TRANSAXLE

210 TRACTOR

Service Manual No. 9-50731

J I Case
A Tenneco Company

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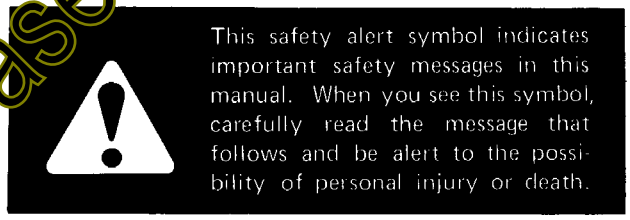

SECTION I

GENERAL SERVICE PROCEDURE AND TROUBLESHOOTING

GENERAL SERVICE PROCEDURES

1. Before removal of unit from equipment, look for:

   a. Loose drive belts.
   b. Improperly adjusted or badly worn clutching mechanism.
   c. Loose or lost setscrews and/or sheared keys in drive and driven pulleys.
   d. Oil saturated drive belts.
   e. Bad operating habits, such as clutch riding.
   f. Oil leaks.
   g. Any trouble, which might be pointed up by operating the unit and equipment, IF POSSIBLE.

2. Removal and installation of the transaxle from the tractor.

   a. Jack up tractor so that transaxle is accessible. Use wood blocks to prevent equipment movement. Do not use bricks, cement, or cinder blocks.
   b. Visually inspect transaxle for oil leaks, cracked housing, binding or rubbing of parts, or other symptoms of malfunction.
   c. Use a jack under the transaxle to support its weight.
   d. Remove wheels and drive belt. Be aware of positioning of parts. Scribe mark, if in doubt, as to re-assemble parts quickly.
   e. Remove shifter boot mounting rings.
   f. Remove bolts holding transaxle to tractor frame.
   g. With transaxle free and supported, remove it from the area of the tractor to the work bench.
   h. Reverse removal procedure to install.

3. Preparing for dis-assembly:

   a. Visually inspect for evidence of oil seepage, tampering, misalignment, freedom of rotating shafts, etc.
   b. Clean unit thoroughly of dirt, oil, [illegible].
   c. Remove shift housing and drain oil from unit. Observe oil to see if metal particles are present.
   d. Check axle shafts carefully for smoothness. Use a stone or suitable hard abrasive to rub down high spots and eliminate rust or paint.
   e. It is advisable to have the exploded parts view handy.
   f. Have seal sleeves, driver, tools, shop clothes and informational material at hand.

OIL LEAKS, SEAL AND GASKET SERVICE

1. Other than leaking seals, gaskets and "O" rings, leakage can occur due to a cracked case or cover, flats on shafts, porosity (rarely, if ever), and worn bushings and shafts.

2. Single lip inward sealing can be salvaged by use of the proper seal protector when pulling the seal over a shaft. Outward sealing seal (both single and double lip) must be replaced since there is no assurance that the initial sealing surface can be protected.

3. If you can't protect the sealing lip, replace the entire seal. The cost of the seal is small in comparison to a return repair due to reuse of seals.

4. Check seals for cracks, scuffs, cuts, and distortion. Check seal areas for evidence of oil leaks both at sealing surfaces and between metal-to-metal contact surface areas.

5. Some seals have a "Redicoat" sealant applied, while others may need a thin coat of this or a similar sealant.

6. The surface over which the seal lips must slide must be free of all cuts, scratches, high spots, or rust. The shafts should be smooth, shiny, and a thin film of lithium grease applied. Sleeves should be used to clear keyways, splines, or other sharp edges machined into shafts.

TORQUE VALUES - TROUBLE SHOOTING

1. All torque values must be applied. The torque value for any fastener will be found in the assembly instruction where that fastener is used.

2. Overtightening - Can strip threads, compress the gasket excessively, possibly causing binding.

3. Cross tightening sequence to half the torque then finally to full torque value.

4. Undertightening - Oil leakage, loosening of attaching parts, possible shifting of the internal part causing complete failure.

5. Since all bolts are readily accessible, there is no reason that a torque wrench can not be used for all bolt and screw tightening. To use guess or chance, any of the previous can result.

TORQUE VALUES

PART			TORQUE READING	
			FT-LBS	(Nm)
Bolt	1/4-20	(Case to Cover)	8-10	(11-13)
Bolt	1/4-20	(Shift Lever Housing)	8-10	(11-13)
Bolt	5/16-18	(Axle Support Housing)	15-18	(20.5-24)
Bolt	1/4-20	(Differential)	7-10	(9.5-13)
Bolt	3/8-16	(Axle Support Housing)	20-26	(27.5-35)

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   a. Visually inspect for evidence of oil seepage, tampering, misalignment, freedom of rotating shafts, etc.
   b. Clean unit thoroughly of dirt, oil, grease.
   c. Remove shift housing and drain oil from unit. Observe oil to see if metal particles are present.
   d. Check axle shafts carefully for smoothness. Use a stone or suitable hard abrasive to rub down high spots and eliminate rust or paint.
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3. If you can't protect the sealing lip, replace the entire seal. The cost of the seal is small in comparison to a return repair due to reuse of seals.

4. Check seals for cracks, scuffs, cuts, and distortion. Check seal areas for evidence of oil leaks both at sealing surfaces and between metal-to-metal contact surface areas.

5. Some seals have a "Medicoat" sealant applied, while others may need a thin coat of this or a similar sealant.

6. The surface over which the seal lips must slide must be free of all cuts, scratches, high spots, or rust. The shafts should be smooth, shiny, and a thin film of light oil applied. Sleeves should be used to clear keyways, splines, or other sharp edges machined into shafts.

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Bolt	3/8-16	(Axle Support Housing)	20-26	(27.5-35)

TROUBLESHOOTING

CAUSE	REMEDY
UNIT CANNOT BE SHIFTED (OR DIFFICULT TO SHIFT)	
Gears improperly installed.	Review positioning of gearing.
Forks and Rod assembly incorrectly installed.	Remove assembly. Recheck and correctly position parts.
Axle Housing not installed or not tightened.	Seal retainers are not properly seated. Tighten axle housing bolts.
Same items covered under heading, "Axles Cannot Be Turned (Same Direction) While Unit In Neutral Gear."	Review remedy listed.
Shifting lever improperly positioned.	Determine if finger of shifting lever is correct for the unit and correctly installed. Check to make sure shift lever housing has required gasket.
Shift lever housing misaligned to case.	Check to determine if alignment marks are on unit that they are correctly positioned. Also, determine if bend on shaft is in correct position.
Parts missing.	Install missing parts.
Equipment clutch not disengaging.	Adjust clutch according to equipment instructions.
Shifter stop assembled backwards.	Check to determine that notch in STOP aligns with shifter forks in NEUTRAL position.
Chamfer on shift gears on wrong side.	Check to determine that bevels on shifter gears are correct (fork flanges should be toward each other). On 3 gear cluster, small gear and medium gear chamfers go down toward big gear.
UNIT IS NOISY	
Gearing overly noisy - chatter, etc.	Check lubrication is at proper content.
Metallic pieces and/or other foreign objects in unit.	Check for and remove bits of broken metal, loose washers, etc.
Worn gears.	Remove and replace with new gears.
Worn bearings - mainly in output shaft ball bearing.	Replace bearing.
UNIT JUMPS OUT OF GEAR	
Shifting lever improperly assembled in housing.	Disassemble shifting lever and determine if properly assembled.
Teeth of gears are worn beyond tolerances.	Check gears. Replace worn gears.
Spring in shifter fork weak or broken.	Replace spring.
Attaching screws for shift lever and housing assembly not properly torqued.	Torque screws to 10 lbs. ft.

(Continued on next page.)

CAUSE	REMEDY
UNIT JUMPS OUT OF GEAR (continued)	
Shift lever bent and hitting unit frame.	Replace shift lever.
Shift rod grooves worn.	Replace shift rods.
Shift rod of improper length or grooving installed.	Check rod length. Replace rod with correct part.
Constant mesh gears improperly installed on counter shaft.	Reposition gears.
AXLES CANNOT BE TURNED (SAME DIRECTION) WITH UNIT IN NEUTRAL GEAR	
Axle housing not installed (or not tightened).	Seal retainers are not properly seated. Tighten axle housing bolts.
Burrs on gearing.	Remove gear and hone with stone.
Parts missing.	Install missing parts.
Broken shifter stop allowing unit to be shifted into two speeds at the same time.	Replace snap ring on shift rod out of groove.
Thrust washers in wrong position.	Recheck thrust washer and reposition, if wrong.
Bearings not pressed in deep enough.	Use the proper bearing tool to seat the bearing.
Improper fit of case to cover.	Recheck positioning of thrust washers. A misplacement or omission of washer can cause binding.
Dowel pins not installed.	Install dowel pins.
Gears improperly installed.	Check unit for correct assembly of parts.
Input shaft not properly installed.	Input shaft spline must be fitted into gear and must be tapped completely into the case.
Differential installed improperly.	Re-check positioning of bolts in differential - must be opposite output shaft gear.
Seal retainers improperly positioned.	Determine seals are correctly installed.
UNIT DOES NOT DRIVE	
Differential bevel gears broken.	Replace.
3 gear cluster counter shaft key sheared.	Replace.
Stripped teeth on gears.	Replace.
Keys sheared in drive pulleys.	Replace.
Broken input gear.	Replace.

TESTING

The absence of binding and oil leakage are the best indications that the unit has been properly reassembled. Though other, more elaborate, tests can be done, this would be the perogative of the servicing agency, since the following checks are considered adequate.

With the shift forks in neutral, rotate both axle ends in the same direction. They should turn smoothly although a little effort may be necessary. The brake shaft should rotate whenever the axles turn together, but in neutral, the input shaft should not turn.

By moving any shifter gear into mesh, a greater drag should be felt on the axles and both the input and brakeshaft should turn.

To ease in turning of the various shafts, insert a tool (such as punch or a socket head screw key) into the keyway, however, do not force if the shaft is binding.

Reason for unit binding:

1. Reused or lack of gasket.
2. Oil seal retainers installed backward.
3. Mis-installed thrust washers.
4. Differential installed backward.
5. Mis-assembly of shifting parts.
6. Mis-placement of spacers.
7. Foreign matter blocking gear teeth mesh.
8. Shifter stop installed backwards.
9. Input shaft not completely in case.
10. Mis-alignment of case and cover. Align with dowels before tightening cap screws.

VERY IMPORTANT: DECLUTCHING IS REQUIRED WHEN SHIFTING TO AVOID GEAR CLASHING AND DAMAGE.

SECTION II GENERAL INFORMATION

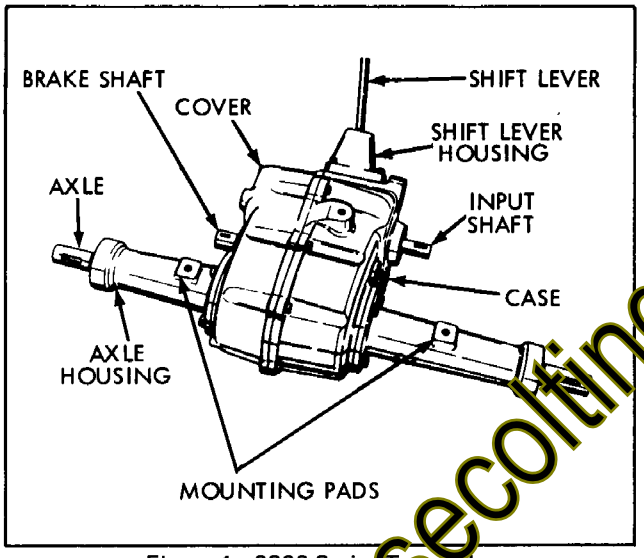

Figure 1 - 2300 Series Transaxle

1. The 2300 series transaxles have a four speed forward and one speed reverse transmission.
2. Service for the shifter assembly is covered on page 13 in Section VII.
3. This is the only transaxle currently produced by Peerless which is approved for use with ground engaging equipment.

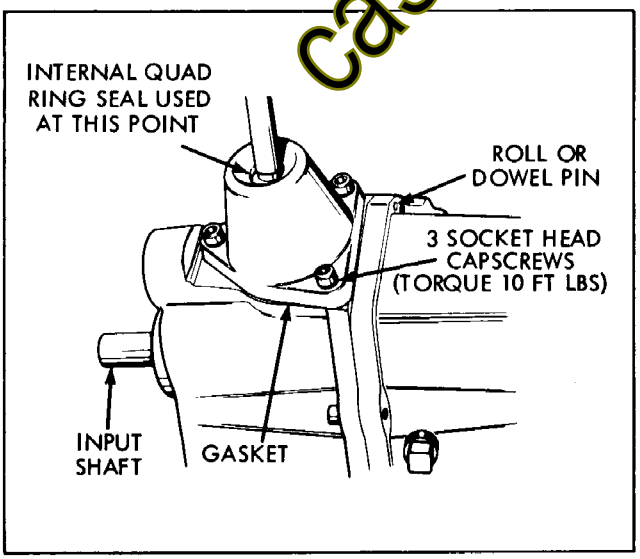

Figure 2 - Shift Lever Housing

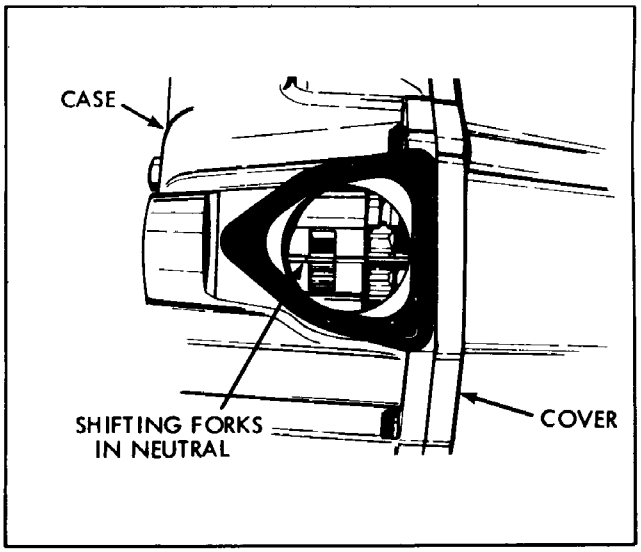

Figure 3 - Position of Shifter Forks Prior to Disassembly

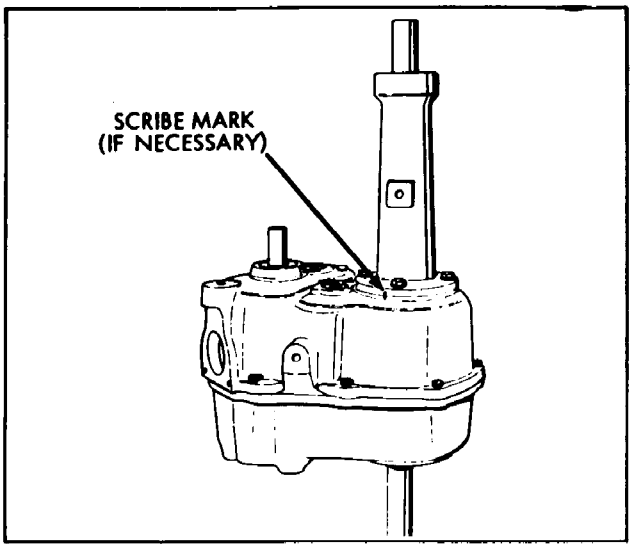

Figure 4 - Remove Axle Housings

1. Perform all pre-disassembly procedures outlined in Section I, General Service Procedure and trouble shooting.

2. Position the shifter forks in neutral before disassembly.

3. Remove both axle housings and use the exposed axle as a ram to separate the seal retainers from the case and cover.

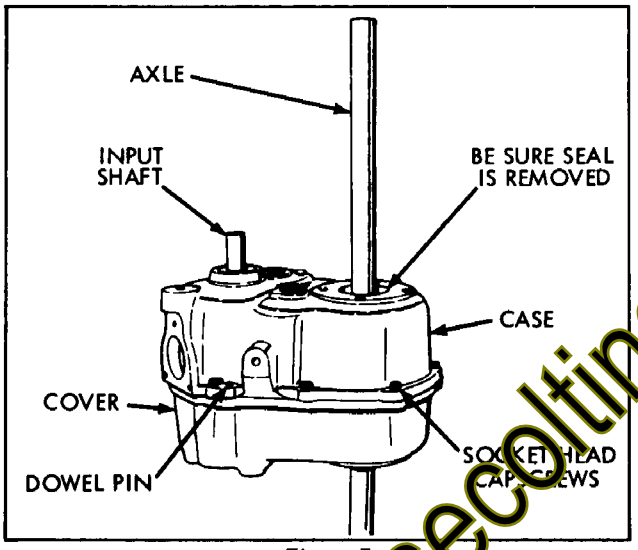

Figure 5

4. When disassembling the rest of the unit, it should be held so that:

   (a) It rests on the cover, properly blocked up, so that no weight rests on the brake shaft.

   (b) The cover should sit rigidly so that removal of parts can be done in a systematic step by step procedure.

   (c) It will not fall causing an accident or injury.

5. Oil seals are of the double lip type so sleeve protectors do not offer much protection when removing them. Upon replacement, new seals should be used.

6. Tap dowel pins into the cover and remove eight socket head capscrews.

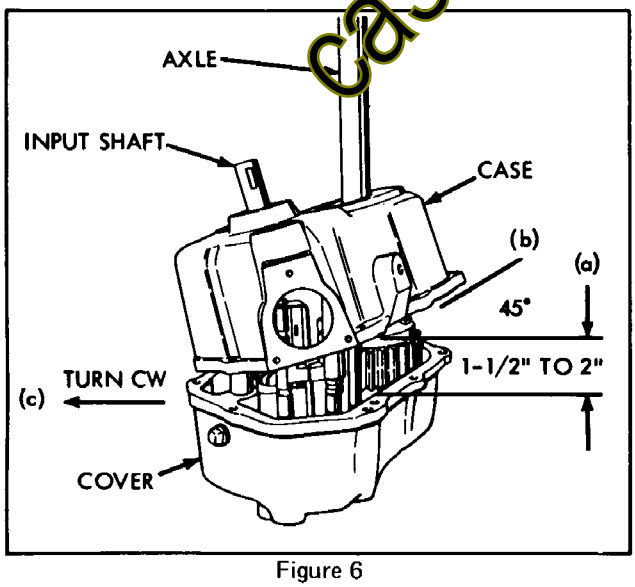

Figure 6

7. To separate the case from the cover:

   (a) Lift the case 1-1/2 to 2 inches (38.1-50.8 mm) above the cover.

   (b) Tilt the case so that shift rods will clear edge.

   (c) Rotate the case so that boss hidden inside will clear gears, then lift free of the differential.

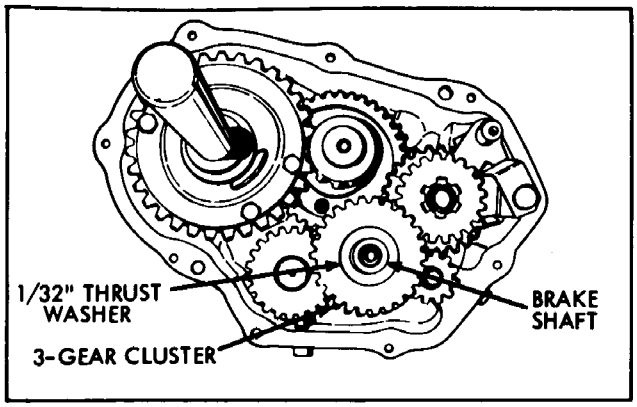

Figure 7 - Remove Three Gear Cluster

8. Remove thrust washer and three gear cluster from brake shaft, noting whether the cluster has a sloppy fit.

   Inspect gear teeth for wearing, chipping or breaks. Wear or chipping on the bevel area only, indicates shifting while the equipment is in motion.

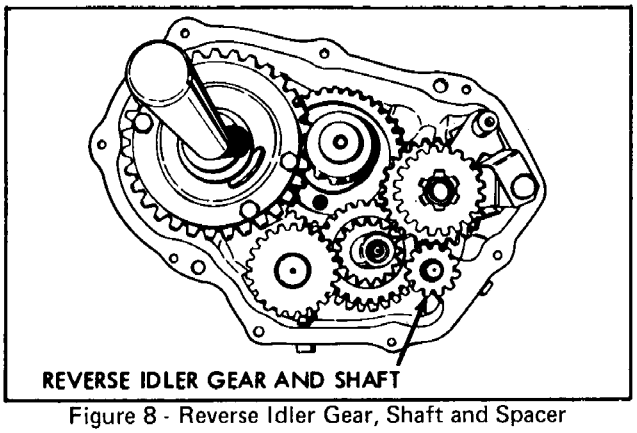

Figure 8 - Reverse Idler Gear, Shaft and Spacer

9. Remove the reverse idler gear, spacer, and shaft from boss in cover.

   Note that the spacer goes between the gear and that the gear bevels go down.

   Excessive wear on teeth bevels indicates improper shifting technique.

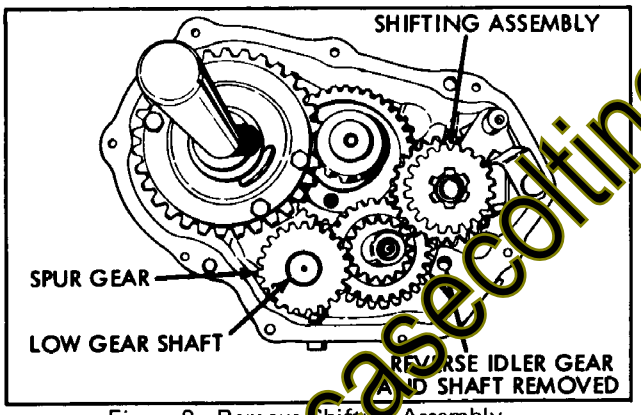

Figure 9 - Remove Shifting Assembly

10. Lift out the shifter assembly. Service of this unit is described in Section VII.

    If it is evident that the shifter assembly needs no further teardown, place it aside, in a clean place, intact, for easy re-assembly.

11. Remove the low gear and shaft, and splined spur gear. Separate gear and shaft. Note that NO thrust washer is between the gear and case.

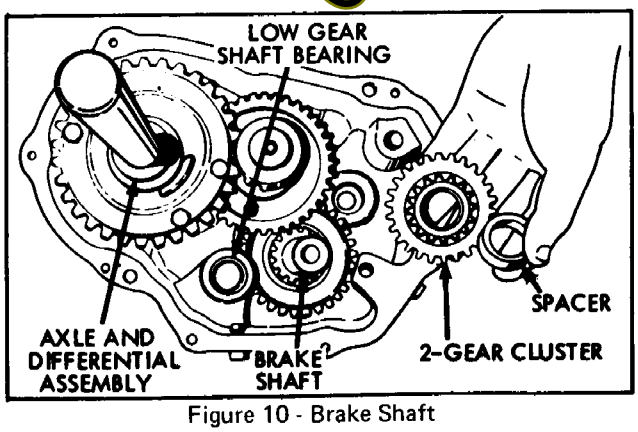

Figure 10 - Brake Shaft

12. Remove the two gear cluster and spacer from the brake shaft.

13. Lift the differential unit out of the cover. Service information appears in Section VIII.

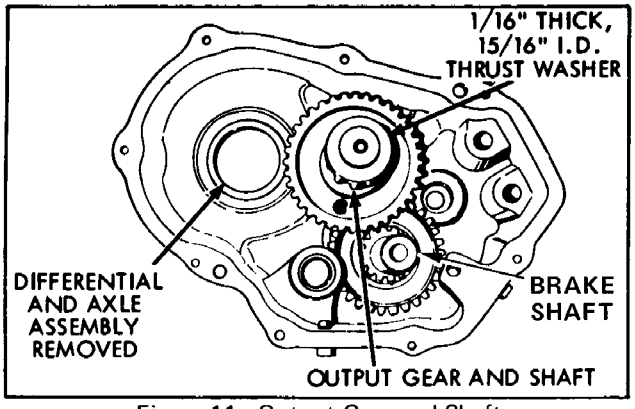

Figure 11 - Output Gear and Shaft

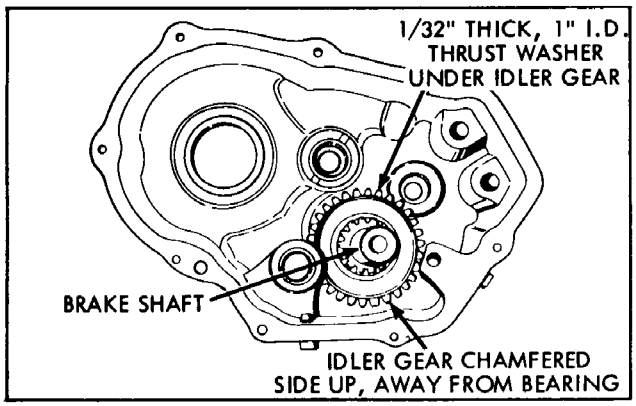

Figure 12 - Idler Gear and Brake Shaft

14. Remove the output gear and shaft and thrust washer from each end of shaft.

15. Remove the brake shaft.

    Note that the brake shaft idler separates from the shaft. If separated, be sure that when re-assembled, the idler gear chamfers are away from the cover.

16. Remove input shaft from case by tapping with a non-metallic hammer.

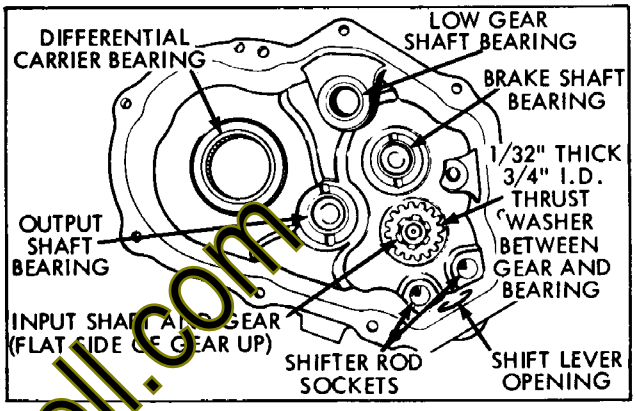

Figure 13 - Case Assembly

SECTION IV INSPECTION AND REPAIR

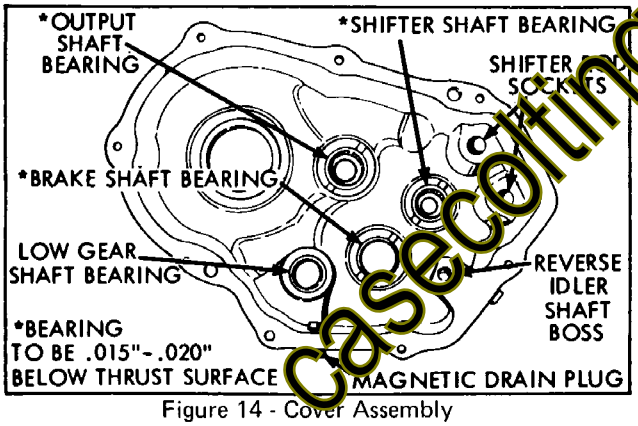

Figure 14 - Cover Assembly

1. Gears

   (a) Check bevels for evidence of galling due to improper shifting.

   IMPORTANT: Peerless Transaxles must be stopped for shifting.

   (b) Check face of teeth for wear, large shiny areas indicate much tooth contact and possible excessive wear. Replace gears indicating damage or excessive wear.

2. Shafts and Axles

   (a) Check surface for rust, pitting, scratches or wear.

   (b) Check keyways, splines, threads, and grooves for wear. Replace parts if worn or damaged beyond a refinishable state.

3. Case and Cover

   Check for cracks, stripped threads, metal chips, flat sealing surfaces, and rust. Clean out any rust. Replace parts if any damage is found that cannot be repaired.

4. Thrust Washers and Spacers

   Check for shininess indicating wear. Replace if wear is evident. Try to determine cause of thrust washer wear such as: lack of end play due to re-use of gasket or use of wrong thrust washer.

5. Shifting Assembly

   Refer to Section VII.

6. Gaskets

   Replace all gaskets.

7. Oil Seals

   It is a good habit to replace all seals. It is necessary to replace all double lip seals. Refer to Section I.

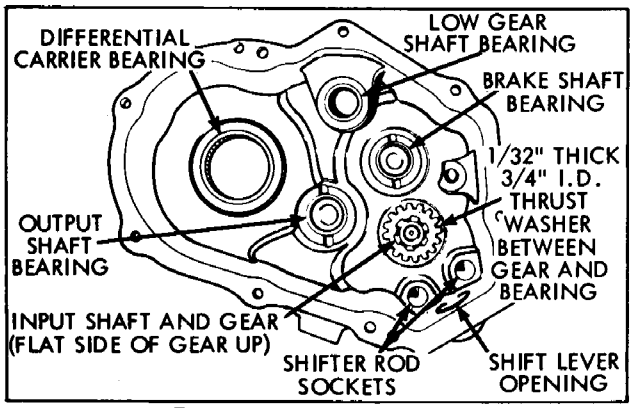

Figure 15 - Case Assembly

1. Install input shaft in case. Use a soft mallet to seat shaft and gear completely. Often binding in the assembled unit can be traced to a partially installed input shaft.

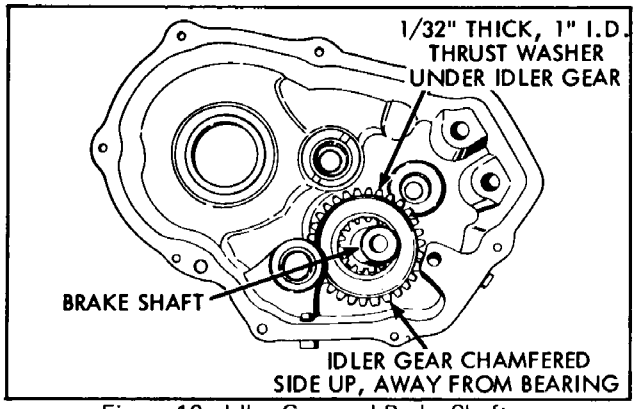

Figure 16 - Idler Gear and Brake Shaft

2. Center on 1/32 inch (.79 mm) thick by 1 inch (25.4 mm) I.D. thrust washer on the cover brake shaft needle bearing, then install the brake shaft and gear (chamfer side away from cover).

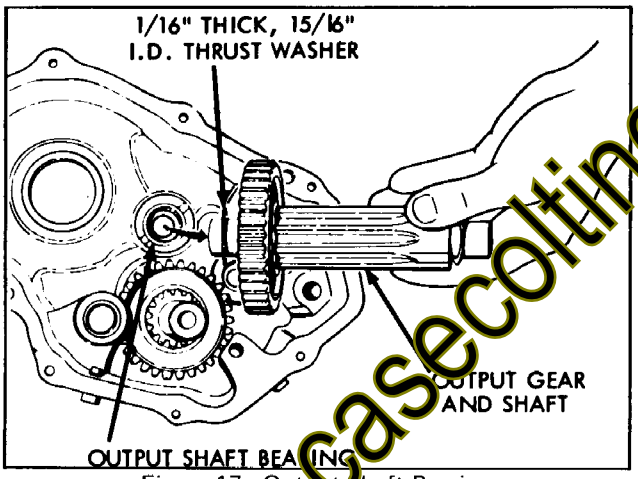

Figure 17 - Output Shaft Bearing

3. Install the output shaft and gear after centering a 1/16 inch (1.59 mm) thick by 15/16 inch (23.81 mm) I.D. thrust washer on each end of the shaft.

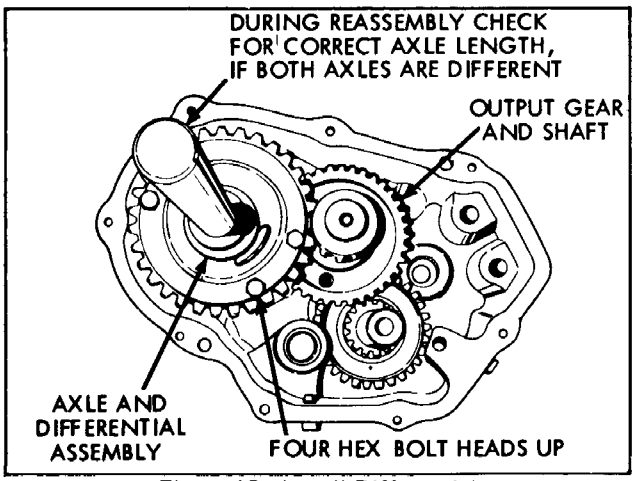

Figure 18 - Install Differential

4. Insert the differential assembly in the cover. Note that the four bolt heads should be out away from the output gear.

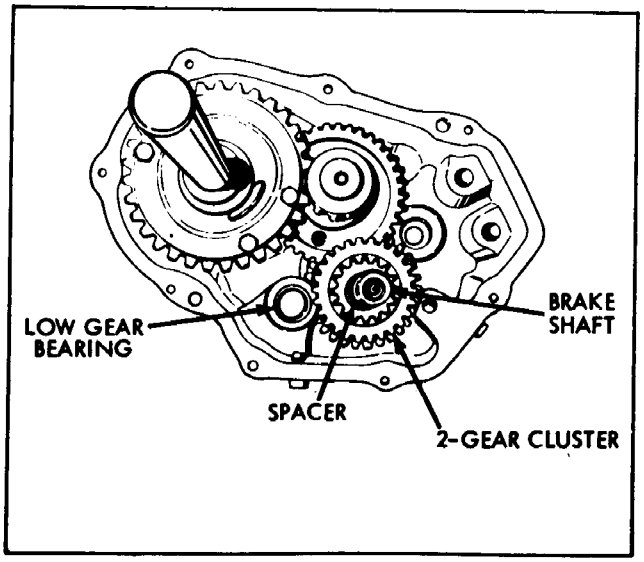

Figure 19 - Two Gear Cluster

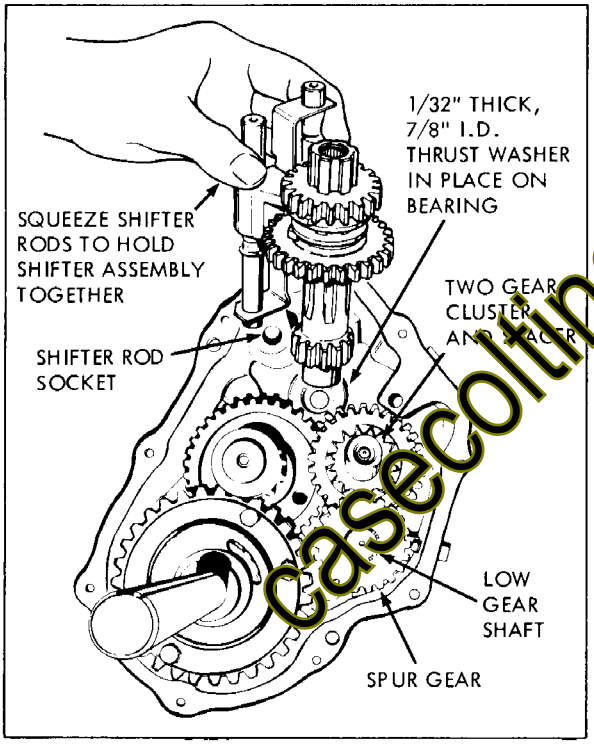

Figure 20 - Spur Gear and Low Speed Shaft

5. Install the two gear cluster and spacer on the brake shaft.

6. Install a 1/16 inch (1.59 mm) thick by 3/4 inch (19.05 mm) I.D. thrust washer, gear, and low gear idler shaft in cover. Do not put a thrust washer on the exposed end of this shaft. Be sure the small gear meshes with the larger gear of the two gear cluster.

7. Center on a 1/32 inch (.79 mm) thick by 7/8 inch (22.22 mm) I.D. thrust washer on cover shifter shaft boss.

8. Install shifter assembly as a unit into the cover.

9. With the small gear of the three gear cluster toward the spacer, install the three gear cluster and other 1/32 inch (.79 mm) thick by 7/8 inch (22.22 mm) I.D. thrust washer on the brake shaft.

10. Install the reverse idler shaft, spacer, and gear into the cover. The beveled side of the idler gear should be down into the cover.

11. Position the gasket on the cover sealing surface, then install case over the differential shaft. Be sure the boss goes under gears and that edge of the case goes over the shaft rods in the opposite manner from which it was removed.

12. Once in position, if case hangs 1/2 (12.7 mm) to 1 inch (25.4 mm) high, turn the input shaft to get gears to mesh. The case should drop to about 1/4 inch (6.35 mm) from closing.

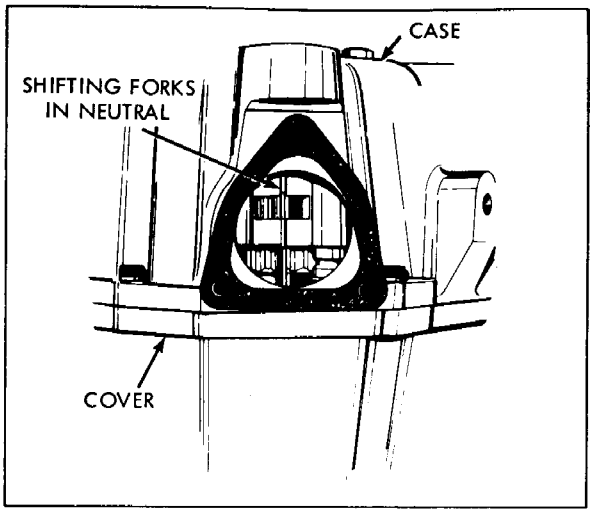

Figure 21 - Install Case

13. Use a pair of needle nose pliers on the shifter stop on each shifter fork to agitate the shifter rod ends into their machined recesses in the case.

14. Align the case and cover with the two dowels, then install and tighten the eight socket head capscrews. Torque screws to 10 lbs. ft. (13 Nm). Unit can now be placed flat on the work bench.

Position seal retainers and new seals in position.

IMPORTANT: Sleeves must be used to protect seals, especially axle ends or where wheels attach.

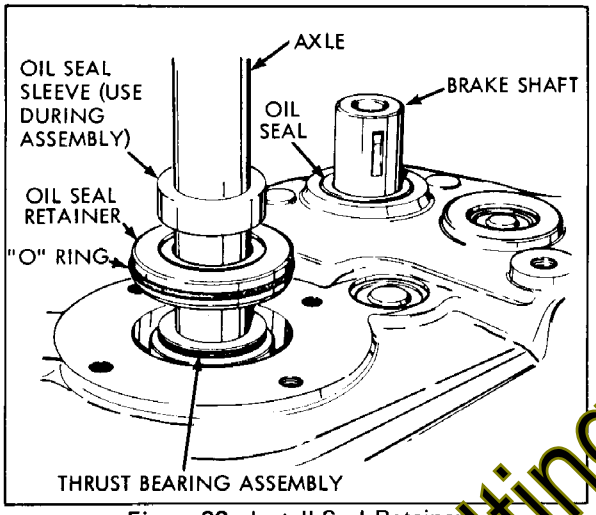

Figure 22 - Install Seal Retainers

15. Install new "O" rings on seal retainers and position axle supports to case and cover. Be sure mounting pads face in same position as when removed. Install capscrews and torque to 13 lbs. ft. (17.6 Nm).

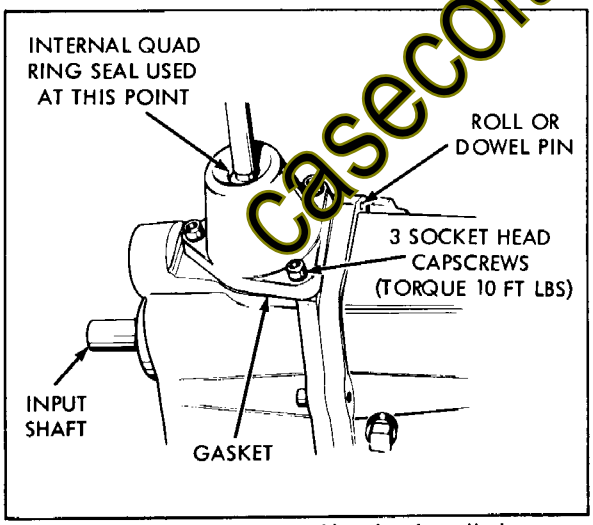

Figure 23 - Shift Lever Housing Installed

16. Install shift lever housing and new gasket.

SECTION VI TESTING AND LUBRICATION

1. For testing, refer to Section I.

2. Fill with 3 pints (1.4 l) of SAE E.P. 90 oil.

SECTION VII SHIFT LEVER ASSEMBLY

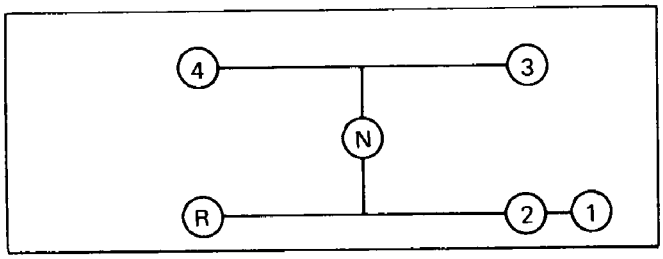

Figure 24

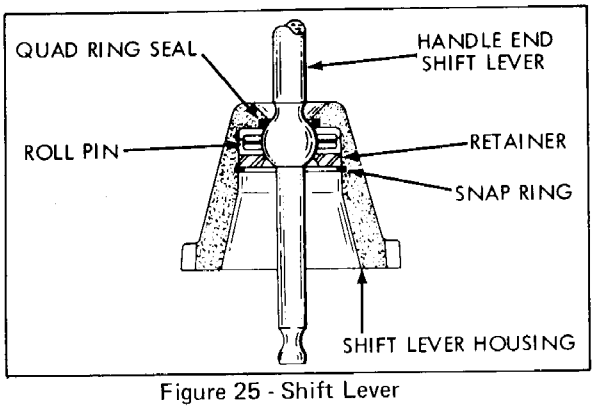

Figure 25 - Shift Lever

SHIFT LEVER ASSEMBLY

1. General

   (a) Prior to removing a shift lever assembly from a transaxle, make note of the position of the shift lever so that it may be assembled correctly to the shift lever housing.

   (b) Move the shift lever to Neutral, if possible, before removing it from the transaxle. Clean around the lever housing to prevent dirt from falling into the transaxle. Cover this opening, if possible.

2. Disassembly

   (a) Place the shift lever in a vise so that the shift lever housing is at least one inch from the top of the vise jaws.

   (b) Use the proper compressing type tool for removing the snap ring. Loosen the vise and disassemble the pieces (Fig. 25).

   (c) Remove the shift lever from the shift lever housing. Examine the roll pin in the ball of the shift lever, (Fig. 25) if bent or worn, replace. When inserting a new roll pin in the ball, position so that equal lengths protrude from both sides of the ball.

   (d) Oil leakage past the point where the shift lever housing will require replacement of the quad ring seal in the shift lever housing.

   (e) Prior to reassembly, be sure that bends in the shift lever correspond to the mounting on the vehicle.

3. Reassembly

   (a) Secure parts with the snap ring. Before installing the shift lever and housing to the transaxle housing, check the shifting forks for Neutral position.

   (b) Always use new gaskets between the shift lever housing and the transaxle.

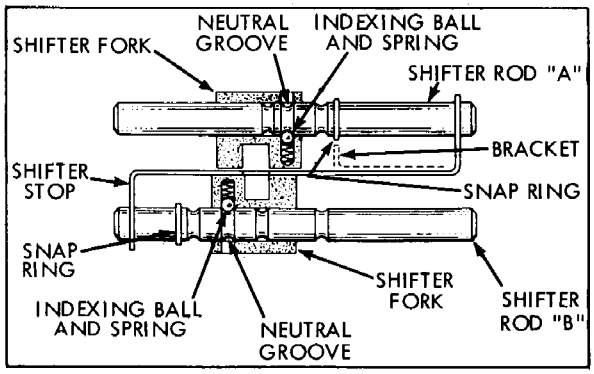

Figure 26 - Four Stop. Four-Speed Transaxle Shifter and Fork Assembly

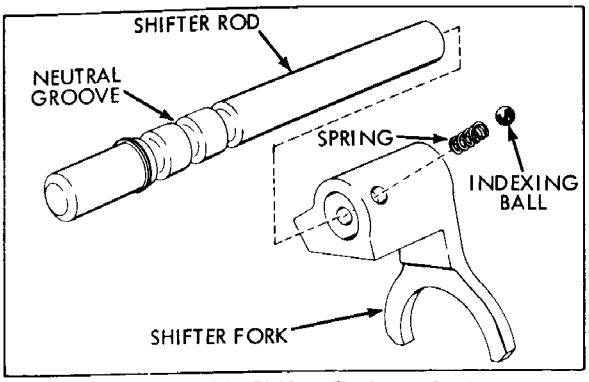

Figure 27 - Assemble Shifter Forks to Shifter Rods

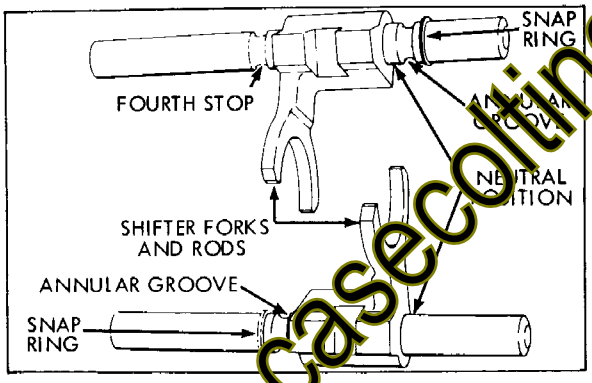

Figure 28 - Shifter Forks and Rods Positioned in Neutral

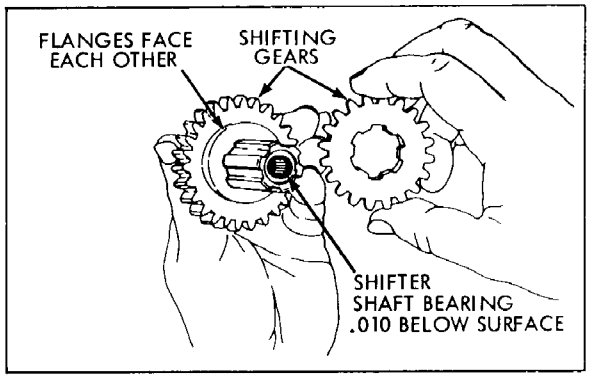

Figure 29 - Two Flanged Gears onto Shifter Shaft

SHIFTING ASSEMBLY

1. General

   (a) Shifting assemblies are removed from and installed into transaxles by squeezing the top end of the shifter rods. This causes a binding that retains all parts during removal or installation.

2. Disassembly

   Follow the illustrations in order. Figures 31, 30, 29, 28, 27, 26. Prior to disassembly compare the assembly with the illustrations. This will aid during the reassembly.

3. Inspection

   (a) Replace the shifter stop if worn or damaged.

   (b) Examine the teeth and internal splines of the two shifter gears. Replace damaged gears. The gears must slide freely on the shifter shaft. Excessive wear of the internal spline in the gears will create cocking and difficult shifting. Replace the gear if this condition is present.

   (c) Replace the shifter shaft needle bearing if wear is evident. Replace if the bearing surface of this shaft should be scuffed, pitted or worn to a diameter less than .750" (19.05 mm).

   (d) Replace other parts showing wear, looseness, cracks, etc.

4. Assembly

   (a) Reassemble the shifting assembly by following the illustrations beginning with Figure 26 through 31. Pay particular attention to Figure 26 during the reassembly of the shifter forks and shifter rods. Lay the parts on the bench in the same manner as illustrated in Figure 26 on a clean paper or shop cloth. Pay particular attention to the annular grooves in the shifter rods and the snap ring.

      (1) Assemble the shifter forks to the shifter rods as illustrated in Figure 26. The shifter forks are interchangeable.

      (2) Refer to Figure 26. Slide the shifter fork onto the shifter rod until it comes to the hole with the indexing ball and spring. With a flat blade screw driver press the indexing ball into the hole and move the shifting fork completely onto the shifter rod.

      (3) Move the shifting fork to the Neutral position. The neutral groove is the second groove from the shortest end. This neutral groove can be seen through the hole in the shifter fork. See Figure 26. The arrow from the words "Neutral Groove" is passing through the hole for viewing.

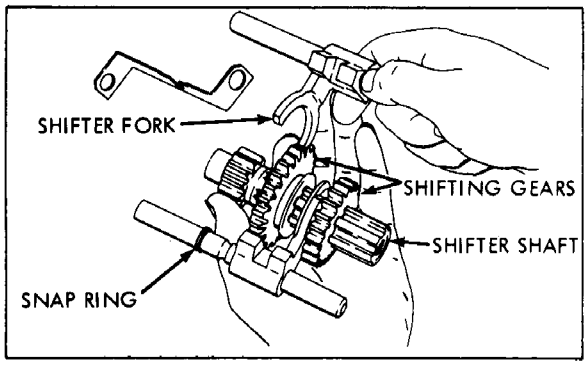

Figure 30 - Assembling Shift Fork, Gears and Shaft Assemblies

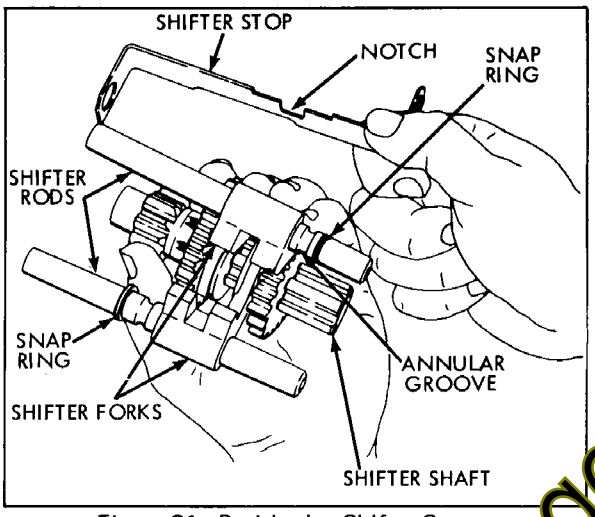

Figure 31 - Positioning Shifter Stop

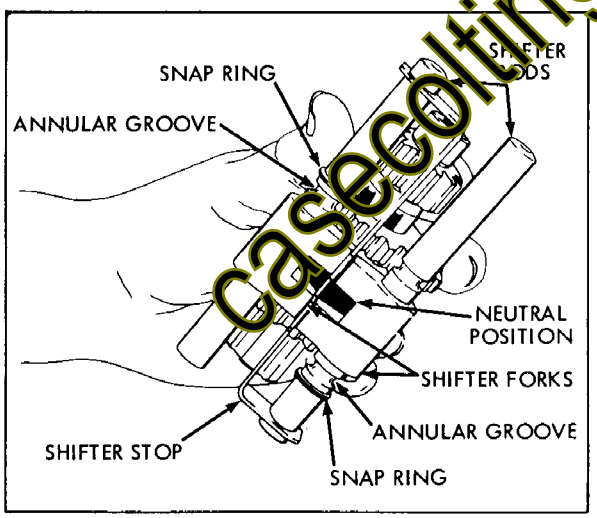

Figure 32 - Final Assembly

(4) When the shifter forks are properly assembled to the shifter rods and positioned in neutral, the ends of the notches in the shifter forks are in alignment. (Figure 32).

(b) Assemble the two flanged gears onto the shifter shaft. (Figure 29) Note that the large gear is placed on the shaft first with the flange side toward the needle bearing in the end of the shifter shaft. Slide on the smaller gear with the flange toward that of the larger gear. (Figure 29, 30).

(c) When assembling the shifter fork and rod to the flanged gears on the shifter shaft, Figure 30, that shifter fork which is on shifter rod "A" always engages in flange in the larger gear. To determine which is shifter rod "A" compare the parts to illustrations. Figure 26. Hold the shifter shaft in the hand as illustrated (Figure 29 during assembly.

(d) After the shifter fork and rod assemblies have been engaged with the flanged gears allow the shifter rods to fly open in the hand and position the shifter stop. (Figure 31). The notch in the shifter stop is the guide for correct positioning. Align this notch with the corresponding notches in the shifter forks and insert the shifter stop. Move the shifter rods together, (Figure 32) and insert into the transaxle. Remember to squeeze the ends of the shifter rods to cause the assembly to bind and stay together.

(e) When placing the shifting assembly into the four speed transaxle be sure the thrust washer is on the bearing. Place the assembly into the transaxle with the needle bearing end of the shifter shaft up. Allow the end of the shifter shaft to protrude below the ends of the shifter rods, this will ease the alignment of the assembly.

(f) The shifter assembly is correctly installed in the transaxle if the notches in the shifter forks are just about in the center of the opening in the case or cover of the transaxle.

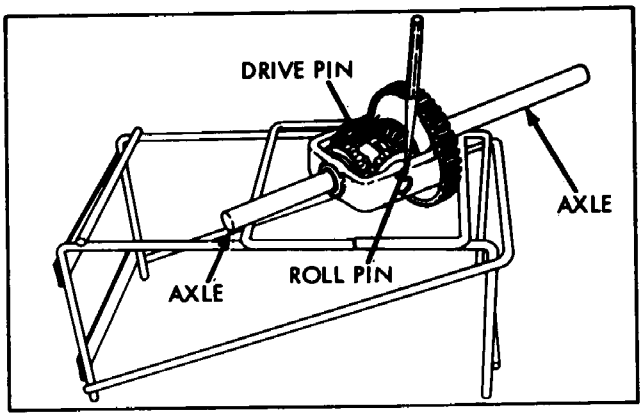

Figure 33

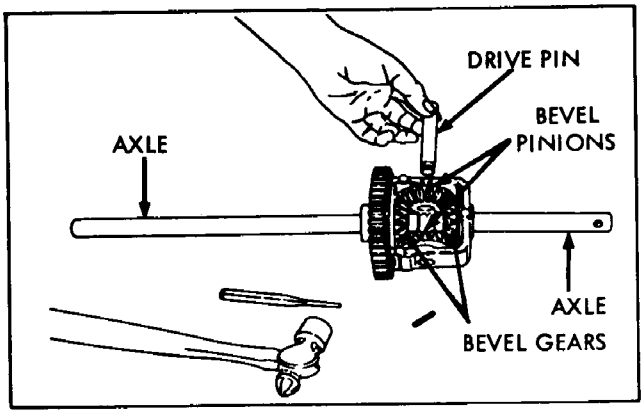

Figure 34

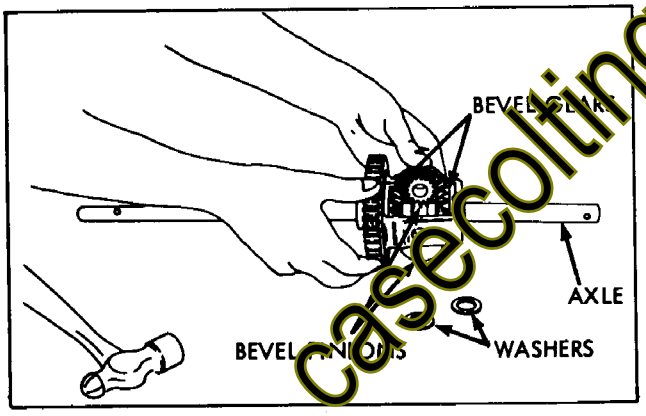

Figure 35

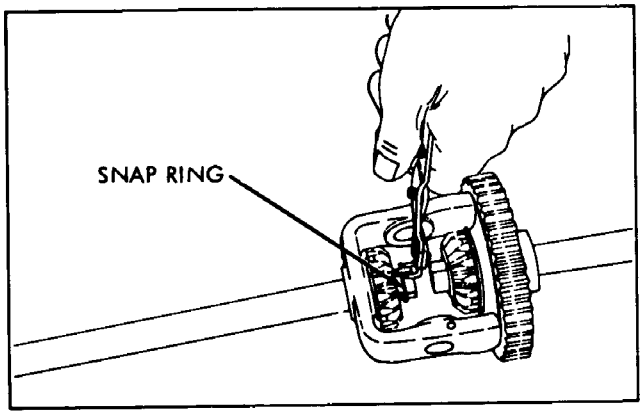

Figure 36

1. Disassembly

   (a) Drive out roll pin that secures drive pin with suitable driver.

   (b) Remove drive pin.

   (c) Thrust washers must be removed before attempting to remove the pinions. Remove bevel pinions simultaneously by rotating the gears in opposite directions; gears will move out of position.

   (d) Remove snap ring, bevel gear and thrust washer. Slide axle out. See Figure 36.

   (e) Inspect bushings and gears for wear and replace when necessary.

2. Reassembly of Differential Assembly

   (a) Place axles (left and right) into differential gear assembly. Install thrust washers.

   (b) Place bevel gears on the shaft and install snap ring in groove on the shaft.

   (c) Install bevel pinions SIMULTANEOUSLY FROM OPPOSITE SIDES by rotating pinions in opposite directions while sliding into position in gear assembly. See Figure 35. Check alignment by inserting fingers into drive pin holes. If not aligned, drive pin cannot be inserted. Remove and replace bevel pinions as only one tooth out of position will cause mis-alignment.

   (d) After aligning, insert thrust washers behind each pinion. Insert drive pin and secure with roll pin.

GENERAL BEARING AND BUSHING CARE

1. Bearings, bushings and bearing surfaces should be thoroughly cleaned prior to examination. Examine closely for scuffing, wear, pitting and abnormal conditions. Replace if any conditions mentioned appear.

2. Use a good grade of clean solvent to clean bearings. After cleaning, always use clean lint-free cloth to dry and wipe bearings. Immediately coat cleaned bearing with lubricant to prevent rusting or corrosion. If the bearing is to be stored, wrap in oil proof paper until needed. Ball bearings will be damaged if spun with compressed air. Moisture from compressed air will cause rust.

3. Take care of bearings in the case and cover. Cover them to keep out foreign matter. Place gasket surface down on clean paper and cover with clean cloth.

   Never clean the lubricant from new bearings. This lubricant prevents damage before the transaxle lubricant enters the bearing.

BALL BEARING SERVICE

The ball bearings used in the outer ends of the axle supports are sealed. Without removing, but with the axle out, rotate the inner race with the fingers. If any roughness is noted replace the ball bearing assembly. These ball bearings are factory lubricated and additional lubricants cannot be added. When driving in these ball bearings, use the proper tool that drives on the outer race.

1. Install the needle and ball bearing combination for the input shaft into the cover prior to installation of the input shaft.

2. When installing ball bearings, use a tool to drive on the race which is encountering the restricted fit. For example, install the input shaft ball bearing into the case by driving on the outer race. After the input shaft bearings are installed assemble the input shaft. Press the input shaft into the bearing combination while supporting the inner race of the ball bearing on a hollow tube.

NEEDLE BEARING SERVICE

It is advisable to use an abor press to remove and install needle bearings.

1. Use a bearing tool to press out the bearing. Insert the proper tool in the bearing and with an arbor press, press out the bearing from the inside.

2. When installing open end needle bearings, always apply pressure to the stamped side.

3. The inside face of the bearing housing should be below the thrust face on the case or cover. Bearings should be pressed into the case or cover .015 inch (.38 mm) to .020 inch (.50 mm) below the thrust surface. The open end bearing in the low speed shaft ear of four-speed transaxles is to be .010 inch (.25 mm) below the thrust surface. The open end bearing in the shifter shaft should be .010 inch (.25 mm) below the end.

4. To remove the needle bearing in the splined shifter shaft proceed as follows:

   NOTE: Blind bearing pullers are available to remove this bearing. There is a space between the bottom of the drilled hole and the inside end of the bearing to accommodate the ridges of the bearing puller.

   (a) With the needle bearing up, clamp the splined shifter shaft vertically in a soft jaw vise so that the lower end of the shaft rests on a block of wood.

   (b) Prepare some pieces of paper toweling, newspaper, etc. by soaking in water.

   (c) Tear paper into pieces, approximately one to two inches square. Stuff these wet pieces of paper into the needle bearing until full.

   (d) Insert a 7/16" (11.1 mm) metal rod into this bearing. With a mallet strike the rod sharply. This will compress the wet paper. Continue to add more wet paper, this will hydraulically lift the bearing out of the shaft.

   (e) Needle bearings in shifter shafts should be installed .010 inch (.25 mm) below flush.

BUSHING SERVICE

Position the piece to be serviced on the table of an arbor press with an opening to allow the bushing to pass through.

1. The bushings in the three gear cluster, four-speed transaxle, are both removed at the same time. The bushing from one end will contact the bushing in the opposite end and both may be pushed out.

2. After new bushings are pressed into the piece they must be sized. See the tool list for the proper sizing ball and driver. Use an arbor press and push the steel ball through the new bushing to expand it to the required size.

SECTION X SPECIAL SERVICE TOOLS

The following special tools are highly recommended to properly service the Model 2326 transaxle.

Part No.	
670171	Needle Bearing Removal and Installation Tool
670172	Needle Bearing Removal and Installation Tool
670173	Needle Bearing Removal and Installation Tool
670174	Needle Bearing Removal and Installation Tool
670175	Needle Bearing Removal and Installation Tool
670194	Needle Bearing Installation Tool
670177	Bushing Sizing Ball and Driver
670179	Seal Sleeve
670182	Seal Sleeve
670185	Seal Sleeve
670180	Seal Driver
670184	Seal and Bearing Driver
670186	Shaft Seal Driver
670181	Bushing Removal and Installation Tool
670183	Bushing Removal and Installation Tool
670227	Shaft Driver
670220	Shaft Driver
670158	Bearing Support
670162	Bearing Support

These tools may be purchased individually or in a Kit with other tools, (Kit Part Number 670233) from your local Peerless dealer or distributor.

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