

**MASSEY FERGUSON**  
**1160/1165/1180/1190**  
**SERVICE MANUAL**  
**1449251M1**  
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## 5A-28 - TRANSMISSION

### MAIN TRANSMISSION GEARS 1165

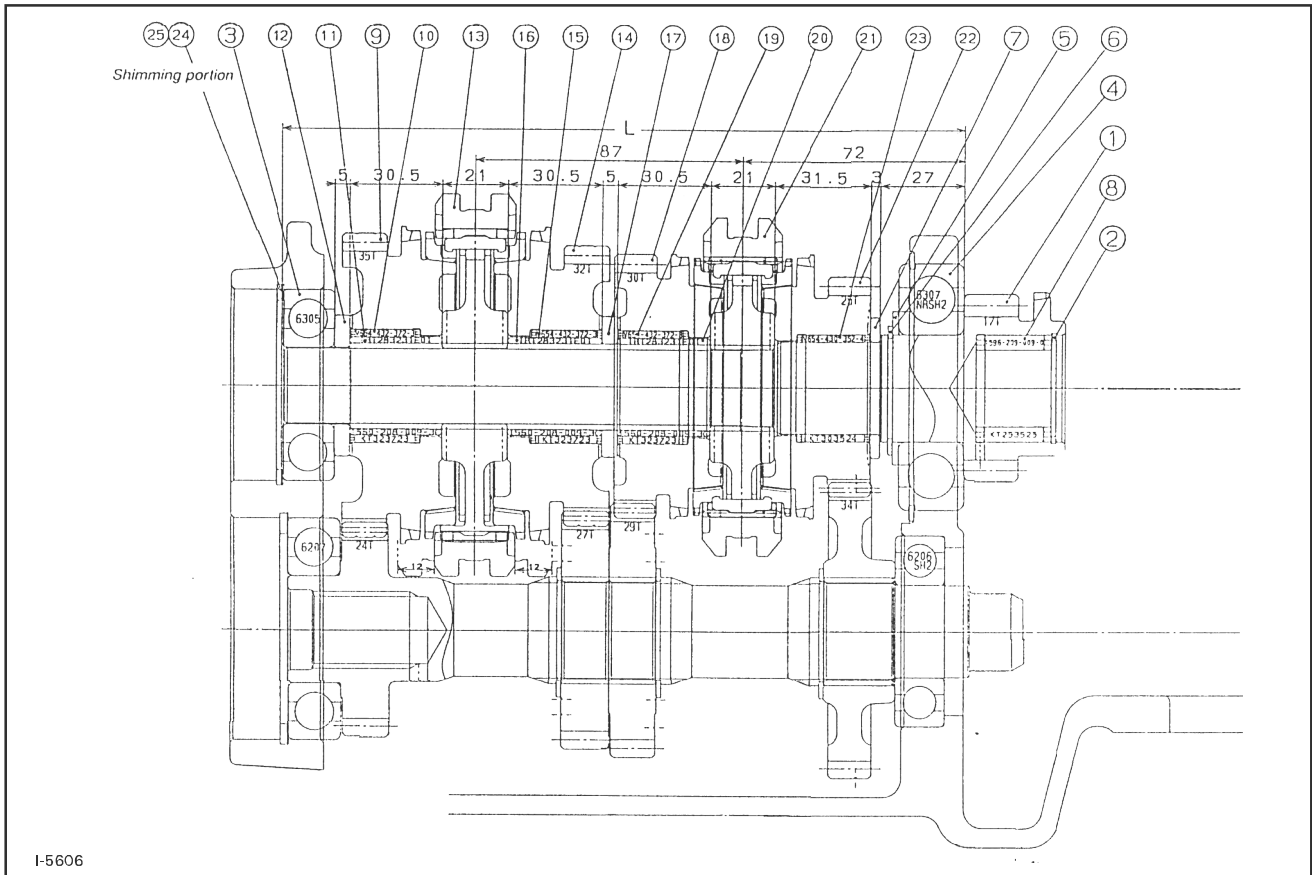


FIG. 5A-42

**FIG. 5A-42:** Adjust the dimension L to be  $222 \pm \text{mm}$  ( $8.7468 \pm 0.003937\text{in}$ ) by shimming. Install the determined shims (24 and 25 into the transmission case.

**NOTE:** As each synchronizer assembly maintains a specific installed width, be sure not to mix different pairs of the hub and sleeve.

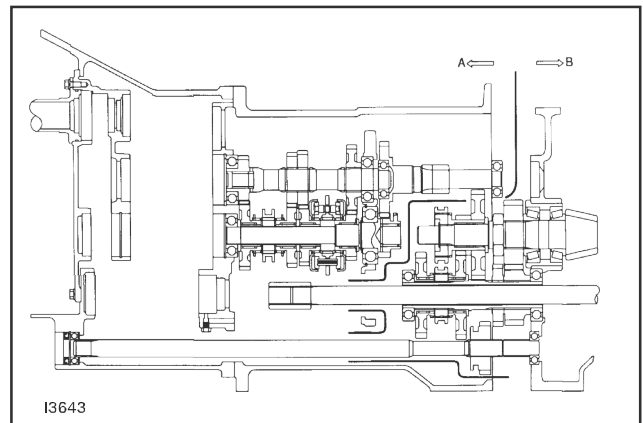
Ref	Part Name	Qty
1	Gear (17T)	1
2	Snap Ring	1
3	RBB	1
4	Needle roller bearing	1
5	Collar (35x46x2)	1
6	Snap Ring	1
7	Washer (30x46x03)	1
8	Needle Roller Bearing	1
9	Gear (35T)	1
10	Gear (35T)	1
11	Bush (25x32x31)	1
12	Washer (25x46x05)	1
13	Synchronizer (28) Assembly	1
14	Gear (32T)	1
15	Needle roller bearing	1
16	Bush (25x32x31)	1
17	Washer (25x46x05)	1
18	Gear (30T)	1
19	Needle roller bearing	1
20	Bush (25x32x31)	1
21	Synchronizer (28) Assembly	1
22	Gear (251)	1
23	Needle Roller bearing	1
24	Shim (A)	2
25	Shim (B)	1

**Removal and Installation**

**FIG. 5A-43:** Split the spacer transmission case at rear differential.

When split in this area the case is divided into two parts, "A" and "B".

Part "A" includes main transmission shift mechanism and part "B" includes range shifting and 4 WD shifting mechanism.



**FIG. 5A-43**

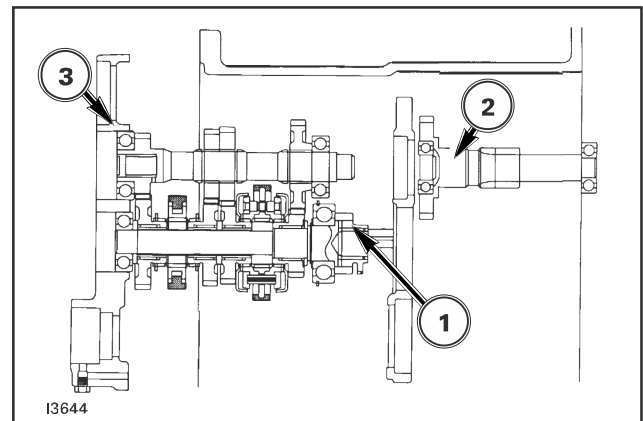
**Disassembly - transmission gears**

**FIGS. 5A-44 & 5A-44a:** Gear, 1, (shown with the assembly moved out of position) has a cutout section, on the coupler gear, 4. The gear must be turned so the cutout section clears teeth on gear, 2, as shown.

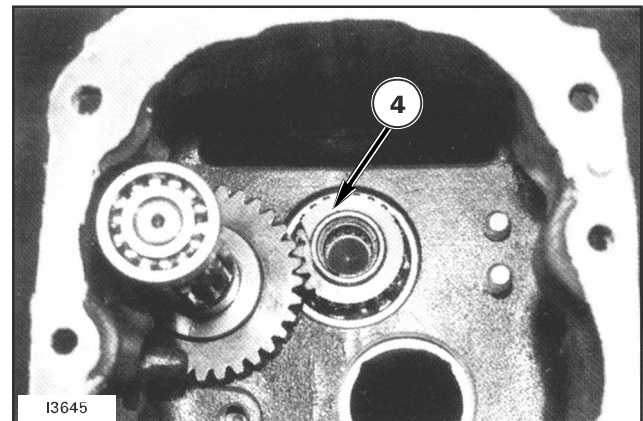
Remove bolts from reverse shift support, 3, and move it out of housing with gear assemblies, by tapping with a plastic hammer,

Be careful that gear, and shaft, 2, does not drop as the assembly is removed.

*NOTE: The shift support, 3, is located on two dowel pins, which will offer some resistance as it starts to move out.*



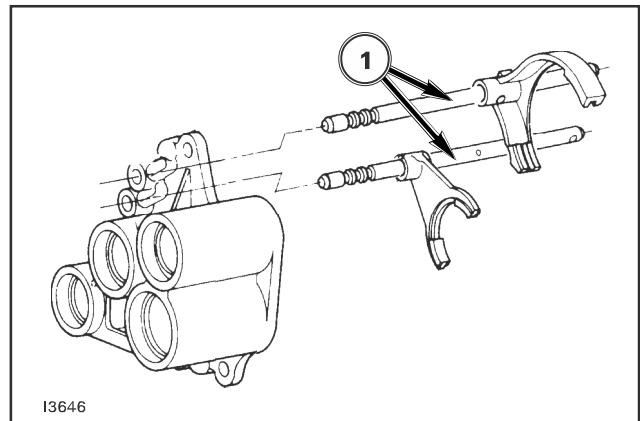
**FIG. 5A-44**



**FIG. 5A-44a**

## 5A-30 - TRANSMISSION

**FIG. 5A-45:** Remove shifter rails, 1, from the reverse shift housing, being careful to keep detent balls and springs which will be released when rail is pulled out of housing



**FIG. 5A-45**

**FIG. 5A-46:** Remove bearings and gears from each shaft and replace as necessary.

Reverse procedures to assemble transmission gears.

Make certain detent ball and spring are installed as each rail is put in position.

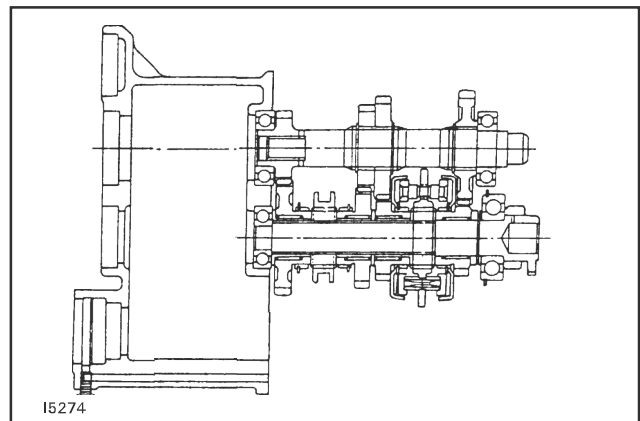
### Overhaul

Remove transmission gears.

Overhaul synchronizer using same procedure used in earlier operation.

### Inspection

Before and after disassembly, inspect each part for points mentioned below, and replace if necessary.



**FIG. 5A-46**

Inspection items	Standard values	Usable limits
Backlash of each gear (measured in meshed condition)	0.1 - 0.2 mm (0.004 - 0.008 in.)	0.5 mm (0.020 in.)
Stepped wear of teeth	0 mm (0 in.)	0.3mm (0.012 in.)
Assembled width of synchromesh assembly	51.17 +0.18 -0.424mm (2.015 in.)	--
Synchro-hub thrust for shifting Neutral → Engaging	13.0 - 18.8 kgf (28.7 - 41.4 lbs.)	9.5 kgf (20.9 lbs)
Thrust play of fixed gears	0 mm (0 in.)	0.5mm (0.020 in.)
Wear in each shifter		0.5 mm (0.020 in.)

Inspect bearings such as ball bearing and needle bearings for abnormalities in rotation such as irregularity, roughness, etc. by turning them with pressure applied by hand. Replace defective ones.

Severely worn or damaged parts should also be replaced.

## Reassembly

Reassemble parts in reverse order of disassembly, following these instructions.

**NOTE:** Each part should be washed before reassembly.

Apply multi-purpose, quality grease to needle bearing in advance.

Each bolt and nut should be tightened specified torque in accordance with torque chart. -See Introduction Section.

Every time a gear is installed, its smooth rotation should be checked.

Every snap ring should be seated securely in its groove.

As each synchromesh assembly maintains a specified width, be sure not to mix parts.

Remember to install snap rings

## Installation of Main Transmission Gears

**FIG. 5A-47:** Hold gear and shaft, 38, up in place.

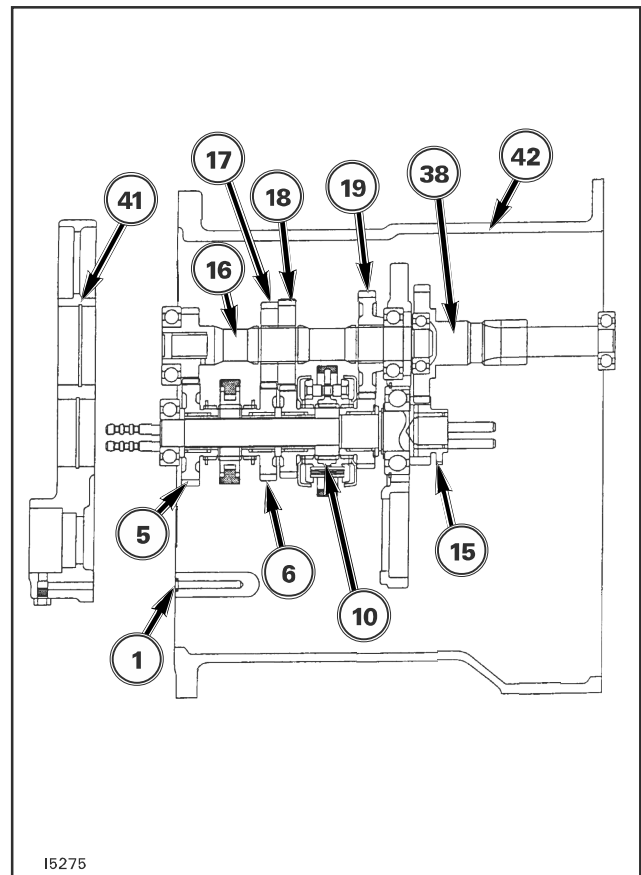
Install the main transmission gears and cover, 41, by tapping the cover lightly on front with a plastic hammer. Also tap shaft, 38, forward as assembly takes place.

Sub-assemble the shifter rail, spring, and steel ball on reverse shift housing and install the sub assembly.

Align the holes in the reverse shift housing with the ball bearings on sub-assemblies and with dowel pins, and install housing on transmission case.

**NOTE:** Align cut away part of gear, 15, with mating gear, 38, when assembling gears.

Lubricate "O" ring, 1, and make certain it stays in place during assembly.



**FIG. 5A-47**

## 5A-32 - TRANSMISSION

### Main Transmission Gear Shift Forks

**FIG. 5A-48:** When assembling shifter rails, proceed as follows:

Select rail with shortest span "A" for lower position.

Select smaller fork, 3, for lower rail it will be installed with hub as shown.

Select rail with longest span "B" for upper position

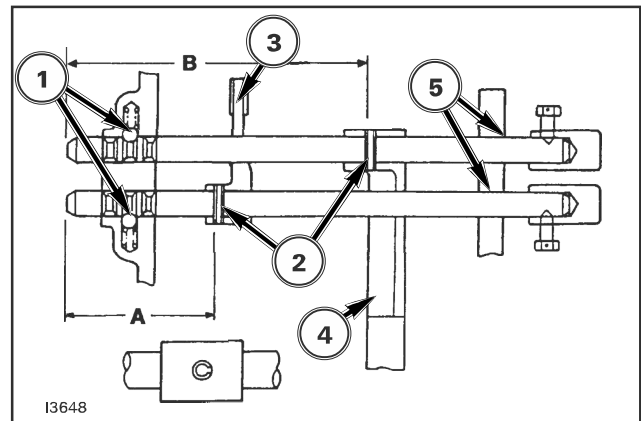
Select larger fork, 4, for upper rail, it will be installed with hub as shown.

Rails should be oiled in detent and support areas.

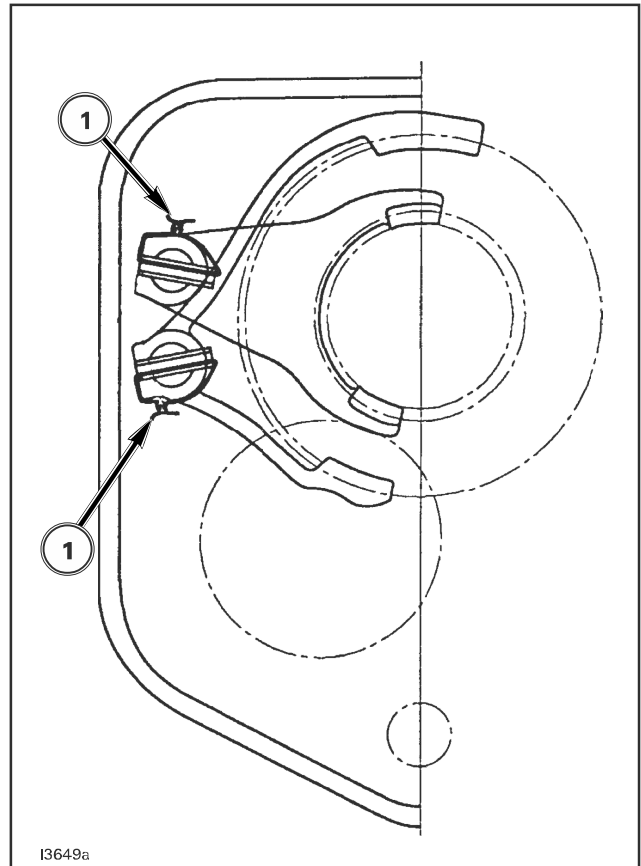
Use a deep socket, of short shaft approximately same size as rails, to hold detent ball and spring in place as rails are being installed,

Roll pins, 2, should be installed with seams as shown.

Shifter lugs, 5, and set screw should be installed 180° apart, as shown.



**FIG. 5A-48**



**FIG. 5A-49**

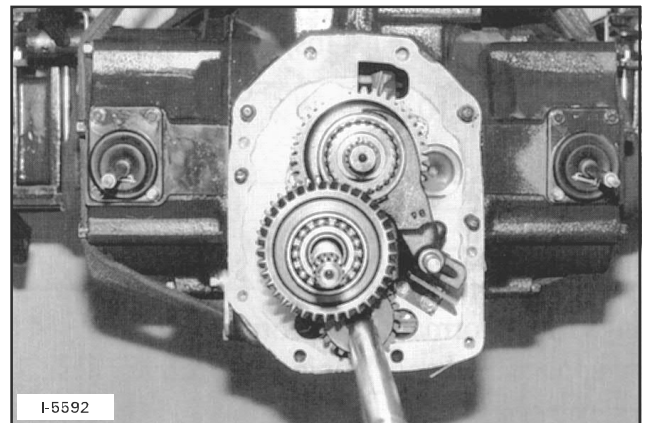
**FIG. 5A-49:** Roll pins should be wired in place as shown, 1.

**RANGE SHIFT GEARS**

**Removal and Installation**

**FIG. 5A-50:** Split the center (spacer) transmission case and rear differential.

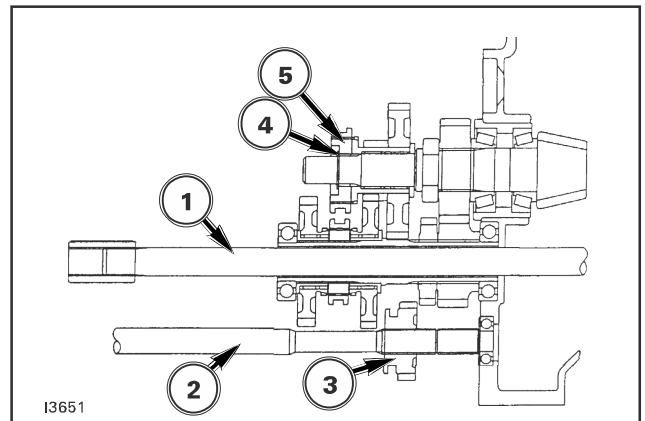
Remove shifter fork and shift rail.



**FIG. 5A-50**

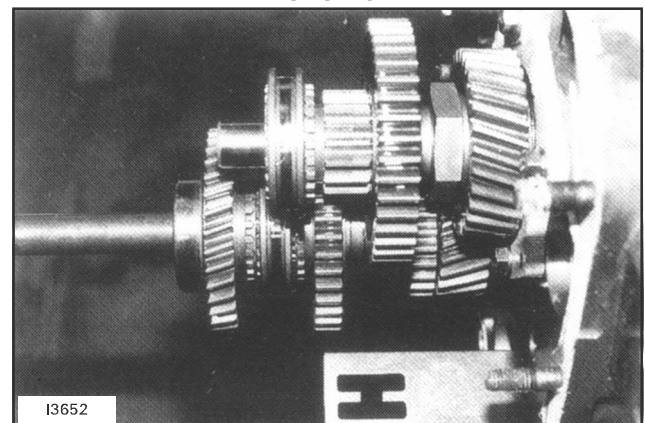
**FIG. 5A-51:** Pull out the PTO shaft, 1, 4WD shaft, 2, and gear, 3.

Snap ring, 4, and hub, 5, will be removed later.



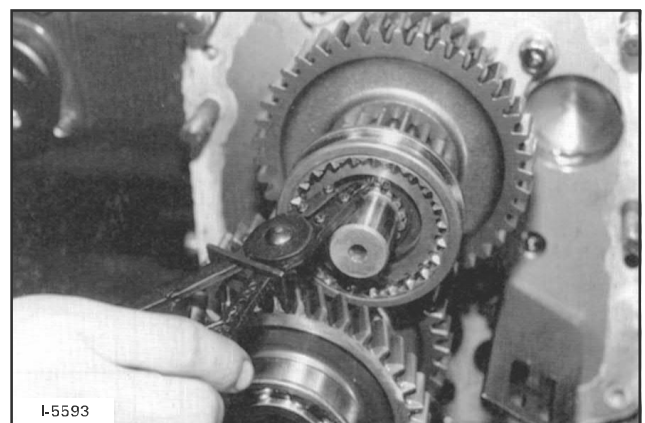
**FIG. 5A-51**

**FIG. 5A-52:** Remove range shift gears.



**FIG. 5A-52**

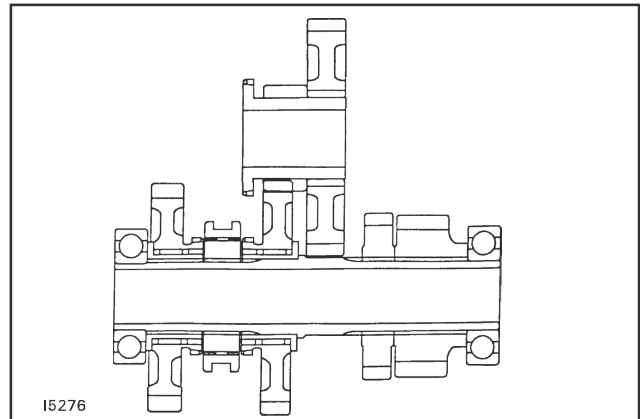
**FIG. 5A-53:** Remove the snap ring from the end of the pinion gear shaft, and remove hub.



**FIG. 5A-53**

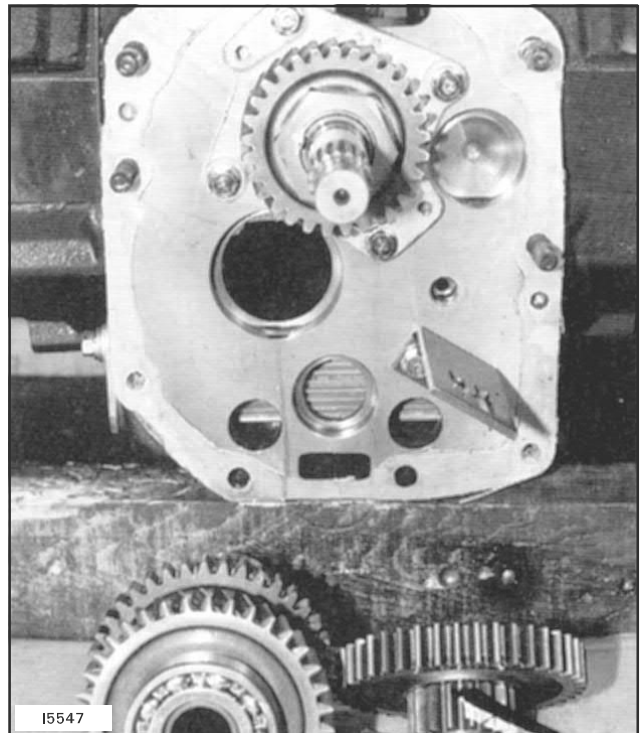
## 5A-34 - TRANSMISSION

**FIG. 5A-54:** Remove range shift gears.



**FIG. 5A-54**

**FIG. 5A-55:** Remove bearings and gears from shaft. Reverse procedures to reassemble range shift gears. Assemble transmission.



**FIG. 5A-55**

### Overhaul

Remove range shift gears.

Before and after disassembly, inspect each part for points mentioned below, and replace if necessary.

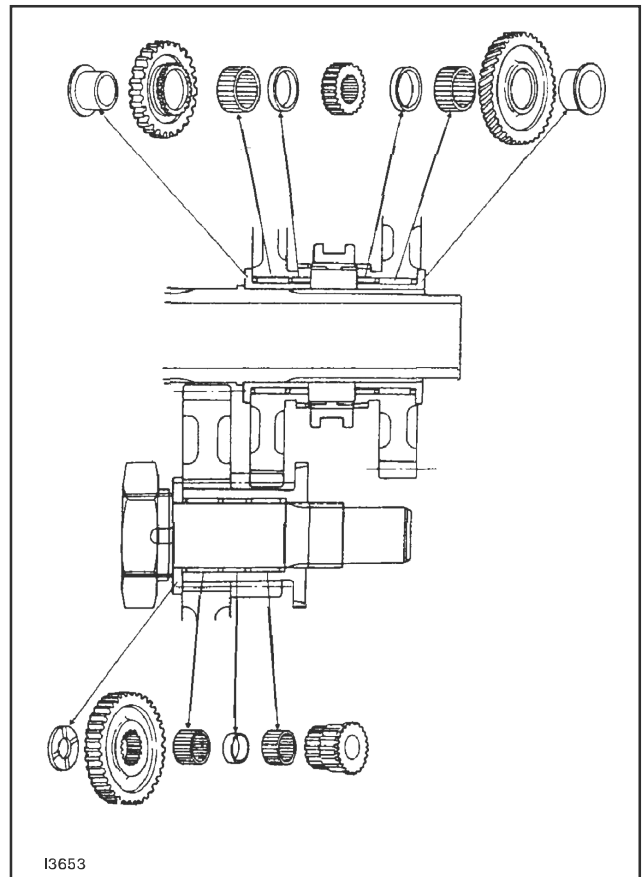
Inspection items	Standard values	Usable limits
Backlash of each gear (measured in meshed condition)	0.1 – 0.2 mm (0.004 – 0.008 in.)	0.5 mm (0.020 in.)
Stepped wear of teeth	0 mm (0 in.)	0.3 mm (0.012 in.)
Thrust play of fixed gears	0 mm (0 in.)	0.5 mm (0.020 in.)
Wear in each shifter	—	0.5 mm (0.020 in.)

Inspect bearings such as ball bearings and needle bearings for abnormalities in rotation such as irregularity, roughness, etc. by turning them with pressure applied by hand. Replace defective ones.

Excessively worn or damaged parts should also be replaced.

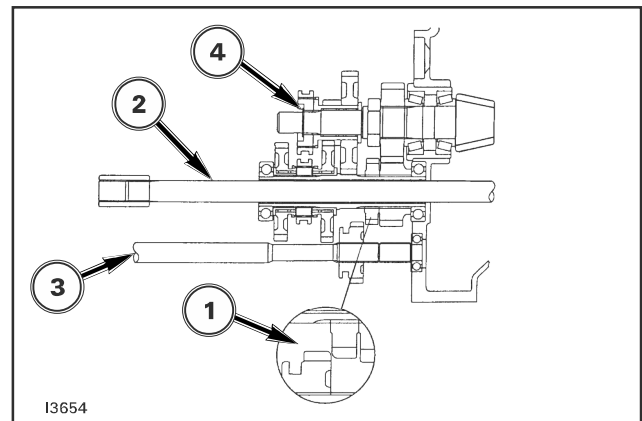


**FIG. 5A-56:** Reassemble range change gears using reverse procedure with the following precautions.  
Make certain needle bearings, bushings and spacers are installed correctly.



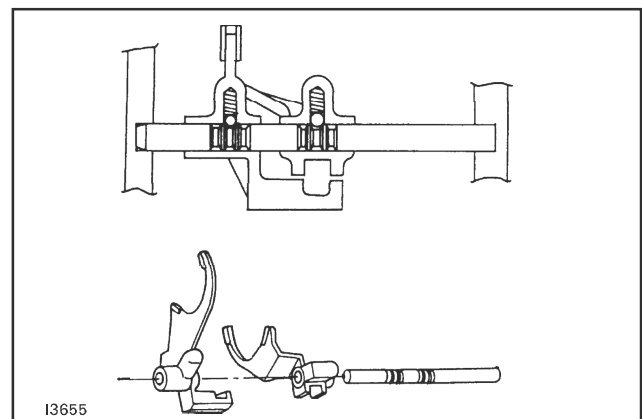
**FIG. 5A-56**

**FIG. 5A-57:** Install gear, 1, as shown in inset.  
Install PTO shaft, 2.  
Install 4WD shaft, 3.  
Make certain snap ring, 4, is located in groove.



**FIG. 5A-57**

**FIG. 5A-58:** The range shift rail is installed as shown.  
Oil the rails in support areas and detent areas.  
Use a short shaft of same size as rail to keep detent ball and spring in position as rail is pushed through forks.  
Install forks as shown.  
Reassemble range shift gears.



**FIG. 5A-58**

REAR DIFFERENTIAL

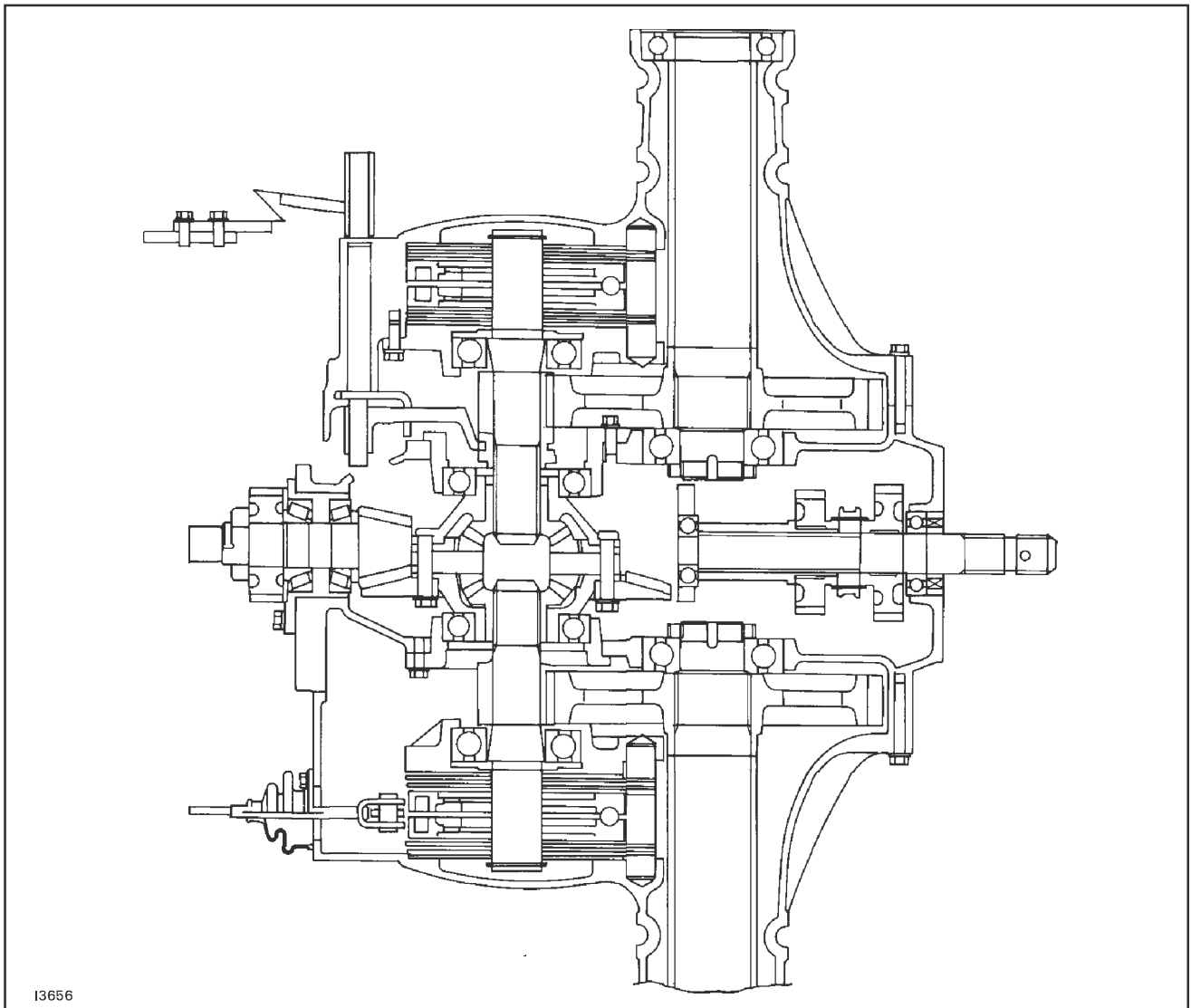


FIG. 5A-59

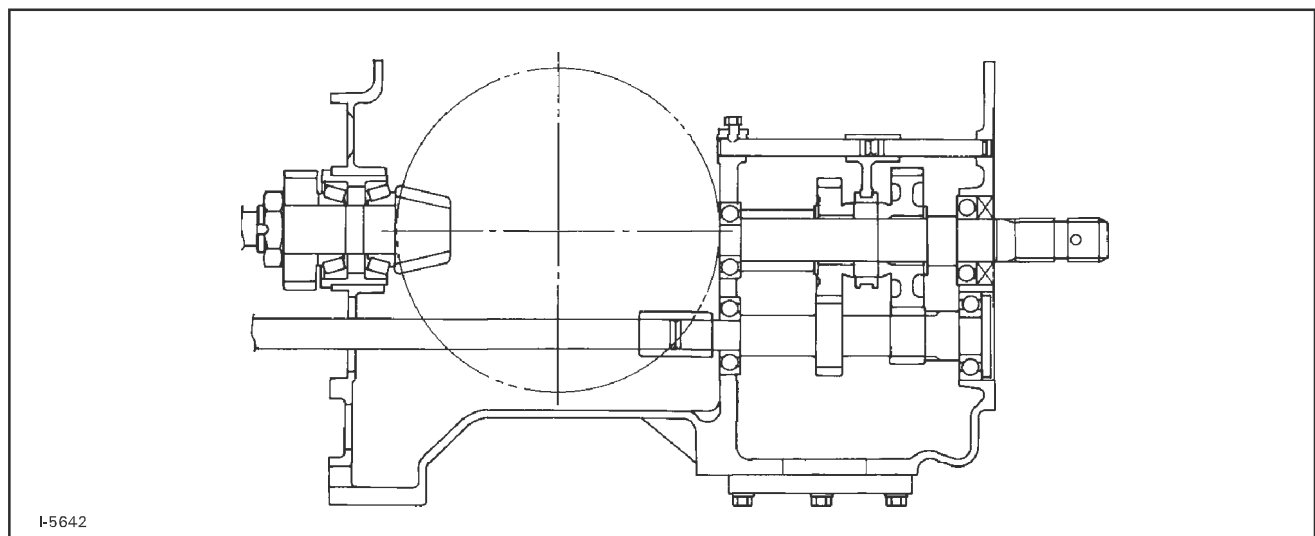


FIG. 5A-59a

FIGS. 5A-59 & 5A-59a: Rear Differential

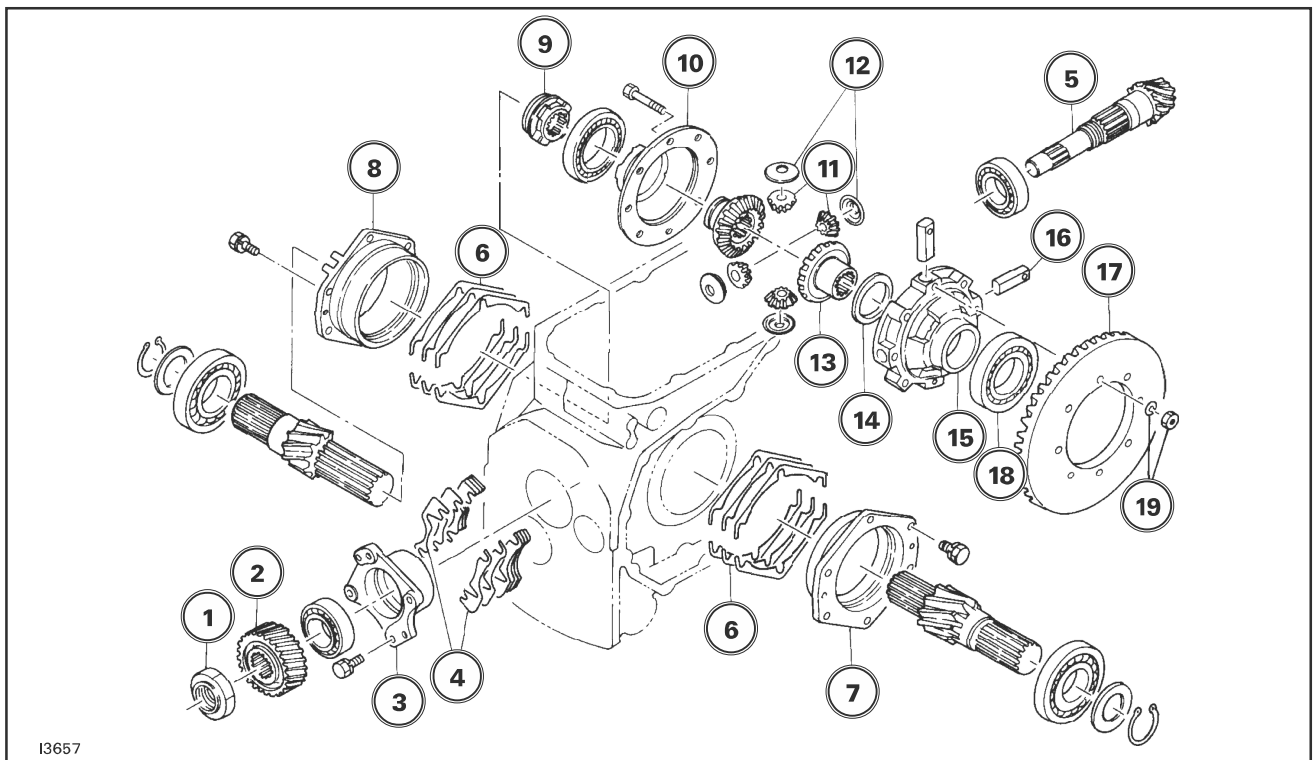


FIG. 5A-60

FIG. 5A-60: Differential component list: (MF 1160)

1. Nut
2. Gear (29T)
3. Pinion support
4. Shim
5. Drive pinion (11T)
6. Shim
7. Bearing support (LH)
8. Bearing support (RH)
9. Differential lock clutch
10. Differential case (RH)
11. Differential pinion
12. Pinion thrust washer
13. Differential side gear
14. Thrust collar
15. Differential case (LH)
16. Differential pinion shaft
17. Ring gear
18. Bearing
19. Lock plate, or lock washer

## 5A-38 - TRANSMISSION

### RING GEAR AND PINION

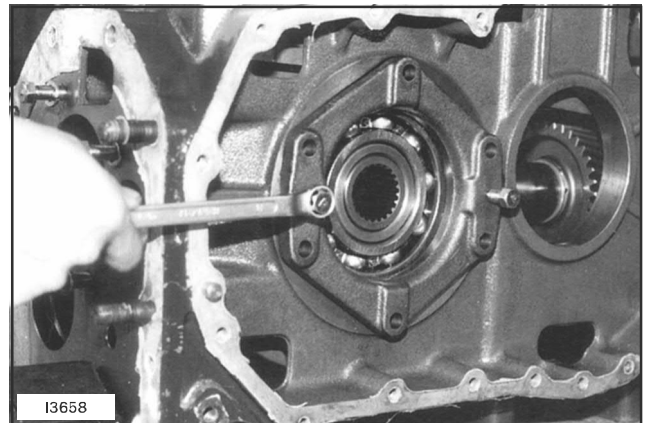
#### Removal and Installation

Split the center (spacer) transmission and the differential.

Separate the axle housings from differential housing.

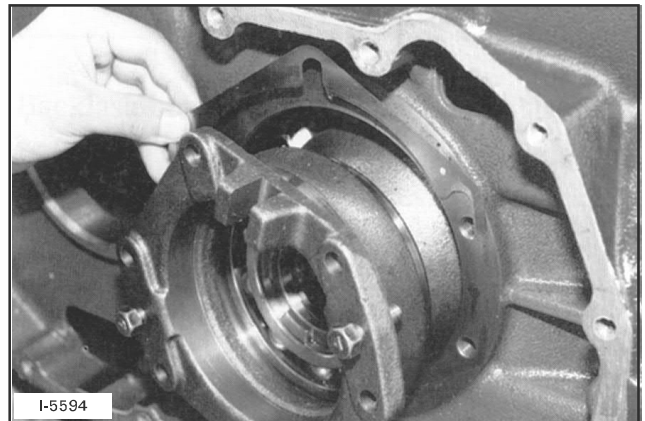
Remove hydraulic lift cover.

**FIG. 5A-61:** Remove all differential case bearing support bolts, then install push bolts as shown. Tighten push bolts evenly to remove bearing support.



**FIG. 5A-61**

**FIG. 5A-62:** The number of shims installed behind each bearing support should be carefully checked and recorded for assembly later.



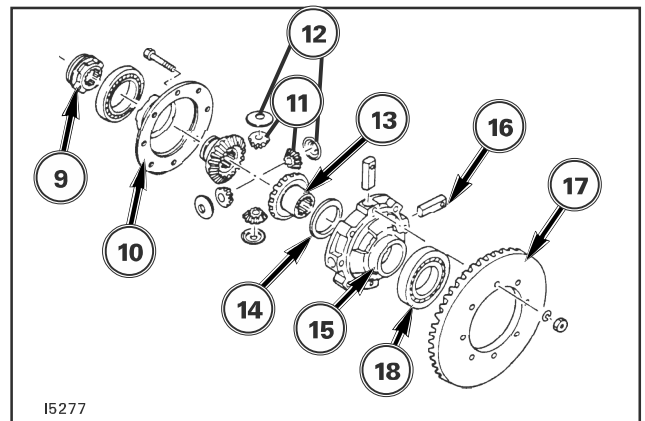
**FIG. 5A-62**

**FIG. 5A-63:** Remove complete differential including ring gear, 17.

Remove bearing 18, using a puller.

Remove bolts through differential and separate cases, 10 & 15.

Pull out differential pinion shaft and remove pinions, 13.



**FIG. 5A-63**

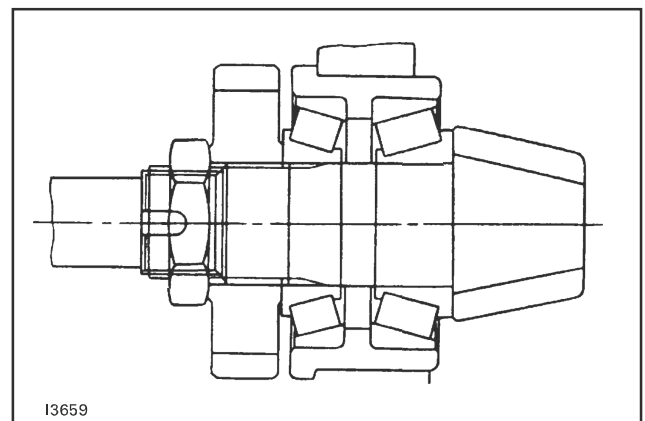
**Fig. 5A-64:** Remove bolts holding pinion with bearings as an assembly.

The number of shims installed behind bearing support should be carefully checked and recorded for assembly later.

Reverse procedures to install ring gear and pinion, with following information.

After all bolts are torqued properly, as outlined in ring gear and opinion overhaul.

Check ring gear and pinion backlash. It should be 0.1 - 0.2 mm (0.004 - 0.008in). If not correct see ring gear and pinion overhaul.

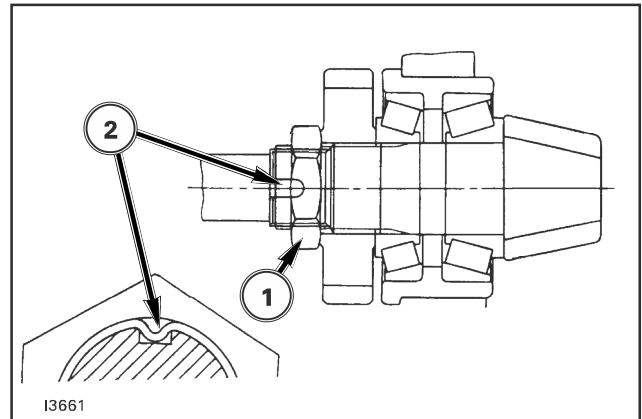


**FIG. 5A-64**

**Overhaul**

Remove ring gear and pinion.

**FIG. 5A-65:** Use a small chisel in keyway to remove locking crimps, 2, on pinion nut, and remove nut, 1.



**FIG. 5A-65**

**FIG. 5A-66:** Push drive pinion, 1, out of bearing retainer using a press.

Use a special tool to remove bearing.

**Inspection**

Before and after disassembly, inspect each part for the items mentioned below. Parts which deviate from the specified values should be, adjusted or replaced

Wash all disassembled parts and check them for wear, damage, deformation, burning, etc. replace if necessary.

The drive pinion and ring gear are a matched set they should be replaced in pairs even if only one is damaged.

Backlash between the drive pinion and the ring gear.

Backlash between differential-pinion and differential-side

Backlash	0.1-0.2 mm (0.004-0.008 in.)
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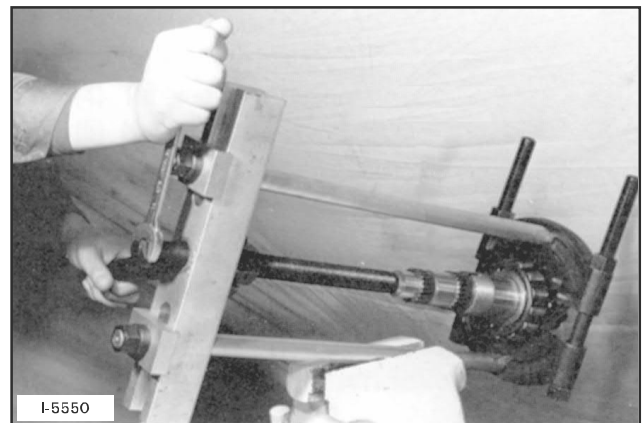
When the backlash exceeds 0.5 mm, also inspect the thrust washer for wear. Worn washers should be replaced.

Backlash	0.1-0.2 mm (0.004-0.008 in.)
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Collar thickness:

Disengaging resistance of PTO shifter\*

Thrust collar	1.0 mm (0.039 in.)
Pinion thrust collar	1.0 (0.039 in.)



**FIG. 5A-66**

## 5A-40 - TRANSMISSION

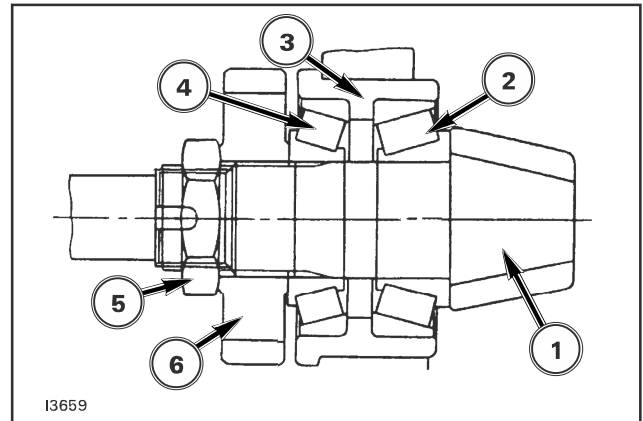
### Reassembly

Reassembly the parts in reverse order of disassembly, following these instruction.

Ring gear, Drive pinion and related parts.

**FIG. 5A-67:** Key:

- |                           |                           |
|---------------------------|---------------------------|
| 1. Drive Pinion           | 4. Tapered Roller Bearing |
| 2. Tapered Roller Bearing | 5. Nut (M36)              |
| 3. Drive Pinion Housing   | 6. Gear (29T)             |



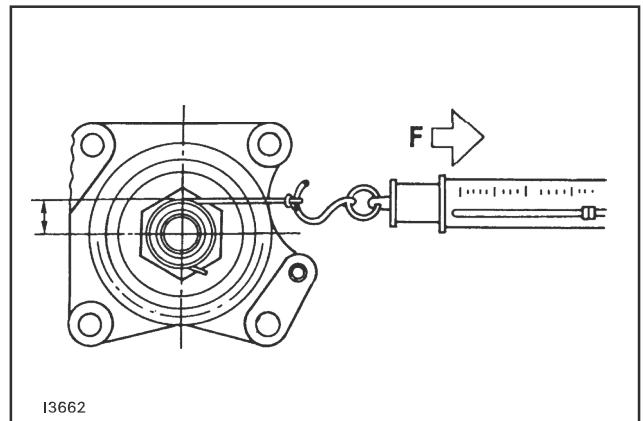
**FIG. 5A-67**

Apply oil to the drive pinion and related parts ahead of time, then install them and tightening the assembly to the specified torque.

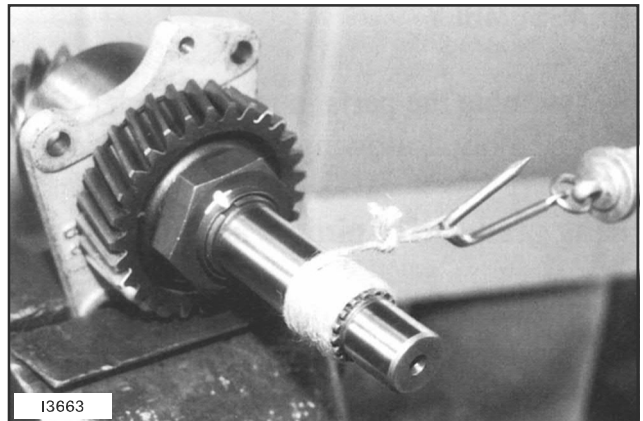
Tightening torque	12.6 Nm (9.36 ft.-lbs.)
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**FIGS. 5A-68 & 5A-69:** Be sure that starting torque of drive pinion meets the specified level.

Starting torque	0.11-0.13 kg.m (0.792 - 0.936 ft.-lbs.)
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**FIG. 5A-68**



**FIG. 5A-69**

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