

Fiat Trattori
FIAT

HAVE NOT SENT.
ENGINE PAGED AS
REFERS ONLY TO
DIESEL.

411 R *wheel tractor*

SERVICE MANUAL

SECOND EDITION

Service Department
Via Canaprii, 3 - Stupinigi - Torino (Italy)

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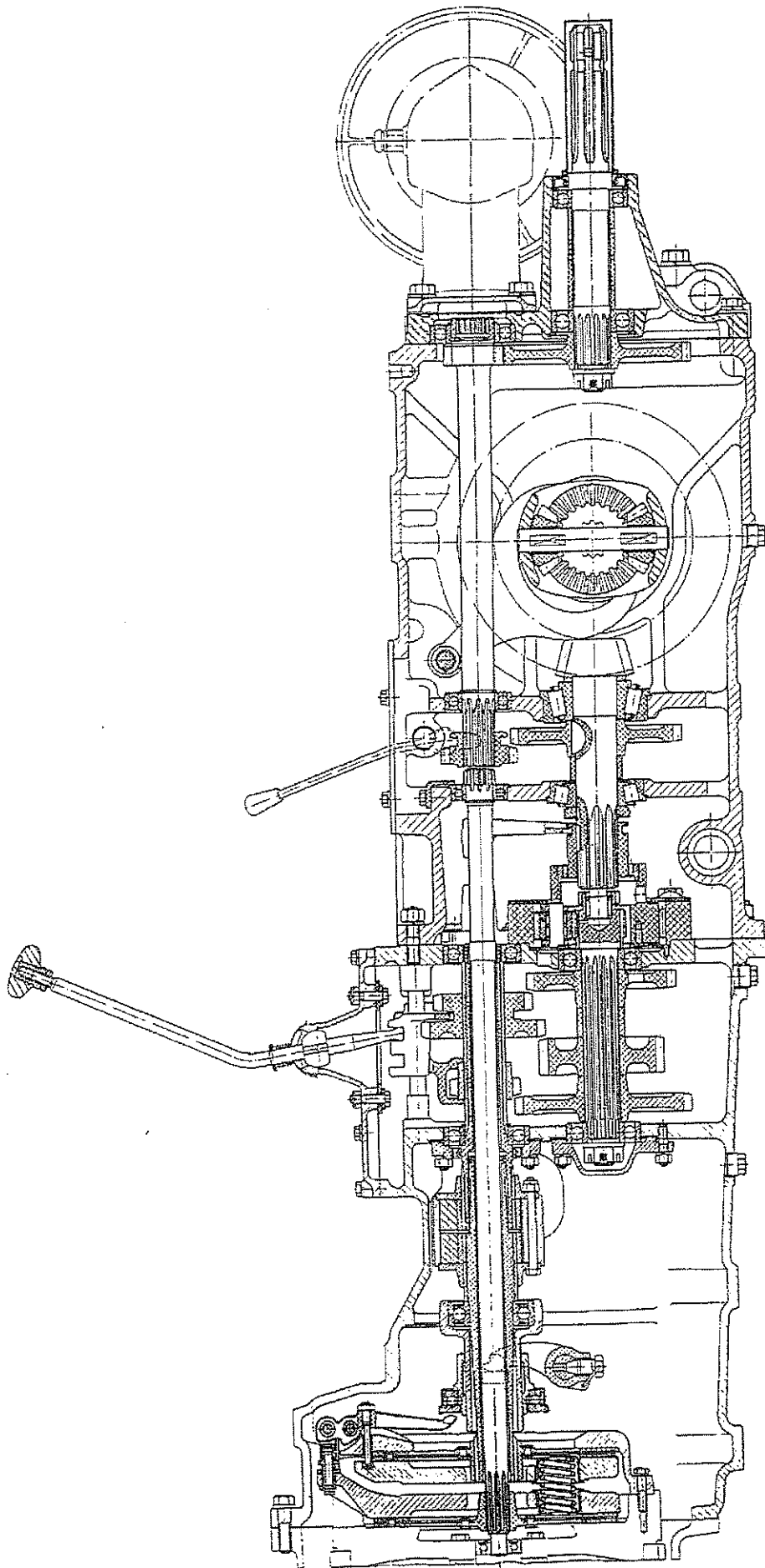


Fig. 81. - Transmission longitudinal section.

TRANSMISSION ASSEMBLIES

CLUTCH

The master clutch assembly is composed of two dry, single-plate clutches, one for the tractor transmission drive and the other for the power-take-off drive.

The unit is controlled by one single pedal which, during the first part of its travel, disengages the main clutch (transmission) and in the following one, the power-take-off, but only when this attachment is directly driven by the engine (independent power-take-off).

The three diagrams of Fig. 82 illustrate, respectively:

a) the clutch engaged; b) the main clutch disengaged; c) clutch completely disengaged.

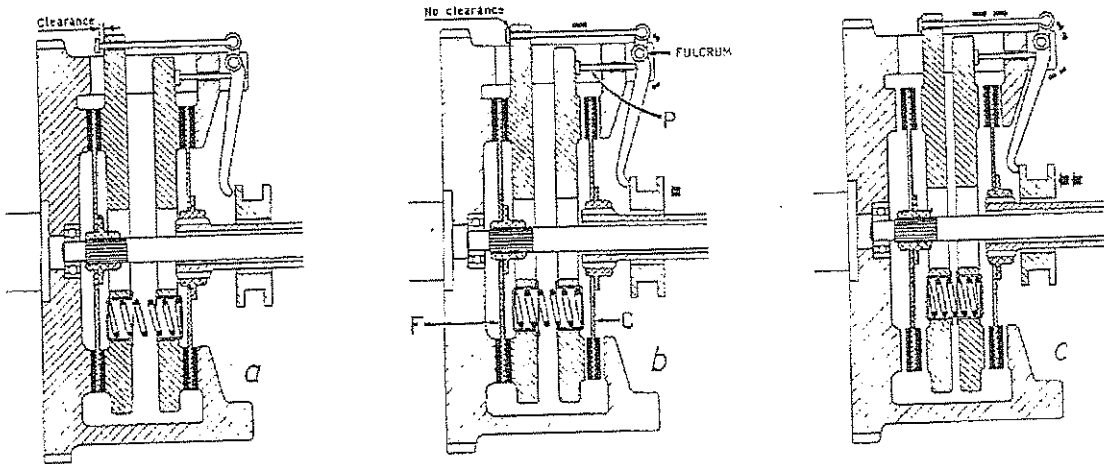


Fig. 82. - Clutch functional diagram.

a - engaged clutch. b - main clutch, disengaged. c - clutch, completely disengaged.
 F = Power take-off driven plate - C = Gearbox driven plate - P = Lever points.

Removal and stripping of clutch.

Removing the clutch assembly from tractor:

Parts to be removed.

- The batteries.
- The exhaust pipe.
- The engine, with the front axle (Fig. 83).

Operations and cautions.

Disconnect the following components:

— the hydraulic pump oil lines, the steering shaft lever longitudinal tie-rod, the board from the battery support and this support from the gearbox case, the accelerator pedal tie-rod from the transmission shaft; the electric cables central connection;

— fit two wooden wedges on the front axle, attach the engine assembly to a lift and place the gearbox case on a stand;

— remove the screws assembling the engine to the gearbox and facilitate the removal by actuating the clutch pedal.

Note. - To pull the flywheel inner pilot bearing use tool A 619027.

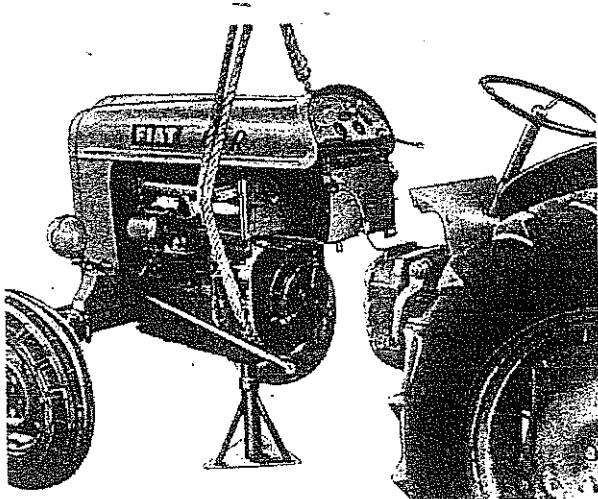


Fig. 83. - Removal of engine, with front axle.

B

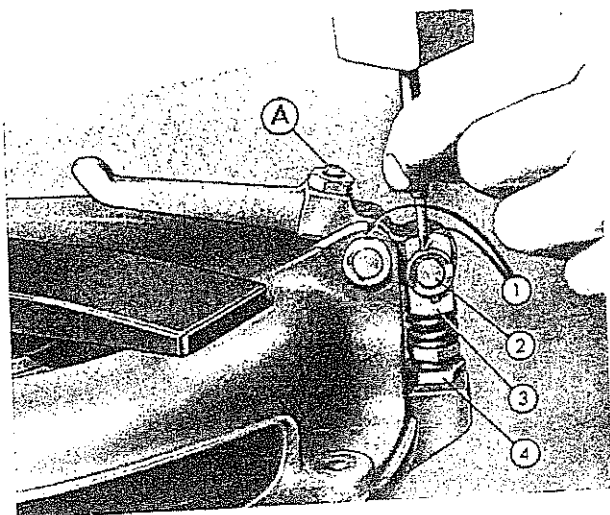


Fig. 84. - Stripping of clutch on device A 711063/A.

A. Disengagement lever adjustment nuts - 1. Elastic pins -
2. Lever pivots - 3. Forks - 4. Fork adjusting nuts.

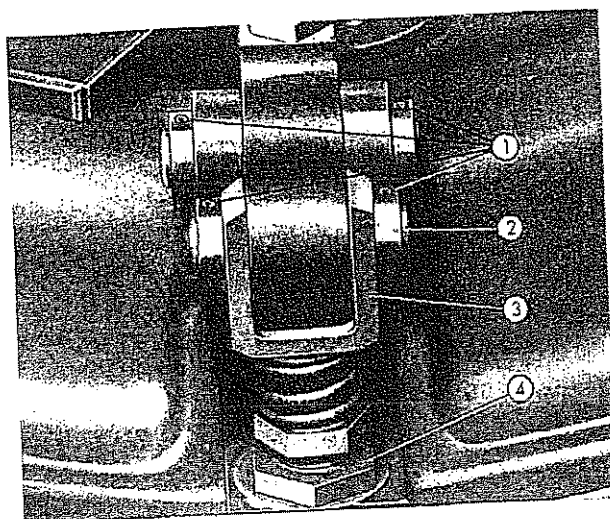


Fig. 85. - Front view of a tie-rod and orientation of elastic pins.

(See the last figure for references).

Stripping of clutch:

Mount clutch on fixture A 711063 or on fixture A 711063/A, remove the elastic pins (1, Fig. 84) and push out the disengagement lever pivot pins (2). By slackening the stud bolts fastening the clutch to fixture, all parts become free.

If the clevises (3) must be removed unscrew them from the pressure plate after slackening the adjusting nuts (4).

Inspection of clutch dismantled parts.

Check the clutch components as follows, according to the data of table at page 57:

- check condition of friction linings and of metal surfaces contacting them; if necessary smooth them. If the rings are soaked with oil, replace them, as washing in gasoline and surface brushing are insufficient;
- check clearance between the clutch driven disk hub teeth and splined shafts;
- check the throw-out bearing, and the clutch shaft pilot bearing, located in the flywheel;

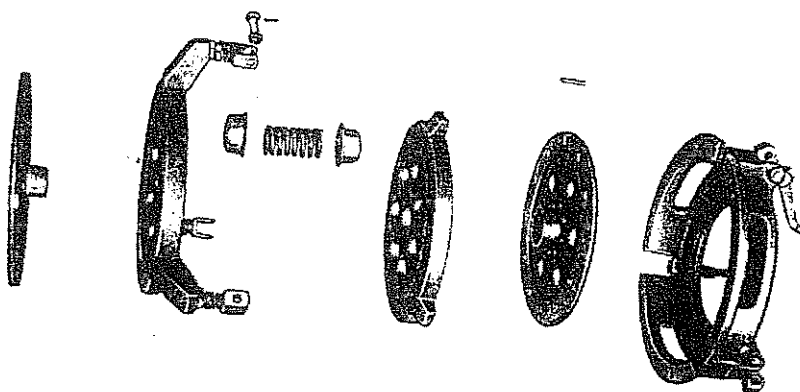


Fig. 86. - Clutch, exploded view.

- check clearance between bushes and disengagement lever pins;
- check plate spring characteristics;
- check the throw-out collar working sliding surface. If wear does not exceed the permissible limits, the shaft can be mounted again after rotating it 180°; if necessary replace the parts when grease drips due to excessive clearance.

Assembling and adjusting the clutch.

Lubrication.

Smear lightly the following components before assembling using quality chassis grease:

- the clutch disengagement lever pivots, the clevis ends contacting the disengagement levers (3, Fig. 84), the clutch-gearbox and the clutch power take-off shaft splines, the ball ends of push levers (P, Fig. 88), the clevis lever ends where contacting the disengagement collar; in addition service the bearing housing in engine flywheel.

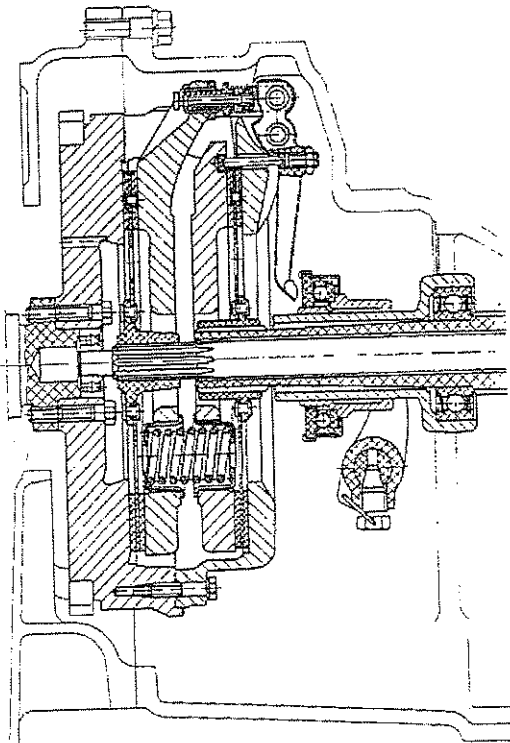


Fig. 87. - Clutch section.

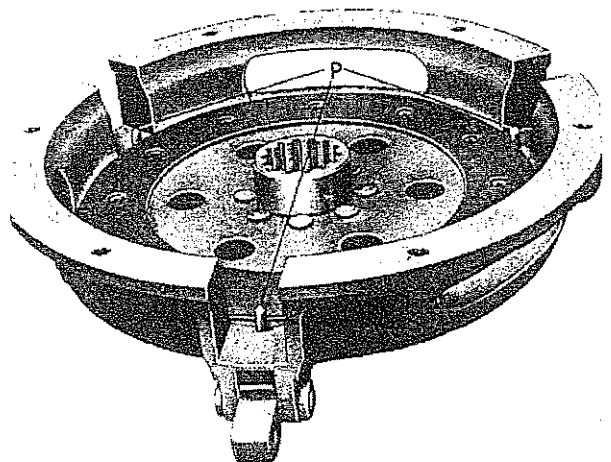


Fig. 88. - Clutch plate centering with reference to points P.

Assembling the clutch components.

It is easily performed by following Figs. 86 and 87 and caring that the clutch-gearbox plate is centered with reference to the caps and that the elastic pins are oriented as shown in Fig. 85.

Clutch assembly to be performed on fixture A 711063, using it on the side marked with the tractor number.

Clutch adjustment.

For clutch adjustment it is not necessary to place upon the fixture A 711063 the power take-off disc, which remains outside the assembly, and is substituted by a ring (Fig. 89) superposed to fixture E.

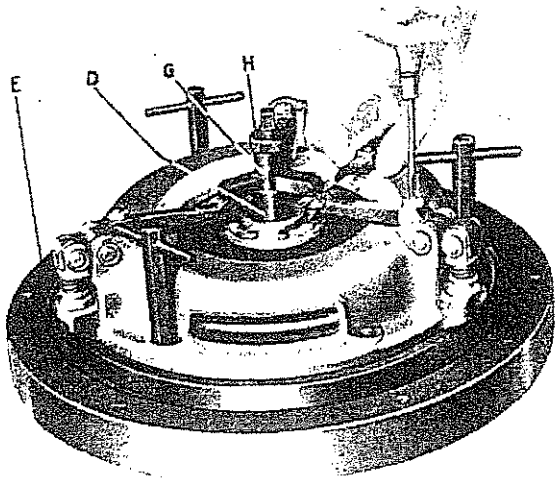


Fig. 89. - Clutch adjustment using fixture A 711063
 E, G, H Fixture components - D Spacer bearing No. 411 R,
 used also for other wheel types belonging to the series 400.

Clutch control adjustment.

Assembly of clutch on engine.

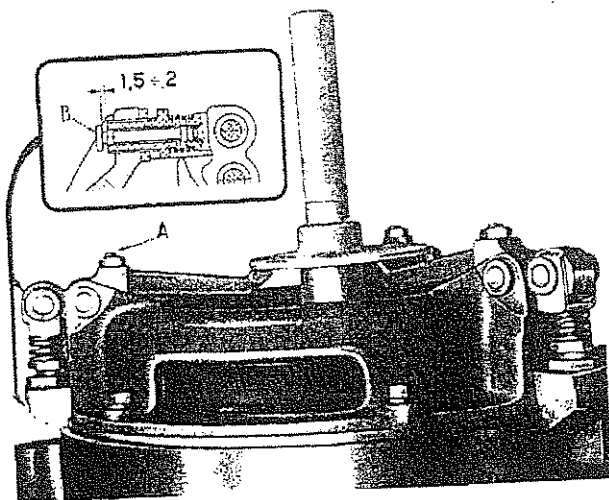


Fig. 90. - Clutch adjustment on engine, using tool
 A 117063, complete.

B Clearance 1,5-2 mm (0.0591-0.0787 in.).

Clutch adjustments should be made as follows:

- a) adjustment of the complanarity of the clutch disengagement three lever ends. The adjustment to be made according the Fig. 89 i.e., by checking, using feeler gauge, that between the lever ends and the checking elements laid upon the spacer there is a max clearance of 0,1 mm (0.0039"); a different clearance requires to unscrew the fastening nut and adjusting the proper screw.

Note. - If clutch is installed on fixture A 711063/A, the adjustment may be made after the assembly on the tractor, using fixture A 117063 provided with a suitable flange (Fig. 90).

- b) Adjust the clearance (B, Fig. 90) of the power take-off pressure plate clevis. Check that clearance be 1.5 to 2 mm (0.0591" to 0.0787"), and if different, unscrew the locknut and screw on or unscrew the sleeve. The clearance adjustment may also be made when the clutch is mounted on the tractor through the gearbox side cover.

The free travel of the clutch pedal is 25 to 35 mm (0.9843" to 1.3780"). Plate wear, however, decreases the free travel. Unscrew the pedal tie-rod clevis as much as necessary to reestablish the previous value.

The centering of the assembly on the engine flywheel is facilitated by using fixture A 117063 (Fig. 91) that may also be used for the disengagement levers adjustment, when fitted with the proper plate (Fig. 90).

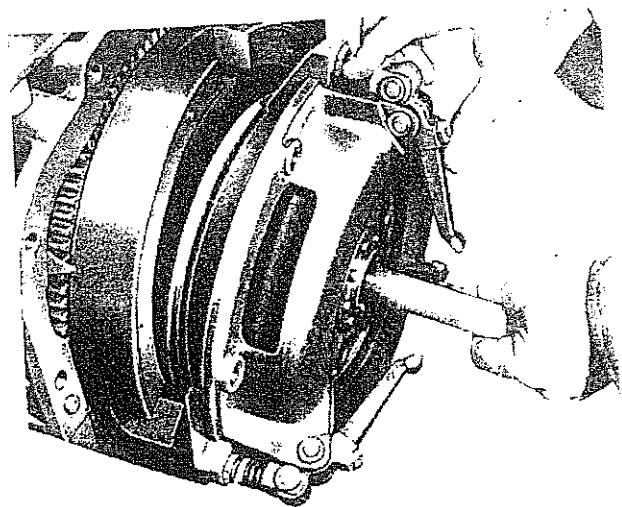


Fig. 91. - Mounting clutch on engine using tool A 117063.

FLEXIBLE COUPLING BETWEEN CLUTCH SHAFT AND GEARBOX

Noisy transmission.

Calls for the dismantling of the elastic coupling to check the rubber block efficiency; if blocks have excessive wear, replace them.

When reassembling ascertain the correct functioning by locating coupling and shaft splines correctly according the drawing of Fig. 92, in addition tighten the fastening bolts of the flanges to a torque of 2,5 kgm (18 ft.lb).

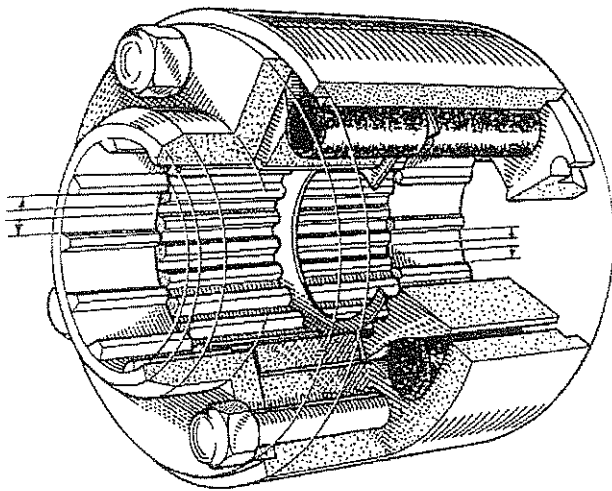


Fig. 92. - Diagram of flexible coupling for clutch-gearbox shafts.

CLUTCH COMPONENTS: SPECIFICATIONS, ASSEMBLY CLEARANCES AND PERMISSIBLE WEAR

Assembly clearances	mm		in.	
	mm	in.	Wear limits mm	in.
Between wheel drive splined shaft and its disc	0,010 to 0,106	0.0004 to 0.0042	0,35	0.0138
Between power take-off clutch splined shaft and its disc	0,013 to 0,115	0.0005 to 0.0045	0,35	0.0138
Between wheel drive shaft spline flanks and flexible joint collar	-0,024 to -0,072	-0.0009 to -0.0028	0,20	0.0079
Between disengagement lever bushes and their pins	0,013 to 0,064	0.0005 to 0.0025	0,30	0.0118
Between shaft and clutch throw-out collar	0,030 to 0,145	0.0012 to 0.0057	0,30	0.0118
Clutch driven disc thickness (wheel drive and power take-off), complete with friction lining	8,6	0.3386	7	0.2756
Tightening torque for flexible coupling flange nuts (Fig. 92)	2.5 kgm		18 ft.lb	
Clutch spring specifications				
Spring free length	66,1 mm (2.6024 in)			
Spring length under check load	45,2 mm (1.7795 in)			
Check load	112,8 to 124,6 kg (248.7 to 274.7 lb)			

Each clutch area 64.65 sq ins.



GEARBOX AND EPICYCLIC REDUCTION GEAR

Dismantling - Stripping of components.

Remove the gearbox from tractor as follows:

Parts to be disassembled.

The engine, with its front axle.

The steering box.

The two foot-boards, the rear lamps cable and the clutch disengagement tie-rods.

The stripping of gearbox components is facilitated by installing it on the rotary stand ARR 2204 (Fig. 93).

The central clutch shaft and the throw-out collar.

The gearbox and the epicyclic reduction gear shifter rods.

Operations and cautions.

Follow the sequence described on page 53 for the main clutch removal.

If the tractor is provided with oil lines running from the hydraulic pump to the lift, remove them.

Remove the two screws fastening the clutch throw-out collar support to the gearbox, and remove it together with the engine clutch shaft and the flexible coupling.

Remove the gearbox cover with the shift lever; remove the shifter forks, after pulling the fastening pins, beginning from the central rod (2, Fig. 95); slide out the reduction gear control sleeve with shifter forks and rods; take away the 3 springs (Section C-C, fig. 100) and the detent balls.

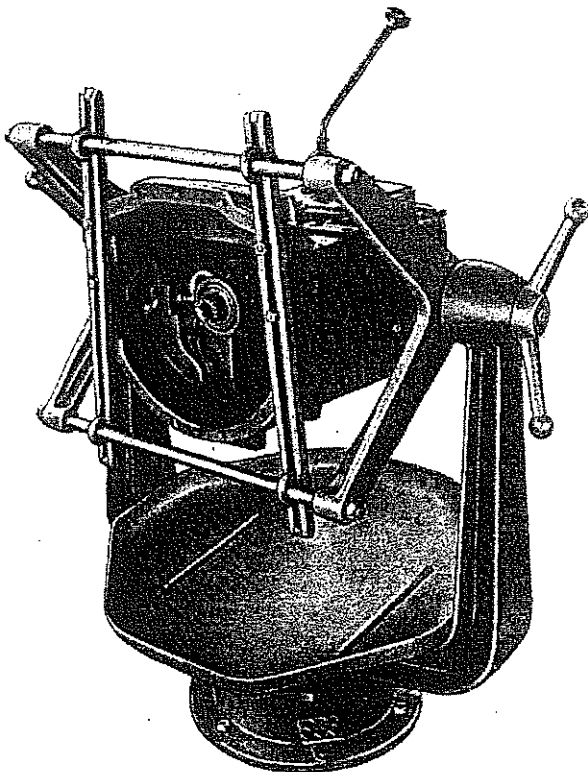


Fig. 93. - Gearbox casing mounted on rotary stand ARR 2204.

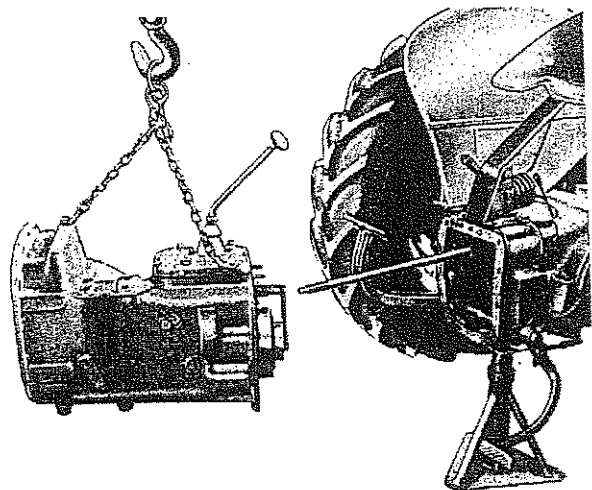


Fig. 94. - Removal of gearbox casing from tractor.

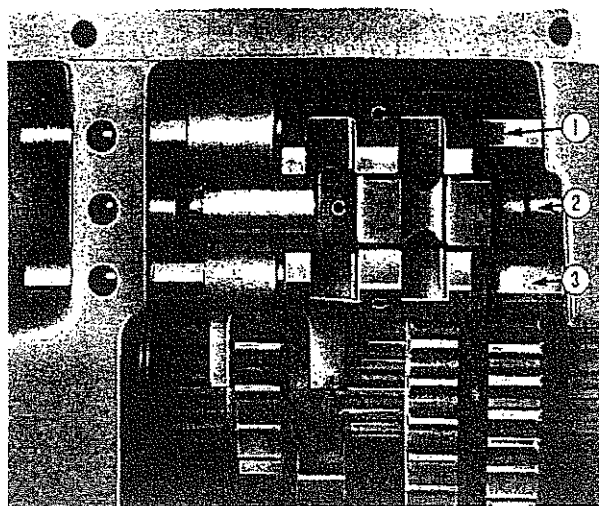


Fig. 95. - Upper view of gearbox control gears and shifter forks.

1. Shifter forks for 1st, 4th gears and reverse - 2. Epicyclic reduction gear control fork - 3. Shift fork controlling 2nd and 5th, 3rd and 6th gears.

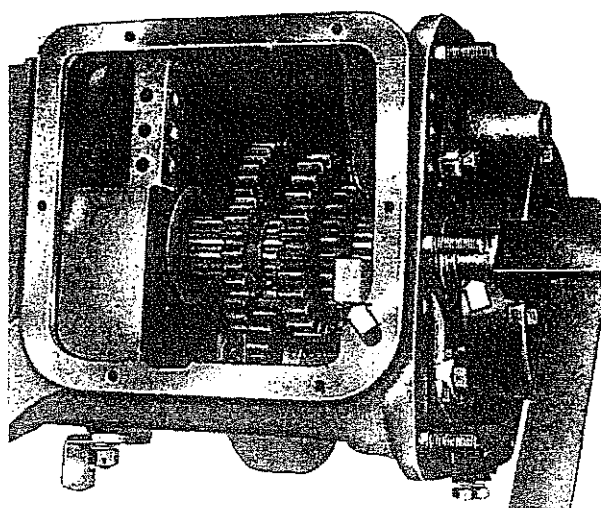


Fig. 96. - Disassembly of primary shaft.

(Arrows show the wooden wedge and the punch).

Primary shaft.

Note. - When also the secondary shaft is to be disassembled, engage two gears in order to unscrew the front end fastening nut.

Take away the primary shaft front cover and remove the shaft by hammering on rear end.

Prevent the rear bearing from coming off together with the shaft by placing a wooden wedge as shown in Fig. 96.

If necessary pull out the bearing also using punch A 960703.

Reverse gear and its shaft.

Remove the stop and slide out the shaft together with the gear.

Should the shaft removal offer some difficulty, apply a screw to the threaded hole in the axle.

Remove bush from gear using the punch A 928251.

Secondary shaft.

Remove the epicyclic reduction unit and the gearbox wall inner thrust disc;

slide out the secondary shaft with a bronze punch hammering it on its front end.

Checking the stripped out components of the gearbox and epicyclic reduction gear.

Check gearbox and epicyclic reduction gear components against specifications of page 63.

Neither gear teeth nor chamfered surfaces should be damaged.

Check if the teeth of mating gears are working on the whole face length, and if the surfaces are smooth and free from signs of scoring or hammering.

The sliding gear hub internal splines should be free from marks of wear or seizing, and all splines should have their corners without signs of hammering.

The splined primary shaft should be absolutely free from pitting or scoring, especially on gear sliding surfaces. Slide the gears on the shaft and check for clearance between the gear guide flanks and the corresponding shaft spline flanks.