

Massey Ferguson®

573 / 583 / 593 / 596

Tractor

WORKSHOP SERVICE MANUAL

4283075M1

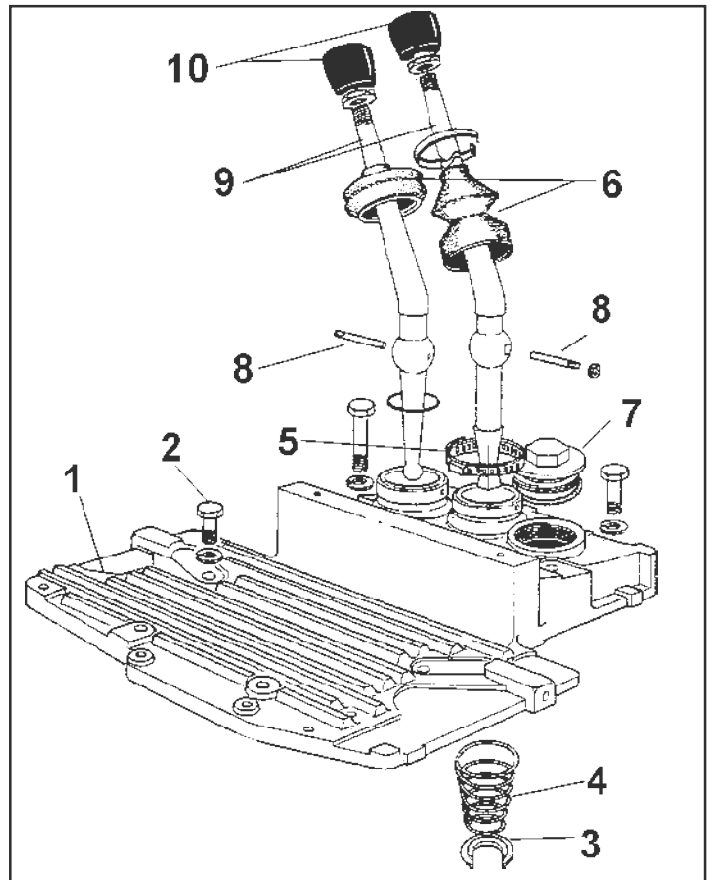
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2 - Lever cover and gear shift levers

2.1 - Identification of the components


- 1 - Cover
- 2 - Cover (1) retaining bolts
- 3 - Spring retaining washer (spring seat)
- 4 - Spring
- 5 - Clip retaining the rubber dust cap (6)
- 6 - Rubber dust cap (rubber boot)
- 7 - Transmission oil filler neck plug
- 8 - Roll pins retaining the levers
- 9 - Gear shift and High / Low levers
- 10 - Gear lever knobs.



2.2 - Removal and examination

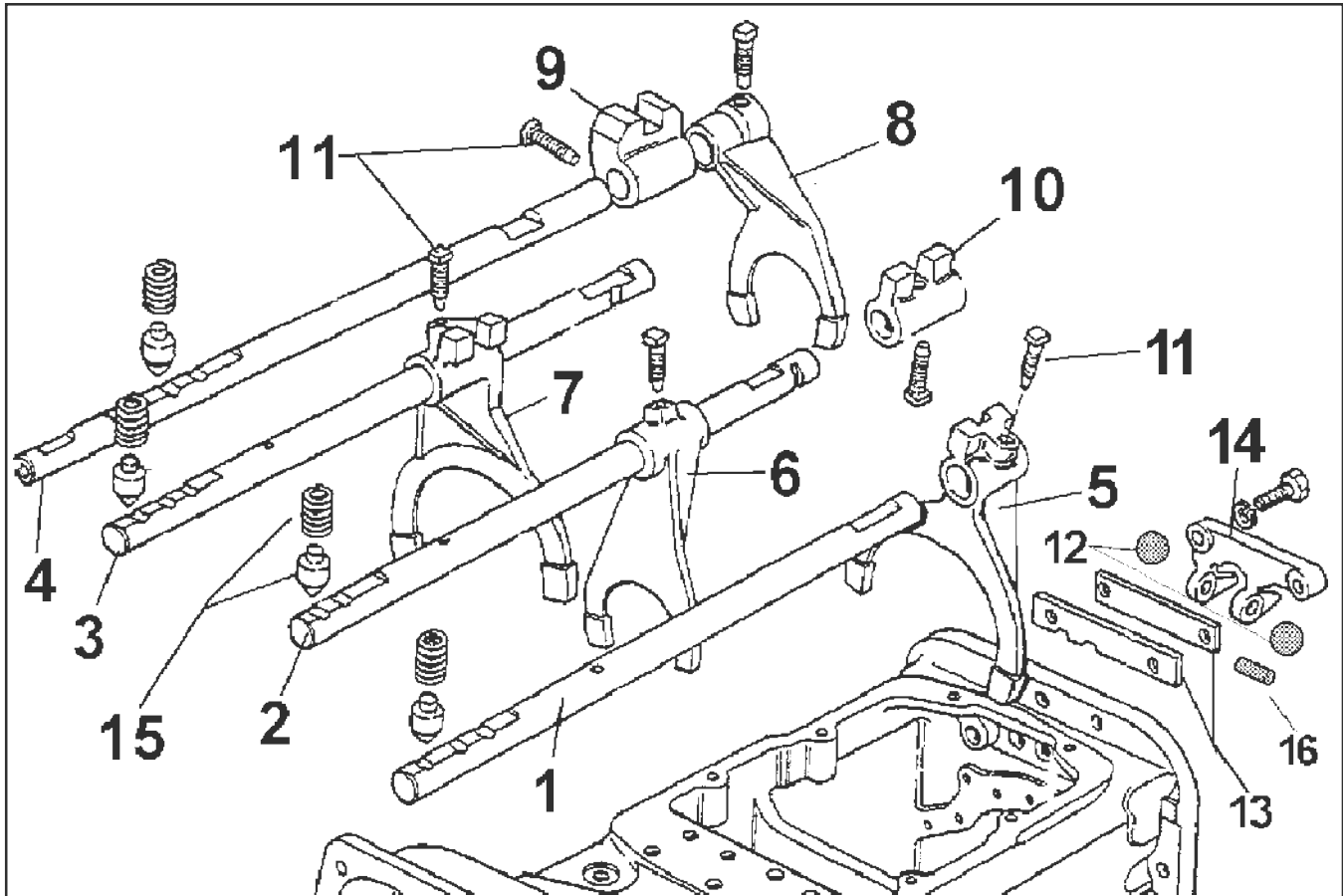
- a) Split the tractor between the engine and the gearbox. Remove the transmission case by securing it to a proper support.
- b) Remove the bolts securing the top cover (1) to the transmission casing; then remove the top cover.
- c) If the gear shift and high/low shift levers are to be removed, withdraw the spring retaining washers (spring seats) (3), the springs (4) and the roll pins (8) retaining the levers.
- d) Examine all the components for undue wear, cracks, ruptures, or shippings: the spring retaining washers (3), the springs (4), the levers (9) in the pivoting area on the top cover. It is recommended to replace the roll pins (8). The rubber dust caps (6) and clips (5) should always be replaced on a general overhaul on the transmission case.

2.3 - Reassemble

- a) Coat the top cover seating surface (1) with Loctite 598 sealant, then refit the top cover by complying with the correct seating of the shift levers (9) in the inner selectors.
- b) Tighten all the top cover retaining bolts progressively to a final torque of 75 N.m (7,5 kgf.m or 54 lbs.ft). 
- c) Check the correct engagement of the levers in all ratios as well as a free spinning of all gears in all ratios.

3 - Selector rails and forks

3.1 - Identification of the components



- | | |
|---|---|
| 1 - 2 nd and 3 th selector rail | 10 - 4 th gear selector |
| 2 - 4 th selector rail | 11 - Locking bolts |
| 3 - 1 st and reverse selector rail | 12 - Interlock balls (against overlapping) |
| 4 - High/low selector rail | 13 - Interlock plain plate and interlock stop plate |
| 5 - 2 nd and 3 th selector fork | 14 - Interlock ball (12) carrier (ball retainer) |
| 6 - 4 th selector fork | 15 - Selector rail detent plungers and detent springs |
| 7 - 1 st and reverse selector fork | 16 - Interlock cross pin |
| 8 - High/low selector fork | |
| 9 - High/low selector | |

3.2 - Removal and examination

- Remove the selector rail interlock assy (12, 13, 14 and 16) by releasing both retaining bolts. Extra care should be taken not to lose the interlock balls (12) and the interlock cross pin (16).



NOTE:

This assy prevents two selector rails from simultaneously sliding, that it is to say, from overlapping the gear ratios.

- b) Lift out the selector rail detent plungers and detent springs (15).
- c) Release the locking wires and corresponding locking bolts (11).
- d) Slide the selector rails rearwards (1, 2, 3, and 4), then remove the selector forks (5, 6, 7 and 8).
- e) Examine all the components for wear, scoring, chipping or distortion. Any worn or damaged component should be replaced:
 - The detent plungers and detent springs (15);
 - Selector rails (1 to 4): Check these items for signs of undue wear in the sliding areas in the housing and in the centering of the detent plungers (15) as well. Likewise, inspect these components for distortion.
 - Selector forks (5, 6, 7 and 8): check these items if there is wear in the mating area with the sliding gears.
 - Mechanism against overlapping (12, 13, 14 and 16): wear in the interlock ball carrier (ball retainer) (14), interlock cross pins (16) and interlock balls (12).
 - Centering of the gear lever engagement selector (9 and 10) and selector forks (5 and 7): otherwise undue wear will occur in the area of the gear shift levers.

3.3 - Reassemble

- a) Refit the high/low selector rail (4) into the transmission casing, into the right-hand side of the housing.
- b) Place the high/low gear lever engagement selector (9), the high/low selector fork (8) and high/low shift coupler over the high/low selector rail (4). Next, tighten the corresponding locking screw (11).
- c) Install the first and reverse selector rail (3), then place the first and reverse selector fork (7) and corresponding locking screw (11).
- d) Insert the fourth selector rail (2), then place the fourth selector fork (6) and the fourth gear lever engagement selector (10). Next, tighten the corresponding locking (11).
- e) Refit the second and third selector rail (1), then place the second and third selector fork (5) and the corresponding locking screw (11).
- f) Refit all detent plungers and detent springs (15).
- g) Refit the Interlock mechanism to the rear end of the transmission casing, then tighten the retaining bolts to a torque of **40 to 50 N.m (30 to 37 lbs.ft)** *Pay extra attention to the correct positioning of the interlock balls (12) and interlock cross pin (16).*



- h) *Press the detent plungers and detent springs (15) using a plate or a pair of pressure pliers. Slide all selector rails (1 through 4), one by one, forward and rearward to ensure that all gears properly mesh.*

Inspect the mechanism that prevents more than one of the selector rails (1 through 3) from be shifted at the same time.

4 - Epicyclic unit

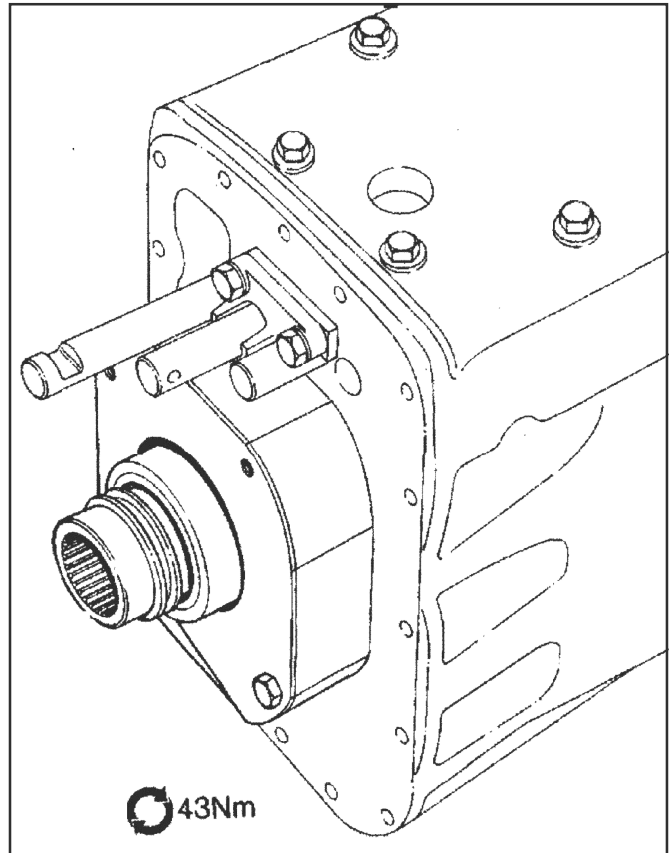
4.1 - Removal and refitment

Removal

1. Remove the selector mechanism (*See page 8*).
2. Remove the coupling.
3. Remove the bolts.
4. Remove the complete assembly.

Refitment

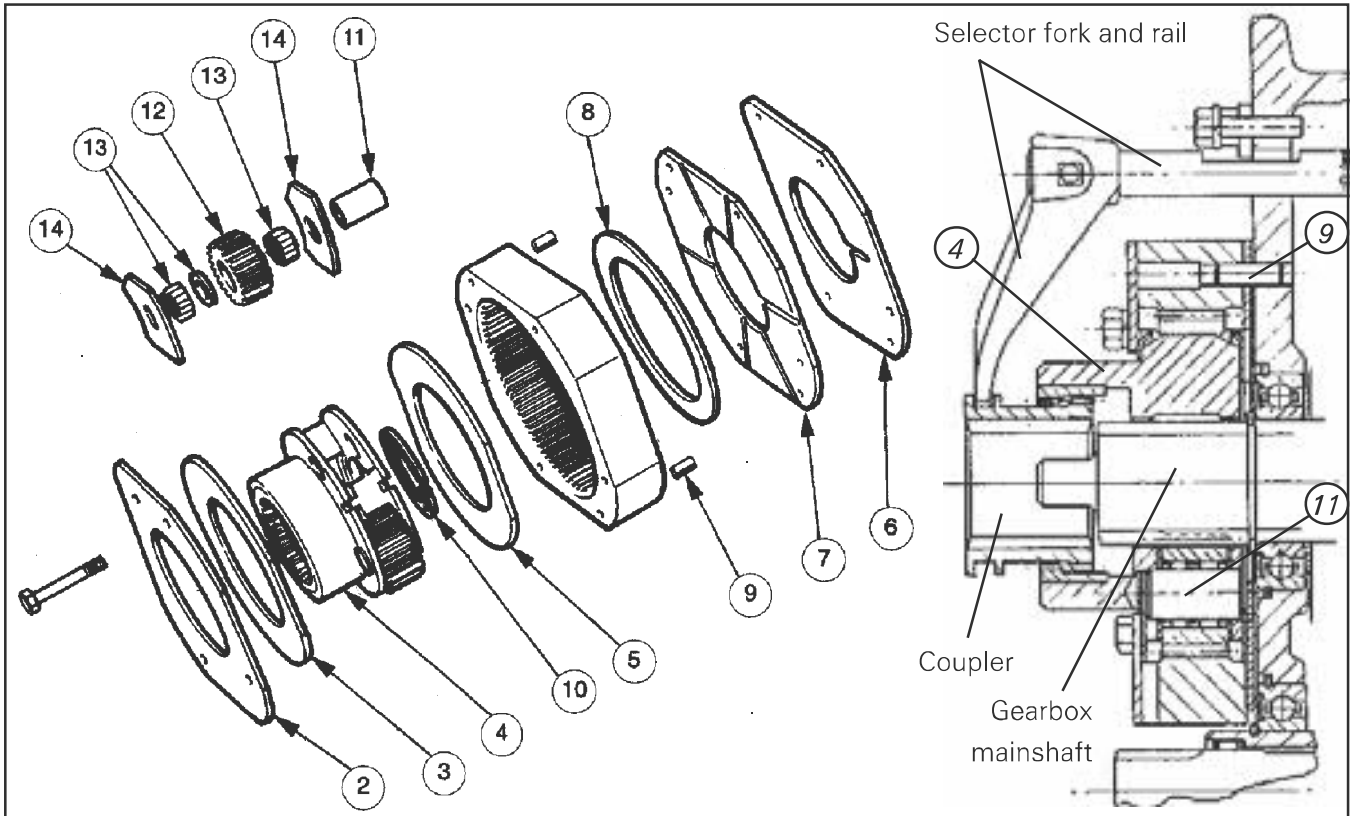
5. Reverse procedures 1 to 4 except:
 - a. Ensure that the front and rear thrust rings are correctly located before refitment.
 - b. Ensure that the dowels are correctly located in the gearbox casing.
 - c. Locate the cover plate with the cut out, to the bottom left hand corner
 - d. Tighten the retaining bolts progressively and evenly to a torque of 43 N.m (32 lbf ft).



4.2 - Overhaul

(*See next figure*)

1. Remove the gearbox epicyclic unit, (*See page 10*).
2. Remove the cover plate.
3. Remove the rear thrust ring.
4. Remove the planetary pinion carrier.
5. Remove the front thrust ring.
6. Remove the shim.
7. Remove the front plate.
8. Belleville spring disc.
9. If necessary, remove the dowels from the planetary ring gear.
10. Remove the external snap ring.
11. Gently tap out the three pinion shafts towards the front.
12. Remove the planetary pinions.
13. Remove the two sets of rollers and spacer from each pinion.
14. Remove the wear plates from each side of each pinion.



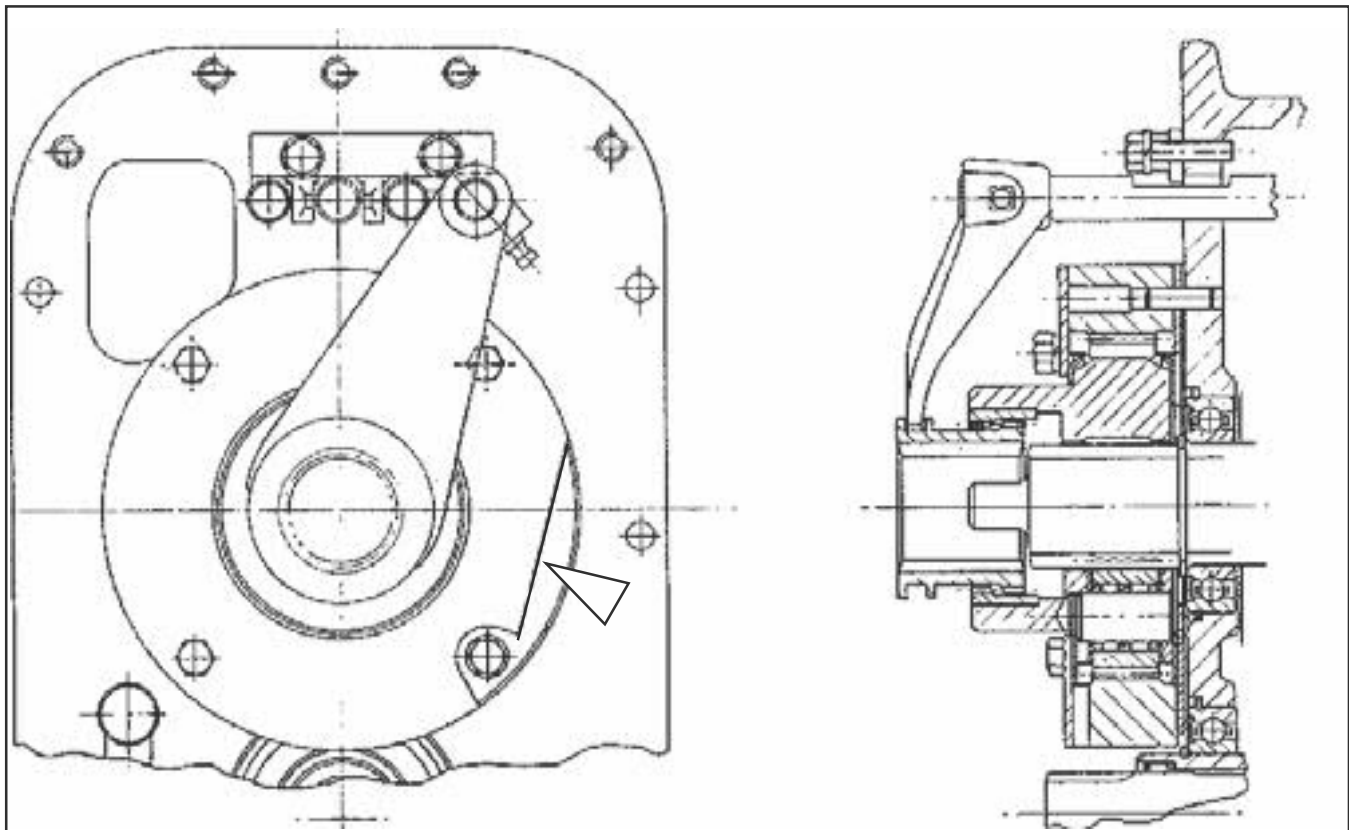
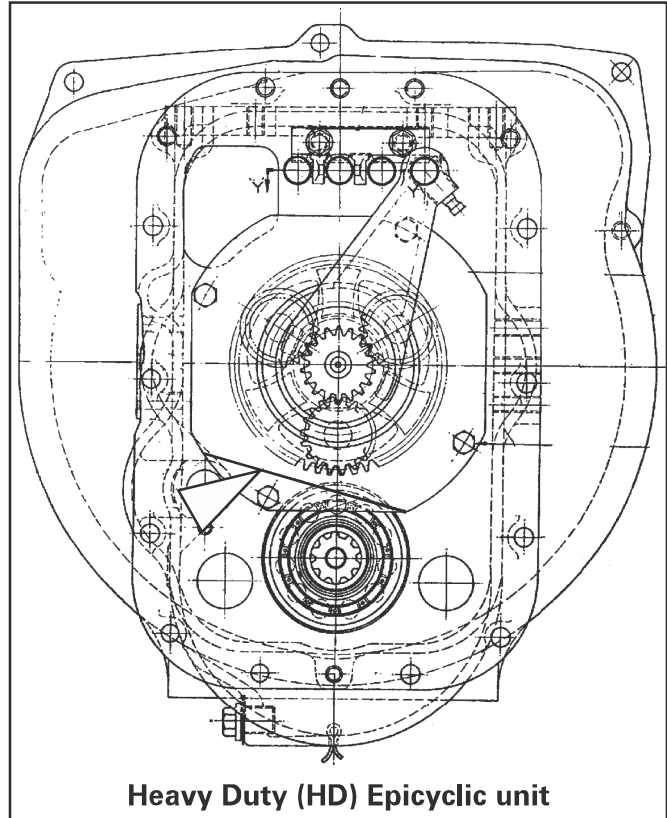
Components examination

Clean and carefully examine all the components, especially those subject to movement, and replace any items that show signs of damage or wear.

4.3 - Reassemble

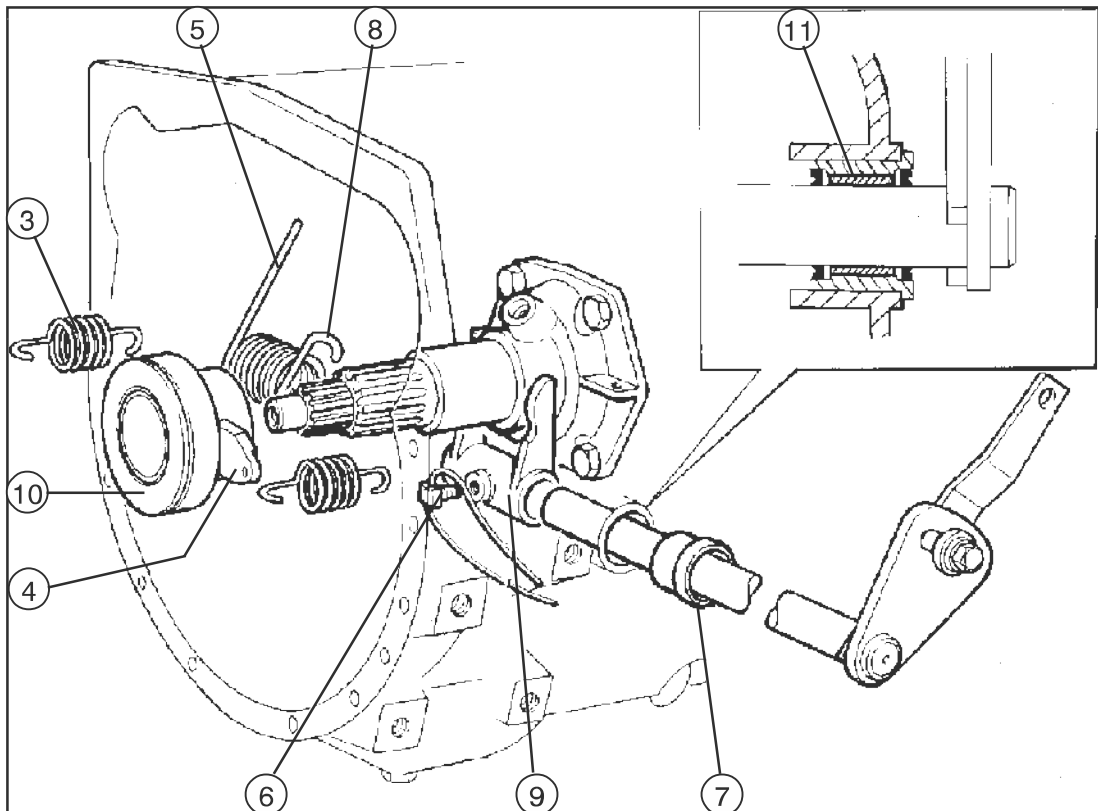
15. Reverse procedures 1 to 14 (of operation 4.2), except:
 - a. When replacing the rollers (13) in the pinions (12), a smear of petroleum jelly, NOT GREASE, will help retain them. Do not omit the spacer (13) from between the two rows of rollers. Each row consists of 16 rollers.
 - b. Ensure that the Belleville spring (8) is located correctly in the epicyclic ring gear with the concave face rearwards.
 - c. Ensure that the gap of the snap ring (10) is located midway between the planetary pinion shafts (11).
 - d. To assist assemble of the front (5) and rear (3) thrust rings on the pinion carrier, smear them with petroleum jelly, NOT GREASE.
Ensure that the tabs on the thrust rings locate in the pinion carrier cutouts, and that the brass faces are away from the planetary pinion carrier.
 - e. The front plate (7) and the cover plate (2) must be positioned with the oil grooves towards the pinion carrier (4).

- f. The cover plate (2) must be positioned with the cut out (indicated by arrows), at position shown below, for Normal Duty (ND) and Heavy Duty (HD) epicyclic units:



5 - Clutch system

5.1 - Clutch release mechanism



Removal

1. Split the tractor between the engine and gearbox, (See Part B of this Manual).
2. Support the cab and remove the left-hand cab support bracket.
3. Release the two retaining springs.
4. Remove the release bearing and carrier assembly.
5. Release the torsion spring from the release fork.
6. Remove the locking wire and locking screw from the release fork.
7. Withdraw the clutch cross shaft from the gearbox casing.
8. Remove the torsion spring.
9. Remove the release fork.
10. Remove the release bearing assembly, (See next page).
11. If necessary, remove the clutch cross shaft bearing and seal assemblies.

Refitment

12. Reverse procedures 1 to 11 except:
 - a. If the clutch cross shaft bushes have been removed, apply Massey Ferguson Studlock (Loctite 270) to the outside of the bearing.

- b. Install the cross shaft seals in the bearing with the lip of the seal facing the bearing.
 - c. Smear a light coating of grease on the input shaft splines, cross shaft bushes and the release bearing carrier. Use a lithium-based grease.
 - d. Ensure that the locking screw is located in the hole in the cross shaft.
 - e. When refitting the gearbox to engine, rotate the clutch cross shaft clockwise to hold the release bearing away from the clutch during assemble. Secure the operating lever in this position.
 - f. Release the cross shaft after the two halves of the tractor have been bolted together
13. Adjust the clutch pedal height, (See Part F of this Manual).

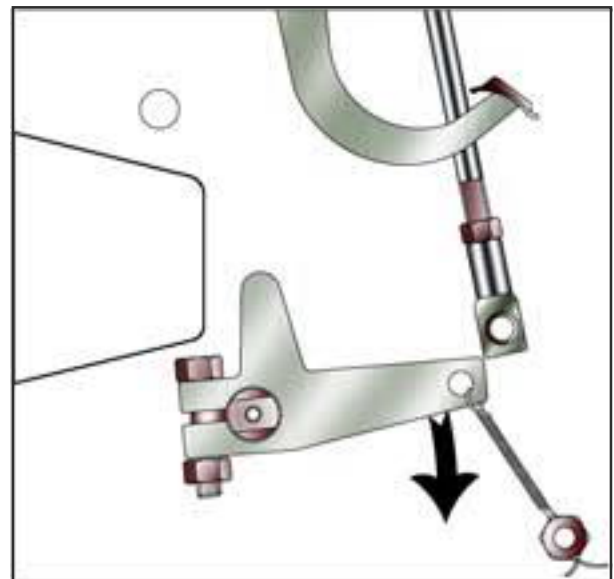
5.2 - Clutch release bearing

Special Tools:

- MF.479 Clutch Release Bearing Installer
MS.550 Universal Handle

Removal

1. Prior to splitting the tractor, disconnect the clutch cable at the lower end.
2. To prevent the cross shaft rotating against the tension of the torsion spring, the operating lever must be restrained with locking wire as shown in the illustration.
3. Split the tractor between the engine and gearbox, (See Part B of this Manual).
4. Release the two retaining springs.
5. Remove the release bearing and carrier assembly.
6. Press the release bearing off the carrier.



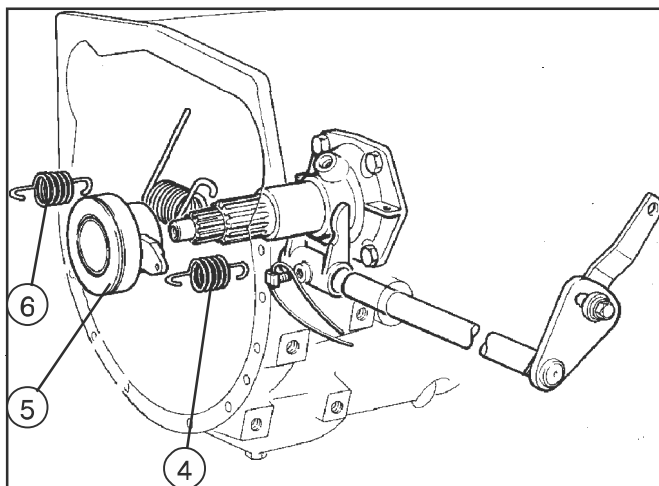
Refitment



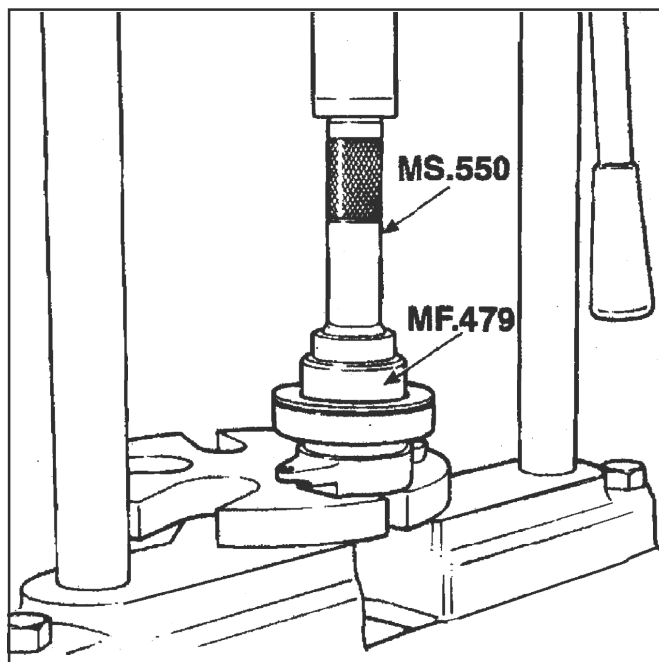
IMPORTANT:

Special service tool MF.479, must be used to install the clutch release bearing to the carrier. Failure to carry out this operation using the special tool will result in damage to the bearing and premature failure.

**The release bearing carrier must be refitted so that the small 'T' cast into the body, is assembled to the top. Failure to carry out this instruction will result in premature failure of the bearing.*

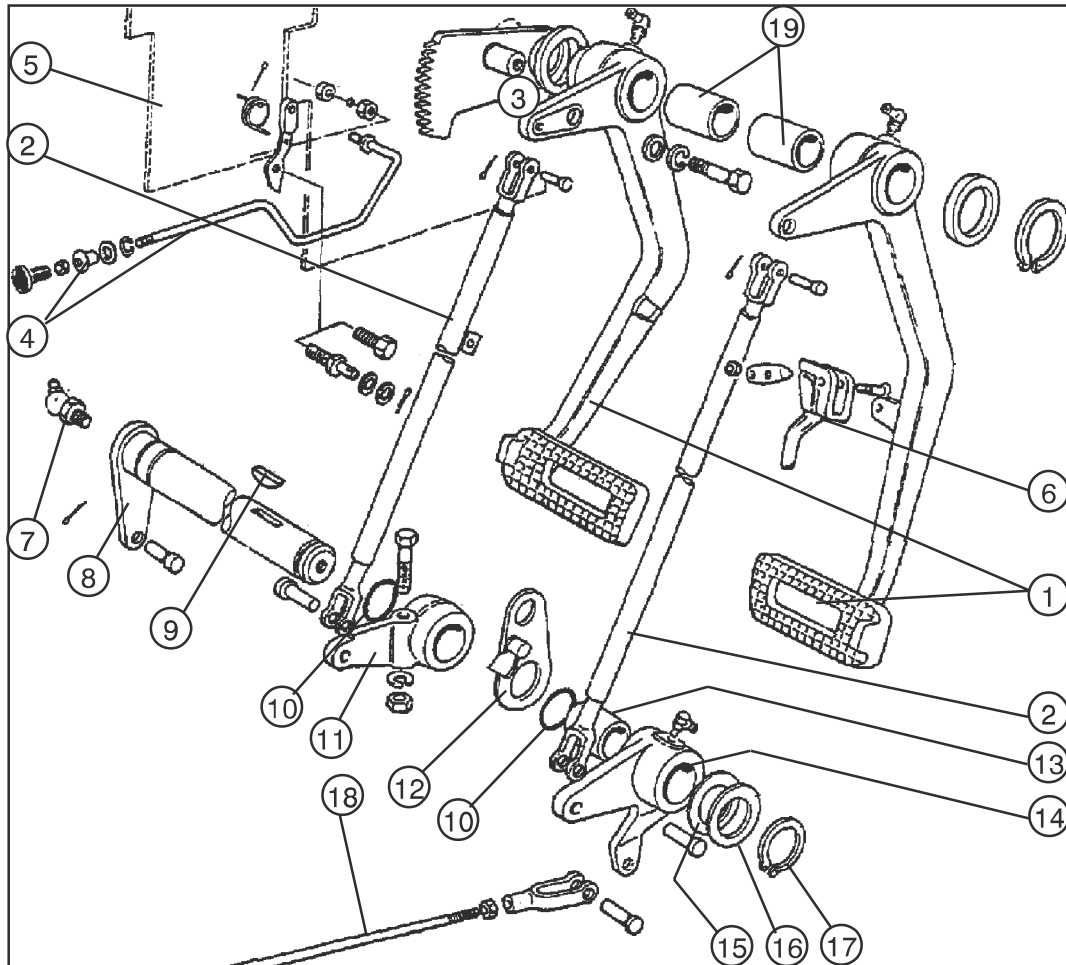


7. Replace the release bearing using special tool MF.479, Clutch Release Bearing Installer, and MS.550, Universal Handle, as shown in the illustration using a hand press.
8. Replace the release bearing and carrier assembly. Check that the small 'T' is on top.
9. Reverse procedures 1 to 6 except:
 - a. Smear a light coating of lithium-based grease on the input shaft splines and the bore of the release bearing carrier.
 - b. Ensure that the release fork is correctly located on the carrier.
 - c. When refitting the gearbox to engine, rotate the clutch cross shaft clockwise to hold the release bearing away from the clutch during assembly. Secure the operating lever in this position (see first illustration).
 - d. Release the cross shaft after the two halves of the tractor have been bolted together.
 - e. Adjust the clutch pedal height, (See Part F of this Manual).



6 - Brake pedal cross-shaft

6.1 - Identification of the components



- | | |
|------------------------------------|--|
| 1 - Pedals | 13 - Bush |
| 2 - Vertical brake rods | 14 - Cross shaft arm |
| 3 - Brake locking ratchet (sector) | 15 - Adjusting shim: several thicknesses, as an option |
| 4 - Brake lock | 16 - Thrust washer |
| 5 - Cross-shaft support | 17 - Circlip (snap ring) |
| 6 - Interlocking latch | 18 - Lower brake pull rod |
| 7 - Greaser (grease nipple) | 19 - Bushings |
| 8 - Brake lower cross shaft | |
| 9 - Woodruff key | |
| 10 - "O" ring | |
| 11 - Center arm (lever) | |
| 12 - Stop plate (bracket) | |

6.2 - Disassemble and examination

- a) Release the lower brake pull rod (18) from the cross shaft arm (14) and the brake lower cross shaft center arm (lever).
- b) Release the vertical brake rods (2) from the cross shaft arm (14) and the center arm (lever) (11).
- c) Remove the snap ring (17), then the remaining components: the thrust washer (16), the adjusting shim (15), the cross shaft arm (14) and the stop plate (bracket) (12).
- d) Drive out the center arm (lever) (11) pinch bolt, and using a lever, remove the center arm.
- e) Remove the woodruff from the brake lower cross shaft (8).
- f) Remove the "O" rings (10).
- g) Slide the lower cross shaft to the left side of tractor.

Examine:

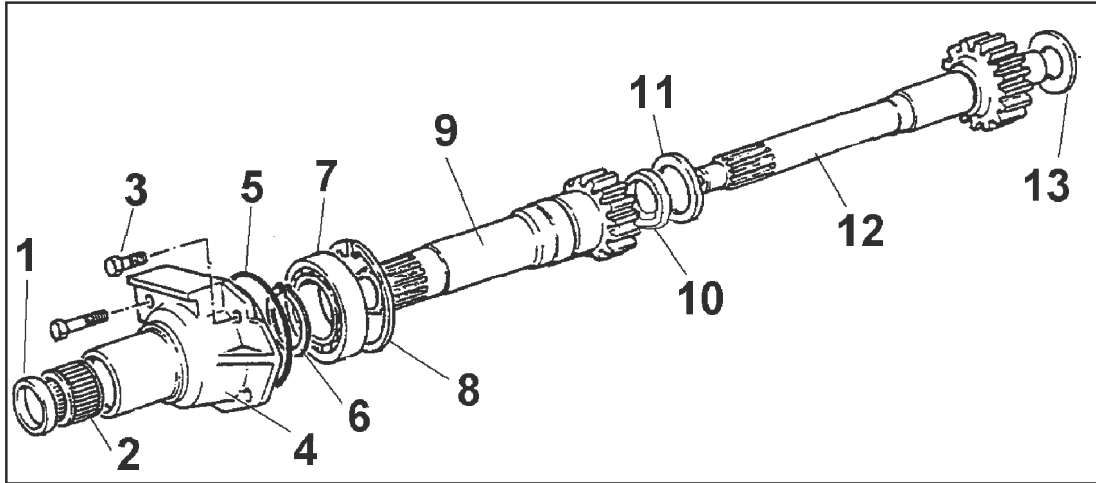
- The bushes (13): if necessary, replace them.
- Replace the "O" rings (10).
- Replace the grease nipples (7) which are not in good repair.
- Thoroughly examine all the remaining components for end play, undue wear, distortion, cracks, etc. Replace any which show signs of undue wear or damage.

6.3 - Reassemble

- Invert the disassemble procedure by complying with the exploded view in previous page and taking into account the following items:
- After the positioning of the brake lower cross shaft (8), secure it by means of the woodruff key (9).
- Comply with the correct positioning of reassemble of the center arm (lever - 11), the cross shaft arm (14) and the plate (12) which serves as a stop.
- Firmly tighten the center arm (11) pinch bolt.
- After all components have been reassembled, check if the assy axial clearance is not excessive. If so, add one or more adjusting shims (15), as required.
- As soon as the reassemble is complete, carry out a free travel inspection on the brake pedals. The free travel should be 40 to 50 mm (1.5 to 2 in) and equal for both pedals.

7 - Gearbox inner assy disassemble

7.1 - Input housing assy and main drive input shaft



- | | |
|---|---|
| 1 - Seal | 8 - Snap ring of the bearing (7) inside the input housing (front flange retainer) |
| 2 - Needle roller bearing | 9 - PTO input shaft (outer) |
| 3 - Input housing securing bolts | 10 - Seal |
| 4 - Input housing (front flange retainer) | 11 - Washer |
| 5 - "O" ring | 12 - Main drive input shaft (inner) |
| 6 - Snap ring of the bearing (7) over the PTO input shaft (9) | 13 - Spacer |
| 7 - Bearing | |

- a) Release the securing bolts (3) from the front retainer flange (input housing - 4), then withdraw the input housing complete.



NOTE:

The main drive input shaft can only be removed after the PTO output shaft (item 12 - page 19) is removed from its front gear (item 11 - page 19).



- b) If the input housing (front retainer flange) assy is to be removed, remove the snap ring which holds the PTO input shaft inside the front retainer flange.

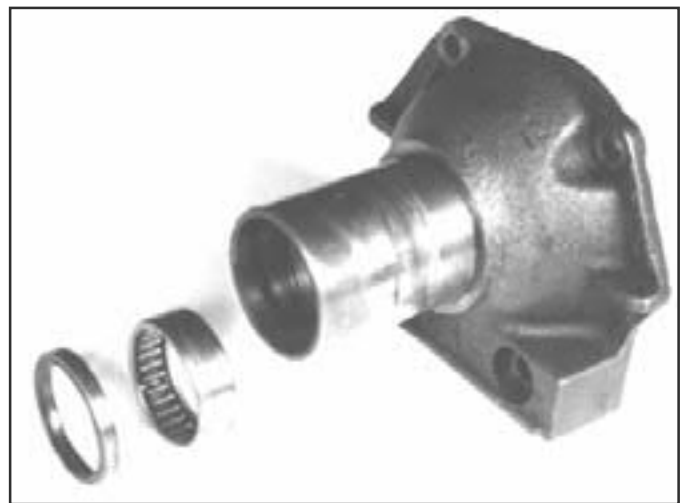
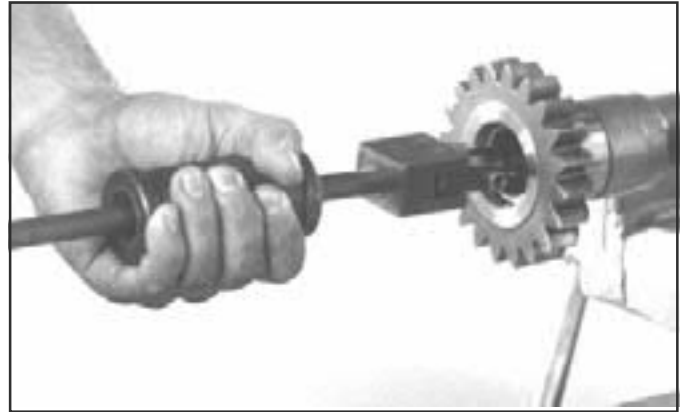
- c) Inspect the bearing (7) for wear or damage.
If necessary, remove it by releasing the snap ring (6) using a bench press.
- d) Also replace the "O" ring (5).
- e) Inspect the condition of the needle roller bearing and the seal (10) inside the PTO input shaft (9). If the transmission casing is to be rebuilt, these items should be replaced.

For reassemble, use a suitable tool in order not to damage the components.

Also inspect the PTO input shaft and the main drive input shaft (9) and (12). If they show signs of wear or cracks in the gear splines and teeth, replace it (them).

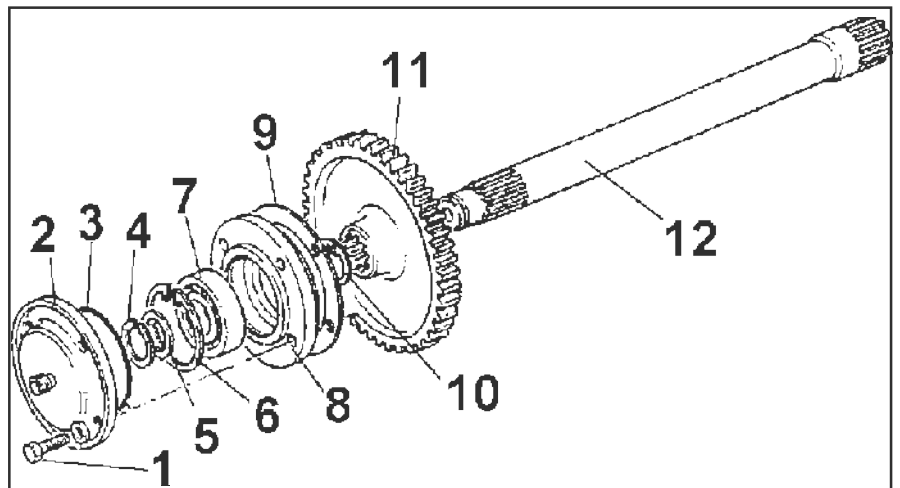
- f) Likewise examine the seal (1) and the needle roller bearing (2) of the input housing (front retainer flange).

If the transmission gear is to be rebuilt, these items should be replaced.

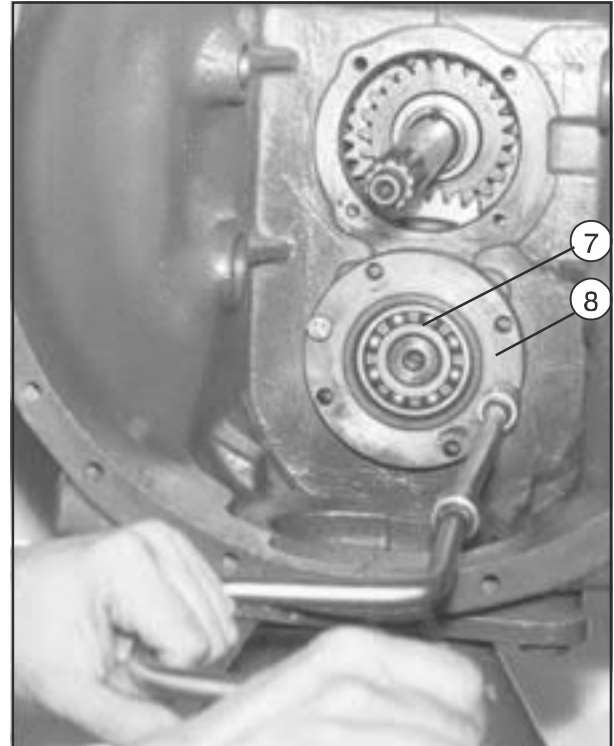


7.2 - PTO output shaft

- 1 - Bolts
- 2 - Front cover
- 3 - "O" ring
- 4 - Sealing ring
- 5 - Snap ring
- 6 - Inner sealing ring
- 7 - Bearing
- 8 - Flange
- 9 - Gasket
- 10 - Sealing ring of the gear (11) over the shaft (12)
- 11 - PTO driven gear
- 12 - PTO output shaft

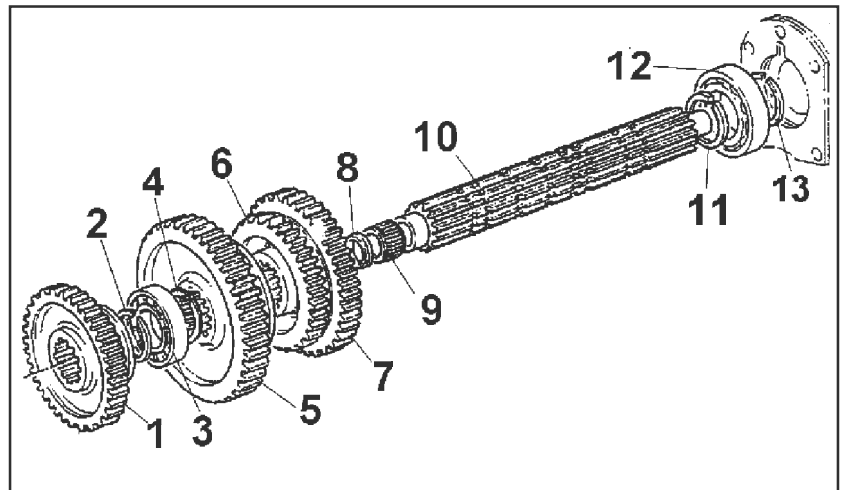


- a) Remove components in following the order:
- Bolts (1)
 - Front cover (2) and "O" ring (3)
 - Retaining ring (4)
 - Snap ring (5)
 - Retaining ring (6)
- b) Remove the flange (8) together with the bearing (7). For this operation, use 2 bolts as a puller - refer to the figure opposite.
- c) Pull the PTO output shaft (12) out of the rear of the casing. The gear (11) will be kept loose inside of the casing.
- d) Examine the bearing (7) of the PTO flange. If necessary, remove it for replacement.
- Also replace the gasket (9), the "O" ring (3) and other components which are to be replaced.



7.3 - Mainshaft

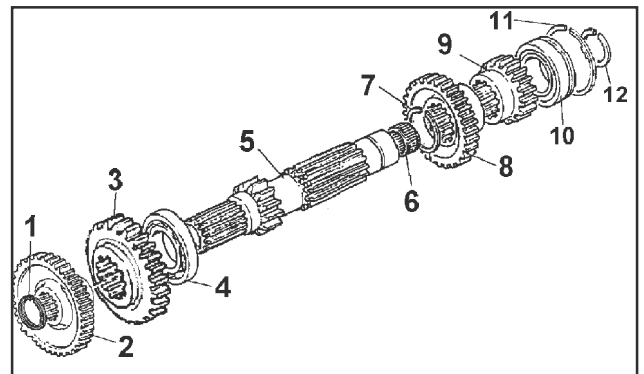
- 1 - Fourth speed driven gear
- 2 - Circlip
- 3 - Front bearing
- 4 - Retaining ring
- 5 - 1st speed and reverse driven gear
- 6 - 3rd speed driven gear
- 7 - 2nd speed driven gear
- 8 - Spacer ring
- 9 - Needle roller bearing
- 10 - Output shaft
- 11 - Snap ring
- 12 - Rear bearing
- 13 - Snap ring



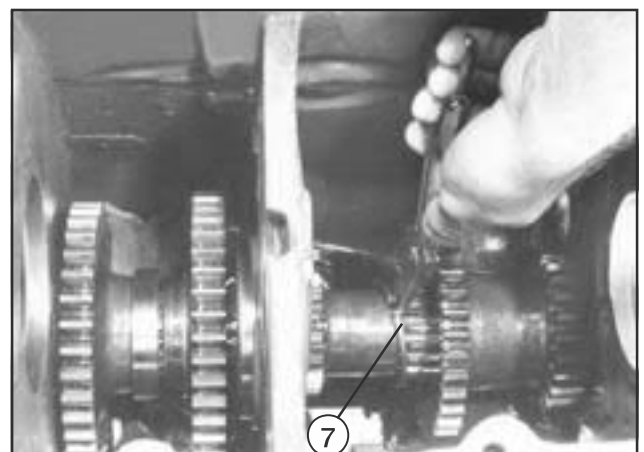
- a) Slide the mainshaft rearwards, until its bearings is out of the bore, then remove the fourth speed driven gear (1).
- b) Remove the needle roller bearing (9) and the spacer (8) from the front grooves of the mainshaft (10). Then, drive out the circlip (2) in front of the bearing (3) and remove the bearing.
- c) Then, drive out the other circlip (4) and have the mainshaft slid rearward, removing the first and reverse gear (5) and second and third gears (6 and 7), which are meshed gears.
- d) If it is necessary to disassemble the bearing (12) from the rear of the shaft (10), remove the circlips (11 and 13) and, using a press, remove it by the front end of the shaft.

7.4 - Secondary shaft

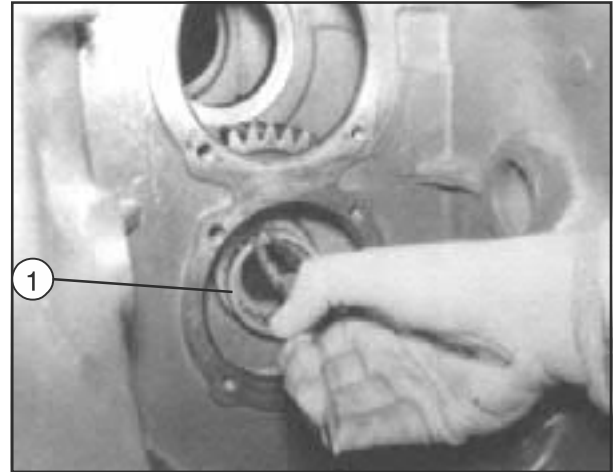
- 1 - Snap ring
- 2 - Secondary shaft (5) driving gear
- 3 - 4th speed driving gear
- 4 - Front bearing
- 5 - Secondary shaft (incorporates the 1st speed driving gear)
- 6 - Needle roller bearing
- 7 - Retaining ring
- 8 - 3rd speed driving gear
- 9 - 2nd speed driving gear
- 10 - Rear bearing
- 11 - Bearing (10) retaining ring
- 12 - Snap ring



- a) Slide the snap ring (7) from the third gear over the unsplined portion of the secondary shaft (5) figure at right.
- b) Then, slide the secondary shaft a little rearwards, then remove the PTO gear (item 11 - page 19) in front of the casing.

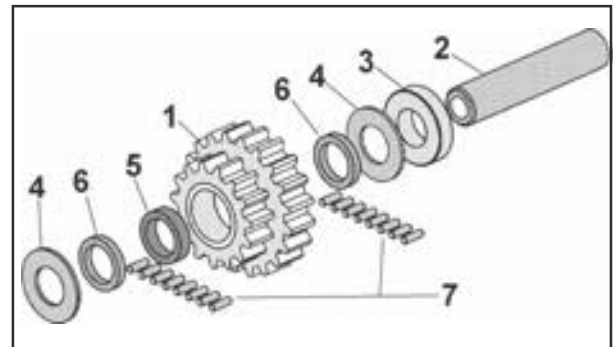


- c) Drive out the snap ring (1) which retains the input gear (2).
- d) Slide the secondary shaft (5) rearwards and remove the input gear (2) and the 4th speed gear (3).
- e) Remove the small internal snap ring (12) of the rear bearing (10), then slide the secondary shaft inwards, with help of a fiber/rubber mallet.
- f) Remove the 2nd speed gear (9) and the 3rd speed gear (8).
- g) Inspect all items for undue wear or damage, cracks, ruptures.
- h) Also examine the condition of the bearing for wear or damage.



7.5 - Reverse gear assy

- 1 - Reverse gear
- 2 - Reverse gear shaft
- 3 - Spacer
- 4 - Thrust washers
- 5 - Central spacer washer (between rollers)
- 6 - Roller retaining washers
- 7 - Set of rollers (56).

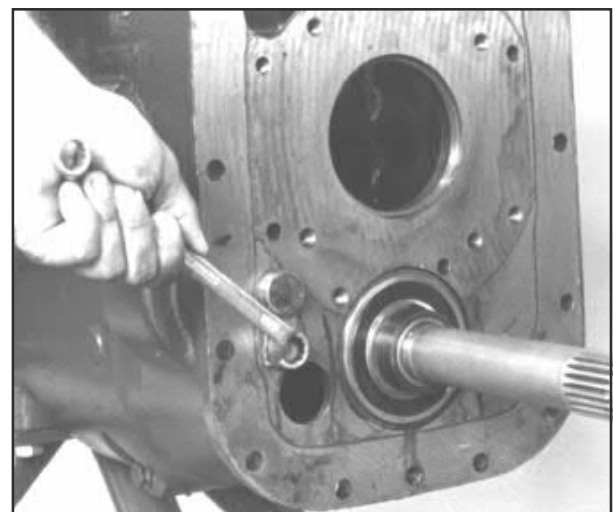


- a) Unlock and remove the bolt and the shaft retaining plate.
Then, remove the shaft by the rear end and, at the same time, holding the reverse gear assy in order not to drop.
- b) Separate all components; clean them with clearing solvent and inspect the items for undue wear or damage. Replace any of them which need to be replaced.



NOTE:

Should it be necessary to replace any rollers, they all should be replaced at the same time.



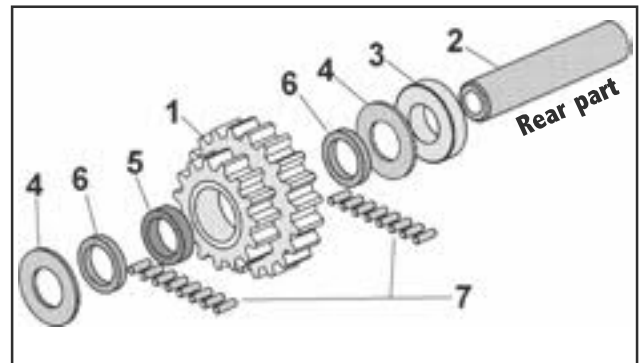
8 - Gearbox reassemble and servicing

The reassemble only consists in following the reverse order of disassemble.

Always comply with the identification of the items in the exploded views of each assy and corresponding instructions described below.

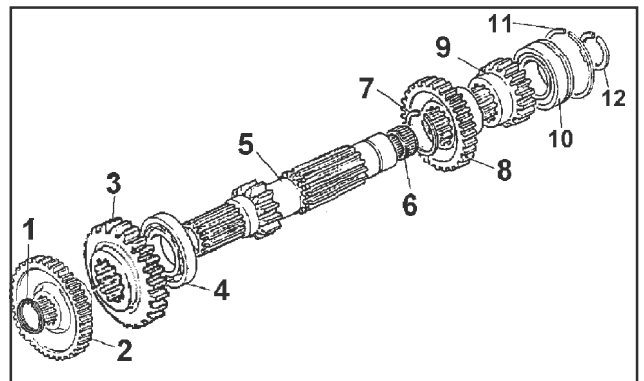
8.1 - Reverse gear assy

- a) Smear the inner surface of the gear (1) in petroleum jelly to facilitate reassemble, then reinstall the rollers (7), the spacer ring (5) and the washers (6);
- b) Afterwards, reinstall the assy into the housing, paying attention to the spacer (3) which should be facing the rear of the casing and the smaller gear (1) should be facing the front end of the transmission casing.

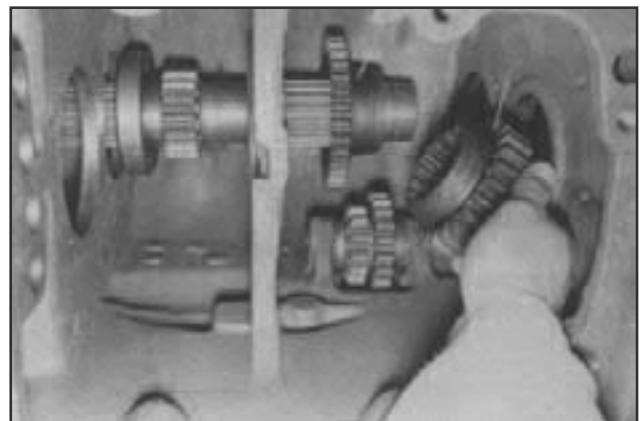


8.2 - Secondary shaft

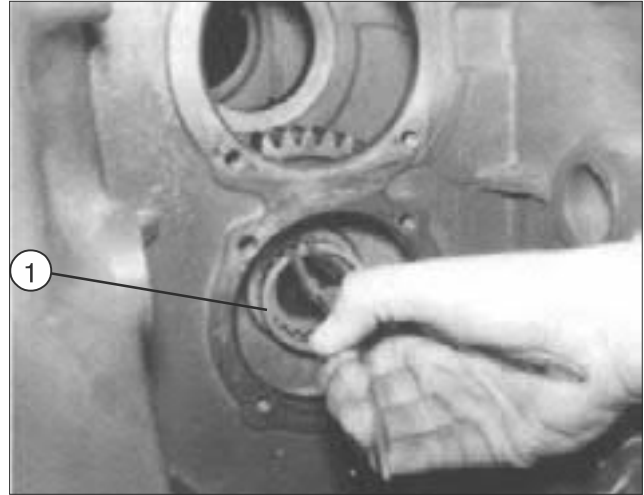
- a) Relocate the secondary shaft (5) into the housing from the front end, locating the snap ring (7) correctly in its groove.
Next, reinstall the third speed driving gear (8) and the second speed driving gear (9);



- b) Slide the secondary shaft rearward and reinstall the rear bearing (10).
Then, reinstall the 4th speed driving gear (3) and the input gear (2);

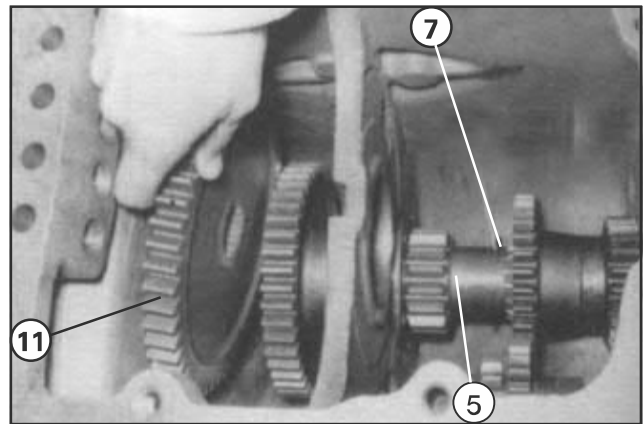


- c) Install the snap ring (1) which retains the input gear (2);



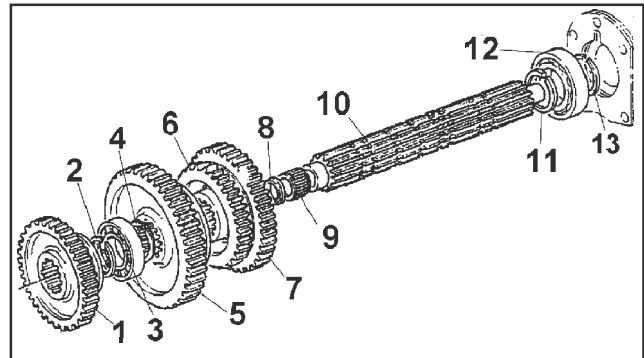
- d) Locate the PTO gear loose in the bottom of the gearbox (item 11 - pages 19 and 25).

- e) Next, move the secondary shaft (5) forward in order to allow the snap ring (7) to be correctly located in its groove.



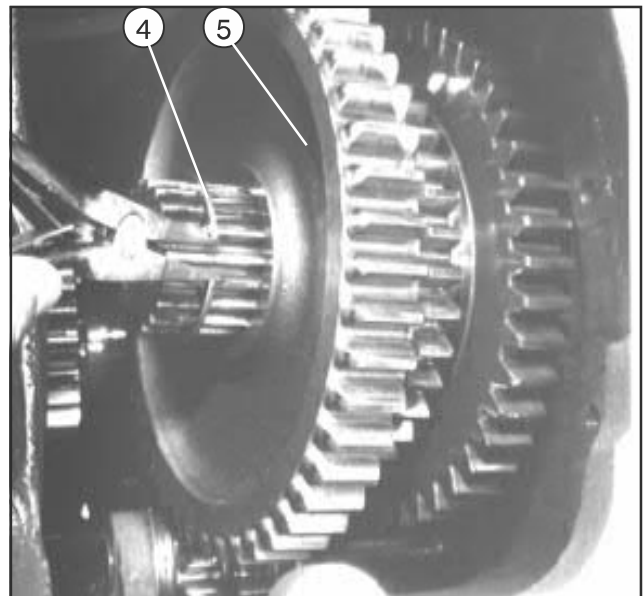
8.3 - Mainshaft

- a) Relocate the mainshaft with the rear bearing (12) already installed through the rear of the gearbox case, then through the second and third (7 and 6) and first/reverse gears (5).

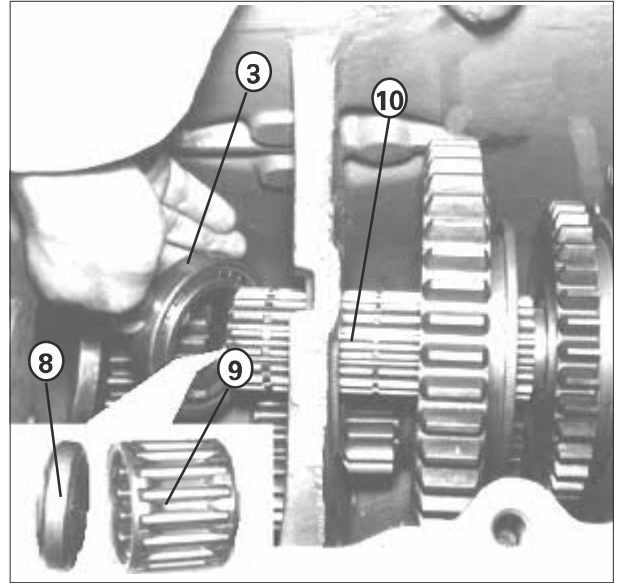


- b) Refit the circlip (4), the bearing (3) and the other circlip (2).

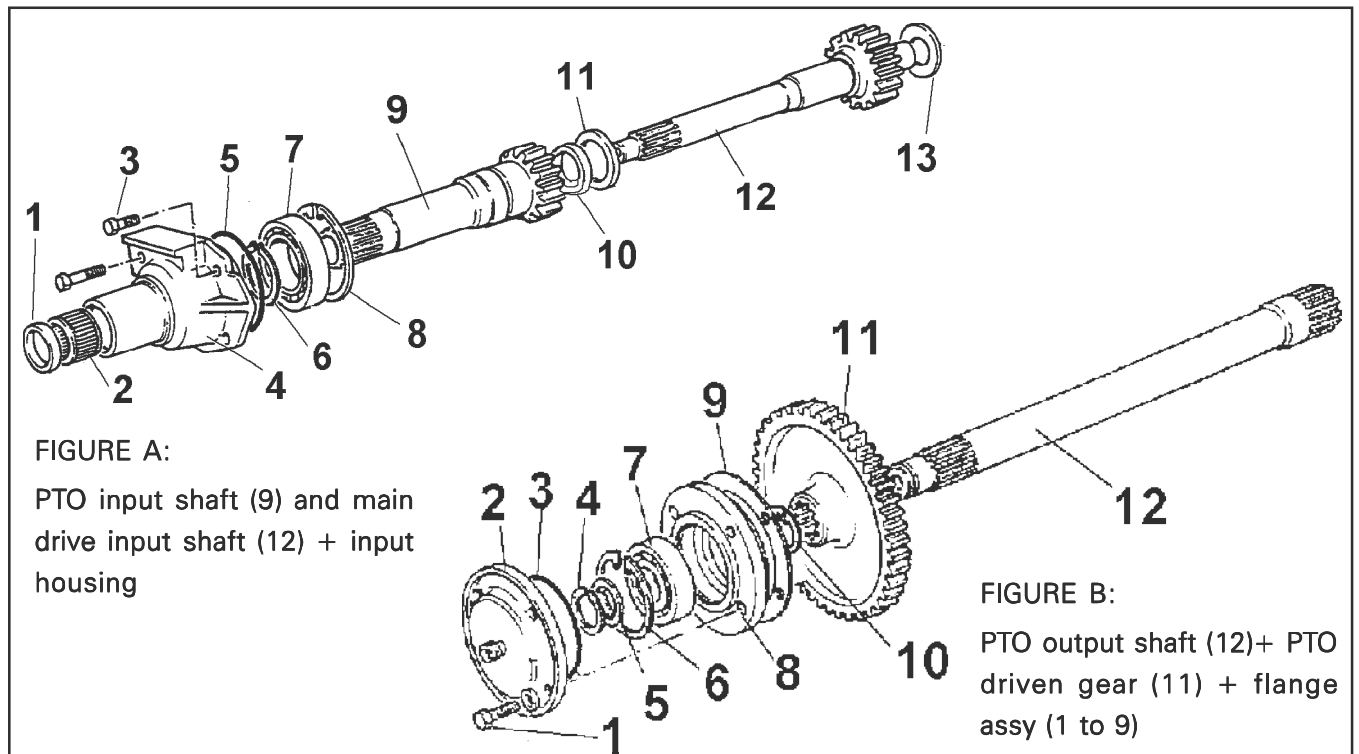
- c) Reinstall fourth gear (1) and push the output shaft (10) forward, placing the rear bearing (12) in its bore.



- d) Insert the needle roller bearing (9) in the front cavity of the mainshaft (10), then refit the spacer ring (8).



8.4 - Main drive input shaft + PTO output shaft + input housing



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