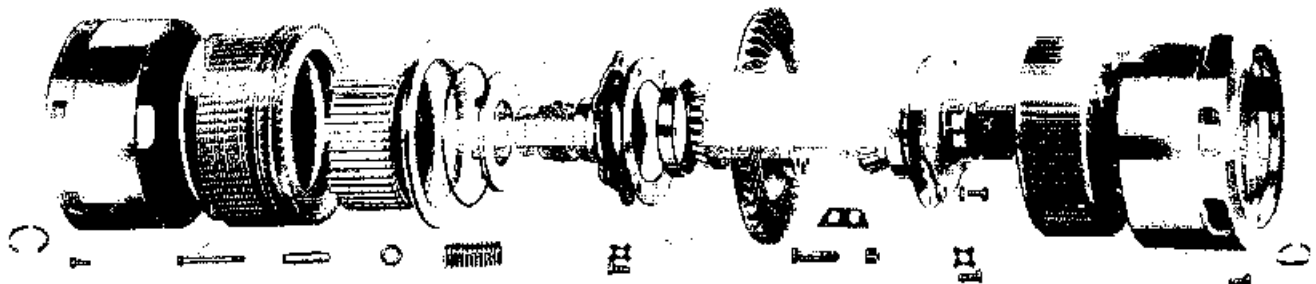


- lock jam nut. This adjustment screw holds the brake band up in its proper location.
5. Install brake spring in brake lever.
 6. Install equalizer bar in bottom of transmission case.
 7. Install throwout fork assembly, making sure it seats in the equalizer.
 8. Install steering clutch cover and grease tubes.
 9. Adjust brakes. Refer to brake adjustment, Topic 57-A, and install brake adjustment cover.
 10. Adjust steering clutches; refer to steering clutch adjustment, Topic 55-A, and install top cover.
 11. Install remaining parts that were removed.

106 -- "HD 10" Steering Clutches and Brakes



EXPLODED VIEW OF STEERING CLUTCH AND BEVEL GEAR

FIG. 1

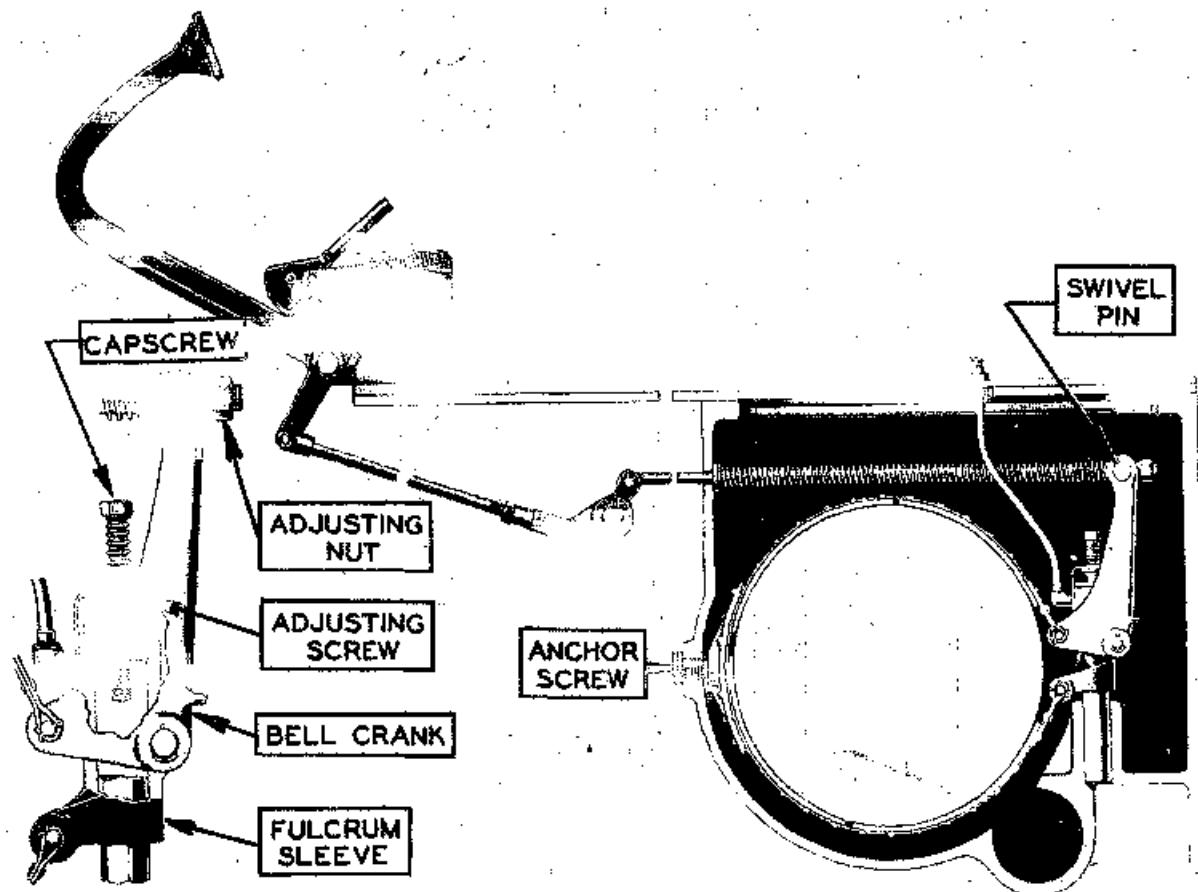


FIG. 2

A. REMOVAL OF BRAKES:

1. Remove seat cushion and batteries. Remove rear enclosure plate.
2. Shut fuel off under tank by turning shut-off cock handle to vertical. Fig. 3.

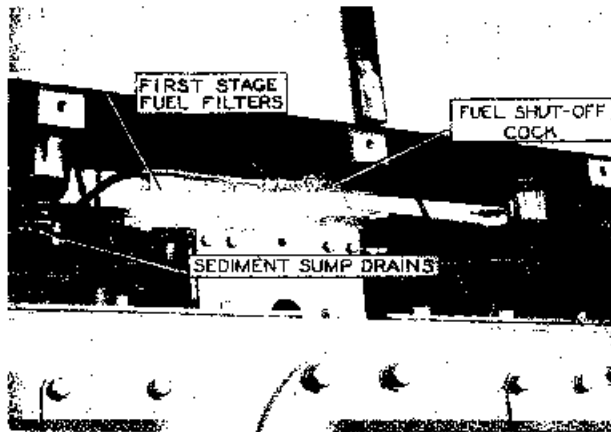


FIG. 3

3. Disconnect fuel lines under tank and remove clamp bolts holding fuel line to fender. Fig. 3.
4. Disconnect both inlet and outlet lines at filters under tank and remove filters by taking out 2 capscrews holding them to top of transmission case.
5. Remove seat by taking out 3 capscrews on each side holding seat to fuel tank, the 3 capscrews holding seat to top fenders, and the 2 bolts holding floor plate to front of seat frame.
6. Remove clamp bolt holding return fuel line to rear of seat frame.
7. Remove battery rack by removing 2 bolts on each side holding it to the rear fenders.
8. Remove rear fender support angle by taking out 3 capscrews and 4 bolts in each side.
9. Remove ventilating covers from top of steering clutch cover by taking out 4 capscrews in each. Fig. 4.
10. Remove jam nuts from grease tubes which come up through steering clutch cover assembly. Fig. 4.
11. Loosen steering clutch adjusting screw lock bolts at top of throwout fork and back adjusting screw out far enough to pass by thrust pin; unhook throwout fork spring from dowel in top of case. Fig. 4.
12. Hold rod connector and loosen jam nut. Back screw out of connector.
13. Remove 2 capscrews holding steering clutch covers on each side and remove covers from case. Remove jam nut on grease fitting to brake fulcrum pin.
14. Remove 10 remaining capscrews in top cover. Repeat operation on opposite side.

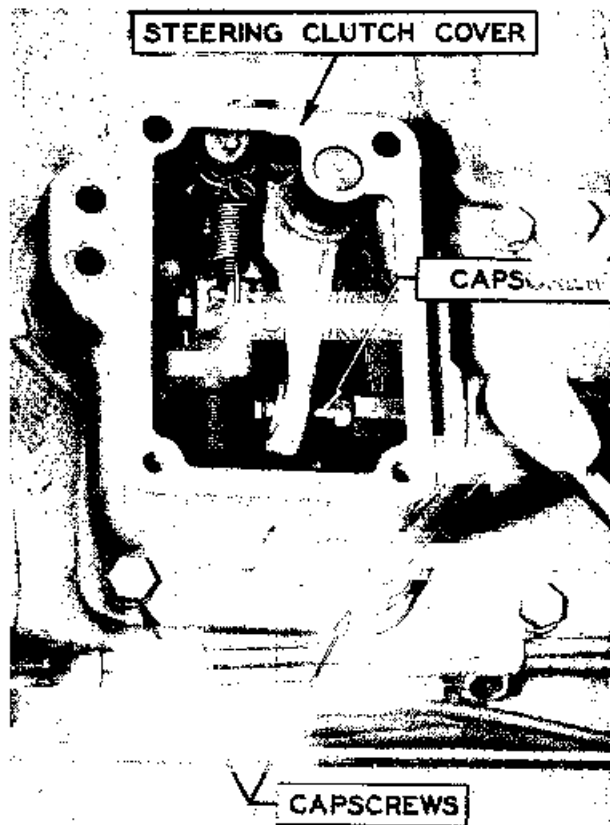


FIG. 4

15. Remove steering clutch throwout forks.
16. Remove equalizers in bottom of each clutch compartment by removing bolt which comes up through bottom of transmission case.
17. Remove 4 capscrews on brake adjusting cover on each side.

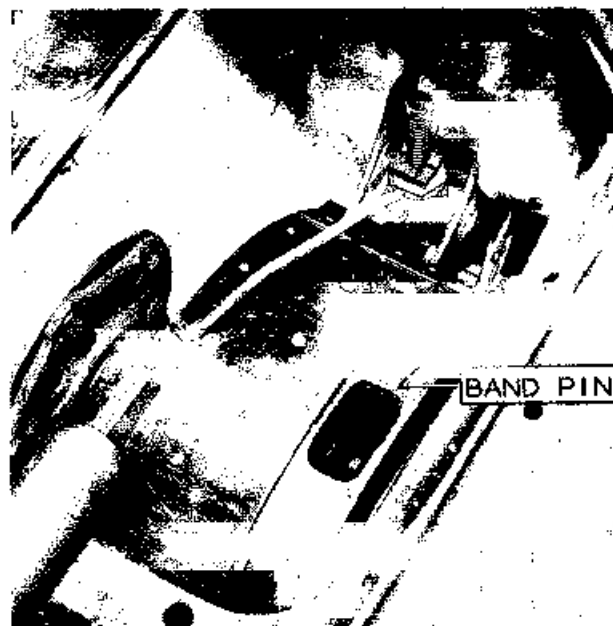


FIG. 5

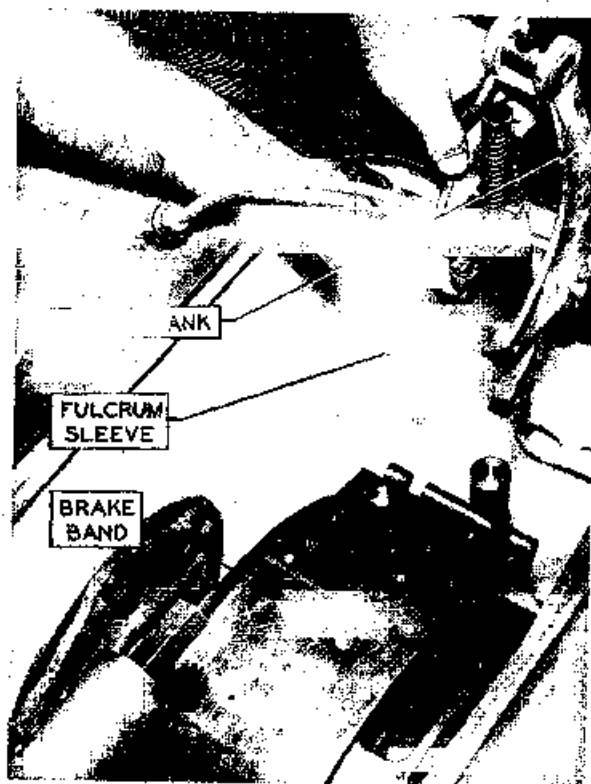


FIG. 6



FIG. 7

18. Remove adjusting nut, swivel pin, brake rod pin, cotter pin and washer holding bell crank on shaft; pull bell crank off shaft.
19. Pull brake rod out of case holding spring, flat washer and felt washer so that they will not fall into case.
20. Straighten lock and remove anchor

screws from front of case. Take cap-screws out of top of fulcrum pin and remove band pins; bands can now be removed from case.

B. REMOVAL OF FINAL DRIVE PINION: Standard Tread, "HD 10" Tractor.

1. Remove brakes, see Topic 106-A.
2. Remove lockwire and 8 capscrews which hold the brake drum to the driven hub. Now the drum can be pushed away from the driven hub.
3. Remove axle end covers and sprocket guards.
4. Remove covers from outer end of pinion shaft by taking out 4 capscrews in each.

NOTE: Remove pinion from each side as follows using special pinion puller. On second type HD 10 and HD 10-W, Serial No. 1516 and above, only one pinion needs to be pulled. See paragraph "D." For instructions on pulling HD 10-W (Wide Gauge) see paragraph "C."

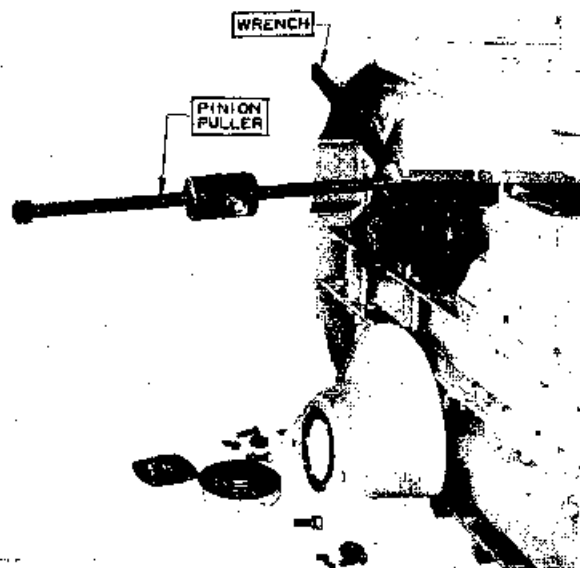


FIG. 8

5. Screw adapter into end of pinion shaft and tighten securely.
6. Set puller pedestal in place between the sprocket spokes and directly over adapter. Screw puller bolts in place.
7. Straighten lockwashers and back pinion nut off pinion shaft.
8. Tighten up on puller nut using a 4 foot pipe or wrench handle, then use ram and jar pinion loose from driven hub.
9. Finish removing nut end of pinion shaft.
10. Finish pulling pinion from clutch compartment.

C. REMOVAL OF FINAL DRIVE PINION: (Wide Gauge HD 10-W)

1. Follow instructions under Topic 106-B,



FIG. 9

1 to 5 inclusive.

CAUTION: Do not attempt to pull the pinion more than $\frac{3}{4}$ " as bearing will be damaged if it is pulled any farther. The inner race of the center bearing will strike the teeth of the gear assembly before the outer bearing comes out of gear case bore.

2. Remove outer bearing race and roller assembly.

NOTE: There are three slots in gear case bore. Use screw driver in these, to remove bearing. Fig. 11-B.

3. Remove capscrews from inside bearing retainer. Fig. 11-C.
4. Slide driven hub toward steering clutch as far as possible.
5. Remove inner bearing from case.

NOTE: To remove inner bearing, place a small punch inside the final gear case bore parallel to the teeth of the pinion. Drive against the outer race of the center bearing until outer case of inner bearing is out of bore case. Fig. 11-C.

6. Remove pinion from case.

NOTE: The pinion can now be lifted away from teeth of gear assembly as the center bearing rollers are clear of the race, thus allowing the pinion to be lifted above its normal position. It will be necessary to turn pinion until flat space on spacer is away from gear assembly to provide clearance and allow the pinion to lift away far enough for the inner race lip on center bearing to clear teeth on gear assembly. Fig. 11-D.

CAUTION: If pinion pulls to a stop it must be turned until it will pull easily.

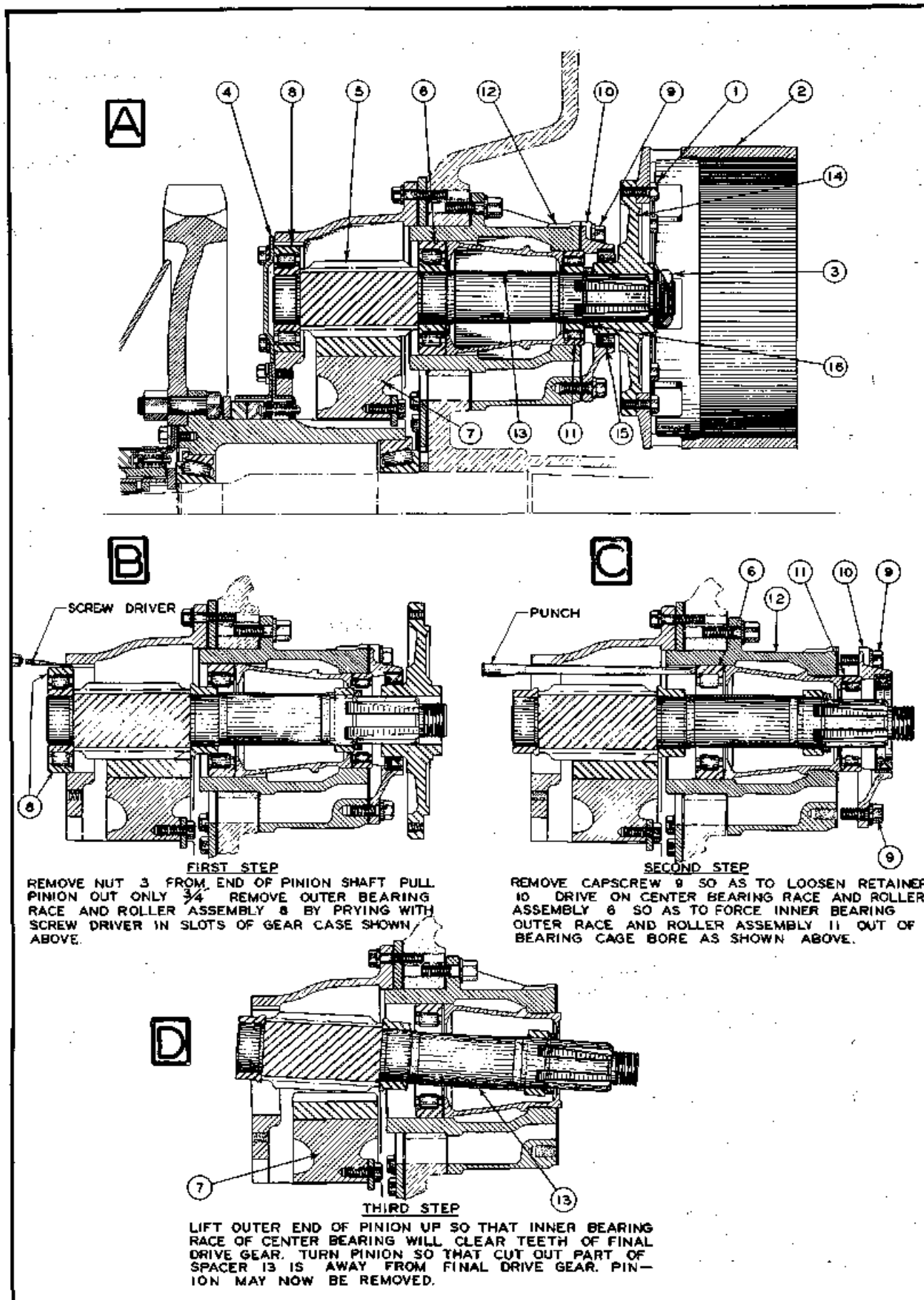
D. BALL BEARING NO. 042890 USED ON "HD 10" FINAL DRIVE PINION:

NOTICE: On account of a material shortage, effective in production with HD 10-1756, ball bearing No. 042890 was used in place of the No. 042952 roller bearing on the outer end of the final drive pinion.

1. Pinions having the No. 042890 ball bearing on the outer end are removed in a slightly different manner from those having the roller bearing.
2. The following gives details of the method of removal and installation:
3. Proceed in the usual manner in preparation for actually pulling the pinion.



FIG. 10



4. Install the final drive pinion puller and pull the shaft out enough so that the ball bearing clears the case.
5. On the wide model remove the five capscrews No. 71113 which hold the bearing retainer and spacer in position. On the standard model remove the five capscrews No. 36707.
6. Move the pinion shaft sideways so that a punch can be used to move the roller bearings and spacer in as far as they will go on wide models and to move the bearing retainer on the standard models.
7. This is necessary to prevent damage to the rollers.
8. Pull the pinion shaft out almost to the sprocket. Place a piece of steel, in the shape of a horseshoe, between the ball bearing and the final drive case.
9. Use the pinion puller and drive the pinion out of the ball bearing. Remove the bearing and then finish removing the pinion.
10. In installing the pinion, first install the inner bearings and spacers, bearing retainer and tighten capscrews.
11. In the standard model replace the bearing and bearing retainer and tighten the capscrews No. 36707.
12. Install the pinion and the outer pinion bearing. Proceed in the usual manner with the remainder of the assembly.

CAUTION: We do not recommend using the No. 042890 ball bearing for service on tractors below Serial No. HD 10W-1700 because on wide models pinion design will not allow removal without first removing the final drive gear. For replacement the No. 042952 roller bearing can be used in place of the ball bearing.

In an emergency, the No. 042890 ball bearing can be used in HD 10W tractors, Serial 1397 to 1700 by installing pinion No. 047470 at the same time the ball bearing is installed.

NOTE: All lend-lease HD 10 tractors built to date have the No. 042952 roller bearing. These are Serial Nos. 1802 and 2081, inclusive. The ball bearing No. 042890 is effective again in regular production with HD 10-2082.

E. REMOVAL OF STEERING CLUTCHES (First Type Clutch Shaft Prior to "HD 10" #1516)

1. Straighten lockwashers at each end of steering clutch shaft and remove nuts with special socket.
2. Push clutch shaft either way far enough to permit one clutch to be lifted out.
3. Push shaft in opposite direction until the other clutch can be lifted out. The spacers between hub and bevel gear hub will drop into the case when the clutches are removed from the compartments. Be

sure they are in place when reinstalling clutches.

F. REMOVAL OF STEERING CLUTCHES (Second Type Clutch Shaft, "HD 10" #1516 and above)

1. If only one steering clutch is to be removed, always pull opposite pinion, using special Pinion Puller.

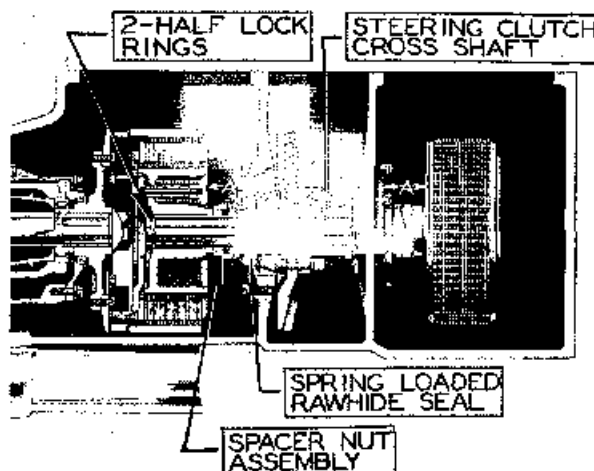


FIG. 12

2. Only one pinion need be pulled when removing both clutches.
3. Follow instructions in Paragraph "B" on HD 10 standard tread. For HD 10-W Wide gauge in Paragraph "C."
4. Cut lockwire and back out capscrew in spacer nut assembly far enough to clear spline shaft.
5. Screw one adjusting screw nut toward

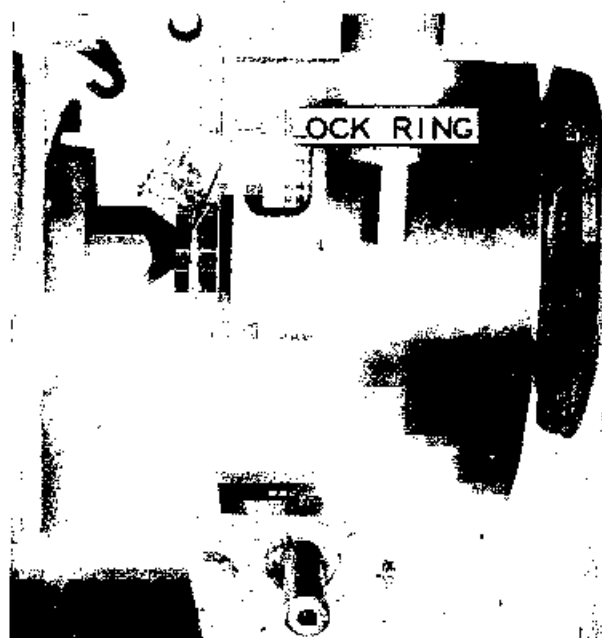


FIG. 13

- bevel gear hub as far as it will go.
6. Now slide clutch toward bevel gear hub on shaft, and remove split lock rings, push shaft through other, and remove the other lock rings.
 7. The shaft can now be removed.
NOTE: A tapped hole, the same size as one in the final drive pinion, is provided in each end of steering clutch shaft, as shown.



FIG. 14

8. Now the steering clutches can be removed from compartment.

G. DISMANTLE STEERING CLUTCHES:

1. Remove drum from clutch assembly taking care not to bend or break the clutch disc teeth.
2. Remove lockwire from 9 capscrews and remove 3 capscrews equally spaced from each other. Install, as shown, 3 studs, 7" long, which have 1" N.F. threads on one end and 3" N.C. threads on other end. Install the end with 1" thread in the shifter plate.

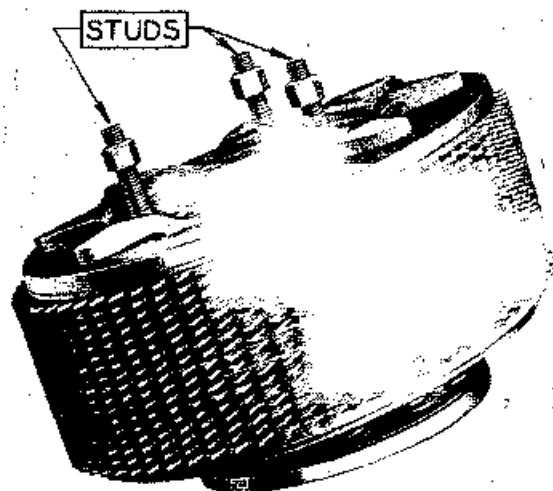


FIG. 15

3. Install nuts on studs and tighten down against pressure plate.
4. Remove remaining capscrews; loosen the stud nuts **EVENLY** until all tension is taken off the clutch springs.
5. The pressure plate, discs, etc., can now be removed.

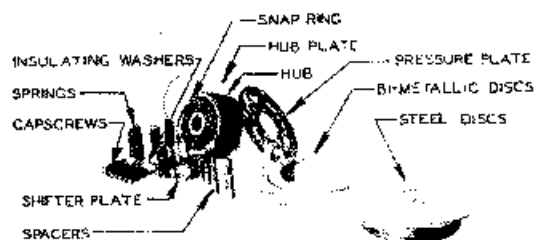


FIG. 16

H. INSPECTION OF STEERING CLUTCH AND BEVEL GEAR HUB PARTS:

When the clutches have been removed and dismantled inspect the following items:

1. **BI-METALLIC FRICTION DISCS:** These discs are made of a steel center with bi-metallic bonded to the steel. Thickness when new is approx. $\frac{1}{8}$ ". Inspect discs for wear and metal flaking. If over-all thickness of disc is less than $\frac{1}{8}$ " or if the metal has flaked off at any point a new disc should be installed.
2. **HYCO FRICTION DISCS:** These discs are made of a steel center with wire mesh woven lining, bonded to the steel. Thickness when new is approx. $\frac{3}{16}$ ". Inspect discs for wear and material coming loose. If over-all thickness of the disc is less than $\frac{3}{16}$ " or if the material has come loose at any point a new disc must be installed.
3. **RAYBESTOS FRICTION DISCS:** These discs are made of a solid piece, wire mesh and molded material. The over-all thickness when new is approx. $\frac{1}{8}$ ". Inspect discs for wear, condition of teeth, and oil saturation. If over-all thickness of discs is less than $\frac{3}{16}$ ", or the teeth are in bad condition, new discs must be installed.
4. **BRAKE DRUMS:** Clean thoroughly and inspect. If drums are scored or grooved on the outer surface they can be chucked in a lathe and turned down. In doing this do not take off more than $\frac{1}{16}$ " of material and extend the cut only to the ventilating holes. To remove any material from between the ventilating holes will materially weaken the drum.
5. **BEVEL GEAR BEARINGS:** Inspect for loose bearings, observing play when prying on clutch shaft. When doing this, be sure the hub packing is loosened or removed so that it does not prevent the detection of any play that may be present in the bearings. For bearing adjustment refer to Topic 103-L.
6. **BEVEL GEAR HUB PACKING:** (PRIOR TO HD 10-1516) Inspect for proper adjustment and serviceable condition. If packing leaks, tighten adjusting nuts only enough to stop leak. If

packing is worn out, adjusting nuts will screw in all the way without stopping leaks; new packing must be installed.

7. **BEVEL GEAR HUB SEALS:** (HD 10-1516 ABOVE) This is a rawhide spring loaded seal, and cannot be adjusted. If this seal leaks oil the bevel bearings must be inspected for proper clearance; adjust if necessary and install new seals.
8. **CLUTCH SPRING:** Inspect tension of spring by measuring its "free height," that is, its height when standing upright with nothing compressing it. If this length is $3\frac{15}{16}$ " or greater the spring can be re-used. If it is less than $3\frac{15}{16}$ " it is an indication that the spring has lost its tension and new springs should be installed.

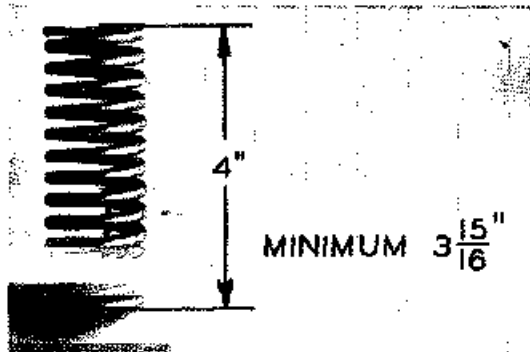


FIG. 17

9. **CLUTCH THROWOUT BEARINGS:** Inspect for wear or lack of lubrication. Install new bearings if necessary.
 10. **SPLINE SHAFT:** Inspect splines for burrs. Be sure nuts will start on thread freely.
- I. ASSEMBLY OF STEERING CLUTCH:**
1. Place steering clutch hub on bench or some flat surface with spring holes up.
 2. Install an insulating washer in each hole. Make sure the washers lie flat in the bottom of the hole.

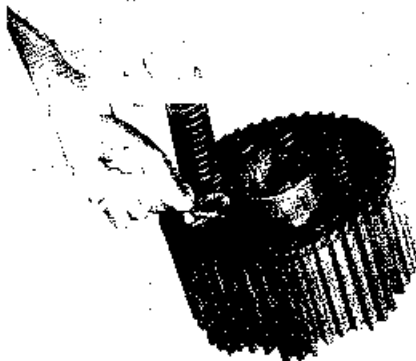


FIG. 18

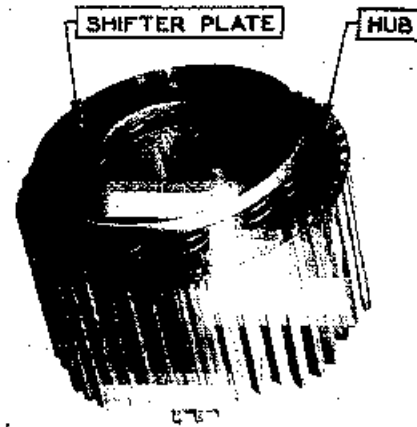


FIG. 19

3. Install a spring in each hole.
4. Install shifter plate on springs with flat surface up.
5. Hold shifter plate firmly in place and turn hub assembly so that shifter plate is now on bench.
6. Install a spacer in each hole in hub through center of springs.

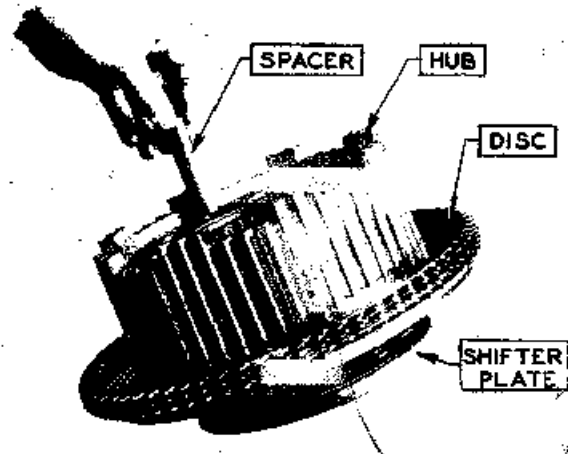


FIG. 20

7. Stack discs alternately on hub beginning with a friction disc.
NOTE: Any friction disc that can be used again should be stacked on hub first and new discs toward the top. (See inspection of steering clutches). Stack discs on hub until stack height is $4\frac{1}{8}$ " plus or minus $\frac{1}{16}$ ".
8. Lay pressure plate in place and screw 3 studs into the shifter plate equally spaced, as shown.
9. Line up teeth on clutch discs so brake drums will slide up and down on discs freely.
10. Run nuts down on studs, forcing pressure plate down until capscrews reach

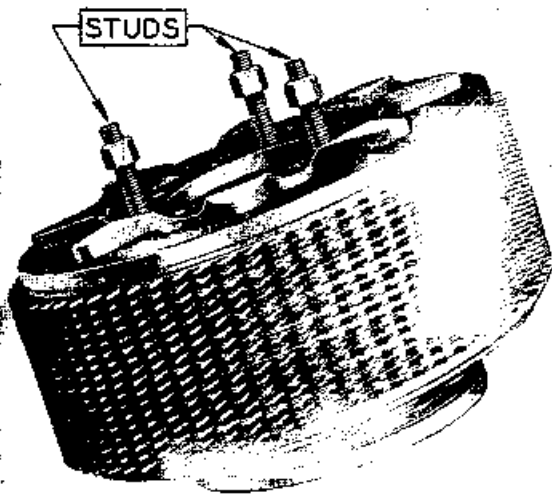


FIG. 21

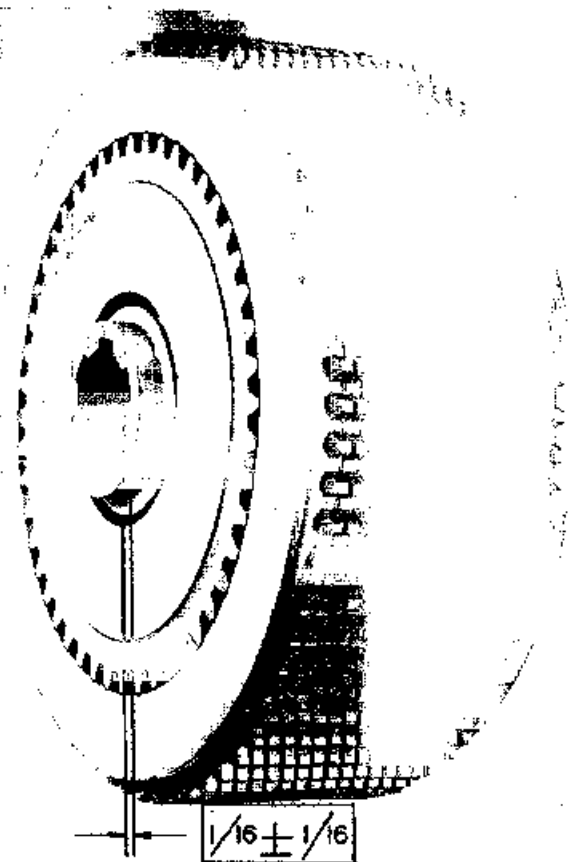


FIG. 22

- the threaded holes in the shifter plate.
11. Install 6 capscrews and tighten, remove the studs and install the 3 remaining capscrews. Draw the 9 capscrews down securely and install lockwire. Repeat the same operation for the other clutch.

J. INSTALLATION OF STEERING CLUTCHES (First Type Clutch Shaft Prior to "HD 10" #1516)

1. With the 9 capscrews in clutch assembly facing upward, place steering clutch brake drum down over clutch assembly.



FIG. 23

Place in compartment with capscrews toward final drive.

2. Install clutch shaft in bevel gear hub from opposite side and push through far enough to place spacer on end of shaft.

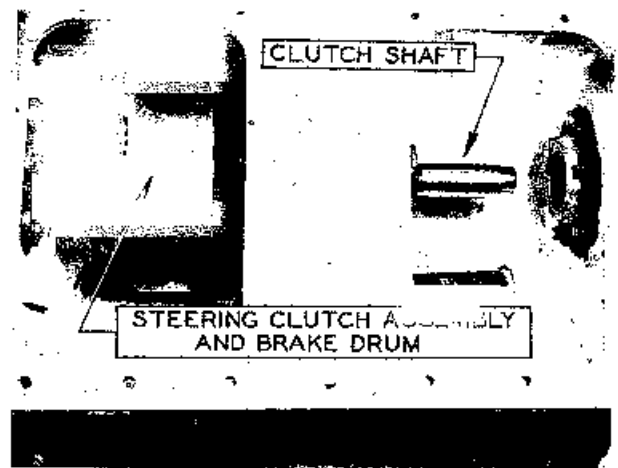


FIG. 24

3. Lift clutch assembly up to align the hole in the clutch hub with shaft. Push shaft through clutch hub taking care not to damage the threads on the shaft. The clutch will have to be rotated to get the splines on the shaft to line up with the splines in steering clutch hub.
4. Push shaft through until the other clutch can be lowered into the other compartment. Install other spacer and clutch on shaft.
5. Install thick washer, lockwasher (with cup part out) and nut on one end of shaft. Run nut on as far as possible and lock in two places.
6. Install washer, lockwasher and nut on the other end; draw the latter nut up tight with the special wrench and lock in two places.

K. INSTALLATION OF STEERING CLUTCHES (Second Type Clutch Shaft, "HD 10" #1516 and above)

1. With the 9 capscrews in clutch assembly facing upward, place steering clutch brake drum down over clutch assembly. Place in compartment with capscrews toward final drive.
2. Place steering clutch assembly in compartment and slide clutch shaft through final drive case and through spline bore in clutch hub.

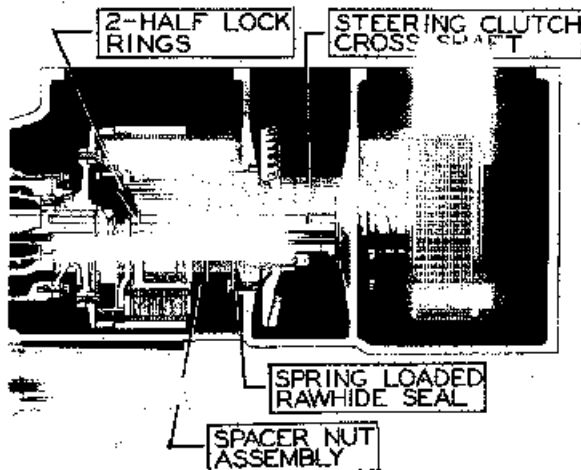


FIG. 25

3. Install adjustable spacer nut assembly over splines on shaft, sliding shaft through bevel gear hub.
4. Install the other adjustable spacer nut assembly on opposite side, and push shaft through other clutch assembly.
5. Install the split lock rings in place, at the ends of shaft and slide the clutches out so rings fit into counterbore of clutch hub.
6. Adjust the spacer nuts on both sides equally so the dimensions between

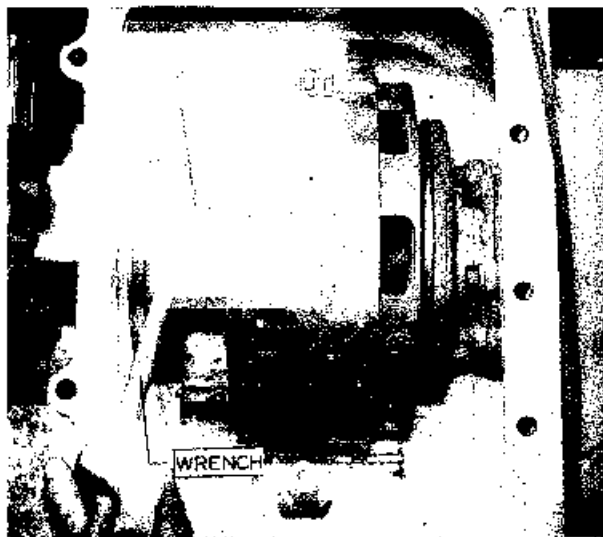


FIG. 26

clutch throwout plate and bevel case are equal on both sides.

7. When installing the locking capscrews in the spacer nuts, be sure they fit into one of the splines on the clutch shaft.
8. Lock capscrews securely with lockwire.

L. INSTALLATION OF FINAL DRIVE PINIONS: Standard Tread Tractors.

1. Install pinion through inner bearing far enough to place Duprene seal over end of shaft.
2. Lift hub and align splines with splines on the pinion shaft. Push driven hub into rawhide seal and hold firmly by placing a bar on each side of the hub and prying it toward the pinion.
3. With the aid of the pinion puller adaptor, puller screw and ram assembled to pinion, drive the pinion in until the lockwashers and cap nut can be started on the shaft.
4. Drive pinion shaft through hub with the ram holding against hub with bars and tighten nut at intervals until shaft and nut are tightened securely. Place a 4 foot extension on wrench and give the nut a final pull. Bend the lockwashers over in two places on hub and two places on nut and remove pinion puller parts.
5. Install bearing on outer end of shaft. Install cover and gasket over end of pinion shaft.
6. Replace sprocket shield and axle cap. From this point reverse dismantling procedure covered in Topic 106-A, 1 to 20.
7. Before replacing steering clutch ventilating covers, adjust the clutches. Refer to Topic 56.
8. Before replacing brake adjusting covers adjust the brakes. Refer to Topic 58-A.

M. INSTALLATION OF FINAL DRIVE PINIONS: Wide Tread Tractors. (Fig. 11)

1. Stack the driven hub (14), retainer (10), oil slinger (15), rubber seal (16), and outer race and roller assembly of the inner bearing (11) together and pilot into the bore of the bearing cage (12).
2. Feed the pinion in and start spline on pinion into splined bore of driven hub (14).
3. Feed pinion in until the inner race of center bearing (6) enters the outer race and roller assembly.
4. The center bearing (6) outer race and roller assembly and rear bearing outer race and roller assembly (11) may now be pressed into place by drawing down on retainer (10).
5. Install the outer bearing (8). Install nut and lockwasher (3) on end of pinion shaft, draw up nut and lock it.
6. Bolt brake drum (2) to driven hub

(14) and replace outer bearing cover (4).

7. Install sprocket guard and end cover.

N. INSTALLATION OF BRAKES:

1. Install the bands around the front side of drums. Care must be taken that brake bands fit drum after being installed.
2. Install the anchor screw and lock at the front side of clutch compartment of transmission case.

3. Install fulcrum sleeve and bell crank assembly.

4. Install band pins and keys.

5. Install brake rod, felt washer, steel washer, spring and adjusting nut.

6. For brake adjustments refer to Topic 58-A.

7. Install other parts that were removed.

8. For steering clutch adjustment refer to Topic 56-B.

107 -- "HD 14" Steering Clutches and Brakes

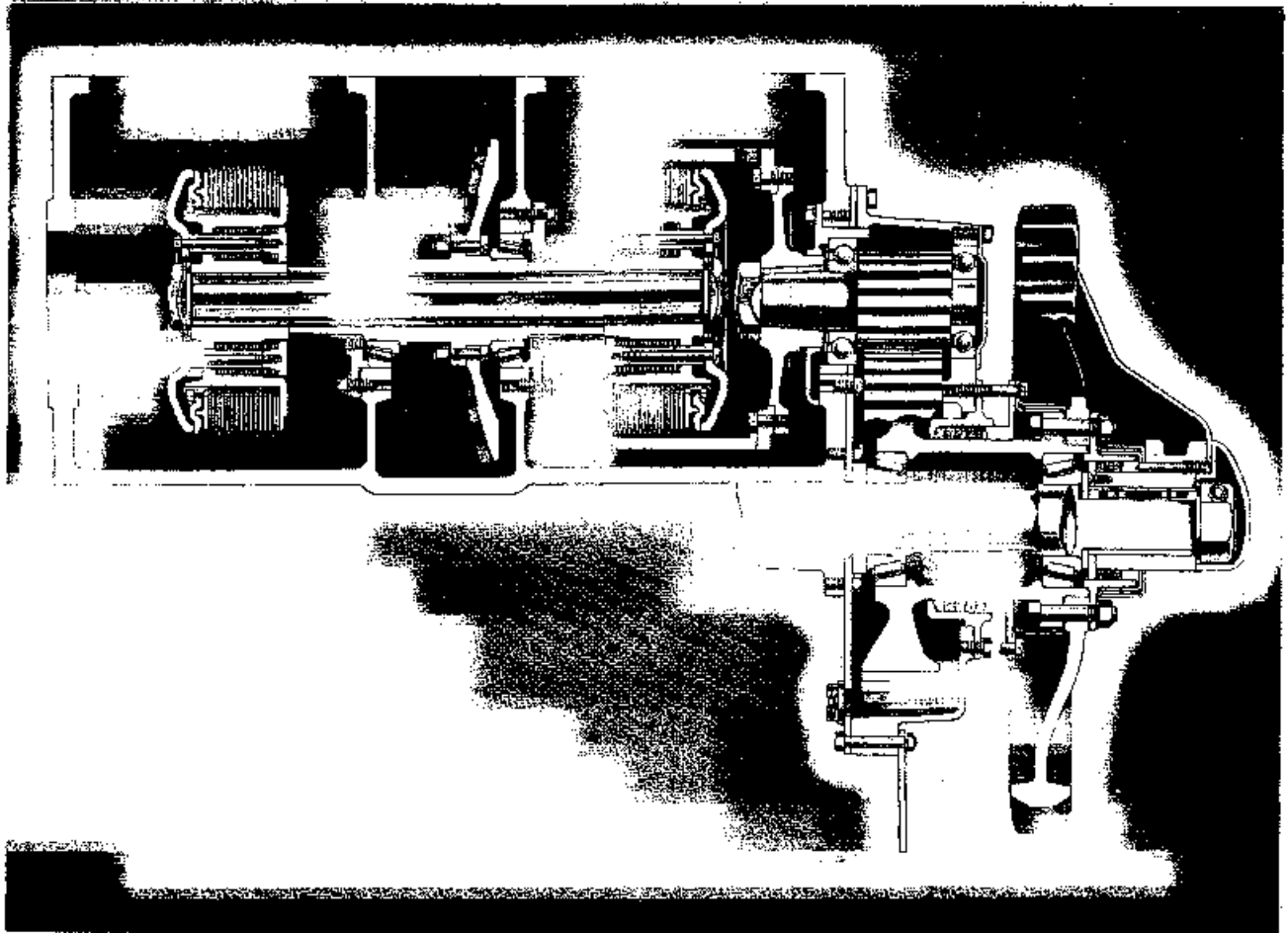


FIG. 1