Remove the "O" rings (50) (51).

NOTE: *The 17 bar (GTA1040 transmission) or 21 bar supply (GTA1540 transmission) for the multidisc differential lock is provided via the left-hand differential support and the cover plate (52). A set of rings seals the circuit. See chapter 9.*

92. If necessary, drive out the cup (47).

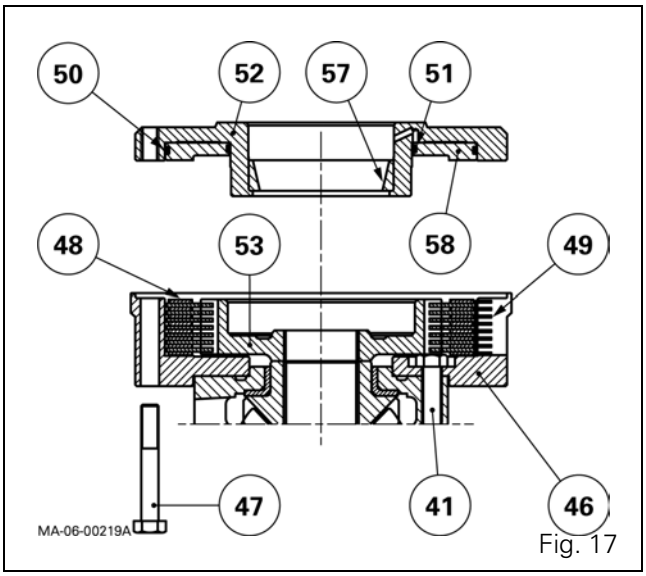

Fig. 17

Reassembly

93. Clean and check all components. Replace those that are defective.

IMPORTANT: *If it is necessary to replace the unit (46) and/or the cover plate (52) and/or the left-hand differential support, this must be systematically followed by a preload adjustment of the ring gear/differential assembly and a check on the back-lash between the pinion and the ring gear (see § I and H).*

94. Ensure that the hydraulic channels of the cover plate (52) are not blocked.

95. Lubricate and fit new "O" rings (50) (51) on the piston (58).

96. Use a plastic hammer to fit the piston, tapping around its rim in a circular motion.

Ensure that there are no seal fragments after fitting.

97. Fit the unit (46) on the half-unit (23). Lightly smear the thread of the screws (41) with Loctite 270 or equivalent. Tighten to a torque of 85-130 Nm.

98. Fit the hub (53). Insert the intermediate plates (48) and the friction discs (49) on the hub (53), starting with a disc, then an intermediate plate, and so on as per Fig. 17.

99. Position the cover plate (52) fitted with the piston (58). Fit and tighten the screws (47) to 90-120 Nm after lightly smearing their threads with Loctite 270 or equivalent.

100. Manually check that the discs and intermediate plates are not obstructed in any way.

Final steps

101. Refit the ring gear/differential assembly (see §D).

102. Carry out the final steps in § D.

F . Removing and refitting the planet gears and sun gears

Preliminary steps

103. Carry out the preliminary steps of § D.

104. Remove the ring gear/differential assembly (see § D).

105. Remove the differential lock mechanism (see § E).

Removal

106. Separate the half-units (23) (Fig. 18).

***IMPORTANT**: These components bear the same numbers. They must be fitted as pairs.*

107. Remove (Fig. 18):

- the sun gears (30);
- the planet gears (29);
- the washers (28);
- the spider (33).

108. If necessary, extract the cup (32) with the deflector (20) from its half-unit (23). Recover the shim(s) (59). Discard the deflector (20).

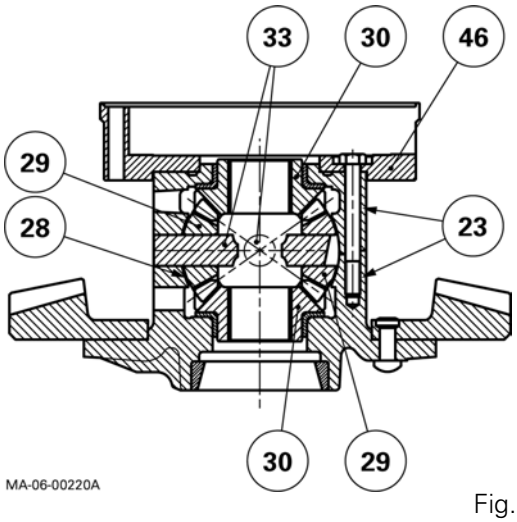

Fig. 18

Refitting

109. If necessary, lightly smear the external surface of the friction rings (35) (61) with Loctite 638 or equivalent. Fit them respectively into each half-unit (23) using a suitable fixture.

IMPORTANT: *After fitting, ensure that the lubrication holes are not blocked with Loctite.*

110. If work is necessary on the oil deflector (20) and the bearing cup (32), refer to step 125.

111. Refit the planet gears and sun gears by following steps 106 and 107 in reverse order.

Final steps

112. Position the unit (46).

Lightly smear the thread of the screws (41) with Loctite 270 or equivalent. Tighten to a torque of 85-130 Nm.

113. Refit (see § E):

- the hub (53);
- the intermediate plates;
- the discs;
- the cover plate (52).

114. Refit the ring gear/differential assembly (see steps 69 to 72).

115. Finish refitting the different assemblies, repeating steps 73 to 83.

G . Disassembling and reassembling the ring gear

Disassembly (Fig. 19, Fig. 20)

IMPORTANT: *If the ring gear is replaced, the pinion must also be replaced. Both parts bear the same number. They must be fitted as pairs.*

The ring gear and unit are originally assembled using rivets. During repairs, these rivets are replaced by screws and nuts.

The pinion and ring gear are available from the parts department under a single reference. The screws and nuts have their own reference.

116. Remove:
- the differential lock mechanism (§ E);
- the sun gears and planet gears (see § F).

117. Place the ring gear/half-unit assembly (23) on the column drill table (Fig. 19).

118. Drill and drive out the rivets (24) as follows:
- Using a centre punch, firmly punch the centre of each rivet (24) (ring gear teeth end) (Fig. 19);
- Using a 5 mm drill bit, drill the rivets to a depth of 12 mm (Fig. 19). Carry out a second drilling operation (Ø 12 mm) to the same depth.
- Using a pin punch and a suitable hammer, firmly drive out the rivets (Fig. 20).

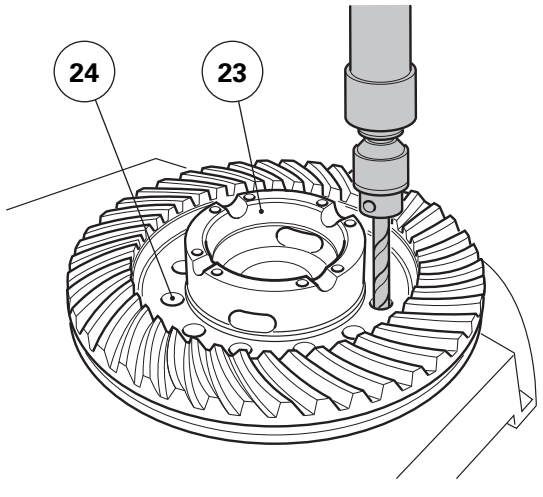

Fig. 19

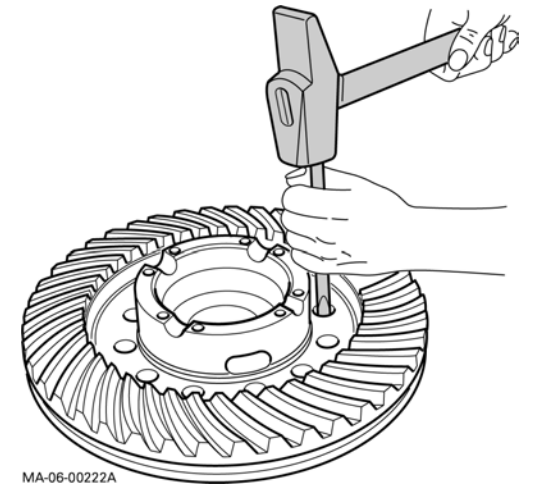

Fig. 20

Reassembly

119. Clean:

- the mating faces of the new ring gear (22) and the half-unit (23);
- the screws and nuts from the repair kit.

120. Lightly smear the thread of the screws that are to replace the rivets with Loctite 270 or equivalent. Fit them into the holes in the ring gear and the half-unit (23).

121. Screw on and tighten the nuts to 150-200 Nm.

122. Refit:

- the sun gears and planet gears (see § F);
- the differential lock mechanism (§ E).

H . Adjusting and checking the backlash

The backlash between the ring gear and pinion ensures the reliability and correct operation of the crownwheel and pinion.

This backlash must be checked after:

- shimming and preloading the tapered roller bearings of the pinion;
- adjusting the pinion position;
- shimming with preload of the ring gear/differential assembly.

It is obtained using the shim(s) inserted between the half-unit (23) and the bearing cup (32) in order to offset the ring gear/differential assembly from right to left and vice-versa in relation to the pinion.

Pre-adjustment

123. Using a suitable puller with reverse prongs, extract the bearing cup (32)/oil deflector (20) assembly. Systematically discard the deflector.

124. Select a shim thickness E determined according to the following formula:

E = DC + 0.35 mm

where

E = shim (59) thickness to be fitted

DC = ring gear offset

NOTE: *The DC (example: - 0.10) is engraved on the external surface of the ring gear (Fig. 22) after the number and pairing letter (3E18). It can be between 0 and - 0.60 mm.*

IMPORTANT: *When calculating E, ignore the negative sign preceding the DC (Fig. 22).*

125. Fit the previously selected shim(s) (59) (Fig. 22) into the bore of the half-unit (23). Fit the oil deflector (20) and the bearing cup (32) (Fig. 22).

NOTE: *The deflector acts as a centring device to position the shims inside the half-unit (23). It is fitted using the cup and a suitable makeshift tool. This method allows the deflector to rest against the cup both during and after its insertion.*

126. Check that the bearing cup is correctly positioned against the shim(s) and in contact with the oil deflector (20).

127. Refit and shim the ring gear/differential assembly (see § D and I).

Checking the pre-adjustment

128. Through the opening on the rear compartment of the centre housing (45), place the feeler pin of a dial gauge half way across the length of a tooth of the ring gear (Fig. 21).

129. Ensure that the pre-adjustment is correct by checking that the backlash between the ring gear and the pinion is between 0.15 and 0.45 mm. Carry out this step at three equidistant points on the ring gear.

IMPORTANT: *If the pre-adjustment is incorrect, reduce or increase the thickness of shim(s) E (59) calculated previously.*

Shim the ring gear/differential assembly again in order to obtain the preload for the tapered roller bearings (31) (32) and (54) (57) (see § D and I).

Check the backlash between the pinion and the ring gear a second time.

130. After obtaining a preload for the tapered roller bearings and correct adjustment of the backlash, continue the reassembly steps.

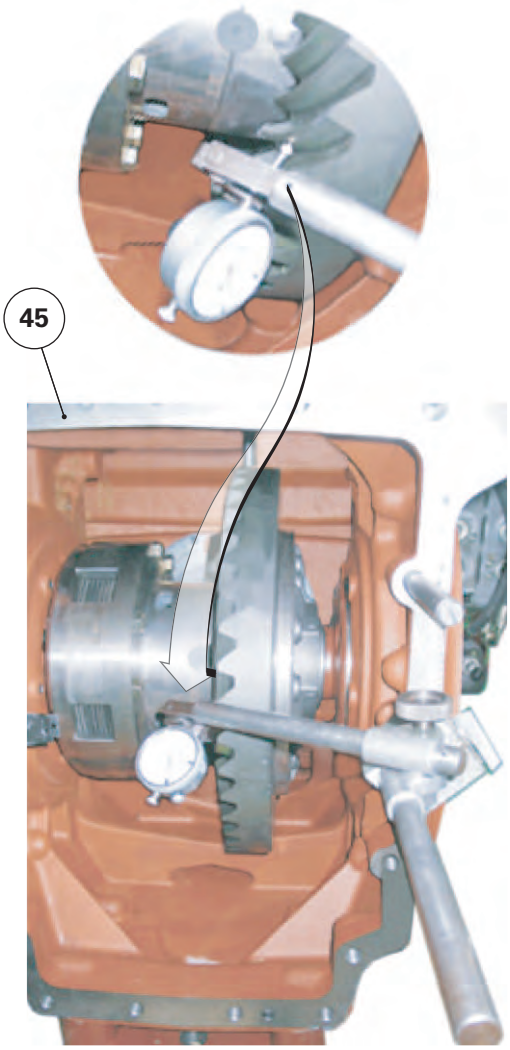

Fig. 21

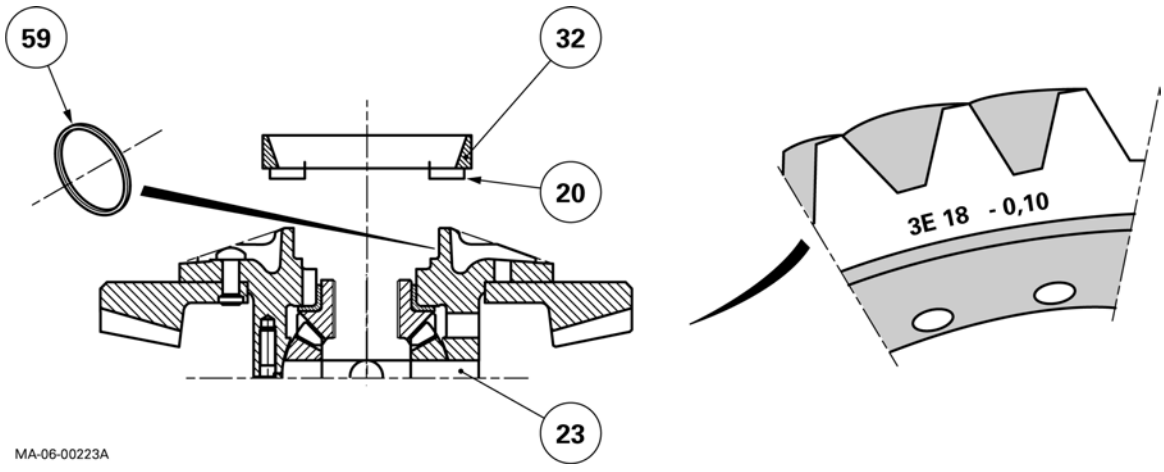

Fig. 22

I . Shimming the ring gear/differential assembly

The ring gear/differential assembly must be shimmed if it is necessary to replace one or more of the following components:

- the centre housing (45);
- the crownwheel and pinion (ring gear/pinion) (see § G and chapter 6);
- the tapered roller bearings (31) (32) and (54) (57);
- the right-hand differential support (27);
- the left-hand differential support (38).

Preliminary steps

131. Ensure that the shims (59) used for the backlash between the ring gear and the pinion are fitted between the half-unit (23) and the bearing cup (32).

132. Fit the ring gear/differential assembly into the centre housing using tool ref. 3378502M11, (see § D and J) and fit the right-hand differential support (27) (see § D).

133. Remove the bearing cone (54) and the shim(s) (55) from the left-hand differential support (38).

Shimming

134. Slide the bearing cone (54) onto tool ref. 3378117M1, (see § J) suitable for use with the 5" multidisc differential unit.

Using two screws, fix the tool onto the centre housing (Fig. 23).

135. Tighten the central screw of the tool to 10 Nm (Fig. 23).

IMPORTANT: *Turn the ring gear of the crownwheel and pinion a few turns to correctly fit the cones in the bearing cups. Check the tightening torque of the central screw again.*

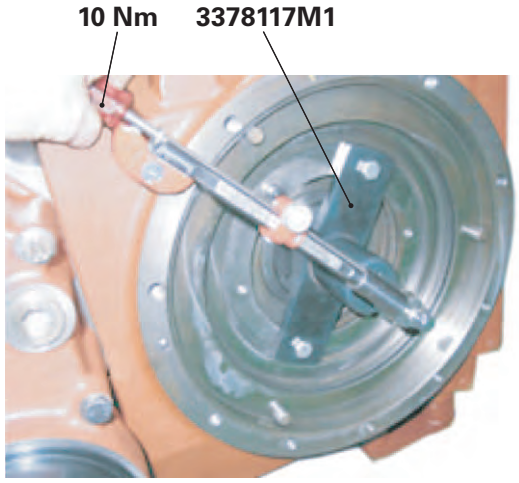

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Fig. 23

136. Using a suitable depth gauge, measure dimension B at two opposite points (Fig. 24). Calculate the average of the two readings; we will also call this average B.

137. Determine dimension C between the bearing cone (54) and the mating face of the left-hand differential support (38) on the centre housing using the following formula (Fig. 25): **C = B-10 mm**.

NOTE: *10 mm is the thickness of tool ref. 3378117M1.*

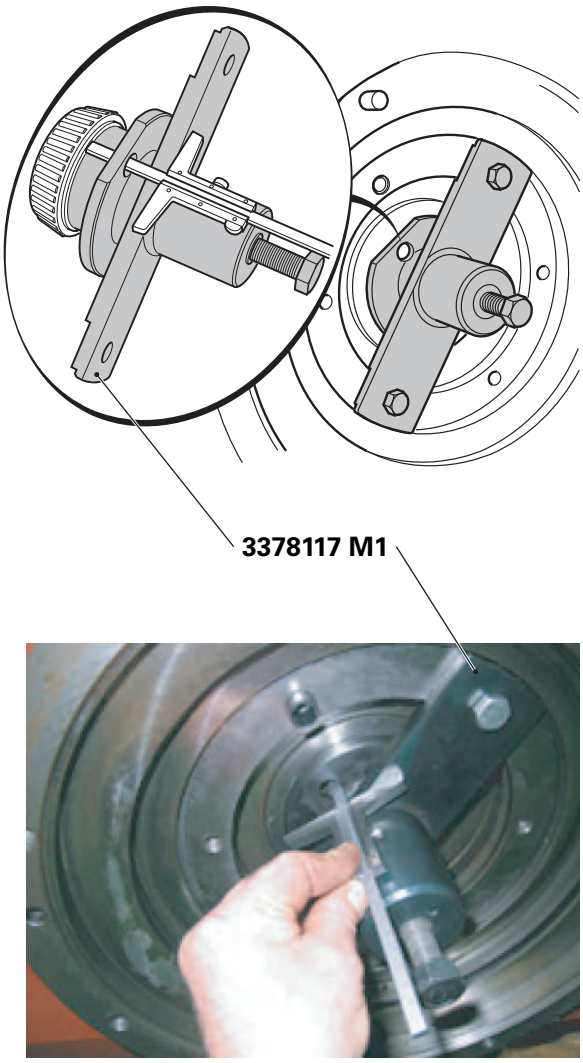

Fig. 24

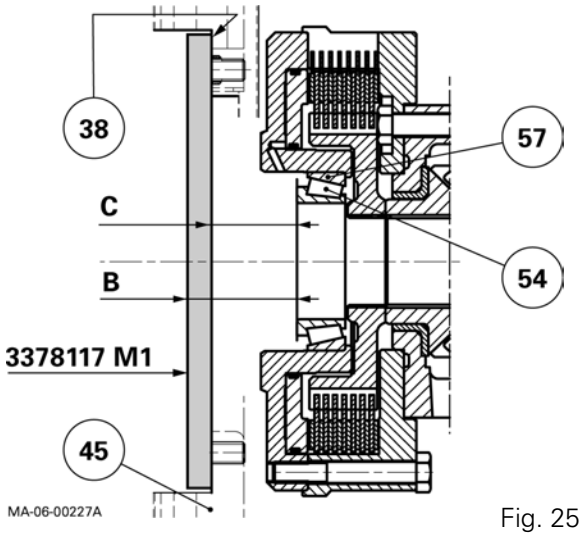

Fig. 25

138. Using a suitable depth gauge and a ruler, measure dimension Y at two opposite points. Calculate the average of the two readings; we will also call this average Y.

139. Determine the spacing l between the mating face of the bearing cone (54) and the left-hand differential support (38) using the following formula (Fig. 25, Fig. 26, Fig. 27): **E = C-Y**.

140. Fill space l with a shim (55) thickness.

141. Add an extra shim thickness between 0.05 and 0.15 mm in filled space l to obtain a preload P2 (Fig. 27) so that: **P2 = 0.05 to 0.15 mm**.

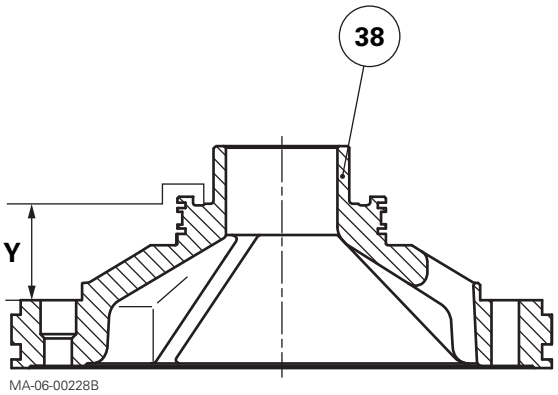

Fig. 26

Final steps

142. Remove the tool and the bearing cone (54).

143. On the left-hand differential support (38), fit the shims determined in step 141. Centre the differential assembly, fit the left-hand differential support (38) (see § D) and carry out the final steps in § D.

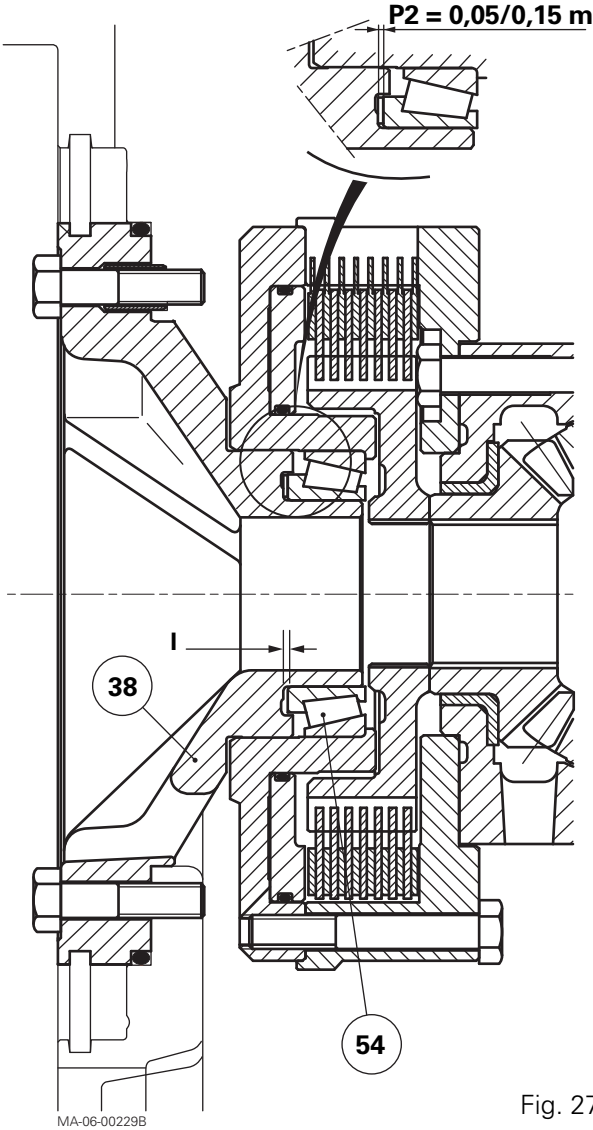

Fig. 27

J . Service tools

Tools available in the AGCO network

- 3378117M1: Shimming tool (Fig. 28)
- 3378502M11: Rods (L = 59 mm) and tool for removing and refitting the ring gear/differential assembly (Fig. 29)

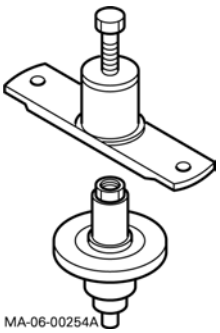

Fig. 28

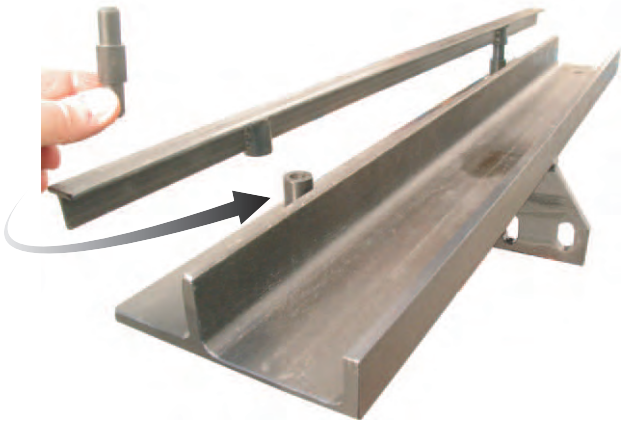

Fig. 29

GPA40 - 5" differential and multidisc lock

6B19 - GPA40 - 7" differential and multidisc lock

CONTENTS

GPA40 - 7" differential and multidisc lock

A . General

On tractors fitted with GTA1040 or GTA1540 transmission, the 7" multidisc differential is fitted with a hydraulically controlled multidisc locking device. This is located on the left inside the centre housing. The main components of the differential lock are housed inside a unit.

The 7" dimension is determined by the space between two planet gears mounted on their spider (Fig. 1).

On tractors fitted with GTA1540 transmission (50 kph), the differential supports (25) (40) are fitted with a mechanical device (Fig. 2) that controls the return of each brake piston (see chapter 6).

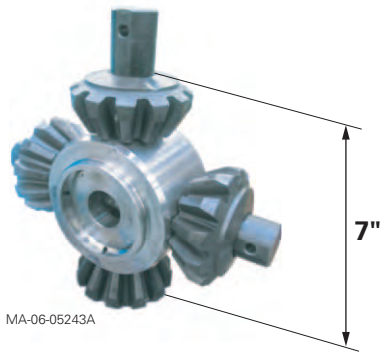

Fig. 1

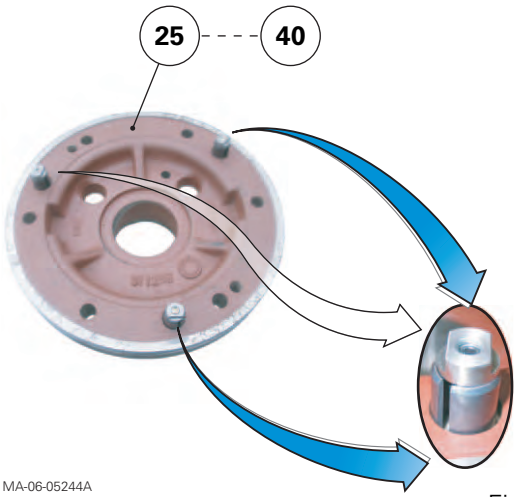

Fig. 2

Construction

The ring gear is fixed to the differential unit using screws. The ring gear/differential assembly is driven by the pinion and turns on two tapered roller bearings supported by two lateral supports, which are centred by locating pins (23) and fixed to the centre housing using screws.

The differential is composed of a unit containing four planet gears (31) and two sun gears (32) (33). The left-hand sun gear (33) also acts as a hub for the discs (56) of the multidisc locking device. The planet gears turn on four half-shafts (35) centred by the unit and the differential yoke (34). The half-shafts are held in place by pins which, in turn, are held by screws.

The planet gears are lubricated via the half-shafts (35). Each half-shaft is fitted with a central channel and radial holes.

The sun gears, the left-hand differential support (40), the cover plate (50) and the differential yoke (34) have a lubricating channel, which allows the transmission oil to flow to the friction rings (36) (37), the discs (56) and the differential lock mechanism.

The preload shimming of the ring gear/differential assembly is carried out using the shim(s) (48) fitted between the bearing cone (46) and the left-hand differential support (40).

The backlash between the pinion and the ring gear is obtained using the shim(s) (29) inserted between the bearing cone (27) and the right-hand differential support (25).

The multidisc locking device incorporates:

- a unit (21) holding the discs (56) and the intermediate plates (55);
- a hub (33) splined to the input sun gear of the left-hand trumpet housing;
- a cover plate (50) fitted with the piston (52) and supported by the tapered roller bearings (46) (47).

  The piston chamber is located inside the cover plate and communicates with a channel from the left-hand differential support, which allows the 17 bar (GTA1040 transmission) or 21 bar low pressure (GTA1540 transmission) to act on the piston (52). Two rings (49) ensure the system is sealed.

Operation

Clutch engaged position (engaged)

When the differential lock solenoid valve is activated, the hydraulic pressure is delivered via the channels of the left-hand differential support (40) and the cover plate (50), and then enters the piston chamber (52). The piston then compresses the intermediate plates (55) and the discs (56) that are attached to the half-unit (21) and the hub (33) via lugs and splines.

In this position with the clutch engaged, the input sun gears of the left and right-hand trumpet housings turn at the same speed.

Clutch disengaged position (disengaged)

When the hydraulic pressure is released, the piston withdraws and the discs and intermediate plates decompress, allowing the sun gears and planet gears to carry out their differential function.

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Parts list (Fig. 3)

(20) Ring gear
(21) Unit
(22) Screw
(23) Locating pin
(24) Screw
(25) Right-hand differential support
(26) "O" rings
(27) Bearing cone
(28) Bearing cup
(29) Shim(s)
(30) Spherical washer
(31) Planet gear
(32) Right-hand sun gear
(33) Left-hand sun gear
(34) Differential yoke
(35) Planet gear half-shafts
(36) Friction ring
(37) Friction ring
(38) Needle rollers
(39) Screw
(40) Left-hand differential support
(41) "O" ring
(42) Transfer pipe
(43) "O" ring
(44) Union
(45) Centre housing
(46) Bearing cone
(47) Bearing cup
(48) Shim(s)
(49) Seal rings
(50) Cover plate
(51) Screw
(52) Piston
(53) "O" ring
(54) "O" ring
(55) Intermediate plates
(56) Discs
(58) Rivets

Legend

A Details
B Details
P 17 bar pressure (GTA1040 transmission) or 21 bar pressure (GTA1540 transmission)

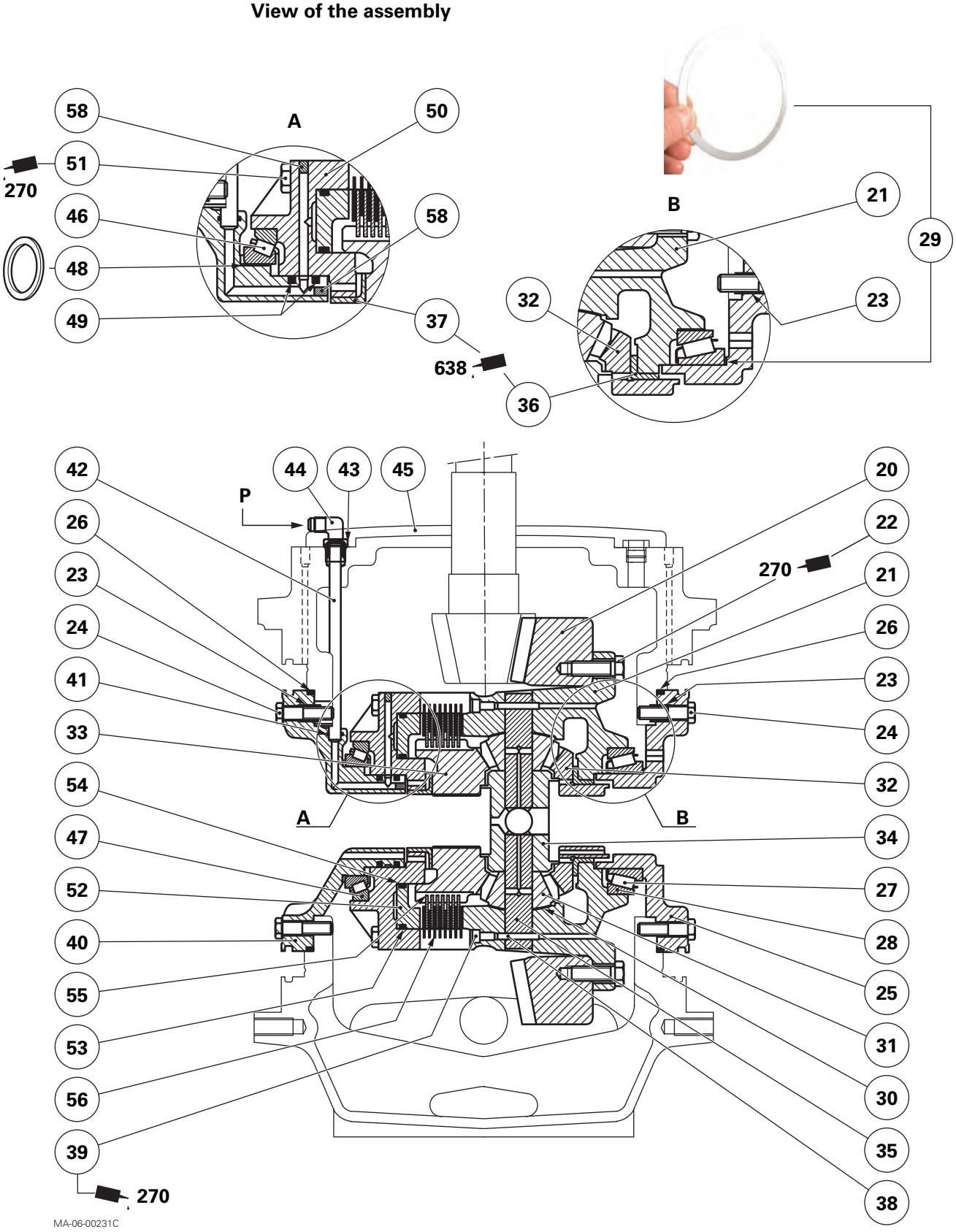
View of the assembly
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Fig. 3

Parts list (Fig. 4)

(20) Ring gear
(21) Unit
(22) Screw
(23) Locating pin
(24) Screw
(25) Right-hand differential support
(26) "O" rings
(27) Bearing cone
(28) Bearing cup
(29) Shim(s)
(30) Spherical washer
(31) Planet gear
(32) Right-hand sun gear
(33) Left-hand sun gear
(34) Differential yoke
(35) Planet gear half-shafts
(36) Friction ring
(37) Friction ring
(38) Needle rollers
(39) Screw
(40) Left-hand differential support
(41) "O" ring
(42) Transfer pipe
(43) "O" ring
(44) Union
(46) Bearing cone
(47) Bearing cup
(48) Shim(s)
(49) Seal rings
(50) Cover plate
(51) Screw
(52) Piston
(53) "O" ring
(54) "O" ring
(55) Intermediate plates
(56) Discs

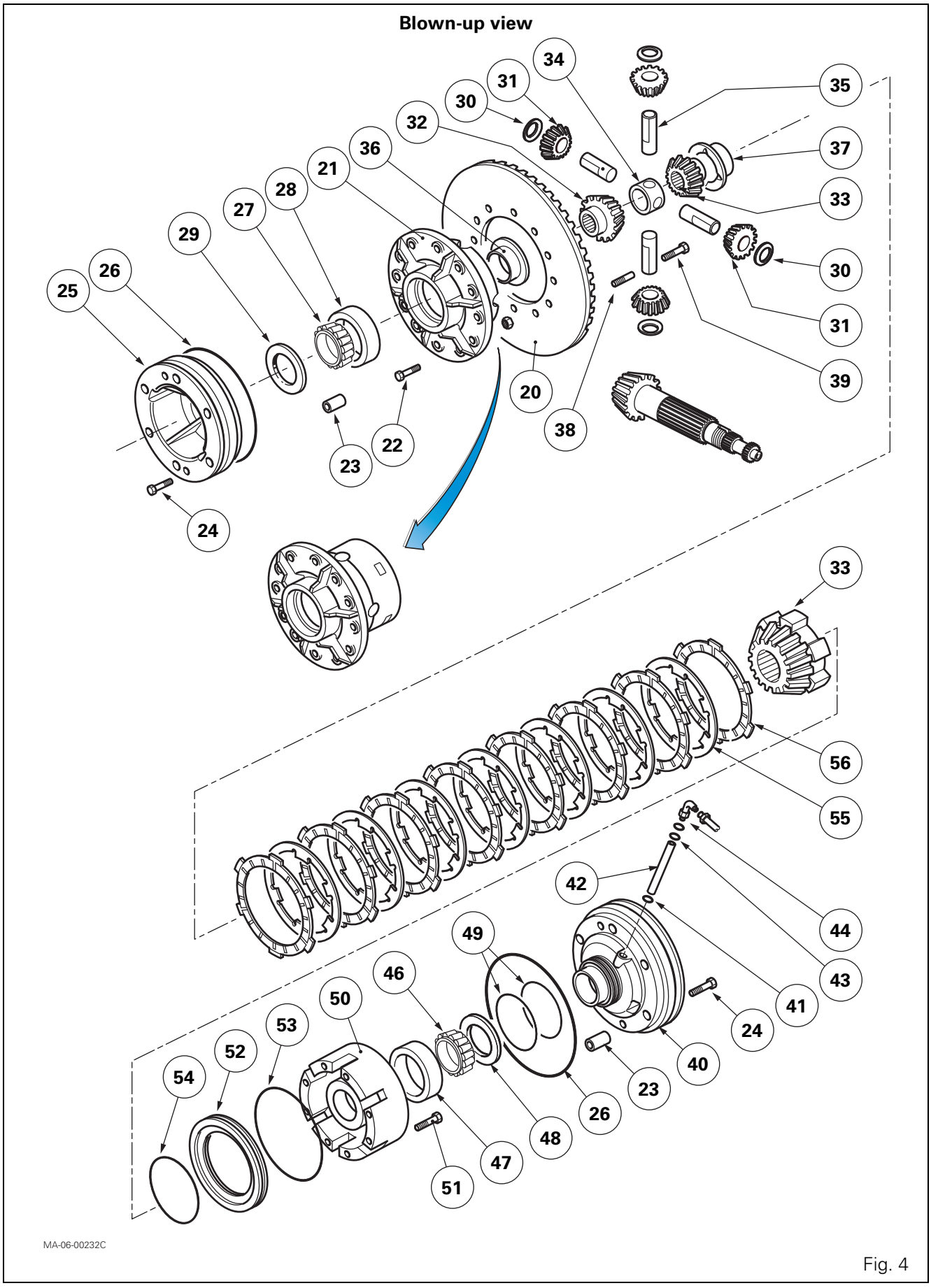
Blown-up view
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Fig. 4

B . Removing and refitting the left-hand differential support and seal rings

Removing the left-hand differential support (40) provides direct access to the seal rings of the hydraulic supply line for the differential locking device.

Preliminary steps

1. Remove the trumpet housing concerned (see chapter 6).
2. Disconnect the differential lock supply pipe.
   Remove the 90° elbow union (44) (Fig. 5) located on the top left of the centre housing.
3. Raise the transfer pipe (42) (Fig. 5) in order to free it from the hydraulic chamber of the left-hand differential support.
4. Drive out the brake piston (see chapter 6).
5. To prevent the ring gear and crownwheel and pinion causing any interference with the end of the forward speed sensor, remove or deactivate the forward speed sensor located on top of the ring gear, to the right of the centre housing.

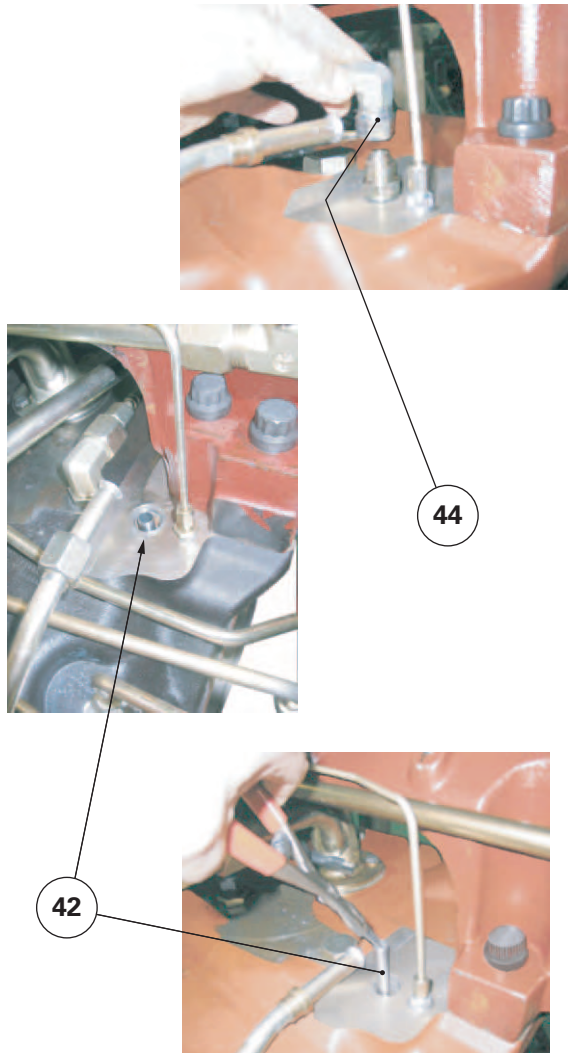

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Fig. 5

Removing the left-hand differential support

6. Select two original screws (24) fitted opposite one another on the left-hand differential support. Unscrew them.

7. In their place, screw in two guide studs G (M12, length approx. 120 mm) (Fig. 6) until one of their ends is against the cover plate (50) of the differential unit (Fig. 7).

NOTE: *Guide studs G are used to support and retain the ring gear/differential assembly in the same axis as before the left-hand differential support was removed.*

They also allow the left-hand support to be correctly refitted to the centre housing at a later stage without chipping or breaking the seal rings (49).

8. Use two locally obtained extraction screws V (M12, length approx. 120 mm) (Fig. 6). Screw them into the tapped holes of the left-hand differential support in preparation for its removal.

9. Gradually and alternately screw in the two screws V until the left-hand differential support is completely extracted. This support is fitted tightly into the bore of the centre housing.

10. Remove the left-hand differential support. Recover or discard the "O" ring (26). This seal seals the brake piston chamber.

Check that the following are present on the support:

- the bearing cone (46);
- the shim(s) (48) (not to be discarded or lost), used to preload the tapered roller bearings of the ring gear/differential assembly.

11. Check that the locating pin (23) is present on the centre housing.

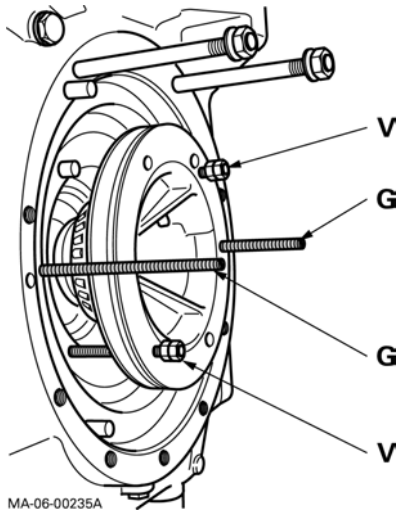

Fig. 6

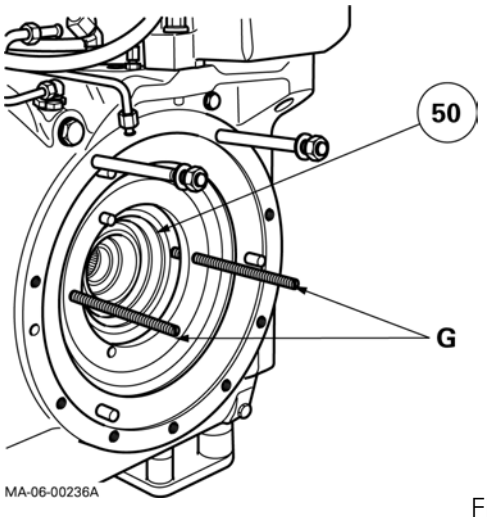

Fig. 7

Removing the seal rings

12. Remove the seal rings from the left-hand differential support. If these are to be re-used, visually note the position of the seal rings in relation to their respective grooves.

13. Check:

- their flexibility, manually without damaging them;
- their profile, visually.

In case of any uncertainty as to their condition, systematically discard the seal rings.

Refitting the seal rings

14. Clean the components and pay special attention to the seal ring grooves, without using metal or sharp tools.

15. Check each component and, if necessary, replace any defective parts.

16. Test-fit the seal rings (49) (new or re-used) in the grooves of the left-hand differential support (40) (Fig. 8).

NOTE: *For re-used seal rings, take note of the visual marks made during step 12.*

17. Check that the seal rings turn correctly and freely. Remove them.

18. Lightly smear the seal rings (new or re-used) with miscible grease. Definitively fit them into the grooves of the left-hand differential support, ensuring that:

- they are seated correctly at the base of the groove;
- their ends overlap correctly (Fig. 8).

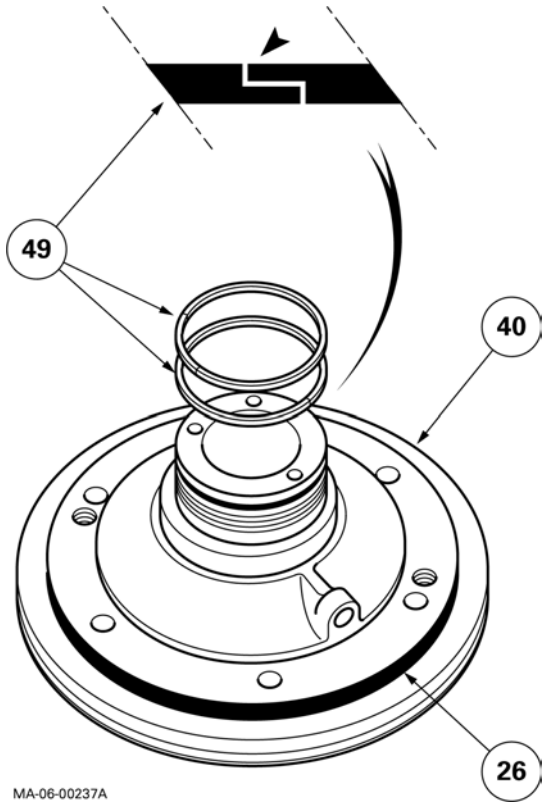

Fig. 8

Refitting the left-hand differential support

19. Check that the following parts are present on the left-hand differential support:
- the "O" ring (41) inside the hydraulic port of the transfer pipe (42) on the differential lock;
- the "O" ring (26) (Fig. 8);
- the seal rings (49) correctly positioned at the base of the groove of the left-hand differential support;
- the bearing cone (46) and the shims (48) recovered during removal to preload the tapered roller bearings of the ring gear/differential assembly.

IMPORTANT 1: *If the left-hand differential support and/or the tapered roller bearings (bearing cone and cup) are to be replaced, it will be necessary to carry out the shimming on the ring gear/differential assembly again (see § I).*

IMPORTANT 2*: If guide studs G used during removal have been removed for any reason, it is advisable to refit them so that the ring gear/differential assembly is returned to the same position as previously. To do this, use shimming tool ref. 3378117M1 (see § J) to centre and reposition the ring gear/differential assembly in the housing, turning the central screw until the bearing cone (46) is positioned in the cup (47). Fit guide studs G as in step 7. Once the ring gear/differential assembly is correctly centred, remove the tool.*

20. Check that the locating pin (23) is present on the centre housing (Fig. 9).

21. Slide the left-hand support onto guide studs G.
Start fitting the support using a soft hammer. Continue fitting it using the original four screws (24).

22. Remove guide studs G. Fit the two remaining screws. Gradually tighten the six screws equally in diametrically opposed pairs to a final tightening torque of 85-130 Nm.

23. Manually check that the ring gear/differential assembly rotates freely.

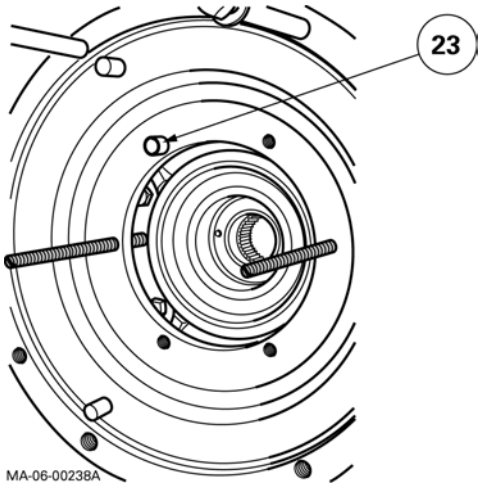

Fig. 9

Final steps

24. Fit and adjust the forward speed sensor, after lightly smearing its thread with Loctite Form A Gasket 2 (Sensor Sealing or equivalent) (see chapter 11).
25. Clean out any dirt from the brake piston chamber on the centre housing.
26. Using a makeshift tool, fit the brake piston into the centre housing cavity (see chapter 6).
27. Engage the transfer pipe (42) in the left-hand differential support.
28. Screw in the elbow union (44). Reconnect the differential lock supply pipe.
29. Check the tightness of the brake piston chamber (see chapter 6).
30. Refit the trumpet housing (see chapter 6).
31. Bleed the main brakes (see chapter 9).
32. Check the tightness of the hydraulic systems.
33. Carry out a road test on the brake system.
34. Carry out a test on the differential locking device.

C . Removing and refitting the right-hand differential support

The right-hand differential support performs no hydraulic function. However, it has a number of characteristics in common with the left-hand differential support.

It is also:

- fitted tightly into the bore of the centre housing;
- positioned by a pin (23);
- fitted with two tapped holes for its removal;
- fitted with a groove to house the "O" ring (26) used to seal the brake piston chamber.

It supports the shim(s) (29) and the right-hand tapered roller bearing cone (27) of the ring gear/differential assembly.

Preliminary steps

35. Remove the trumpet housing concerned (see chapter 6).

36. Drive out the brake piston (see chapter 6).

37. To prevent the ring gear and crownwheel and pinion causing any interference with the end of the forward speed sensor, remove or deactivate the forward speed sensor located on top of the ring gear, to the right of the centre housing.

Removing the right-hand differential support

38. Select two original screws (24) fitted opposite one another on the right-hand differential support (25). Unscrew them.

39. In their place, screw in two guide studs G (M12, length approx. 120 mm) (Fig. 10) until one of their ends is against the differential unit (21) (Fig. 11).

NOTE: *Guide studs G are used to support and retain the ring gear/differential assembly in the same position as before the right-hand differential support was removed. They also allow the right-hand support on the centre housing to be correctly refitted at a later stage.*

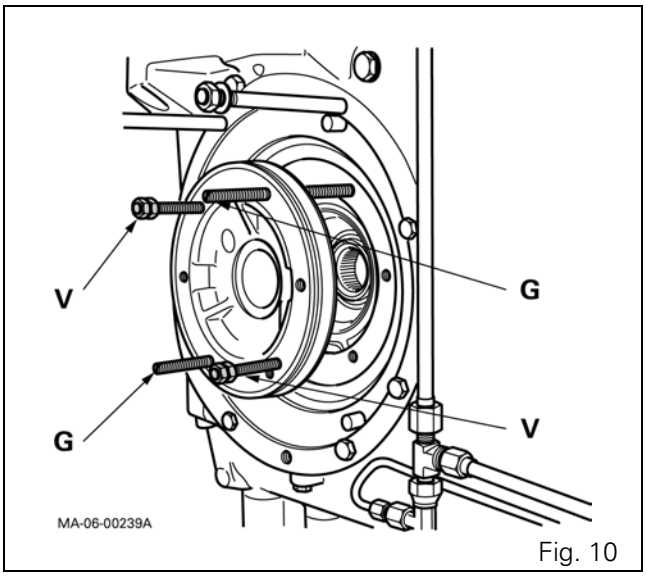

Fig. 10

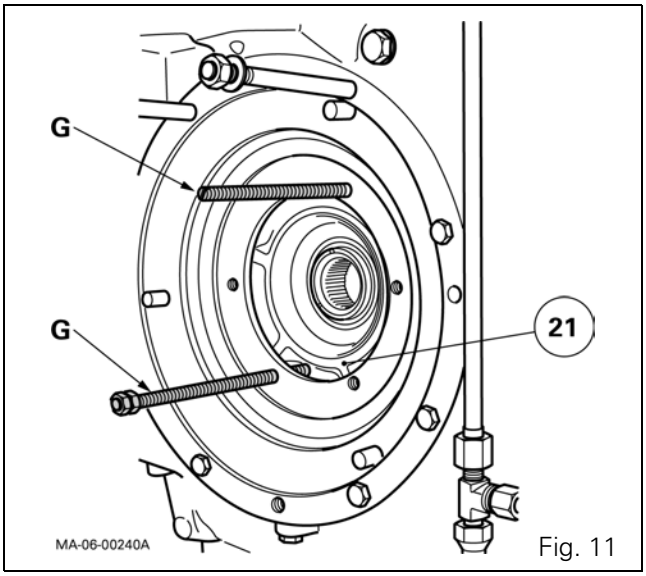

Fig. 11

40. Use two locally obtained extraction screws V (M12, length approx. 120 mm) (Fig. 10). Screw them into the tapped holes of the right-hand differential support in preparation for its removal.

41. Gradually and alternately screw in the two screws until the right-hand differential support is completely extracted. This support is fitted tightly into the bore of the centre housing.

42. Remove the right-hand differential support. Recover or discard the "O" ring (26). This seal seals the brake piston chamber.

Refitting the right-hand differential support

43. Check that the following parts are present on the right-hand differential support (25) (Fig. 12):

- the "O" ring (26);
- the shim(s) (29);
- the bearing cone (27).

The tapered roller bearing cone (27) is fitted firmly onto the right-hand differential support.

IMPORTANT 1: *If the right-hand differential support and/or the tapered roller bearing (bearing cone and cup) are to be replaced, it will be necessary to carry out the of the ring gear/differential assembly again (see §I) and to check or adjust the backlash between the ring gear and the pinion again (see §H).*

IMPORTANT 2*: If guide studs G used during removal have been removed for any reason, it is advisable to refit them so that the ring gear/differential assembly is returned to the same position as previously.*

44. Check that the locating pin (23) is present on the centre housing (Fig. 13).

45. Slide the right-hand differential support onto guide studs G.

Start fitting the support using a soft hammer. Continue fitting it using the original four screws (24).

46. Remove guide studs G. Fit the two remaining screws. Gradually tighten the six screws equally in diametrically opposed pairs to a final tightening torque of 85-130 Nm.

47. Manually check that the ring gear/differential assembly rotates freely.

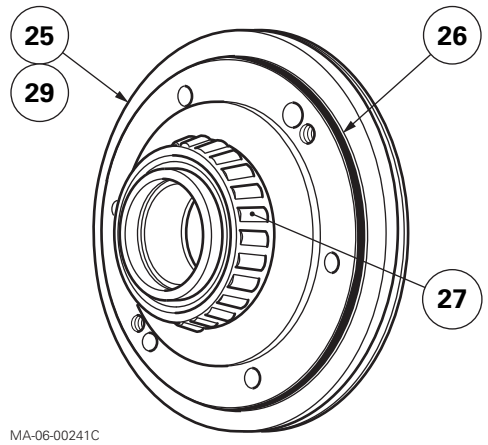

Fig. 12

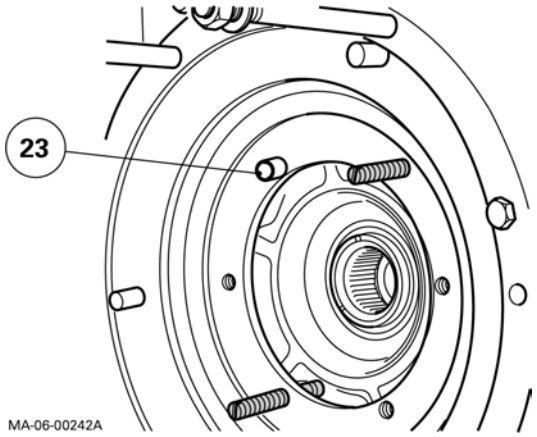

Fig. 13

Final steps

48. Fit and adjust the forward speed sensor, after lightly smearing its thread with Loctite Form A Gasket 2 (Sensor Sealing or equivalent) (see chapter 11).

49. Clean out any dirt from the brake piston chamber on the centre housing.

50. Using a makeshift tool, fit the brake piston into the centre housing cavity (see chapter 6).

51. Check the tightness of the brake piston chamber (see chapter 6).

52. Refit the trumpet housing (see chapter 6).

53. Bleed the main brakes (see chapter 9).

54. Check the tightness of the hydraulic systems.

55. Carry out a road test on the brake system.

D . Removing and refitting the ring gear/differential assembly

Preliminary steps

56. Separate the power take-off (PTO) housing from the rear axle (see chapter 2).

57. Mark the direction in which intermediate shaft A of the power take-off (optional) is fitted and remove it from its clutch and the centre housing.

58. Remove the trumpet housings (see chapter 6).

59. Disconnect the differential lock supply pipe. Remove the 90° elbow union (44) located on the top left of the centre housing.

60. Raise the transfer pipe (42) in order to free it from the hydraulic chamber of the left-hand differential support.

61. Remove the forward speed sensor located on top of the ring gear, to the right of the centre housing.

62. Using the 3 mm Allen key, remove the screw (2) holding the pipe (1) clip. Take care not to lose the Nylstop locknut (Fig. 14).

63. Disconnect and remove the internal pipe (1) from the centre housing. Recover the "O" ring at its upper end.

64. Remove the brake pistons (see chapter 6), pairing them with their respective hydraulic chamber on the centre housing.

Removal

65. Using the tool for removing the ring gear/differential assembly (see §J) and with the help of an operator, hold the ring gear/differential assembly in the centre line of the left and right-hand differential unit supports.

66. Extract the left-hand differential support (see § B).

67. Extract the right-hand differential support (see § C).

68. Remove the ring gear/differential assembly through the rear opening of the centre housing (Fig. 15).

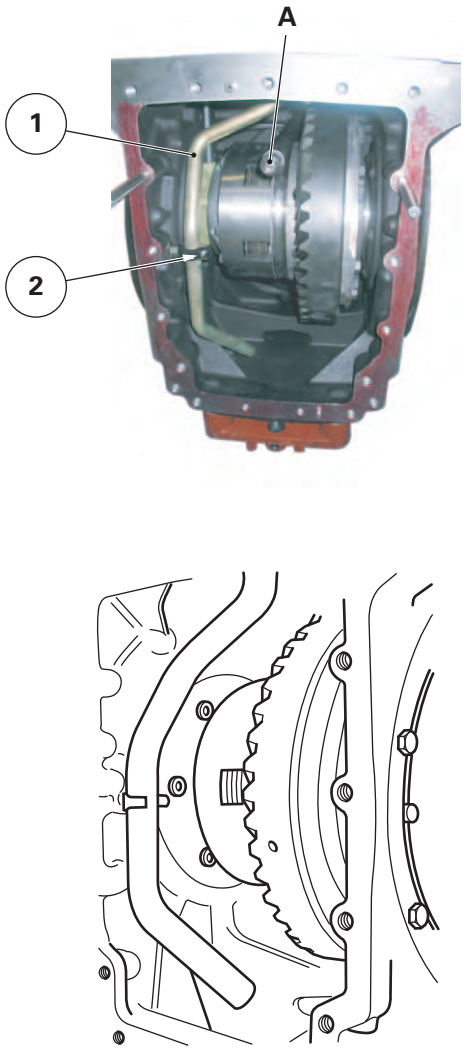

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Fig. 14

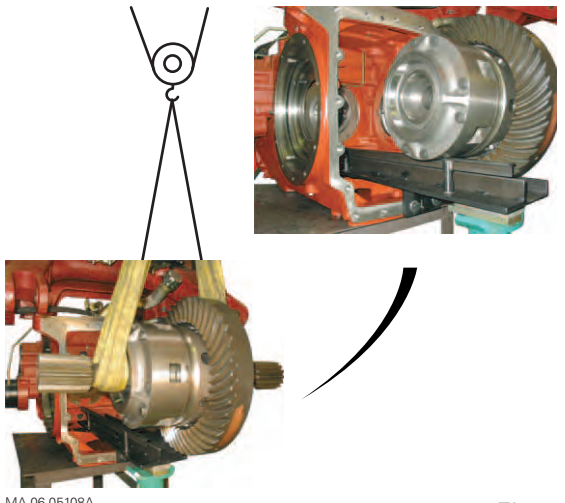
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Fig. 15

Refitting

69. Using the same tool as previously, align the ring gear/differential assembly in the centre line of the bores of the right-hand support (25) and left-hand support (40).

70. Fit the right-hand differential support (see §C).

71. Fit the left-hand differential support (see §B).

72. Manually check the rotation of the ring gear/differential assembly.

Final steps

73. Check that the brake piston hydraulic chambers on the centre housing are clean.

74. Using a makeshift tool, fit the brake pistons into their respective chambers in the centre housing (see chapter 6).

75. Individually check the tightness of each brake piston (see chapter 6).

76. Refit the internal oil return pipe for the auxiliary spool valves and linkage spool valves.

77. Fit and adjust the forward speed sensor, after lightly smearing its thread with Loctite Form A Gasket 2 (Sensor Sealing or equivalent) (see chapter 11).

78. Refit the trumpet housings (see chapter 6).

79. If necessary, refit the power take-off intermediate shaft.

80. Assemble the power take-off housing on the rear axle (see chapter 2).

81. Check the operation of all controls (mechanical, hydraulic and electronic).

82. Carry out a road test.

83. Check the tightness of the mating faces and hydraulic unions.

E . Disassembling and reassembling the multidisc differential lock

Preliminary steps

84. Carry out the preliminary steps of § D.

85. Remove the ring gear/differential assembly (see § D).

Disassembly (Fig. 16)

86. Position the ring gear/differential assembly with the multidisc differential lock facing upwards.

87. Loosen and remove the screws (51).

88. Remove the cover plate (50).

89. Remove the discs (56) and the intermediate plates (55) from the left-hand sun gear (33).

90. Gently tap the cover plate (50) on a wooden block and remove the piston (52).

Remove the "O" rings (53) (54).

NOTE: *The 17 bar (GTA1040 transmission) or 21 bar supply (GTA1540 transmission) for the multidisc differential lock is provided via the left-hand differential support and the cover plate (50). A set of rings seals the circuit. See chapter 9.*

91. If necessary, drive out the cup (47).

Reassembly

92. Clean and check all components. Replace those that are defective.

IMPORTANT: *If it is necessary to replace the unit (21) and/or the cover plate (50) and/or the left-hand differential support, this must be systematically followed by a preload adjustment of the ring gear/differential assembly and a check on the backlash between the pinion and the ring gear (see § I and H).*

93. Ensure that the hydraulic channels of the cover plate (50) are not blocked.

94. Lubricate and fit new "O" rings (53) (54) on the piston (52).

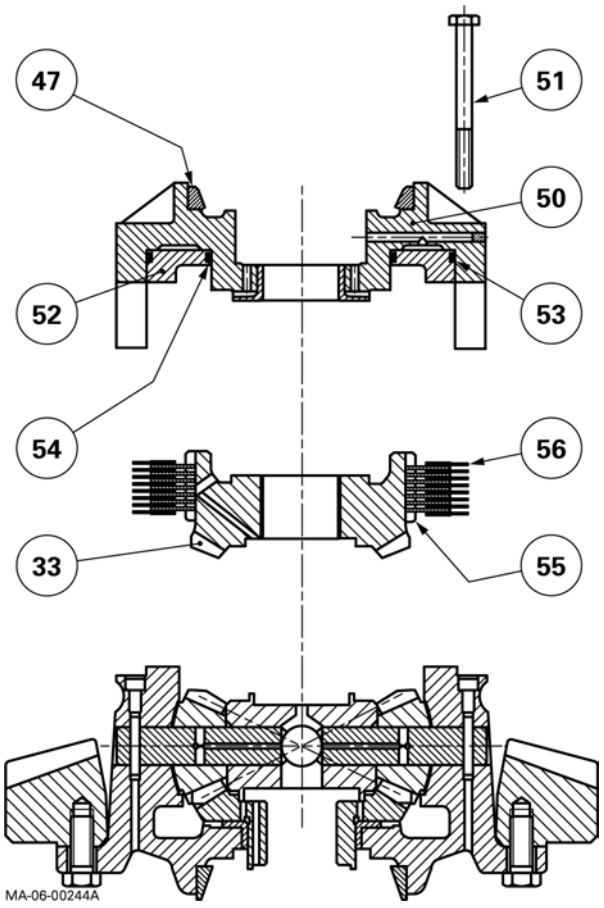


Fig. 16

95. Use a plastic hammer to fit the piston, tapping around its rim in a circular motion.

Ensure that there are no seal fragments after fitting.

96. Insert the intermediate plates (55) and the friction discs (56) into the left-hand sun gear (33), starting with a disc, then an intermediate plate and so on as shown in the view of the assembly.

97. Fit the cover plate (50) fitted with the piston (52). Fit and tighten the screws (51) to 100-130 Nm after lightly smearing their threads with Loctite 270 or equivalent.

98. Manually check that the discs and intermediate plates are not obstructed in any way.

Final steps

99. Refit the ring gear/differential assembly (see §D).

100. Carry out the final steps in § D.

F . Removing and refitting the planet gears and sun gears

Preliminary steps

101. Carry out the preliminary steps of § D.

102. Remove the ring gear/differential assembly (see § D).

103. Remove the differential lock mechanism (see § E).

Removal

104. Remove (Fig. 17):

- the left-hand sun gear (33)

  NOTE: *This sun gear provides the following two functions:*

  - *it is one of the main components of the differential system;*
  - *it has a large splined profile, allowing the series of discs of the differential lock to be fitted;*
- the ring gear hindering the removal of the planet gear half-shafts.

105. Unscrew the screws (39).

106. Remove the needle rollers (38) from the unit (21).

107. Push on a half-shaft as indicated by the arrow (Fig. 17) to drive out the opposite half-shaft.

Repeat the step the remaining half-shafts.

Recover the spherical washers (30).

108. Remove the planet gears (31).

109. Remove the differential yoke (34) and right-hand sun gear (32).

110. If necessary:

- extract the bearing cup (28) from the unit (21);
- drive out the friction rings (36) (37).

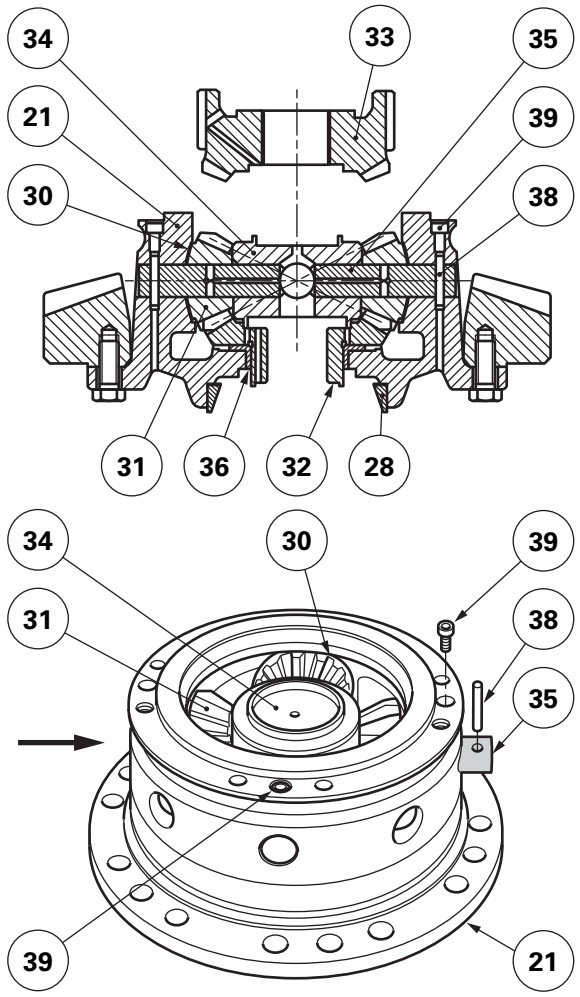


Fig. 17

Refitting

111. If necessary, lightly smear the external surface of the friction rings (36) (37) with Loctite 638 or equivalent. Fit them respectively into the cover plate (50) and the unit (21) using a suitable fixture.

IMPORTANT: *After fitting, ensure that the lubrication holes are not blocked with Loctite.*

112. If necessary, fit the bearing cup (28) against the shoulder of the unit (21).

113. Refit:

- the right-hand sun gear (32) in the friction ring (36);
- the differential yoke (34) in the direction shown in the view of the assembly.

114. Ensure that the central channels and radial holes of the planet gear half-shafts are not blocked.

115. Fit:

- the planet gears (31);
- the spherical washers (30);
- the half-shafts (35) with their hole facing towards the screw (39) as shown in the view of the assembly.

116. Fit the needle rollers (38).

Lightly smear the thread of the screws (39) with Loctite 270 or equivalent. Screw in the screws. Tighten to a torque of 25-35 Nm.

117. Manually check the rotation of the planet gears and the right-hand sun gear.

118. Refit the intermediate plates, the discs and the cover plate (50) (see § E).

119. Refit the ring gear (see § G).

Final steps

120. Refit:

- the cover plate (50) for the differential locking device (see § E);
- the ring gear/differential assembly (see § D).

121. Carry out the final steps in § D.

G . Disassembling and reassembling the ring gear

Disassembly (Fig. 18)

IMPORTANT: *If the ring gear is replaced, the pinion must also be replaced. Both parts bear the same number. They must be fitted as pairs.*

The pinion and ring gear are available from the parts department under a single reference.

122. Assisted by an operator, firmly tighten the ring gear in a vice fitted with protective jaws.

123. Unscrew the screws (22). Separate the ring gear from the unit.

Reassembly

124. Clean the mating faces of the new ring gear (20) and the differential unit (21).

125. For repairs, it is necessary to use the screws (22) referenced in the spare parts catalogue.

126. Degrease each screw.

127. Screw a guide stud into a tapped hole in the ring gear. Fit the ring gear to the unit and remove the stud.

128. Lightly smear the thread of each screw (22) with Loctite 270.

129. Screw in the screws (22) several times in order to correctly fit the ring gear against the unit (21). Tighten to a torque of 240-320 Nm.

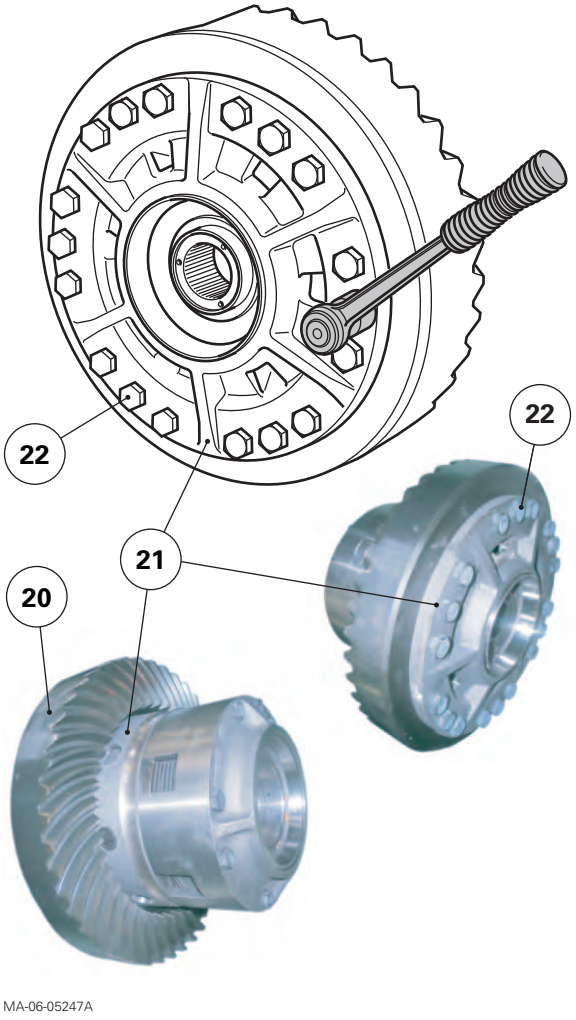


Fig. 18

H . Adjusting and checking the backlash

The backlash between the ring gear and pinion ensures the reliability and correct operation of the crownwheel and pinion.

This backlash must be checked after:

- shimming and preloading the tapered roller bearings of the pinion;
- adjusting the pinion position;
- shimming with preload of the ring gear/differential assembly.

It is obtained using the shim(s) inserted between the right-hand differential support (25) and the bearing cone (27) in order to offset the ring gear/differential assembly from right to left and vice-versa in relation to the pinion.

Pre-adjustment

130. Extract the bearing cone (27) without damaging it, using a suitable puller.

131. Select a shim thickness E determined according to the following formula:

E = DC + 0.35 mm

where

E = shim (29) thickness to be fitted

DC = ring gear offset

NOTE: *The DC (example: - 0.42) is engraved on the external surface of the ring gear (Fig. 19) after the number and pairing letter (4F3). It can be between 0 and - 0.60 mm.*

IMPORTANT: *When calculating E, ignore the negative sign preceding the DC (Fig. 19).*

132. Fit the previously selected shim(s) (29) (Fig. 19) onto the right-hand differential support (25). Fit the bearing cone (27) against the shim(s) using a press.

133. Refit and shim the ring gear/differential assembly (see § D and I).

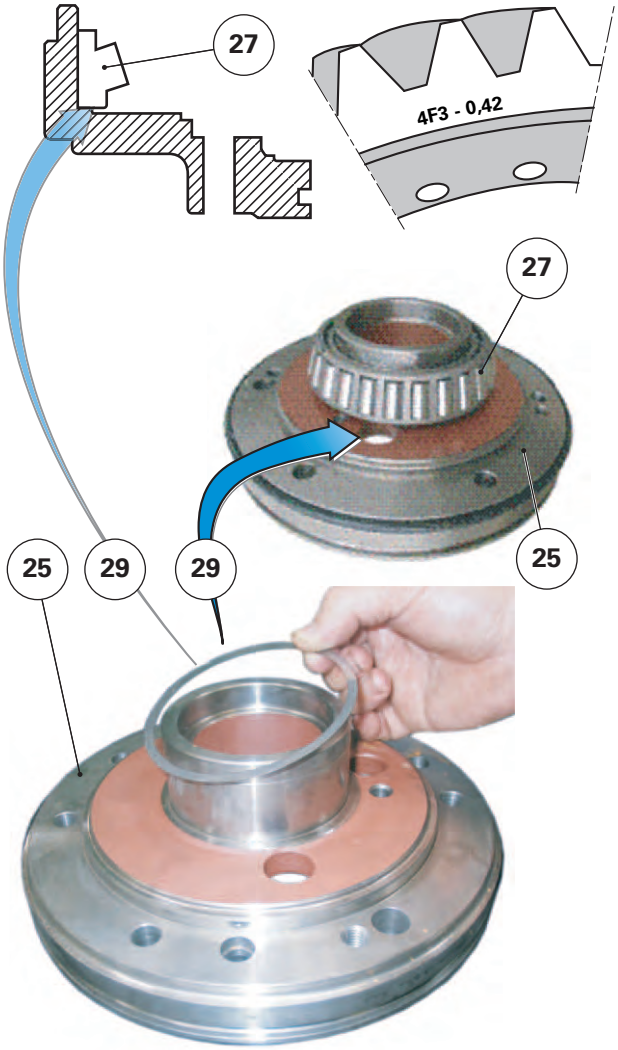


Fig. 19

Checking the pre-adjustment

134. Through the opening on the rear compartment of the centre housing (45), place the feeler pin of a dial gauge half way across the length of a tooth of the ring gear (Fig. 20).

135. Ensure that the pre-adjustment is correct by checking that the backlash between the ring gear and the pinion is between 0.15 and 0.45 mm. Carry out this step at three equidistant points on the ring gear.

IMPORTANT: *If the pre-adjustment is incorrect, reduce or increase the thickness of shim(s) E (29) calculated previously.*

Shim the ring gear/differential assembly again in order to obtain the preload for the tapered roller bearings (27) (28) and (46) (47) (see § D and I).

Check the backlash between the pinion and the ring gear a second time.

136. After obtaining a preload for the tapered roller bearings and correct adjustment of the backlash, continue the reassembly steps.

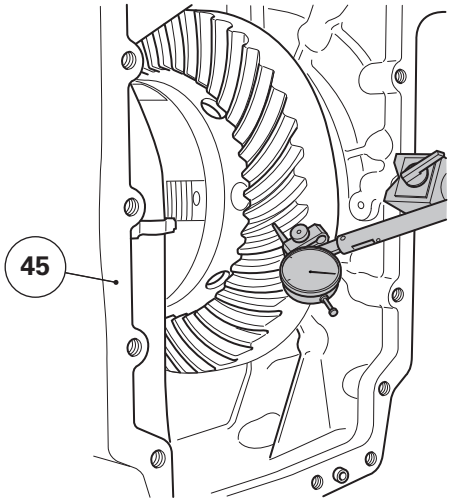


Fig. 20

I . Shimming the ring gear/differential assembly

The ring gear/differential assembly must be shimmed if it is necessary to replace one or more of the following components:

- the centre housing (45);
- the crownwheel and pinion (ring gear/pinion) (see § G and chapter 6);
- the tapered roller bearings (27) (28) and (46) (47);
- the right-hand differential support (25);
- the left-hand differential support (40).

Preliminary steps

137. Fit the ring gear/differential assembly into the centre housing using tool ref. 3378502M11, (see § D and J) and fit the right-hand differential support (25) (see § D).

138. Remove the bearing cone (46) and the shim(s) (48) from the left-hand differential support (40).

Shimming

139. Slide the bearing cone (46) onto tool ref. 3378117M1, (see § J) suitable for use with the 7" multidisc differential unit.

Using two screws, fix the tool onto the centre housing (Fig. 21).

140. Tighten the central screw of the tool to 10 Nm (Fig. 21).

IMPORTANT: *Turn the ring gear of the crownwheel and pinion a few turns to correctly fit the cones in the bearing cups. Check the tightening torque of the central screw again.*

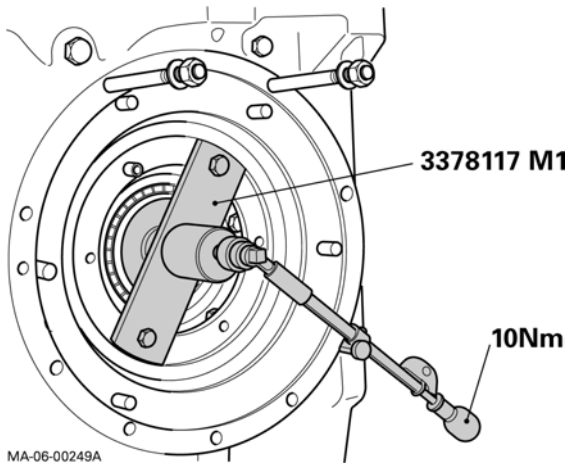


Fig. 21

141. Using a suitable depth gauge, measure dimension B at two opposite points. Calculate the average of the two readings; we will also call this average B.

142. Determine dimension C between the bearing cone (46) and the mating face of the left-hand differential support (40) on the centre housing using the following formula (Fig. 22): **C = B-10 mm**.

NOTE: *10 mm is the thickness of tool ref. 3378117M1.*

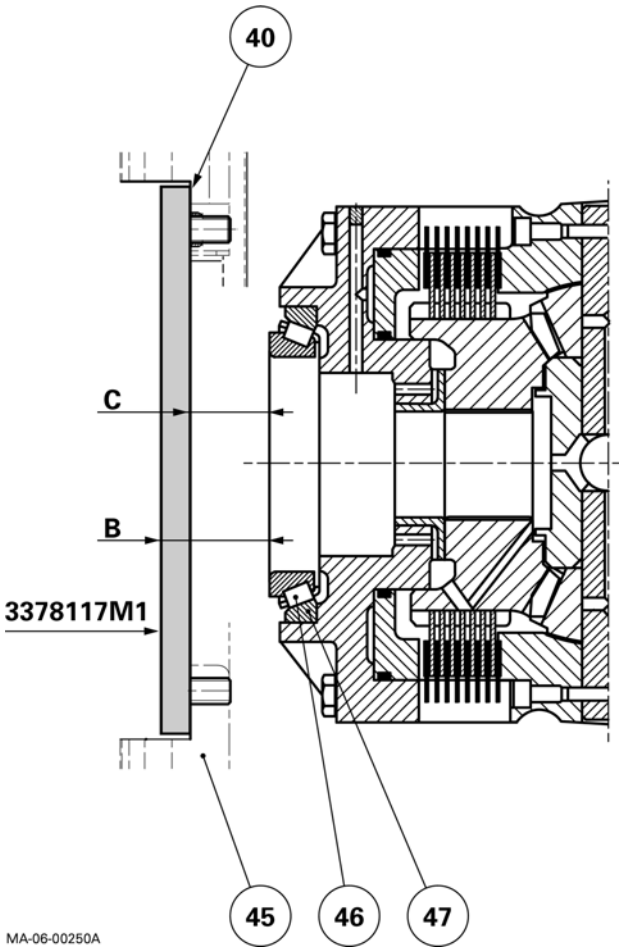
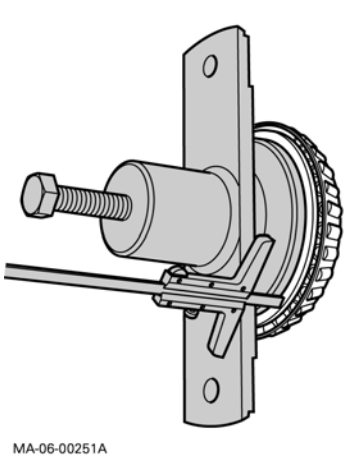


Fig. 22



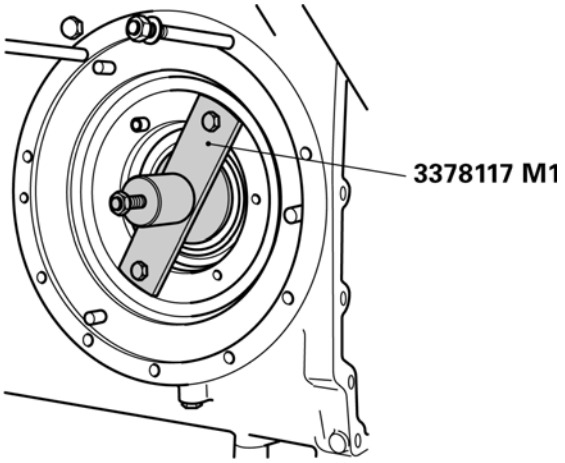


Fig. 23

143. Using a suitable depth gauge and a ruler, measure dimension Y on two opposite points. Calculate the average of the two readings; we will also call this average Y.

144. Determine the spacing I between the mating face of the bearing cone (46) and the left-hand differential support (40) using the following formula (Fig. 22, Fig. 24, Fig. 25): **I = C-Y**.

145. Fill space I with a shim (48) thickness.

146. Add an extra shim thickness between 0.05 and 0.15 mm in filled space I to obtain a preload P2 (Fig. 25) so that: **P2 = 0.05 to 0.15 mm**.

Final steps

147. Remove the tool and the bearing cone (46).

148. On the left-hand differential support (40), fit the shims determined in step 146. Centre the ring gear/differential assembly, fit the left-hand differential support (40) (see § D) and carry out the final steps in § D.

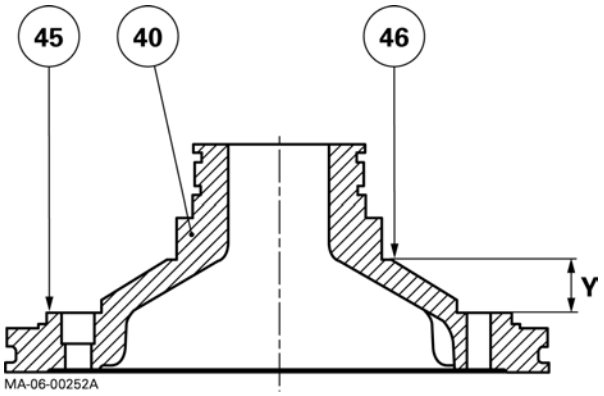


Fig. 24

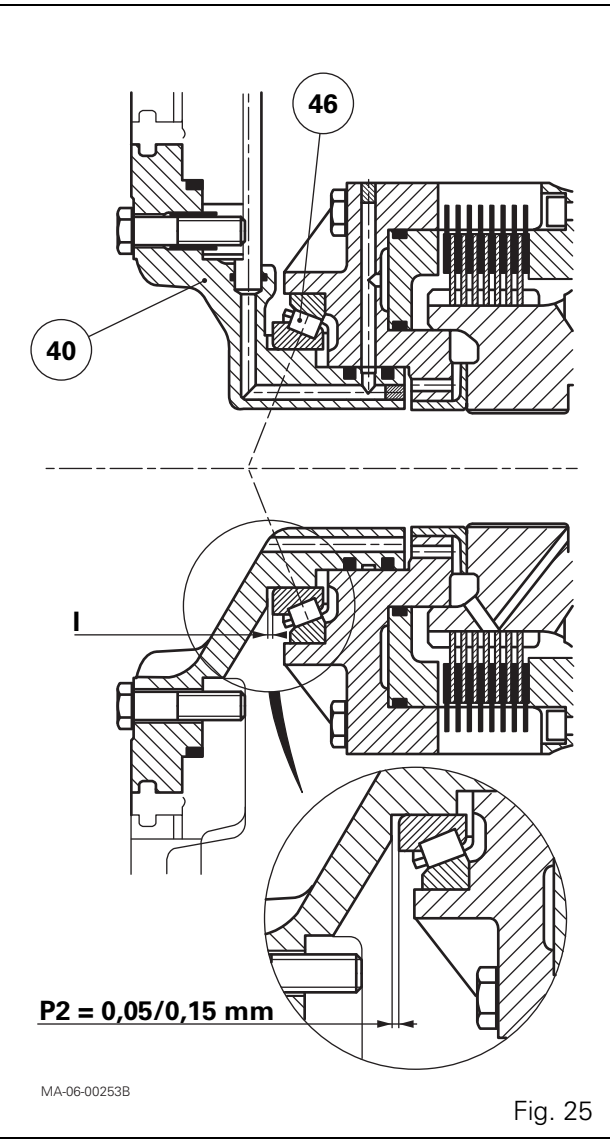


Fig. 25

J . Service tools

Tools available in the AGCO network

- 3378117M1: Shimming tool (Fig. 26)
- 3378502M11: Rods (L = 20 mm) and tool for removing and refitting the ring gear/differential assembly (Fig. 27)

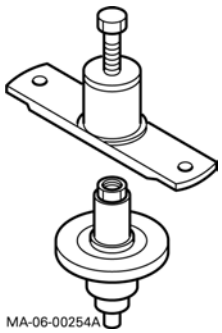


Fig. 26

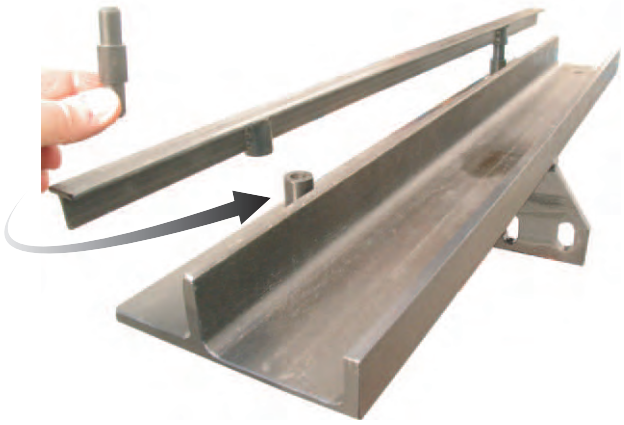


Fig. 27

6B20 - GPA40 - Hitch and linkage

CONTENTS

A . General

The linkage mechanism comprises (Fig. 3):
- two single-piece linkage arms (1);
- two bearings (4);
- a main support (2);
- a position sensor (12).

The linkage arms pivot on two symmetrical bearings (4) (Fig. 3).
The pivot pins (2) are force fitted into the single-piece linkage arms (1) (Fig. 1) at the factory. The right-hand pivot pin (2) is indexed at the factory so that oblong slot (F) (Fig. 2) is correctly positioned for correct operation of the position sensor (12).

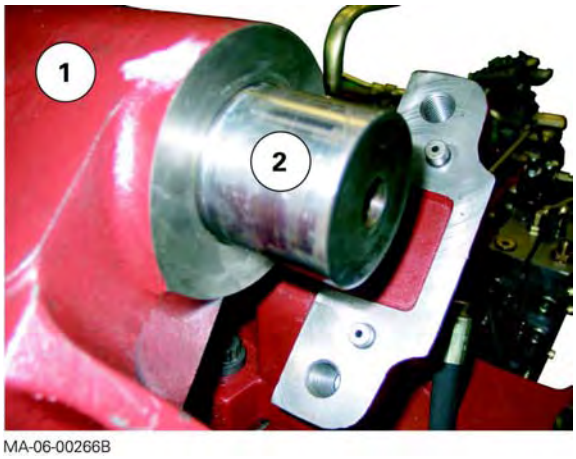


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Fig. 1

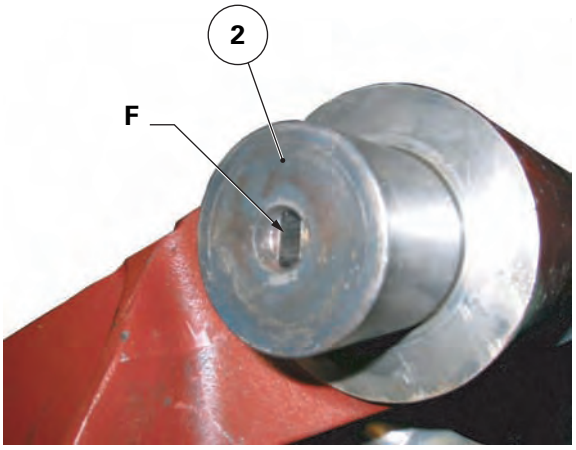

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Fig. 2

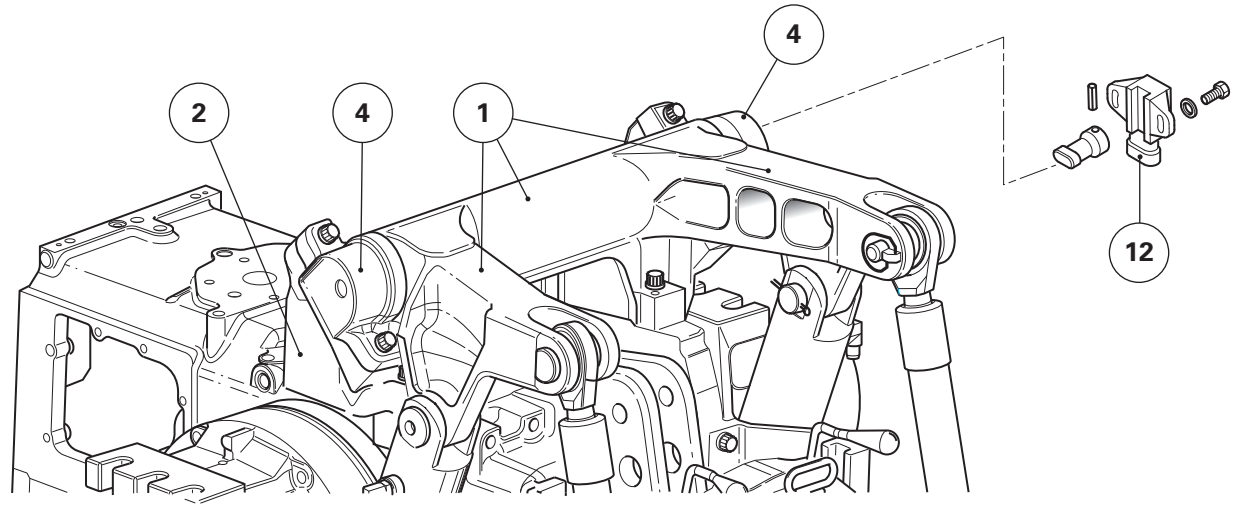

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Fig. 3

Each bearing (4) is fitted with a friction ring and a grease nipple.

Each bearing (4) is positioned using two pins P and fixed to the main support (2) using two M20 screws (Fig. 4). The main support is centred by two rings B (Fig. 5) and fixed to the centre housing by four M20 screws.

NOTE: *On tractors fitted with a GPA40 rear axle with a new generation centre housing, the main support (2) is also centred using two rings B (Fig. 6), but its attachment is reinforced by six M20 screws on the centre housing instead of four M20 screws.*

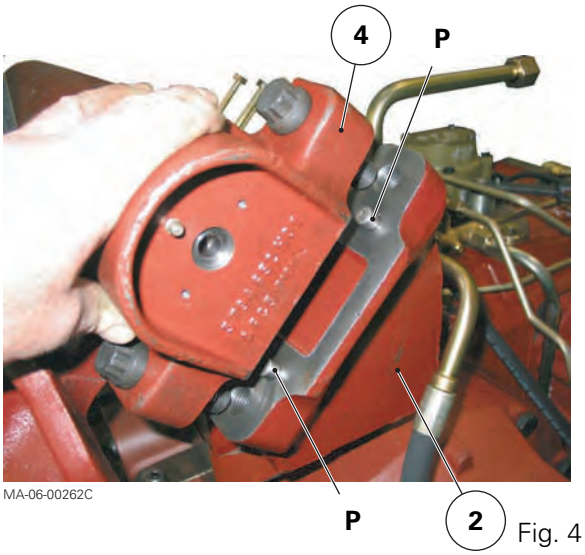

Fig. 4

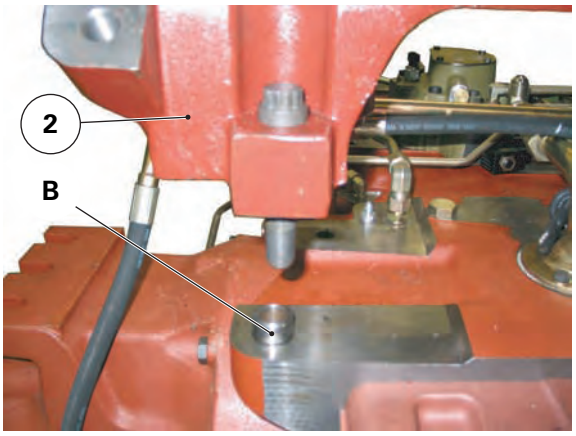

Fig. 5

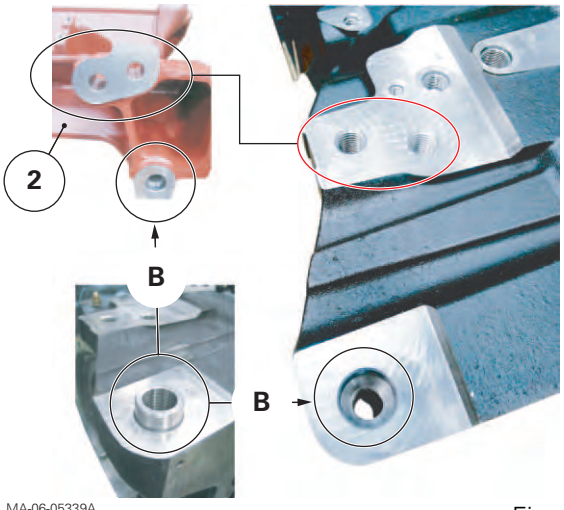

Fig. 6

The right-hand bearing (4) (Fig. 7) is fitted with an adjustable position sensor (12). This sensor marks the position of the single-piece linkage arms and sends this information to the electronic controller (see chapter 11). The sensor is sealed by a cap (1) (Fig. 7).

On the left-hand bearing, the unused location for the position sensor is plugged with a cup plug.

Each bearing (4) is sealed by a lip seal (7) (Fig. 8). This seal is designed to allow any excess grease to drain out during improper greasing.

Each of the lift ram joints (upper and lower) is fitted with a grease nipple for lubricating the pins.

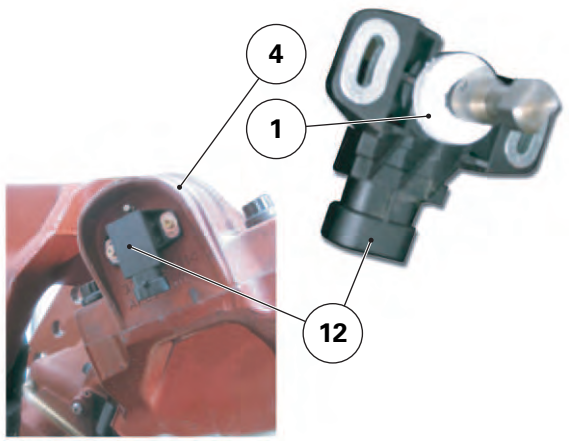

Fig. 7

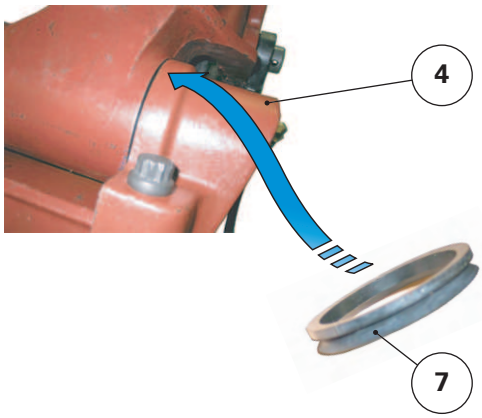

Fig. 8

Parts list (Fig. 9)

(1) Single-piece linkage arm
(2) Main support
(3) M20 screw
(4) Bearings
(5) M20 screw
(13) Friction rings

View of the assembly

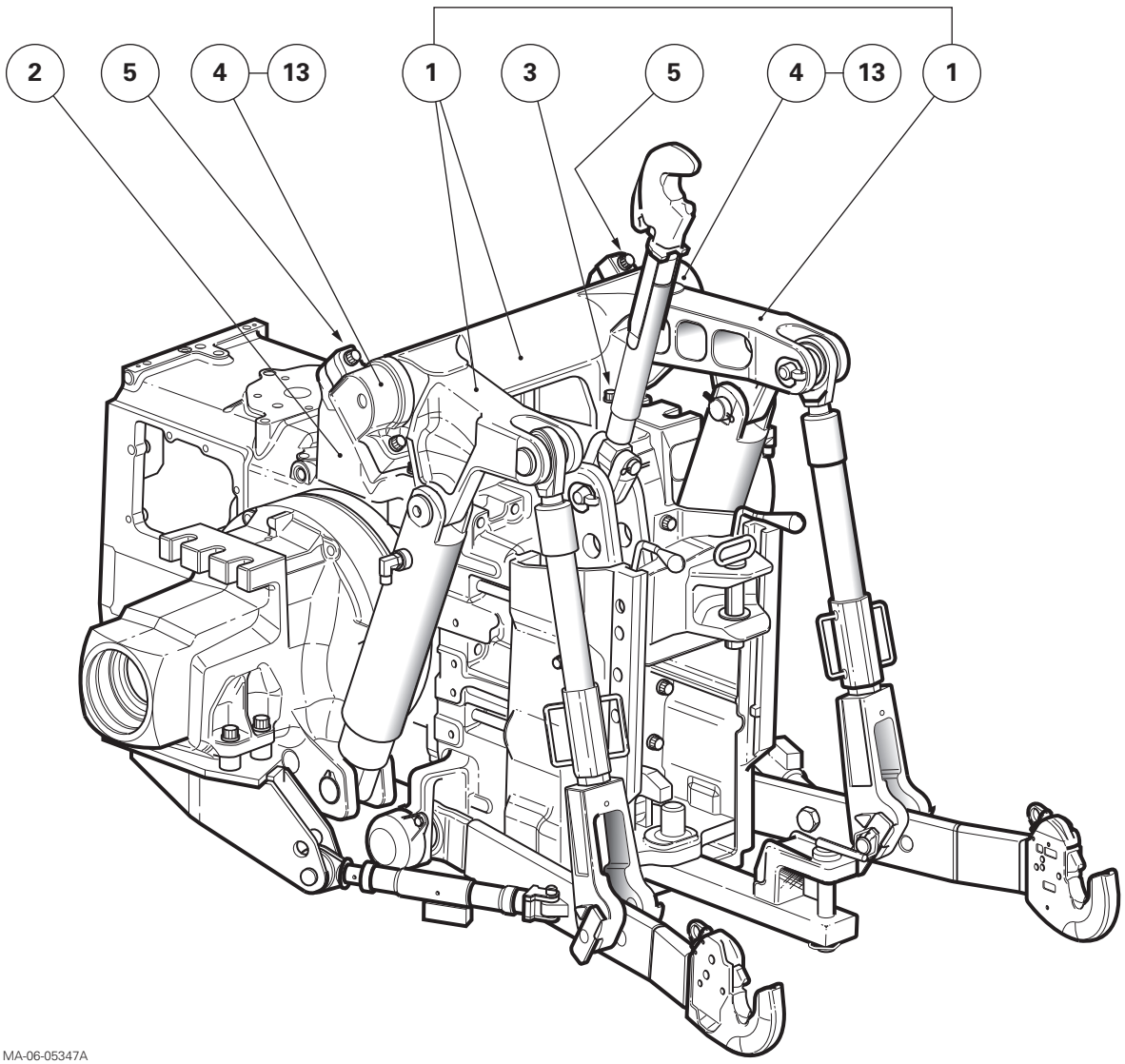

Fig. 9

Parts list (Fig. 10)

(1) Single-piece linkage arm
(2) Main support
(3) M20 screw
(4) Bearings
(5) M20 screw
(6) Grease nipples
(7) Lip seals
(8) Mecanindus pin
(9) Linking finger
(10) Friction rings
(11) Screw
(12) Position sensor
(13) Friction rings
(14) Dowels
(15) Cup plug
(16) Locating rings

Legend

A Assembly with four M20 screws (3) (previous generation centre housing)
B Assembly with six M20 screws (3) (new generation centre housing)

Blown-up view

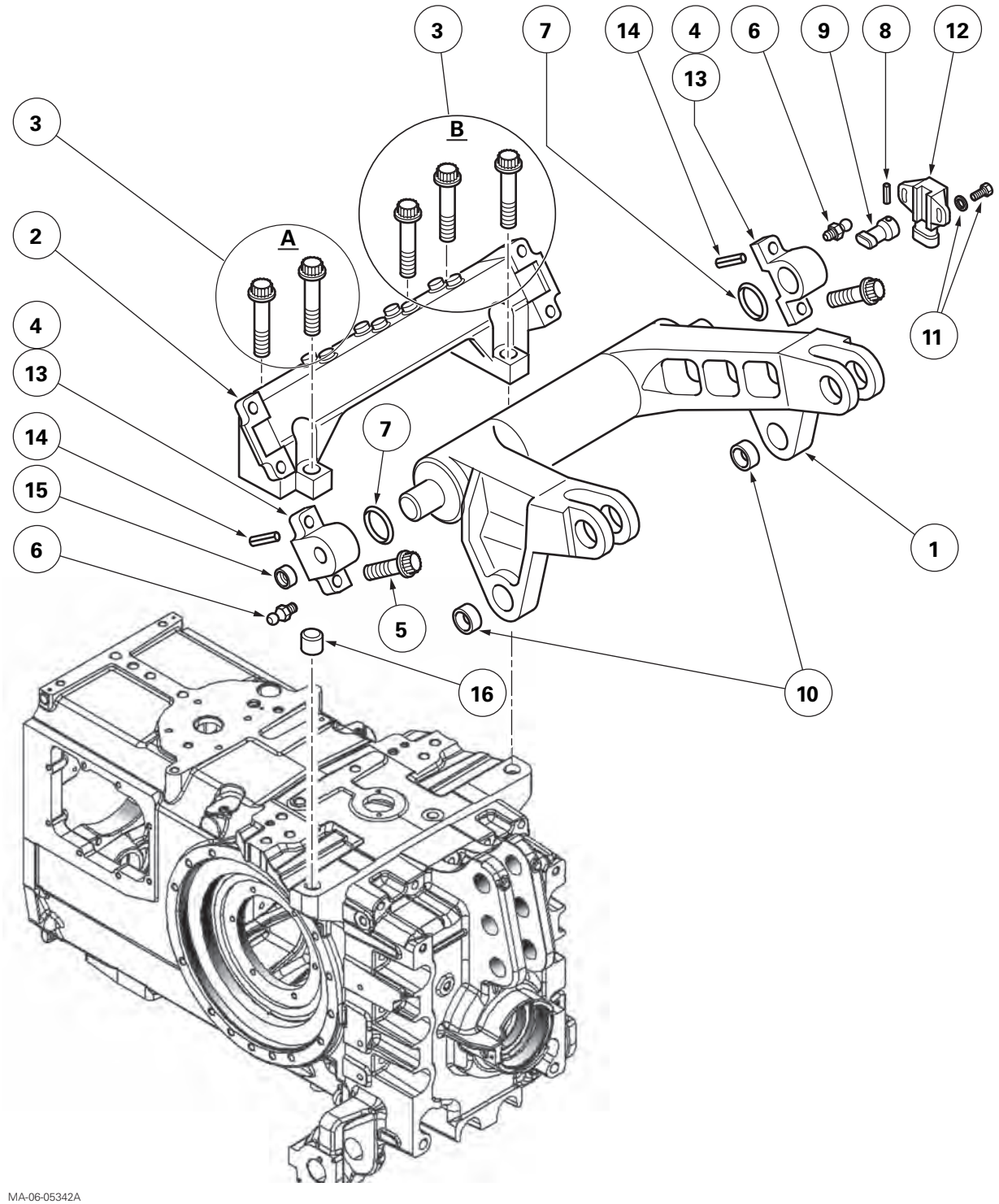

Fig. 10

B . Attaching the rams

Layout of components (Fig. 11)

(20) Upper pins
(21) Cotter pins
(22) Rams
(23) Washers
(24) Grease nipples
(25) Circlips
(26) Washers
(27) Lower pins
(28) Circlips
(29) Snap ring
(30) Shim(s)

Legend

A Version for Normal and Heavy Duty trumpet housing
B Version for Heavy Duty sealed trumpet housing
C Version for trumpet housing with composite final drive

View of the assembly

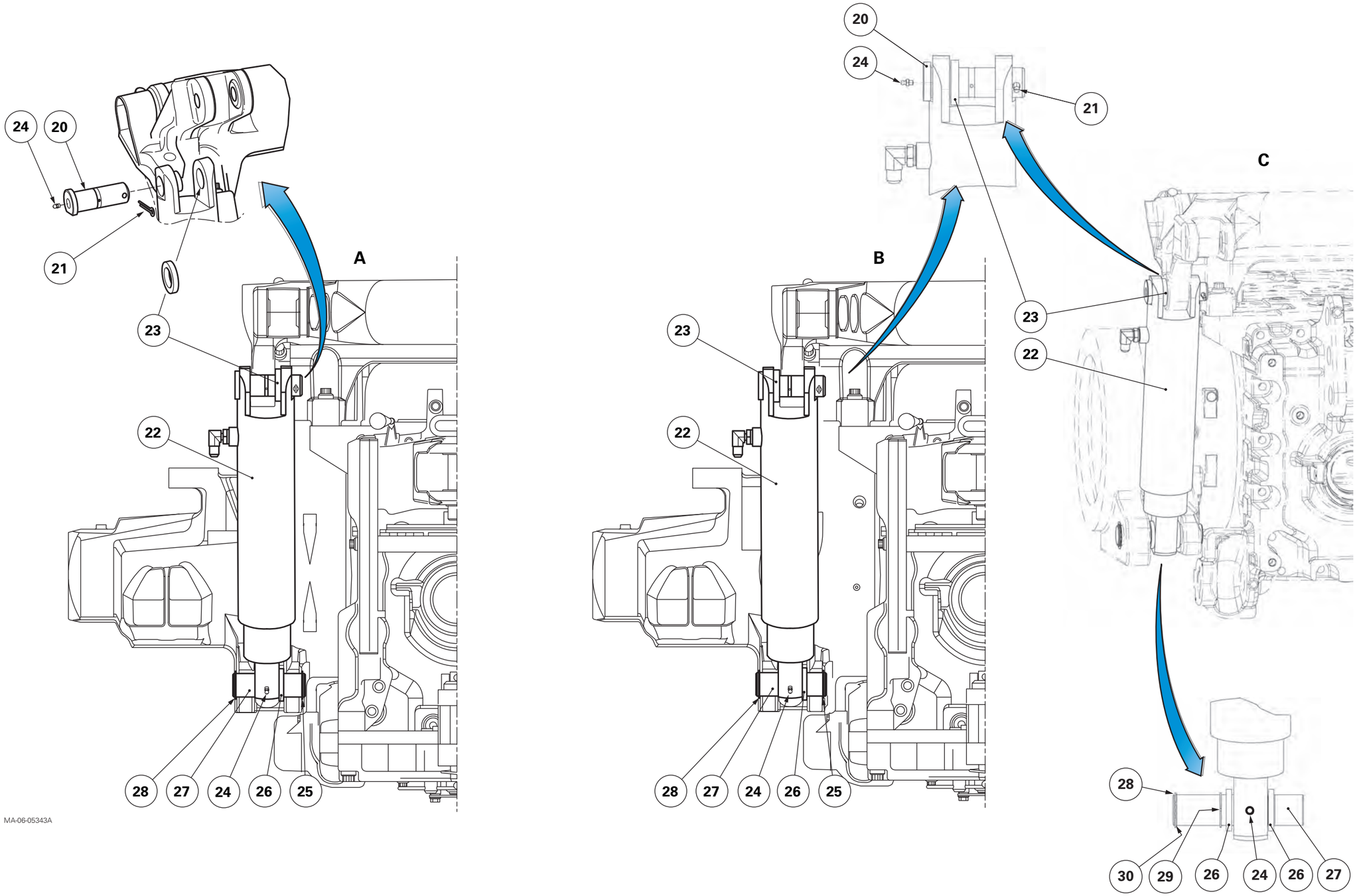

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Fig. 11

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C . Removing and refitting the bearings and single-piece linkage arms

Preliminary steps

1. Immobilise the tractor. If the tractor is not fitted with a ParkLock device, engage the hand brake.
2. Start the engine and place the linkage arms in lowered position.
3. Stop the engine.
4. Remove the upper pins (20) from the rams and the pins from the lift rods (2) (Fig. 12).
5. Disconnect:
   - the hydraulic control valve from the front linkage (if fitted), fixed to the auxiliary spool valve block;
   - the tubes and the hydraulic hoses located to the right of the auxiliary spool valve block (high pressure, return and LS);
   - the pipes connected below the linkage spool valve (high pressure and spool valve return).
6. Remove the following from the auxiliary spool valve support:
   - the trailer brake connection hose (if fitted);
   - the brake bleed pipes (support side).
7. Disconnect the hoses used to recover oil (clean and used) fitted to the hydraulic couplers.
8. Disconnect the connectors of the electrical harnesses, which might hinder the removal of the auxiliary spool valve block.
9. Sling the auxiliary spool valve block using a suitable makeshift strap.
10. Unscrew the attachment screws on the support holding the auxiliary spool valve block at the front of the main support.
11. Gently lift the auxiliary spool valve block, ensuring that no connected parts hinder this operation.

    NOTE: *If the auxiliary spool valve block is fitted with cable-controlled auxiliary spool valves, it is not necessary to disconnect the cables.*

    Move aside the auxiliary spool valve block sufficiently that the single-piece linkage arms are easy to access.

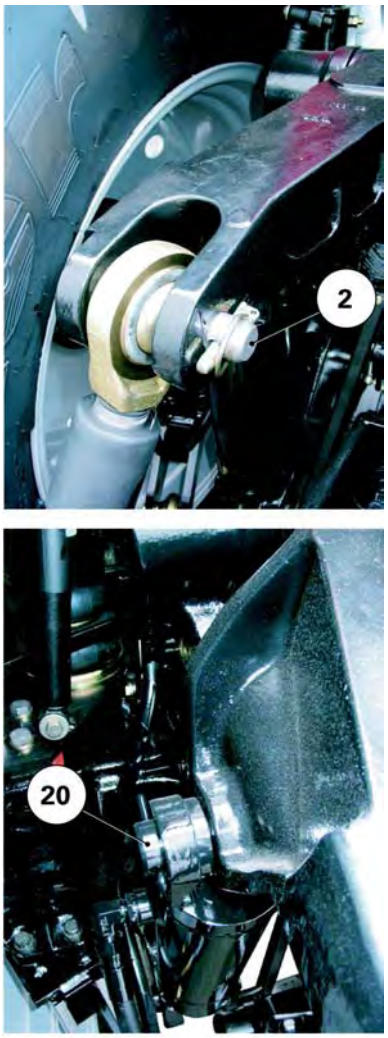

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Fig. 12

Removing the bearings

12. If necessary, remove the rear wheels. Fit safety axle stands.

13. Remove the position sensor (12) on the right-hand bearing (4) (Fig. 13).

14. Use a workshop crane or hoist to sling the single-piece linkage arms using a suitable make-shift strap.

15. Unscrew the screws (5) (Fig. 14).

16. Raise the single-piece linkage arms slightly to release the bearings from the dowels (14) (Fig. 14).

17. Remove the bearings (4) (Fig. 14). Discard the lip seals (7) (Fig. 15).

NOTE: *Some tractor cabs are fitted with wheel fenders fitted with plastic guards to protect from projections (of mud or stones) if the tractor is adapted for working in particularly humid conditions. Remove or move aside these guards if their presence hinders the removal of the bearings.*

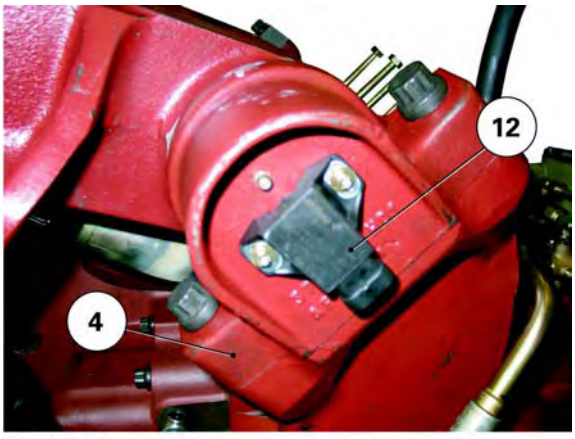

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Fig. 13

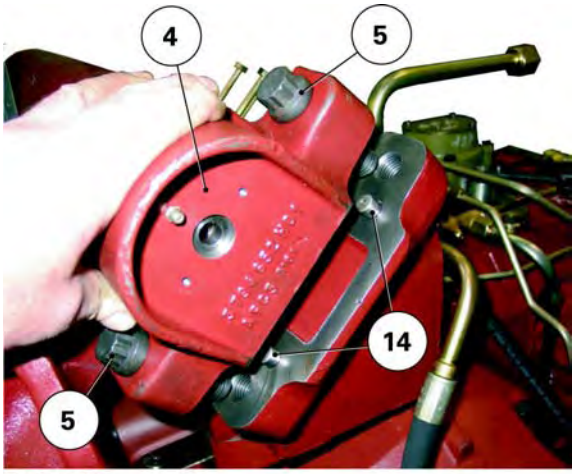

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Fig. 14

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Fig. 15

Refitting the bearings

18. Clean the components.

19. Check that the position sensor sleeve with flat sections slides freely in its housing located on the end of the right-hand pivot pin (2) (no clearance).

20. Ensure that are no heavy impact marks or deep scratches on the pivot pins (2).

21. Slide a new lip seal (7) onto the pivot pins (2), with the lip facing outwards as shown in Fig. 16.

22. Check that the locating pins (14) are present on the main support (2) (Fig. 17).

23. Using the equipment used for removal, lift the linkage arms and engage the pre-lubricated bearings on the pivot pins and in the dowels.

24. Fit and tighten the screws (5) (Fig. 17) to 480-640 Nm.

NOTE: *Clearance J (Fig. 18) between the single-piece linkage arms and the bearings is not adjustable. Depending on machining tolerances, it can vary from 0.5 mm to a maximum of 2 mm.*

25. Refit and adjust the position sensor (see § G).

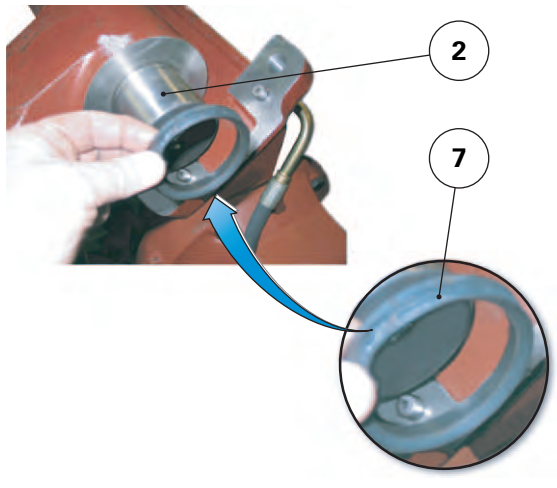

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Fig. 16

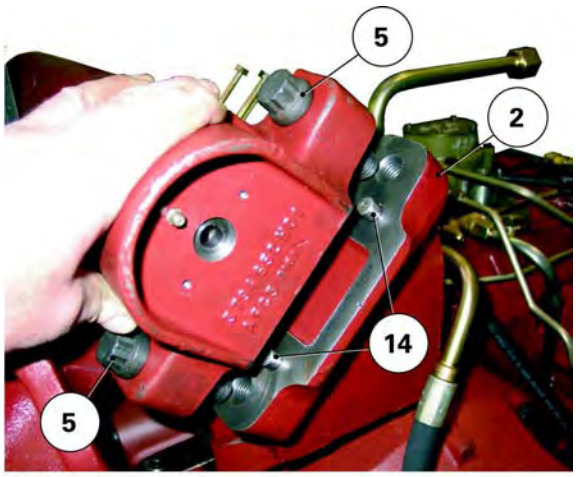

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Fig. 17

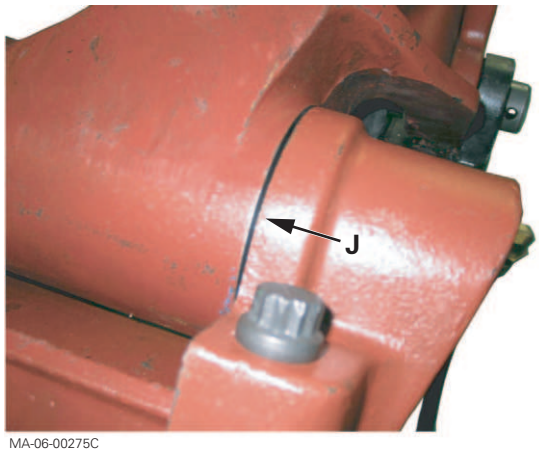

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Fig. 18

Removing the single-piece linkage arms

The single-piece linkage arms are removed by a process almost identical to that used to remove the bearings.

26. Remove the single-piece linkage arms.

27. If necessary, drive out the friction rings (10) of the single-piece linkage arms (Fig. 19) using a drift of a slightly smaller diameter than the external diameter of the friction rings.

NOTE: *The friction rings (10) can also be replaced on the tractor without removing the single-piece linkage arms.*

Fig. 19

Refitting the single-piece linkage arms

The pivot pins (2) are factory fitted into the bores of the single-piece linkage arms under a force of approx. 15 to 20 tonnes. The pivot pin/linkage arm assembly is identified in the spare parts catalogue under a single reference.

28. If necessary, fit the new friction rings (10) (Fig. 19) into the single-piece linkage arms using the fitting drift used for removal.

NOTE: *Ensure that the ends of the friction rings are slightly set back from each face (inner and outer) of the single-piece linkage arms.*

29. Refit the single-piece linkage arms.

Final steps

30. Refit the auxiliary spool valve block using the sling method employed to remove it.

31. Reconnect:
- the electrical harness connectors;
- the hoses used to recover oil on the hydraulic couplers.

32. Refit the following on the spool valve support:
- the brake bleed pipes;
- the trailer brake connection hose (if fitted).

33. Reconnect:
- the linkage spool valve pipes (return and high pressure);
- the pipes located to the right of the auxiliary spool valves (high pressure, return and LS).

34. Refit the upper pins to the rams and the pins to the lift rods.

35. Using a pump connected to the grease nipples (6) and (24) (Fig. 20, Fig. 21), lubricate the bearings and the lift ram pins.

36. Start the engine. Check the operation of the brakes, the linkage and the auxiliary spool valves.

37. Ensure that there are no leaks on the hydraulic unions.

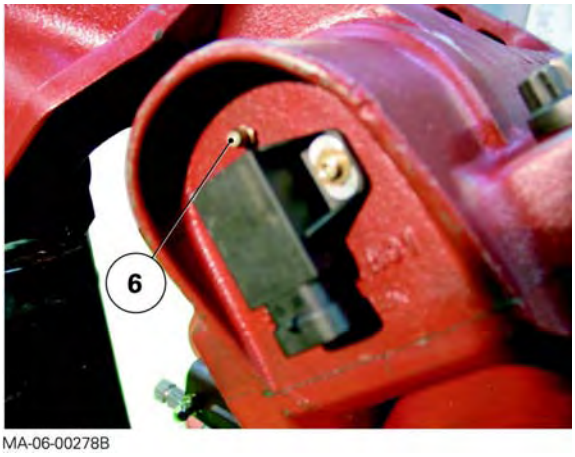

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Fig. 20

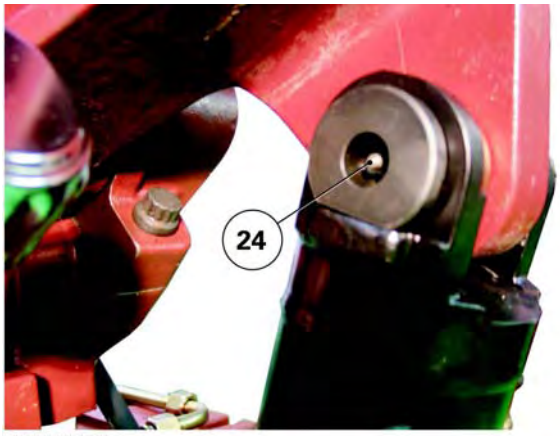

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Fig. 21

D . Disassembling and reassembling the bearings

Disassembly

38. Remove the bearings (see § C).

39. Check the wear on the friction rings (13).

NOTE: *On each bearing (4), a friction ring (13) with recesses and grooves (Fig. 22) allows the pivot to be correctly lubricated via a grease nipple. There is no reference for this ring in the spare parts catalogue. Only the complete bearing (4) is referenced. Replace the complete bearing if the friction ring is worn (13).*

40. Remove the grease nipple. If necessary, discard it.

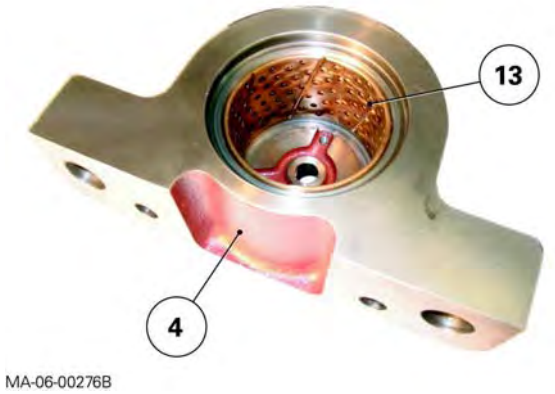


Fig. 22

Reassembly

41. Clean the components.

42. Lightly smear the friction rings (13) with bearing grease.

43. Screw a new grease nipple onto each bearing (4).

44. Refit the bearings (see § C).

E . Removing and refitting the main support

Removal

45. Remove the bearings and the front single-piece linkage arms before working on the main support (see § C).

46. Remove the flanges (1). Separate lift ram supply pipes T from the main support (2) (Fig. 23).

47. Unscrew:

- the four M20 screws (3) on tractors fitted with a previous generation centre housing;
- the six M20 screws (3) on tractors fitted with a new generation centre housing.

48. Sling the main support using a suitable makeshift strap. Remove it from the centre housing.

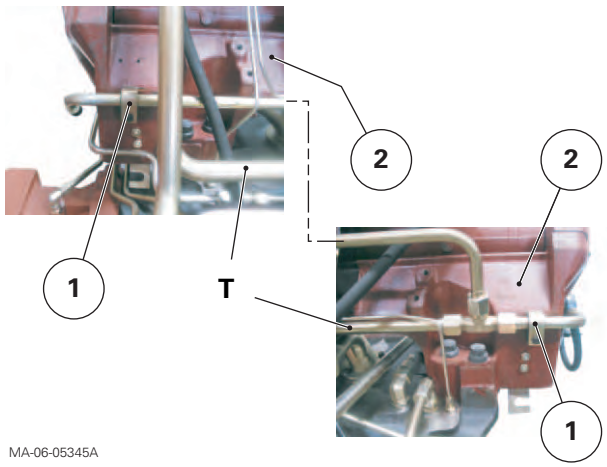


Fig. 23

Refitting

49. Check that locating rings B are present on centre housing C (Fig. 24).

50. Refit the main support (2) on the centre housing.

51. Lightly smear the thread of the screws (3) with Loctite 270 or equivalent.

52. Refit and screw in (Fig. 24):

- the four M20 screws (3) on tractors fitted with a previous generation centre housing. Tighten to a torque of 480-640 Nm;
- the six M20 screws (3) on tractors fitted with a new generation centre housing. Tighten to a torque of 480-640 Nm.

53. Refit supply pipes T and the flanges (1) to the main support (2) (Fig. 23).

54. Lightly grease the two bearings.

55. Refit the single-piece linkage arms and the bearings (see § C).

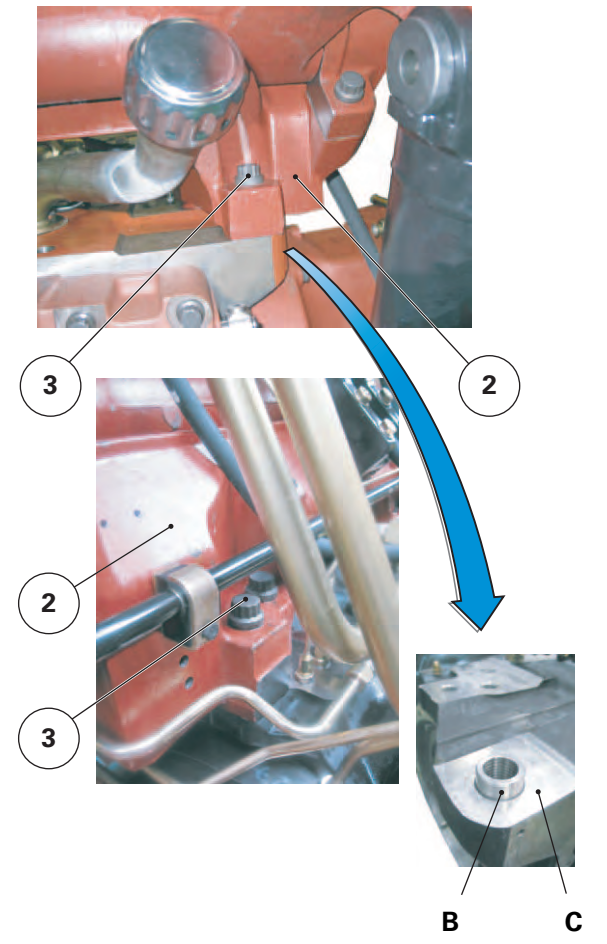


Fig. 24

F . Rear hitch and ram - description, disassembling and reassembling

Partial description (Fig. 25)

The rear hitch is of standard type and comprises:

- two adjustable tie rods (1);
- two different lower arms (2) joined to the PTO housing by effort sensors.

  NOTE: *Depending on the option, the lower arms (2) may have a different profile;*
- two adjustable stabilisers (3);
- two effort sensors (4) with different capacities, depending on the option, which communicate with the tractor's electronic system;
- two guards (5) to protect the effort sensors;
- two stabiliser supports (6) fitted underneath the trumpet housings.

The top link (7) is adjustable. It is joined to the upper section of the PTO housing.

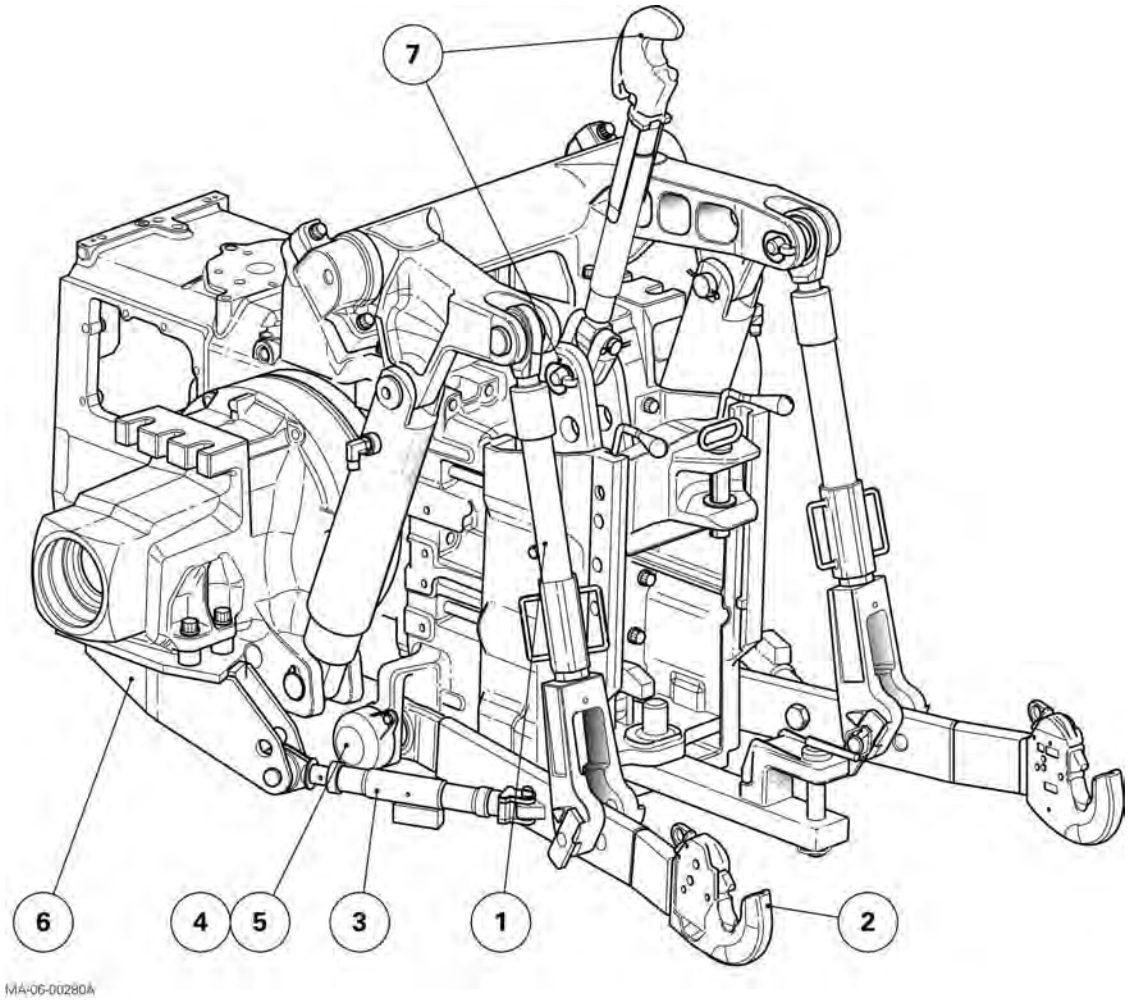


Fig. 25

Disassembling and reassembling the rear hitch and the top link

Disassembly

Disassembling the rear hitch and the top link is not especially difficult.

Reassembly

During reassembly, lightly smear the pins and effort sensors with AS767 graphite grease or equivalent. Also ensure that the stop pins are in good condition and replace them if necessary.

Removing and refitting a lift ram

Disassembly (Fig. 26)

56. Start the tractor engine.
Place the lower hitch arms as far as possible using the electronic system.

57. Disconnect the supply hose from the ram.
Remove and drain the oil from the ram.

58. Remove the elbow union (1) fitted with its "O" ring.

59. Insert the rod into the body of the ram (5) until the snap ring (4) appears in port O of the union.

60. Insert a screwdriver into port O.
Offset the snap ring into the adjacent (V-shaped) groove of the rod, while turning the rod at the same time.

61. Remove the rod and the snap ring (4).
Drive out the wiper seal (2) and the gasket (3) (discard these components).

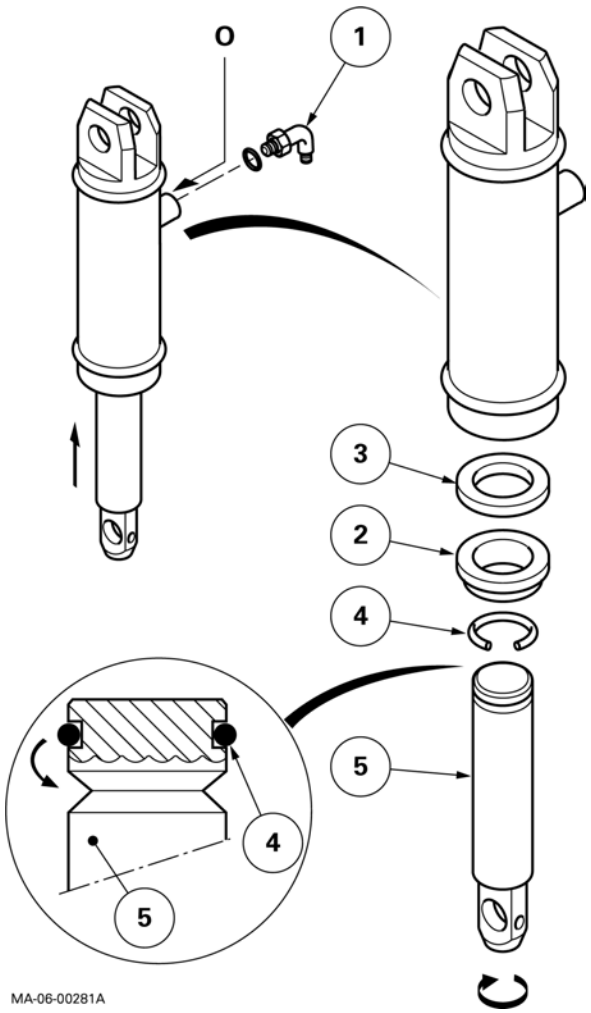


Fig. 26

Reassembly

62. Clean all components. Replace any components found to be scratched or damaged.

IMPORTANT: *In case of seizure or if there is significant scratching on the functional components, replace the ram.*

63. Dry off all components using a jet of compressed air.

64. Lubricate the components with clean transmission oil.

65. Reassemble the ram. Carry out steps 56 to 61 in reverse order.

IMPORTANT*: Always fit a new snap ring and new seals.*

Use a suitable fixture to fit the seals without damaging them.

Carefully refit the rod into the ram body.

66. Lubricate the upper and lower pins of the lift ram with AS767 grease or equivalent. Refit the lift ram and reconnect its supply pipe.

67. Start the engine.

Using the tractor's electronic system (ELC), activate the lower arms of the hitch in turn, from the high position to the low position and vice versa.

68. Check that the hitch is functioning correctly and that there are no leaks around the rim of the lift ram.

G . Preparing and refitting the position sensor

The angular movement of the single-piece linkage arms drives the position sensor via a linking finger with flat sections. This finger is housed inside the oblong slot on the right-hand pivot pin.

Preparation

69. Ensure that the sensor pin turns freely through 360°.

70. Check that the seal (1) is present.

71. Mark the linking finger (9) with paint (P). Refit the finger onto the position sensor pin, aligning mark P with flat section M.

NOTE: *Mark P makes it easier to fit the position sensor in the right position when refitting it to the right-hand bearing.*

72. Align the pin holes on the pin and the linking finger (Fig. 27). Fit the pin, positioning its chamfered edge opposite flat section M.

IMPORTANT*: To protect the position sensor, the finger must be pressed against a metal part to ensure the counter-movement caused by the strikes of the hammer when fitting the pin.*

73. Check the rotation of the position sensor pin again.

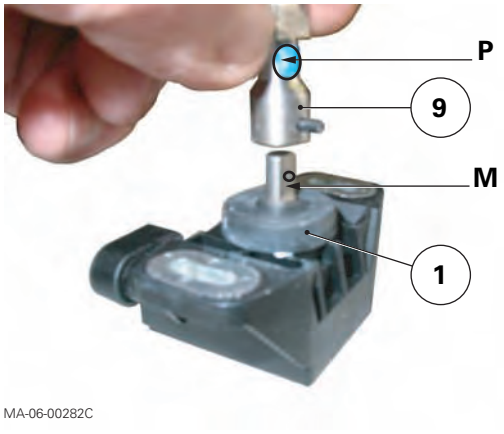


Fig. 27

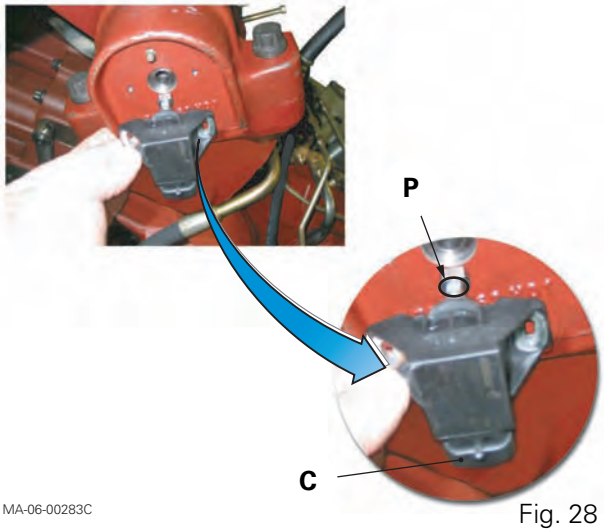


Fig. 28

Refitting

IMPORTANT*: To refit the position sensor, the single-piece linkage arms must be in the high position (continuous hydraulic pumping).*

74. Position the sensor on the right-hand bearing, so that:

- paint mark P is facing upwards (Fig. 28);
- connector C is facing downwards.

75. Partially screw the screws into the centre of the oblong holes on the position sensor.

76. Adjust the position sensor using Wintest (see chapter 11).

77. Tighten the screws alternately and definitively to a torque of 3 to 4 Nm.

6B21 - GPA40 - Auto-hitch

CONTENTS

A . General

Tractors fitted with GTA1040 or GTA1540 transmission may be fitted with a "Dromone" auto-hitch with or without ladder (1) (Fig. 1).

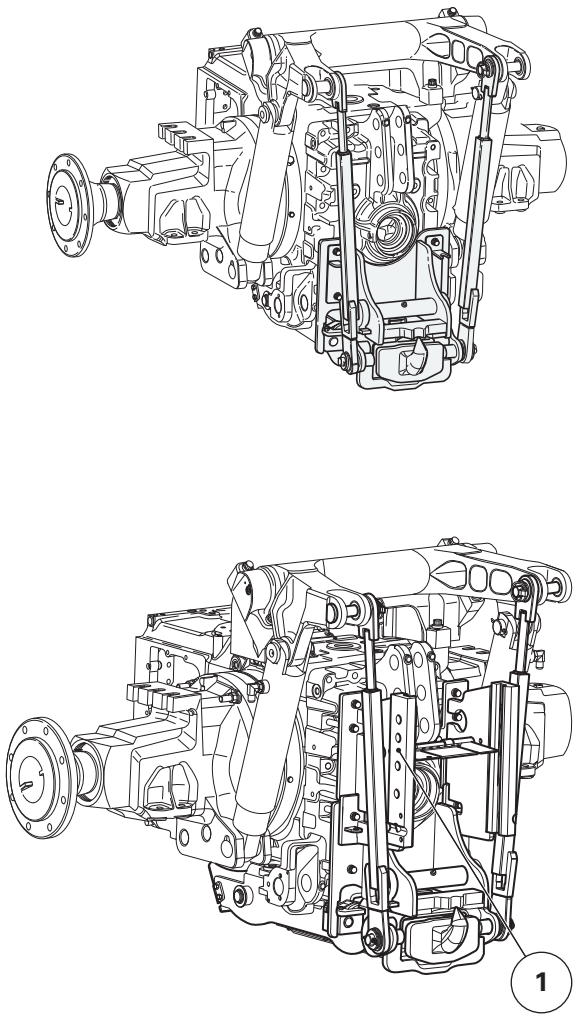


Fig. 1

B . Operating principle of the "Dromone" hitch

Parts list and legend

Parts list (Fig. 2)

(1) Fixed support fitted to the centre housing with a plate

(2) Moving plate that can be raised or lowered by the linkage mechanism

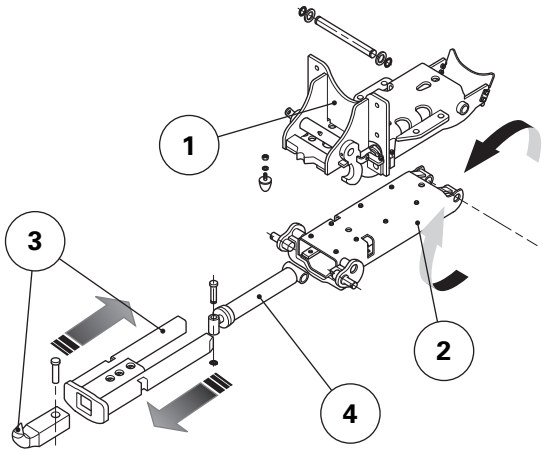
(3) Auto-hitch with a double-acting hydraulic ram (4)

Legend (Fig. 3, Fig. 4)

A and B Outputs to male couplings

R Direction of travel of auxiliary lever to retract the auto-hitch

S Direction of travel of auxiliary lever to extend the auto-hitch



MA-06-05006B

Fig. 2

MA-06-05240A

Fig. 3

Operating principle (Fig. 4)

When the manual valve (1) is open and the relevant auxiliary lever is activated (Fig. 3), the high pressure passes via the unions (2) linked to the manifolds of quick connectors A and B to supply the double-acting ram (4) fitted to the auto-hitch. When the moving plate is lowered or raised and depending on the position of the auxiliary lever, the hitch can be extended or retracted by the moving plate in order to hitch the trailer

Safety lock

Fitting

The safety lock on the hitch is ensured when:

- the moving plate is lifted and engaged;
- the hitch is retracted to the maximum and is in contact with the rear stop screws.

The fixed support locks only prevent any inadvertent hitch movements when these conditions are fulfilled.

When engaging safety mode, the locking mechanism clicks audibly.

It is possible to use the auxiliary spool valve again when the lever is hydraulically isolated by the closed valve (1) (Fig. 4).

***IMPORTANT 1**: Before hitching the trailer, the operator must ensure the tractor movement is free while seated in the operator's seat, by checking that:*

- *the gear lever is in neutral (GTA1040 transmission);*
- *the hand brake has been released;*
- *the ParkLock manual control is unlocked (depending on option).*

***IMPORTANT 2**: Periodically grease the rear linked pin, the link rod pin and the control cable for the moving plate (see Fig. 5 and lubrication intervals specified in the tractor's Service Record Book).*

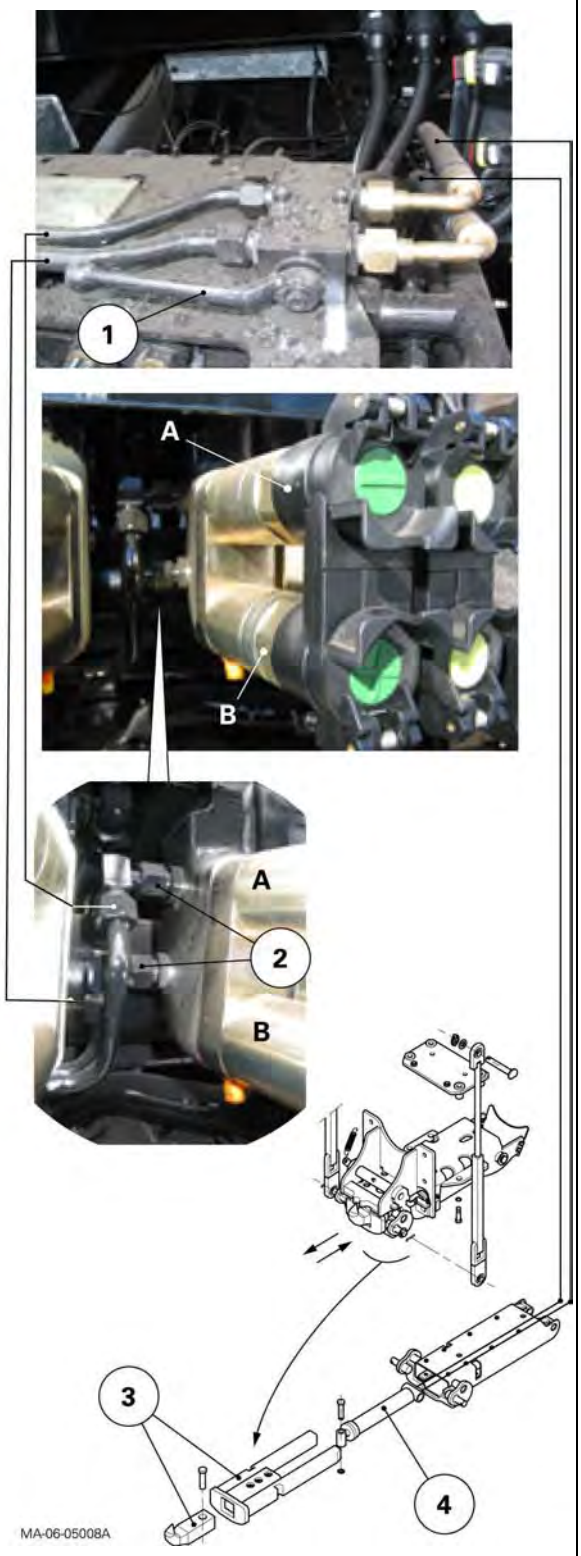


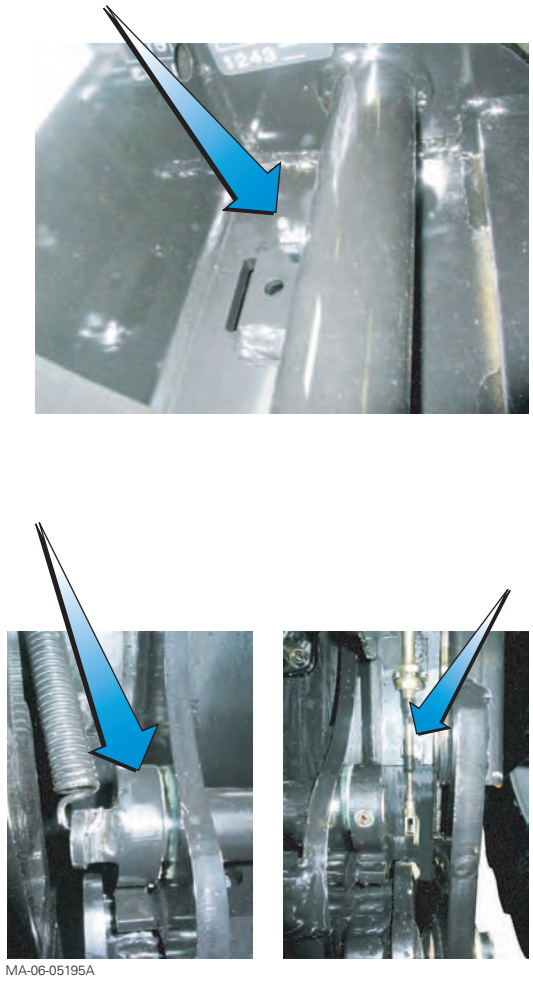
Fig. 4

Checking the safety lock

DANGER: The lock must be checked extremely carefully and in accordance with the procedure described below.

With the engine running and plate raised, open the valve (1) (Fig. 4).

Check that the hitch is secured by moving the auxiliary spool valve lever in the two positions (Fig. 3): the hitch should not extend the moving plate. If it does, investigate the cause of the problem.



MA-06-05195A

Fig. 5

C . Adjusting the tie rods and the control

Adjusting the tie rods

1. Lower the auto-hitch moving plate using the linkage electric control (internal or external).
2. Remove the rubber buffer located between the moving plate and the fixed support of the auto-hitch.
3. Disconnect:
   - the tie rod clevises (2) (right and left-hand);
   - the control cable connected to the fixed support.
4. Start the tractor engine.
5. Move the linkage control (internal or external) so that the linkage arms are in maximum raised position (continuous hydraulic pumping).
6. Using a trolley jack, moderately compress the auto-hitch moving plate at F (Fig. 6) until it is placed in contact with the fixed support (dimension X = 0 mm).
7. Adjust each tie rod to as short a length as possible by moving the clevises (2) (Fig. 7): the clevises should fit freely on the pins (3) of the moving plate.
8. Fit the new pins.
9. Decompress and remove the trolley jack.
10. Reconnect the control cable. Adjust the cable (see later steps).
11. Lower the auto-hitch moving plate using the linkage electric control (internal or external).
12. Refit the rubber buffer.
13. Operate the linkage in order to lift the arms to their maximum position, repeating steps 4 and5.

    Unlock the moving plate, using the handle (1) located in the cab at the rear of the seat (Fig. 8).

    Check for correct operation:
    - of the moving plate (up/down and vice versa);
    - of the unlocking and locking mechanisms of the moving plate.

    IMPORTANT: *If the unlocking and/or locking mechanisms operate incorrectly, check the adjustment of the cable and the tie rods. Adjust the cable and/or tie rods if necessary.*

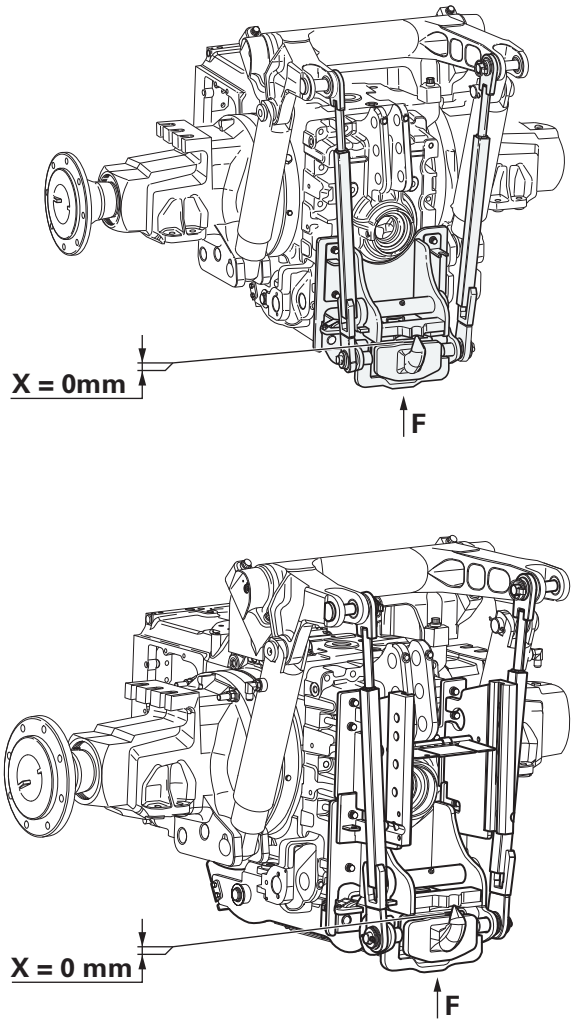


Fig. 6

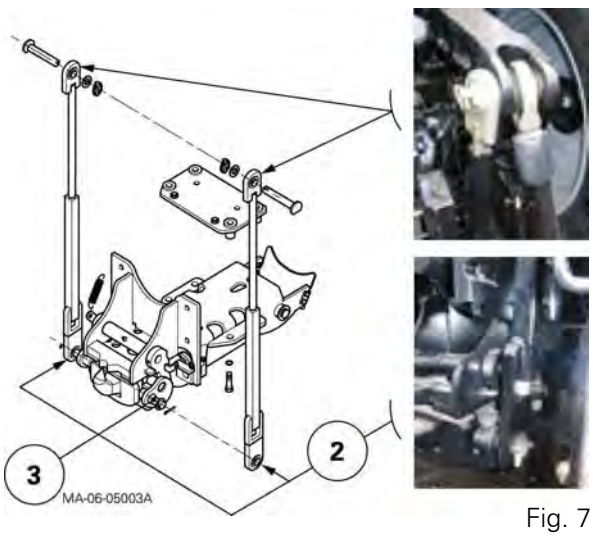


Fig. 7

Fitting and adjusting the control cable (Fig. 8, Fig. 9)

Fitting the cable to the cab

14. Slide the sheath end (9) into the hole in the cab floor.

15. Make the sheath end thread length almost identical on either side of the floor, using nuts (2). Lock the nuts.

Fitting and adjusting the cable on the auto-hitch (Fig. 9)

16. Screw the clevis (4) level with the tapped end of the cable (3).

17. Fit the clevis on rod B.

Fix the clevis with the hook (5), ensuring that rod B is still locked.

Tighten the nut (6).

18. Fit the sheath end (7) in the support.

Adjust and lock the nuts (8) so that rod B remains locked and the cable (3) is neither loose nor pinched.

Fig. 8

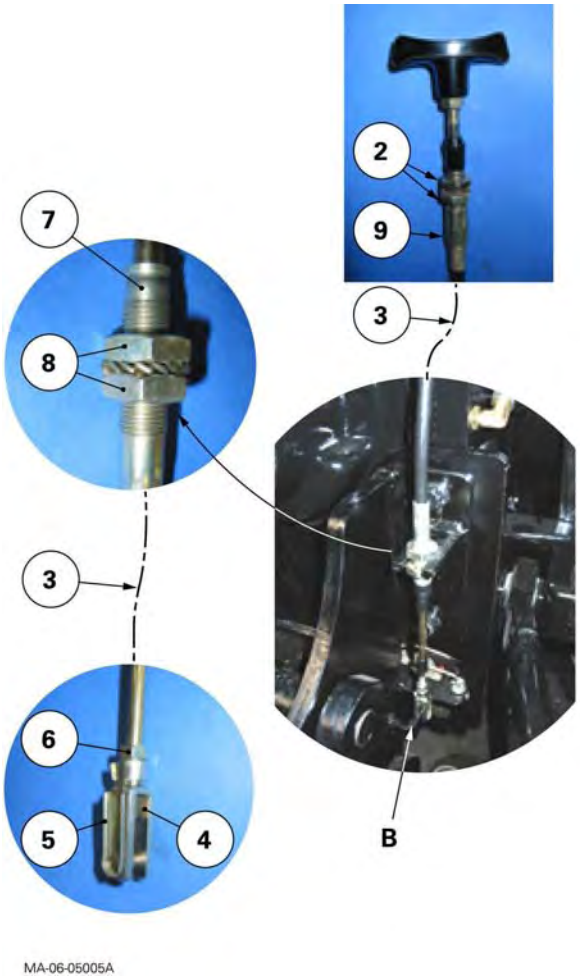


Fig. 9

D . Fitting the "Dromone" hitch fixed support

19. Clean the screws (1) (2) (3) (4) and (5) (Fig. 10) and their tapped holes. Dry them off with a jet of compressed air.

IMPORTANT: *If it is necessary to replace one or more screws, it is essential to comply with their specifications as indicated in the table below.*

Screw	Specifications
(1)	M20 x 55 mm-Grade 8.8
(2)	M20 x 220 mm-Grade 10.9
(3)	M16 x 40 mm-Grade 10.9
(4)	M16 x 60 mm-Grade 10.9
(5)	M16 x 215 mm-Grade 10.9 (for fitting type without ladder) M16 x 225 mm-Grade 10.9 (for fitting type with ladder)

Screw specifications

20. Lightly smear the thread of the screws (1) (2) (3) (4) and (5) with Loctite 270 or equivalent.

Screw in and tighten the screws (Fig. 10):

- (1) to a torque of 420-560 Nm;
- (2) to a torque of 480-640 Nm;
- (3) to a torque of 240-320 Nm;
- (4) to a torque of 240-320 Nm;
- (5) to a torque of 240-320 Nm.

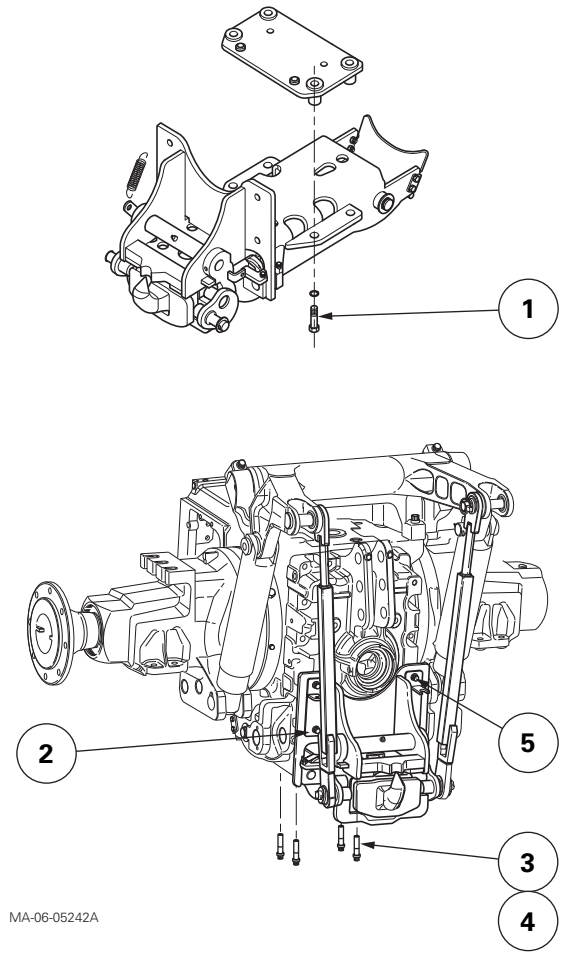


Fig. 10

6B22 - GPA40 - Rear wheels/hubs

CONTENTS

A . General

The GPA40 rear axle is fitted with trumpets fitted with flanged axle shafts or straight axle shafts.

The wheel disc can be made from steel or cast iron.

The rear axle track width can be adjusted:

- for a flanged axle shaft (Fig. 1),
  by modifying the position of the rim in relation to the wheel disc (cast iron disc) or by changing the wheels;
- for a straight axle shaft (Fig. 2, Fig. 3),
  by moving the hub on the axle shaft. The hub comprises a split cone (95 mm diameter straight axle shaft) or two half-cones (110 mm diameter straight axle shaft) which becomes/become attached to the axle shaft when it is/they are tightened.

Legend (Fig. 1, Fig. 2, Fig. 3)

1	Flanged axle shaft
2	Straight axle shaft: diameter 95 mm
3	Straight axle shaft: diameter 110 mm

View of the assembly

1

MA-06-05323A

Fig. 1

View of the assembly

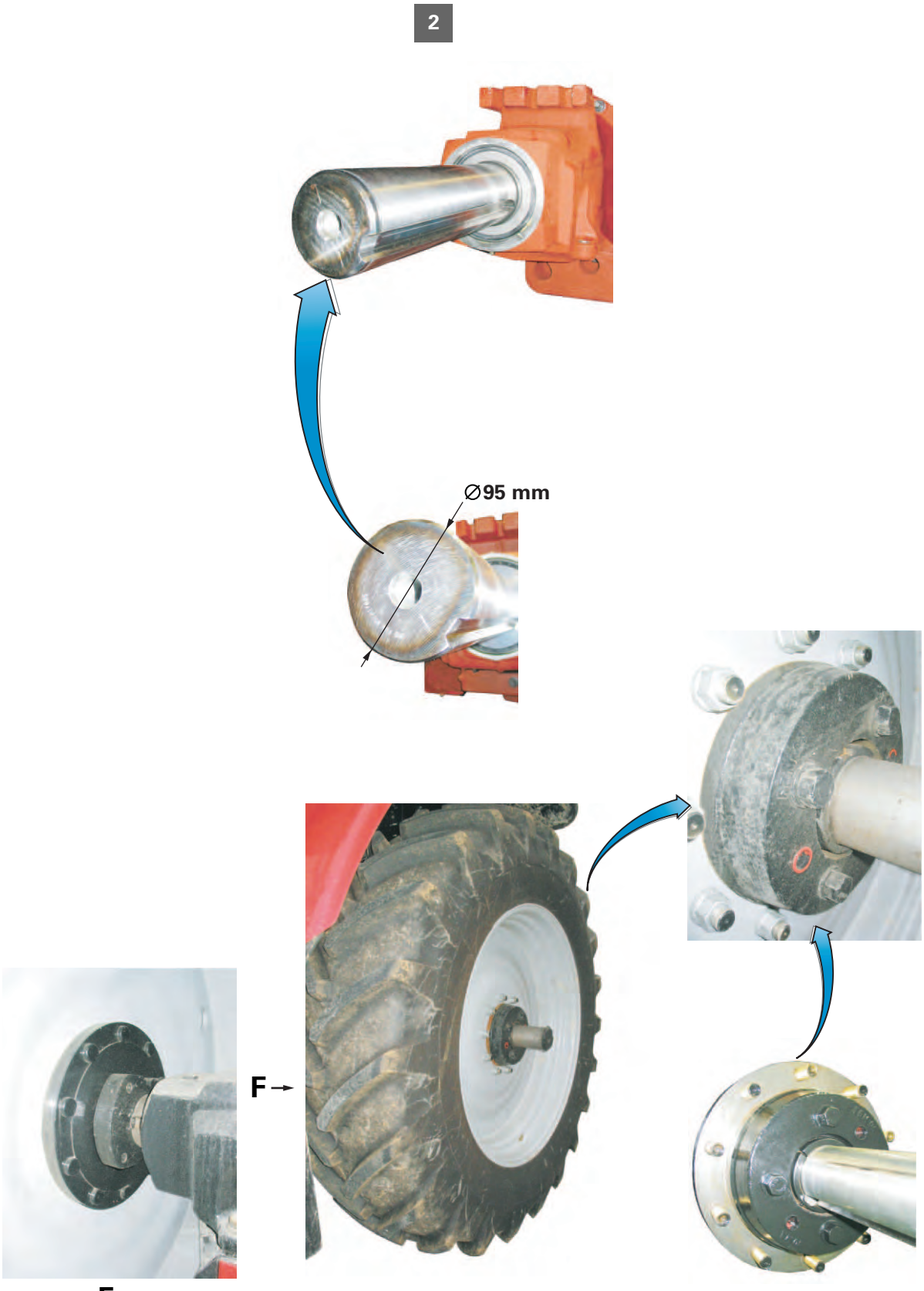


Fig. 2

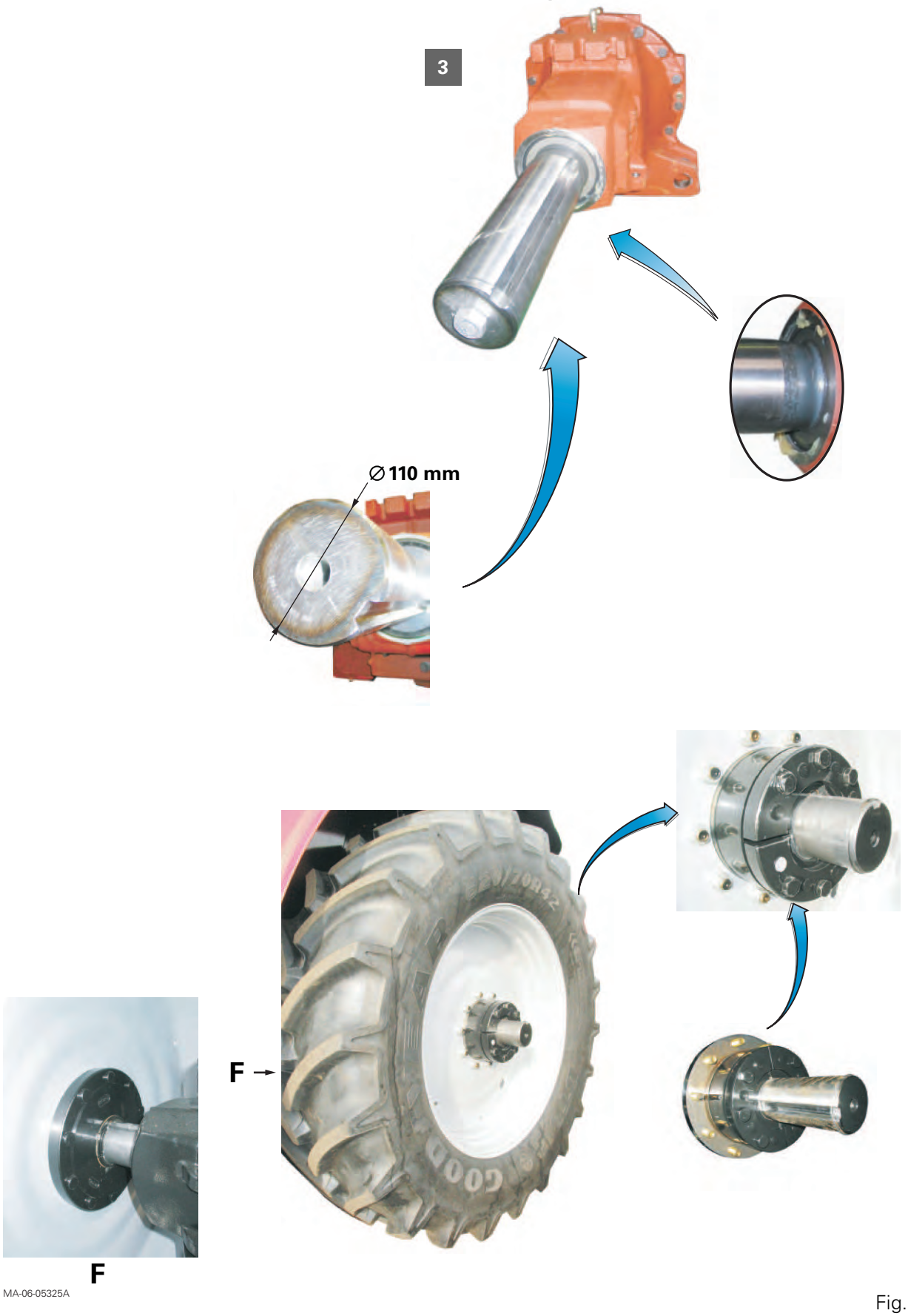


Fig. 3

B . Flanged axle shaft

Preliminary step

1. Immobilise the tractor.
Carefully chock the front wheels.
If the tractor is not fitted with a ParkLock device (optional), engage the hand brake.

Preparing a wheel

2. Release the wheel nuts (1) slightly (Fig. 6).
Using a trolley jack of sufficient capacity, lift the appropriate side of the tractor.
Remove:
- the wheel nuts;
- the wheel, using a lifting device and a suitable sling to be inserted into hole T of the wheel disc (Fig. 4).

Adjusting the rear wheel track width

3. Change the track width:
- by modifying the position of the rim in relation to the wheel disc (cast iron wheel disc) or
- by changing the wheels or
- by removing spacer(s) E (Fig. 5) located on the outside of the wheel disc in order to fit it/them between the wheel disc and the axle shaft flange.

NOTE: *If this is the first fitting of spacers E, ensure that the spacer thickness is adapted to the length of the wheel studs.*

4. Check that the thread of each wheel stud is in good condition. If one or more wheel studs are to be replaced, see steps 7 to 11.

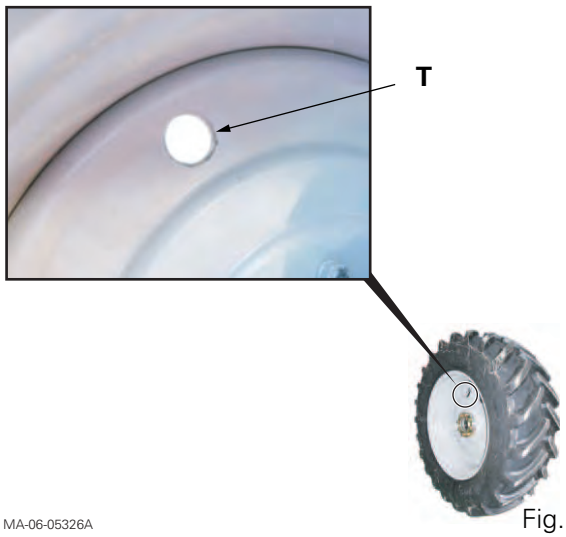


Fig. 4

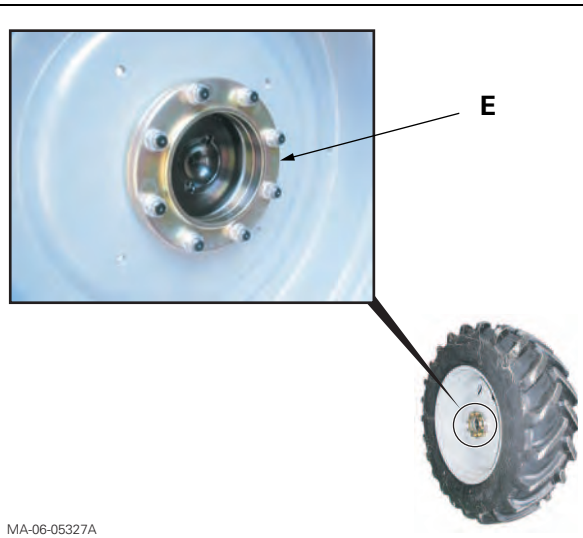


Fig. 5

Final steps

5. Refit:
- the wheel using the method and tools used previously;
- the wheel nuts (1) (M22 x 1.5) (Fig. 6), tightening them to a torque of 640-680 Nm.

6. Repeat steps 2 to 5 for the second wheel.

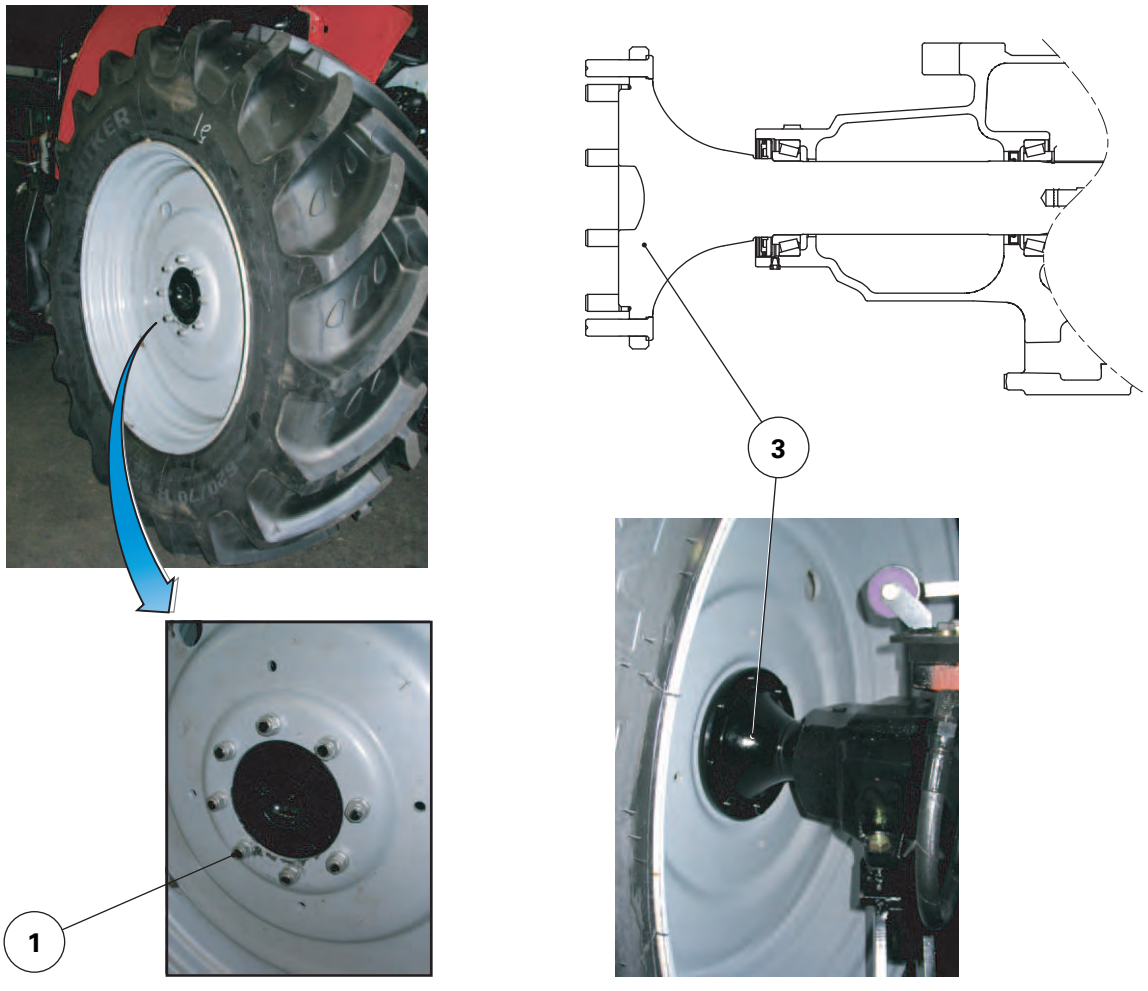


Fig. 6

Replacing a wheel stud

If the space around the wheel (trumpet housing side) is large enough, it will be possible to fit the new stud without removing the tractor wheel. If the space is limited, remove the wheel.

7. Drive out the defective wheel stud.

8. Clean the new stud and its housing inside the shaft flange.

9. Lightly smear the ribbed part of the replacement wheel stud with Loctite 270 or equivalent.

10. Fit the new wheel stud using a bronze drift and a suitable hammer.

11. If the wheel has been removed:

- refit it as per the sling method used previously;
- tighten the wheel nuts (M22 x 1.5) to a torque of 640-680 Nm.

C . Straight axle shaft

Description of a 95 mm diameter tapered hub on a straight axle shaft (Fig. 7)

When the screws (5) are tightened, the male cone (1) is attached to the hub (12) (female cone) and the straight axle shaft (3).

The keys (7) (8) prevent any angular slippage of the male cone (1) in the hub (12) or the cast iron wheel disc and on the straight axle shaft (3).

The circlip (6) at the end of the straight shaft (3) acts as a safety stop for the wheel hub when the wheel is pulled to its outer limit.

Parts list (Fig. 7)

(1) Male cone
(3) Straight axle shaft (Ø 95 mm)
(4) M22 nuts
(5) Screw
(6) Circlip
(7) Key and pin
(8) Key and screw
(12) Hub

Legend (Fig. 7)

1 Narrow track width

2 Wide track width

Tightening torque (Fig. 7)

Screws and nuts	Tightening torque
Nuts M22 x 1.5 (4)	640-680 Nm
Screw (5)	350-460 Nm

Table 1

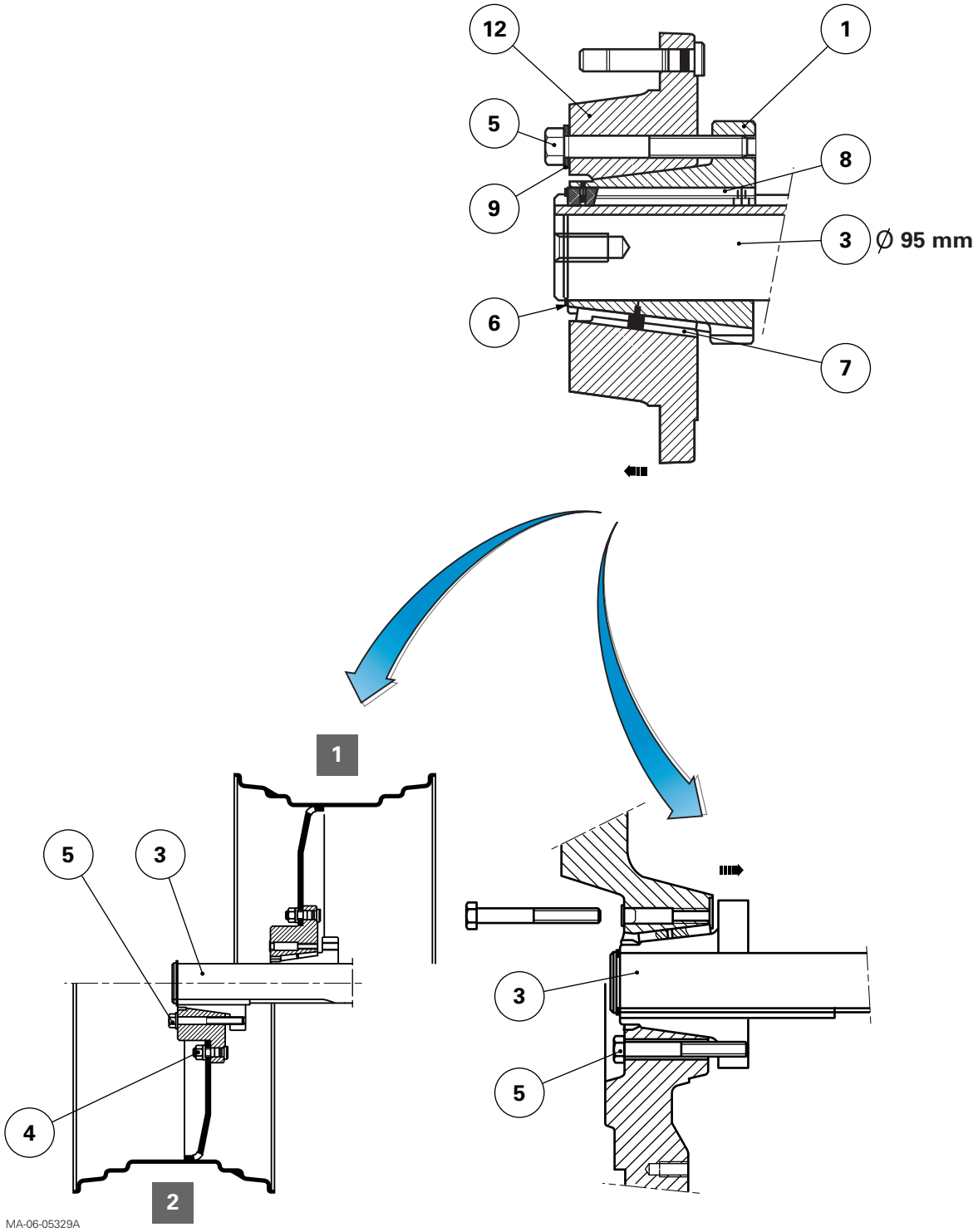


Fig. 7

Description of a 110 mm tapered hub on a straight axle shaft (Fig. 8)

Tightening the screws (5) attaches the male half-cones (2) to the hub (12) (female cone) and the straight axle shaft (3).

The keys (7) (8) prevent any angular slippage of the male half-cones (2) in the hub (12) and on the straight axle shaft (3).

The circlip (6) at the end of the straight axle shaft (3) acts as a safety stop for the wheel hub when the wheel is pulled to its outer limit.

Parts list (Fig. 8)

(2) Male half-cones
(3) Straight axle shaft (Ø 110 mm)
(4) M22 nuts
(5) Screw
(6) Circlip
(7) Key and pin
(8) Key and screw
(12) Hub

Legend (Fig. 8)

1 Narrow track width

2 Wide track width

Tightening torque (Fig. 8)

Screws and nuts	Tightening torque
Nuts M22 x 1.5 (4)	640-680 Nm
Screw (5)	500-600 Nm

Table 2

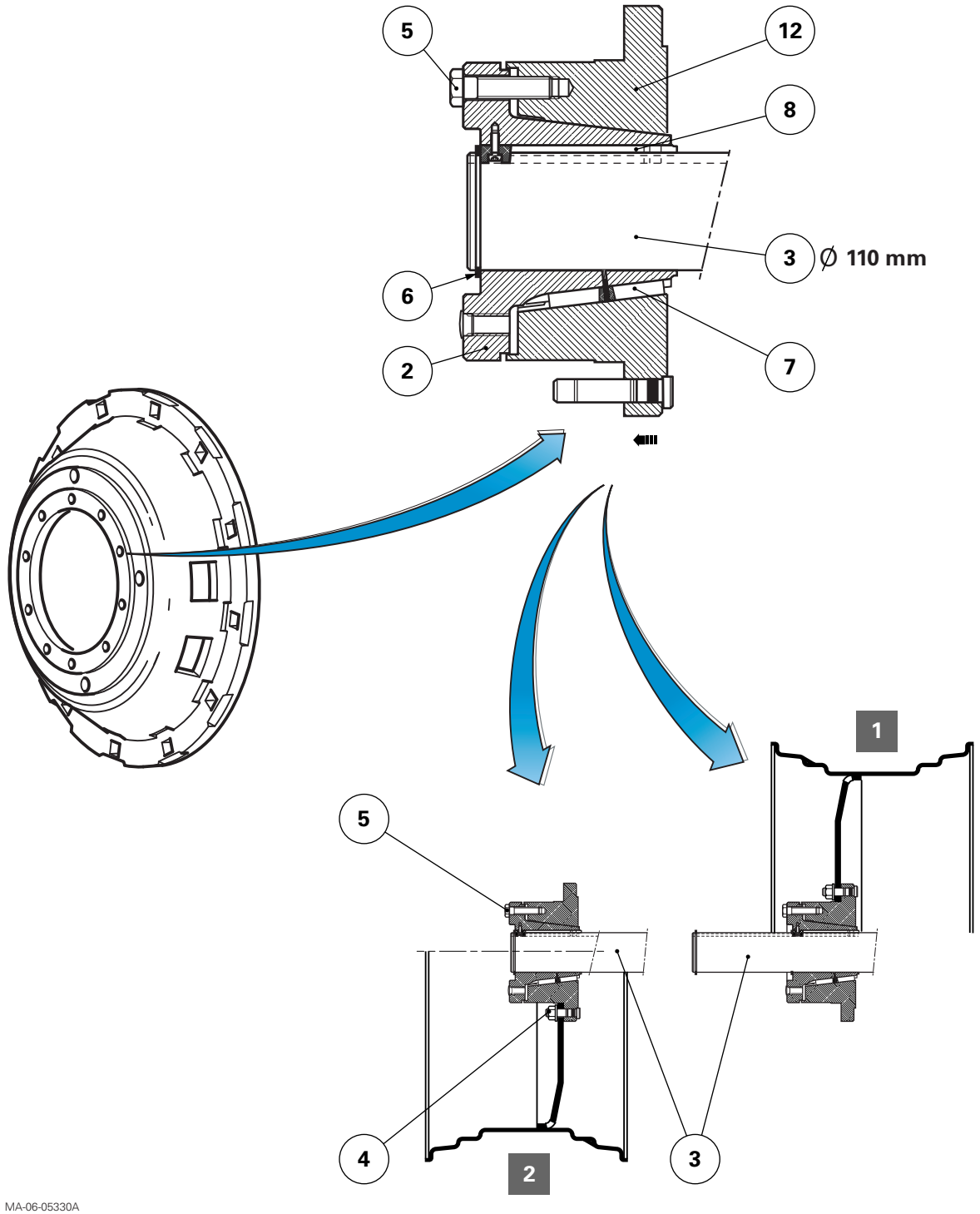


Fig. 8

D . Adjusting the rear wheel track width

Preliminary steps

12. Immobilise the tractor.
Carefully chock the front wheels.
If the tractor is not fitted with a ParkLock device (optional), engage the hand brake.

13. Remove any traces of mud that may be stuck to the rim of the straight axle shaft (3).

14. If it is necessary to remove the wheel with steel or cast iron wheel disc, use a lifting device and sling suitable for the type of wheel disc.

CAUTION: Handle with care and with the help of an operator.

Preparation (Fig. 9)

15. Unlock the screws (5).
Using a trolley jack of sufficient capacity, lift the appropriate side of the tractor.

16. Remove, depending on version:
- two or four diametrically opposed screws (5);
- the washers (9).

Loosen the other screws by a few turns.

17. Remove the plastic protectors plugging the tapped holes in the hub (12) or the cast iron wheel disc (depending on version).

18. For versions with a 95 mm diameter straight axle shaft, clean the thread of each extraction screw (5) in the hub (12) by screwing and unscrewing a tap in each thread located at the base of holes T in the hub (12) (Fig. 10) in order to extract any dirt.

NOTE: *The tap must be of suitable length.*

19. For versions with a 110 mm diameter straight axle shaft, clean the thread of each extraction screw (5) in the half-cones (2) by screwing and unscrewing a tap in each threaded hole T1 of the half-cones (2) (Fig. 10) in order to extract any dirt.

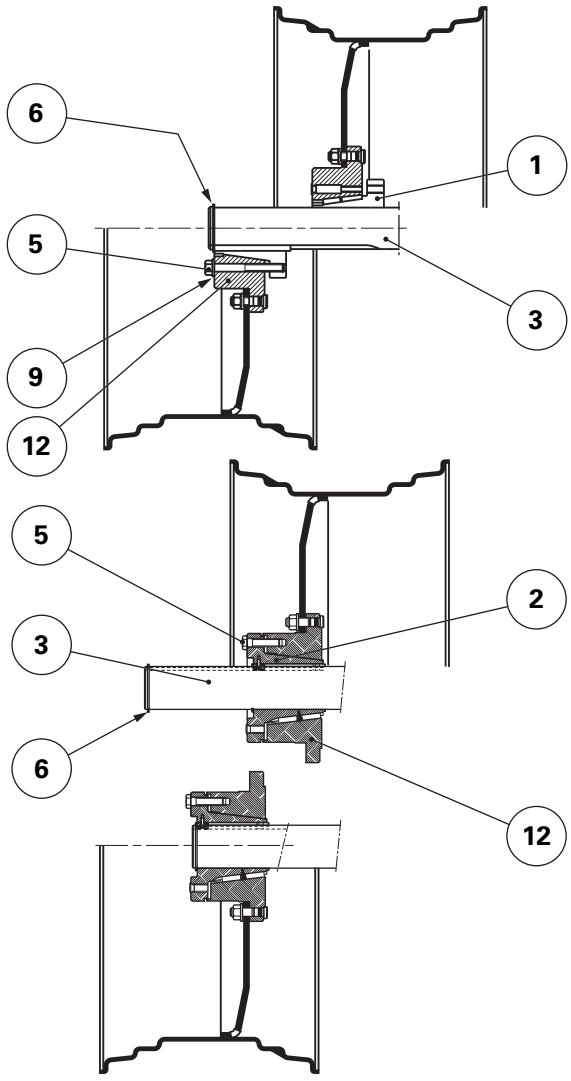


Fig. 9

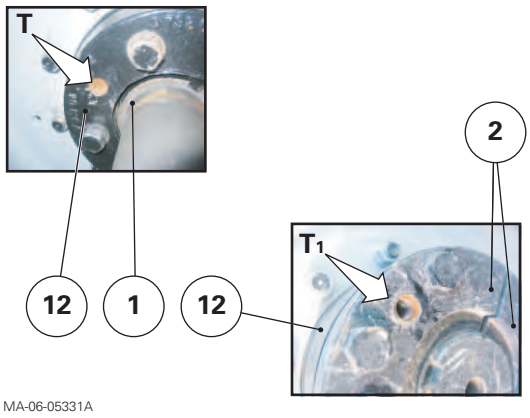


Fig. 10

20. Lightly smear the thread of the screws (5) removed during operation 16 with AS767 graphite grease or equivalent. Tighten the screws (5) in the tapped holes mentioned above.

Tighten the screws (5) uniformly in opposite pairs to separate the hub taper mechanism.

***IMPORTANT**: If the hub taper mechanism cannot be separated, slide a makeshift oblique metallic tool into the slot of the male cone (1) or the male half-cones (2) (depending on version). Tap the tool vigorously to release the male cone or half-cones.*

Settings

***IMPORTANT 1:** The tapered sections of the hub (12) (Fig. 11) must not be greased.*

***IMPORTANT 2:** Lightly smear the entire length of the rim on the straight axle shaft (3) with AS767 grease or equivalent (Fig. 11). This precaution prevents corrosion and facilitates the smooth sliding of the male cone (1) or the half-cones (2) (depending on version) on the straight axle shaft for future track width adjustments.*

21. Assisted by an operator, pull or push the wheel to slide the male cone (1) or the half-cones (2) onto the straight axle shaft and to obtain the required track width.

22. Loosen the screws (5) used to extract the tapered hub mechanism (12). Check their condition. Replace them if necessary. Screw them into their original position.

23. Tighten the screws (5) uniformly in opposite pairs (see table(s) of tightening torques at the start of § C).

***IMPORTANT:** For versions with a 110 mm diameter straight axle shaft, after tightening the screws (5), a maximum face offset of 2 mm between each male half-cone (2) is tolerated (Fig. 12).*

24. Partially fill the extraction holes on the hub (12) or the male half-cones (2) (depending on version) with bearing grease.

Plug the extraction holes with the plastic plugs.

Final steps

25. If the wheel has been removed, refit it. Tighten the M22 nuts (4) (see table(s) of tightening torques at the start of § C).

26. Remove the safety chocks from the front wheels.

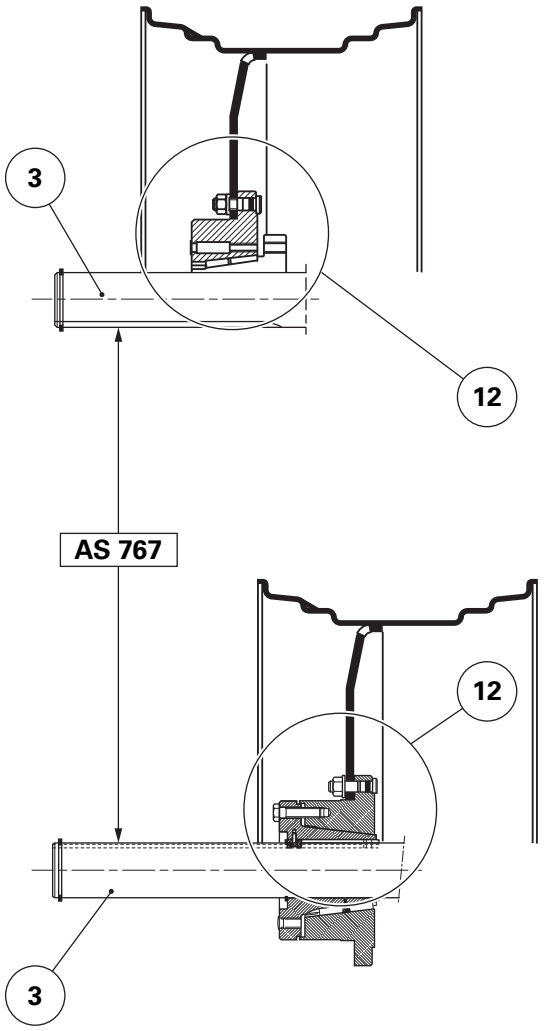


Fig. 11

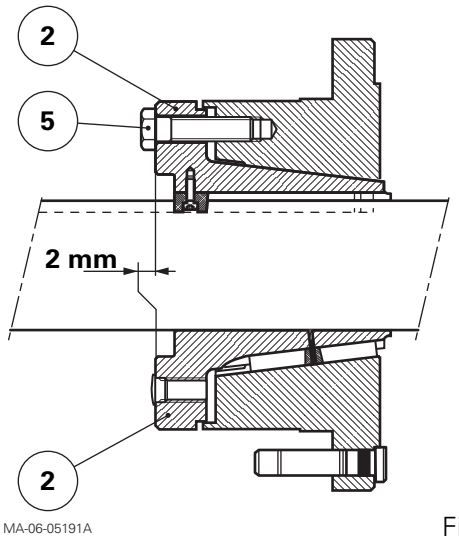


Fig. 12

6C10 - GPA30 - General - Operation

CONTENTS

A . General

The rear axle comprises five main housings: centre housing, intermediate housing, PTO housing and trumpet housings.

Centre housing

The centre housing comprises:

- on the inside
  - the rear differential assembly and ring gear (see chapter 6),
  - the power take-off brake (see chapter 7);
- on the outside
  - the lift arms and shaft (see chapter 6).

Intermediate housing

The intermediate housing comprises:

- on the inside
  - the drive pinion (see chapter 6),
  - the 4 WD clutch (see chapter 8),
  - the handbrake control unit (see chapter 6),
  - the creeper unit coupler and fork,
  - the hydraulic pump drive pinion (see chapter 9);
- on the outside
  - the right- and left-hand hydraulic casing covers (see chapter 9).

PTO housing

The PTO housing comprises:

- the independent PTO clutch (see chapter 7);
- the different versions of the 2 speed PTO (see chapter 7) (removable shaft or shiftable shaft with cable or external level control);
- 1000 rpm power take-off;
- the removable end-fitting (flange shaft with 6, 20 or 21 splines, depending on option) (see chapter 7).

Trumpet housings

The left- and right-hand trumpet housings, fitted on either side of the centre housing, contain the mechanical elements (final drive unit and axle shaft, see chapter 6) used to drive the rear wheels.

B . Layout of main components

Parts list (Fig. 1)

(1) Hydraulic pump drive pinion
(2) Centre housing
(3) PTO housing
(4) Bevel gear and differential
(5) Handbrake unit
(6) Creeper unit coupler and fork (if fitted)
(7) PTO clutch
(8) 2 speed PTO (540/1000 rpm pinions) (removable shaft)
(9) 4 WD clutch
(10) 4 WD shaft
(11) Secondary PTO shaft
(12) Interchangeable end fitting (flange shaft with 6, 20 or 21 splines, depending on option)
(13) 540 or 750 rpm driving pinion, optional
(14) 1000 rpm driving pinion
(15) Intermediate housing
(16) Shiftable PTO (540/100 rpm or 750/1000 rpm pinions)
(17) 1000 rpm PTO (1000 rpm pinion)
(18) PTO brake

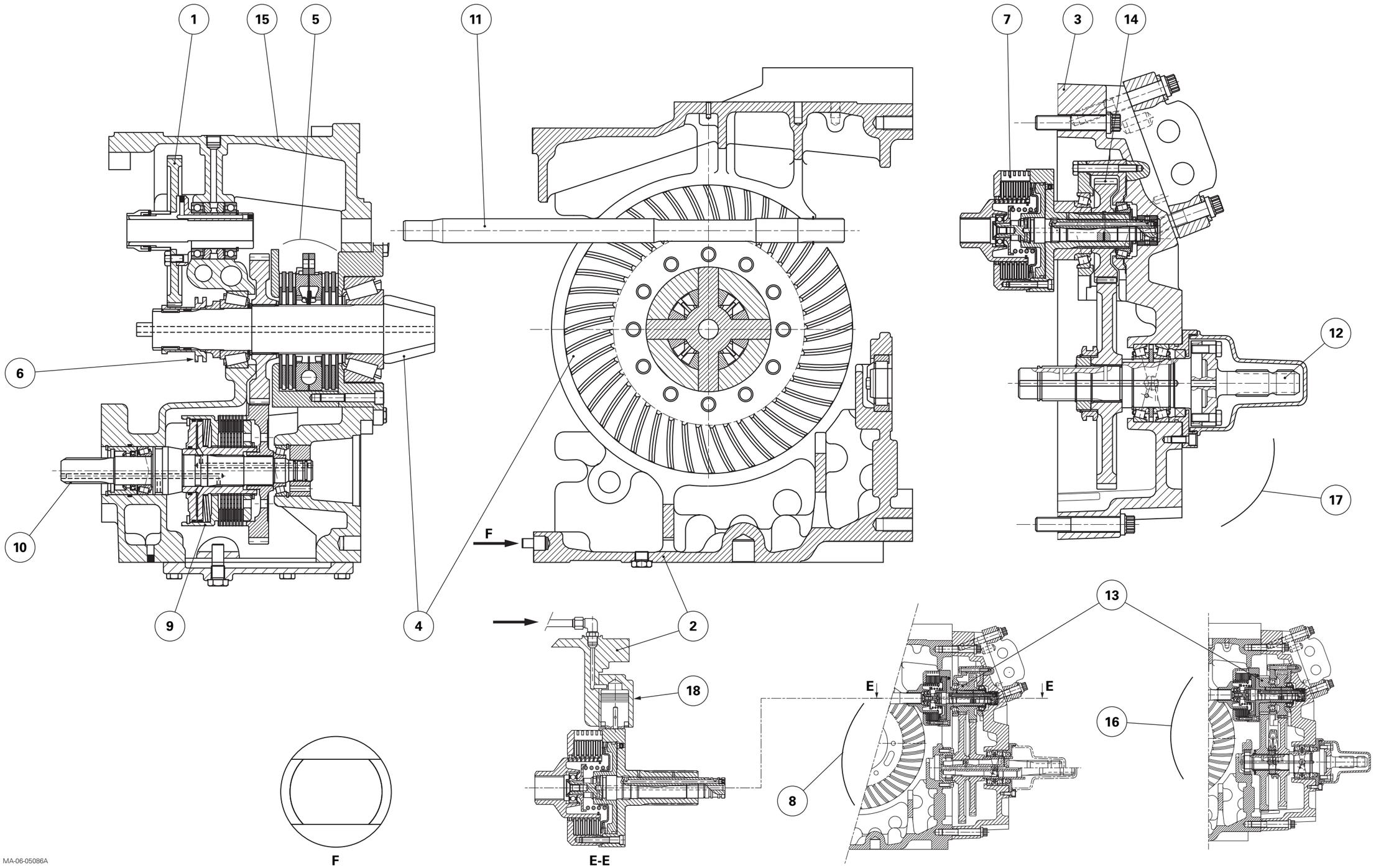


Fig. 1

C . GPA30 rear axle specifications

See Fig. 2 and Fig. 3

Legend (Fig. 2)

J Clearance

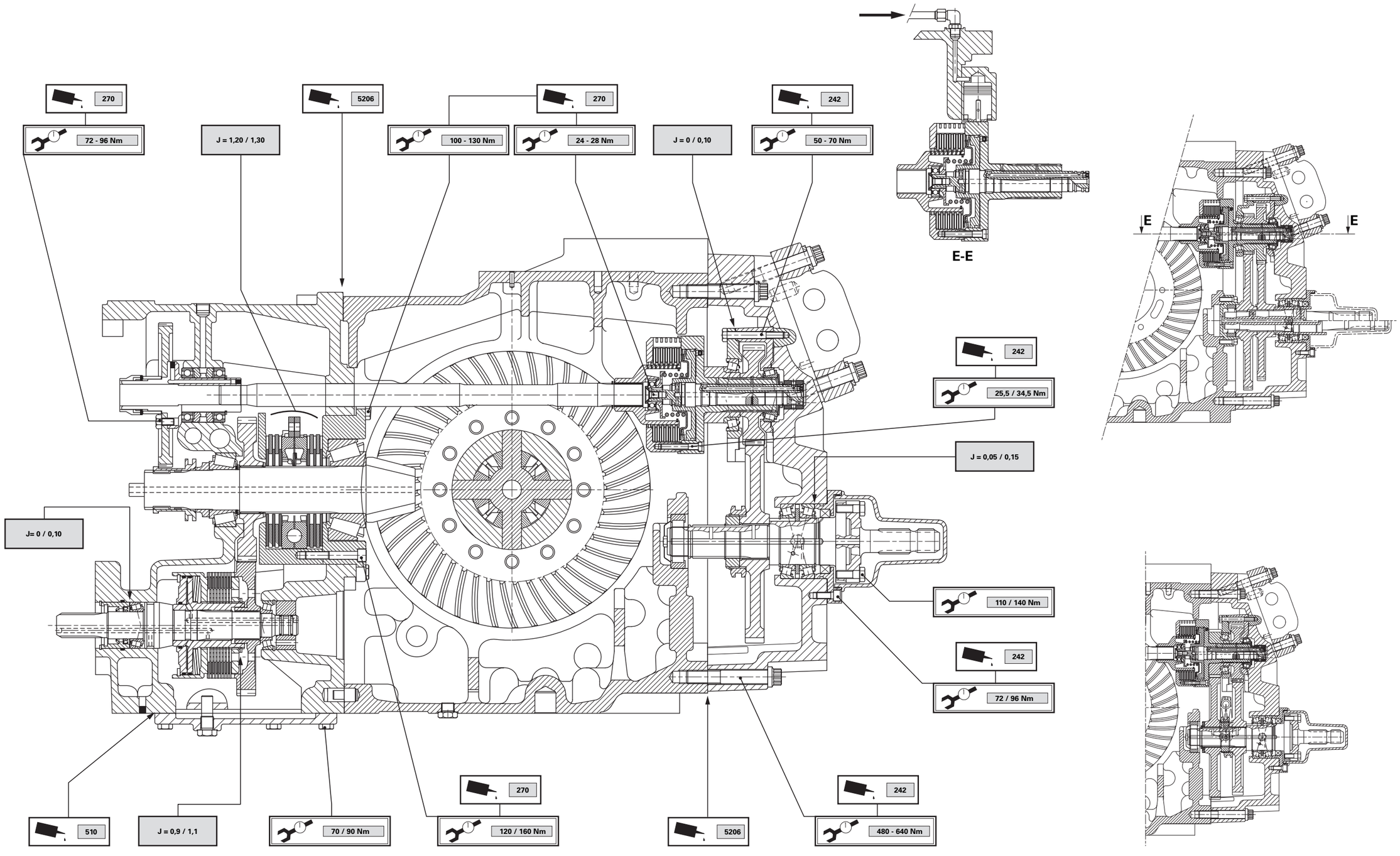

270
72 - 96 Nm
J = 1,20 / 1,30
5206
100 - 130 Nm
270
24 - 28 Nm
J = 0 / 0,10
242
50 - 70 Nm
E-E
242
25,5 / 34,5 Nm
J = 0,05 / 0,15
E
E
J= 0 / 0,10
110 / 140 Nm
242
72 / 96 Nm
510
J = 0,9 / 1,1
70 / 90 Nm
270
120 / 160 Nm
5206
242
480 - 640 Nm
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Fig. 2

Legend (Fig. 3)

J1 Backlash
P Preload

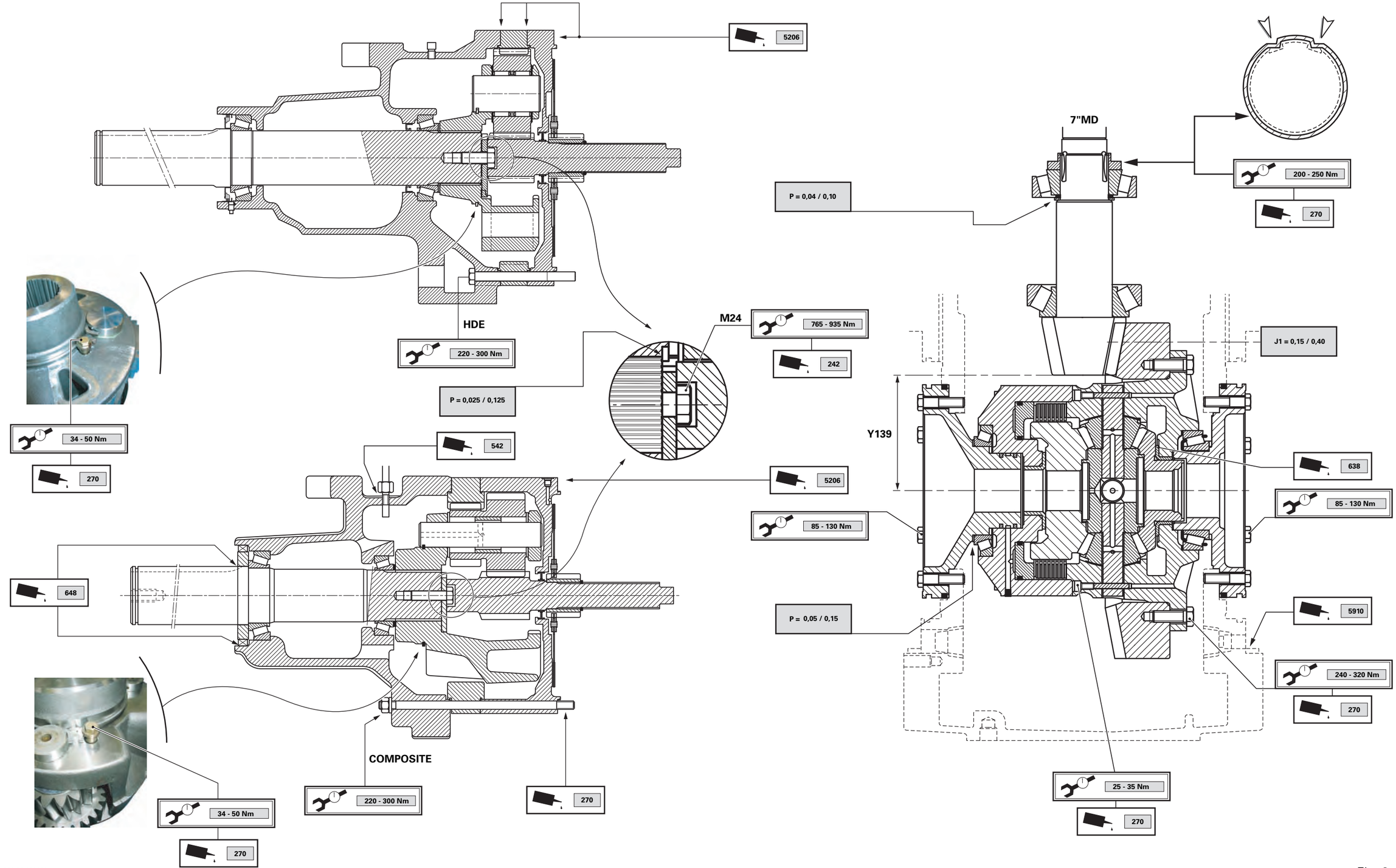

5206
HDE
220 - 300 Nm
P = 0,025 / 0,125
542
M24
765 - 935 Nm
242
P = 0,04 / 0,10
7"MD
200 - 250 Nm
270
J1 = 0,15 / 0,40
Y139
34 - 50 Nm
270
648
5206
85 - 130 Nm
P = 0,05 / 0,15
638
85 - 130 Nm
5910
240 - 320 Nm
270
COMPOSITE
220 - 300 Nm
270
34 - 50 Nm
270
25 - 35 Nm
270
MA-06-05088A

Fig. 3

6C11 - GPA30 - Heavy Duty Sealed trumpet housings

CONTENTS

GPA30 - Heavy Duty Sealed trumpet housings

A . General

The sealed compartment trumpet housings are fitted with a plain axle shaft.

They support the left- and right-hand axle shafts.

They contain the final drive units that transmit the rotation from the differential assembly.

Both trumpet housings are symmetrical and fitted on either side of the centre housing.

GPA30 - Heavy Duty Sealed trumpet housings

Construction (Fig. 1, Fig. 2)

The axle shaft (2) is supported by two opposing bearings.

These bearings consists of cups (8) (12) and cones (7) (13).

The ring gear (15) is held between the trumpet housing (10) and the sealed compartment (30). It is centred by the pins (14).

The planet carrier (25) is splined to the axle shaft. It consists of three planet gears (22) that mesh with the ring gear (15) and shaft/sun gear (29).

Differential rotation is transmitted to the planet gears via a shaft/sun gear (29) which drives the hub (32) (held in place by a snap ring (33)) and the brake disc (35).

Shims (26) fitted at the end of the axle shaft (2) are used to preload the bearings (7)(8) and (12)(13).

Axle shaft (2) and planet carrier (25) are held in place by washer (27) and screw (28).

The final drive unit compartment contains SAE 85W140 viscosity grade oil, which is different from that used in the transmission.

The tightness of each final drive unit is provided by:

- the lip seals (31) fitted back-to-back and
- the lip seal (11).

The tightness of ring gear (15) is provided by:

- seals (Loctite 5206 or equivalent) and
- two beads of silicone (Loctite 5910 or equivalent). One of the beads is applied to the trumpet housing, the other to the sealed compartment.

The three-lipped seal (5) protects the outer bearing.

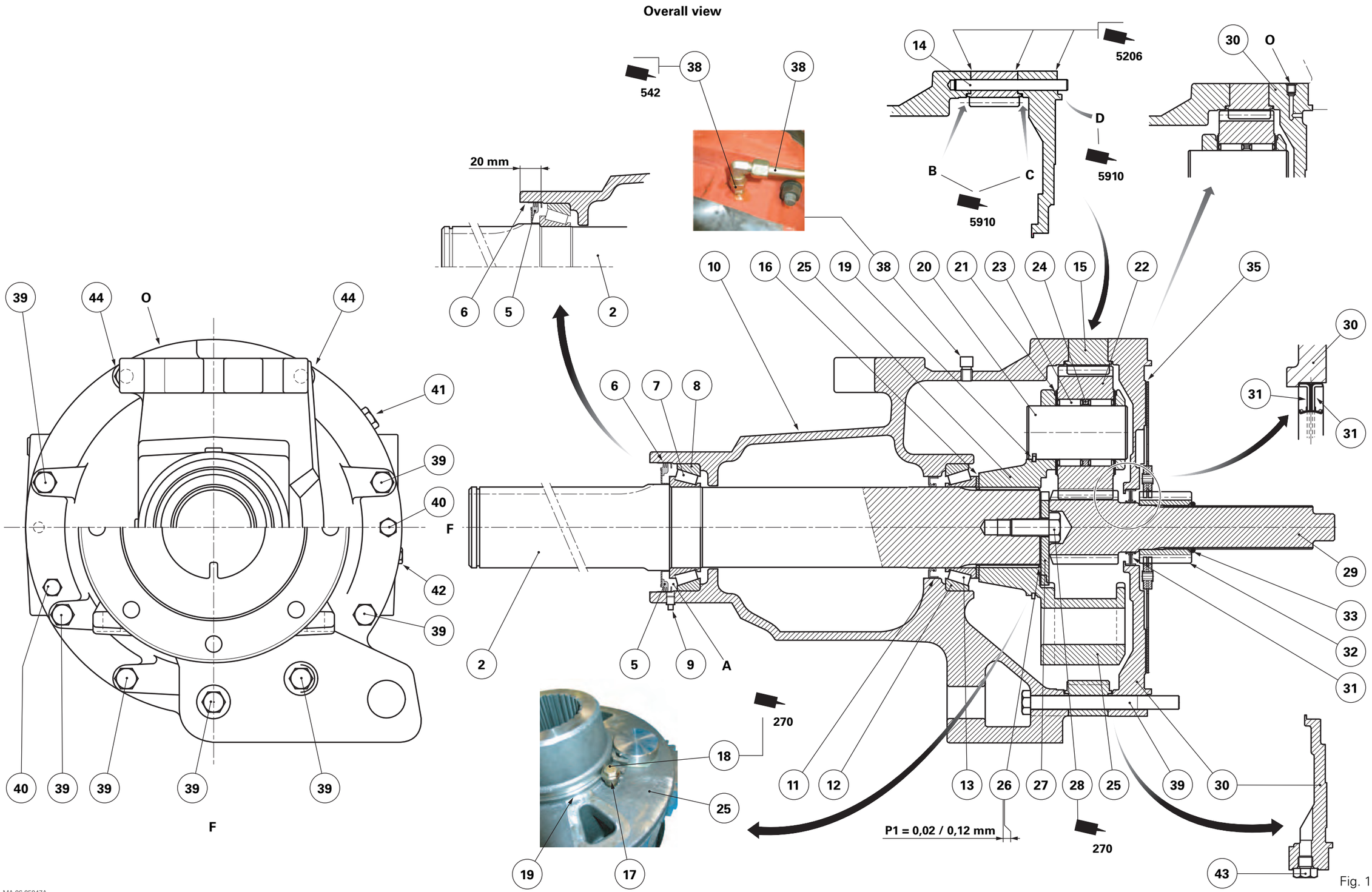
The sealed compartment (30) also serves as a brake plate. It has an O port for brake disc lubrication (see chapter 6).

The mechanical parts (epicyclic gear train) operate in a sealed housing.

The union and vent pipe (38) allow pressure relief from the sealed housing to the centre housing via the left hand-side lifting support.

Parts list (Fig. 1)

(2) Plain axle shaft (Ø 95 mm)
(5) Three-lipped seal
(6) Cage
(7) Bearing cone
(8) Bearing cup
(9) Threaded plug
(10) Trumpet housing
(11) Seal
(12) Bearing cup
(13) Bearing cone
(14) Pins
(15) Ring gear
(16) Tab washer
(17) Spacer
(18) Screw
(19) Circlip
(20) Planet gear pins
(21) Washer
(22) Planet gears
(23) Needle bearings
(24) Spacer
(25) Planet carrier
(26) Shim(s)
(27) Retaining washer
(28) Screw
(29) Shaft/sun gear
(30) Sealed compartment (brake plate)
(31) Seals
(32) Splined hub
(33) Snap ring
(35) Brake disc
(38) Union and vent pipe
(39) Screw
(40) Screw
(41) Filler cap
(42) Oil level cap
(43) Drain plug (magnetic)
(44) Nuts / Washers



MA-06-05047A

Fig. 1

Parts list (Fig. 2)

(1) Locating pin
(2) Plain axle shaft (Ø 95 mm)
(5) Three-lipped seal
(6) Cage
(7) Bearing cone
(8) Bearing cup
(9) Threaded plug
(10) Trumpet housing
(11) Seal
(12) Bearing cup
(13) Bearing cone
(14) Pins
(15) Ring gear
(16) Tab washer
(17) Spacer
(18) Screw
(19) Circlip
(20) Planet gear pins
(21) Washer
(22) Planet gears
(23) Needle bearings
(24) Spacer
(25) Planet carrier
(26) Shim(s)
(27) Retaining washer
(28) Screw
(29) Shaft/sun gear
(30) Sealed compartment (brake plate)
(31) Seals
(32) Splined hub
(33) Snap ring
(35) Brake disc
(38) Union and vent pipe
(39) Screw
(40) Screw
(41) Filler cap
(42) Oil level cap
(43) Drain plug (magnetic)
(44) Nuts/Washers

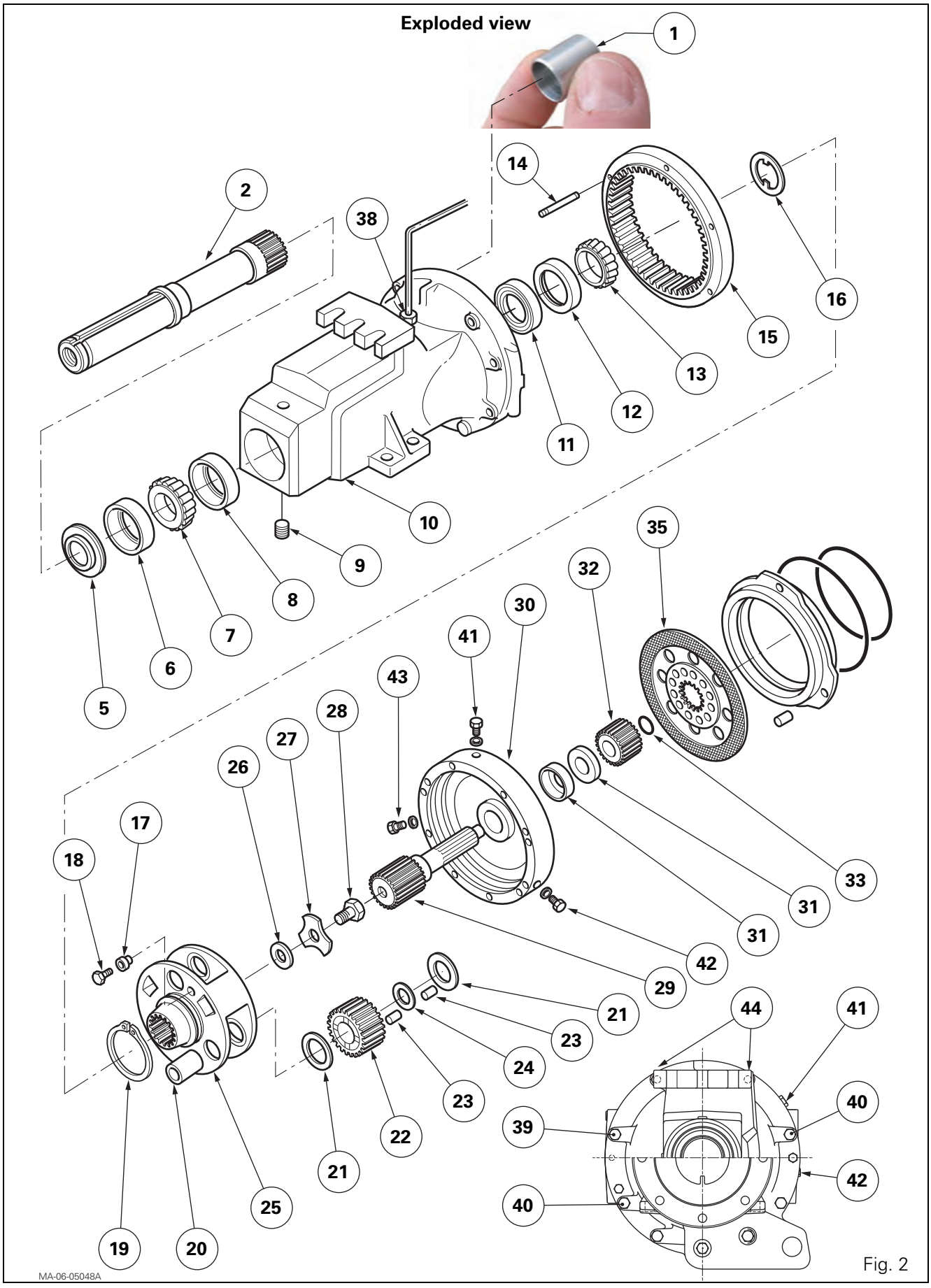

Exploded view
1
2
38
14
16
15
13
12
11
10
9
8
7
6
5
35
32
30
41
43
28
27
26
17
18
33
31
31
42
29
21
23
24
23
22
21
25
19
20
44
41
40
39
42
40
MA-06-05048A

Fig. 2

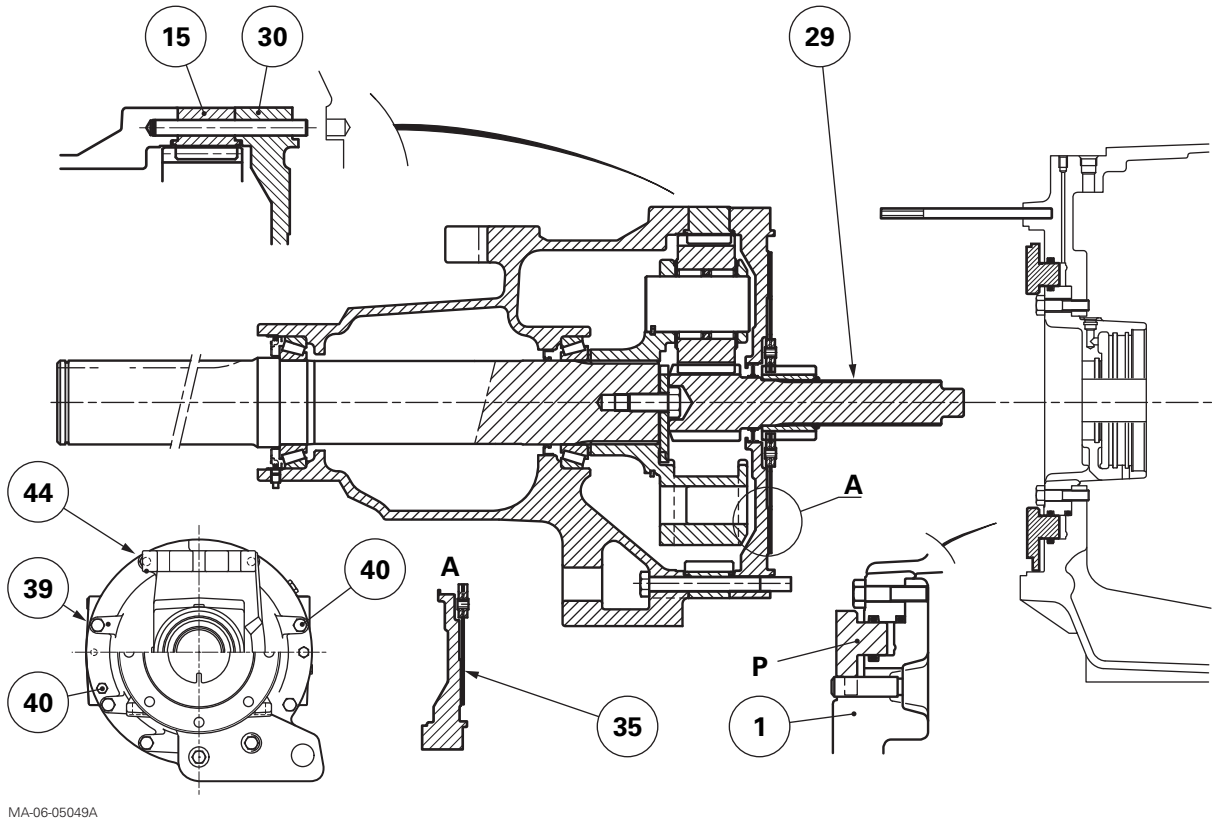

15
30
29
44
39
40
40
A
A
35
P
1
MA-06-05049A

Fig. 3

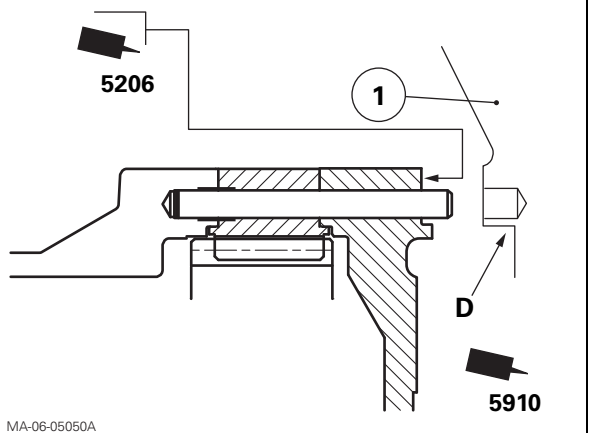

5206
1
D
5910
MA-06-05050A

Fig. 4

B . Removing - refitting the trumpet assembly

Removal

1. Drain the centre housing.

   IMPORTANT: *The oil used for the mechanical and hydraulic components of the transmission and that used for lubricating the moving parts in the trumpet housing are of different type and viscosity grade. If these oils are not to be changed, they must not be mixed when drained.*
2. Immobilise the tractor.

   Disassemble the wheel.

   Position a safety stand.
3. Remove the cab fixing screws and the stabiliser support. If necessary, raise the concerned cab side slightly. For suspended cabs, see chapter 12.
4. Remove the shaft from the lift ram.
5. Support the trumpet housing with a suitable fixture and a suitable trolley jack.
6. Remove screws (39) and nuts/washers (44) excluding screws (40).
7. Separate the trumpet assembly from the centre housing (Fig. 3).

   NOTA: *The trumpet assembly consists of the sun gear (29), the sealed compartment (30) and the ring gear (15).*

   IMPORTANT: *Take care not to press the brake pedal to avoid driving out the P piston from the centre housing (Fig. 3).*
8. Attach the retaining tool (see chapter 6).

Refitting

9. Remove all traces of used sealing products.

   Clean the mating faces of the trumpet and centre housings.

   Dry the parts carefully.
10. Evenly smear the sealed compartment mating face with a sealing product (Loctite 5206 or equivalent) (Fig. 4).

    Evenly fill angle D of the centre housing (1) with a silicone bead (Loctite 5910 or equivalent).

    IMPORTANT: *The diameter of the bead must be of small section and without joins.*
11. Replace the brake disc (35) checking that it slides freely on the hub splines (32).
12. Support the trumpet housing using the equipment used for removal. Move the trumpet housing near the centre housing.

    Engage the shaft/sun gear into the differential.

    Turn the axle shaft and push the trumpet until it makes contact with the centre housing.
13. Tighten screws (39) and nuts of the upper studs to a torque of 220 - 300 Nm.
14. Refit the parts around the trumpet housing.

    If necessary, lower the cab into its initial position. Tighten the silentbloc screws to a torque of 200 - 260 Nm (Loctite 270 or equivalent). For suspended cabs, see chapter 12.

    Refit the wheel. Tighten the nuts and screws to the specified torque, depending on version (see chapter 6).
15. Top up the oil level in the housings. Check it using the sight glass located to the left of the centre housing.
16. Check the oil level in the final drive unit. Top up if necessary.
17. Check the lift control operation.

    Carry out a road test of the brake circuit.

    Check the oil tightness of the trumpet housing, hydraulic unions and plugs.

C . Removing - refitting the sealed compartment and ring gear assembly

Removal (Fig. 6)

18. Remove the trumpet assembly (see § B).
Drain the final drive unit.

19. Position the trumpet housing vertically (Fig. 5).

20. Remove screw (40), snap ring (33) and hub (32).

21. Cover the sun gear splines (29) with a flexible protection.
Release and remove the sealed compartment (30).
Remove the sun gear (29).
Release and remove the ring gear (15).

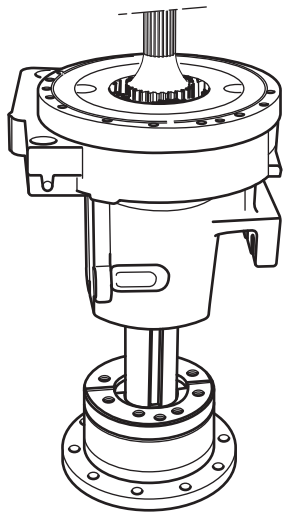


Fig. 5

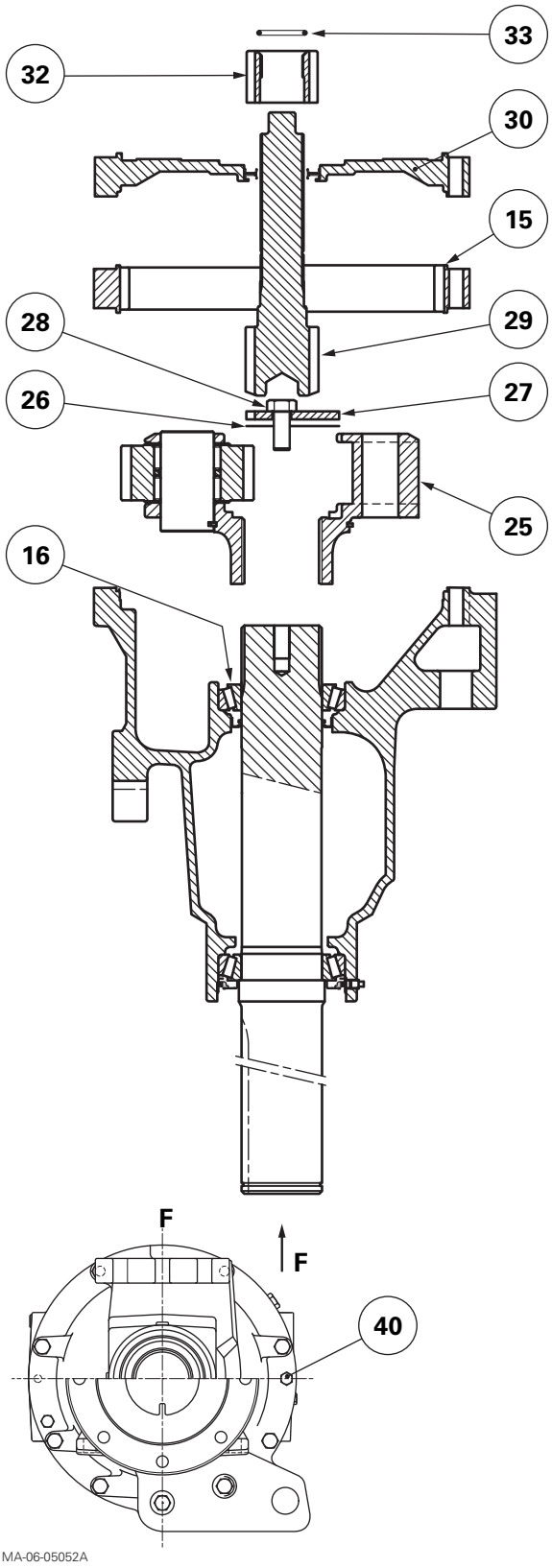


Fig. 6

Refitting

22. Remove all traces of used sealing products.

Using an appropriate solvent, finish cleaning the mating faces:

- of the trumpet housing;
- of the ring gear;
- of the sealed compartment.

Dry the components.

23. Evenly smear the mating face of the ring gear on the trumpet housing (10) with a sealing product (Loctite 5206 or equivalent) (Fig. 7).

Evenly fill angle B of the trumpet housing with a silicone bead (Loctite 5910 or equivalent) (Fig. 7).

IMPORTANT: *The diameter of the bead must be of small section and without joins.*

24. Check the presence of the locating pin (1) (Fig. 7).

Refit the ring gear (15), positioning its turned section D towards the sealed compartment (30) (Fig. 7).

25. Evenly smear the mating face of the ring on the trumpet housing (30) with a sealing product (Loctite 5206 or equivalent) (Fig. 7).

Evenly fill angle C of the sealed compartment with a silicone bead (Loctite 5910 or equivalent) (Fig. 7).

IMPORTANT: *The diameter of the bead must be of small section and without joins.*

26. Refit the shaft/sun gear (29).

Slide the protector 3376885M1 (see § I) on the splines of the shaft/sun gear.

27. Refit:

- the sealed compartment (30);
- the hub (32);
- the snap ring (33) using the locally made tool (see § I).

28. Fit the screws (40). Tighten to a torque of 100 - 130 Nm.

29. Remove the protector.

30. Refit the trumpet assembly (see § B).

Top up the final drive unit oil level.

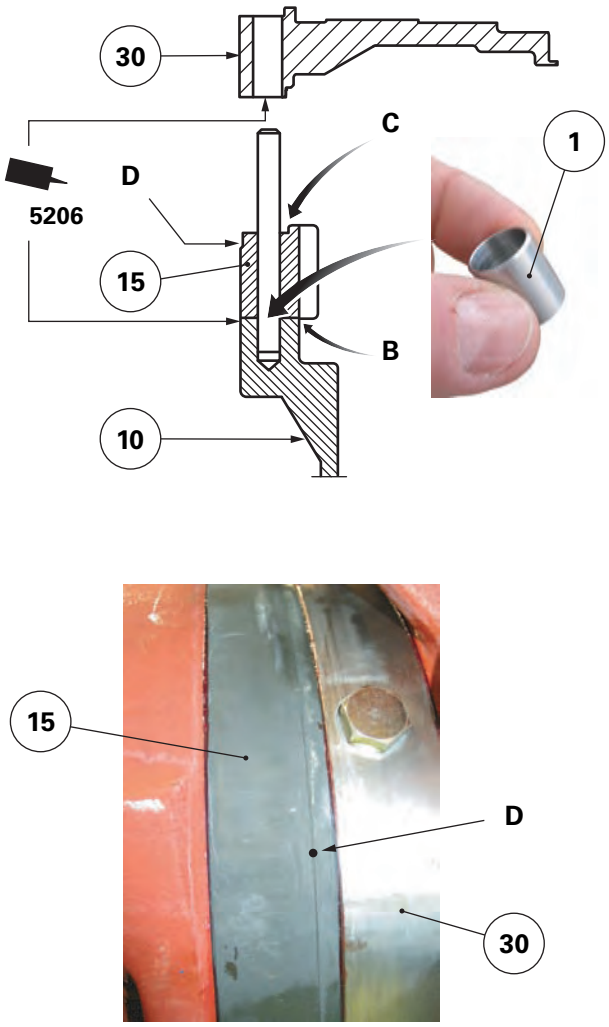


Fig. 7

D . Replacing sealed compartment seals

Disassembly

31. Remove the trumpet assembly (see § B).

32. Remove the sealed compartment (30) and ring gear (15) assembly (see § C).

33. Extract the seals (31).

Reassembly

34. Using a suitable fixture, insert the first new seal (31) against the shoulder of sealed compartment (30) back-to-back with the second seal, using the same method (Fig. 8).

35. Refit the sealed compartment (30) and ring gear (15) assembly (see § C).

Refit the trumpet assembly (see § B).

36. Ensure that the vent pipe (38) is neither blocked nor pinched.

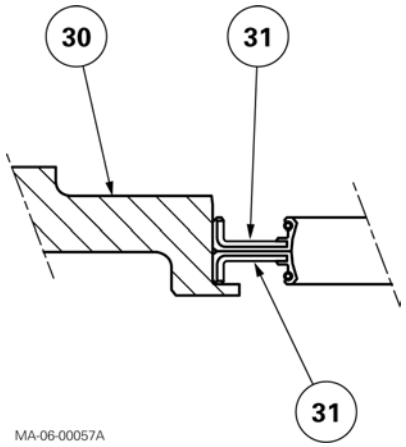


Fig. 8

E . Removing and disassembling the planet carrier

Removal

37. Take off:
- the trumpet assembly (see § B);
- the sealed compartment (30) and the ring gear (15) (see § C).

38. Immobilise the axle shaft and planet carrier.

39. Take out screw (28), washer (27), and shim(s) (26). Remove the planet carrier assembly (25) (Fig. 6).

Disassembly (Fig. 9)

40. Take off:
- the screw (18);
- the spacer (17);
- the circlip (19) by opening its two ends.

41. Drive out and remove the pins (20).
Take off:
- the friction washers (21);
- the planet gears (22);
- the needles (23), making sure not to lose any. They are arranged in two rows separated by a spacer (24).

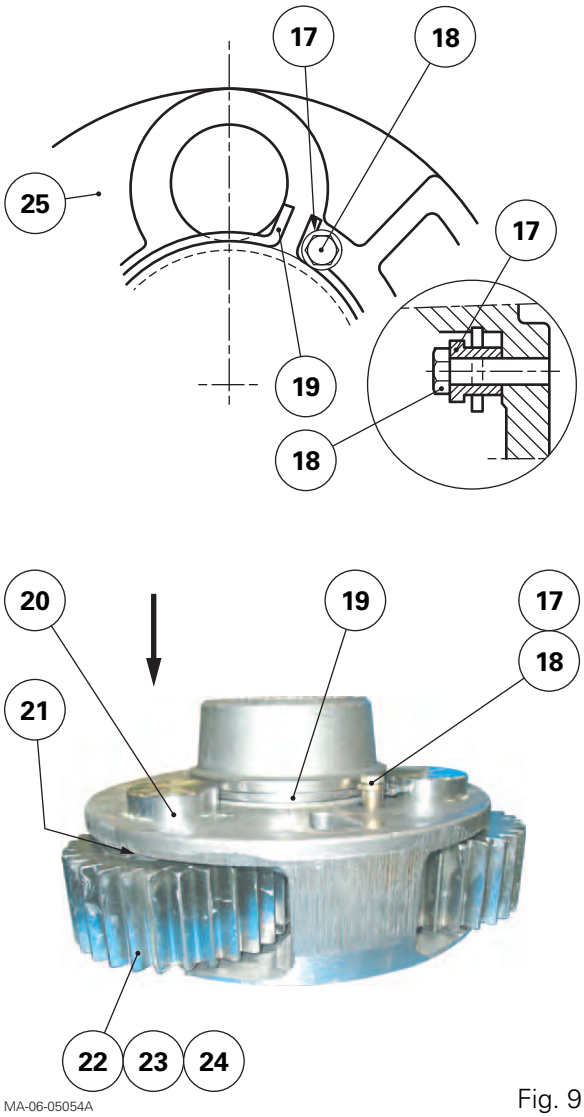


Fig. 9

F . Reassembling and refitting the planet carrier

Reassembly

42. Clean and check all components. Replace any defective parts.

Equip and fit the planet gears.

Carry out the operation 41 in reverse order.

43. Place the spacer (17).

Lightly smear the thread of the screw (18) with Loctite 270 (Fig. 9). Tighten to a torque of 34 - 50 Nm.

Refitting

44. Check for the presence of washer (16).

45. Refit the planet carrier assembly (25) (Fig. 6).

If necessary, shim the axle shaft bearings (see § H).

46. Immobilise the axle shaft and planet carrier.

Place the shim(s) (26) and washer (27).

47. Lightly smear the thread of the screw (28) with Loctite 270 or equivalent. Fit and tighten this screw to a torque of 765 - 935 Nm.

48. Refit the sealed compartment (30) and ring gear (15) (see § C).

49. Refit the trumpet assembly (see § B).

G . Replacing axle shaft bearings and seals

Preliminary operations

50. Take off:

- the trumpet assembly (see § B);
- the sealed compartment (30) (see § C);
- planet carrier assembly (25) (see § E).
- the ring gear (15) (see § C).

Disassembly

51. Take off:

- the washer (16);
- the bearing cone (13) (free on axle shaft);
- the axle shaft (2).

52. Extract the bearing cone (7) using an extractor.

53. Drive out:

- the seal (5);
- the cage (6).

54. Extract the bearing cups (8) (12) according to a locally defined method.

Reassembly

55. Clean and check all components. Replace any defective parts.

IMPORTANT: *When replacing the bearings, it is recommended to fit a new seal (11).*

56. Position the seal (11) (Fig. 10) according to the following indications.

- If the axle shaft (2) is new, replace the seal (11). Smear the outer diameter of the new seal with a film of transmission oil. Fit the seal to within 8 mm of the cup shoulder (12), with the lip turned towards the final drive unit.
- If the axle shaft (2) is reused and if its rim is marked by a circumferential groove on the mating face (11), move the seal slightly such that its lip is in contact with a different part of the shaft.

57. Fit:

- the bearing cups (8) (12) thrust against their respective shoulders;
- the cage (6) according to Fig. 11;
- the bearing cone (7) lubricated with clean transmission oil, thrust against the axle shaft shoulder (2).

58. Fit the new three-lip seal (5) thrust against bearing cone (7), respecting the assembly direction (Fig. 11).

59. Moderately grease the bearing cone and seal lips (5) (11) (AGCO 1143 grease or equivalent).

60. Protect the seal lip (11) by temporarily masking the splines on the axle shaft with a flexible protection.

61. Insert the prepared shaft into the trumpet housing, directing the seal lips (5) outwards.

62. Slide the bearing cone (13) and the tab washer (16) onto the axle shaft.

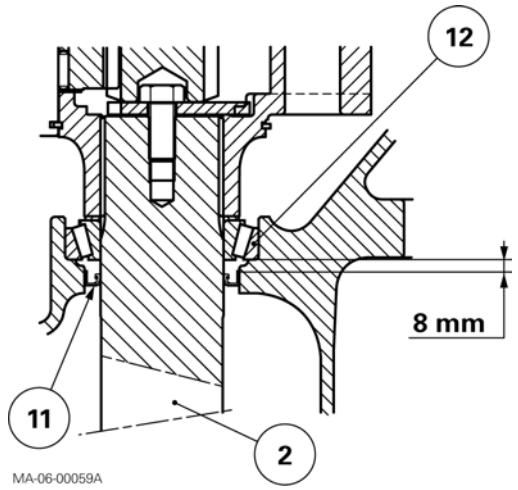


Fig. 10

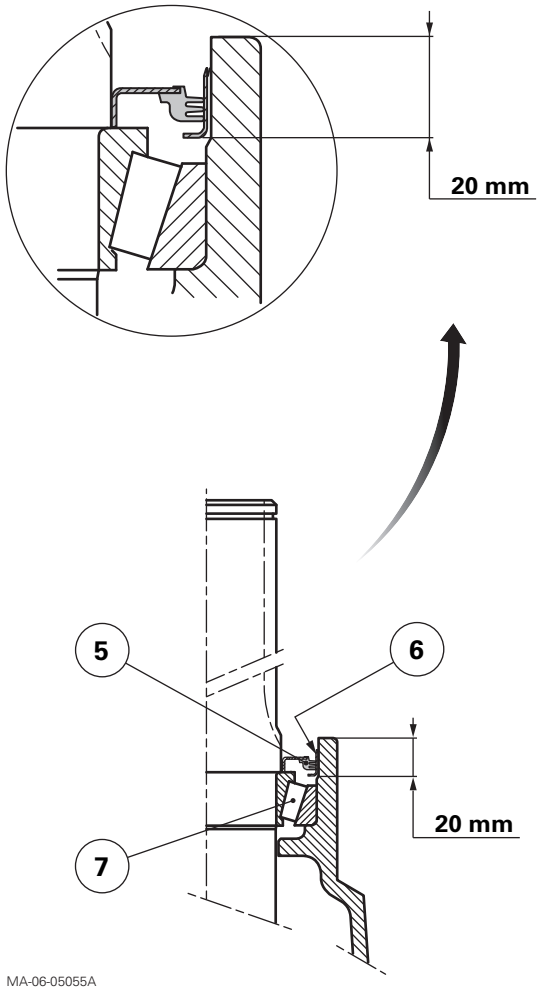


Fig. 11

Final operations

63. Refit the planet carrier assembly (25).

64. Shim the bearings (see § H).

65. Refit the sealed compartment (30) and ring gear (15).

66. Temporarily replace plug (9) by a grease nipple.

Partially fill cavity A (Fig. 12) of the trumpet housing with AGCO 1143 grease or equivalent.

IMPORTANT: *A few grease gun operations are sufficient to grease the bearing. Moderate greasing prevents seal turning (see greasing interval on the Operator Instruction Book).*

Remove the grease nipple.

Screw in the cap.

67. Refit the trumpet assembly (see § B).

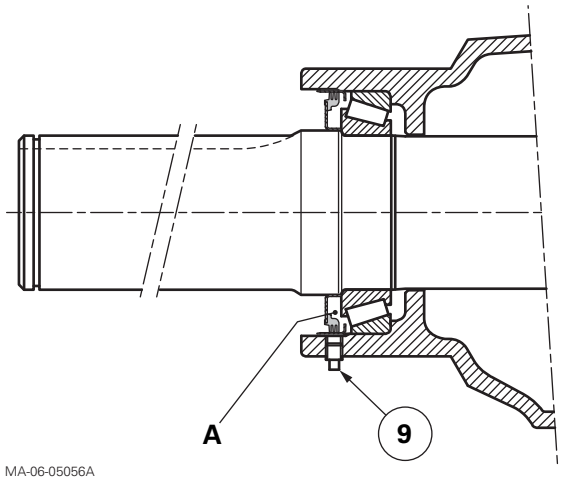


Fig. 12

H . Shimming the axle shaft bearings

Replacement of the following parts requires checking of axle shaft bearing shimming:

- the axle shaft (2);
- the bearings (7)(8) and (12)(13);
- the trumpet housing;
- the tab washer (16);
- the planet carrier (25).

NOTA: *The preloading shimming of the axle shaft bearings is carried out via shim(s) (26) placed between the axle shaft (2) end and the washer (27) (Fig. 13).*

IMPORTANT: *To carry out the correct shimming of the bearings, place the trumpet housing in a vertical position (Fig. 13).*

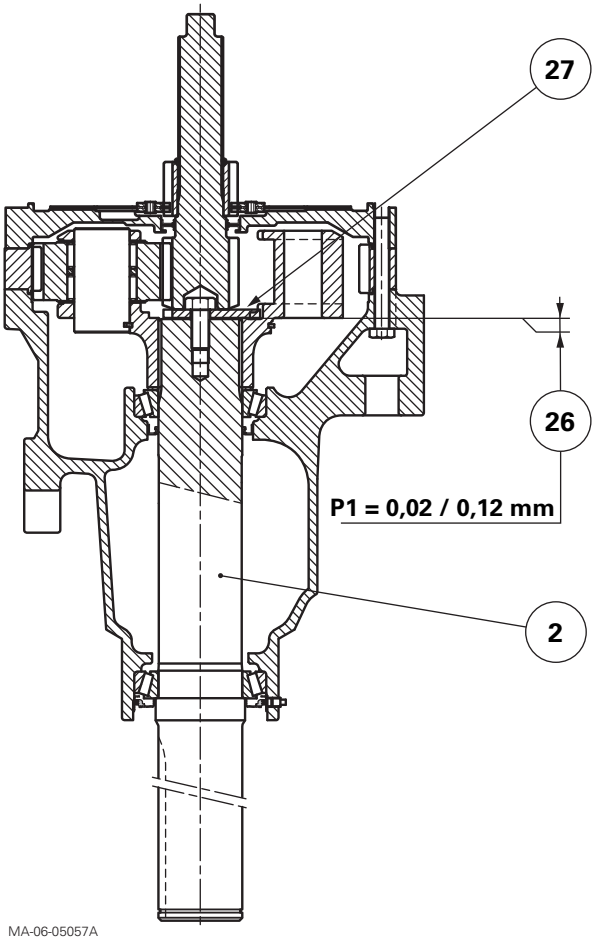


Fig. 13

Preparing for shimming

68. Refit the bearing cone (13), tab washer (16) and planet carrier (25).

69. Fit a shim(s) (26) with a thickness greater than the space between the end of the axle shaft (2) and the washer (27) mating face on the planet carrier (Fig. 14). This should give a temporary clearance **J** of approximately **0.10 to 0.15 mm**.

70. Fit washer (27). Provisionally lock screw (28).

Shimming (Fig. 14)

71. Press hard on the planet carrier while simultaneously turning the trumpet several turns.

72. Place a dial gauge on the planet carrier with its index positioned near the centre.

Set the dial gauge to zero.

73. Using appropriate levers, move the planet carrier vertically (Fig. 14). Repeat this operation several times. Take the average of the clearances J measured by the dial gauge during each movement.

74. Reduce shim (26) thickness according to the J + (0.02 to 0.12) value to obtain a preload **P1 = 0.02 to 0.12 mm** (Fig. 13).

75. Definitively fit the washer (27).

Lightly smear the thread of the screw (28) with Loctite 270 or equivalent. Tighten this screw to a torque of 765 - 935 Nm.

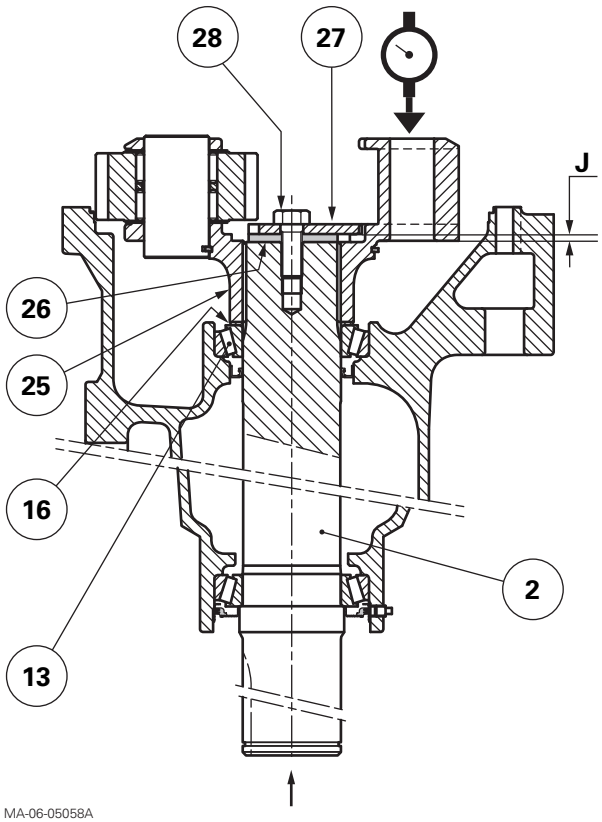


Fig. 14

I . Service tools

Tools available in the AGCO network

- 3376885M1: Compartment oil seal protector (Fig. 15)

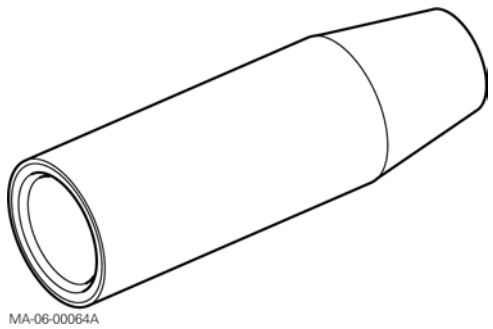


Fig. 15

Locally made tool

- one and pusher for inserting snap ring (33) (Fig. 16)

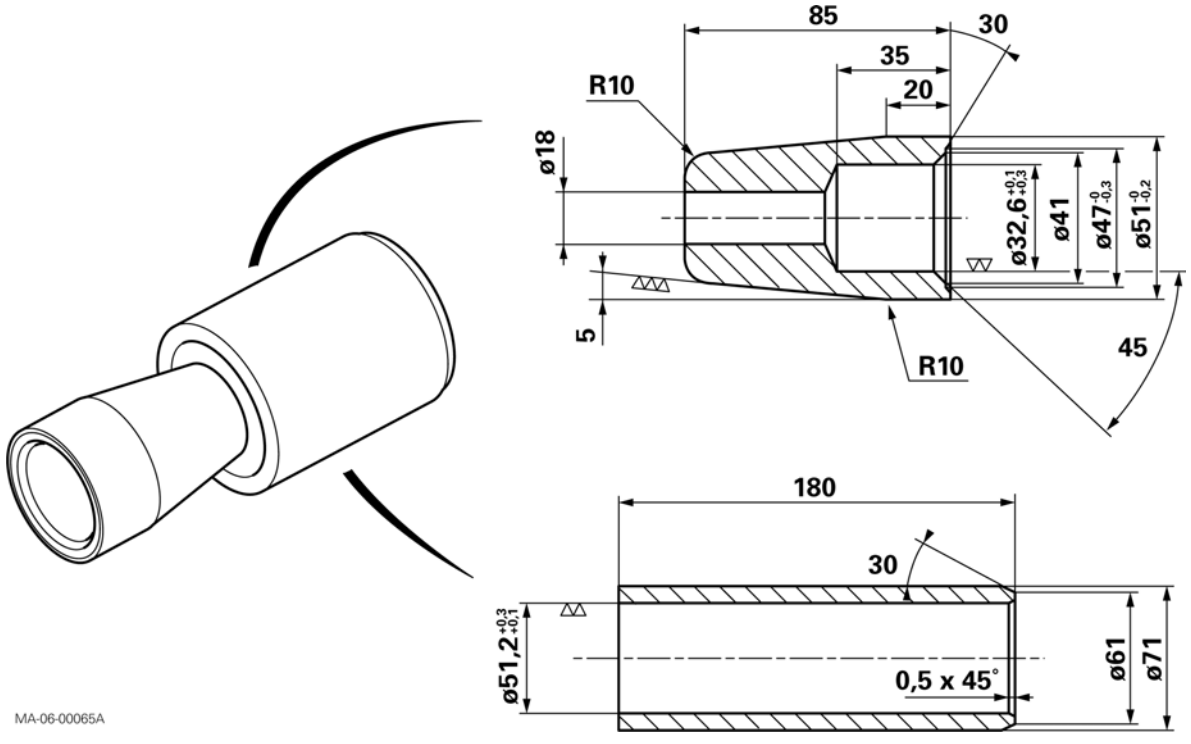


Fig. 16

6C12 - GPA30 - Trumpets housings with composite drive unit

CONTENTS

GPA30 - Trumpets housings with composite drive unit

A . General

The trumpet housings with composite drive units are fitted with a plain axle shaft.

They support the left- and right-hand axle shafts.

They contain the final drive units that transmit the rotation from the differential assembly.

Each final drive unit consists of an epicyclic gear train with double planet gears.

Both trumpet housings are symmetrical and fitted on either side of the centre housing.

GPA30 - Trumpets housings with composite drive unit

Construction (Fig. 1, Fig. 2)

The axle shaft (2) is supported by two opposing bearings.

These bearings consist of cups (8) (12) and cones (7) (13).

The ring gear (15) is held between the trumpet housing (10) and the spacer (30). It is centred by the pin (14).

The spacer (30) is positioned by means of the locating pin (5) on the centre housing. It contains the planet carrier (25).

The planet carrier (25) is splined to the axle shaft. It comprises three double planet gears (22).

Differential rotation is transmitted to the double planet gears via a shaft/sun gear (29) which drives the hub (32) held in place by a snap ring (33) and the brake disc (35).

Shims (26) fitted at the end of the axle shaft (2) are used to preload the bearings (7)(8) and (12)(13).

Axle shaft (2) and planet carrier (25) are held in place by washer (27) and screw (28).

The shimming of the double planet gears (22) is achieved using shim(s) (6) placed against the 17 teeth pinion.

The trumpet housing contains SAE 85W140 viscosity grade oil, which is different from that used in the transmission.

The oil tightness of each trumpet housing is provided by:

- the lip seals (31) fitted back-to-back and
- the O'rings (4).

The cassette seal (3) protects the outer bearing (7)(8).

An axial hole and a radial hole on the pin (20) allow for the lubrication of the double planet gear (23) needle bearing (22).

The spacer (30) also serves as a brake plate. It has an O port for brake disc lubrication (see chapter 6).

The union and vent pipe (38) allow pressure relief from the trumpet housing to the centre housing via the left hand-side linkage support.

Parts list (Fig. 1)

(1) Bush
(2) Plain axle shaft (Ø 110 mm)
(3) Cassette seal
(4) O'rings
(5) Locating pin
(6) Shim(s)
(7) Bearing cone
(8) Bearing cup
(9) Washers
(10) Trumpet housing
(11) Nuts
(12) Bearing cup
(13) Bearing cone
(14) Cotter pin
(15) Ring gear
(16) Tab washer
(17) Spacer
(18) Screw
(19) Circlip
(20) Planet gear pins
(21) Washers
(22) Double planet gears
(23) Needle bearings
(24) Spacer
(25) Planet carrier
(26) Shim(s)
(27) Retaining washer
(28) Screw
(29) Shaft/sun gear
(30) Spacer (brake plate)
(31) Seals
(32) Splined hub
(33) Snap ring
(34) Studs (Ø 16 mm ; L = 335 mm)
(35) Brake disc
(36) Studs (Ø 16 mm ; L = 320 mm)
(37) Stud (Ø 16 mm ; L = 330 mm)
(38) Union and vent pipe
(40) Screw
(41) Plug (filling and topping)
(43) Drain plug (magnetic)
(45) Stud (Ø 16 mm ; L = 350 mm)

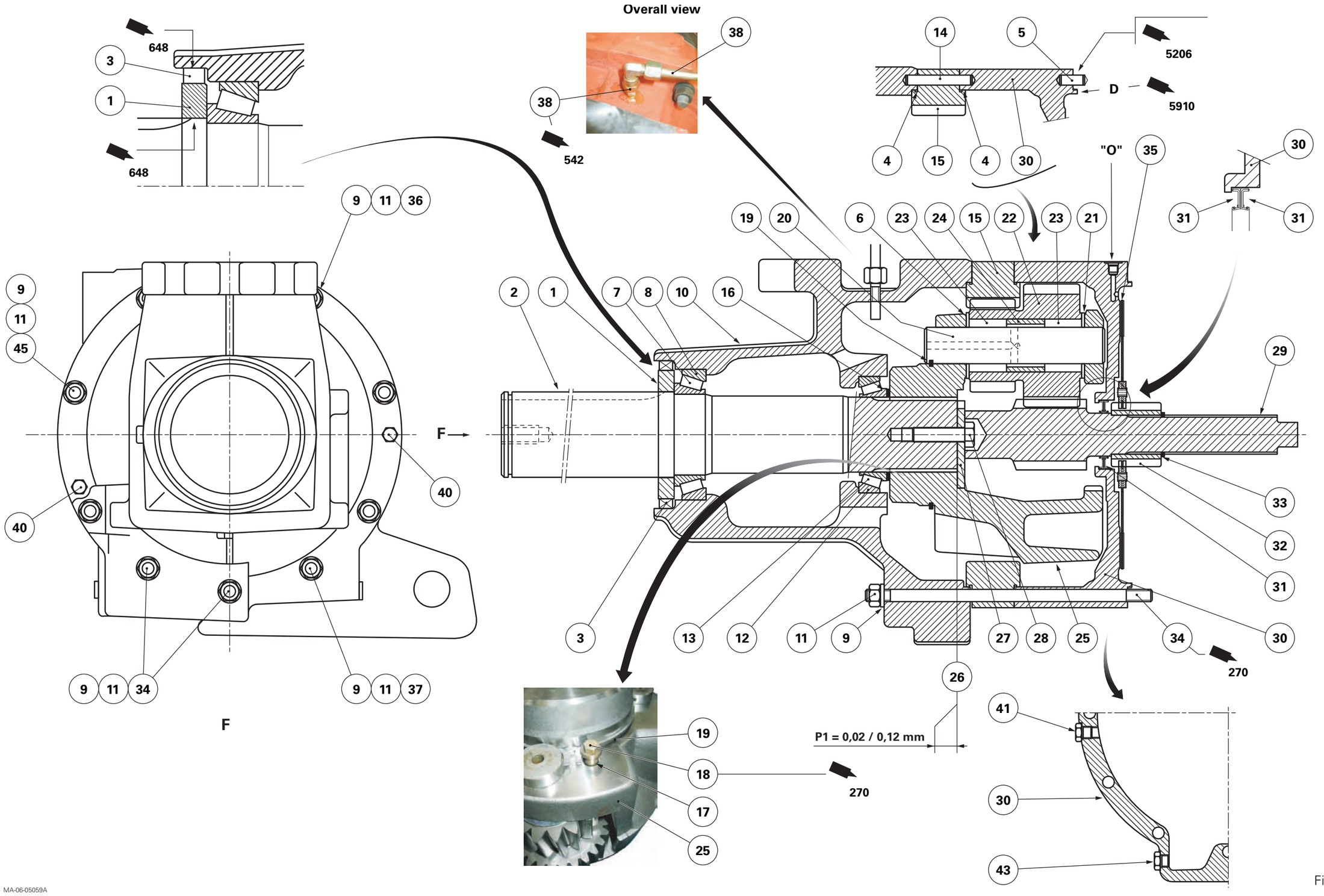


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Fig. 1

Parts list (Fig. 2)

(1) Bush
(2) Plain axle shaft (Ø 110 mm)
(3) Cassette seal
(4) O'rings
(5) Locating pin
(6) Shim(s)
(7) Bearing cone
(8) Bearing cup
(9) Washers
(10) Trumpet housing
(11) Nuts
(12) Bearing cup
(13) Bearing cone
(14) Cotter pin
(15) Ring gear
(16) Tab washer
(17) Spacer
(18) Screw
(19) Circlip
(20) Planet gear pins
(21) Washers
(22) Double planet gears
(23) Needle bearings
(24) Spacer
(25) Planet carrier
(26) Shim(s)
(27) Retaining washer
(28) Screw
(29) Shaft/sun gear
(30) Spacer (brake plate)
(31) Seals
(32) Splined hub
(33) Snap ring
(34) Studs (Ø 16 mm ; L = 335 mm)
(35) Brake disc
(36) Studs (Ø 16 mm ; L = 320 mm)
(37) Stud (Ø 16 mm ; L = 330 mm)
(38) Union and vent pipe
(40) Screw
(41) Plug (filling and topping)
(43) Drain plug (magnetic)
(45) Stud (Ø 16 mm ; L = 350 mm)

Exploded view

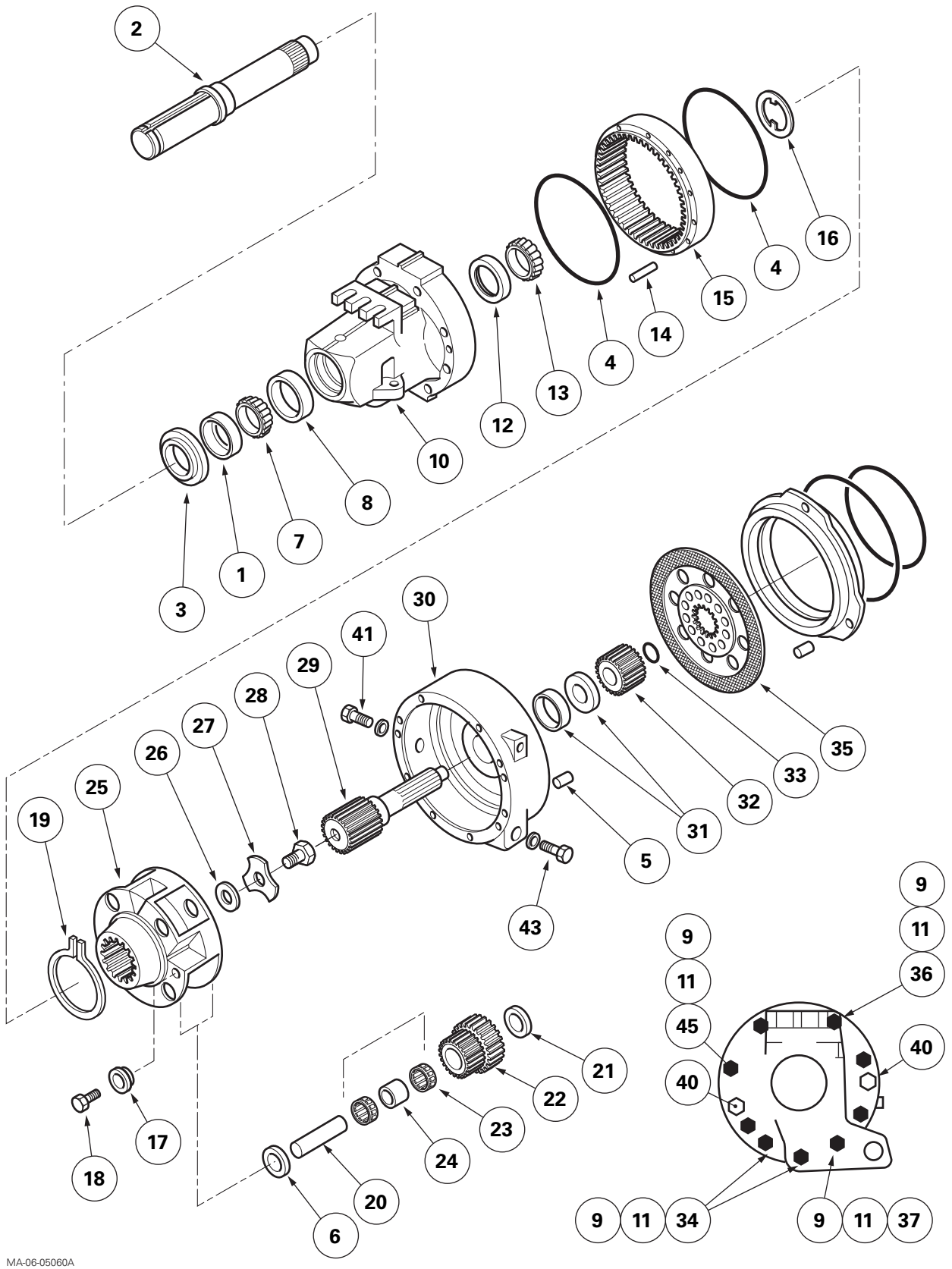

Fig. 2

B . Epicyclic gear train kinematics

The kinematics are as follows (Fig. 3):

1) Ring gear (15) locked
2) Drive input via the shaft/sun gear (29)
3) Drive transmission to:
   - the double pinions (22) (planet gears);
   - the planet carrier (25).
4) Drive output via the axle shaft (2)

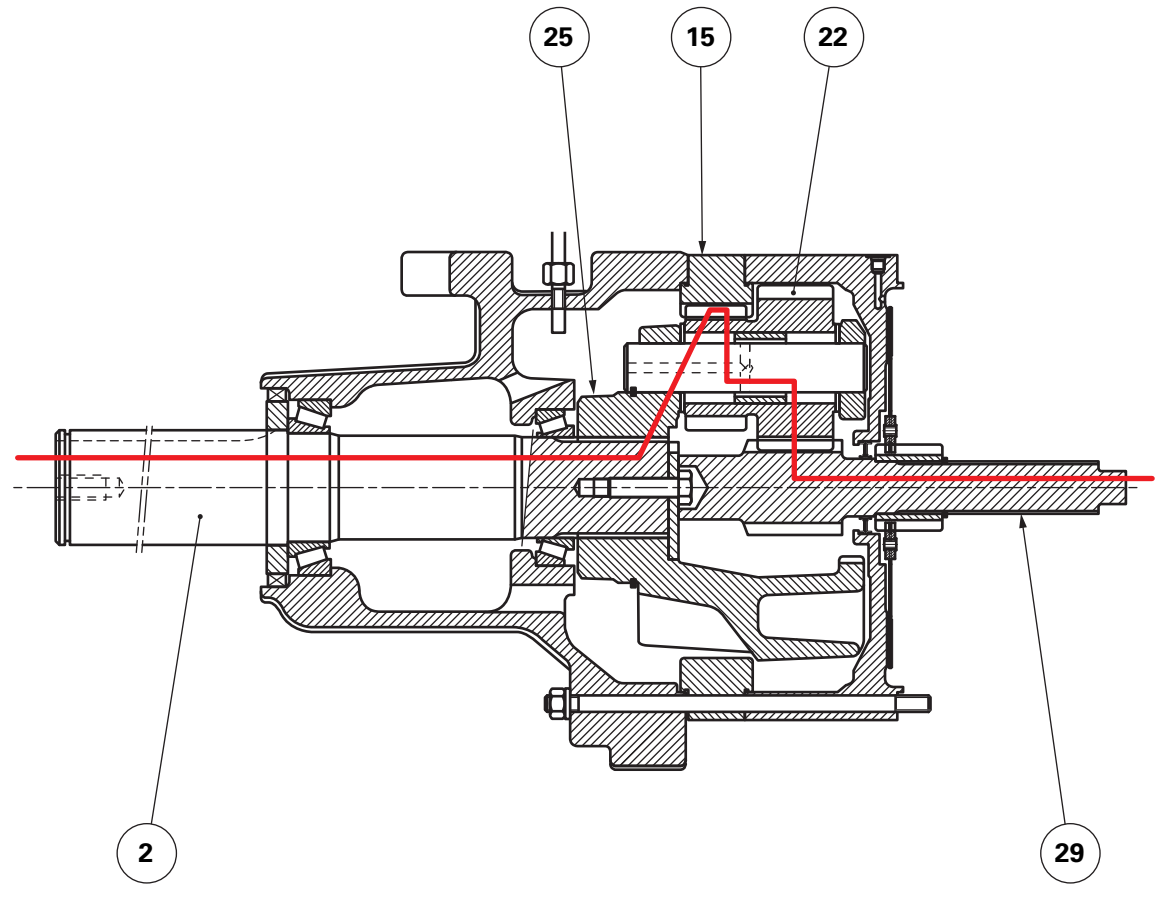

Fig. 3

C . Removing - refitting the trumpet assembly

Removal

1. Drain the centre housing.
   IMPORTANT: *The oil used for the mechanical and hydraulic components of the transmission and that used for lubricating the moving parts in the trumpet housing are of different type and viscosity grade. If these oils are not to be changed, they must not be mixed when drained.*
2. Immobilise the tractor.
   Disassemble the wheel.
   Position a safety stand.
3. Remove the cab fixing screws and the stabiliser support. If necessary, raise the concerned cab side slightly. For suspended cabs, see chapter 12.
4. Drive out the snap ring (1) (Fig. 4).
   Push the lower pin (2) of the lift ram outwards. Remove this pin.
5. Support the trumpet housing with suitable fixture and trolley jack.
6. Remove nuts (11) and washers (9) excluding screws (40).

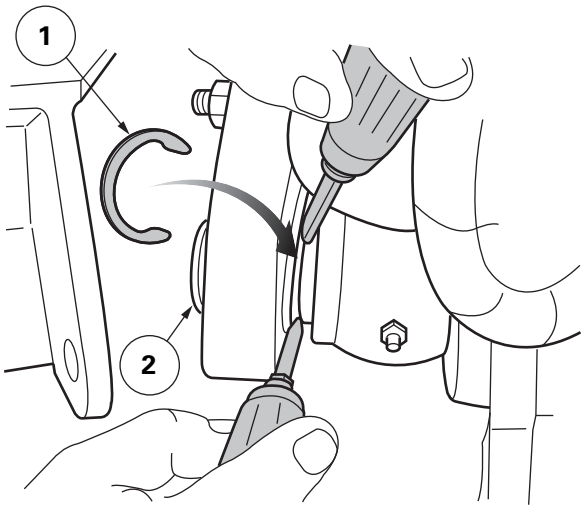

Fig. 4

7. Split the trumpet housing assembly from the centre housing (Fig. 5).

NOTA: *The trumpet assembly consists of the shaft/sun gear (29), the spacer (30) and the ring gear (15).*

IMPORTANT: *Take care not to press the brake pedal to avoid driving out the P piston from the centre housing (Fig. 5).*

8. Fix the retaining tool (see chapter 6).

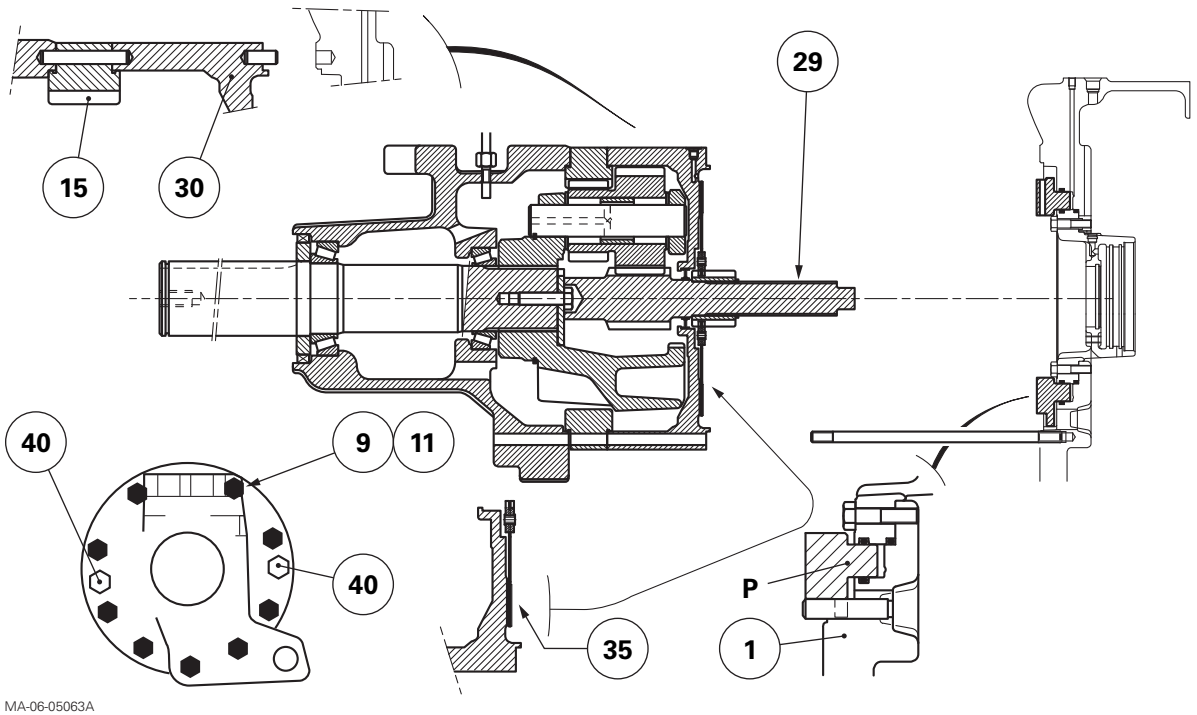

Fig. 5

Refitting

9. If necessary, replace the defective studs, respecting their length and position (Fig. 6).

Stud dimensions

Studs
(34) M16 x 335 mm
(36) M16 x 320 mm
(37) M16 x 330 mm
(45) M16 x 350 mm

Lightly smear the thread of the new studs with Loctite 270 or equivalent (Fig. 6). Tighten and firmly lock the studs on the centre housing.

10. Remove all traces of used sealing products.

Clean the mating faces of the trumpet and centre housings.

Dry the parts carefully.

11. Evenly smear the sealed compartment mating face with a sealing product (Loctite 5206 or equivalent) (Fig. 7).

Evenly fill angle D of the centre housing (1) with a silicone bead (Loctite 5910 or equivalent).

IMPORTANT: *The diameter of the bead must be of small section and without joins.*

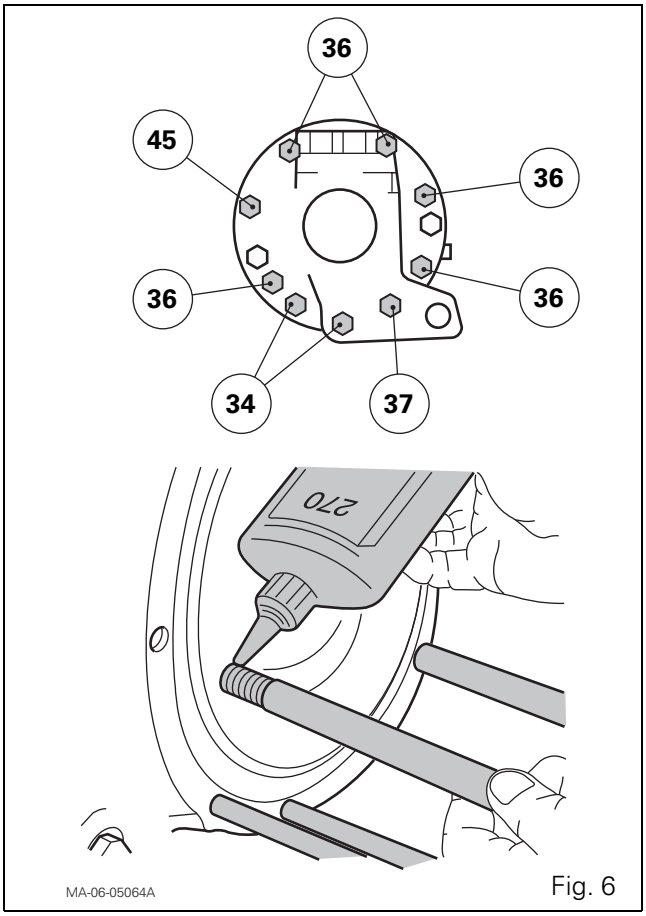

Fig. 6

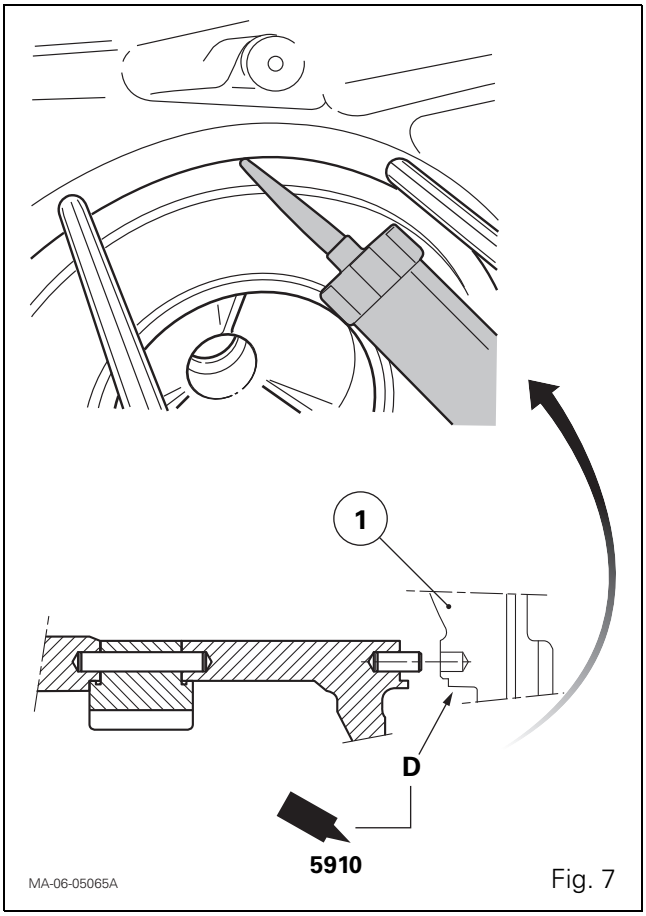

Fig. 7

12. Refit the brake disc (35) checking that it slides freely on the hub splines (32).

13. Check the presence of the locating pin (5) (Fig. 8).

14. Support the trumpet housing using the equipment used for removal. Move the trumpet housing near the centre housing.

Engage the trumpet housing onto the original studs.

Turn the axle shaft and push the trumpet until it makes contact with the centre housing.

Fit a washer (9) on each stud.

Tighten and lock the nuts (11) to a torque of 247 - 253 Nm.

15. Refit the parts around the trumpet housing.

If necessary, lower the cab into its initial position. Tighten the silentbloc screws to a torque of 200 - 260 Nm (Loctite 270 or equivalent). For suspended cabs, see chapter 12.

16. Refit the wheel. Tighten the nuts and screws to their indicated torque, depending on version (see chapter 6).

17. Top up the oil level in the housings. Check using the sight glass located to the left of the centre housing.

18. Check the oil level in the trumpet housing. Top up if necessary.

19. Check the lift control operation.

Carry out a road test of the brake circuit.

Check the oil tightness of the trumpet housing, hydraulic unions and plugs.

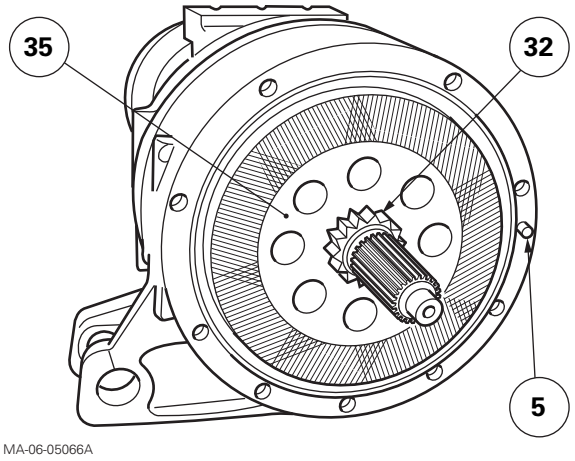

Fig. 8

D . Removing - refitting the spacer and ring gear assembly

Removal (Fig. 10)

20. Remove the trumpet assembly (see § C).
Drain the trumpet housing.

21. Position the trumpet housing vertically (Fig. 9).
Remove screws (40), snap ring (33) and hub (32).

22. Cover the splines of the shaft/sun gear (29) with a flexible protection.
Release and remove the spacer (30).
Remove the shaft/sun gear (29).
Release and remove the ring gear (15).

23. Discard the O'rings (4).

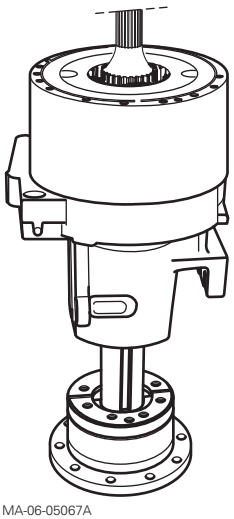

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Fig. 9

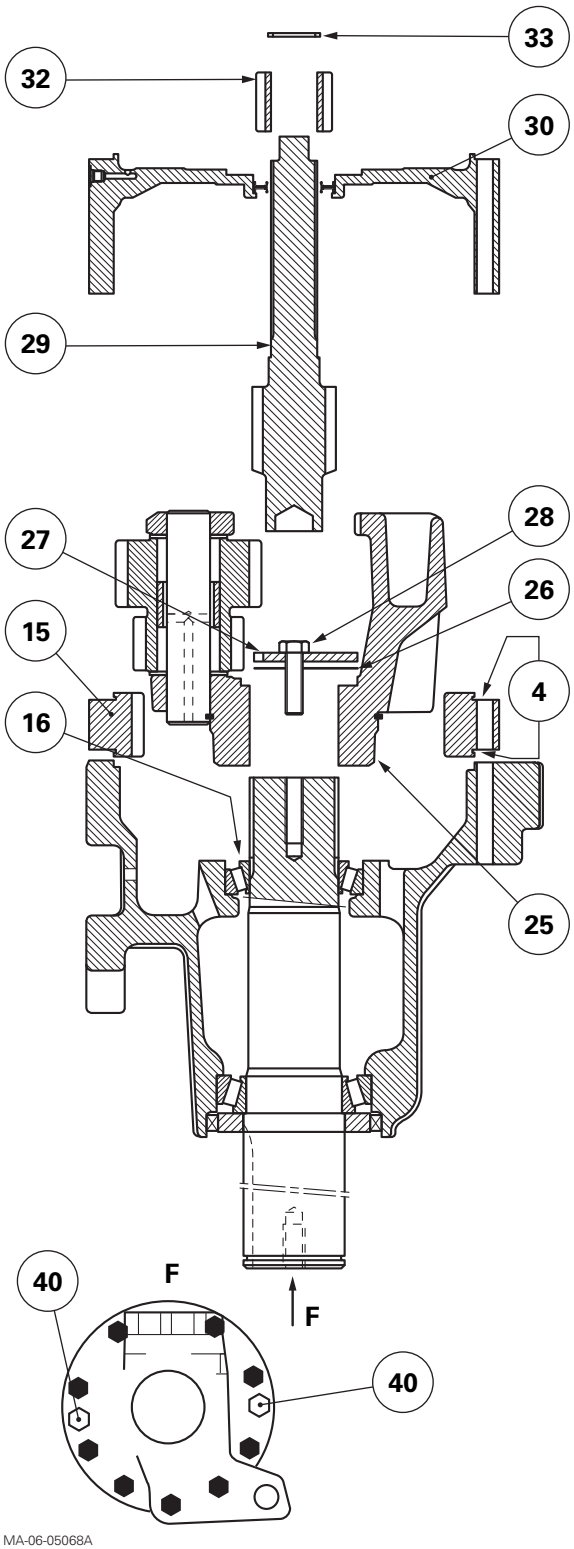

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Fig. 10

Refitting

24. Remove all traces of used sealing products.
Using an appropriate solvent, finish cleaning the mating faces:
- of the trumpet housing;
- of the ring gear;
- of the spacer.

Dry the components.

25. Check the presence of the locating pin (14) (Fig. 11).

26. Fit a new O'ring (4) into each B and C angle of the ring gear (15) (Fig. 11).
Refit the ring gear.

27. Refit:
- the planet carrier assembly (see § H);
- the shaft/sun gear (29).

Slide the protector 3376885M1 (see § L) on the splines of the shaft/sun gear.

28. Refit:
- the spacer (30);
- the hub (32);
- the snap ring (33) using the locally made tool (see § L).

29. Fit the screws (40). Tighten to a torque of 100 - 130 Nm.

30. Remove the protector.

31. Refit the trumpet assembly (see § C).
Top up the oil level.

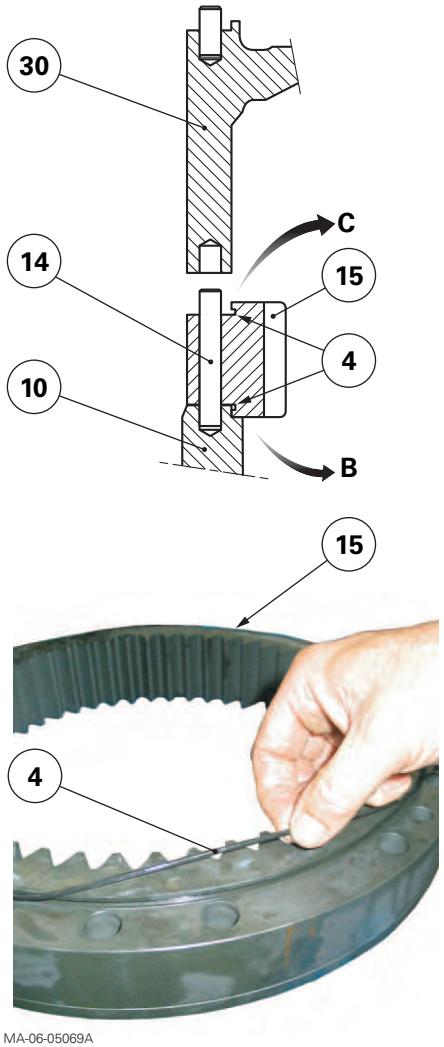

Fig. 11

E . Replacing the spacer seals

Disassembly

32. Remove the trumpet assembly (see § C).

33. Remove the spacer (30) and ring gear (15) assembly (see § D).

34. Extract the seals (31).

Reassembly

35. Using a suitable fixture, insert the first new seal (31) against the spacer (30) shoulder and back-to-back with the second seal, using the same method (Fig. 12).

36. Refit the spacer (30) and ring gear (15) assembly (see § D).

Refit the trumpet assembly (see § C).

37. Ensure that the vent pipe (38) is neither blocked nor pinched.

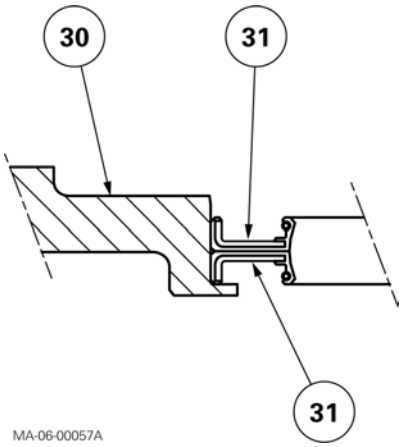

Fig. 12

F . Replacing the cassette seal

Preliminary operations

38. Drain the final drive unit.

39. Chock the front wheels.
Remove the rear wheel.
Place a safety stand under the trumpet housing.

Extracting the cassette seal (Fig. 13)

40. Extract the cassette seal (3) using a locally defined method.
IMPORTANT: *Take care not to scratch the trumpet housing or ring (1) rim during extraction.*

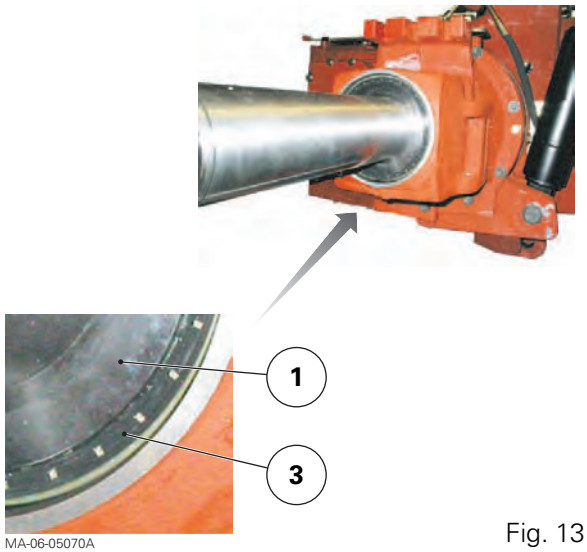

Fig. 13

Fitting the cassette seal

41. Clean the seal position on the trumpet housing and ring (1) (Fig. 14).

42. Lightly smear the outer rim of the cassette seal (3) with Loctite 648 or equivalent. Lubricate its inner rim lightly with clean transmission oil (Fig. 14).

43. Fit the cassette seal using the 3378151M1 tool (see § L). Clean off any excess Loctite.
NOTA: *The tool design allows the cassette seal to be fitted and positioned on the trumpet housing.*

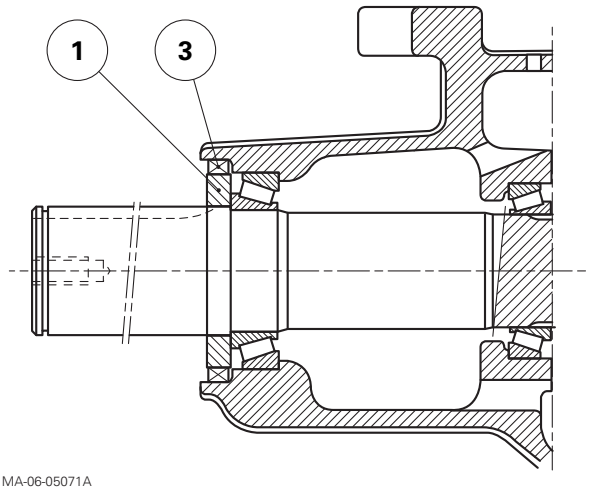

Fig. 14

Final operations

44. Refit the wheel. Tighten the nuts and screws to their indicated torque, depending on version (see chapter 6).

45. Top up the final drive unit oil level.

46. Carry out a road test.

47. Check the oil tightness of the cassette seal.

G . Removing and disassembling the planet carrier

Removal

48. Take off:
- the trumpet assembly (see § C);
- The hub (32), spacer (30) and shaft/sun gear (29) (see § D).

49. Immobilise the axle shaft and planet carrier.

50. Take out screw (28), washer (27), and shim(s) (26). Remove the planet carrier assembly (25) (Fig. 15) using a suitable sling.

51. Remove the ring gear (15) (see § D).

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Fig. 15

Disassembly

52. Remove (Fig. 16, Fig. 17):
- The screw (18);
- the spacer (17);
- the circlip (19) by opening its two ends.

53. Drive out and remove the pins (20) (Fig. 18).
Take off:
- the friction washers (21);
- the shims (6);
- the planet gears (22);
- the needles (23), making sure not to lose any. They are arranged in two rows separated by a spacer (24) (Fig. 18).

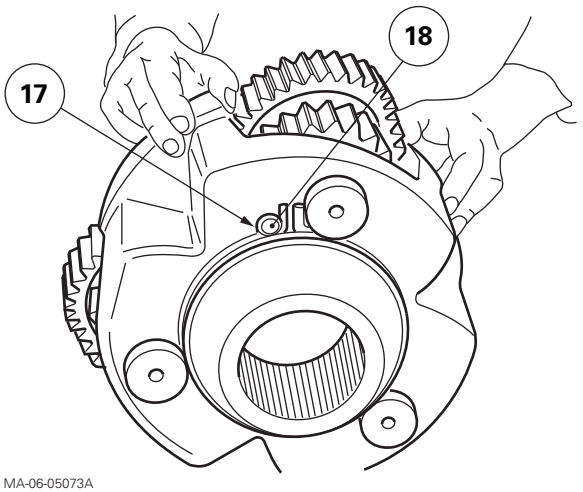


Fig. 16

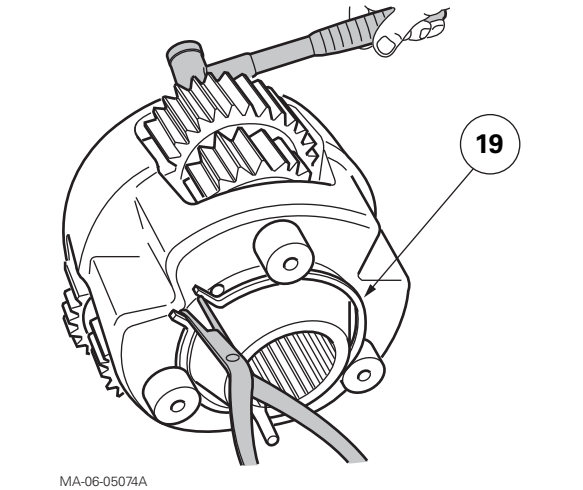


Fig. 17

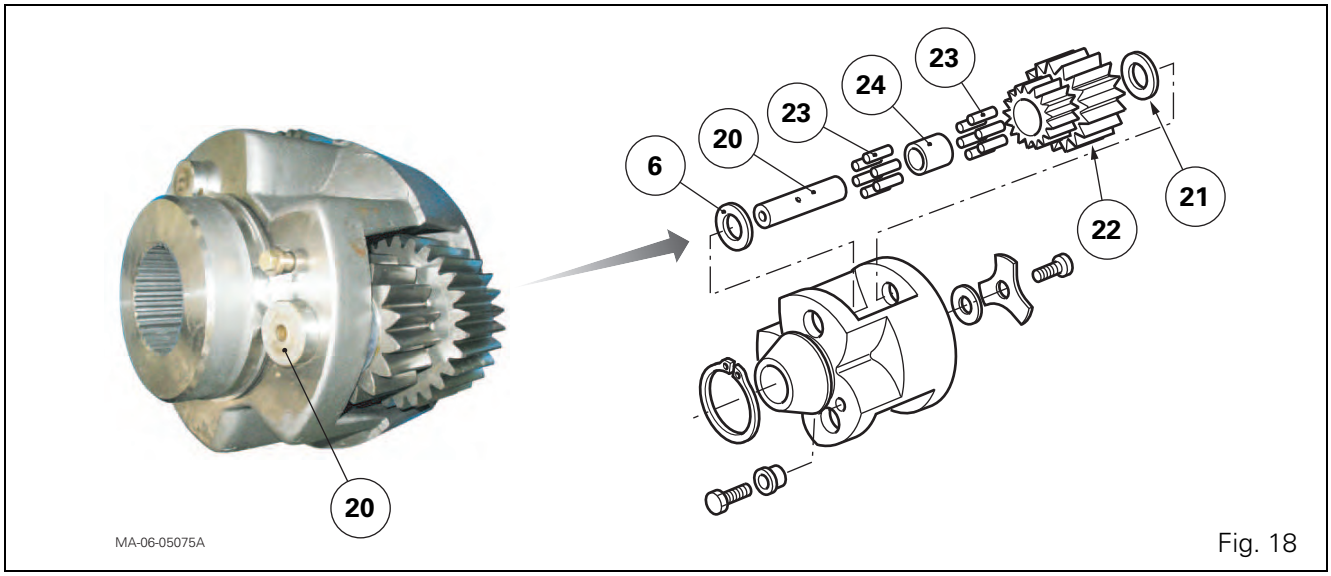


Fig. 18

H . Reassembling and refitting the planet carrier

Reassembly

54. Clean and check all components. Replace any defective parts.

55. Smear the needles (23) with a film of miscible grease.

Position two rows of needles. Separate each row with the spacer (24).

56. If necessary, shim the planet gears (22) (see § I).

57. Fit:

- the planet gears (22) in the planet carrier (25), turning the 17 teeth pinions towards the circlip (19)
- the washers (21);
- the shim(s) (6).

58. Engage the three pins (20), turning the O lubricating holes towards the circlip (19) (Fig. 19);

Tap lightly and alternately on the pins to correctly position the circlip in its groove (Fig. 19).

59. Fit the spacer (17) (Fig. 20).

Lightly smear the thread of the screw (18). Tighten this screw to a torque of 34 - 50 Nm.

60. Manually check that the planet gears rotate smoothly.

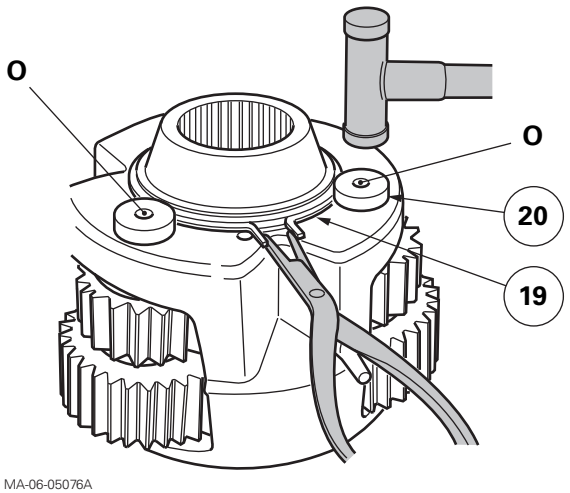


Fig. 19

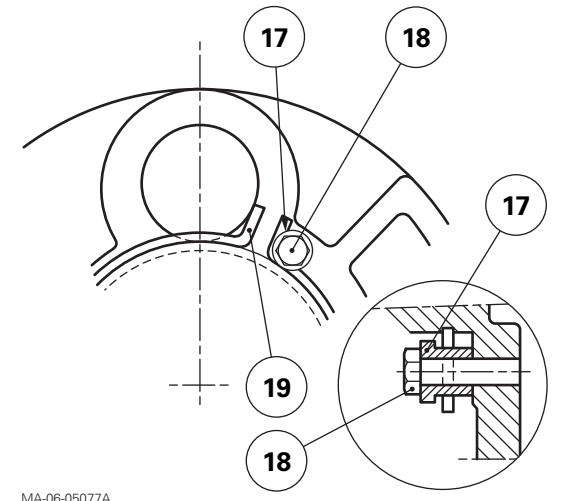


Fig. 20

Refitting

61. Refit the ring gear (15) (see § D).

62. Check for the presence of washer (16).
Refit the planet carrier assembly (25) (Fig. 21).

63. If necessary, shim the axle shaft (2) bearings (see § K).

64. Immobilise the axle shaft and planet carrier.
Place the shim(s) (26) and washer (27).

65. Lightly smear the thread of the screw (28) with Loctite 270 or equivalent. Fit and tighten this screw to a torque of 340 - 500 Nm.

66. Position the mark on each planet gear according to Fig. 22.

IMPORTANT: *Each planet gear (22) is marked (centring punch hole) on the 29 teeth pinion face. This mark corresponds to the alignment on one tooth of pinion A with a tooth of pinion B. Each mark must point towards the centre prior to fitting the shaft/sun gear (29) onto the planet gears.*

67. Refit (see § D):
- the shaft/sun gear (29);
- the spacer (30);
- the hub (32);
- the snap ring (33).

68. Refit the trumpet assembly (see § C).

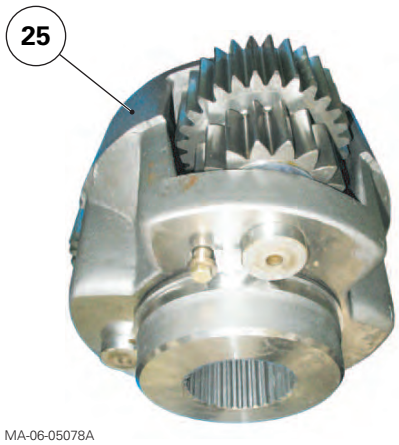


Fig. 21

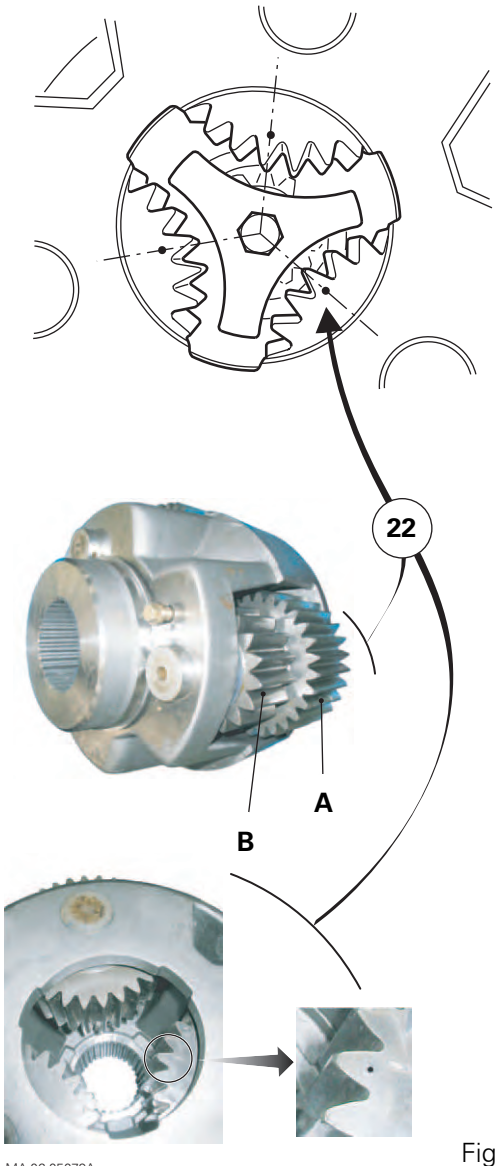


Fig. 22

I . Shimming the planet gears

The shimming of the planet gears is achieved by means of shim(s) (6) placed on the pin (20) and against the 17 teeth pinion.

Preparing the epicyclic gear train

69. Fit (Fig. 23):
- the planet gears (22) in the planet carrier, turning the 17 teeth pinion towards the circlip (19);
- the washers (21) against the 29 teeth pinion;
- the temporary medium thickness shims (6) against the 17 teeth pinion.

70. Engage the three pins (20) in the planet gears, turning the lubricating holes towards the circlip (19) (Fig. 23);

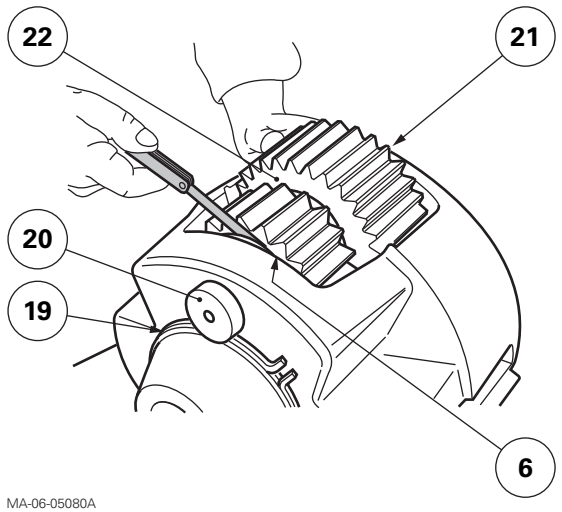


Fig. 23

Shimming (Fig. 23, Fig. 24)

71. Use a set of shims to gauge the distance between the temporary washers (6) and planet gears (22).

Determine a definitive shim thickness, according to the measurement, to obtain, for each planet gear, a clearance **J = 0.15 to 0.60 mm**.

NOTA: *If possible, shim so as to obtain minimum tolerance.*

72. Take out the pins (20) slightly.

Position the previously selected shims (6) according to Fig. 24.

IMPORTANT: *The thick shim must be placed against the row of needles.*

73. Refit the pins, while simultaneously positioning the circlip (19).

Place the spacer (17).

Lightly smear the thread of the screw (18) with Loctite 270 or equivalent. Tighten this screw to a torque of 34 - 50 Nm.

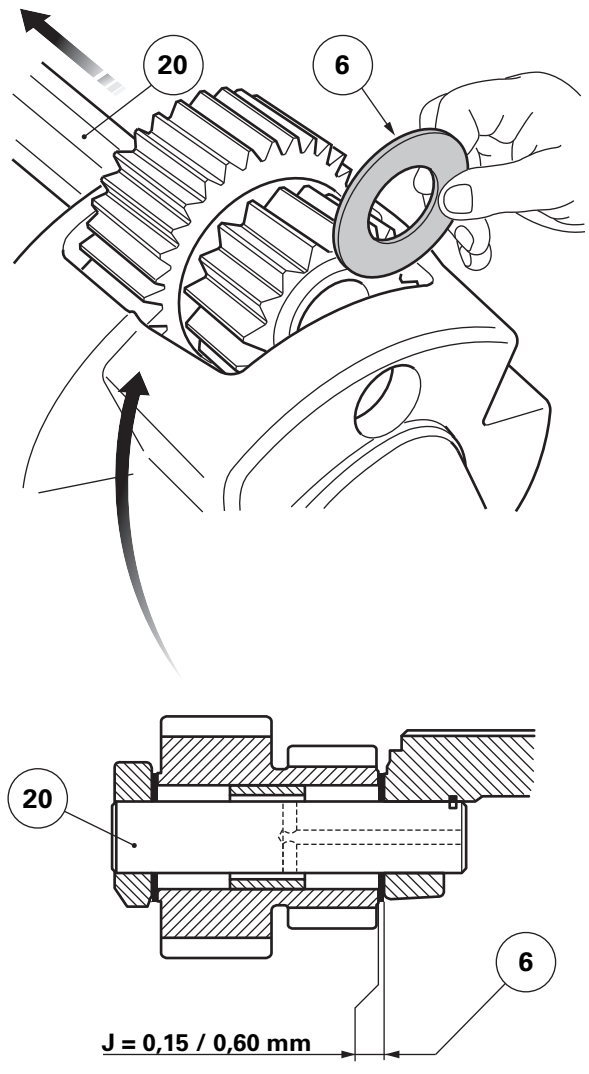


Fig. 24

J . Replacing axle shaft bearings and seals

Preliminary operations

74. Take off:
- the trumpet assembly (see § C);
- the spacer (30) (see § D);
- the planet carrier assembly (25) (see § G);
- the ring gear (15) (see § D).

Disassembly

75. Take off:
- the washer (16);
- the bearing cone (13) (free on axle shaft (2));
- the axle shaft (2).

76. Using an extractor, extract:
- the bearing cone (7);
- the K7 seal (3).

77. Drive off the ring (1).

78. Extract the bearing cups (8) (12) according to a locally defined method.

Reassembly

79. Clean and check all components. Replace any defective parts.

80. Fit:
- the bearing cups (8) (12) thrust against their respective shoulders;
- the bearing cone (7) lubricated with clean transmission oil, thrust against the axle shaft shoulder (2).

81. Introduce the prepared shaft into the trumpet.

82. Slide the bearing cone (13) and the tab washer (16) onto the axle shaft.

Final operations

83. Refit:
- the ring gear (15) (see § D);
- the planet carrier assembly (25) (see § H).

84. Shim the bearings (see § K).

85. Refit the spacer (see § D).

86. Lightly smear the inner rim of the ring (1) with Loctite 648 or equivalent.

Using a suitable fixture, force fit ring (1) onto the axle shaft (2), against the bearing cone (7). Clean off any excess Loctite.

87. Ensure there is no soiling or impacts on the mating face of the cassette seal (3) with the trumpet housing, or on the ring (1).

Lubricate the rim of the ring (1).

Lightly smear the outer rim of the cassette seal with Loctite 648 or equivalent. Slide this seal onto the axle shaft (2). Fir the axle shaft (2) into the trumpet housing using the 3378151M1 tool (see § L).

88. Refit the trumpet assembly (see § C).

K . Shimming the axle shaft bearings

Replacement of the following parts requires checking or performing axle shaft bearing shimming:

- axle shaft (2);
- bearings (7)(8) and (12)(13);
- trumpet housing;
- tab washer (16);
- planet carrier (25).

NOTA: *The preloading shimming of the axle shaft bearings is carried out via shim(s) (26) placed between the axle shaft (2) end and the washer (27) (Fig. 25).*

IMPORTANT: *To carry out the correct shimming of the bearings, place the trumpet housing in a vertical position (Fig. 25).*

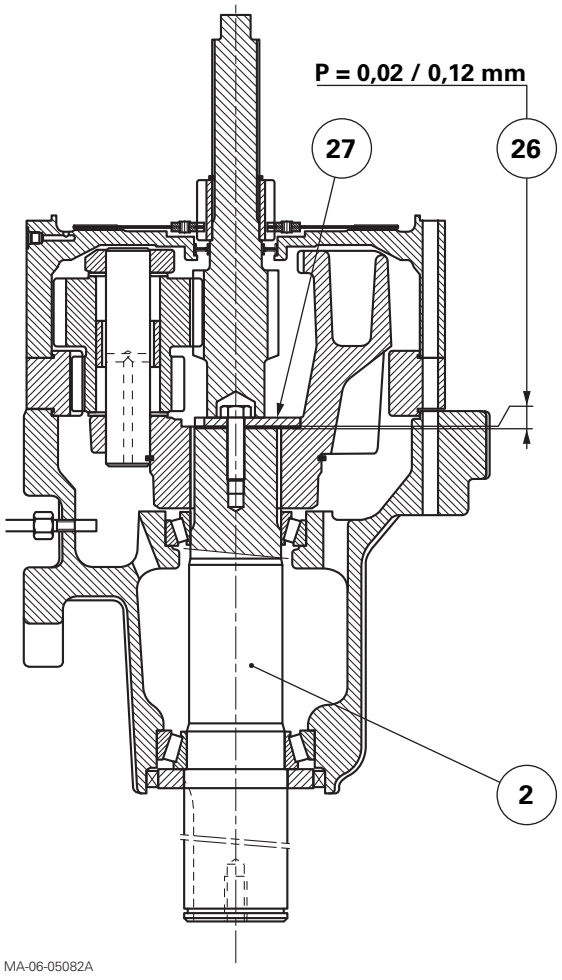


Fig. 25

Preparing for shimming

89. Refit the bearing cone (13), tab washer (16) and planet carrier (25).

90. Fit a shim(s) (26) with a thickness greater than the space between the end of the axle shaft (2) and the washer (27) mating face on the planet carrier (Fig. 27). This should give a temporary clearance **J** of approximately **0.10 to 0.15 mm**.

91. Fit washer (27). Provisionally lock screw (28).

Shimming (Fig. 27)

92. Press hard on the planet carrier while simultaneously turning the trumpet several turns.

93. Place a dial gauge on the planet carrier with its index positioned near the centre (Fig. 26, Fig. 27).

Set the dial gauge to zero.

94. Using suitable levers, move the planet carrier vertically (Fig. 26). Repeat this operation several times. Take the average of the clearances J measured by the dial gauge during each movement.

95. Reduce shim (26) thickness according to the J + (0.02 to 0.12) value to obtain a preload **P1 = 0.02 to 0.12 mm** (Fig. 25).

96. Definitively fit the washer (27).

Lightly smear the thread of the screw (28) with Loctite 270 or equivalent. Tighten this screw to a torque of 765 - 935 Nm.

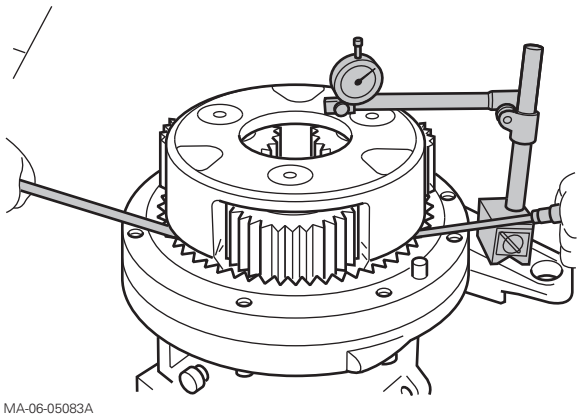


Fig. 26

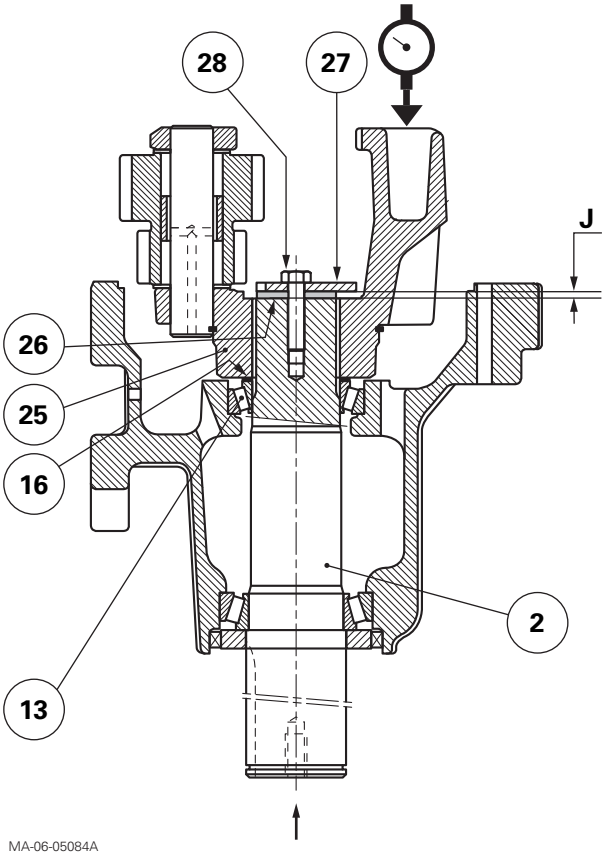


Fig. 27

L . Service tools

Tools available in the AGCO network

- 3376885M1: Spacer (30) oil seal protector (Fig. 28)
- 3378151M1 : Drift for fitting the cassette seal (3) (Fig. 29)

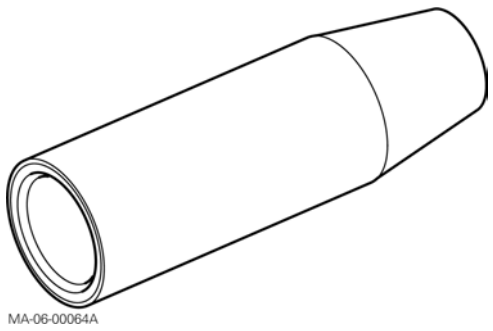


Fig. 28

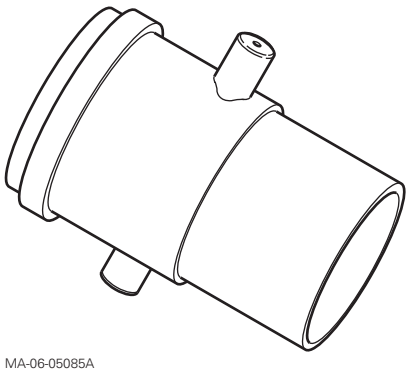


Fig. 29

Locally made tool

- Cone and pushrod for fitting snap ring (33) (Fig. 30)

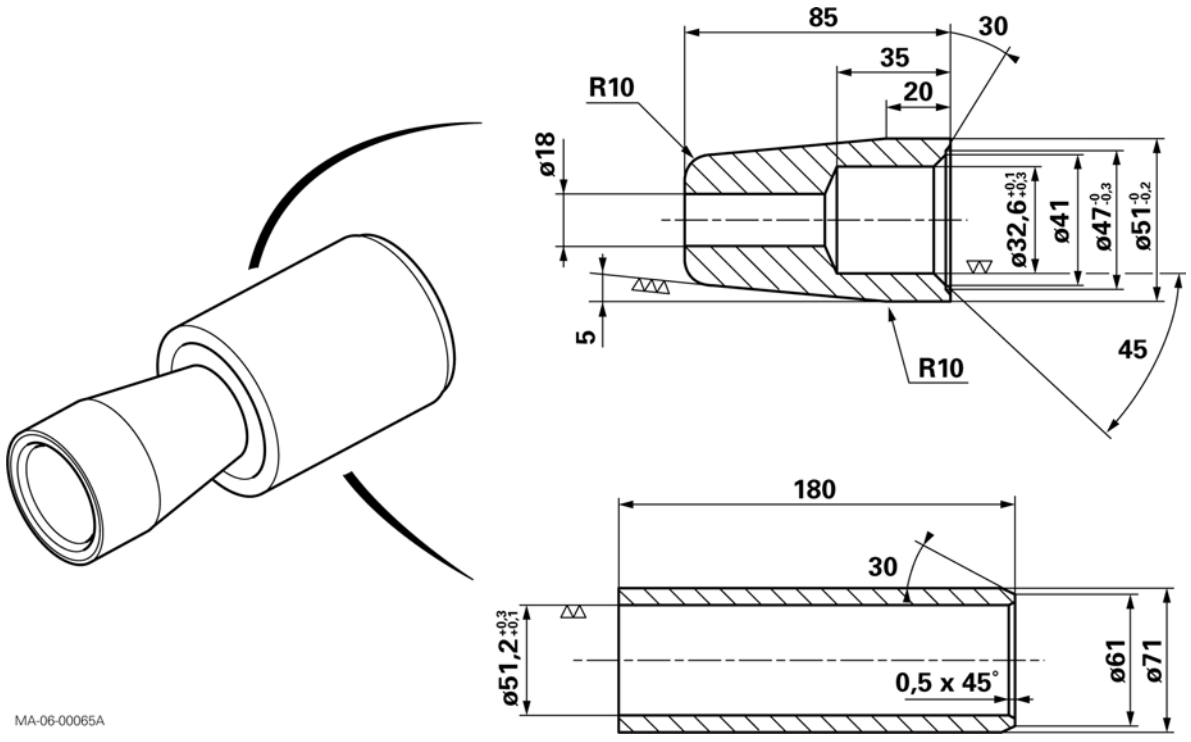


Fig. 30

6C13 - GPA30 - Brake pistons

CONTENTS

GPA30 - Brake pistons

A . General

The brake pistons (2) are housed in two cavities formed by the centre housing and the left and right-hand differential supports (Fig. 1).

They are (Fig. 1):

- concentric with the mating face of each trumpet housing;
- guided by three pins (6) force fitted into the centre housing.

The brake pistons comprise (Fig. 2):

- a ring face A under pressure from the master cylinders;
- A face F, with a greater diameter than face A. Face F compresses the disc (35), splined to the shaft/sun gear, against a compartment which also serves as a brake plate. This compartment is sealed and positioned by means of pins force-fitted into the trumpet housing.

The pistons are kept sealed by O'rings (3) (4) mounted respectively into the grooves of the centre housing and differential supports. A seal (26) placed at the angle of each differential support prevents the pressure in the piston chamber from escaping into the centre housing.

Each brake piston is controlled by a master-cylinder (pressure P) supplied by the 17 bar low pressure circuit.

When the brake is released, minimal clearance is ensured between the brake piston and disc.

The brakes are self-adjusting. They maintain constant pedal clearance.

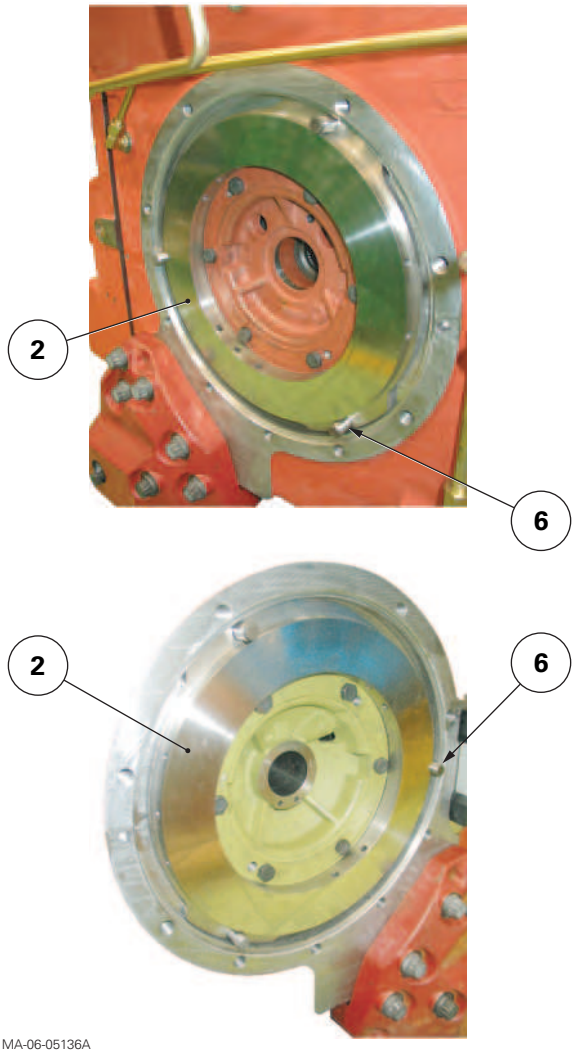


Fig. 1

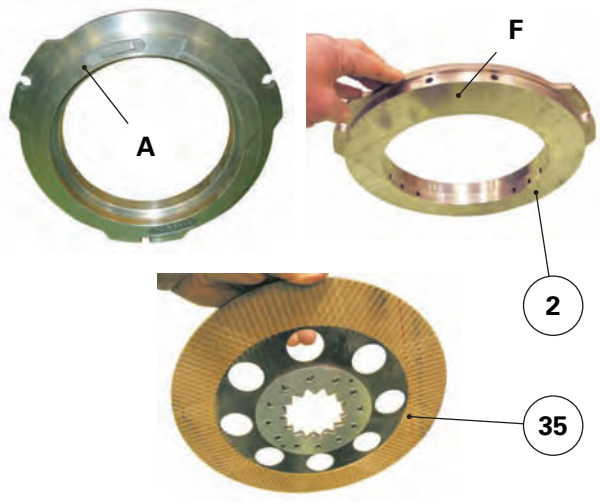


Fig. 2

Lubrication (Fig. 3)

The brake discs are lubricated by an oil flow from the right-hand hydraulic cover (Load Sensing) via the manifold (1) (restrictor) located above the centre housing.

This oil flow is directed to the brake disks through the O holes.

The oil flowing between the brake discs and pistons:

- lubricates the braking surfaces when not in use;
- cools the brakes when in use.

Parts list (Fig. 4)

(1) Centre housing
(2) Brake piston
(3) O'ring
(4) O'ring
(6) Stop pins
(26) O'ring
(32) Hub
(35) Brake disc

Legend

O Brake disc lubricating port
P Pressure from the master cylinder(s)

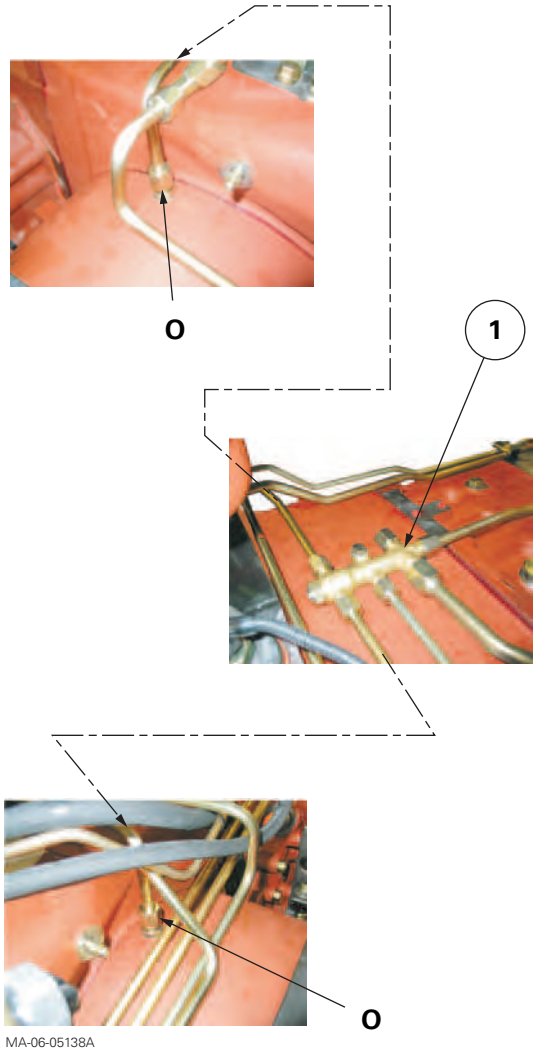
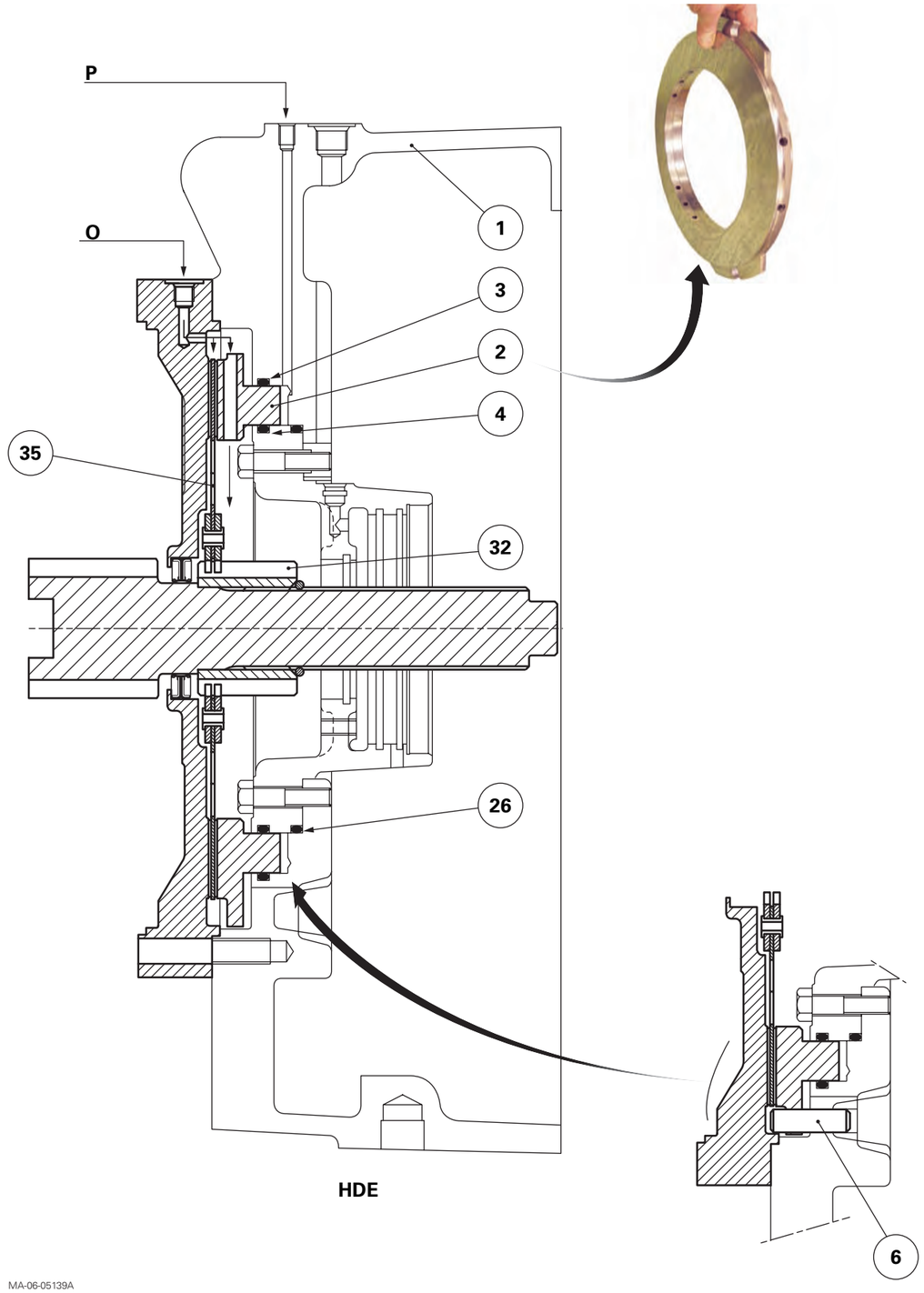
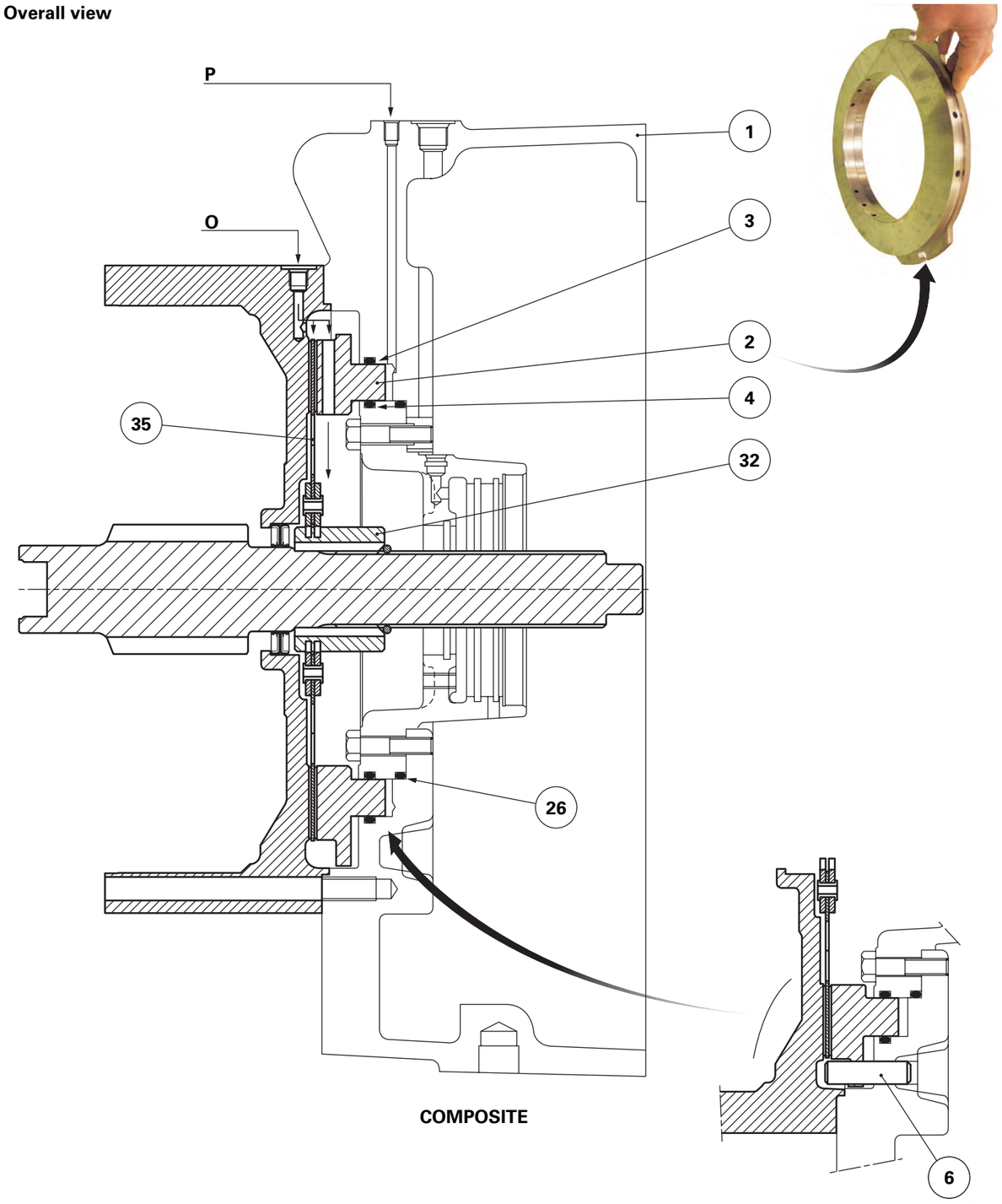


Fig. 3



HDE

Overall view



COMPOSITE

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Fig. 4

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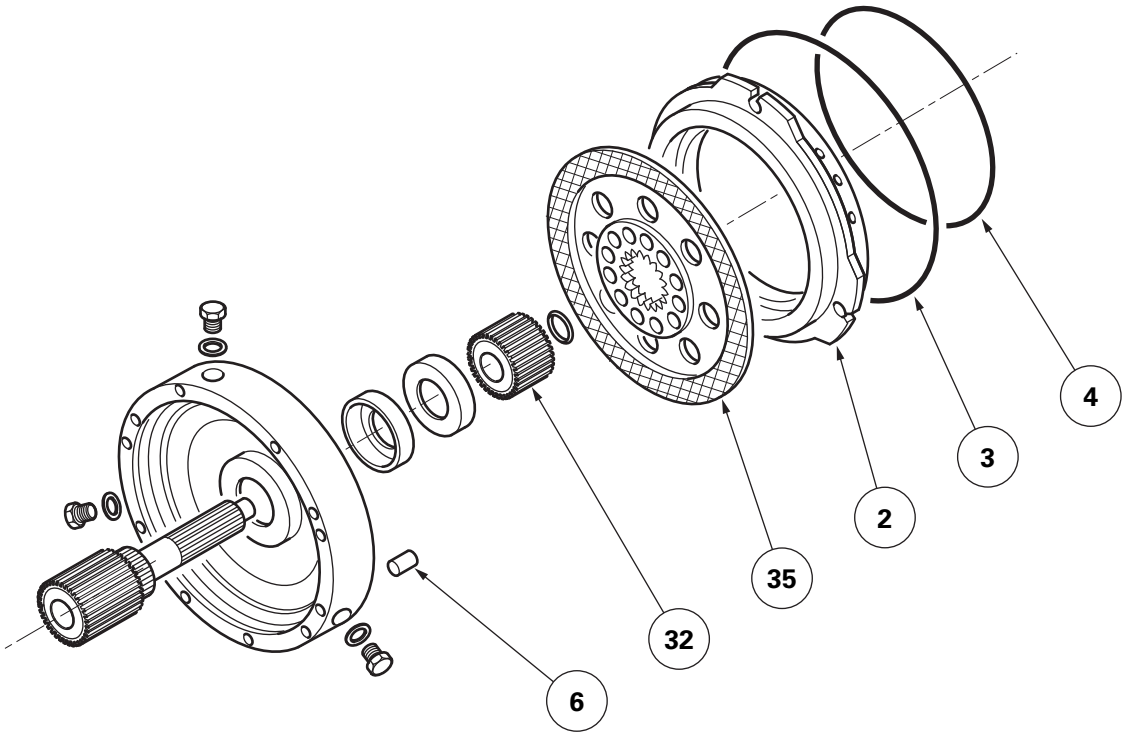
Parts list (Fig. 5)

(2) Brake piston
(3) O'ring
(4) O'ring
(6) Stop pins
(32) Hub
(35) Brake disc

Exploded view



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HDE and COMPOSITE

Fig. 5

B . Preliminary operations

1. Remove the trumpet(s) (see chapter 6).
2. Disconnect the supply pipe(s) (3) located above the centre housing and coming from the brake master cylinder(s) (Fig. 6).

C . Removing a piston

3. Using a jet of compressed air connected to the union (1) (Fig. 6, Fig. 7), gradually remove the piston (2) manually from the centre housing (Fig. 7).

    ***CAUTION: Proceed with care to avoid splashing oil.***

4. Remove the O'rings (3) (4) fitted respectively on the centre housing and the differential support (Fig. 8).

   NOTE 1: *The O'ring (26) located between each differential support (right- and left-hand, Fig. 9) and the centre housing ensures the tightness of the piston chamber. If this seal needs replacing, remove the differential support (see chapter 6).*

   NOTE 2: *If the brake plate (sealed compartment or spacer, depending on assembly fit) needs replacing, see chapter 6.*

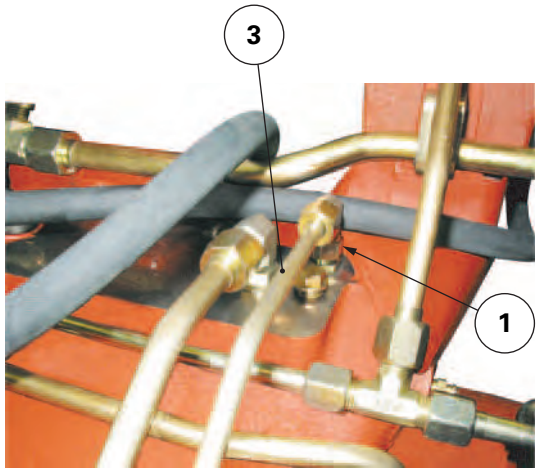

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Fig. 6

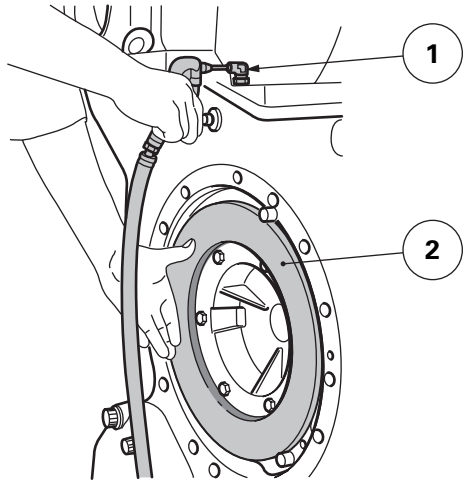

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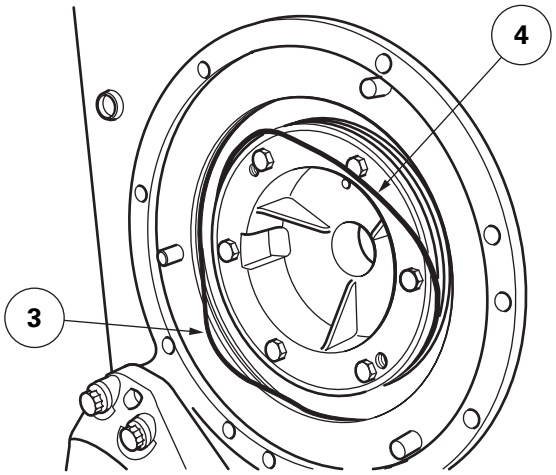
Fig. 7



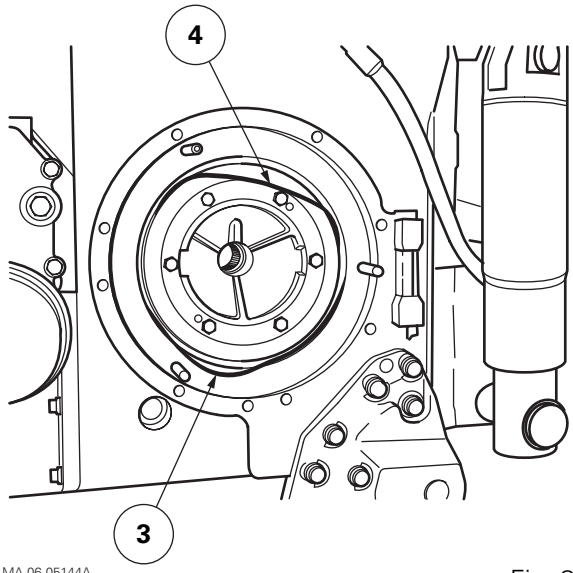


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Fig. 8

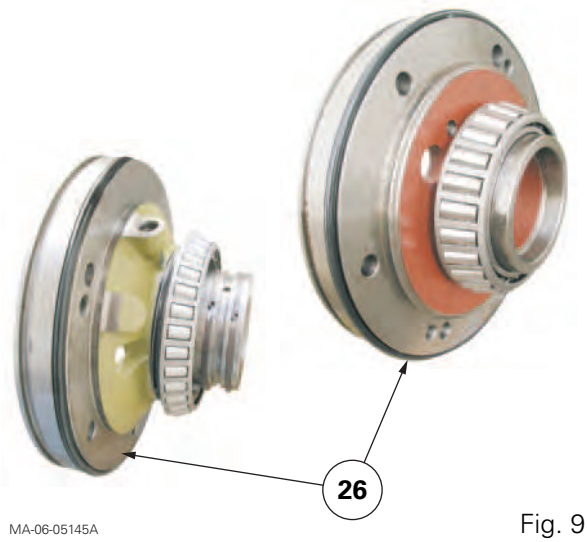

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Fig. 9

D . Preparing and refitting a piston

Preparation

5. Clean and check all components. Replace any defective parts.

6. If removed, reassemble the differential support(s) fitted with a new O'ring (26) (see chapter 6).

7. Perform a dummy fit of the piston (2), temporarily excluding the O'rings (3) (4). This dummy fit makes it possible to check that piston movement is not hindered in the bore of the centre housing and on the stop pins (6).

IMPORTANT 1: *During piston fitting, any friction points must be eliminated and concerned parts must be identified.*

IMPORTANT 2: *Only proceed to final refitting of the new piston (2) when the dummy assembly proves satisfactory.*

Refitting

8. Thoroughly clean out the piston cavity.

Check the presence of lubrication ports on the piston.

9. Grease the new O'rings (3) (4) with clean transmission oil. Fit them in the bottom of their respective grooves (centre housing and differential support) (Fig. 10).

10. If possible, position the piston (2) with the greatest possible number of lubricating ports (Fig. 11) facing towards the top of the centre housing.

NOTA: *However, positioning the lubricating ports is optional.*

11. Place the piston (2) in the centre housing aligning its locating recesses P facing the stop pins (6) (Fig. 12).

12. Fit the piston (2) using a locally made tool (see Fig. 12 and § F).

Gradually and alternately tighten the two V screws.

13. Remove the tool.

If necessary, complete the assembly by lightly and diametrically tapping the piston face (2) with a plastic hammer.

14. Check there are no pieces of seal on the circumferences of the piston after fitting.

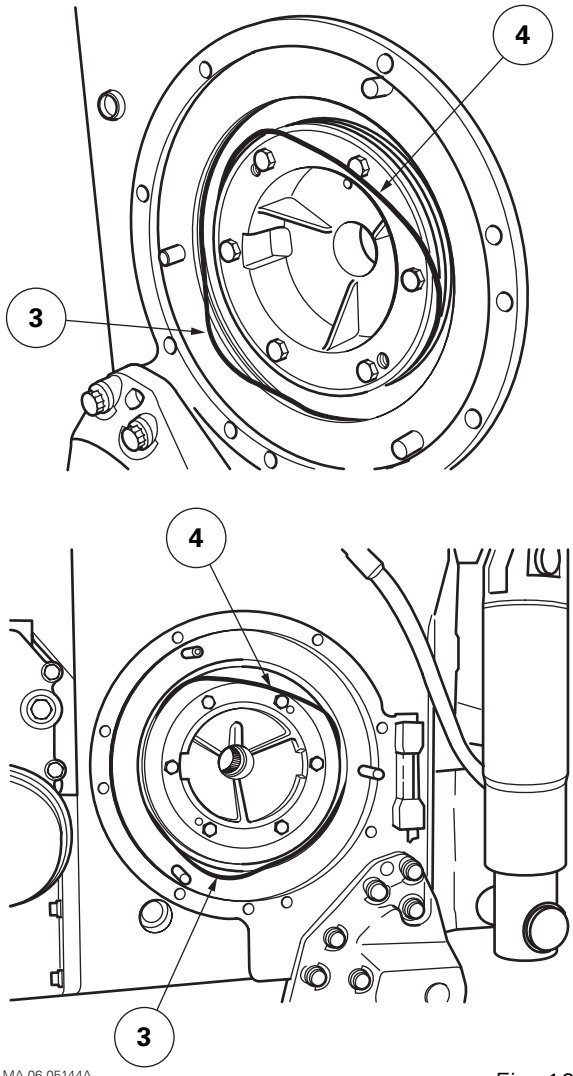

Fig. 10

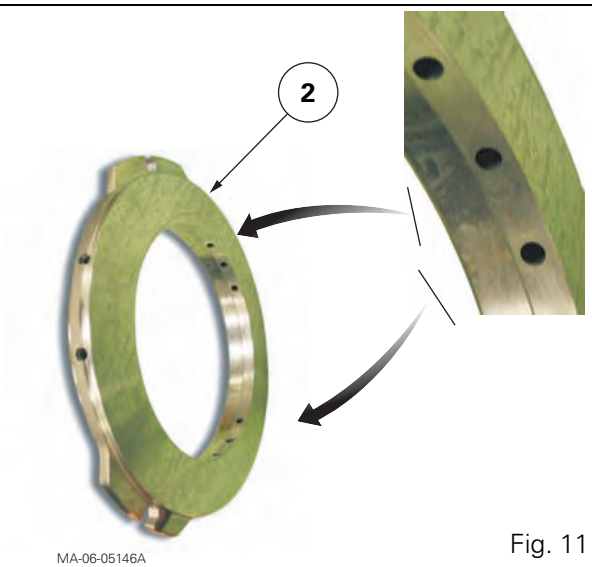

Fig. 11

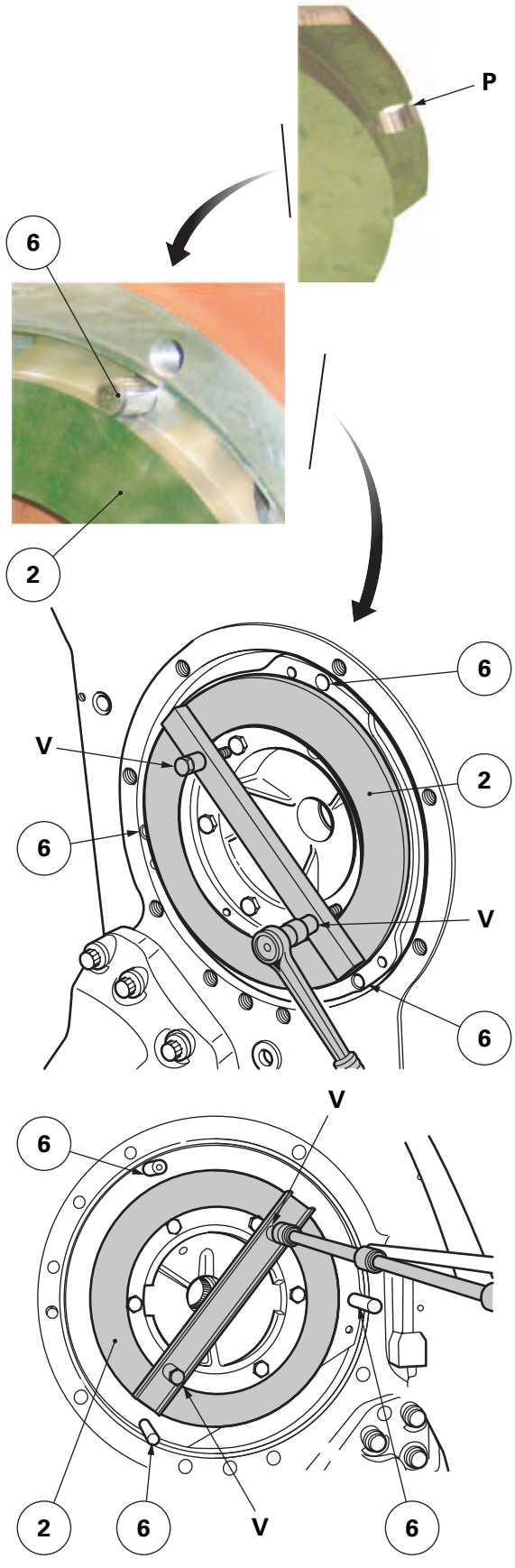

Fig. 12

Piston (2) hydraulic test

A piston hydraulic test can only be carried out correctly if the pressure gauge and compressed air feed line are completely sealed.

Preparation (Fig. 13)

15. Fit the piston (2) retaining bar to the centre housing (see § F).

Connect the pressure gauge to the union (1).

Positioning the O'rings (3) and (4)

16. Feed compressed air into the piston to approximately 3 bar.

17. Shut the valve.

Disconnect the compressed air source.

Open the valve.

Push the piston inwards by striking its rim with a plastic hammer

18. Repeat operations 16 and 17 several times.

Hydraulic test

19. Feed the piston once more with compressed air, but reduce the pressure to approximately 0.3 - 0.4 bar.

20. Close the pressure relief valve.

21. Check the pressure gauge needle remains still for approximately one minute.

22. Shut the compressed air inlet when the test proves satisfactory.

Remove the pressure gauge and retaining bar.

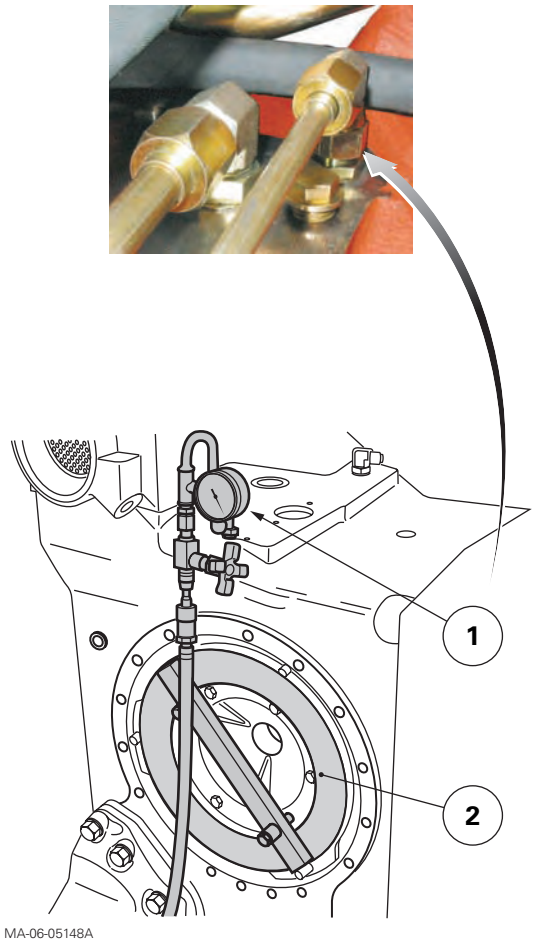

Fig. 13

E . Final operations

23. Reconnect the brake piston feed pipe (Fig. 13).
24. Refit the trumpet(s) (see chapter 6).
25. Drain the brake system thoroughly (see chapter 9).
26. Carry out a road braking test.
27. Check for tightness of:
- trumpet housing seals,
- pipes (feed and lubricating).

F . Service tool

Locally made tool

- Brake piston fitting tool (Fig. 14)
  a: Protection zone (rubber or plastic)

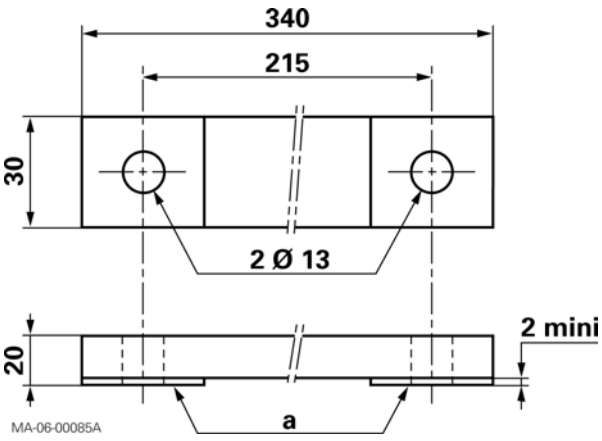

Fig. 14

GPA30 - Brake pistons

6C14 - GPA30 - Drive pinion

CONTENTS

GPA30 - Drive pinion

A . General

Construction

The bevel gear rotation is provided by the output shaft of the gearbox and drives the rear axle.

The helical drive pinion is supported by two bearings mounted in opposition.

The bearing cone (7) is force fitted on the drive pinion. The bearing cups (2) (10) are fitted respectively "tight" in the intermediate housing (19) and the bearing carrier (13).
The bearing cone (1), mounted free on the drive pinion, allows to fit shims (3) required for shimming.

The drive pinion is fitted in the intermediate housing (19). It supports the 4 WD drive pinion (17) (if fitted). The adjustment of drive pinion position is achieved by shims (12) fitted between the bearing carrier (13) and the intermediate housing (19).

The pre-loading of the bearings is obtained by shim(s) (3) fitted between the bearing cone (1) and the thrust washer (4).

Lubrication

Lubrication of the bearings (1)(2)-(7)(10) and handbrake mechanism (6)(14)(16) is performed simply by oil splashing in the intermediate housing.

GPA30 - Drive pinion

Parts list (Fig. 1)

(1) Bearing cone
(2) Bearing cup
(3) Shim(s)
(4) Thrust washer
(5) Circlip
(6) Intermediate plates
(7) Bearing cone
(8) Allen screw
(9) Drive pinion
(10) Bearing cup
(11) Allen screw
(12) Shim(s)
(13) Bearing carrier
(14) Handbrake discs
(15) Handbrake unit
(16) Handbrake mechanism
(17) 4 WD drive pinion
(18) Nut
(19) Intermediate housing

Overall view

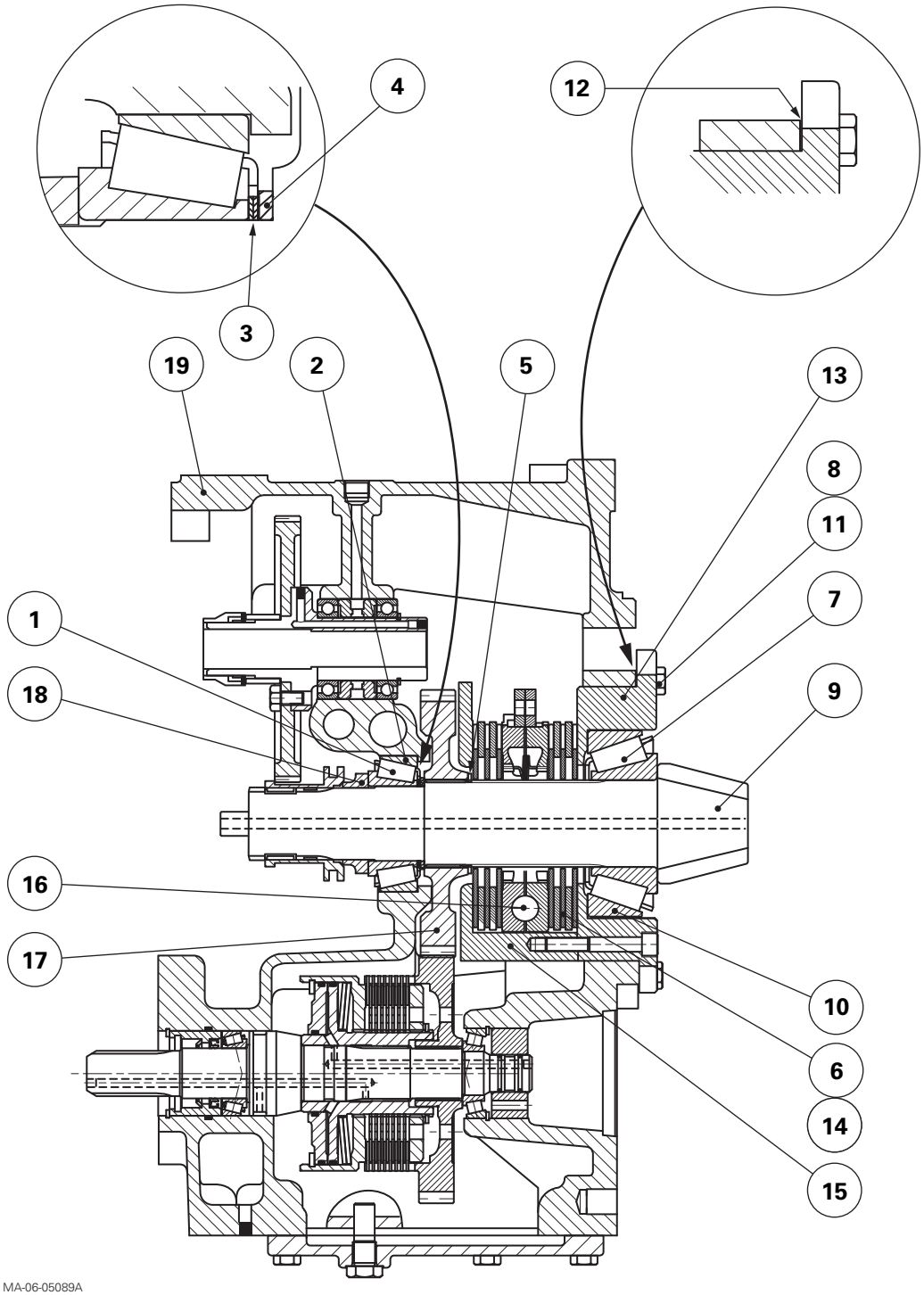

Fig. 1

GPA30 - Drive pinion

Parts list (Fig. 2)

(1) Bearing cone
(2) Bearing cup
(3) Shim(s)
(4) Thrust washer
(7) Bearing cone
(8) Allen screw
(9) Drive pinion
(10) Bearing cup
(11) Allen screw
(12) Shim(s)
(13) Bearing carrier
(18) Nut

Exploded view

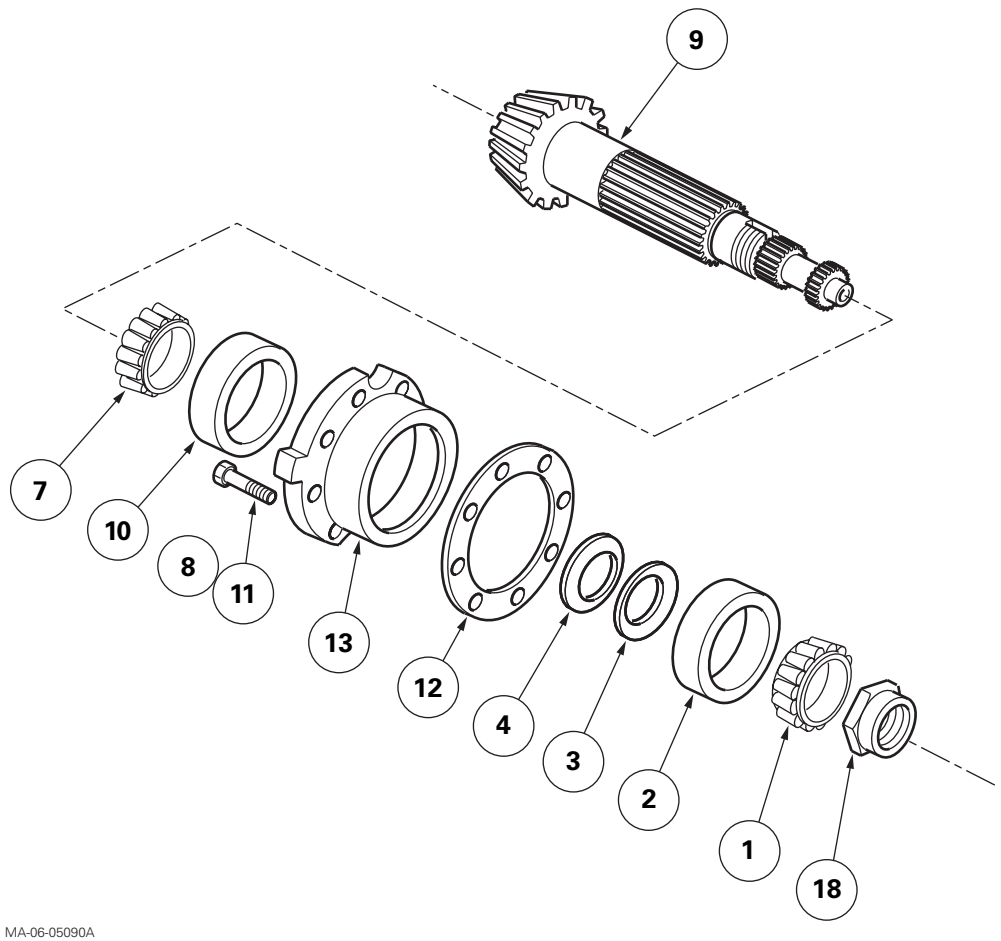

Fig. 2

B . Removing - refitting and disassembling - reassembling the unit/drive pinion

Preliminary operations

1. Split the tractor between the gearbox and the intermediate housing (the cab remains integral with the gearbox, see chapter 2).
2. Split the rear axle between the intermediate housing and centre housing (see chapter 2).
3. Remove (see chapter 9):
   - the right-hand hydraulic cover;
   - the left-hand hydraulic cover;
   - the hydraulic pump bearing/drive pinion assembly (Load Sensing).
4. Remove the creeper unit system (if fitted, see chapter 5).

Removing the unit/drive pinion

5. Separate the control pin (25) from the handbrake mechanism (see chapter 6).
6. Unlock nut (18). Immobilize it using wrench, ref. 3378118M1 (see Fig. 3 and § D).

   Position the special socket ref. 3378119M1 (see Fig. 3 and § D) at the end of the drive pinion.

   Turn the drive pinion clockwise to loosen the nut.

   NOTA: *This nut loosening method (nut locked - rotating drive pinion) is suitable for the drive pinion profile.*
7. Take off:
   - the bearing cone (1);
   - the shims (3);
   - the thrust washer (4).

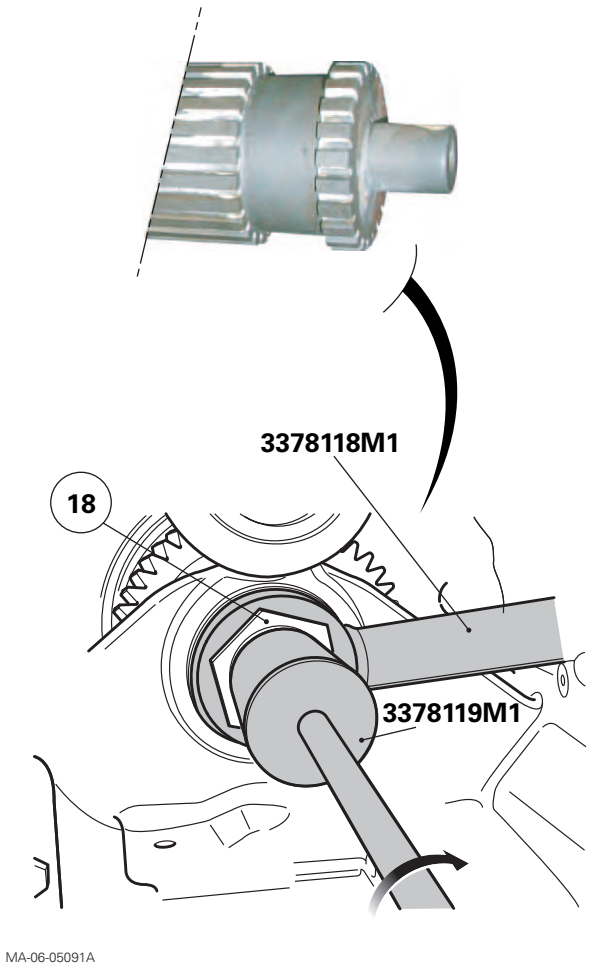

Fig. 3

8. Take out two diametrically opposed screws on bearing carrier (13).

In their place screw two guide studs G (Fig. 4).

Remove the remaining screws.

9. Make two V screws of appropriate length. Screw them into the tapped holes of carrier (13) (Fig. 4). Extract the carrier by alternating V screws tightening.

10. Remove, after visually identifying their position:

- the bearing carrier (13)/unit (15) assembly;
- the shim(s) (12);
- the 4 WD pinion (17) (if fitted).

Refitting (Fig. 6)

11. Use the guide studs G used during removal. Screw them into two opposing tapped holes on the intermediate housing (Fig. 5).

12. Position the shim(s) (12) on the guide studs G and apply them to the intermediate housing (19) (Fig. 5).

13. Check that the 4 WD drive pinion (17) is correctly positioned in the intermediate housing (19) (Fig. 6).

14. Engage the support bearing carrier (13)/unit (15) assembly on the guide studs.

Turn the drive pinion in order to engage the splines in 4 WD pinion (17).

Push the bearing carrier/unit assembly into the bore of the intermediate housing (19) until it begins to force fit.

15. Take out the guide studs.

Fit the screws (11).

Evenly fit the bearing carrier/unit assembly into the housing bore, tightening screws (11) alternately.

After force fitting:

- Remove all screws.

  Lightly smear their threads with Loctite 270 or equivalent.

  Tighten to a torque of 100 - 130 Nm.
- Using a set of shims, check that the shim(s) (12) is(are) correctly inserted between the intermediate housing (19) and the bearing carrier (13).

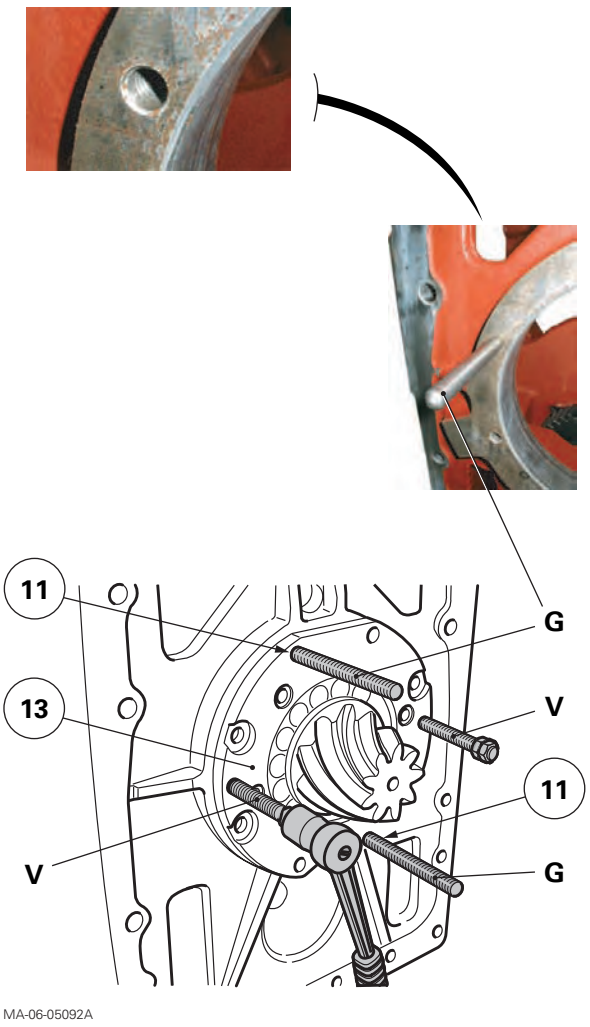

Fig. 4

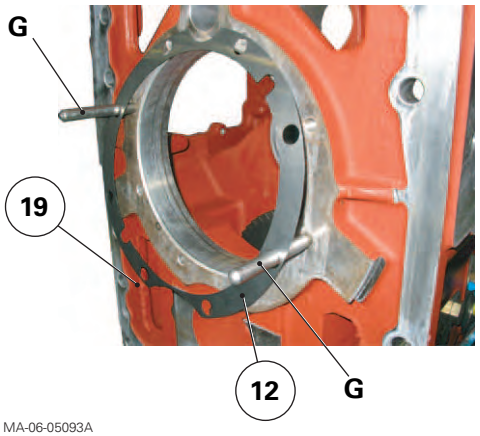

Fig. 5

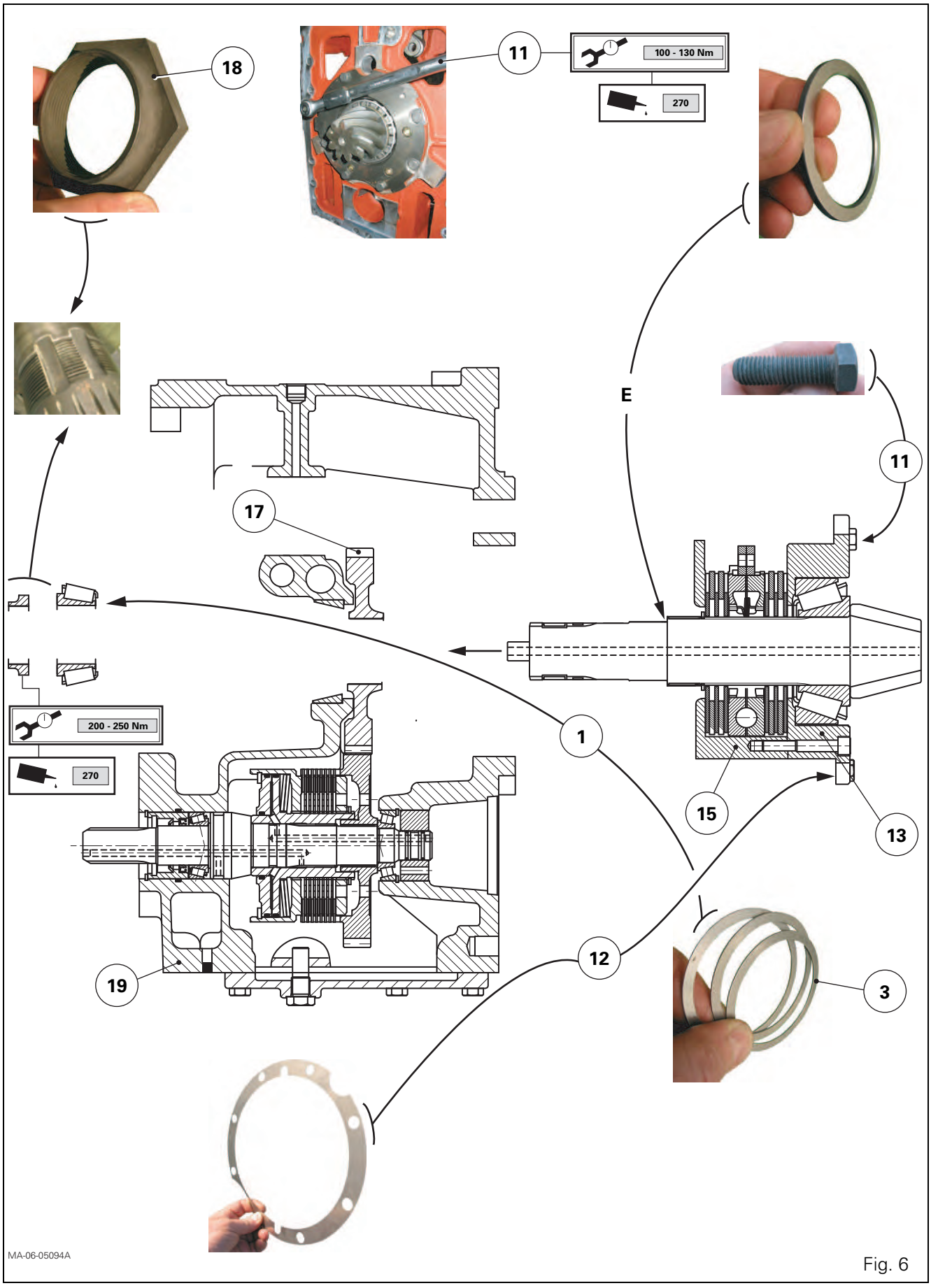
18
11
100 - 130 Nm
270
E
11
17
200 - 250 Nm
270
1
15
13
19
12
3
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Fig. 6

16. Place the thrust washer (4) against shoulder E of the drive pinion (Fig. 7).

IMPORTANT: *The thrust washer must be fitted against the shoulder E so as to create a stop for the 4 WD drive pinion (if fitted) and to optimise the bearing of shims (3). There is no assembly direction as there is a machined chamfer on each surface.*

17. Slide the shim(s) (3).

Lightly grease the bearing cone (1) with clean transmission oil. Push it up against the shims.

18. Degrease the threads of the new nut (18) as well as those of the drive pinion.

19. Lightly smear the nut (18) thread with Loctite 270 or equivalent. Tighten the nut onto the drive pinion. Immobilise it using wrench, ref. 3378118M1 (Fig. 8 and § D).

Correctly position the torque wrench and socket ref. 3378119M1 (Fig. 8 and § D).

Tighten the nut (18) to a torque of 200 - 250 Nm turning the drive pinion anticlockwise (Fig. 8).

Remove tools.

20. Lock the nut by bending the lock washer into the grooves of the drive pinion without breaking it, using a suitable tool.

21. Position and fit the pin (25) allowing for its easy access on the handbrake mechanism.

Fit the washer and a new pin.

If necessary, adjust the handbrake control unit (see chapter 6),

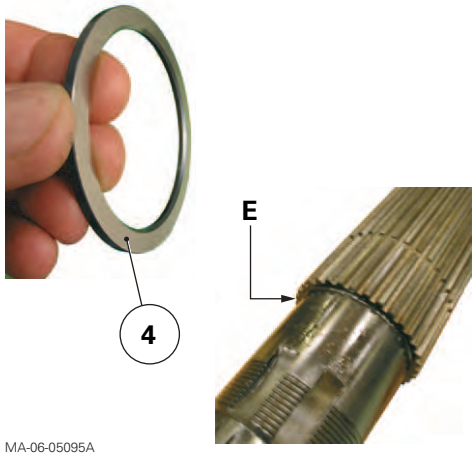

Fig. 7

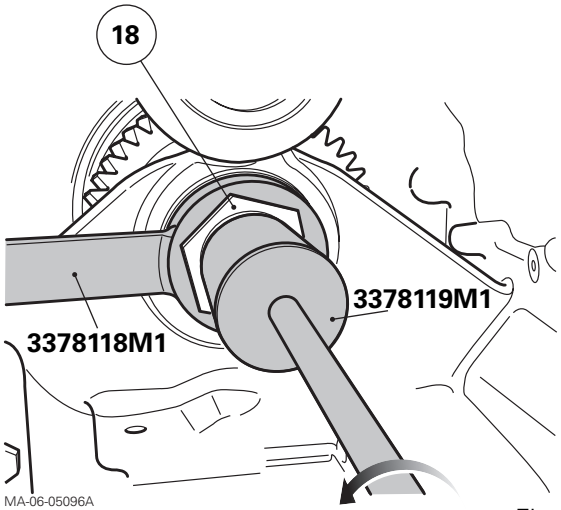

Fig. 8

Disassembling the unit/drive pinion

22. Fit the unit/drive pinion assembly on a workbench.
Take off the circlip (5) (Fig. 9).
Loosen and remove screws (8) (Fig. 9).
Separate the bearing carrier (13) from the unit (15) (see chapter 6).

23. Remove (Fig. 9 and chapter 6):
- the discs (14);
- the intermediate plates (6);
- the handbrake mechanism (16).

24. Extract (if necessary):
- the bearing cup (2) from the intermediate housing (19);
- the bearing cup (10) from the carrier (13);
- the bearing cone (7) from the drive pinion (9).

Refitting the unit/drive pinion

The replacement of the drive pinion **systematically** requires replacement of the ring gear. Both parts bear the same number. They must be matched (see chapter 6).

25. Clean and check all components. Replace any defective parts.
Carefully check the intermediate plates and hand-brake discs for any:
- buckling;
- heat discoloration;
- surface and spline wear.

26. If removed, with a press and suitable fixture, fit home:
- the bearing cone (7) against the drive pinion;
- the cup (10) against the bearing carrier (13);
- the bearing cup (2) against the shoulder of the intermediate casing cover (19).

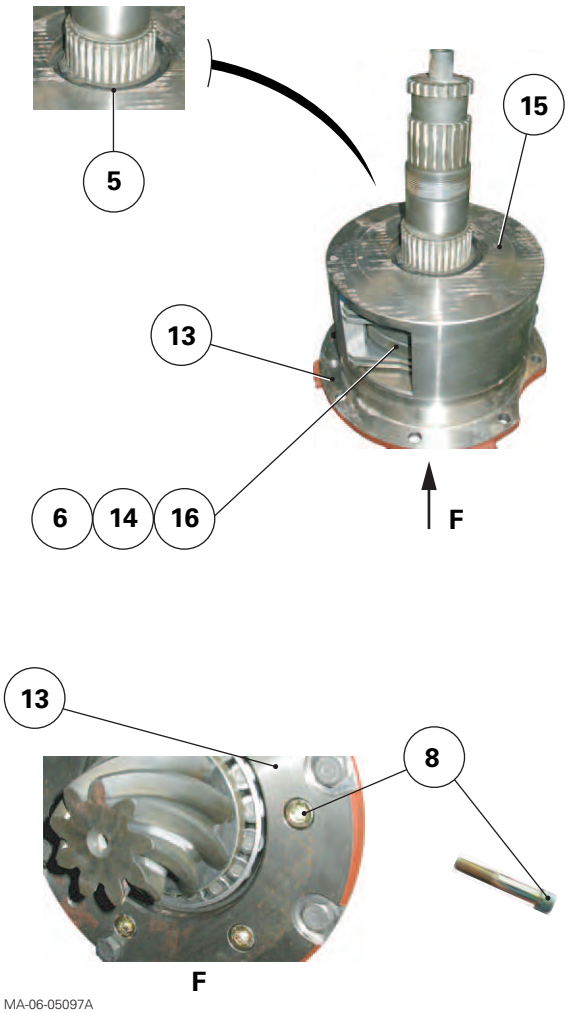

Fig. 9

27. Check that the parts are properly supported by their respective seats.

IMPORTANT:

If replacement of the parts listed below is necessary, carry out the following operations in the given order (see § C):

1) pinion position (apex distance) adjustment;

2) bearings (1) (2) and (7) (10) preload adjustment.

List of parts:

- *intermediate housing (19);*
- *bevel gear (drive pinion and ring gear);*
- *head bearing (cone (7) and cup (10));*
- *thrust washer (4);*
- *bearing carrier (13);*
- *end bearing (cone (1) and cup (2)).*

28. Lightly grease the bearing (7)(10) with clean transmission oil.

29. Slide the drive pinion into the bearing carrier (13).

Position the assembly vertically on a workbench.

30. Reassemble the handbrake system (16) on the drive pinion (Fig. 10 and chapter 6).

31. Fit (Fig. 10):

- the circlip (5);
- the unit (15). Tighten on the carrier (13) (see chapter 6).

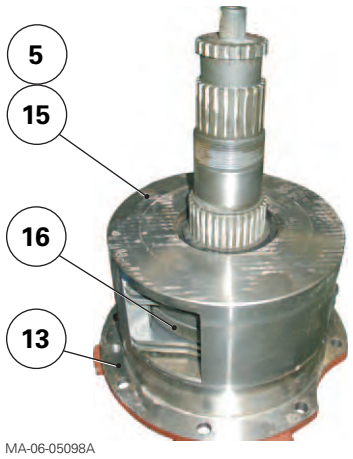

Fig. 10

Final operations

IMPORTANT: *If the servicing concerns the replacement of the bevel gear (drive pinion and ring gear), check the backlash between the drive pinion and ring gear (see chapter 6).*

32. Refit the creeper unit system (if fitted, see chapter 6).

33. Refit (see chapter 9):

- the hydraulic pump bearing/drive pinion assembly (Load Sensing);
- the left-hand hydraulic cover;
- the right-hand hydraulic cover.

34. Assemble the rear axle between the intermediate housing and centre housing (see chapter 2).

35. Assemble the tractor between the gearbox and the intermediate housing (the cab remains integral with the gearbox, see chapter 2).

36. Carry out a road test on all controls.

37. Check the oil tightness of the mating surfaces.

38. Check the oil tightness of the hydraulic unions.

C . Adjusting drive pinion position and bearing shimming

IMPORTANT: *Drive pinion adjustments must be carried out in the following order:*

1) drive pinion position (apex distance) adjustment;

2) bearings (1) (2) and (7) (10) preload adjustment.

Under no circumstances should drive pinion position adjustment be modified without readjusting the shimming of the bearings.

Preliminary operations

39. Force fit the bearing cone (7) (if removed) against the drive pinion shoulder with a press and a suitable fixture.

40. Fit (if necessary):
- the bearing cup (10) against the shoulder of the carrier (13);
- the bearing cup (2) against the shoulder of the intermediate casing cover (19).

41. Temporarily exclude from the bearing carrier (13):
- the unit (15);
- the handbrake mechanism;
- the shim(s) (12).

42. Fit the bearing carrier (13) inside the intermediate housing. Attach with screws (11), progressively and alternately tightened to a torque of 100 - 130 Nm.

IMPORTANT: *Using a 0.05 mm thick shim, check, at three equidistant points, that the carrier (13) is in contact with the intermediate housing (19) (Fig. 11).*

43. Lightly grease the bearing (7)(10) with clean transmission oil.

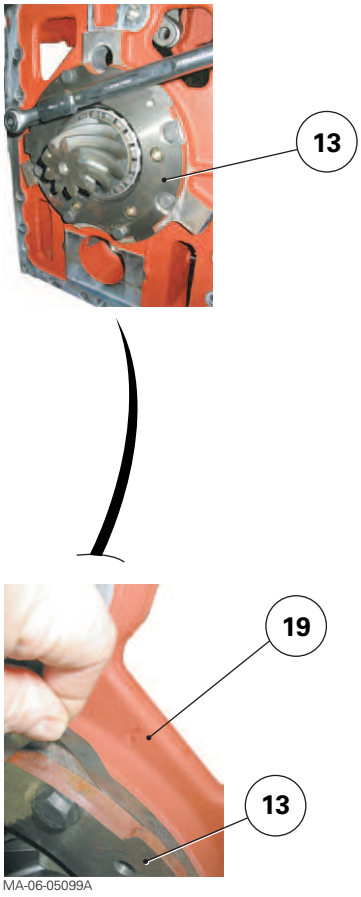

Fig. 11

44. Temporarily fit in the intermediate housing (19):
- the drive pinion;
- the thrust washer (4);
- the bearing cone (1);
- the nut (18).

IMPORTANT: *The shims (3) are temporarily excluded.*

45. Immobilise the nut (18) using wrench, ref. 3378118M1 (Fig. 8 and § D).

Correctly position the torque wrench and socket ref. 3378119M1 (Fig. 8 and § D).

Pre-tighten the nut (18) to a torque of 30 - 50 Nm turning the drive pinion anticlockwise (Fig. 8).

Remove tools.

46. Manually turn the drive pinion several times to correctly seat the bearing cones in the cups.

Check again the correct pre-tightening of the nut (18).

Adjusting drive pinion position (Fig. 12 and Fig. 13)

The inner diameter of the shims (12) is approximately 220 mm. They are centred on the bearing carrier (13) bore.

The thickness of shims required to position the drive pinion correctly is calculated as follows:

E = Z - (X + Y) where

E: Thickness of shims (12) to be fitted (tolerance 0/+ 05 mm)

Z: Nominal dimension between the rear face of the intermediate housing (19) and the axis of the differential ring gear, i.e. 241 mm

X: Dimension measured between the end of the drive pinion and the rear face of the intermediate housing

Y: Nominal dimension of the positioning of the drive pinion, i.e. 139 mm

47. Using a suitable depth gauge, measure dimension X (Fig. 13).

48. Apply the formula to determine the thickness of the shim(s) (12) to fit to obtain the correct apex distance.

49. Fit the previously defined shim(s).

Measure dimension X once more. Check that X+Y is equal to Z.

50. Shim the drive pinion bearings (see following paragraph).

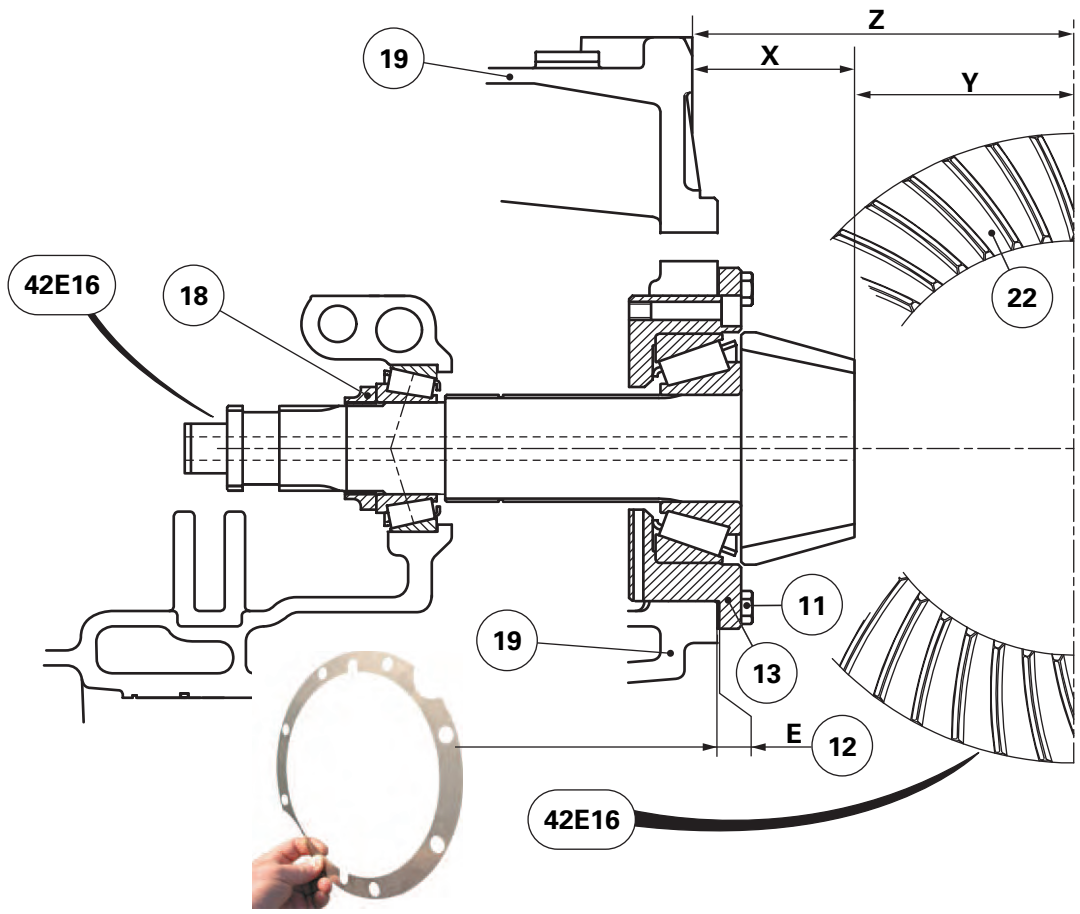

Fig. 12

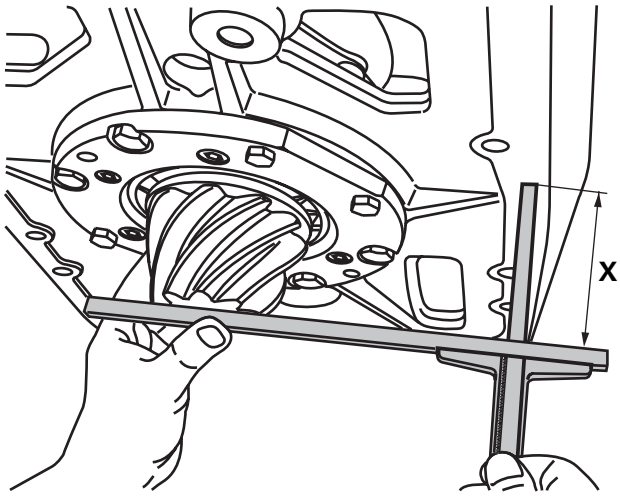

Fig. 13

Shimming the drive pinion bearings

IMPORTANT:

- *The handbrake unit must be bare (free of discs and intermediary plates).*
- *The preload adjustment of bearings (1) (2) and (7) (10) is necessarily a two-step operation:*

  The first step involves using a dial gauge and following the conventional method, applying an axial thrust and pulling load to the drive pinion so as to preposition P1 shims.

  The second step consists in fine-tuning the P1 shimming by measuring the rotational torque of the drive pinion bearings using a dial-type torque wrench.

Preparation (Fig. 14)

51. Check the presence of the thrust washer (4) against shoulder E of the drive pinion.

52. Slide shim(s) (3) under the drive pinion such as to obtain a temporary clearance of bearings (1)(2) et (7)(10) of approximately 0.15 to 0.20 mm.

53. Immobilise the nut (18) using wrench, ref. 3378118M1 (Fig. 8 and § D).

Correctly position the torque wrench and socket ref. 3378119M1 (Fig. 8 and § D).

Pre-tighten the nut (18) to a torque of 30 - 50 Nm turning the drive pinion anticlockwise (Fig. 8).

Remove tools.

54. Manually turn the drive pinion several times to partially seat the bearing cones in the cups.

Shimming (Fig. 14)

55. Place the dial gauge feeler pin on the taper end of the drive pinion.

56. Pull very hard on the front of the pinion before turning it from left to right, in order to "seat" the bearing cone (7) correctly in the cup (10).

57. Set the dial gauge to zero.

58. Repeat operation 56, pushing in order to correctly "seat" the bearing cone (1) in the cup (2).

59. Depending on the clearance measured during operation 58, select the thickness of shim(s) (3) required to obtain a pre-loading of: **P1 = 0.04 to 0.10 mm**.

As far as possible, carry out shimming to the maximum tolerance.

60. Loosen the nut (18).

Remove the bearing cone (1).

61. Slide the shims (3) selected during operation 59 between the thrust washer (4) and the bearing cone (1).

62. Temporarily tighten the nut (18) to 200 - 250 Nm.

63. Systematically check/adjust the rotational torque of the drive pinion bearings (see following paragraph).

Checking/adjusting the rotational torque of the drive pinion bearings

Principle

Adjustment consists in adding or removing shims (3) between the thrust washer (4) and the bearing cone (1) in order to obtain the torque specified below.

Check/adjustment

64. Fit the socket ref. 3378119M1 and a dial-type torque wrench on the drive pinion. If necessarily, use reducers to bring together the socket and the wrench (Fig. 15).

65. Turn the drive pinion slowly and regularly for several seconds, keeping the same pace, in order to read the rotational torque. It must range from **1.50** to **3.50 Nm**.

66. As far as possible, adjust the rotational torque to maximum tolerance according to the above-mentioned principle.

67. After check/adjustment, degrease the threads of the new nut (18) as well as those of the drive pinion.

68. Lightly smear the nut (18) thread with Loctite 270 or equivalent. Tighten the nut onto the drive pinion. Immobilise it using wrench, ref. 3378118M1 (Fig. 8 and § D).

Correctly position the torque wrench and socket ref. 3378119M1 (Fig. 8 and § D).

Tighten the nut (18) to a torque of 200 - 250 Nm turning the drive pinion anticlockwise (Fig. 8).

Remove tools.

69. Lock the nut by bending the lock washer into the grooves of the drive pinion without breaking it, using a suitable tool.

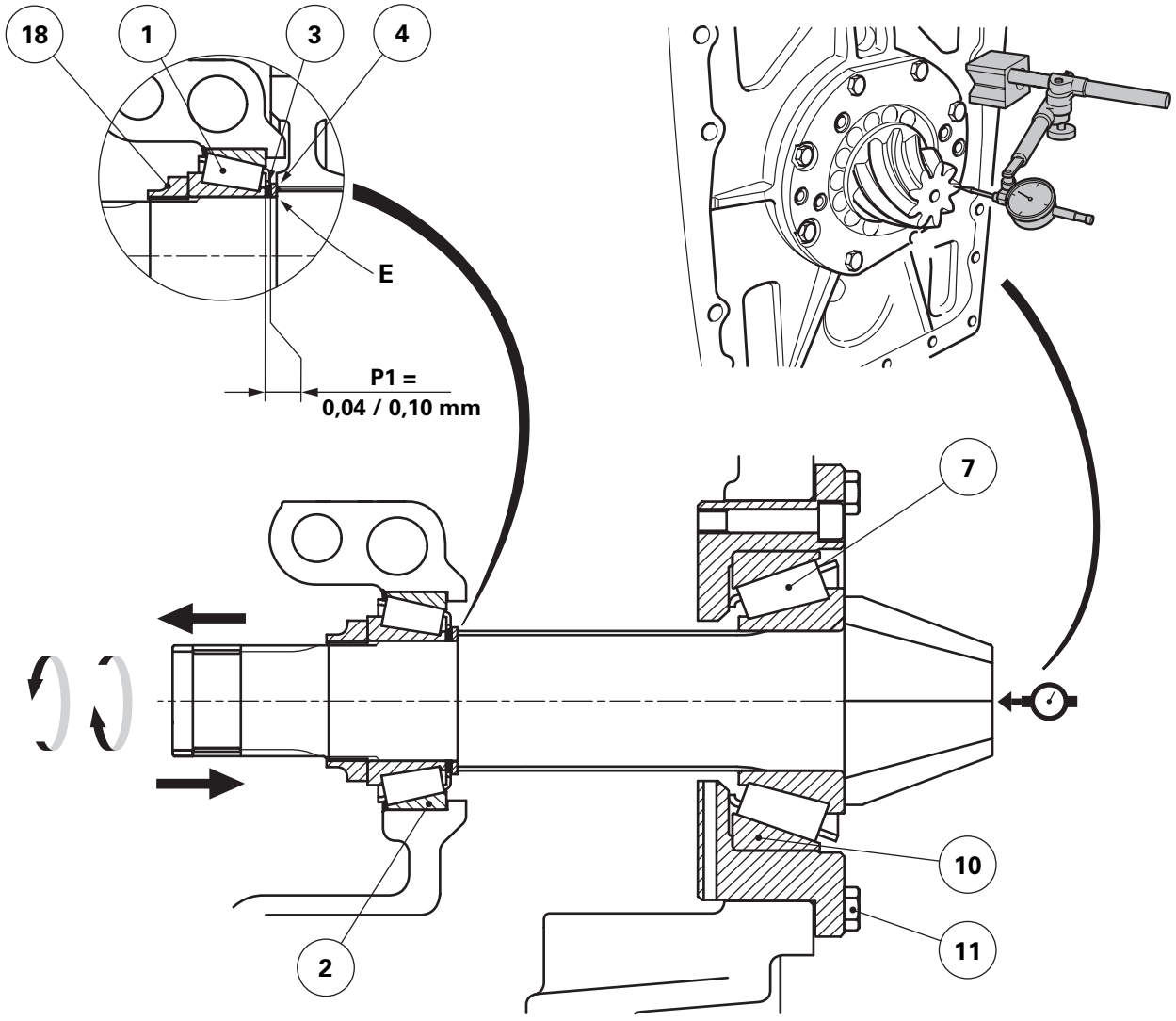
18
1
3
4
E
P1 =
0,04 / 0,10 mm
7
10
11
2
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Fig. 14

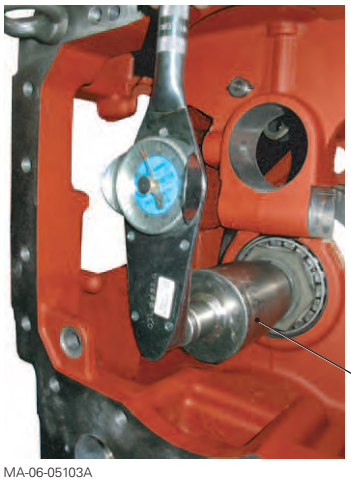
3378119M1
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Fig. 15

D . Service tools

Tools available in the AGCO network

- 3378118M1: Locking wrench for drive pinion nut (Fig. 16)
- 3378119M1: Drive pinion tightening socket (Fig. 17)

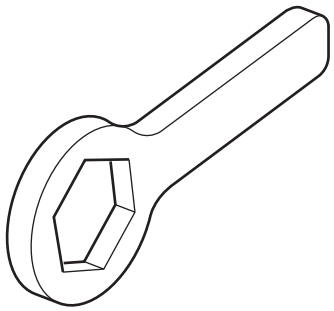

Fig. 16

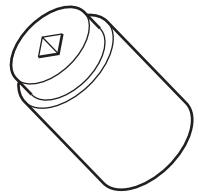

Fig. 17

6C15 - GPA30 - Handbrake unit and control

CONTENTS

GPA30 - Handbrake unit and control

A . General

The mechanical handbrake assembly (secondary brake) is fitted to the drive pinion (9), located in the intermediate housing.

It comprises (Fig. 1):
- six discs (14) splined to the drive pinion;
- four intermediate plates (6) fixed to the unit by catches.

The discs and intermediate plates are evenly distributed on either side of the mechanism (16).

The mechanical handbrake assembly is controlled by a link (3) which acts on the cam (22). This cam is connected to the adjustable tie-rod (23) of the mechanism (16) (Fig. 1).

The mechanism is adjusted by a special nut (21) (Fig. 1). This nut can be reached by removing the feed-through conduit located above the intermediate housing.

Lubrication

The discs and intermediate plates of the mechanical handbrake assembly are simply lubricated by transmission oil splash.

Operation (Fig. 1)

When the handbrake lever is pulled, the cable activates the link (3). This latter pivots and drives the cam (22), separating the mechanism plates (16). Mechanism spreading causes the compression of the discs and intermediate plates in the unit (13)(15) and locks the drive pinion. When the drive pinion is locked, the tractor is immobilized.

When the handbrake lever is released:
- the mechanism is not activated;
- the discs, intermediate plates and drive pinion are free.

The tractor is mobile again.

Tightness (Fig. 1)

Unit (7) oil tightness is provided by:
- a lip seal (12) for the link (3);
- an O'ring (1) for the pin (11);
- a seal with Loctite 510 or equivalent for the mating face of unit (7) on the intermediate housing.

GPA30 - Handbrake unit and control

Parts list (Fig. 1)

(1) O'ring
(2) Screw
(3) Link
(4) Support
(5) Circlip
(6) Intermediate plates
(7) Unit
(8) Screw
(9) Drive pinion
(10) Friction washer
(11) Splined pin
(12) Lip seal
(13) Bearing carrier
(14) Discs
(15) Unit
(16) Mechanism
(17) Screw
(18) Washer
(19) Rod
(20) Pin
(21) Special nut
(22) Cam
(23) Tie-rod
(24) Clevis
(25) Pin
(26) Pin
(27) Friction rings
(28) Special screw
(29) Mecanindus pin
(30) Set screw
(31) Cam
(32) Spring
(33) O'ring
(44) Screw

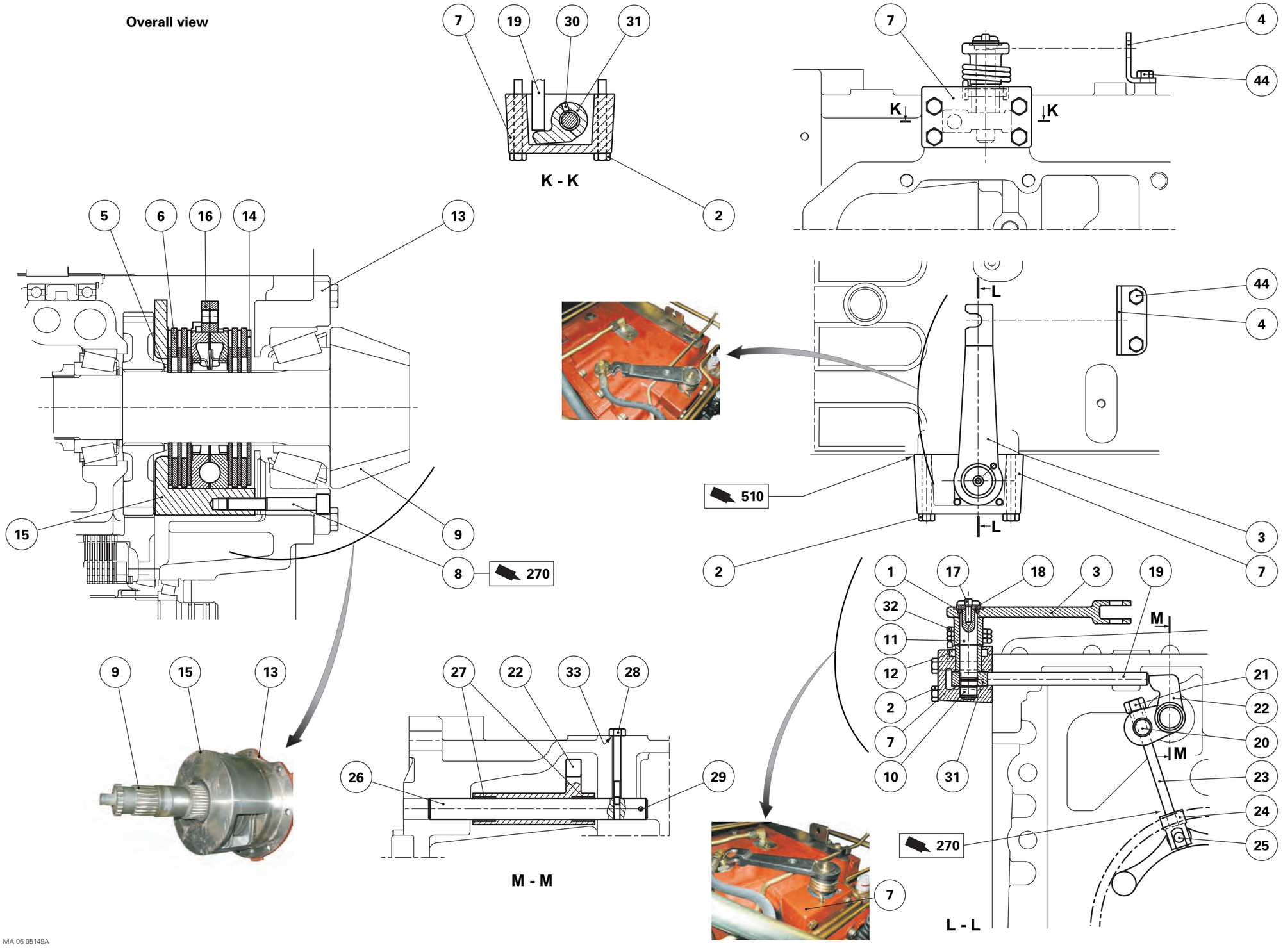

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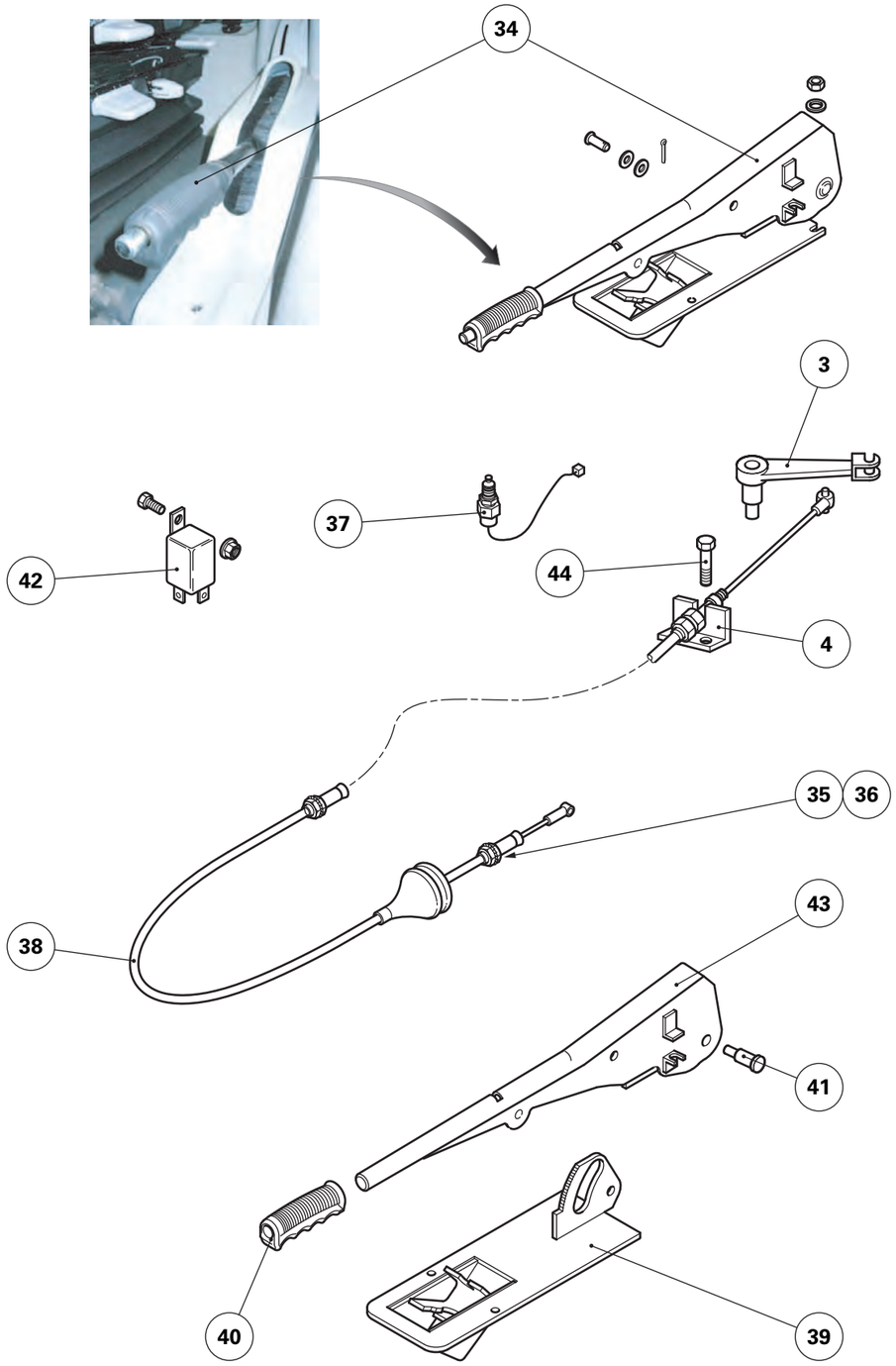
Fig. 1

Parts list (Fig. 2)

(1) O'ring
(2) Screw
(3) Link
(4) Support
(5) Circlip
(6) Intermediate plates
(7) Unit
(8) Screw
(10) Friction washer
(11) Splined pin
(12) Lip seal
(14) Discs
(15) Unit
(16) Mechanism
(17) Screw
(18) Washer
(19) Rod
(20) Pin
(21) Special nut
(22) Cam
(23) Tie-rod
(24) Clevis
(25) Pin
(26) Pin
(27) Friction rings
(28) Special screw
(29) Mecanindus pin
(30) Set screw
(31) Cam
(32) Spring
(33) O'ring
(34) Lever assembly (inside cab)
(35) Nuts
(36) Grower/lock washer
(37) Switch
(38) Cable
(39) Pedestal/notched quadrant
(40) Handle
(41) Pin
(42) Buzzer
(43) Lever
(44) Screw



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Exploded view

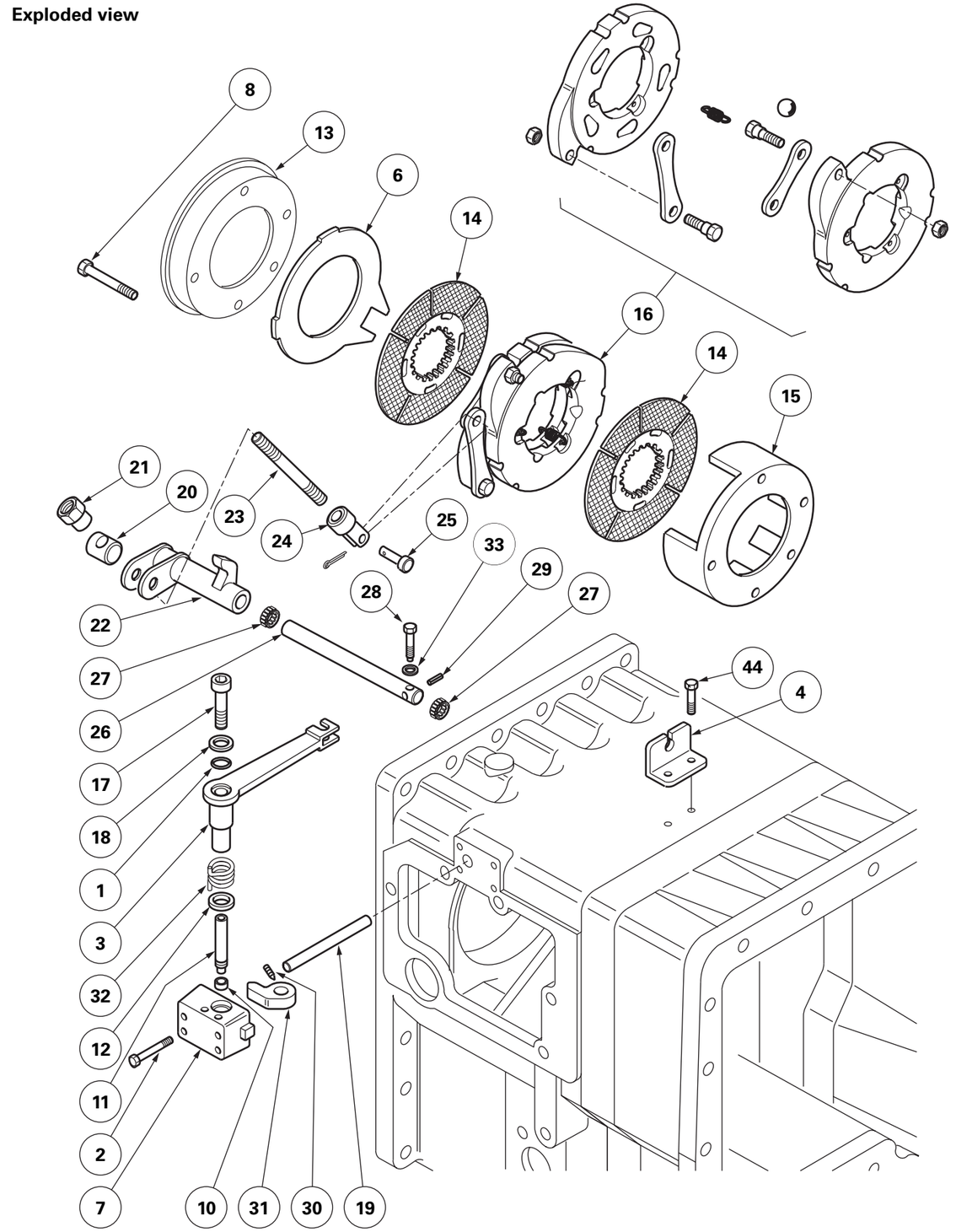

Fig. 2

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B . Disassembling - reassembling the handbrake unit

Preliminary operations

1. Split the tractor between the gearbox and the intermediate housing (the cab remains integral with the gearbox, see chapter 2).
2. Split the rear axle between the intermediate housing and centre housing (see chapter 2).
3. Remove (see chapter 9):
   - the right-hand hydraulic cover;
   - the left-hand hydraulic cover.
4. Remove, as appropriate, the pinion (1) (Fig. 3) or the bearing/hydraulic pump drive pinion assembly (see chapter 9).
5. If the tractor is fitted with a creeper unit, remove its control (see chapter 5).
6. Remove the handbrake/drive pinion assembly (see chapter 6).

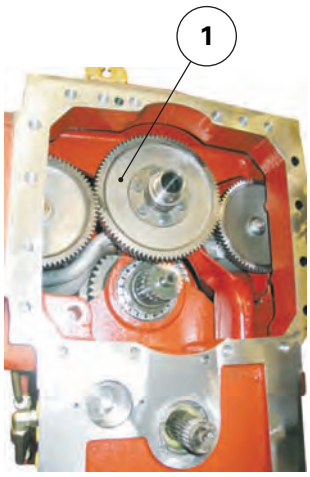

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Fig. 3

Disassembly (Fig. 4)

7. Unlock and remove screws (8).
   Separate the unit (15) from the bearing carrier (13).
8. Remove circlip (5).
9. Mark the position of the elements and remove:
   - the first set of discs (14)/intermediate plates (6);
   - the mechanism (16);
   - the second set of discs (14)/intermediate plates (6).
10. Remove the drive pinion (9) and bearing assembly from carrier (13).

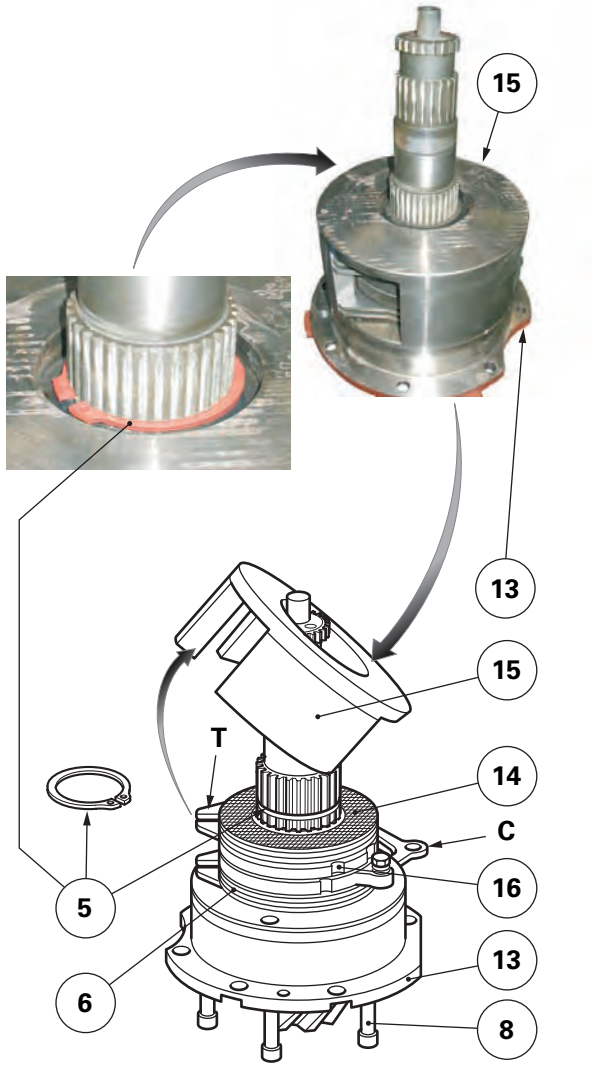

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Fig. 4

Reassembly (Fig. 5)

11. Clean and check all components. Replace any defective parts.

Check:

- that the axial channel of the drive pinion is not obstructed;
- for the presence of oil discharge ports located at the base of the bearing carrier (13).

12. Place the drive pinion fitted with its bearing cone, vertically on a workbench.

Lubricate the bearing cup fitted into the carrier (13) using clean transmission oil.

Refit the support/cup on the drive pinion bearing cone.

13. Correctly position control C of the mechanism (16). Refit the mechanism by placing a set of discs (14)/intermediate plates (6) on either side of it, according to Fig. 5. Correctly align the T catches so that the fit into the D finger of the cover (15) (Fig. 5).

IMPORTANT: *A set consists of three discs and two intermediate plates. When refitting, strictly follow the stacking order of discs and intermediate plates.*

14. Assemble the handbrake unit (15) on the bearing carrier (13) by sliding the D finger into the T catches (Fig. 5).

15. Place circlip (5).

16. Lightly smear the thread of the screws (8) with Loctite 270 or equivalent. Tighten the screws to a torque of 120 -160 Nm.

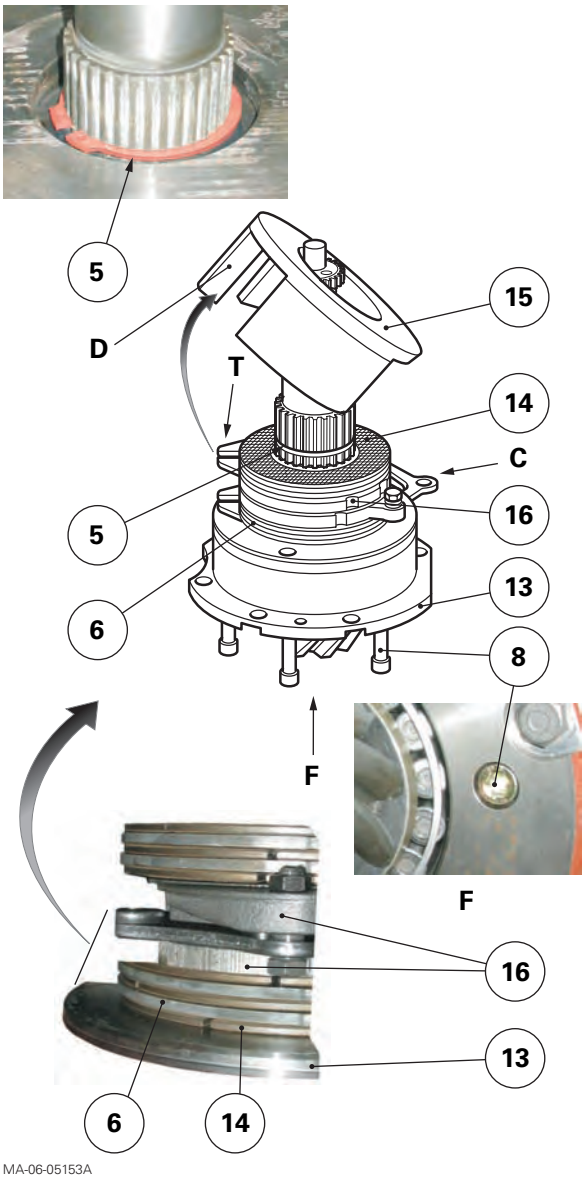

Fig. 5

Final operations

17. Refit the handbrake unit/drive pinion assembly in the centre housing (see chapter 6).

Position and fit the pin (25) allowing for its easy access on the handbrake mechanism.

Fit the washer and a new pin.

Adjust the handbrake control (see § D).

18. If the tractor is fitted with a creeper unit, refit its control (see chapter 5).

19. Refit the pinion (1) hydraulic pump bearing/drive pinion assembly (Fig. 3).

20. Refit (see chapter 9):

- the left-hand hydraulic cover;
- the right-hand hydraulic cover.

21. Assemble the rear axle between the intermediate housing and centre housing (see chapter 2).

22. Assemble the tractor between the gearbox and the intermediate housing (the cab remains integral with the gearbox, see chapter 2).

23. Check:

- the correct operation of all the controls;
- the functions (mechanical and electrical) of the handbrake lever.

24. Carry out a road test.

25. Check the oil tightness of the mating faces and hydraulic unions.

C . Removing/disassembling and reassembling/refitting the hand-brake linkage

Removal/disassembly

On unit (7)

26. Release and remove the complete intermediate housing unit (7)

27. If necessary, remove each unit element.

On the pin (26) and cam (22)

Removing the pin (26) and cam (22) requires:

- splitting the tractor between the gearbox and the intermediate housing (see chapter 2);
- removing the right-hand hydraulic cover (see chapter 9);
- removing the pinion or bearing/hydraulic pump drive pinion assembly (see chapter 9).

28. Loosen the special screw (28).

Remove the pin (26) and cam (22).

29. Drive the friction rings (27) off the cam (Fig. 6), without damaging it.

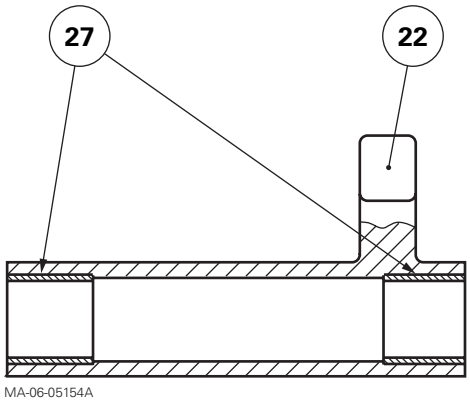

Fig. 6

Reassembly/refitting

On the handbrake mechanism (16)

30. Refit:

- the pin (25);
- the washer and a new stop pin on the pin.

IMPORTANT: *The pin (25) must be positioned and fitted so as to allow for its easy access on the mechanism.*

On cam (22)

31. Fit:
- the friction ring (27) flush with the chamfer of face F of the cam (22) (Fig. 7);
- a new Mecanindus pin (29) in the hole at the front end of the pin (26).

32. Refit the cam and pin.

Check that the cam pivots correctly on its pin.

33. Lightly smear the thread of the special screw (28) with Loctite 242 or equivalent, only if this screw does not have an O'ring.

Tighten the screw (25) to a torque of 25 - 35 Nm.

On the unit (7)

34. Fit (Fig. 8):
- the friction ring (10), using a locally made drift;
- the seal (12) in direct contact with the shoulder of the housing (7), using a suitable locally made fixture.

Grease the lip of the seal (12) with clean transmission oil.

35. Fit the splined pin (11) and cam (31) in the unit (7) (Fig. 8).

36. Lightly smear (Fig. 8):
- the thread of the (Allen) screw (30) with Loctite 242 or equivalent. Moderately tighten the screw;
- the mating face of unit (7) with Loctite 510 or equivalent.

37. Slide the rod (19) in the intermediate housing. Check that it slides freely.

38. Place the unit (7) against the intermediate housing.

Tighten screws (2) to a torque of 25 - 35 Nm.

39. Adjust the angular position of the link (3) on the splined pin (11), using the method described in § D.

40. Place on the link (3), after adjustment:
- the O'ring (1);
- the washer (18).

41. Tighten the screw (17) to a torque of 14 - 20 Nm.

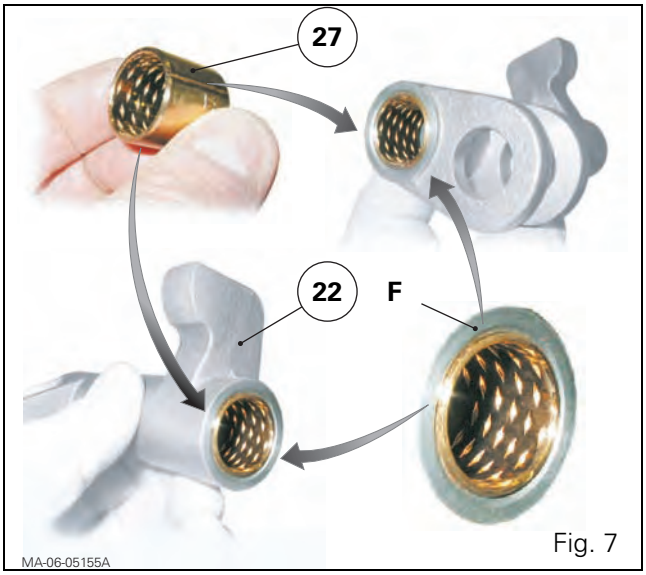

Fig. 7

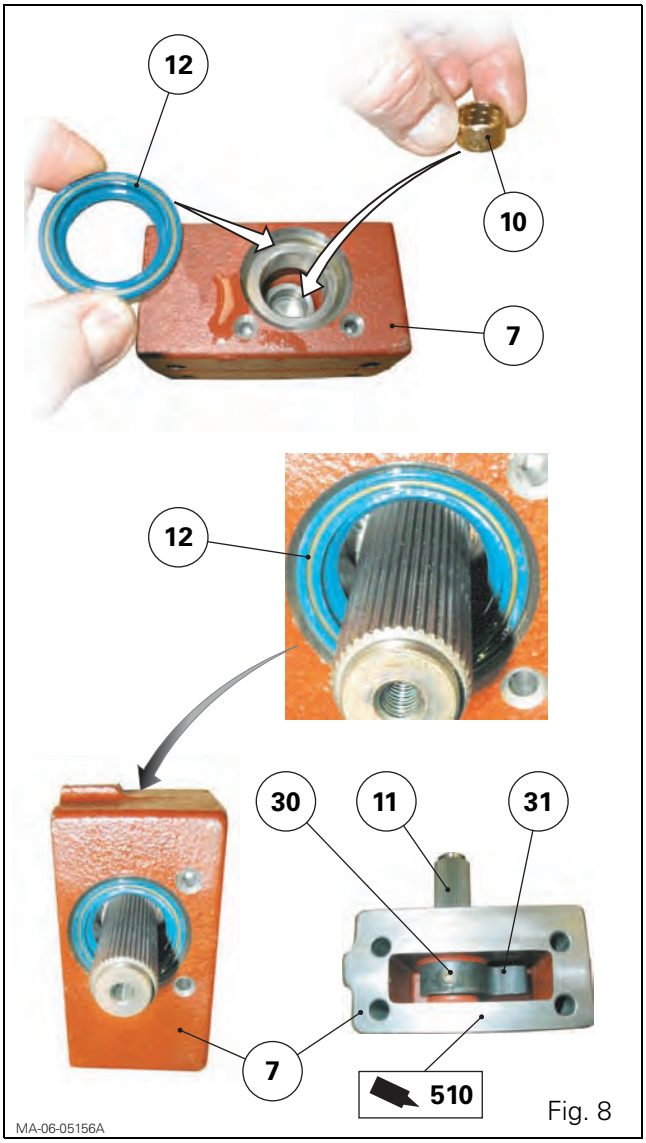

Fig. 8

D . Adjusting the control

Preliminary operations

42. Take off:

- the concerned wheel (if necessary). Position an axle stand ;
- the screw (17);
- the washer (18);
- the O'ring (1) ;
- the link (3);
- the spring (32).

Adjusting the mechanism (16)

43. Manually check that the cam (31) is placed against the bottom of the unit (7) (Fig. 9).

44. If the right-hand hydraulic cover has been removed, adjust the special nut (21) through the port in the intermediate housing cover to obtain a clearance **J** of **1.2 to 1.3 mm**, using a set of shims (Fig. 10).

NOTA: *When the hydraulic cover does not need to be removed, the mechanism (16) can be adjusted without adjusting the clearance J, by directly adjusting link (3) travel according to the value indicated in operation 51. For this, using a locally made short spanner, directly adjust the special nut (21) through port 0 of the feed-through conduit located above the intermediate housing (Fig. 11). This feed-through conduit returns clean oil from the auxiliary spool valve quick-disconnect couplings to the return line.*

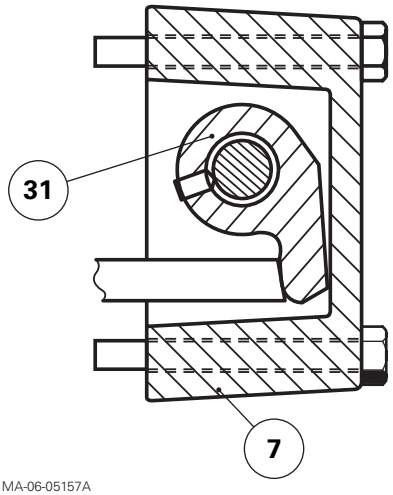

Fig. 9

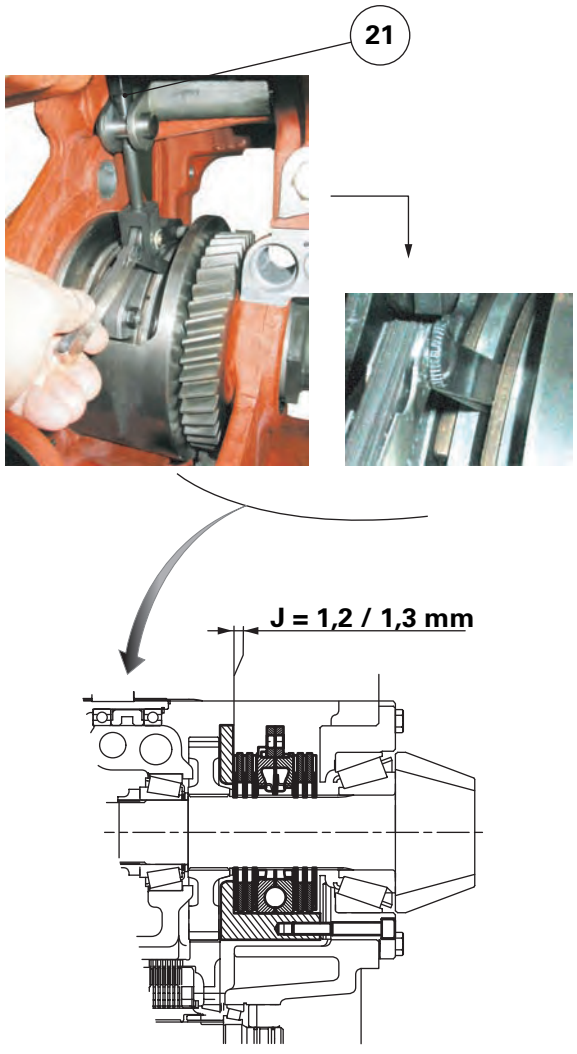

Fig. 10

Adjust the position of link (3)

45. Manually check that the cam (31) is placed against the bottom of the unit (7) (Fig. 9).

46. Temporarily position the link (3) on the splined pin (11) of the cam (31) without the spring (32) such as to obtain a value of **225 to 250 mm** between the cable bearing pin on the link (3) and the external side of the support (4) (position A, Fig. 11).

47. Mark the position of the link (3) with respect to the pin (11). Remove the link.

48. Fit the spring.
Definitively refit the link according to the previous marks.

49. Refit:
- the O'ring (1);
- the washer (18).

50. Tighten the screw (17) to a torque of 14 - 20 Nm.

Check link (3) travel

51. Check that link travel falls between **30 and 45 mm** with a load of 10 - 25 daN applied at the point where the cable is fixed (position B, Fig. 11).
NOTA: *The travel of approximately 30 to 45 mm is the result of the clearance J indicated in operation 44 and of the load of 10 to 25 daN applied to the link.*

Final operations

52. If the wheel has been removed:
- refit it;
- remove the axle stand;
- tighten the screws or nuts (see chapter 6).

53. Check tractor mobility with handbrake off.

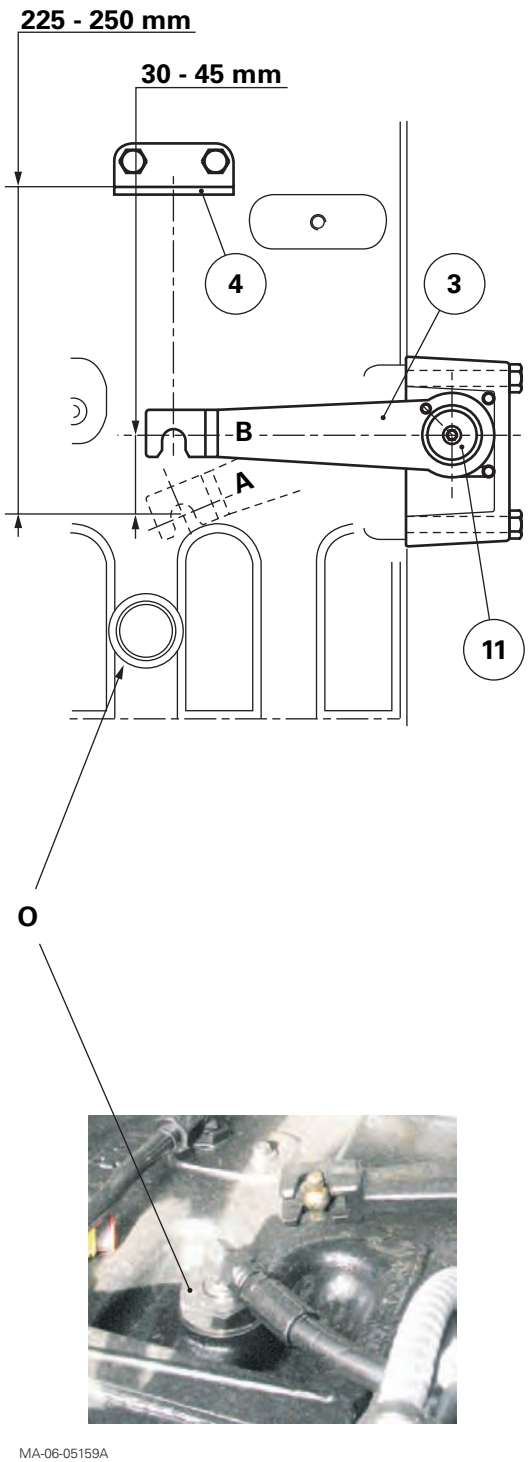

Fig. 11

E . Removing - refitting the lever and replacing the cable

Parts list (Fig. 12)

(3) Link
(4) Support
(34) Lever assembly (inside cab)
(37) Switch
(38) Cable
(39) Pedestal/notched quadrant
(40) Handle
(41) Pin
(42) Buzzer
(43) Lever

Removing the handbrake lever

54. Disconnect the electrical connector from switch (37) and the handbrake control cable (38) on the lever.

55. Remove the lever fitted to the cab floor.

56. Remove the pin (41).

57. Split the pedestal/notched quadrant (39) from the lever (43).

NOTA: *Replacement of the notched quadrant requires that of the pedestal. The parts are welded together.*

Refitting the handbrake lever

58. Refit the lever by carrying out the disassembly operations in reverse order.

59. Check the correct operation of the lever.

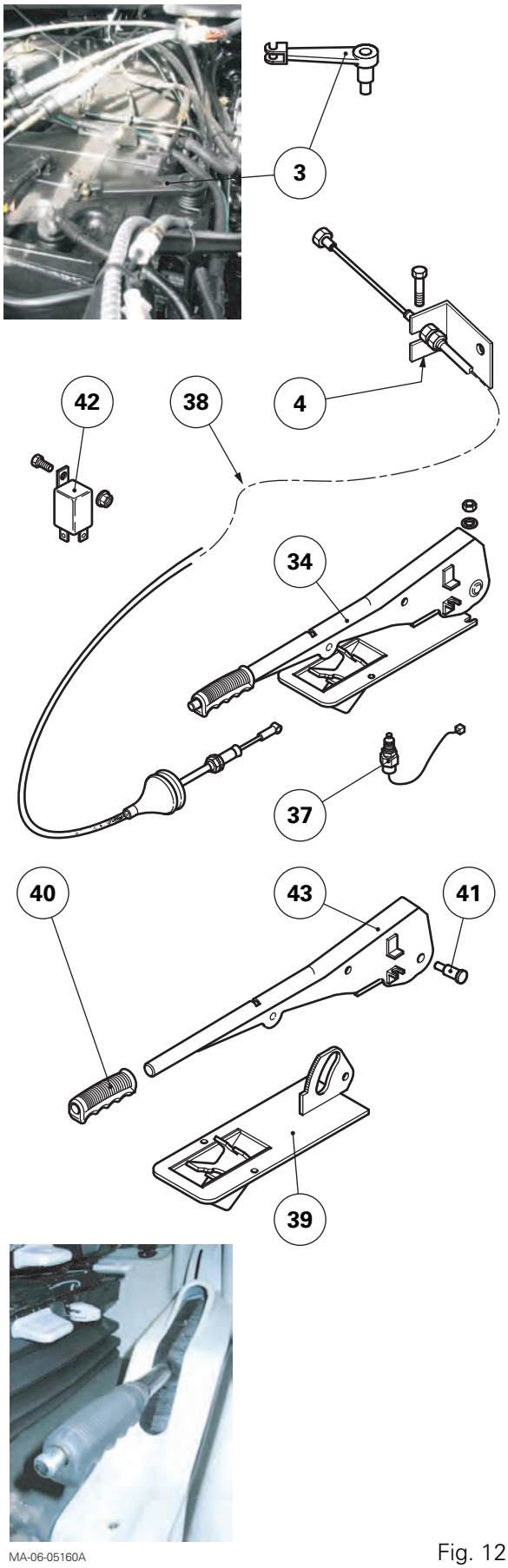

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Fig. 12

Replacing the cable

Removal

60. Disconnect the ends of the cable and sheath.

Refitting

61. Pull and push on one end of the new or used cable. Ensure that the cable presents no hard points in its sheath.

62. Connect the cable to the lever (43).

Adjust the sheath end on lever side, in order to balance the thread on either side of the pedestal/notched quadrant.

Tighten the nut and locknut.

Slide the sheath end into the support (4), near the link (3).

IMPORTANT: *The lock washer (1) must be placed between the two nuts (35) on the support (4) sheath end (Fig. 13). The cable is float mounted on the support (Fig. 13), allowing it to be aligned with the control and minimising stresses when the lever is pulled.*

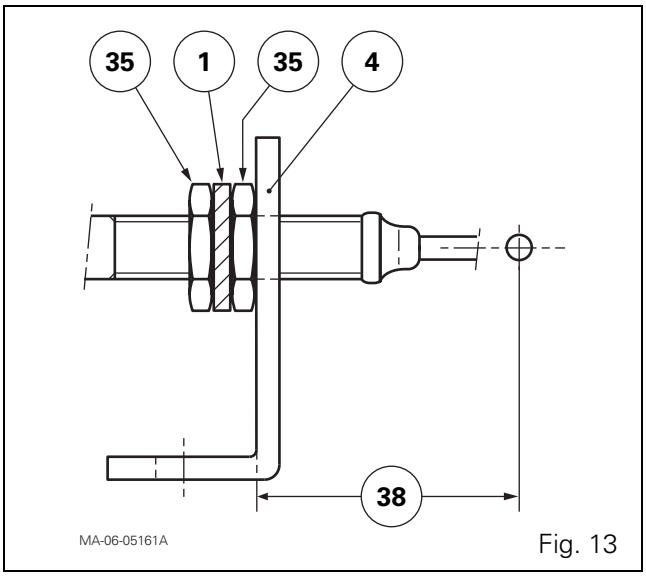

Fig. 13

Adjusting the cable

63. Check that the lever in the cab is in the released position.

64. Fit the cable on the support (4) and on the link (3) (Fig. 12).

65. Adjust the cable (38) (Fig. 13) according to the link (3) adjustment minus 10 mm (see operation 46).

Checking handbrake lever travel

66. Firmly move the lever in the cab several times. Check its travel: it needs approximately ten notches for the tractor to be immobilised.

If necessary, adjust the mechanism (16) and the control (see § D).

67. Check for correct operation:

- of the indicator light on the instrument panel;
- of the buzzer (42) (handbrake on and speed engaged).

GPA30 - Handbrake unit and control

6C16 - GPA30 - 7" differential unit and multidisc lock

CONTENTS

GPA30 - 7" differential unit and multidisc lock

A . General

The 7" differential is identified by the size of its unit.

The size of the unit corresponds to the distance between the end of two planet gears (31) fitted opposite each other on axle shafts (35) (Fig. 1).

The drive pinion and ring gear of the standard 7″ bevel gear share the same shaftline.

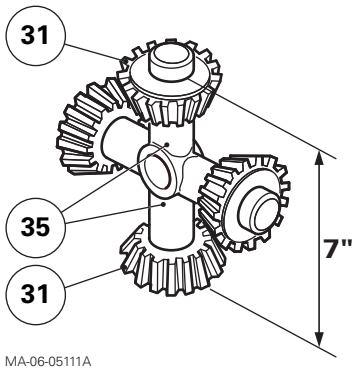

Fig. 1

Construction

The bevel gear rotation is provided by the output shaft of the gearbox and drives the rear axle.

The ring gear is fixed to the differential unit by screws (22).

The differential assembly rotates on two taper roller bearings supported by two lateral carriers. These lateral carriers are positioned by means of rings (23) and screwed onto the centre housing.

The differential assembly consists of a unit containing four planet gears (31) and two sun gears (32) (33).

The left-hand sun gear (33) has the following specific feature: it also serves as a hub for the discs (56) of the differential lock.

The planet gears turn on four axle shafts (35). These axle shafts are held together in the unit (21) by the differential yoke (34). They are held in place by pins and screws.

Preload shimming of the differential assembly is carried out via shim(s) (48) positioned between the bearing cone (46) and the left-hand differential support (40).

Backlash between the drive pinion and the ring gear is obtained by using (a) shim(s) (29) inserted between the bearing cone (27) and the right-hand differential support (25).

Lubrication

The lubrication of the planet gears is provided by an axial channel and radial bores drilled in the half shafts.

The planet gears, left-hand differential support (40), cover (50) and differential yoke (34) possess a drilled lubrication channel. All these channels also allow the transmission oil to reach the rings (36) (37), discs (56) and differential lock mechanism.

Differential lock

The multidisc lock system incorporates:

- a unit (21) holding the discs (56) and the intermediate plates (55);
- a hub (33) integral via splines with the input sun gear of the left-hand trumpet housing
- a cover (50)/piston (52) assembly supported by the bearing (46) (47).

The 17 bar low pressure circuit feeds the piston chamber (52) through the left-hand differential support (40).

Two rings (49) keep the circuit sealed.

Operation

Clutch engaged position

When the differential lock solenoid valve is operated, the 17 bar low pressure fluid flows through the P channels (Fig. 2) of the left-hand differential support (40) and cover (50). It is then directed to the piston chamber (52).

The piston compresses:

- the intermediate plates (55), which are integral via catches with the hub (33);
- the discs (56), which are splined to the cover (50).

In this position with the clutch engaged, the input sun gears of the left- and right-hand side trumpet housings turn at the same speed. The differential lock mechanism is then activated.

Clutch disengaged position

When pressure is cut off, the piston retracts and frees the discs and intermediate plates. The sun gears and planet gears are released and perform their differential function.

Parts list (Fig. 2)

(20) Ring gear
(21) Differential unit
(22) Screw
(23) Locating pins
(24) Screw
(25) Right-hand differential support
(26) O'rings
(27) Bearing cone
(28) Bearing cup
(29) Shim(s)
(30) Spherical washers
(31) Planet gears
(32) Right-hand sun gear
(33) Left-hand sun gear
(34) Differential yoke
(35) Planet gear axle shafts
(36) Shouldered ring
(37) Shouldered ring
(38) Needle bearings
(39) Screw
(40) Left-hand differential support
(41) Transfer pipe
(42) O'ring
(43) O'ring
(44) Union
(45) Centre housing
(46) Bearing cone
(47) Bearing cup
(48) Shim(s)
(49) Seal rings
(50) Cover
(51) Screw
(52) Piston
(53) O'ring
(54) O'ring
(55) Intermediate plates
(56) Friction discs
(58) Rivets

Legend

P: 17 bar pressure

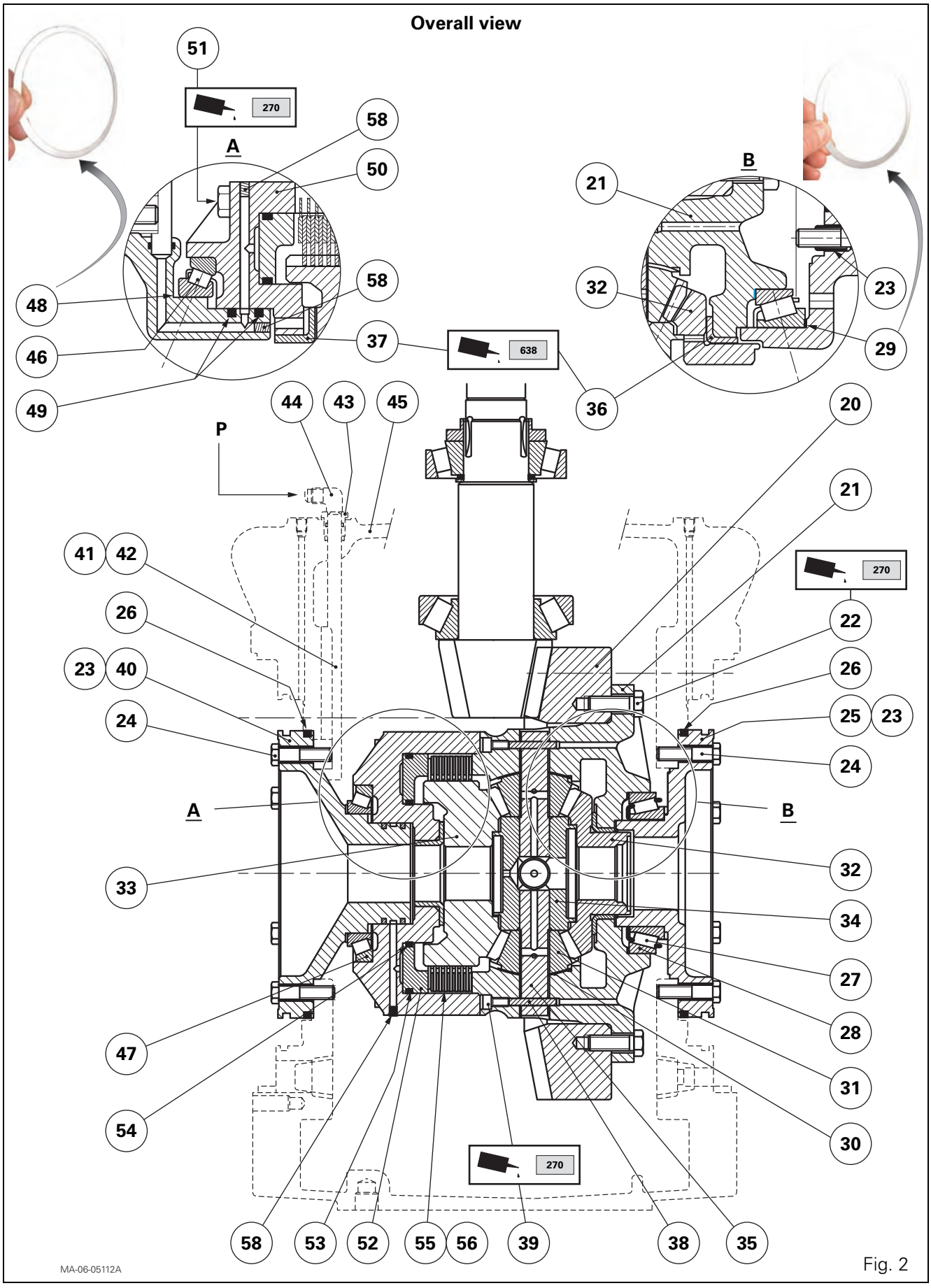
Overall view
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Fig. 2

Parts list (Fig. 3)

(20) Ring gear
(21) Differential unit
(22) Screw
(23) Locating pins
(24) Screw
(25) Right-hand differential support
(26) O'rings
(27) Bearing cone
(28) Bearing cup
(29) Shim(s)
(30) Spherical washers
(31) Planet gears
(32) Right-hand sun gear
(33) Left-hand sun gear
(34) Differential yoke
(35) Planet gear axle shafts
(36) Shouldered ring
(37) Shouldered ring
(38) Needle bearings
(39) Screw
(40) Left-hand differential support
(41) Transfer pipe
(42) O'ring
(43) O'ring
(44) Union
(46) Bearing cone
(47) Bearing cup
(48) Shim(s)
(49) Seal rings
(50) Cover
(51) Screw
(52) Piston
(53) O'ring
(54) O'ring
(55) Intermediate plates
(56) Friction discs

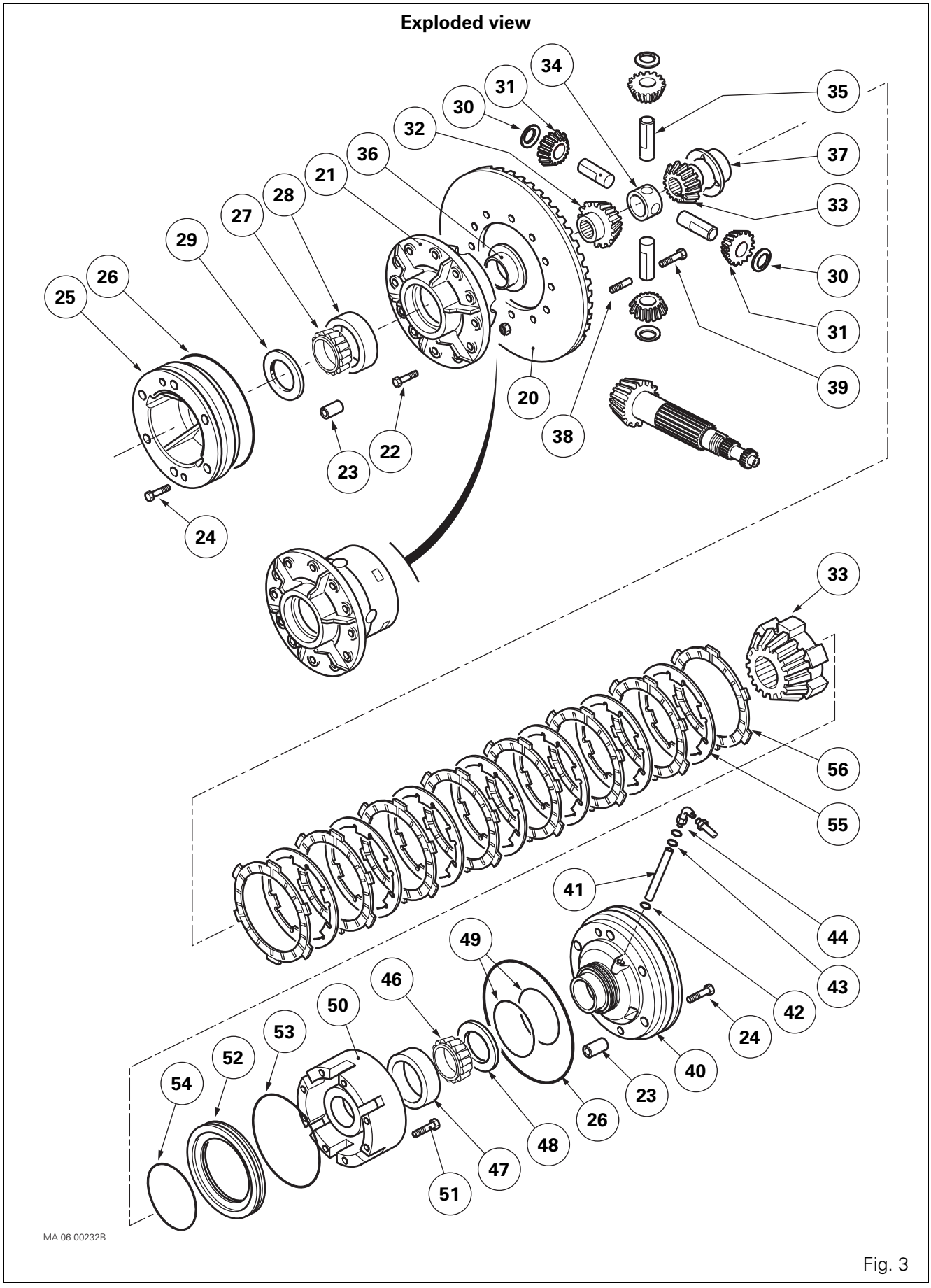
Exploded view
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Fig. 3

B . Removing - refitting the left-hand differential support and seal rings

By removing the left-hand differential support (40) (Fig. 4) it is possible to gain direct access to the rings used to seal the differential lock supply line.

Preliminary operations

1. Remove the left-hand trumpet housing (see chapter 6).
2. Unscrew the pipe and union (44).
   Raise the transfer pipe (41) (Fig. 5) to release it from the left-hand differential support (40).
3. Drive out the left-hand brake piston (see chapter 6).
4. Remove the ground speed sensor located above the centre housing, to avoid it interfering with the ring gear.

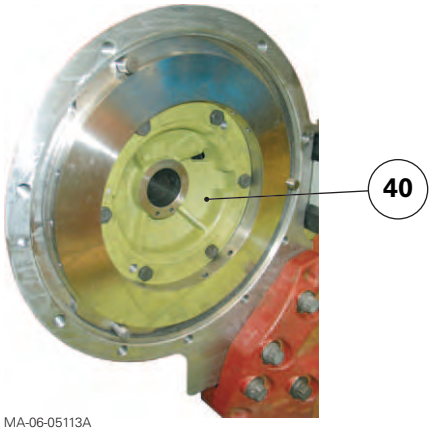

Fig. 4

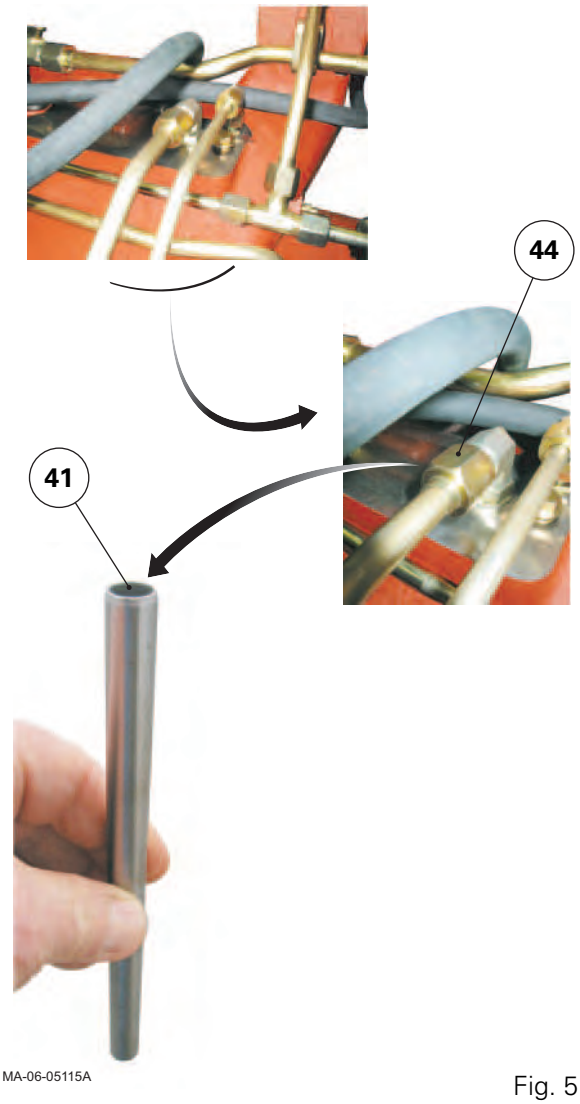

Fig. 5

Removing the left-hand differential support (Fig. 6)

5. Remove two diametrically opposed screws (24) on the left-hand differential support (40).

6. Replace them with two G guide studs (M12, length approximately 250 mm).

The end of each guide stud should rest against the cover (50) of the differential unit (21).

NOTA: *The guide studs hold the differential assembly along the trumpet housing axis after removing the left-hand differential support.*

7. Loosen the four remaining screws (24).

8. Screw in to locally made V extraction screws (M12, length approximately 120 mm) in the tapped holes of the left-hand support.

9. Turn the V screws progressively and alternately until the left-hand centre housing support is removed.

NOTA: *The support is force-fitted into the bore of the housing.*

The tightness of the brake piston chamber is ensured by an O'ring (26) fitted between the support and the housing.

10. Remove the left-hand support/(free) bearing cone (46)/shim (48) assembly.

11. Discard the O'ring (26).

12. Remove the seal rings (49) from the left-hand differential support. Discard if necessary (Fig. 7).

IMPORTANT 1 : *Systematically discard the seals if unsure of their condition.*

IMPORTANT 2: *If the seals are reused, visually mark the position of each seal in its groove.*

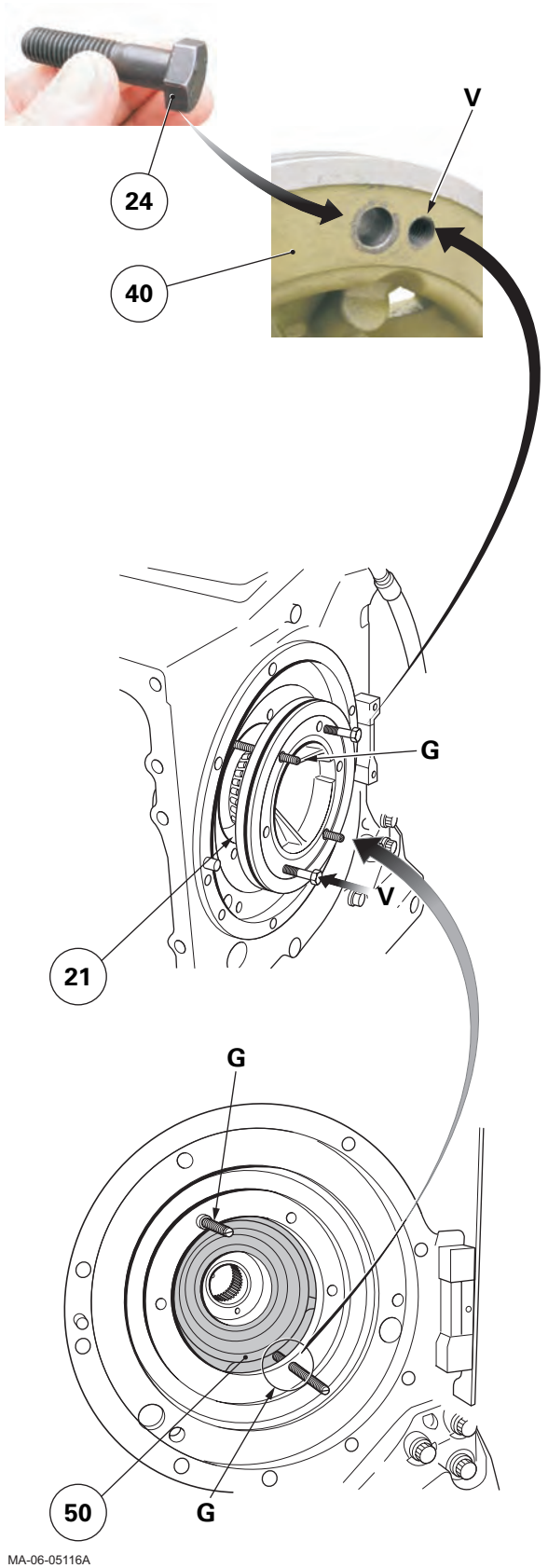

Fig. 6

Fitting new seal rings

13. Clean the parts, paying special attention to the seal grooves, without using metal or sharp tools.

14. Check for groove wear.

15. Test fit each seal (Fig. 7).

IMPORTANT: *Reused seals must be refitted into their original groove and in the position observed during operation 12.*

Check that they rotate freely on the left-hand differential support.

Remove seal rings.

16. Lightly smear the seal rings with miscible grease. Refit them definitively on the left-hand differential support (Fig. 7).

17. Check:

- that these seal rings stay at the bottom of their groove and,
- that their ends overlap correctly.

Fig. 7

Refitting the left-hand differential support

18. Check for the following on the support (Fig. 8):
- O'ring (42) in the hydraulic port of the transfer pipe;
- the new O'ring (26);
- the seal rings lightly smeared with miscible grease and correctly positioned at the bottom of their grooves;
- the bearing cone (46) and shims (48). The bearing cone (46) is free on the left-hand support.

IMPORTANT: *If the left-hand differential support and/or bearing (cone and cup) must be replaced, it is necessary to readjust the differential unit assembly. (See § H and I).*

19. Check for the locating pin (23) on the centre housing (Fig. 9).

20. Screw the G guide studs as described in operation 6.

NOTA: *The guide studs allow the left-hand support to be correctly refitted onto the centre housing without chipping or breaking the seal rings (49).*

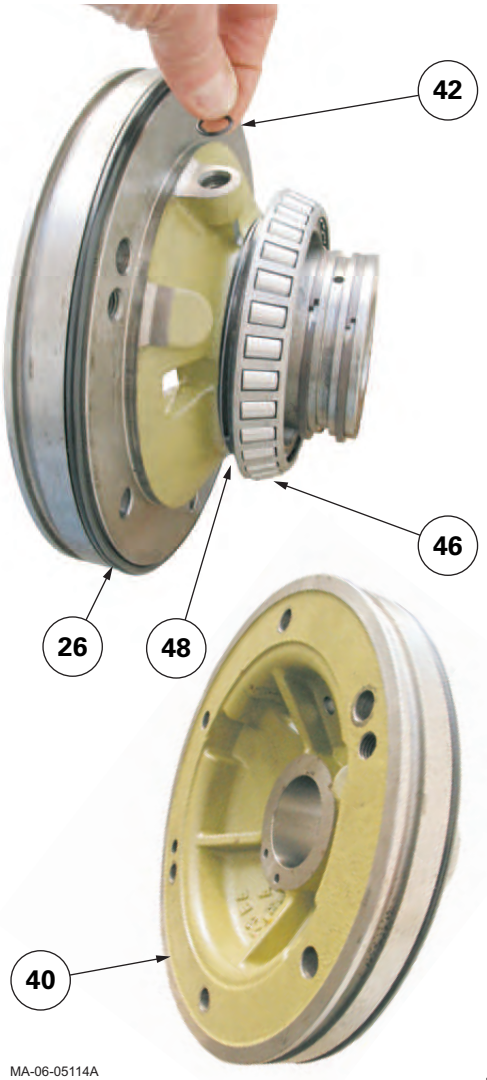

Fig. 8

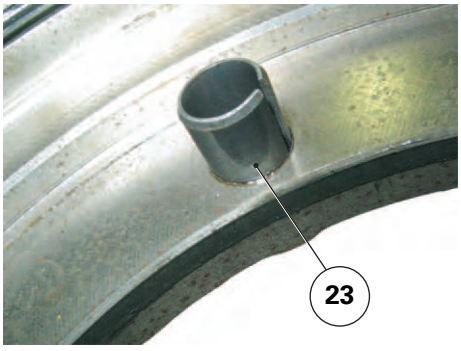

Fig. 9

21. Slide the left-hand differential support onto the G guide studs (Fig. 10). Fit it partially using a soft hammer. Continue force-fitting it with four original screws (24).

22. Remove the guide studs.

Fit the two remaining screws.

Progressively tighten the six screws in diametrically opposed pairs to a torque of 100 to 130 Nm.

23. Manually check the differential unit assembly rotates freely.

Final operations

24. Lightly smear the ground speed sensor thread with Loctite "Form A Gasket 2" or equivalent.

25. Adjust the ground speed sensor (see Fig. 11 and chapter 11 – Electronics).

IMPORTANT 1 : *If it is necessary to remove the support (1), proceed as follows:*

- *Lightly smear the concerned face of the support (1) with Loctite 510 or equivalent.*
- *Turn the offset D to the right of the centre housing (Fig. 11).*
- *Lightly smear the thread of the screws (3) with Loctite 542 or equivalent. Tighten to a torque of 25 - 35 Nm.*

IMPORTANT 2 : *The end of the sensor (2) must always be placed above the teeth of the ring gear (20).*

26. Clean any dirt from the brake piston chamber on the housing.

27. Fit the brake piston into the housing chamber using a locally made tool (see chapter 6).

28. Slide the transfer pipe (41) into the left-hand differential support (40).

29. Check the tightness of the brake piston chamber (see chapter 6).

30. Refit the trumpet housing (see chapter 6).

31. Bleed the brakes (see chapter 9).

32. Check the oil tightness of the hydraulic circuits.

33. Check the correct operation of the differential lock mechanism.

34. Carry out a road test of the brake circuit.

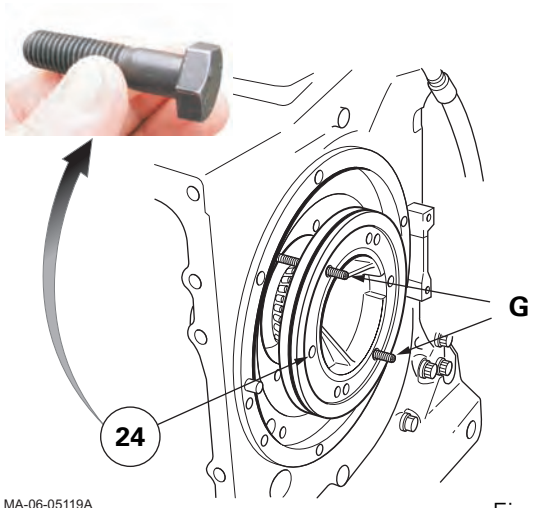

Fig. 10

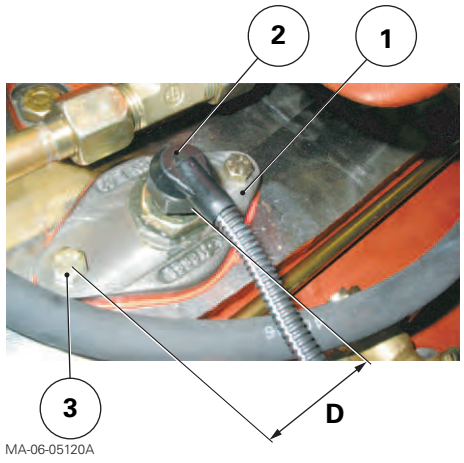

Fig. 11

C . Removing - refitting the right-hand differential support

The right-hand differential support (25) (Fig. 12) carries the shim(s) and bearing cone (27).

It does not fulfil any hydraulic function.

It has a number of characteristics in common with the left-hand differential support.

It is:

- force-fitted into the bore of the centre housing;
- positioned by a pin (23);
- fitted with tapped holes for its removal;
- fitted with a groove to house the O'ring (26) used to seal the brake piston chamber.

Preliminary operations

35. Remove the right-hand trumpet housing (see chapter 6).

36. Drive out the right-hand brake piston (see chapter 6).

37. Remove the ground speed sensor located above the centre housing, to avoid it interfering with the ring gear.

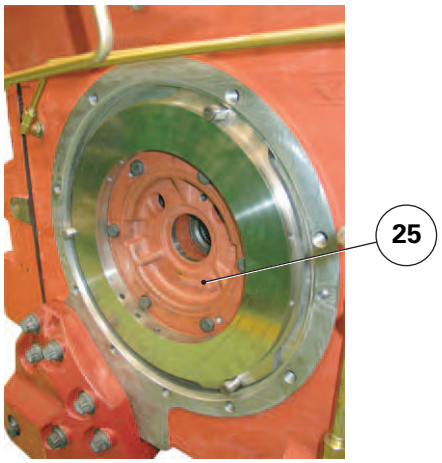

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Fig. 12

Removing the right-hand differential support (Fig. 13)

38. Remove two diametrically opposed screws (24) on the right-hand differential support (25).

39. Replace them with two G guide studs (M12, length approximately 250 mm). The end of each guide stud should rest against the differential unit (21).

NOTA: *The guide studs hold the differential assembly along the trumpet housing axis after removing the right-hand differential support.*

40. Loosen the four remaining screws (24).

41. Screw in to locally made V extraction screws (M12, length approximately 120 mm) in the tapped holes of the right-hand support.

42. Turn the V screws progressively and alternately until the right-hand centre housing support is removed.

NOTE 1: *The support is force-fitted into the bore of the centre housing.*

NOTE 2: *The tightness of the brake piston chamber is ensured by an O'ring (26) fitted between the support and the housing.*

43. Remove the right-hand support/bearing cone (27)/shim (29) assembly.

44. Discard the O'ring (26).

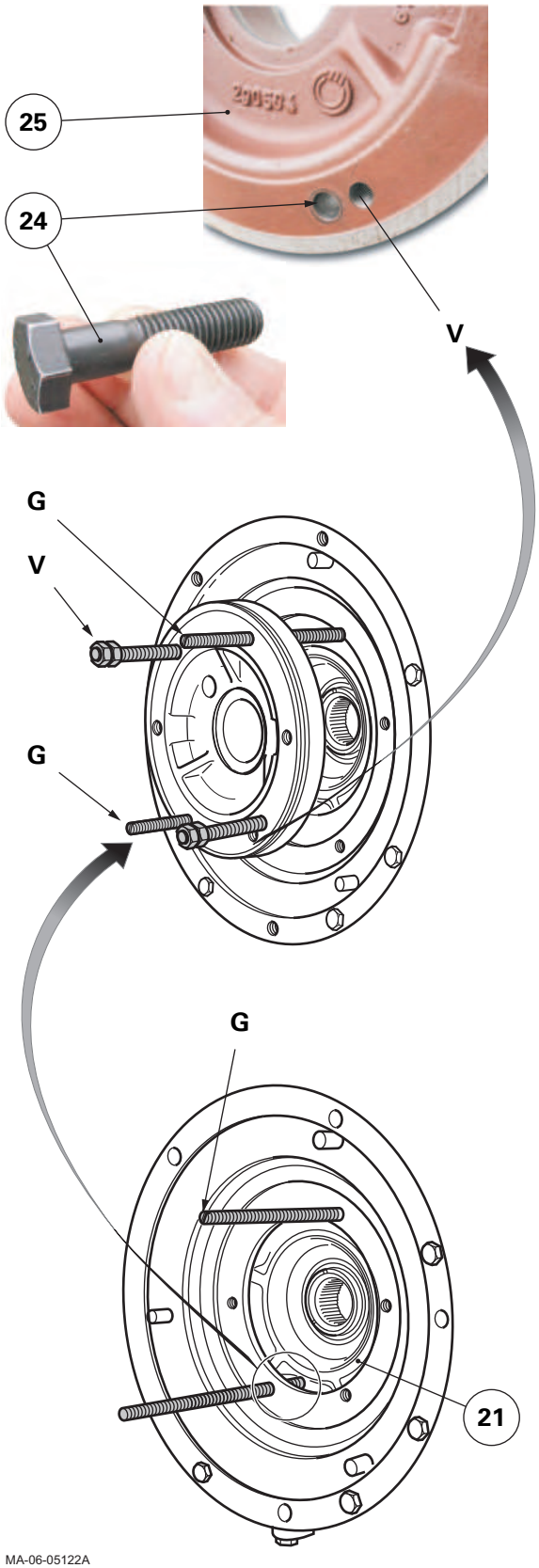

Fig. 13

Refitting the right-hand differential support

45. Check for the following on the support (Fig. 15):
- the new O'ring (26);
- the shim(s) (29);
- the bearing cone (27). The bearing cone (27) is force-fitted onto the right-hand support (25).

IMPORTANT: *If the right-hand differential support and/or bearing (cone and cup) must be replaced, it is necessary to readjust the differential unit assembly. (See § H and I).*

46. Check for the locating pin (23) on the centre housing (Fig. 14).

47. Screw the G guide studs used during removal, as described in operation 39.

48. Slide the right-hand differential support onto the G guide studs (Fig. 16). Fit it partially using a soft hammer. Continue force-fitting it with four original screws (24).

49. Remove the guide studs.

Fit the two remaining screws.

Progressively tighten the six screws in diametrically opposed pairs to a torque of 100 to 130 Nm.

50. Manually check the differential unit assembly rotates freely.

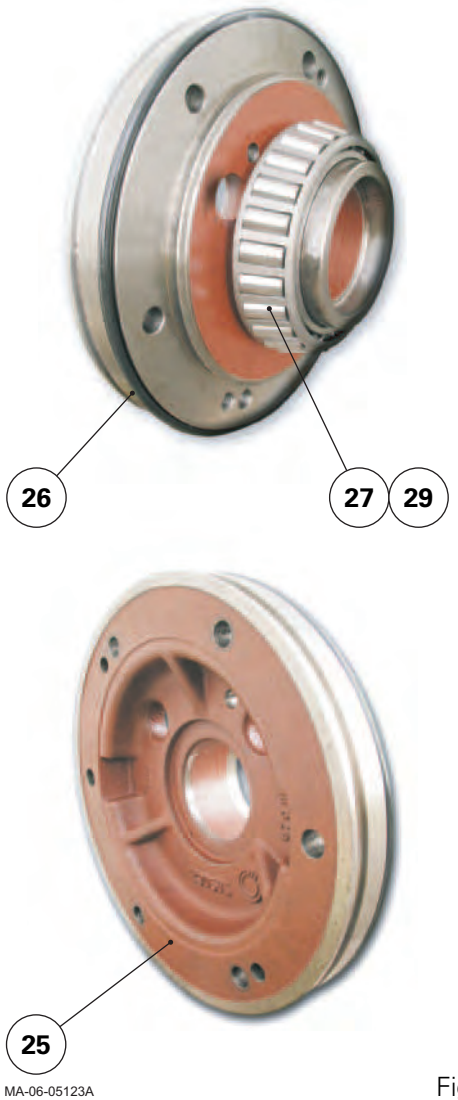

Fig. 15

Fig. 14

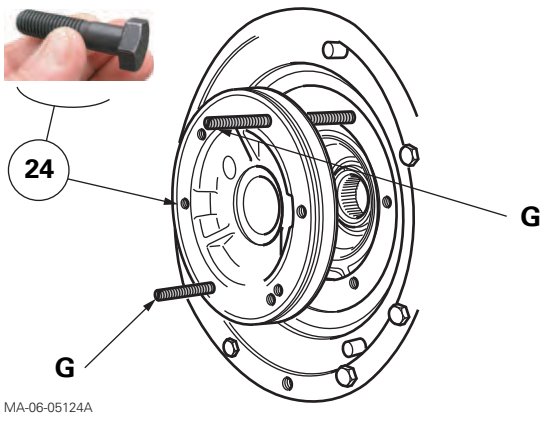

Fig. 16

Final operations

51. Lightly smear the ground speed sensor thread with Loctite "Form A Gasket 2" or equivalent.

52. Adjust the ground speed sensor (see operation 25and chapter 11 - Electronics).

53. Clean any dirt from the brake piston chamber on the housing.

54. Fit the brake piston into the housing chamber using a locally made tool (see chapter 6).

55. Check the tightness of the brake piston chamber (see chapter 6).

56. Refit the trumpet housing (see chapter 6).

57. Bleed the brakes (see chapter 9).

58. Check the oil tightness of the hydraulic circuits.

59. Carry out a road test of the brake circuit.

D . Removing - refitting the differential unit

Preliminary operations

60. Split the tractor between the gearbox and the intermediate housing (see chapter 2).

61. Separate the intermediate housing from the centre housing (see chapter 2).

62. If necessary, split the PTO housing from the centre housing (see chapter 2).

63. Remove the trumpet housing (see chapter 6).

64. Unscrew the union (44).

Raise the transfer pipe (41) to release it from the left-hand differential support (40) (see § B).

65. Drive out the brake pistons (see chapter 6).

66. Remove the ground speed sensor located above the centre housing, to avoid it interfering with the ring gear.

67. Set the 3378116M1 sling support to position 2. Tighten this support.

NOTA: *Position 2 is engraved on the sling.*

68. Support the differential unit assembly along the axis of the right- and left-hand supports (25) (40) using the sling.

Removing the differential unit

69. Screw two G guide studs on either side of the centre housing.

Remove the screws (24) from the right- and left-hand differential supports (25) (40).

Insert two V screws in the tapped holes of each support (see § B and C).

Extract the centre housing supports.

Recover the bearing cone (46) and shims (48) from the left-hand differential support (40).

70. Remove the differential unit assembly from the centre housing using the sling (Fig. 17).

Refitting the differential unit

71. Fit the auxiliary spool valve oil return pipe in the centre housing.

72. Insert the differential unit assembly into the centre housing (Fig. 17). Hold this unit along the trumpet housing axis using the sling.

IMPORTANT: *The differential unit assembly must be correctly aligned with the trumpet housings axis.*

73. Refit the right-hand differential support (25) (see § C).

74. When refitting the differential unit assembly, this latter should be re-centred in the centre housing according to the method described below. This action avoids breaking the seal rings (49) during fitting of the left-hand differential support.

Re-centring method

- Take the tool ref. 3378117M1 (see § J).
- Slide the bearing cone (46) onto the tool.
- Fit the tool/bearing cone assembly on the centre housing. Tighten this assembly using two locally made screws.
- Manually turn central screw of the tool until a hard point is felt.
- Once the differential unit assembly is centred, hold it in place to prepare for removal of the 3378117M1 tool using two guide studs screwed diametrically on the centre housing.
- Remove the tool/bearing cone assembly.

75. If replacement of one or more parts on the differential unit assembly was necessary, make the adjustments (see § H and I) then refit the left-hand differential support (40) (see § B).

If not, directly refit the right-hand differential support (40) (see § B).

Final operations

76. Lightly smear the ground speed sensor thread with Loctite "Form A Gasket 2" or equivalent.

77. Adjust the ground speed sensor (see operation 25 and chapter 11 - Electronics).

78. Clean any dirt from the brake piston chambers on the housing.

79. Fit the brake pistons into the centre housing chamber using a locally made tool (see chapter 6).

80. Slide the transfer pipe (41) into the left-hand differential support (40).

Screw the union (44).

81. Check the tightness of the brake piston chambers (see chapter 6).

82. Refit the trumpet housings (see chapter 6).

83. Fit the PTO housing (if removed) onto the centre housing (see chapter 2).

84. Fit the intermediate housing onto the centre housing (see chapter 2).

85. Assemble the intermediate housing to the gearbox (see chapter 2).

86. Check the correct operation of all the mechanical, hydraulic and electronic controls.

87. Carry out a road test.

88. Check the oil tightness of the mating faces and hydraulic unions.

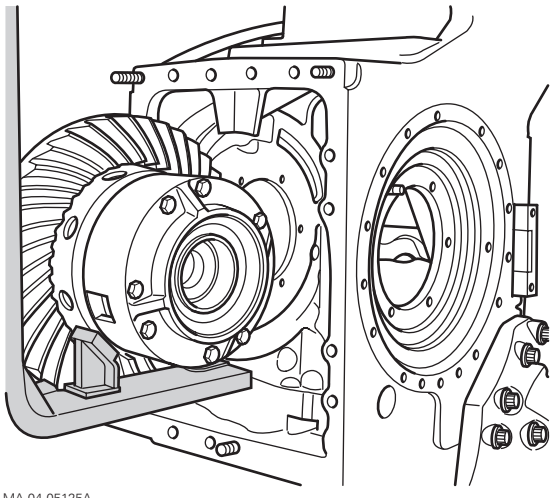

Fig. 17

E . Removing - refitting the multi-disc differential lock

Preliminary operation

89. Remove the differential unit assembly (see § D).

Removal (Fig. 18)

90. Place the differential unit assembly on a work-bench. Position the unit such that the multidisc lock is facing upwards.

91. Loosen and remove screws (51).

92. Take off cover (50).

93. Split the discs (56) and the intermediate plates (55) from the left-hand sun gear (33).

94. Gently tap the cover with a wooden wedge.
Remove piston (52).

NOTA: *The multidisc differential lock is supplied with 17 bar pressure via the left-hand support (40). A set of rings keeps the circuit sealed. For further information, see chapter 9 - Hydraulics.*

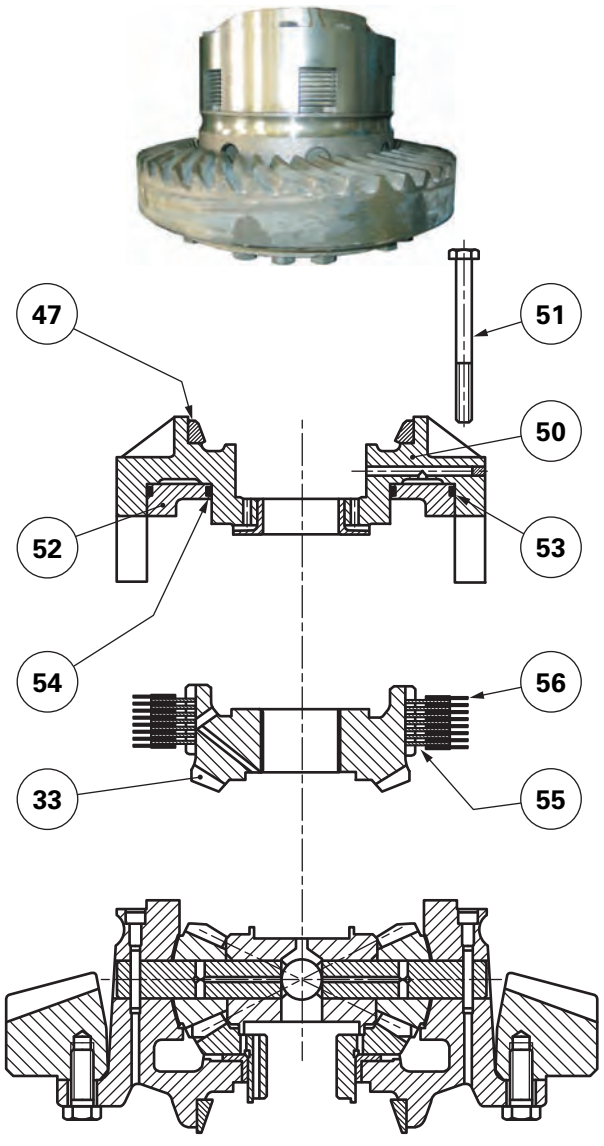

Fig. 18

Refitting

Unit (21), cover (50) and left-hand differential support (40) replacement must systematically be followed by preload adjustment of the differential unit assembly (see § I) and by pinion and ring gear backlash checking (see § H).

95. Clean the components. Replace any defective parts.

96. Ensure that the hydraulic channels of the cover (50) are not blocked.

97. Lubricate the new O'rings (53) (54). Fit them onto the piston (52).

98. Fit the piston. Tap around its rim in a circular motion using a soft hammer.

Ensure that there are no seal fragments after fitting.

99. Insert the intermediate plates (55) and friction discs (56) into the left-hand sun gear (33), starting with a friction disc and following the quantities given in the following table.

Description (Fig. 19)	Quantity
Intermediate plates (55)	7
Friction discs (56)	8

100. Position the cover (50) and piston (52) assembly.

101. Lightly smear the thread of the screws (51) with Loctite 270 or equivalent. Tighten to a torque of 100 - 130 Nm.

102. Manually check that the friction discs and intermediate plates are not overloaded.

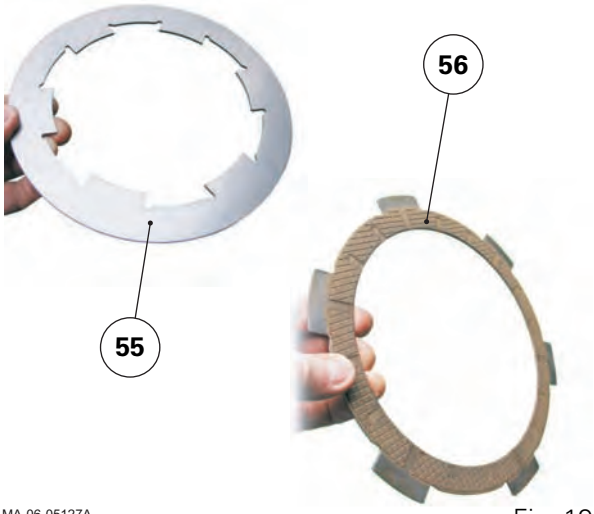

Fig. 19

Final operation

103. Refit the differential unit assembly (see § D).

F . Removing - refitting planet gears and sun gears

Preliminary operation

104. Remove the differential unit assembly (see § D).

Removing planet gears and sun gears (Fig. 20)

105. Remove the multidisc differential lock mechanism (see § E).

106. Remove the left-hand sun gear (33).

NOTA: *This sun gear carries out two special functions:*

- *it is one of the main elements of the differential system;*
- *it allows for the assembly of the series of friction discs and intermediate plates owing to its wide splined profile.*

107. Remove the screws (22) and remove the ring gear (20) (Fig. 21).

NOTA: *The ring gear must be removed as it hinders extraction of the planet gear axle shafts (35).*

108. Loosen the screws (39).

109. Remove the retaining pins (38) from the unit (21).

110. Push on an axle shaft as indicated to drive out the opposite axle shaft.

Repeat for the remaining axle shafts.

Recover the spherical washers (30).

111. Remove planet gears (31).

112. Remove the differential gear (34) and right-hand sun gear (32).

113. If necessary, extract:

- the friction rings (36) (37) (bearings for planet gears);
- the bearing cup (28) from the unit (21).

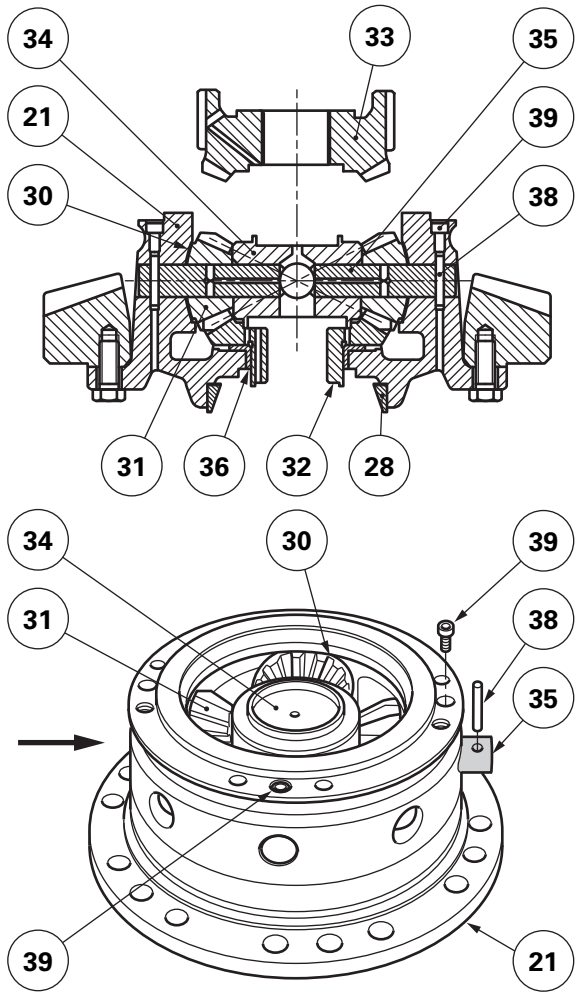

Fig. 20

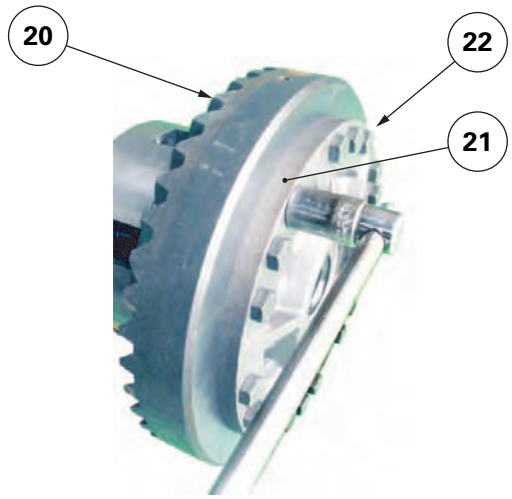

Fig. 21

Refitting planet gears and sun gears

114. If removed, force fit the bearing cup (28) against the differential unit (21).

115. If removed, lightly smear the new friction rings with Loctite 638 or equivalent.

Fit them onto the unit (21) and cover (50).

Wipe away any excess Loctite.

Check that the friction ring lubricating ports have not been blocked by Loctite after fitting.

116. Refit:

- the right-hand sun gear (32) in the friction ring (36);
- the differential yoke (34) as shown on the Overall view.

117. Check that the central channels and radial bores of the axle shafts (35) are not blocked.

118. Fit:

- the planet gears (31);
- the spherical washers (30);
- the axle shafts (35), turning the holes towards the screws (39), as shown in the Overall view.

119. Slide the needle rollers (38) into the unit (21).

120. Lightly smear the thread of the screws (39) with Loctite 270 or equivalent. Tighten the screws to a torque of 25 - 35 Nm.

121. Manually ensure that the planet gears and right-hand sun gears rotate freely.

122. Refit (see § E):

- the left-hand sun gear (33);
- the friction discs (56);
- the intermediate plates (55) ;
- the cover (50).

123. Refit the ring gear (20) (see later operations).

Final operation

124. Refit the differential unit assembly (see § D).

G . Removing - refitting the ring gear

The ring gear and drive pinion form an inseparable assembly.

Parts with the same embossed number are paired up.

The drive pinion and ring gear are available under a single reference from your spare parts department.

Removal

125. Correctly immobilise the differential unit (21)/ring gear (20) assembly.

Loosen the screws (22) (Fig. 22).

Drive out the ring gear from the differential unit (21).

NOTA: *The bore of the ring gear is slightly tight on the differential unit.*

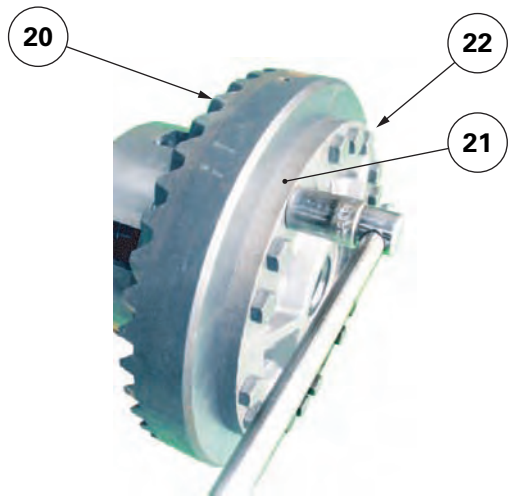

Fig. 22

Refitting

126. Clean the mating faces of the ring gear and differential unit.

127. Degrease each new screw (22) individually.

IMPORTANT: *It is essential to use screws with the appropriate tensile strength. Their reference is indicated in the spare parts catalogue.*

128. If necessary, screw a guide stud into a tapped hole on the ring gear to facilitate ring gear refitting and insertion onto the differential unit (21).

129. Lightly smear the thread of each screw with Loctite 270 or equivalent.

Tighten the screws to a torque of 240 - 320 Nm.

H . Adjusting and checking the backlash

The principle of drive pinion and ring gear backlash adjustment consists in moving the ring gear (20) to the right or left using (a) shim(s) (29), to obtain a backlash of 0.15 to 0.45 mm.

Disassembly

130. Extract the bearing cone (27) from the support (25) using a suitable extractor.

Pre-adjustment (Fig. 23)

131. Determine the thickness of the shim(s) E required to obtain the correct backlash, according to the formula **E = Dc + 0.30 mm** where

E Thickness of shim(s) (29) to be fitted

Dc : Ring gear offset (example on Fig. 23: 0) is embossed on the outer diameter of the ring gear after the pairing number and letter (example on Fig. 23: 66F16). The Dc value is between 0 and - 0.60.

NOTA: *When calculating E, do not take the negative sign preceding the Dc into consideration.*

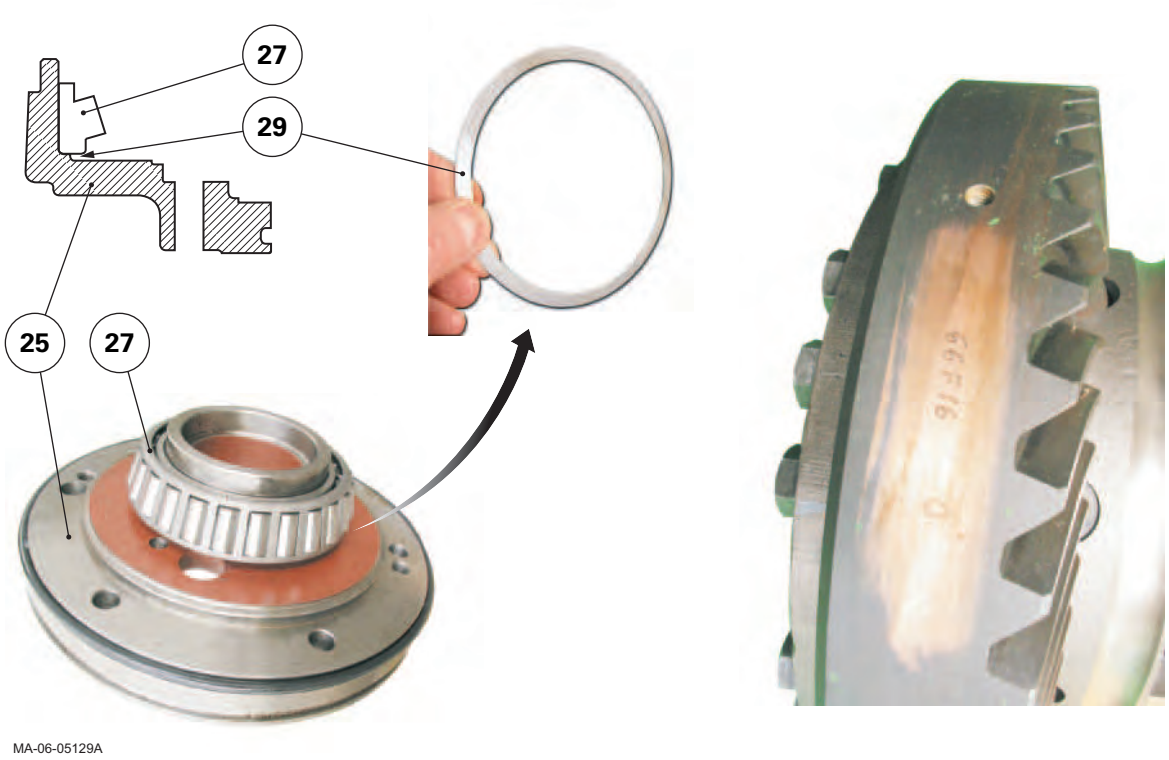

Fig. 23

132. Fit the previously selected shim(s) (29) on the right-hand differential support (25).

Force fit the bearing cone (27) up against the shim(s) using a press.

133. Refit the differential unit assembly (see § D). Shim (see § I).

Check/adjustment

134. Put a dial gauge feeler pin half-way along a ring gear tooth through the rear opening of the centre housing (Fig. 24).

135. Check that the backlash between the drive pinion and ring gear remains within **0.15 and 0.45 mm** over three equidistant point on the ring gear.

IMPORTANT: *If the value is incorrect, proceed as follows:*

- *Decrease or increase the thickness of the shim(s) (29) determined during pre-adjustment. Fit the new shim(s).*
- *Shim the differential unit again in order to obtain the preloading of bearings (27) (28) and (46) (47) (see § I).*
- *Re-check the backlash between the drive pinion and the ring gear.*

136. Continue reassembly operations after having made the final adjustments.

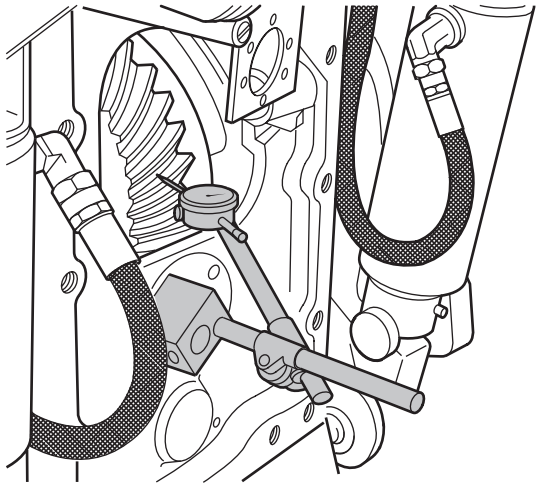

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Fig. 24

I . Shimming the differential unit assembly

IMPORTANT: *The differential unit assembly must be shimmed after replacement of:*

- *the centre housing (45);*
- *the bevel gear (drive pinion/ring gear);*
- *the differential unit (21) and its cover (50);*
- *the right- and left-hand differential supports (25) (40);*
- *the bearings (27)(28) and (46)(47).*

137. Check for the presence of the shim(s) (29) (backlash, see § H) between the bearing cone (27) and the right-hand differential support (25).

Preparing for shimming

138. Fit the differential unit assembly in the centre housing using the 3378116M1 tool (D and J).

139. Refit the right-hand differential support (25) on the centre housing (see § C).

140. Remove from the left-hand support (40):

- the bearing cone (46);
- the shim(s) (48).

141. Slide the bearing cone (46) onto the 3378117M1 tool (see § J).

Fit the tool and bearing cone onto the centre housing using two locally made screws (Fig. 25).

142. Tighten the central screw to 10 Nm (Fig. 25).

Turn the ring gear several times to seat the cones (27) (46) correctly in the bearing cups (28) (47).

Check the tightening torque of the central screw of the tool once again.

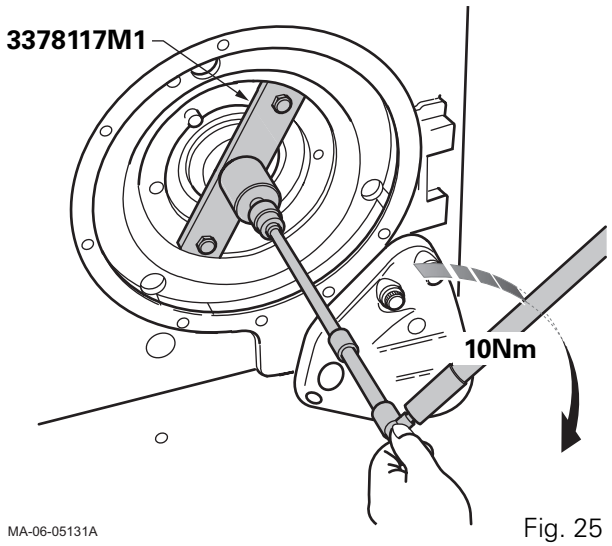

Fig. 25

Shimming

Dimension to be measured on the centre housing (45) (Fig. 26, Fig. 27)

143. Measure dimension **B** at two diametrically opposed points using a suitable depth gauge. Take the average of the two measurements.

144. Determine dimension **C** between the bearing cone (46) and the mating face of the left-hand differential support (40) on the centre housing (Fig. 26) according to the formula **C = B - 10 mm** (where 10 mm is the thickness of tool ref. 3378117M1).

Dimension to be measured on the left-hand differential support (40) (Fig. 28, Fig. 29)

145. Measure dimension **Y** at two diametrically opposed points (Fig. 28) using a suitable depth gauge and ruler. Take the average of the two measurements.

146. Calculate distance **E** between the mating face of the bearing cone (46) and the left-hand differential support (40) (Fig. 29) according to the formula **E = C - Y**.

147. Complete E with a thickness of shims (48).

148. Add an extra thickness of shims between 0.05 and 0.15 mm in the completed space E to obtain a pre-load **P2 = 0.05 to 0.15 mm** (Fig. 29).

NOTA: *Preferably shim to the maximum tolerance.*

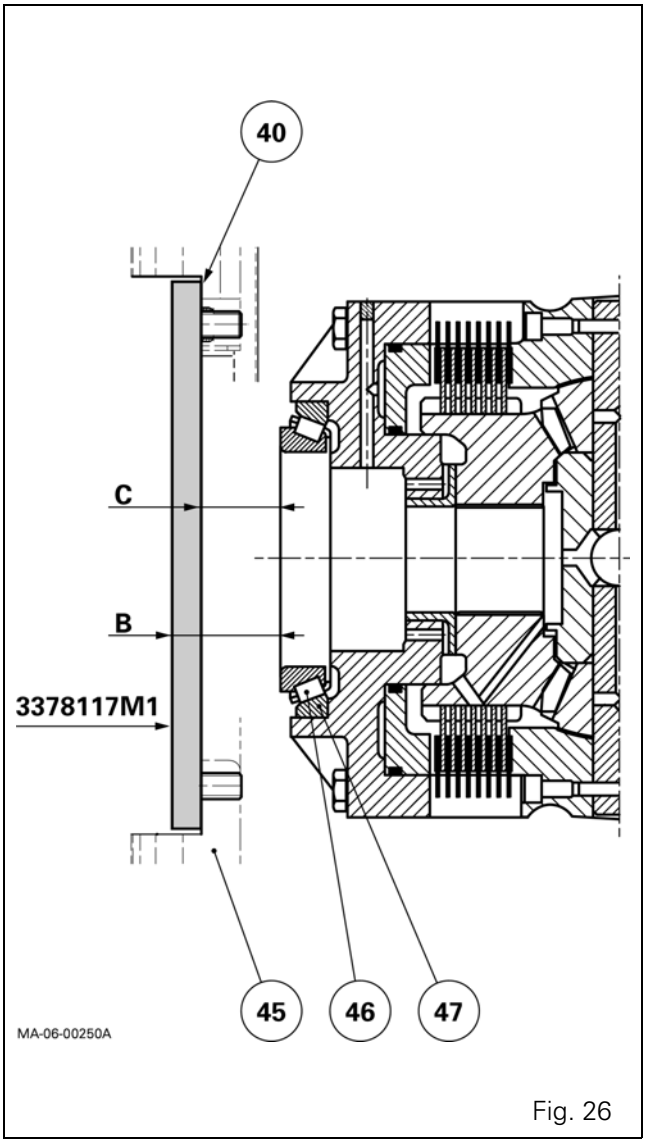

Fig. 26

Final operations

149. Remove tool ref. 3378117M1 and the bearing cone (46).

150. Place the shims determined in operation 148 on the left-hand differential support (40).

151. Centre the differential unit assembly.

Refit the left-hand differential support (see § D).

152. Perform the final operations described in paragraph D.

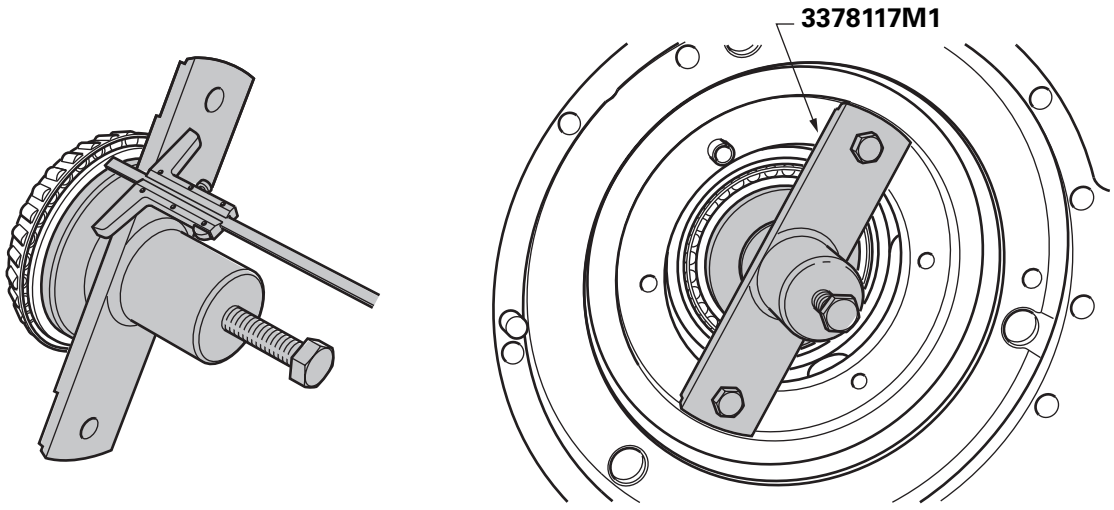

Fig. 27

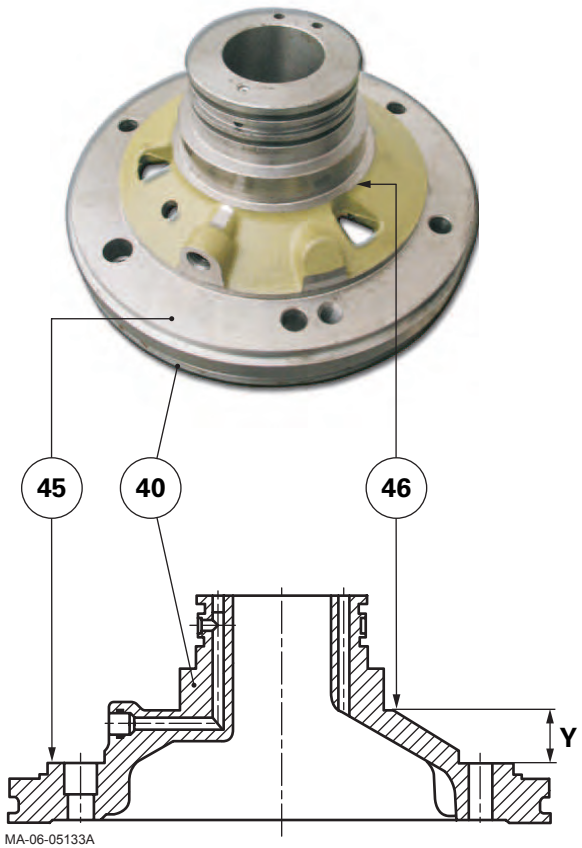

Fig. 28

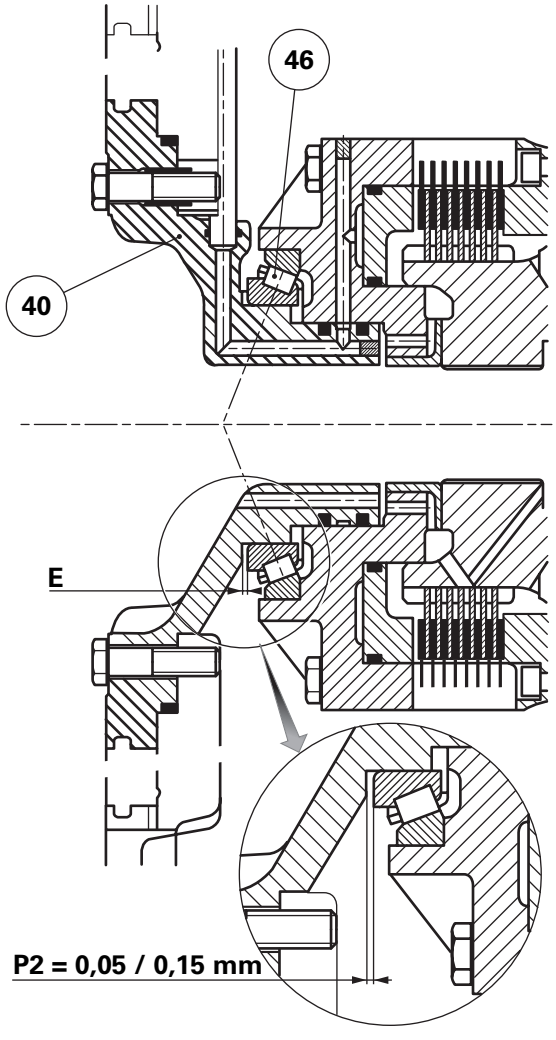

Fig. 29

J . Service tools

Tools available in the AGCO network

- 3378116M1: Sling for removing - refitting the differential unit assembly (Fig. 30)
- 3378117M1: Shimming tool (Fig. 31)

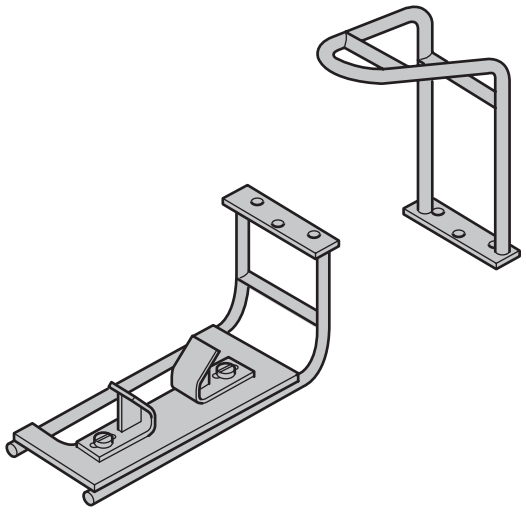

Fig. 30

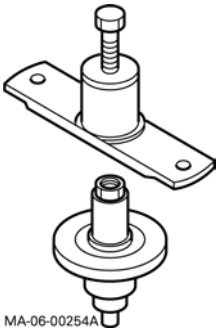

Fig. 31

6C17 - GPA30 - Hitch and linkage mechanisms

CONTENTS

A . General

The lift shaft (7) is fitted in the right- (2) and left-hand (16) supports/bearings (Fig. 1).
It is splined at its ends to allow fitting and driving of the right- (5) and left-hand (15) lift arms (Fig. 1).

The lift arm (5) is positioned by locating pin (4) inserted into the cam (8), itself splined to the shaft.

The sensor (11) informs the linkage calculator of the angular position of the cam (8), driven by the lift shaft (7).

A friction ring (10), inserted into each support/bearing, supports the lift shaft and allows its to rotate partially.

Tightness is provided by:
- The O'rings (1) (3) fitted on either side of each support/bearing;
- An O'ring (19) between the centre housing and the left-hand support/bearing (16) for channel C.

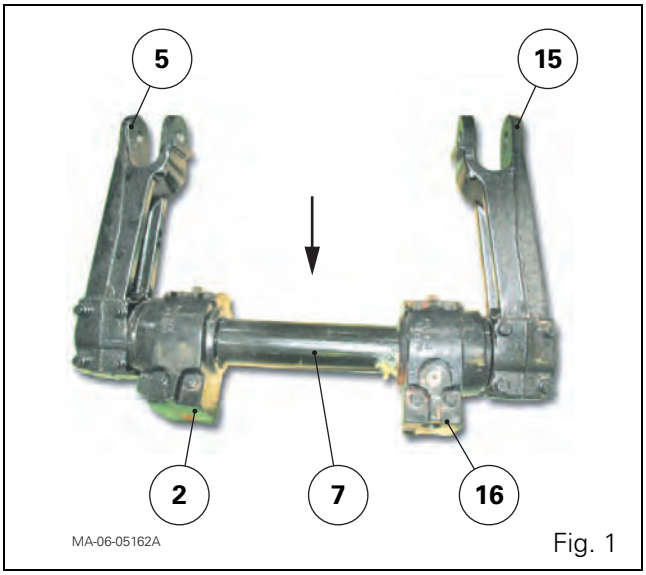

Fig. 1

During loaded linkage lifting and lowering, each drawbar lower support/shoe (8) (Fig. 2) is subjected to significant load: It is therefore positioned by a locating pin (9) and attached with screws (10) to the centre housing.

Each support/shoe is fitted with a draft sensor (4) held by locking plate (13), spacers (11) and bolts (12) (Fig. 2). A guard (5) fixed to the support/shoe, protects the draft sensor (4) from any impacts.

The version without lift eliminates all elements required for the lift function (lift shaft and arms, etc.) and replaces the supports/bearings with plates. The trumpet housing and centre housing venting function remains present.

Parts list (Fig. 3)

(1) Seal
(2) Right-hand support/bearing
(3) Seal
(4) Locating pin
(5) Right-hand lift arm
(6) M16 x 115 screws and washers
(7) Lift shaft
(8) Lift cam
(9) M16 x 130 screws and washers
(10) Friction rings
(11) Position sensor
(12) Nut
(13) Locating pins
(14) Grease nipple
(15) Left-hand lift arm
(16) Left-hand support/bearing
(17) Grooved spacer
(18) Breather pipe
(19) O'ring
(32) O'ring

Legend

A Left-hand support/bearing
B Right-hand support/bearing
C Vent hose
D Version without lift
O Vent port

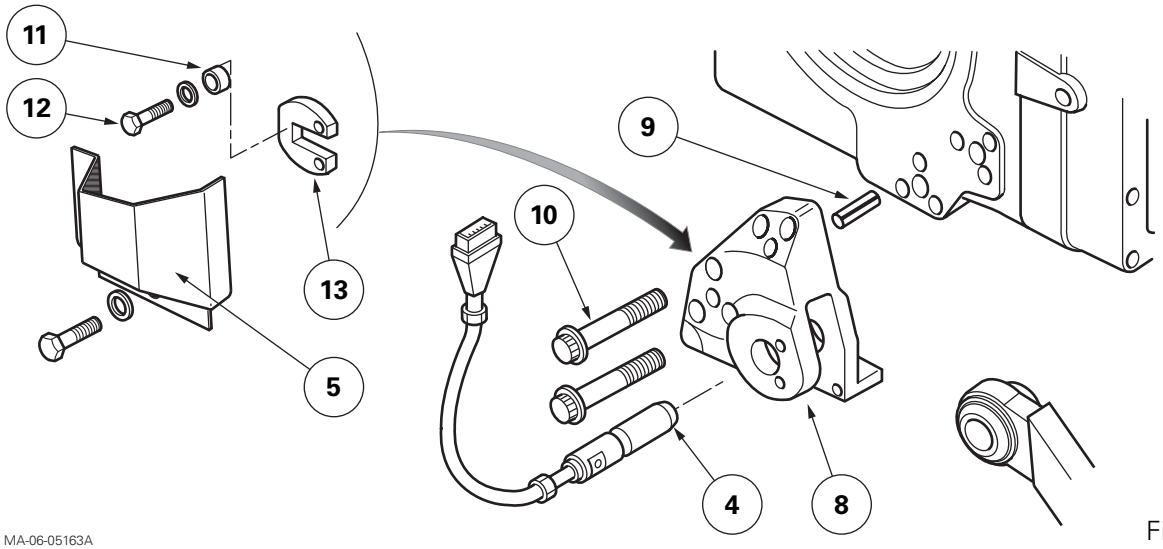

Fig. 2

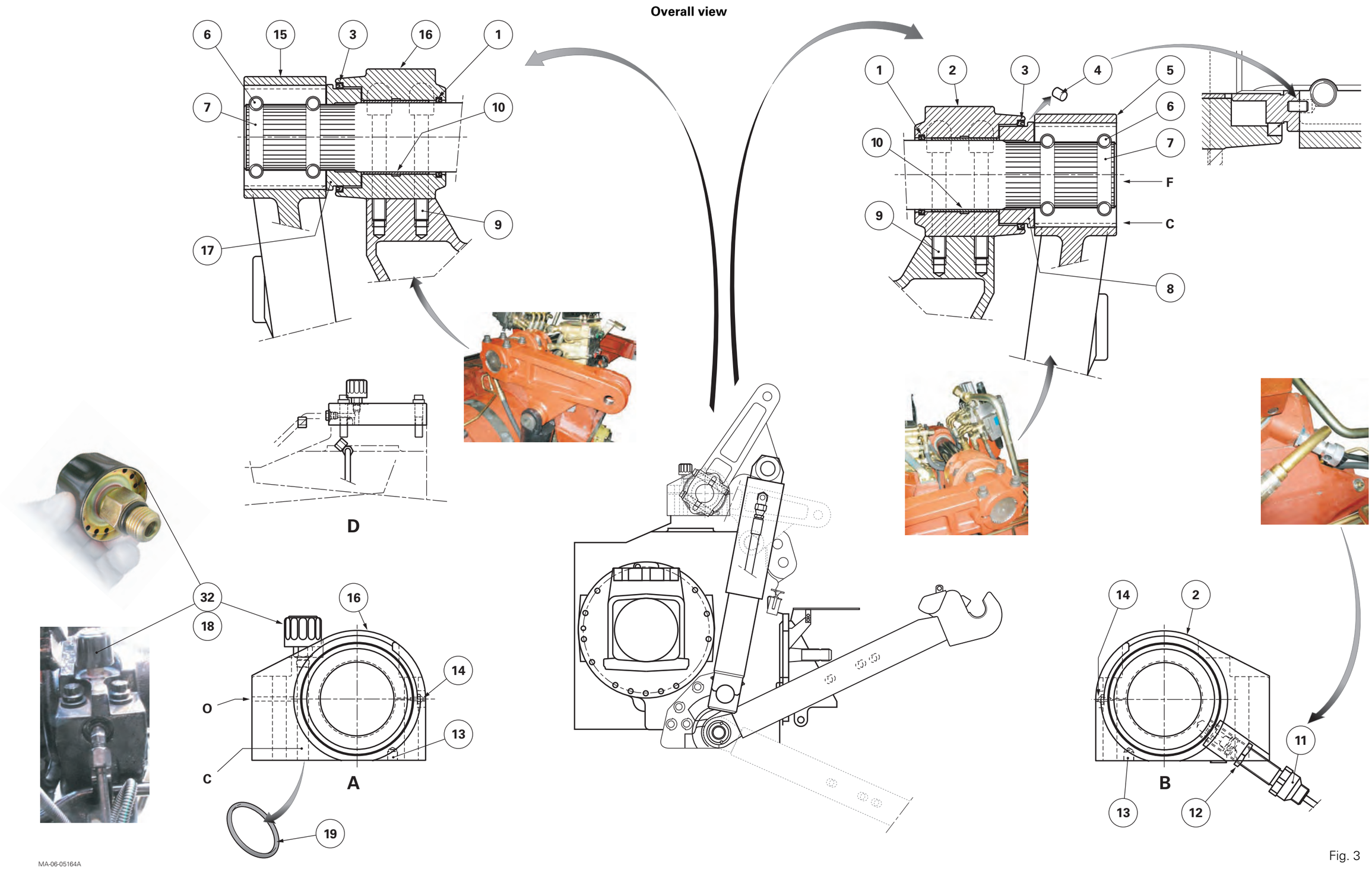
Overall view
6
15
3
16
1
7
10
9
17
1
2
3
4
5
6
7
10
F
C
9
8
D
32
18
16
14
O
13
C
A
19
14
2
11
B
13
12
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Fig. 3

Parts list (Fig. 4)

(1) Seal
(2) Right-hand support/bearing
(3) Seal
(4) Locating pin
(6) M16 x 115 screws and washers
(7) Lift shaft
(8) Lift cam
(9) M16 x 130 screws and washers
(10) Friction rings
(11) Position sensor
(12) Nut
(13) Locating pins
(14) Grease nipple
(15) Left-hand lift arm
(16) Left-hand support/bearing
(17) Grooved spacer
(18) Breather pipe
(19) O'ring
(29) Friction washer
(32) O'ring

Legend

D Version without lift

Exploded view

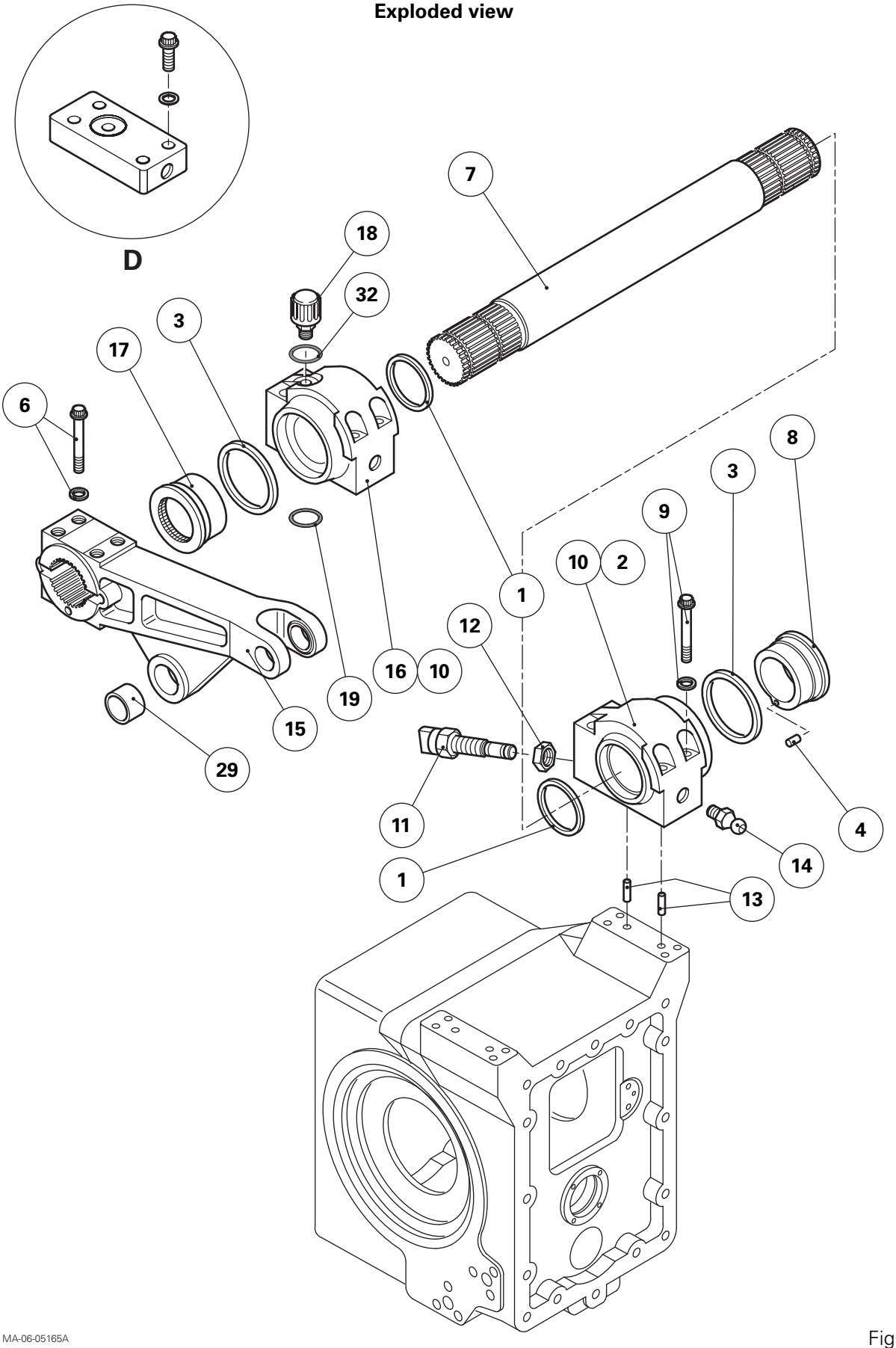

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Fig. 4

B . Attaching a ram

Parts list (Fig. 5)

(20) Upper pin
(21) Cotter pin
(22) Ram
(23) Washers
(24) Grease nipples
(25) Snap ring
(26) Washer
(28) Circlip
(29) Friction ring

Legend

A Version for Heavy Duty Sealed trumpet housing (washer (26): thickness 6 mm)
B Version for trumpet housing with composite drive unit (washer (26): thickness 15.5 mm)

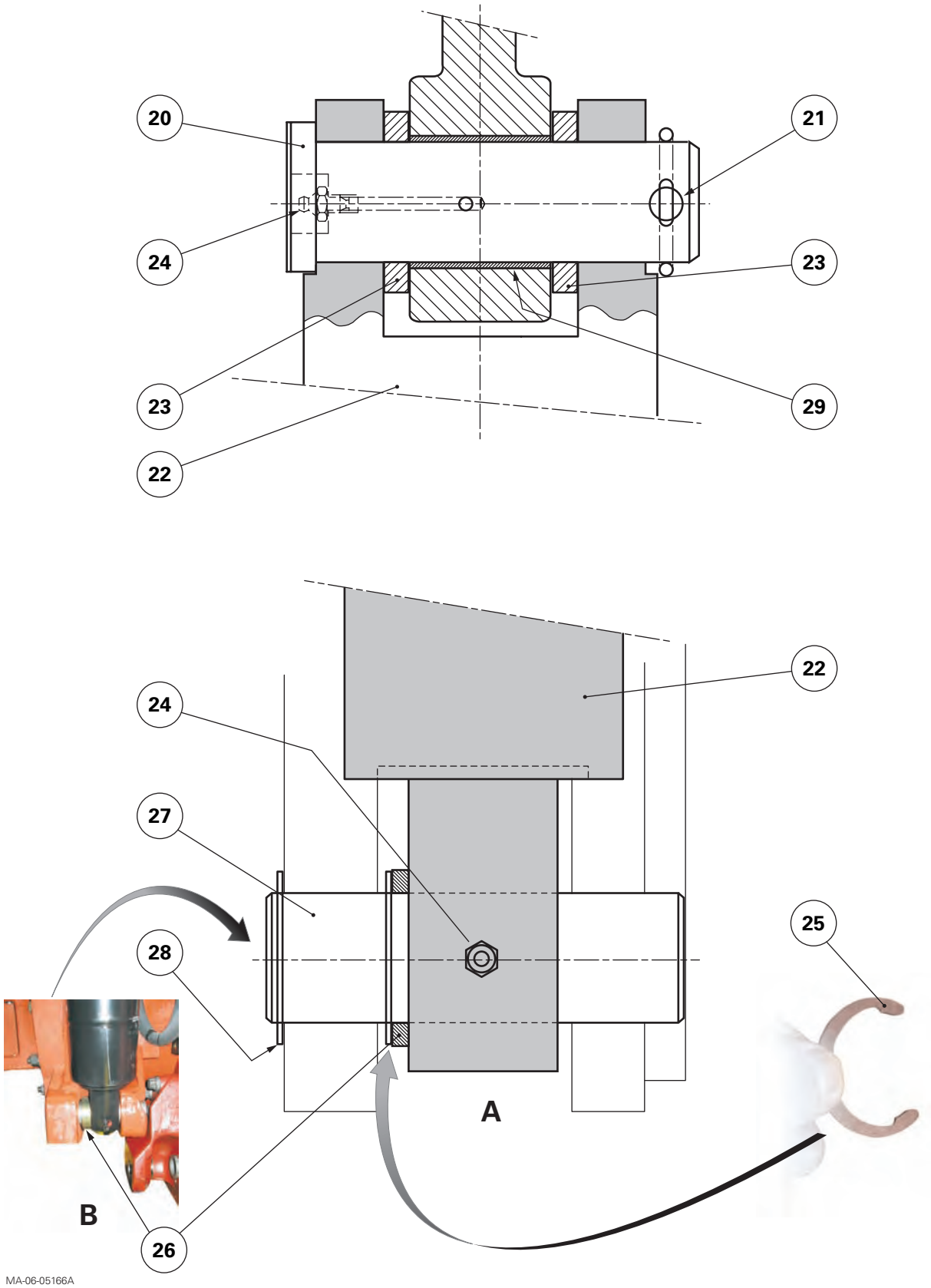

Fig. 5

C . Preliminary operations

1. Immobilise the tractor.
   Chock the front wheels.
2. Start the engine.
   Operate the tractor electronic system to place the lift arms in the maximum down position.
3. Only if the is not enough room to perform the servicing operations:
   - remove the rear wheel(s) (as required);
   - place one or two safety stands (as required).
4. Identify and disconnect the auxiliary spool valve hydraulic hoses (if necessary).
5. Disconnect the L3 connector (Fig. 6).
6. Loosen the position sensor (11) nut (12). Unscrew and remove the sensor.
7. Remove (Fig. 7):
   - the pins (20) of the upper ram (22) ;
   - the lift rod pins (2).

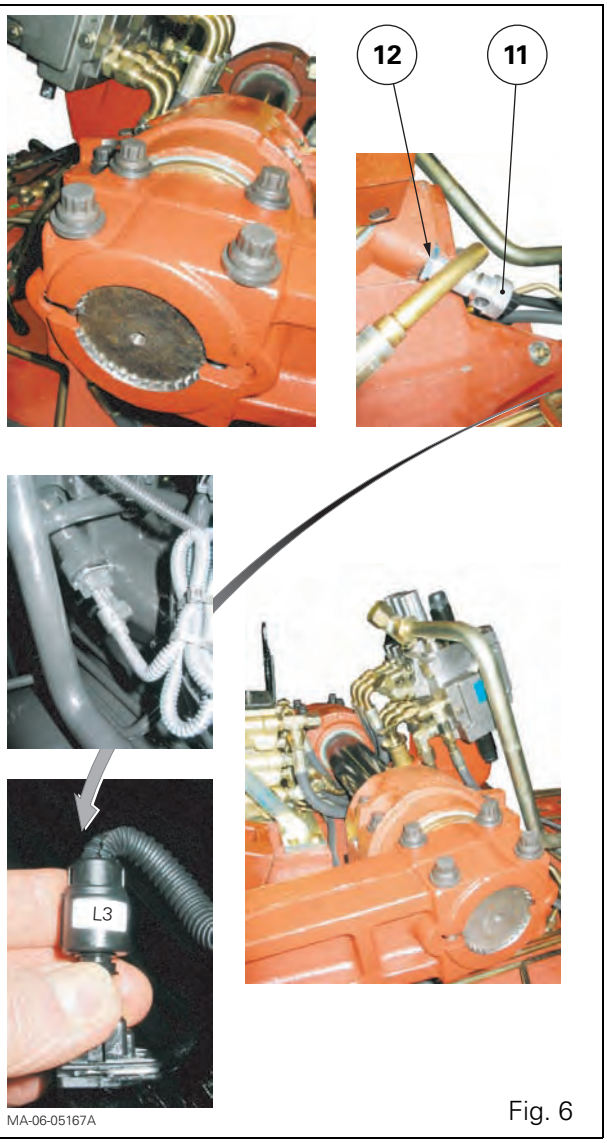

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Fig. 6

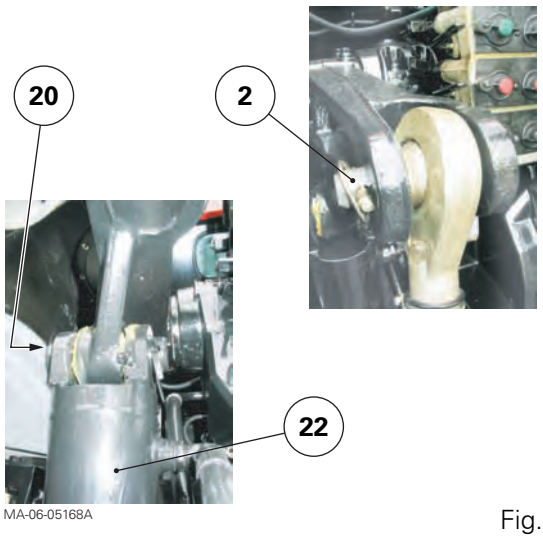

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Fig. 7

D . Removing - refitting the lift arm/shaft and supports/bearings assembly

Removing the lift arm/shaft and supports/bearings assembly

8. Remove the left-hand support/bearing (16) (Fig. 8):
- the breather (18);
- the tube and union screwed into port O.

9. Unscrew and remove the screws (9) from each support/bearing (2) (16).

10. Sling together and remove the assembly (1) (Fig. 9) (lift arm/shaft and supports/bearings) using a local sling or two suitable straps.

11. Remove the O'ring (19). Discard it.

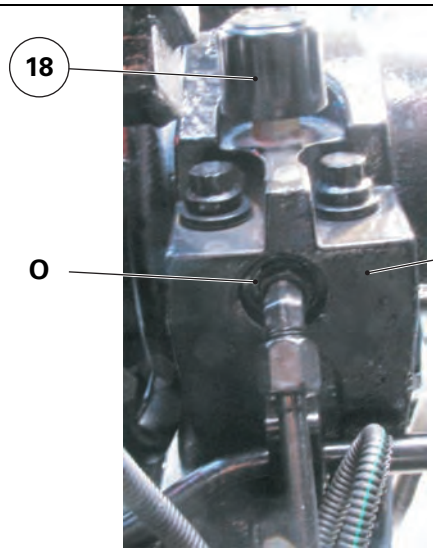

Fig. 8

Separating the supports/bearings (2) (16) from the lift arm (7)

12. Place the assembly (1) (lift arm/shaft and supports/bearings) in a spacious transit area (Fig. 9).

13. Release and remove the screws (6).

14. Note the angular position of the lift arms (right-hand (5) and left-hand (15)) on the shaft (7). Remove them.

15. If necessary, extract the friction rings (29) (Fig. 10).

16. Take off:
- the lift cam (8);
- the splined spacer (17).

17. Visually mark the position (right- and left-hand) of the supports/bearings (2) (16) on the lift shaft. Take them out of the latter without damaging the seals (1).

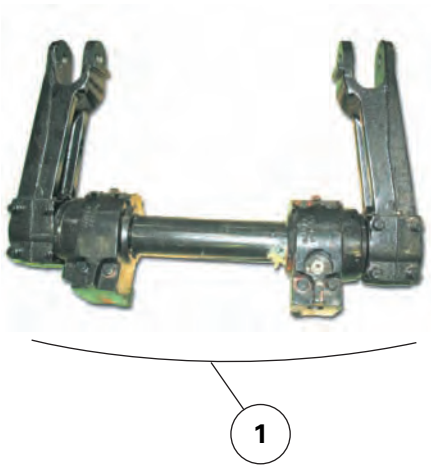

Fig. 9

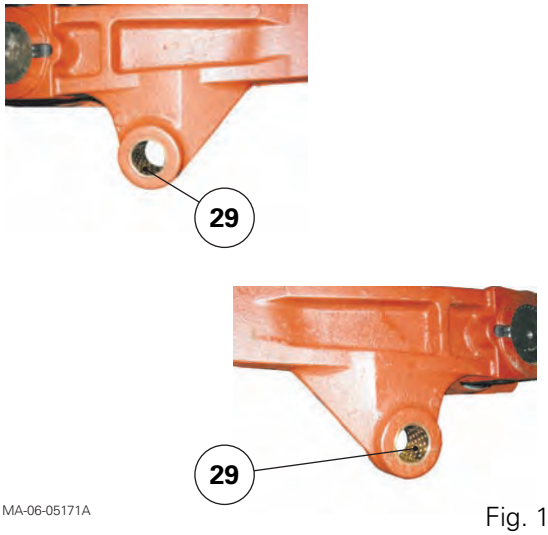

Fig. 10

Refitting the support/bearing (2)

18. Clean and check all components. Replace any defective parts.

19. Cover the concerned lift shaft (7) splines using protector ref. 3378123M1 (see Fig. 11 and § H).

20. Slide the right-hand support/bearing (2) onto the lift shaft (Fig. 11).

21. Check for the presence of locating pin (4) on the lift cam (8) (Fig. 11).

22. Lightly grease the rim of the lift cam with bearing grease.

23. Position the cam (8) on the lift shaft (7), positioning the locating pin (4) so that it is visible (Fig. 11).

Slide the cam over the shaft splines until it makes contact with the support/bearing (2) (Fig. 11).

24. If necessary, refit the friction ring (29) using the original pin as a fitting tool: the edge of the ring must be virtually flush with face F (Fig. 12).

25. Mark the position of locating pin (4) with a line of paint on cam (8) (Fig. 11) and lift arm (5) (Fig. 12).

26. Lightly coat the splined ends of the lift shaft with AS767 graphite grease or equivalent.

27. Refit the lift arms (5) by placing:

- the paint mark on the arm facing that on the cam (8);
- the C chamfer on the lift arm (5) virtually flush with face F of the shaft (7) (Fig. 13).

28. Fit the washers on the screws (6).

Lightly smear the thread of each screw with Loctite 270 or equivalent. Tighten the screws to a torque of 240 - 320 Nm.

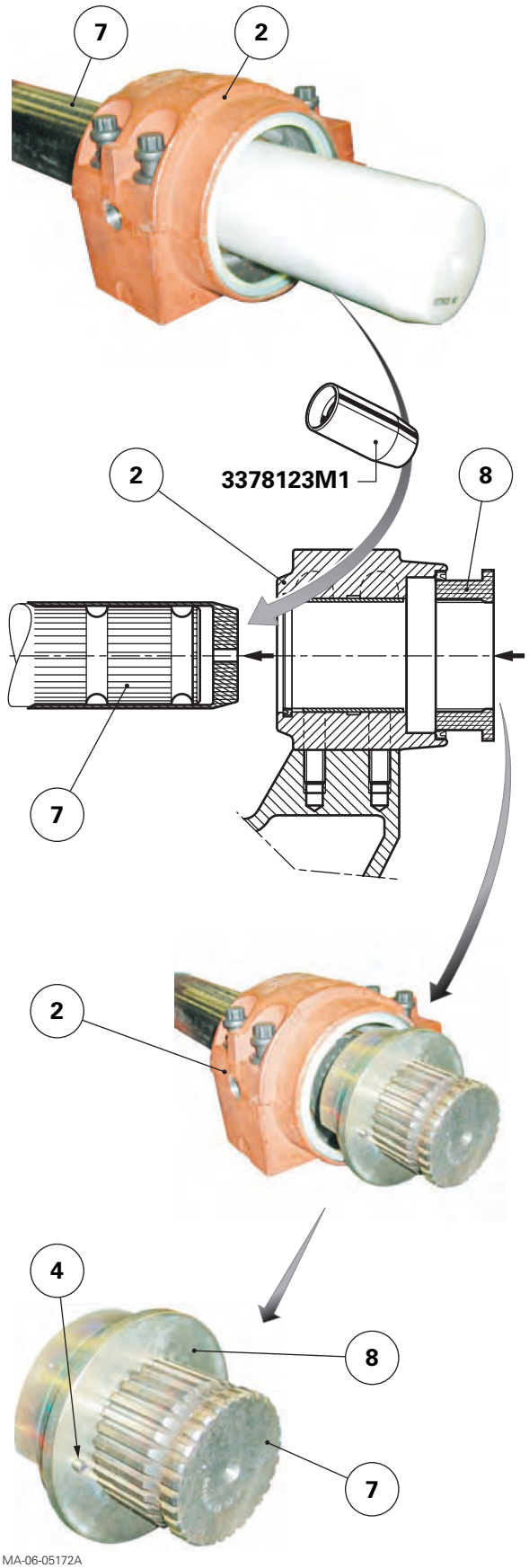

Fig. 11

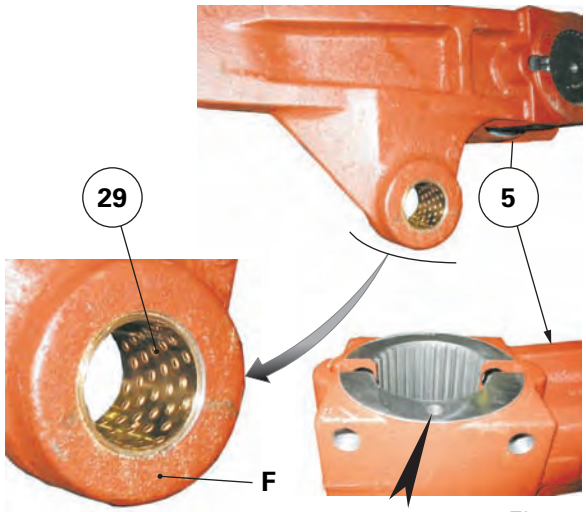

Fig. 12

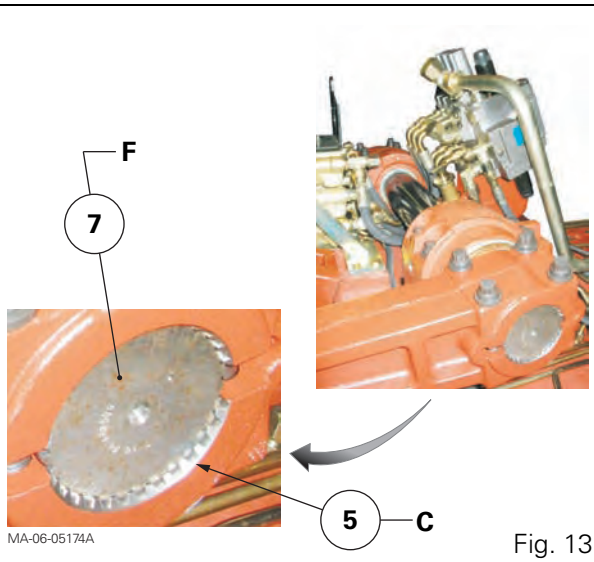

Fig. 13

Refitting the support/bearing (16)

29. Clean and check all components. Replace any defective parts.

30. Cover the concerned lift shaft (7) splines using protector ref. 3378123M1 (see Fig. 14 and § H).

31. Slide the left-hand support/bearing (16) onto the lift shaft (Fig. 14).

32. Lightly grease the rim of the lift cam with bearing grease.

33. Slide the splined spacer (17) over the shaft splines until it makes contact with the support/bearing (16) (Fig. 14).

34. If necessary, refit the friction ring (29) using the original pin (20) as a fitting tool: the edge of the ring must be virtually flush with face F (Fig. 15).

35. Lightly coat the splined ends of the lift shaft with AS767 graphite grease or equivalent.

36. With the help of an operator, push on the lift arm (5) to avoid it moving during lift arm (15) fitting.

Align lift arm (15) with lift arm (5).

Adjust the axial position of the lift arm (15) on the shaft (7) splines such as to obtain a clearance **J** of **0.40 mm** considering that the adjustment tolerance is of 0.30 to 0.50 mm according to Fig. 16.

37. Fit the washers on the screws (6).

Lightly smear the thread of each screw with Loctite 270 or equivalent. Tighten the screws to a torque of 240 - 320 Nm.

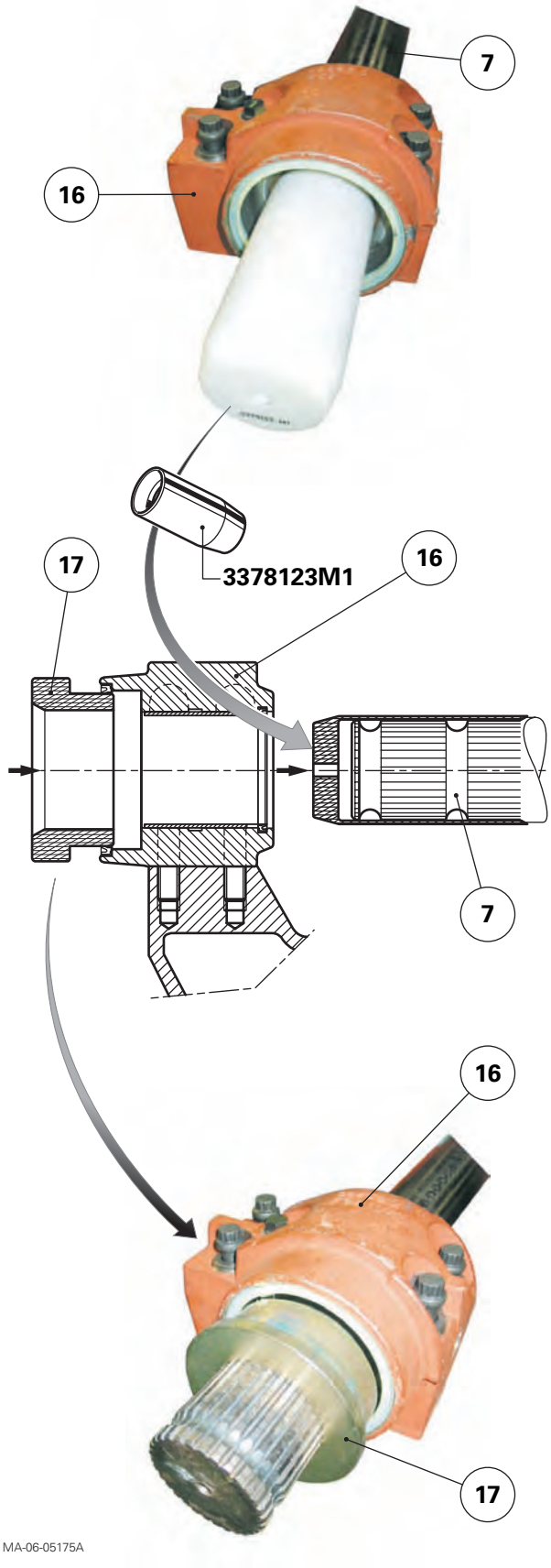

Fig. 14

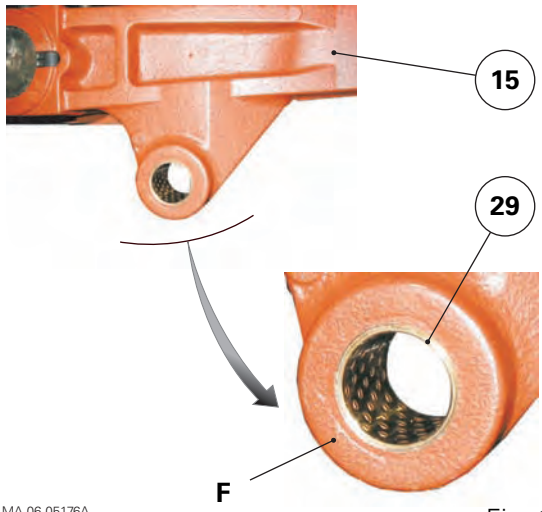

Fig. 15

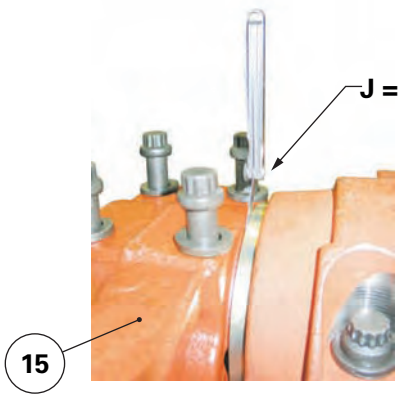

Fig. 16

Refitting the lift arm/shaft and supports/bearings assembly

38. Check the presence on the centre housing (45) (Fig. 17) of:
- the supports/bearings locating pins (13);
- the O'ring (19) for left-hand support/bearing seal.

39. Sling together and refit the lift arm/shaft and supports/bearings assembly using a local sling or two suitable straps.

40. Position the supports/bearings on the locating pins (13) of the centre housing.

41. Fit the washers on the screws (9).

Lightly smear the thread of each screw with Loctite 270 or equivalent. Tighten the screws to a torque of 240 - 320 Nm.

42. Refit the O port union and pipe of the left-hand support/bearing (16).

Clean the breather (18), or replace if necessary.

Fit and tighten the breather, with its new O'ring (32), on the left-hand support/bearing (16).

43. On the lift shaft, manually check:
- the axial clearance;
- the partial rotation of the shaft.

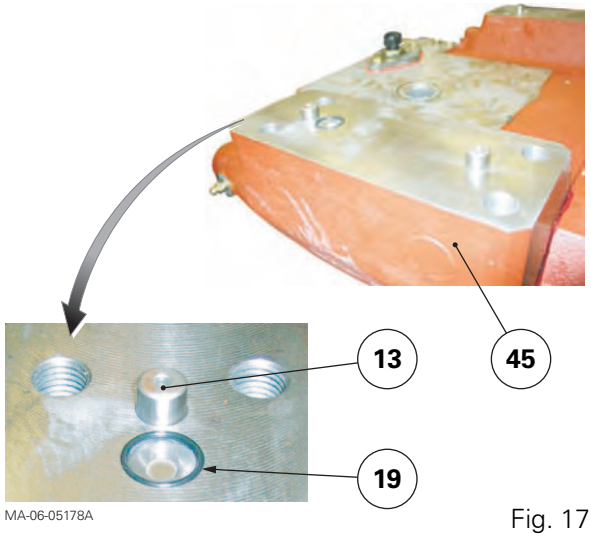

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Fig. 17

E . Removing - refitting the lift supports/bearings

Removal

44. Remove the position sensor (11) from the right-hand support/bearing (2).

45. Drive out the seals (1) (3) (dust seal).

Remove the grease nipples (14) from each support/bearing (2) (16) (Fig. 19).

NOTA: *Do not drive out the friction rings (29) from each support/bearing (Fig. 18) as they are not available in the spare parts catalogue.*

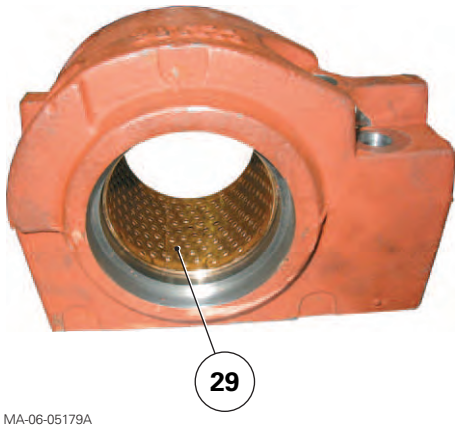

Fig. 18

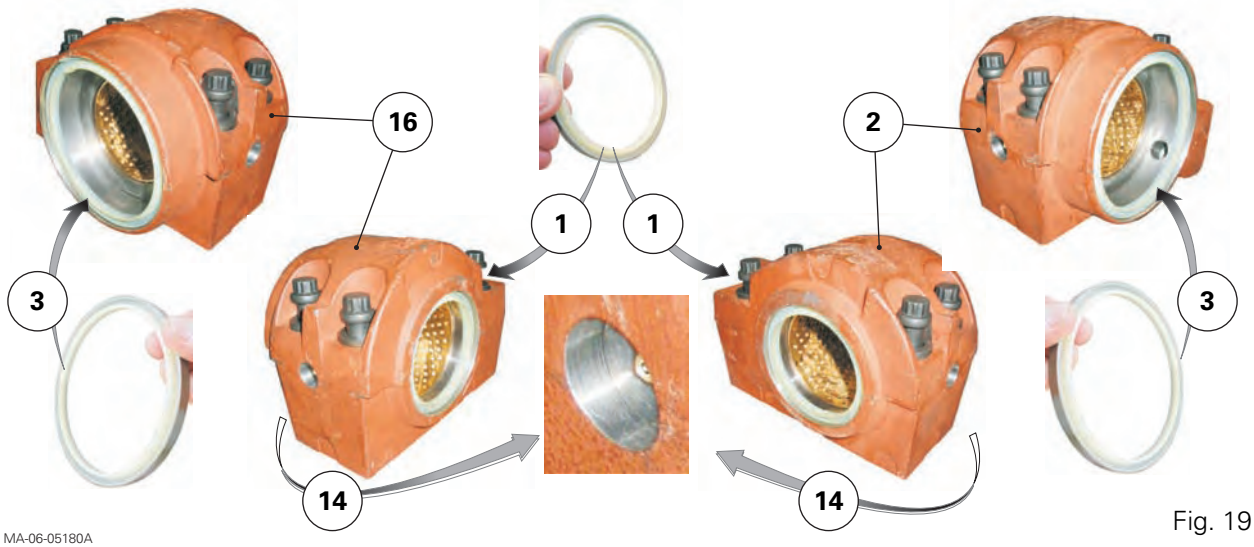

Fig. 19

Refitting

46. Visually check the condition of the support/bearing friction rings (29): if any friction ring is damaged, replace the relevant support/bearing.

Confirm the previous check by sliding each support/bearing onto the lift shaft (7): if a support/bearing shows excessive clearance, replace it.

47. Check that the grease nipple port on each support/bearing opens into the bore of the friction ring.

48. Lightly smear the outer rim of the seals (1) (3) (dust-seal) with Loctite 242 or equivalent.

Turn the seal lips towards the outside of their respective supports/bearings.

Fit the seals on their respective shoulders using the tool ref. 3378124M1 (see § H).

49. Fit new grease nipples (14).

F . Final operations

50. Refit the lift rod pins (2) (Fig. 7).

51. Slide the washers (23) on either side of the lift arms as the upper pins (20) of rams (22) are being fitted.

Fit new grease nipples (24) (Fig. 5).

52. Lightly smear the thread of the position sensor with Loctite FORM GASKET 2. Adjust this sensor.

53. If removed, re-connect the flexible hoses of the auxiliary spool valves (according to marks).

54. If the wheel(s) has (have) been removed:

- refit it (them);
- tighten the screws or nuts to the specified torque (see chapter 6).
- remove the safety stand(s).

55. Using a pump, grease:

- the supports/bearings (2) (16);
- the pins (20) (27).

56. Start the tractor engine.

Operate the electronic system to check the correct linkage operation (lifting/lowering and vice versa).

G . Description, disassembling - reassembling the rear hitch mechanism and a lift ram

Description

The rear hitch mechanism is of standard type and comprises (Fig. 20):

- two adjustable rods (1);
- two lower drawbars (2), different depending on the option. These drawbars are connected to the lower supports (8), which are positioned using locating pins (9) and attached with screws (10) to the centre housing (45);
- two adjustable stabiliser bars (3);
- two draft sensors (4), each held in position by a locking plate (13) fixed by spacers (11) and screws (12). These sensors communicate with the tractor electronic system;
- two guards (5) protecting the draft sensors;
- two guards (14) protecting the draft sensor harnesses;
- two stabilising supports (6) fitted to the trumpet housings.

The top link (7) is articulated at the 3rd point of the PTO sensor.

Parts list (Fig. 20)

(1) Adjustable tie-rods
(2) Lower drawbars
(3) Adjustable stabilisers
(4) Draft sensors
(5) Protector guards
(6) Stabiliser supports
(7) Top link
(8) Lower supports (shoes)
(9) Locating pins
(10) Screws and washers
(11) Spacers
(12) Screws and washers
(13) Locking plates
(14) Protector guards
(45) Centre housing

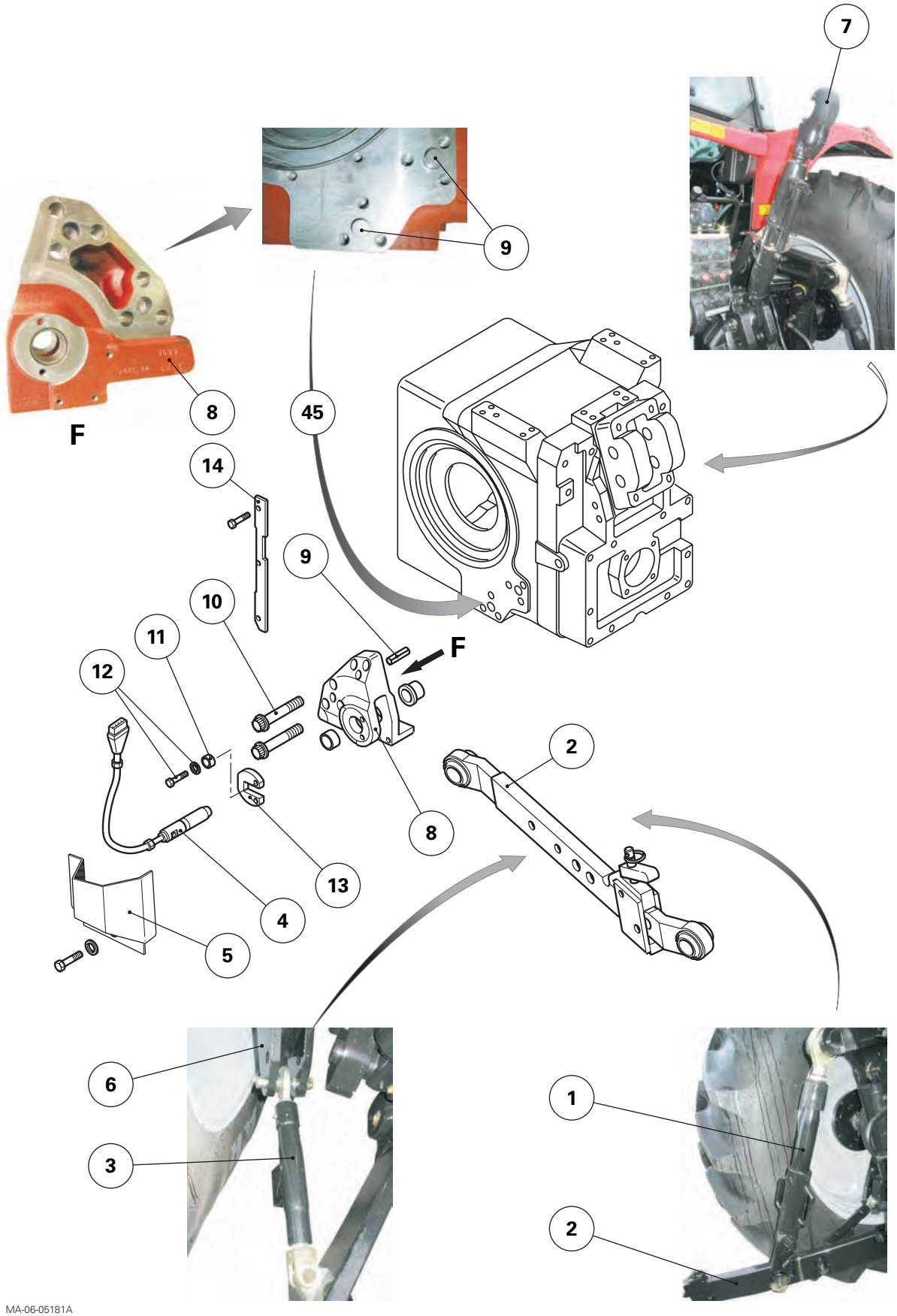

Fig. 20

Disassembling - reassembling the rear hitch mechanism and the third-point linkage

Disassembly

The disassembly of the rear hitch mechanism and third point linkage has no specificity.

Reassembly

During reassembly:

- lightly smear the draft sensor pins with AS767 graphite grease or equivalent;
- check the condition of stop pins. Replace them if necessary.

Disassembling - reassembling a ram

Preliminary operations

57. Start the tractor engine.

58. Place the lower hitch arms in their maximum lowered position using the electronic system.

Disconnect the supply hose from the lift ram. Temporarily plug its end.

59. Remove the lift ram and drain it of its oil.

Disassembly (Fig. 21)

60. Remove the elbow union (1) fitted with its O'ring.

61. Push the rod (5) of the hydraulic ram until the snap ring appears (4) through the union port O.

Insert a screwdriver into port O. Move the snap ring into the neighbouring groove (V-shaped, Fig. 21) of the rod (5) of the ram. Progressively rotate the rod as the snap ring progresses.

62. Remove the rod and snap ring (4) from the ram body.

63. Drive out:

- the scraper ring (2);
- the seal (3).

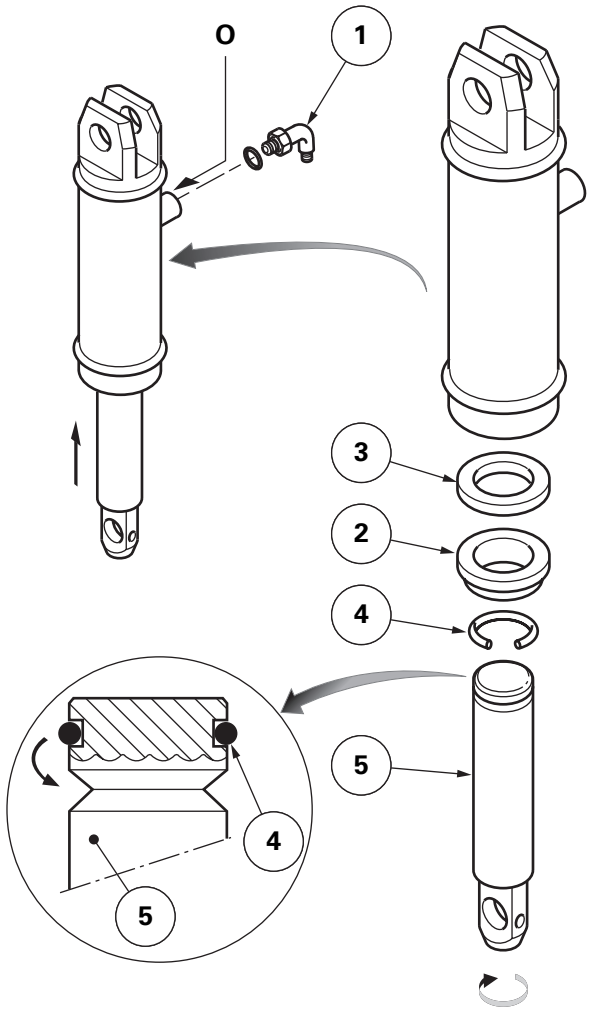

Fig. 21

Reassembly (Fig. 21)

64. Clean and dry all components using a jet of compressed air.

Replace:

- those parts whose mating surface ensuring the ram tightness is scratched;
- the whole ram in the event of significant distortion or scratching.

65. Lubricate the components with clean transmission oil.

66. Refit the ram repeating the operations 60 to 63 in reverse order.

During reassembly:

- replace the snap ring and seals;
- fit the seals, without damaging them, using a suitable fixture;
- carefully refit the rod into the ram body.

Final operations

67. Lubricate the upper and lower pins of the lift ram with AS767 grease or equivalent.

68. Refit the ram and reconnect its supply hose pipe.

69. Start the tractor engine.

Operate the electronic system to check the correct linkage operation (lifting/lowering and vice versa).

70. Check for any leaks around the rim of the ram rod.

H . Service tools

Tools available in the AGCO network

- 3378123M1: Protector (Fig. 22)
- 3378124M1: Seal fitting tools (Fig. 23)

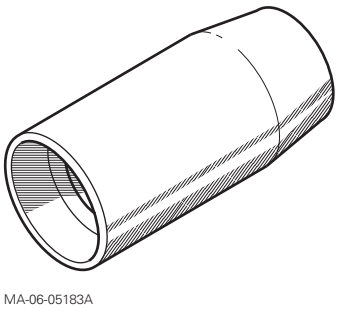

Fig. 22

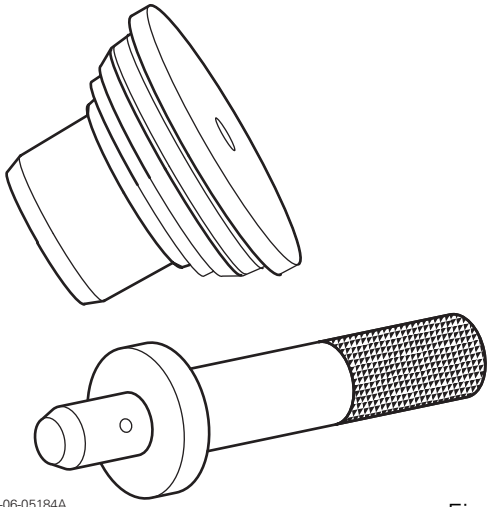

Fig. 23

6C18 - GPA30 - Auto-hitch

CONTENTS

A . General

The Dromone auto-hitch (1) (Fig. 1) can be fitted on the GPA30 transmission. It completes the range of existing hitch supports.

B . Operating principle of the Dromone auto-hitch

Parts list (Fig. 2)

(1) Fixed support fitted to the centre housing
(2) Mobile plate which can be raised or lowered by the lift mechanism
(3) Auto-hitch with a double acting hydraulic ram (4)

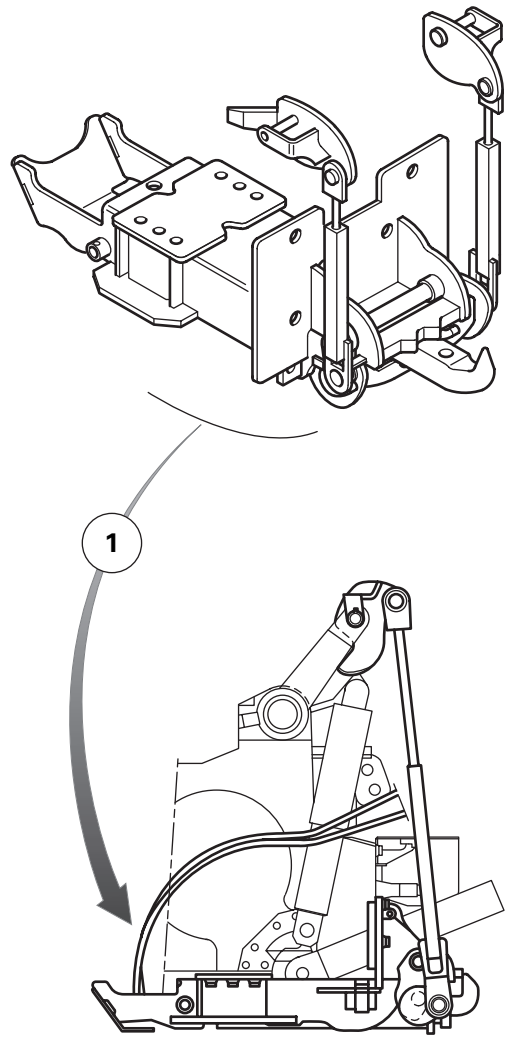

Fig. 1

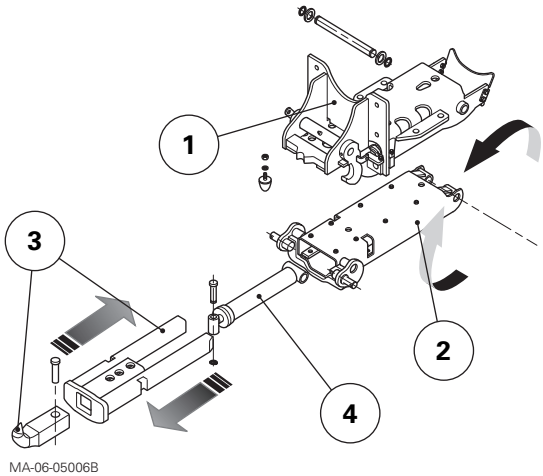

Fig. 2

Legend (Fig. 3, Fig. 5)

A and B Outlets to male couplers
O Manual valve opening direction
R Auxiliary level travel direction to retract the auto-hitch
S Auxiliary level travel direction to extend the auto-hitch

Operating principle (Fig. 5)

Lowered or raised plate

When the manual valve (1) is open and the relevant auxiliary lever is moved (Fig. 3), the high pressure passes via the unions (2) linked to the A and B quick-disconnect manifolds to supply the double-acting ram (4) fitted to the auto-hitch (3). Depending on the position of the auxiliary lever (Fig. 3), the hitch can extend from or retract into the mobile plate in order to hitch onto a trailer.

Safety lock

- **Fitting**

  The safety lock of the hitch is ensured when:
  - the mobile plate is lifted and engaged;
  - The hook is retracted to the maximum and abuts the rear stop screws.

  The fixed support locks only prevent undue hitch movements when these conditions are fulfilled.

  When engaging safety mode, the locking mechanism clicks audibly.

  It is possible to reuse the auxiliary spool valve when the ram is hydraulically isolated by closing the valve (1) (Fig. 3).

  IMPORTANT 1: *Before hitching the trailer, the operator sat in the driver seat must ensure the tractor movement is free, checking that:*
  - *the gear shift lever is in neutral position;*
  - *the parking brake is not engaged.*

  IMPORTANT 2: *Periodically grease the rear yoke pin, the link rod pin and the control cable of the mobile plate (see Fig. 4 and greasing intervals specified in the Service Record Book).*

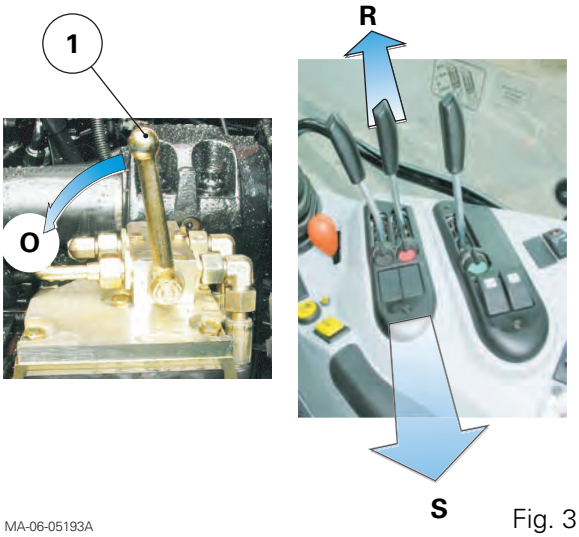

Fig. 3

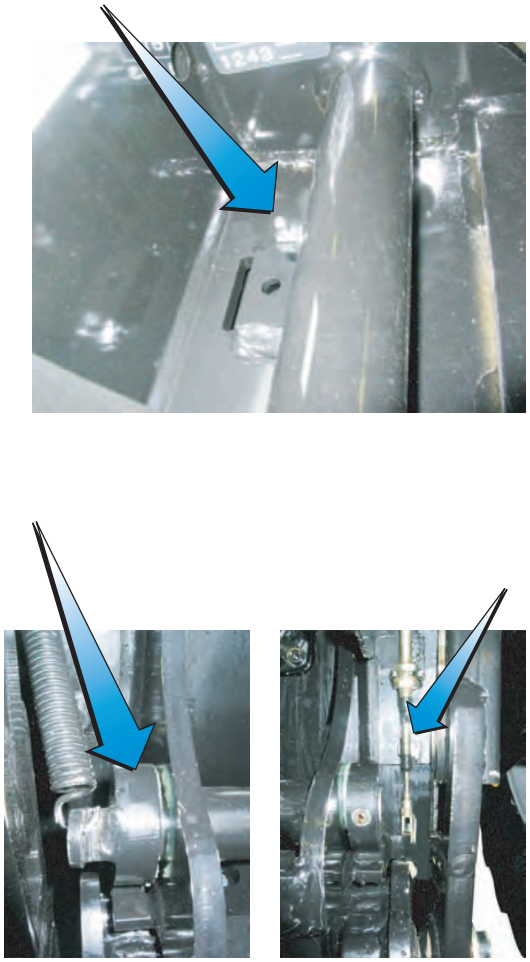

Fig. 4

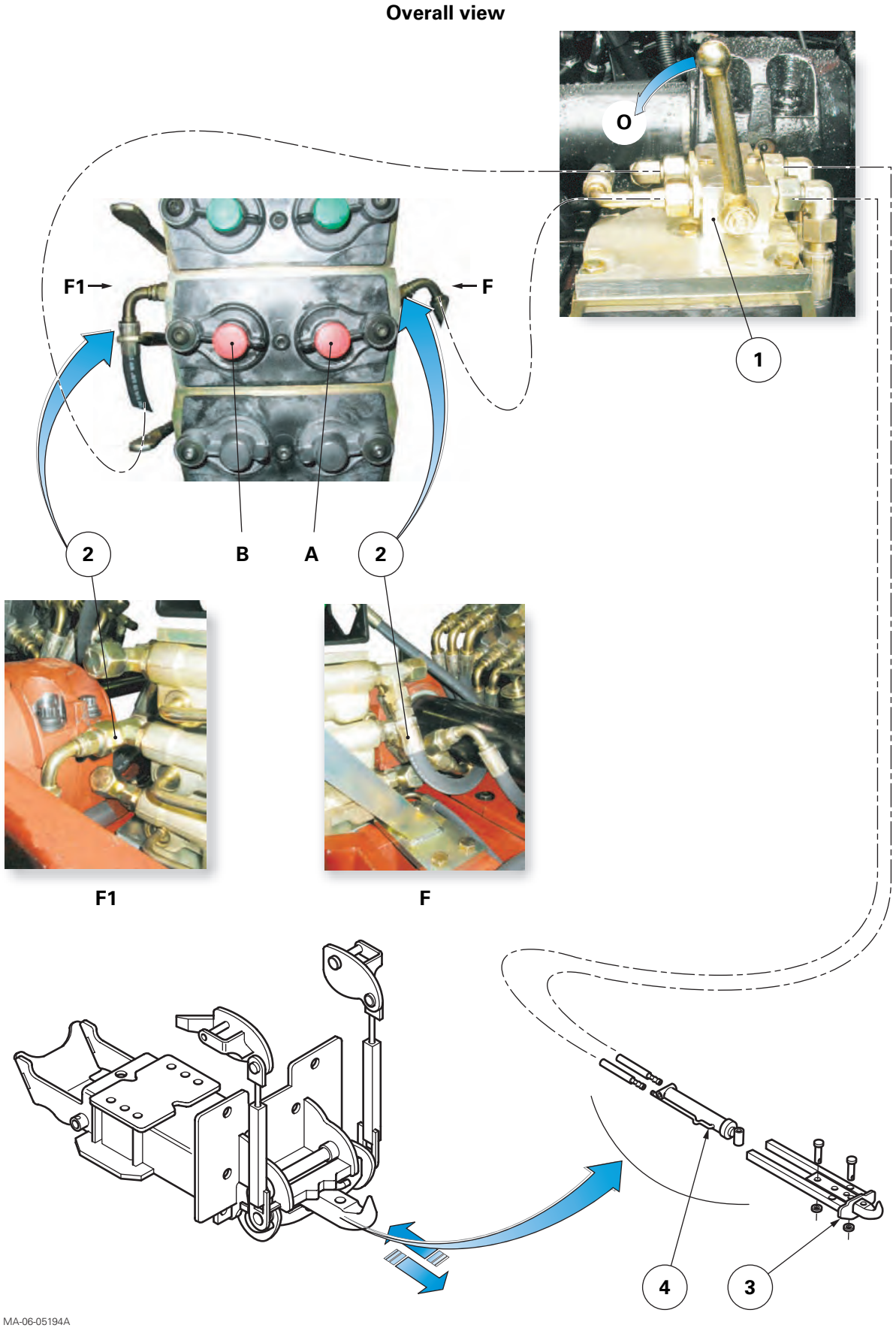

Fig. 5

- **Locking check**

DANGER: Locking must be checked extremely carefully and in accordance with the procedure described below.

With the engine running and plate raised, open the valve (1) (Fig. 3). Check that the hitch is secured by moving the auxiliary spool valve lever into both positions (Fig. 3): the hitch must not extend beyond the mobile plate. If it does, investigate the cause of the problem.

C . Adjusting tie-rods and control

Adjusting the tie-rods

1. Disconnect (Fig. 7):
   - the tie-rod clevises (2) (right and left-hand);
   - the control cable (3) connected to the support.
2. Start the tractor engine.
3. Move the electric lift control (internal or external) so that the lift arms are in maximum raised position (continuously pumping).
4. Using a trolley jack, compress the mobile auto-hitch support moderately along the F axis (Fig. 6) until the top of the mobile support touches the top of the fixed support (X = 0 mm)
5. Shorten each tie-rod as much as possible by adjusting the clevises (2) (Fig. 7): the clevises must engage freely on the pins (4) of the mobile support.
6. Fit new pins (1) (Fig. 7).
7. Release the trolley jack to free the mobile support from the auto-hitch.
8. Reconnect the control cable (3) (Fig. 7).

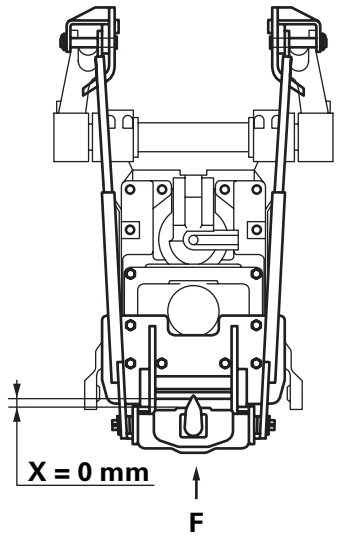

Fig. 6

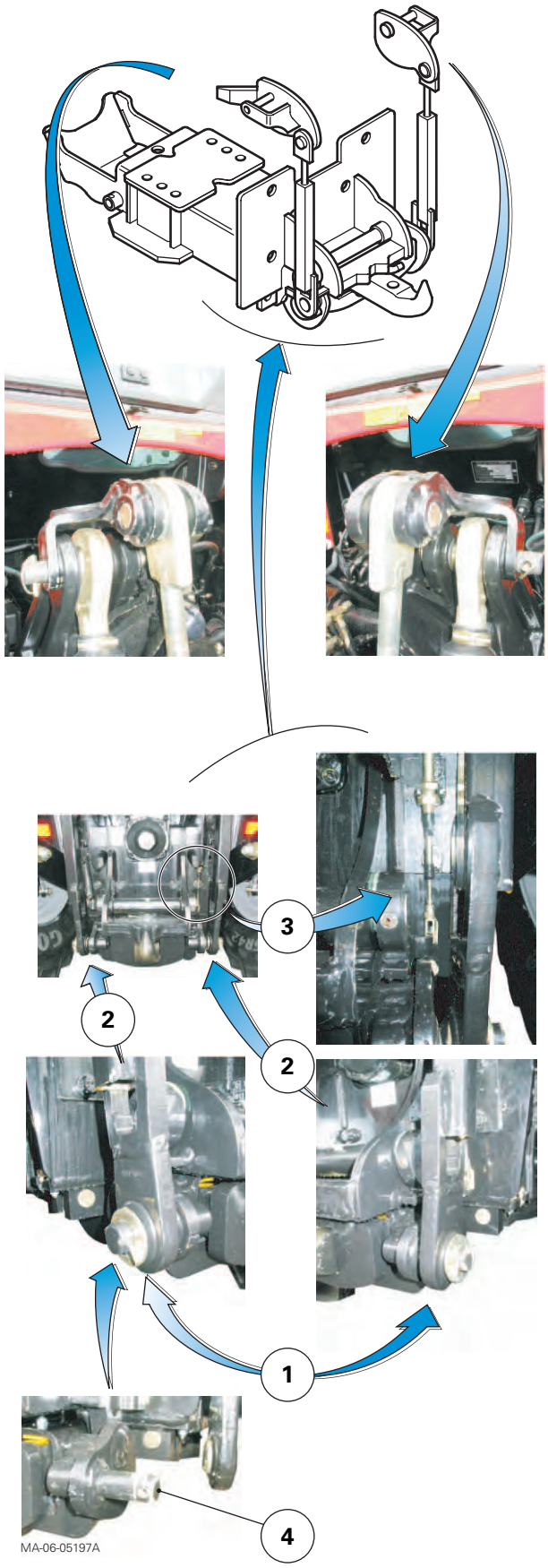

Fig. 7

9. Operate the linkage in order to lift the arms to their maximum, repeating operation 3.

Unlock the mobile support, using the handle (1) located in the cab at the back of the seat (Fig. 8).

Check for correct operation:

- of the mobile support (up/down and vice versa);
- of mobile support unlocking and locking.

IMPORTANT: *If the unlocking and/or locking are carried out in poor conditions, check and adjust the control cable.*

Fitting and adjusting the control cable (Fig. 8)

Fitting the cable in the cab

10. Slide the sheath end-point (9) into the hole in the cab floor.

Restore an identical sheath end-point thread length on either side of the floor, using nuts (2). Lock the nuts.

Fitting and adjusting the cable on the auto-hitch (Fig. 8)

11. Screw the clevis (4) flush with the threaded part of cable (3).

12. Fit the clevis on link B.

Fix the clevis with the hook (5), ensuring that link B is still locked.

Tighten nut (6).

13. Fit the sheath end-point (7) on the support.

Adjust and lock the nuts (8) such that link B remains locked and the cable (3) is neither loose nor pinched.

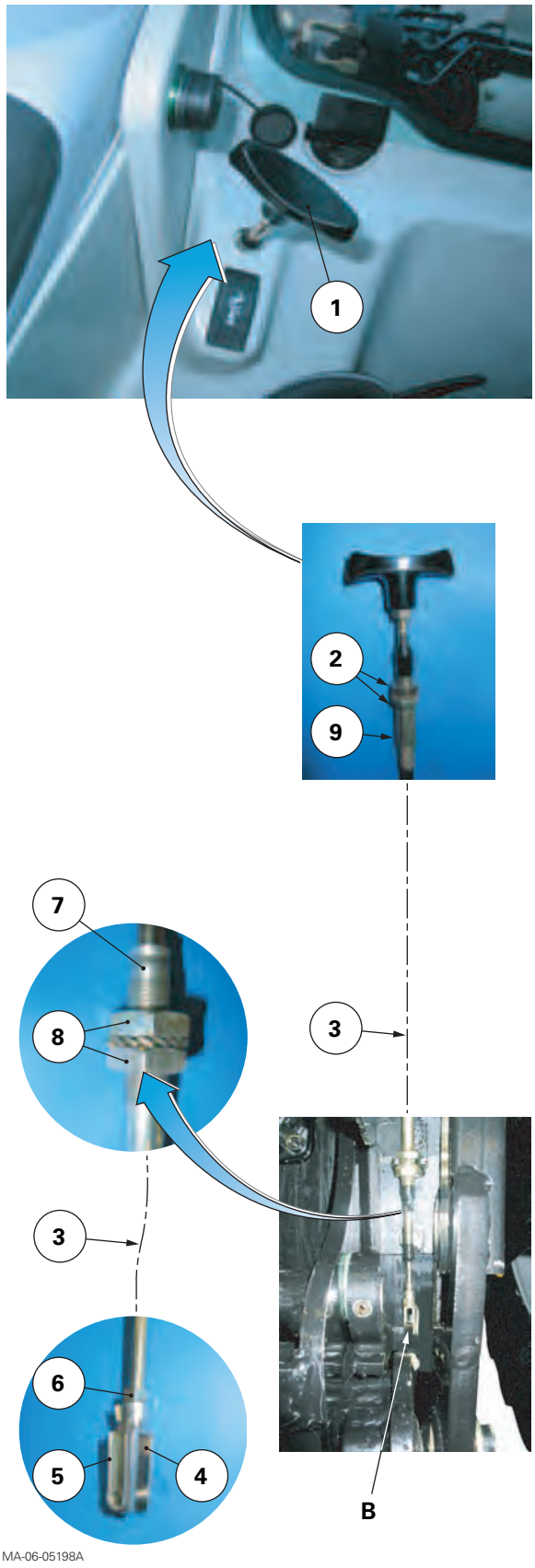

Fig. 8

D . Tightening torques

14. Clean the screws (1) (2) (Fig. 9) and their tapped holes on the centre housing. Dry them using a jet of compressed air.

Screw dimensions

Screw	Specifications
(1)	M20 x 50 mm
(2)	M20 x 130 mm

15. Lightly smear the thread of the screws (1) with Loctite 270 or equivalent.

Tighten screws (1) (2) to a torque of 480 - 640 Nm.

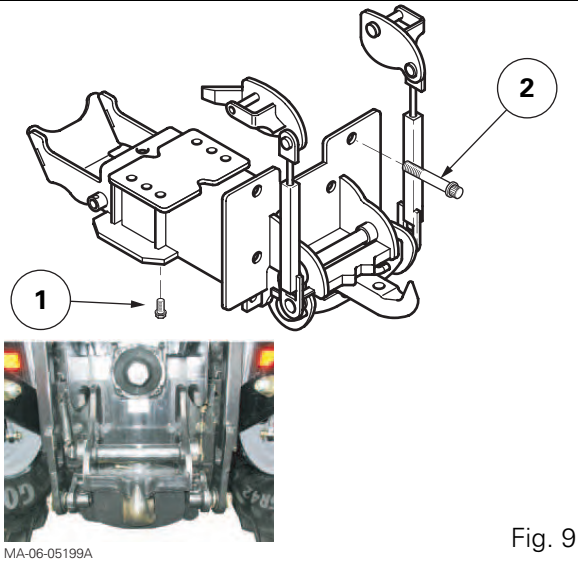

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Fig. 9

6C19 - GPA30 - Rear wheels/Hubs

CONTENTS

A . General

The GPA30 transmission axle shafts are plain (long straight shafts).
Their diameter differs according to the type of trumpet housing fitted on the tractor:

Trumpet housings	Axle shaft diameter
Heavy Duty Sealed (HDE) trumpet housings	95 mm, Fig. 1
Trumpet housings with composite drive unit	110 mm, Fig. 2

The wheel disc can be made from steel or cast iron.

The tractor rear wheel track can be adjusted by sliding the hub on the plain axle shaft.

Axle shaft (Heavy Duty Sealed trumpet housing)

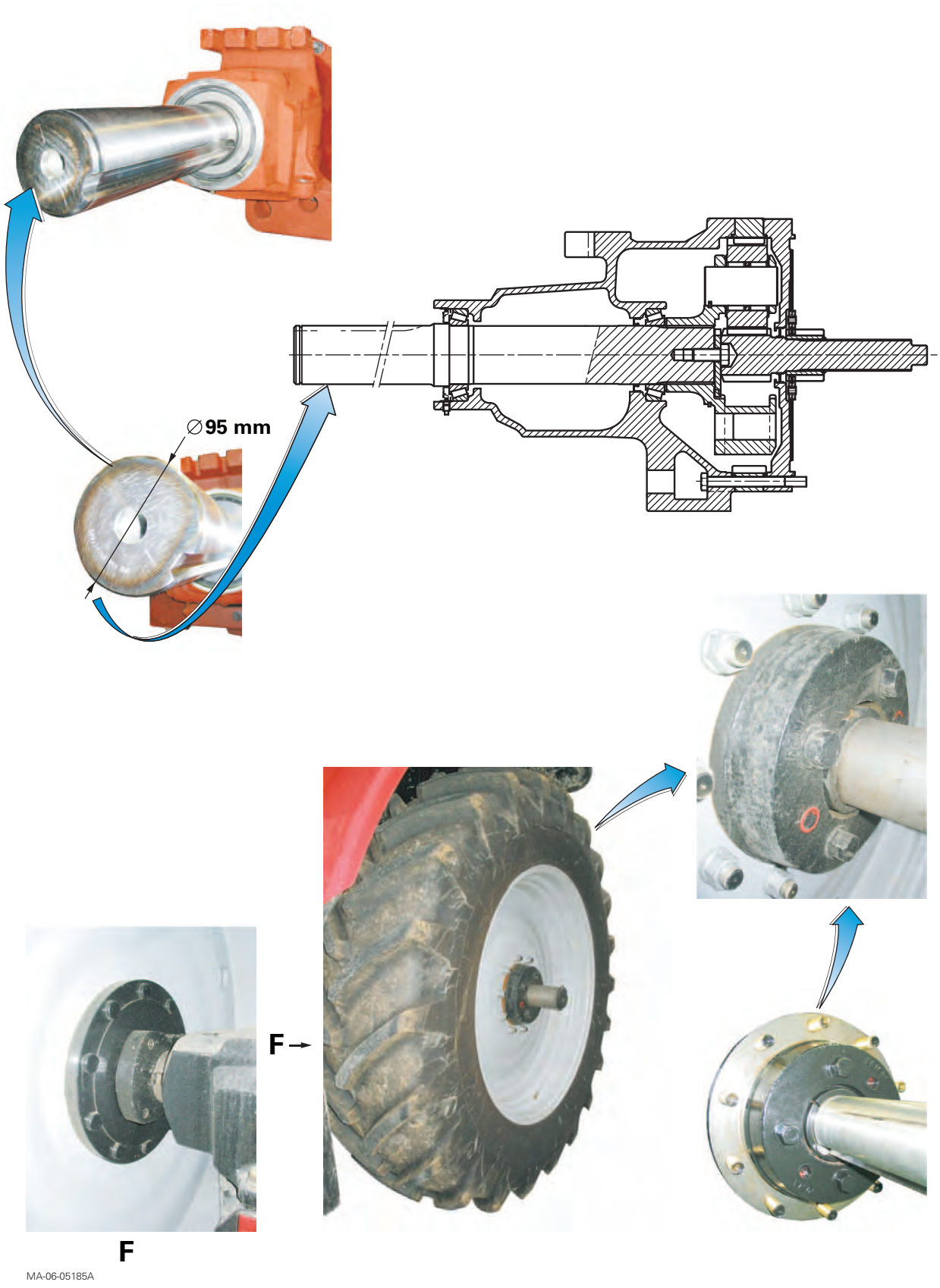

Fig. 1

Axle shaft (trumpet housing fitted with composite drive unit)

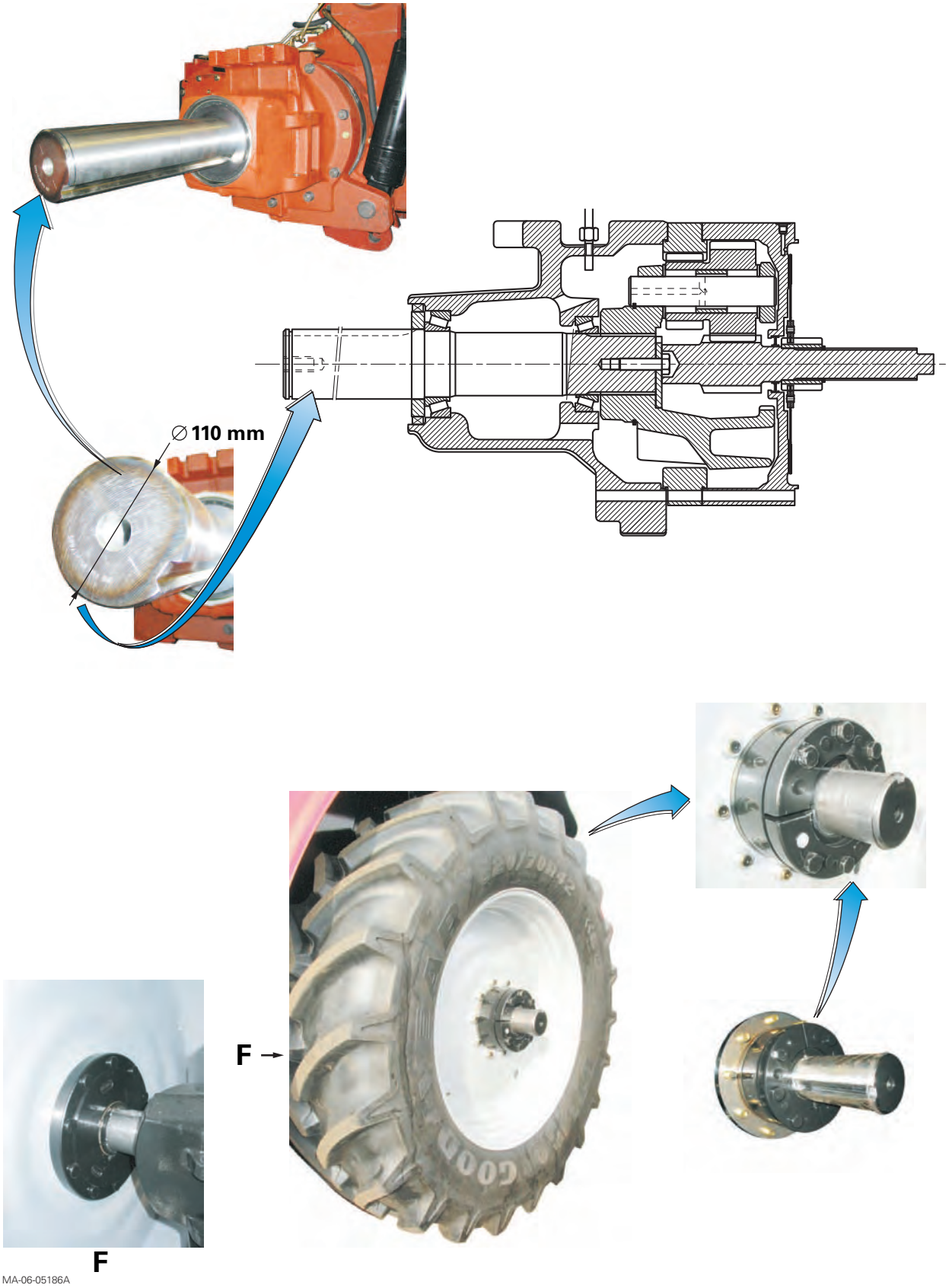

Fig. 2

B . Description of the main assembly fits and torque values

Fitting a hub on a 95 mm diameter axle shaft (Heavy Duty Sealed) (Fig. 1, Fig. 3)

Tightening the screws (5) allows the locking of the male cone (1) with the hub (12) (female cone) and the plain shaft (3).

The keys (7) (8) prevent any angular slippage of the male cone (1) and hub (12).

The circlip (6) at the end of the plain shaft (3) acts as a stop for the wheel hub when the wheel is pulled to its outward limit.

Parts list (Fig. 3)

(1) Male cone
(3) Axle shaft (∅ 95 mm)
(4) M22 nuts
(5) Screw
(6) Circlip
(7) Key and pin
(8) Key and screw
(12) Hub

Tightening torques (Fig. 3)

Bolts and nuts	Tightening torques
M22 nuts (4)	640 - 680 Nm
Screws (5)	350 - 460 Nm

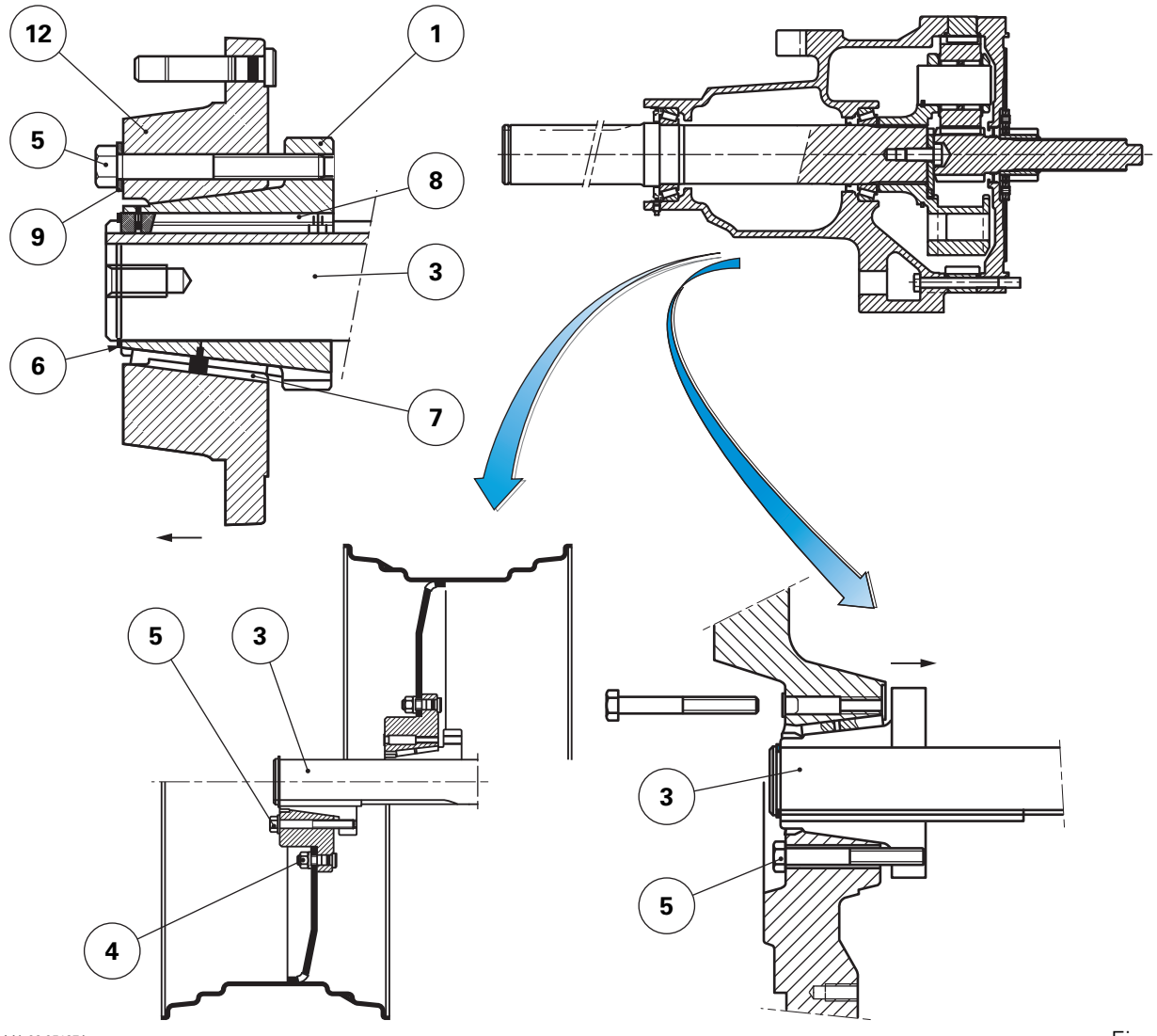

Fig. 3

Fitting a hub on a 110 mm diameter axle shaft (Trumpet housing with composite drive unit) (Fig. 2, Fig. 4)

Tightening the screws (5) allows the locking of the male single cones (2) with the hub (12) (female cone) and the plain shaft (3).

The keys (7) (8) prevent any angular slippage of the male single cones (2) and hub (12).

The circlip (6) at the end of the plain shaft (3) acts as a stop for the wheel hub when the wheel is pulled to its outward limit.

Parts list (Fig. 4)

(2) Male single cones
(3) Axle shaft (∅ 110 mm)
(4) M22 nuts
(5) Screw
(6) Circlip
(7) Key and pin
(8) Key and screw
(12) Hub

Tightening torques (Fig. 4)

Bolts and nuts	Tightening torques
M22 nuts (4)	640 - 680 Nm
Screws (5)	500 - 600 Nm

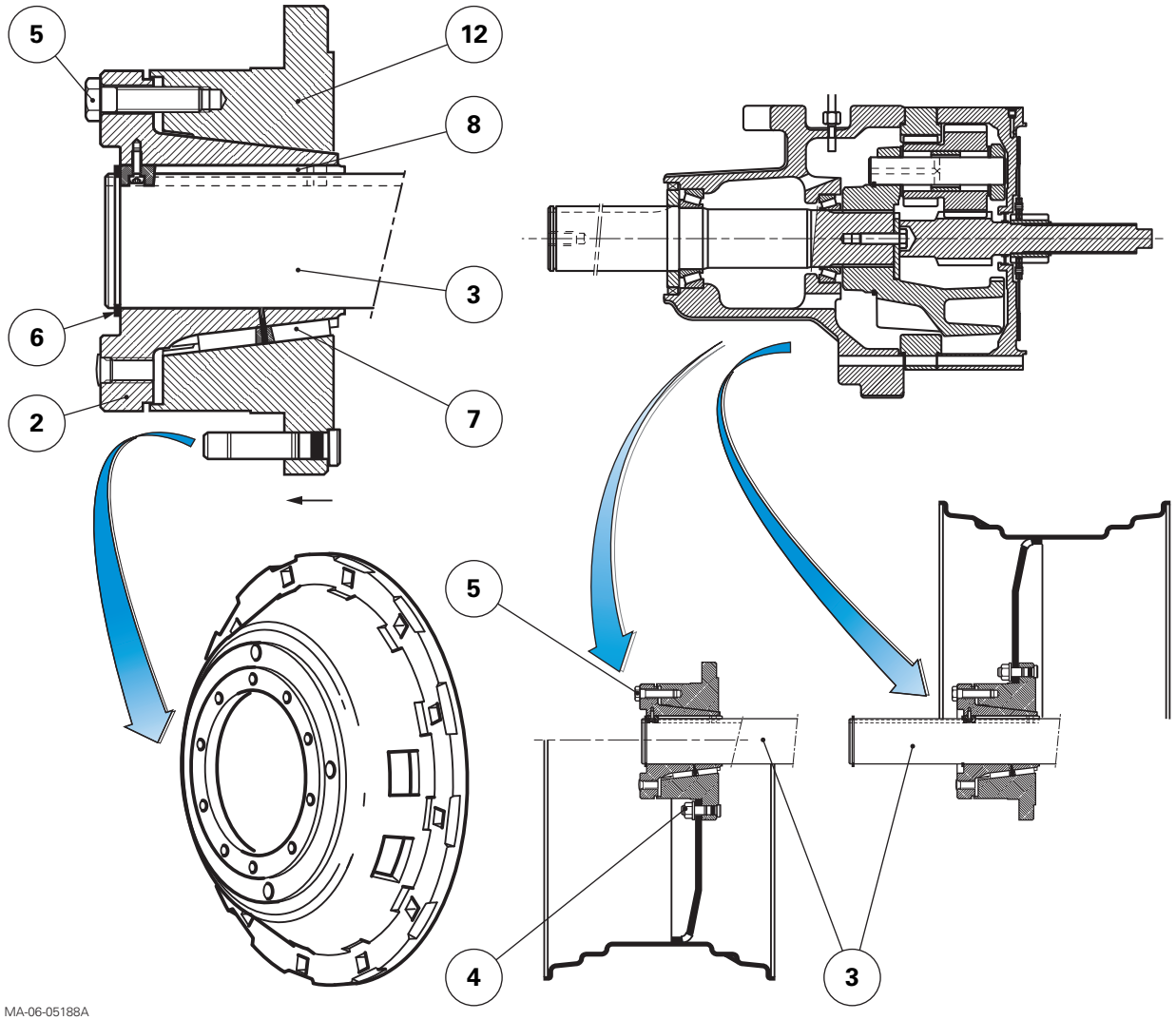

Fig. 4

C . Rear wheel track adjustment

Preliminary operations

1. Immobilise the tractor.
   Carefully chock the front wheels.
2. Remove any traces of mud that may adhere to the rim of the plain shaft (3).
3. If a wheel with steel or cast iron disc needs to be removed, use a suitable lifting tool and sling.

CAUTION: Handle with care and with the help of an operator.

Preparation (Fig. 5)

4. Loosen screws (5).
   Using a trolley jack of sufficient capacity, lift the appropriate side of the tractor.
5. Remove, depending on version:
   - Two or four diametrically opposed screws (5);
   - the washers (9).

   Loosen the other screws by a few turns.
6. Remove the "plastic" protectors blocking the tapped holes in the hub (12) or the cast iron disc (depending on version).
7. Lightly smear the thread of the screws (5) (removed during operation 5) with AS767 graphite grease or equivalent. Tighten the screws (5) in the previously mentioned tapped holes.
   Tighten the screws (5) equally in opposite pairs to separate the hub taper mechanism.

   IMPORTANT: *If the hub taper mechanism cannot be separated, slide a locally made oblique metallic tool in the slot of the male cone (1) or male single cones (2) (depending on version). Tap the tool vigorously to release the cone or single cones.*

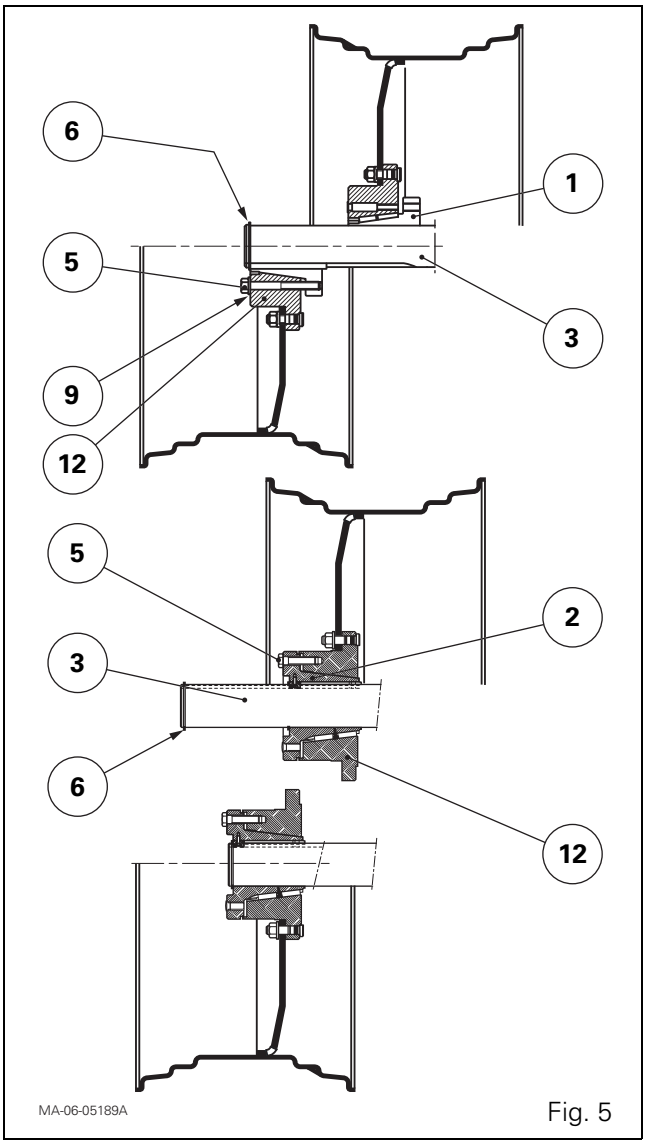

Fig. 5

Adjustment

IMPORTANT 1: *The tapered parts of the hub (12) (Fig. 6) must not be greased.*

IMPORTANT 2: *Lightly smear the rim of the plain shaft (3), over its whole length, with AS767 grease or equivalent (Fig. 6). This precaution prevents corrosion and assists the smooth sliding of the male cone (1) or single cones (2) (depending on version) on the plain shaft for future wheel track adjustments.*

8. Pull or push the wheel with the help of an operator in order to slide the hub (12) onto the plain shaft and to obtain the required track.

9. Loosen the screws (5) used to extract the hub taper mechanism (12). Check their condition. Replace them if necessary. Screw them into their original position.

10. Tighten the screws (5) equally in opposite pairs (see tightening torque in § B).

IMPORTANT: *For versions with ∅ 110 mm plain axle shaft, after tightening the screws (5), a 2 mm face offset between each single male cone (2) is allowed (Fig. 7).*

11. Partially fill the extraction holes on the hub (12) or male single cones (2) (depending on version) with bearing grease.

Plug the extraction holes with "plastic" plugs.

Final operations

12. If the wheel has been removed:

- refit it;
- tighten the nuts to the required torque (see § B).

13. Remove the safety chocks from the front wheels.

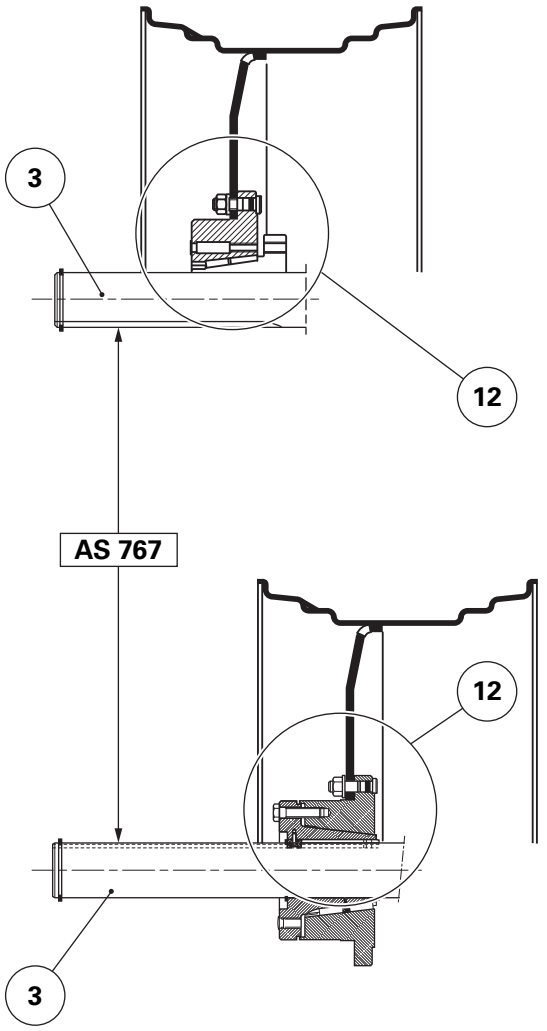

Fig. 6

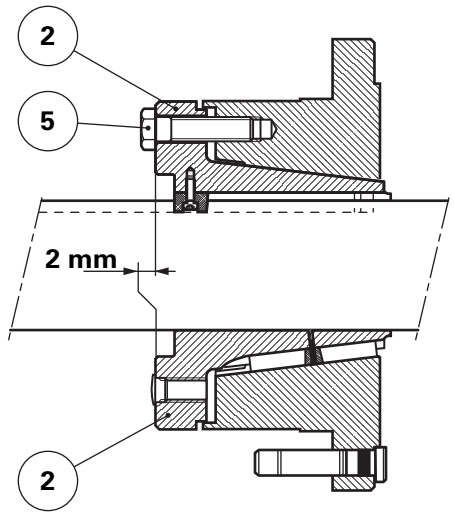

Fig. 7

D . Replacing a wheel stud

14. Remove the concerned wheel if there is not much space surrounding the stud.

15. Drive out the defective stud.

16. Clean the stud and its housing in the hub.

17. Lightly smear the splined part of the new stud with Loctite 270 or equivalent.

18. Fit the new stud using a bronze drift and a suitable hammer.

19. If the wheel has been removed:

- refit it;
- tighten the nuts to the required torque (see § B).