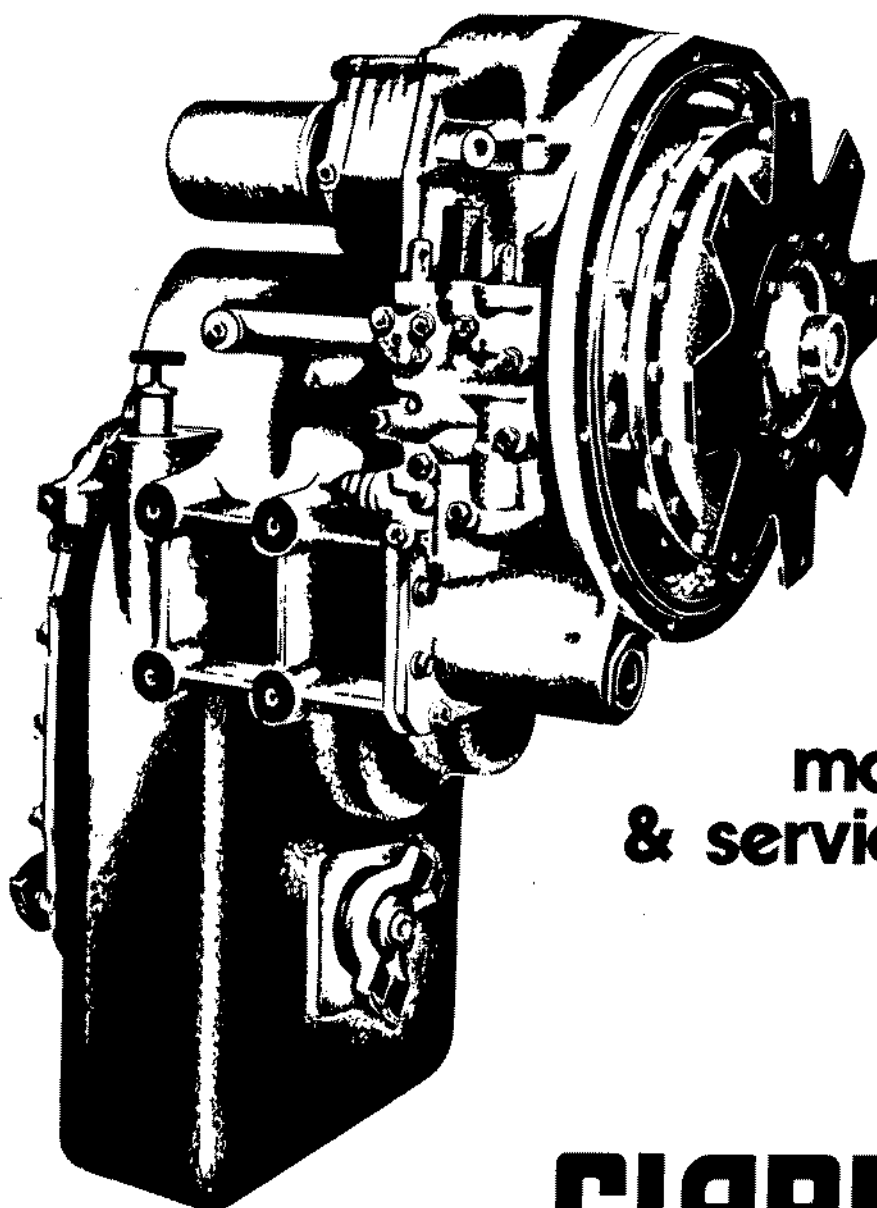


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# **18000 powershift transmission**

**3 speed long drop output**



**maintenance  
& service manual**

**CLARK** Axle and  
Transmission  
Divisions

# FOREWORD



This manual has been prepared to provide the customer and the maintenance personnel with information and instructions on the maintenance and repair of the **CLARK** Power Shift Transmission.

Extreme care has been exercised in the design, selection of materials and manufacturing of these units. The slight outlay in personal attention and cost required to provide regular and proper lubrication, inspection at stated intervals, and such adjustments as may be indicated will be reimbursed many times in low cost operation and trouble free service.

In order to become familiar with the various parts of the transmission, its principle of operation, trouble shooting and adjustments, it is urged that the mechanic study the instructions in this manual carefully and use it as a reference when performing maintenance and repair operations.

Whenever repair or replacement of component parts is required, only Clark-approved parts as listed in the applicable parts manual should be used. Use of "will-fit" or non-approved parts may endanger proper operation and performance of the equipment. The Clark Equipment Company does not warrant repair or replacement parts, nor failures resulting from the use thereof, which are not supplied by or approved by the Clark Equipment Company. **IMPORTANT: Always furnish the Distributor with the transmission serial and model number when ordering parts.**

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**NOTE:** Metric Dimensions Shown in Brackets [    ].

## HOW THE UNITS OPERATE

The transmission and hydraulic torque portion of the power train enacts an important role in transmitting engine power to the driving wheels. In order to properly maintain and service these units it is important to first understand their function and how they operate.

The transmission and torque converter function together and operate through a common hydraulic system. It is necessary to consider both units in the study of their function and operation.

To supplement the text below, and for reference use therewith, the following illustrations are provided:

Basic Design	Fig. A
Converter Group	Fig. B
Converter and Transmission Case Group	Fig. C
Three Speed Gear and Clutch Group	Fig. D
Clutch Group	Fig. E
Control Valve Assembly	Fig. F
Parking Brake Group	Fig. G
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The HR Model consists of a torque converter and powershifted transmission in one package mounted directly to the engine.

The shift control valve assembly is mounted directly on the side of the converter housing. The function of the control valve assembly is to direct oil under pressure to the desired directional and speed clutch. A provision is made on certain models to neutralize the transmission when the brakes are applied. This is accomplished through use of a brake actuated shutoff valve. The speed and direction clutch assemblies are mounted inside the transmission case and are connected to the output shaft of the converter by direct gearing. The purpose of the speed or directional clutches is to direct the power flow through the gear train to provide the desired speed range and direction.

With the engine running, the converter charging pump draws oil from the transmission sump through the removable oil suction screen and directs it through the pressure regulating valve and oil filter.

The pressure regulating valve maintains pressure to the transmission control cover for actuating the direction and speed clutches. This requires a small portion of the total volume of oil used in the system. The remaining volume of oil is directed through the torque converter circuit to the oil cooler and returns to the transmission for positive lubrication. This regulator valve consists of a hardened valve spool operating in a closely fitted bore. The valve spool is spring loaded to hold the valve in a closed position. When a specific pressure is achieved, the valve spool works against the spring until a port is exposed along the side of the bore. This sequence of events provides the proper system pressure.

After entering the converter housing the oil is directed through the stator support to the converter blade cavity and exits in the passage between the turbine shaft and converter support. The oil then flows out of the converter to the oil cooler. After leaving the cooler, the oil is directed to a lubricating fitting on the transmission and through a series of tubes and passages lubricates the transmission bearings and clutches. The oil then gravity drains to the transmission sump.

The hydraulic torque converter consists basically of three elements and their related parts to multiply engine torque. The engine power is transmitted from the engine flywheel to the impeller element through the impeller cover. This element is the pump portion of the hydraulic torque converter and is the primary component which starts the oil flowing to the other components which results in torque multiplication. This element can be compared to a centrifugal pump in that it picks up fluid at its center and discharges at its outer diameter.

The torque converter turbine is mounted opposite the impeller and is connected to the output shaft of the torque converter. This element receives fluid at its outer diameter and discharges at its center. Fluid directed by the impeller out into the particular design of blading in the turbine and reaction member is the means by which the hydraulic torque converter multiplies torque.

The reaction member of the torque converter is located between and at the center or inner diameters of the impeller and turbine elements. Its function is to take the fluid which is exhausting from the inner portion of the turbine and change its direction to allow correct entry for recirculation into the impeller element.

The torque converter will multiply engine torque to its designed maximum multiplication ratio when the output shaft is at zero RPM. Therefore, we can say that as the output shaft is decreasing in speed the torque multiplication is increasing.

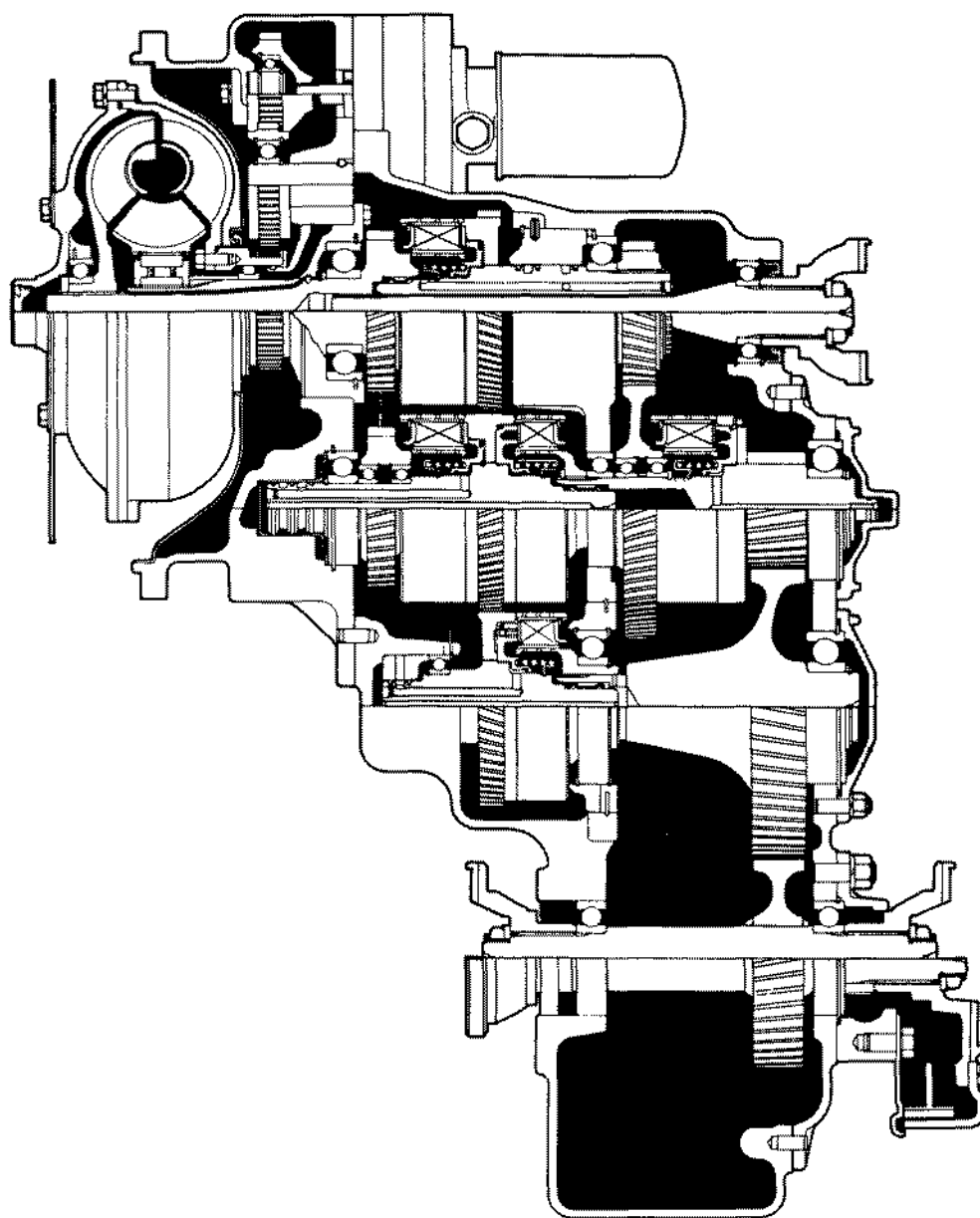
The shift control valve assembly consists of a valve body with selector valve spools. A detent ball and spring in the selector spool provides one position for each speed range. A detent ball and spring in the direction spool provides three positions, one each for forward, neutral and reverse.

With the engine running and the directional control lever in neutral position, oil pressure from the regulating valve is blocked at the control valve, and the transmission is in neutral. Movement of the forward and reverse spool will direct oil, under pressure to either the forward or reverse direction clutch as desired. When either directional clutch is selected the opposite clutch is relieved of pressure and vents back through the direction selector spool. The same procedure is used in the speed selector.

The direction or speed clutch assembly consists of a drum with internal splines and a bore to receive a hydraulically actuated piston. The piston is "oil tight" by the use of sealing rings. A steel disc with external splines is inserted into the drum and rests against the piston. Next, a friction disc with splines at the inner diameter is inserted. Discs are alternated until the required total is achieved. A heavy back-up plate is then inserted and secured with a snap ring. A Hub with O.D. splines is inserted into the splines of discs with teeth on the inner diameter. The discs and hub are free to increase in speed or rotate in the opposite direction as long as no pressure is present in that specific clutch.

To engage the clutch, as previously stated, the control valve is placed in the desired position. This allows oil under pressure to flow from the control valve, through a passageway, to a chosen clutch shaft. This shaft has a drilled passageway for oil under pressure to enter the shaft. Oil pressure sealing rings are located on the clutch shaft. These rings direct oil under pressure to a desired clutch. Pressure of the oil forces the piston and discs against the heavy back-up plate. The discs, with teeth on the outer diameter, clamping against discs with teeth on the inner diameter, enables the hub and clutch shaft to be locked together and allows them to drive as a unit.

There are bleed balls or bleed orifices, depending upon the model, in the clutch piston which allow quick escape for oil when the pressure to the piston is released.

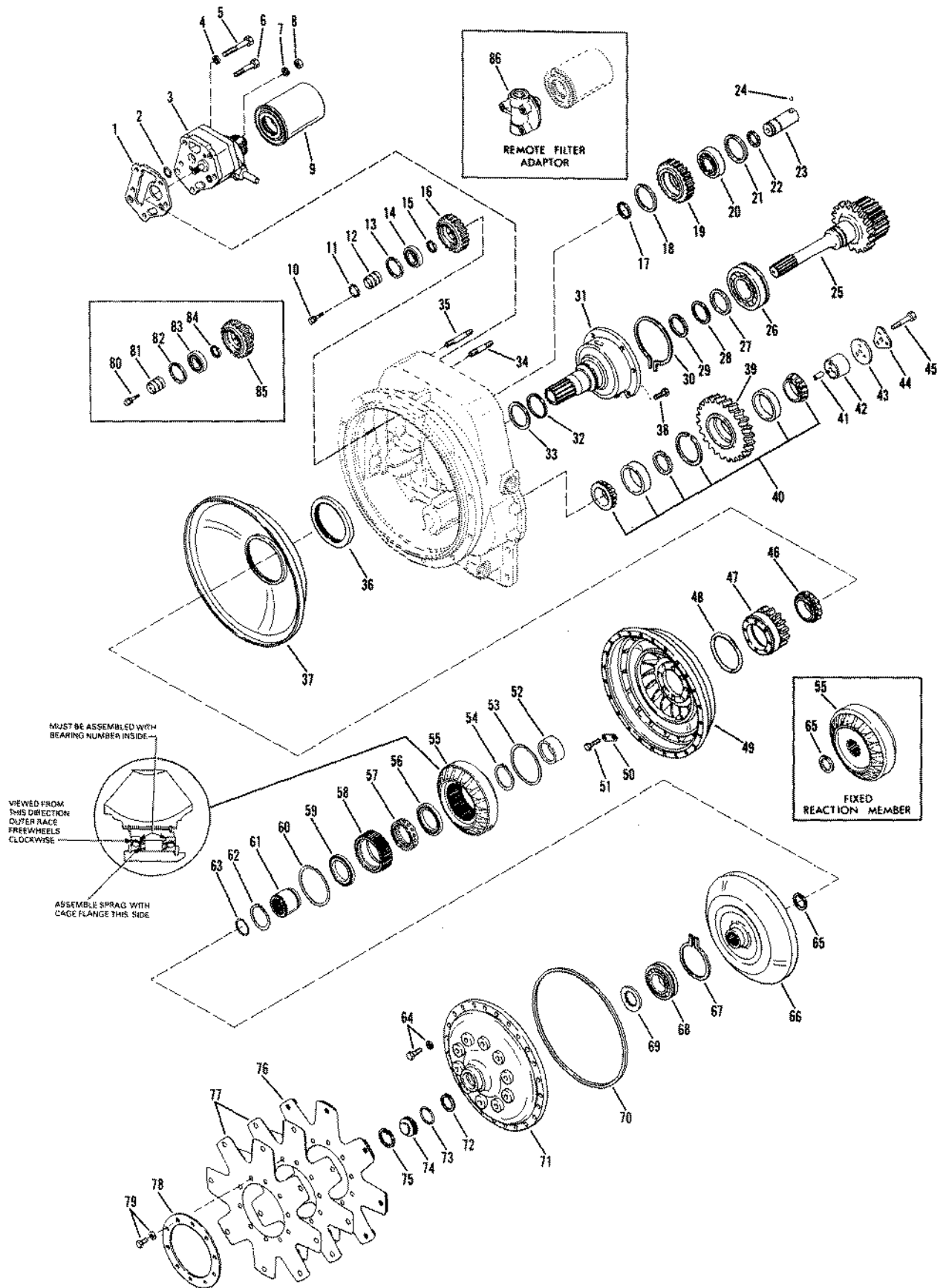


**BASIC DESIGN**

**Figure A**

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**Figure B**

## HR18000 CONVERTER GROUP

ITEM	DESCRIPTION	QTY.	ITEM	DESCRIPTION	QTY.
1	Pump to Housing Gasket .....	1	45	Retaining Plate Screw .....	3
2	"O" Ring .....	1	46	Impeller Hub Gear Bearing .....	1
3	Charging Pump Assembly .....	1	47	Impeller Hub Gear .....	1
4	Pump Mounting Screw Lockwasher .....	3	48	Impeller Hub "O" Ring .....	1
5	Pump Mounting Screw .....	1	49	Impeller .....	1
6	Pump Mounting Screw .....	2	50	Impeller to Hub Screw Lock Tab .....	4
7	Pump Mounting Stud Lockwasher .....	2	51	Impeller to Hub Screw .....	8
8	Pump Mounting Stud Nut .....	2	52	Reaction Member Spacer .....	1
9	Filter Assembly .....	1	53	Freewheel Outer Race Locating Ring .....	1
10	Bearing Support Screw and Lockwasher .....	2	54	Freewheel Inner Race Retaining Ring .....	1
11	Bearing Locating Ring .....	1	55	Reaction Member .....	1
12	Pump Drive Bearing Support .....	1	56	Freewheel Bearing .....	1
13	Bearing Retaining Ring .....	1	57	Freewheel Sprag Assembly .....	1
14	Pump Drive Gear Bearing .....	1	58	Freewheel Outer Race .....	1
15	Bearing Locating Ring .....	1	59	Freewheel Bearing .....	1
16	Pump Drive Gear .....	1	60	Freewheel Outer Race Retaining Ring .....	1
17	Idle Gear Bearing Locating Ring .....	1	61	Freewheel Inner Race .....	1
18	Idle Gear Bearing Retaining Ring .....	1	62	Freewheel Inner Race Locating Ring .....	1
19	Pump Drive Idle Gear .....	1	63	Reaction Member to Support Retaining Ring .....	1
20	Idle Stub Shaft Bearing .....	1	64	Impeller to Cover Screw and Lockwasher .....	24
21	Bearing Retaining Ring .....	1	65	Turbine Locating Ring .....	1
22	Bearing Locating Ring .....	1	66	Turbine .....	1
23	Idle Gear Stub Shaft .....	1	67	Turbine Hub Bearing Locating Ring .....	1
24	Stub Shaft Lockball .....	1	68	Turbine Hub Bearing .....	1
25	Turbine Shaft and Disc Hub Assembly .....	1	69	Bearing Retaining Washer .....	1
26	Turbine Shaft Bearing .....	1	70	Impeller to Cover "O" Ring .....	1
27	Bearing Locating Washer .....	1	71	Impeller Cover .....	1
28	Bearing Retaining Ring .....	1	72	Turbine Retaining Ring .....	1
29	Piston Ring .....	1	73	Impeller Cover Bore Plug "O" Ring .....	1
30	Bearing Snap Ring .....	1	74	Bore Plug .....	1
31	Reaction Member Support .....	1	75	Bore Plug Retaining Ring .....	1
32	Piston Ring Expander Ring .....	1	76	Drive Plate Assembly .....	1
33	Piston Ring .....	1	77	Drive Plate .....	2
34	Pump Mounting Stud .....	1	78	Drive Plate Backing Ring .....	1
35	Pump Mounting Stud .....	1	79	Drive Plate Mounting Screw and Lockwasher .....	10
36	Oil Seal .....	1	80	Bearing Support Screw and Lockwasher .....	2
37	Oil Baffle Assembly .....	1	81	Auxiliary Pump Drive Bearing Support .....	1
38	Reaction Member Support Screw .....	1	82	Bearing Retaining Ring .....	1
39	Reverse Idle Gear .....	1	83	Pump Drive Gear Bearing .....	1
40	Reverse Idle Gear Bearing Assembly .....	1	84	Bearing Locating Ring .....	1
41	Reverse Idle Shaft Pin .....	1	85	Auxiliary Pump Drive Gear .....	1
42	Reverse Idle Shaft .....	1	86	Optional Remote Filter Adaptor .....	1
43	Bearing Retaining Plate .....	1			
44	Lock Plate .....	1			





## HR 18000 LONG DROP CONVERTER AND TRANSMISSION CASE GROUP

ITEM	DESCRIPTION	QTY.	ITEM	DESCRIPTION	QTY.
1	Valve to Converter Housing Screw	9	35	Rear Cover to Case Screw	
2	Valve to Converter Housing Screw			Lockwasher	20
	Lockwasher	9	36	Pipe Plug	1
3	Control Valve Assembly	1	37	Pipe Plug	1
4	Control Valve Gasket	1	38	Pipe Plug	1
5	Detent Ball	2	39	Magnetic Drain Plug	1
6	Detent Spring	2	40	Oil Baffle	1
7	Pipe Plug	1	41	Suction Tube Clip	1
8	Air Breather	1	42	Clip Retaining Screw	1
9	Converter Housing	1	43	Clip Lockwasher	1
10	Pipe Plug	1	44	Suction Line "O" Ring	1
11	Pipe Plug	1	45	Suction Tube Assembly	1
12	Converter Housing Sleeve	1	46	Suction Tube Retaining Screw	
13	Converter Housing to Transmission			Lockwasher	2
	Case Screw Lockwasher	16	47	Suction Tube Retaining Screw	2
14	Converter Housing to Transmission		48	Clutch Lube Tube	1
	Case Screw	16	49	3rd Speed Tube	1
15	Pipe Plug	1	50	Pressure Tube "O" Ring	1
16	Pipe Plug	1	51	Tube Sleeve	1
17	Screen Assembly Gasket	1	52	Tube Sleeve	1
18	Screen Assembly	1	53	Dowel Pin	1
19	Housing to Case Gasket	1	54	3rd Speed Pressure Plug "O" Ring	1
20	Pressure Tube "O" Ring	1	55	3rd Speed Pressure Plug	1
21	Tube Sleeve	1	56	Dipstick Tube Assembly	1
22	Pressure Tube "O" Ring	1	57	Dipstick	1
23	Tube Sleeve	1	<b>Optional Remote Mounted Control Valve Parts</b>		
24	Clutch Pressure "O" Ring	1	58	Remote Control Valve Adaptor	
25	Low Speed Clutch Pressure Tube	1		Plate	1
26	Pipe Plug	1	59	Remote Control Valve Mounting	
27	Pipe Plug	1		Plate	1
28	Transmission Case Assembly	1	60	Detent Spring	2
29	Tube Sleeve	1	61	Detent Ball	2
30	Pressure Tube "O" Ring	1	62	Control Valve to Mounting Plate	
31	Rear Cover to Case Gasket	1		Gasket	1
32	Rear Cover to Case Dowel Pin	2	63	Control Valve Assembly	1
33	Rear Cover	1	64	Valve to Mounting Plate Screw	
34	Rear Cover to Case Screw	20		Lockwasher	9
			65	Valve to Mounting Plate Screw	9

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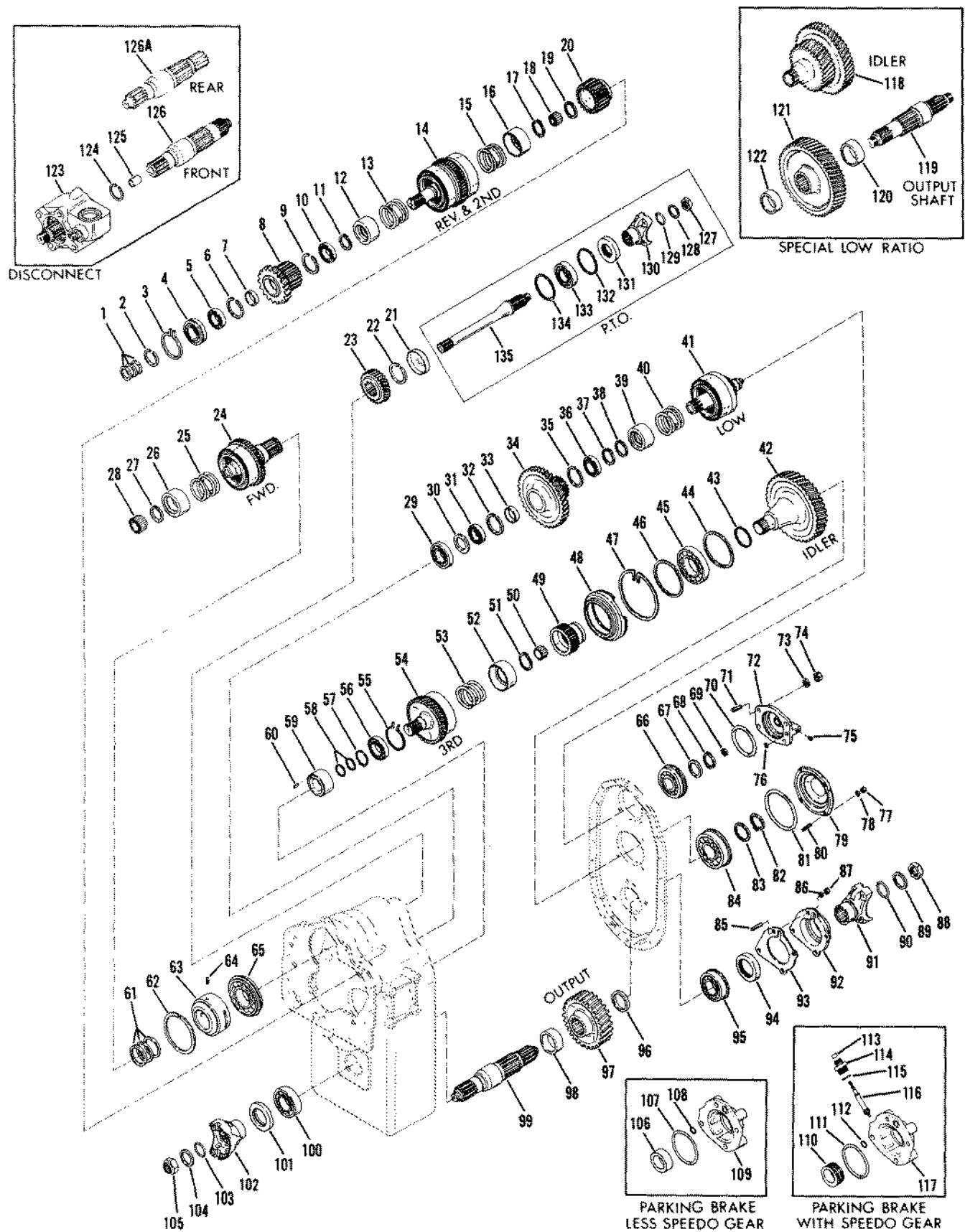


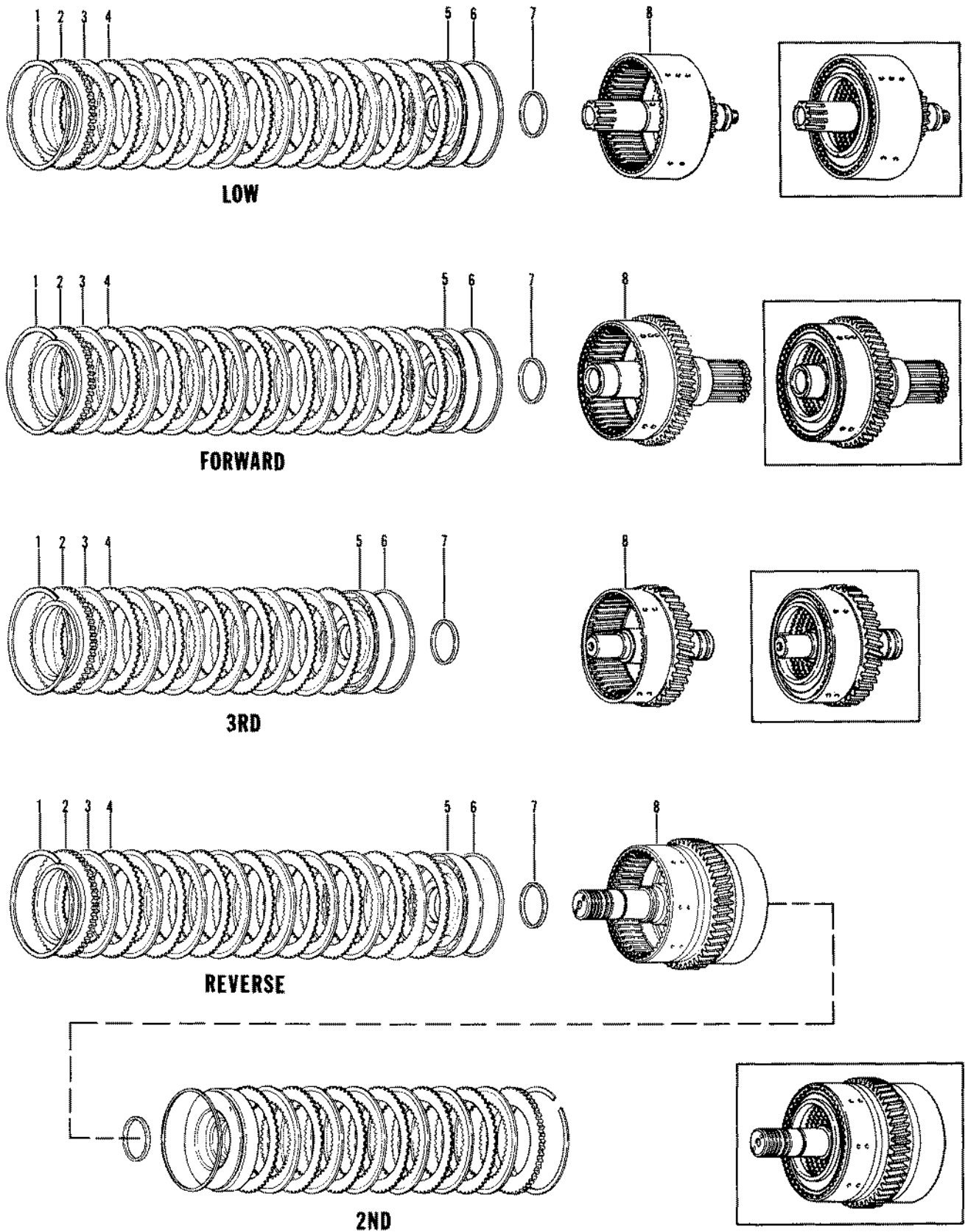
Figure D

## 18000 THREE SPEED LONG DROP GEAR AND CLUTCH GROUP

ITEM	DESCRIPTION	QTY.	ITEM	DESCRIPTION	QTY.
1	Reverse and 2nd Shaft Piston Ring .....	3	55	3rd Speed Clutch Shaft Front Bearing	
2	Front Bearing Retaining Ring .....	1		Locating Ring .....	1
3	Front Bearing Snap Ring .....	1	56	3rd Speed Clutch Shaft Front Bearing .....	1
4	Reverse and 2nd Shaft Front Bearing .....	1	57	3rd Speed Clutch Shaft Front Bearing	
5	Clutch Driven Gear Bearing .....	1		Retaining Ring .....	1
6	Bearing Retaining Ring .....	1	58	3rd Speed Clutch Shaft Piston Ring .....	2
7	Clutch Driven Gear Bearing Spacer .....	1	59	Piston Ring Outer Race .....	1
8	Reverse Clutch Gear and Hub Assembly ....	1	60	Outer Race Roll Pin .....	1
9	Bearing Retaining Ring .....	1	61	Forward Shaft Piston Ring .....	1
10	Clutch Driven Gear Bearing .....	1	62	Piston Ring Sleeve Retainer Ring .....	1
11	Spring Retainer Snap Ring .....	1	63	Piston Ring Sleeve .....	1
12	Spring Retainer .....	1	64	Sleeve Roll Pin .....	1
13	Piston Return Spring .....	1	65	Forward Clutch Shaft Rear Bearing .....	1
14	Reverse and 2nd Clutch .....	1	66	Low Speed Clutch Shaft Rear Bearing .....	1
15	Piston Return Spring .....	1	67	Rear Bearing Support Washer .....	1
16	Spring Retainer .....	1	68	Rear Bearing Retaining Ring .....	1
17	Spring Retainer Snap Ring .....	1	69	Low Speed Clutch Shaft Piston Ring .....	1
18	Reverse and 2nd Clutch Shaft Rear Bearing	1	70	Rear Bearing Cap "O" Ring .....	1
19	2nd Clutch Disc Hub Snap Ring .....	1	71	Bearing Cap Stud .....	4
20	2nd Clutch Disc Hub .....	1	72	Low Speed Clutch Shaft Rear Bearing Cap....	1
21	Bore Plug .....	1	73	Bearing Cap Stud Lockwasher .....	4
22	Gear Retainer Snap Ring .....	1	74	Bearing Cap Stud Nut .....	4
23	Forward Shaft Gear .....	1	75	Bearing Cap Plug .....	1
24	Forward Clutch .....	1	76	Bearing Cap "O" Ring .....	1
25	Piston Return Spring .....	1	77	Rear Bearing Cap Stud Nut .....	4
26	Spring Retainer .....	1	78	Rear Bearing Cap Stud Lockwasher .....	4
27	Spring Retainer Snap Ring .....	1	79	Idler Shaft Rear Bearing Cap .....	1
28	Forward Clutch Shaft Pilot Bearing .....	1	80	Rear Bearing Cap Stud .....	4
29	Low Speed Clutch Shaft Front Bearing .....	1	81	Rear Bearing Cap "O" Ring .....	1
30	Front Bearing Spacer .....	1	82	Idler Shaft Rear Bearing Retainer Ring .....	1
31	Low Speed Gear Bearing .....	1	83	Rear Bearing Support Washer .....	1
32	Low Speed Gear Bearing Locating Ring. ....	1	84	Idler Shaft Rear Bearing .....	1
33	Low Speed Gear Spacer .....	1	85	Bearing Cap Stud .....	4
34	Low Speed Gear and Hub Assembly .....	1	86	Bearing Cap Stud Lockwasher .....	4
35	Low Speed Gear Bearing Locating Ring .....	1	87	Bearing Cap Stud Nut .....	4
36	Low Speed Gear Bearing .....	1	88	Flange Nut .....	1
37	Low Speed Gear Bearing Retaining Ring ....	1	89	Flange Washer .....	1
38	Spring Retainer Snap Ring .....	1	90	Flange "O" Ring .....	1
39	Spring Retainer .....	1	91	Output Flange .....	1
40	Piston Return Spring .....	1	92	Output Shaft Rear Bearing Cap .....	1
41	Low Speed Clutch .....	1	93	Bearing Cap Gasket .....	1
42	Idler Shaft and Gear .....	1	94	Rear Bearing Cap Oil Seal .....	1
43	Bearing Retaining Ring .....	1	95	Output Shaft Rear Bearing .....	1
44	Bearing Locating Ring .....	1	96	Output Shaft Rear Bearing Spacer .....	1
45	3rd Clutch Disc Hub Bearing .....	1	97	Output Gear .....	1
46	Bearing Locating Ring .....	1	98	Output Gear Spacer .....	1
47	Bearing Carrier Locating Ring .....	1	99	Output Shaft .....	1
48	Bearing Carrier .....	1	100	Output Shaft Front Bearing .....	1
49	3rd Speed Clutch Disc Hub .....	1	101	Front Oil Seal .....	1
50	3rd Speed Clutch Shaft Pilot Bearing .....	1	102	Output Flange .....	1
51	Spring Retainer Snap Ring .....	1	103	Flange "O" Ring .....	1
52	Spring Retainer .....	1	104	Flange Washer .....	1
53	Piston Return Spring .....	1	105	Flange Nut .....	1
54	3rd Speed Clutch .....	1	106 thru 135	Various Options	

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**18000 SERIES 3 SPEED LONG DROP CLUTCH ASSEMBLY WITHOUT INCHING**

**Figure E**

## LOW CLUTCH GROUP

ITEM	DESCRIPTION	QTY.	ITEM	DESCRIPTION	QTY.
1	Backing Plate Snap Ring .....	1	5	Clutch Piston .....	1
2	Clutch Disc Backing Plate .....	1	6	Outer Clutch Piston Ring .....	1
3	Clutch Inner Disc .....	8	7	Inner Clutch Piston Seal .....	1
4	Clutch Outer Disc .....	8	8	Low Speed Clutch Shaft and Drum Assembly..	1

## FORWARD CLUTCH GROUP

ITEM	DESCRIPTION	QTY.	ITEM	DESCRIPTION	QTY.
1	Backing Plate Snap Ring .....	1	5	Clutch Piston .....	1
2	Clutch Disc Backing Plate .....	1	6	Outer Clutch Piston Ring .....	1
3	Clutch Inner Disc .....	8	7	Inner Clutch Piston Seal .....	1
4	Clutch Outer Disc .....	8	8	Forward Clutch Shaft and Drum Assembly.....	1

## 3RD CLUTCH GROUP

ITEM	DESCRIPTION	QTY.	ITEM	DESCRIPTION	QTY.
1	Backing Plate Snap Ring .....	1	5	Clutch Piston Assembly .....	1
2	Clutch Disc Backing Plate .....	1	6	Outer Clutch Piston Seal .....	1
3	Clutch Inner Disc .....	6	7	Inner Clutch Piston Seal .....	1
4	Clutch Outer Disc .....	6	8	3rd Speed Clutch Shaft and Drum Assembly..	1

## REVERSE AND 2ND CLUTCH GROUP

ITEM	DESCRIPTION	QTY.	ITEM	DESCRIPTION	QTY.
1	Backing Plate Snap Ring .....	2	5	Clutch Piston .....	2
2	Clutch Disc Backing Plate .....	2	6	Outer Clutch Piston Seal .....	2
3	Clutch Inner Disc .....	14	7	Inner Clutch Piston Seal .....	2
4	Clutch Outer Disc .....	14	8	Reverse and 2nd Speed Clutch Shaft and Drum Assembly .....	1

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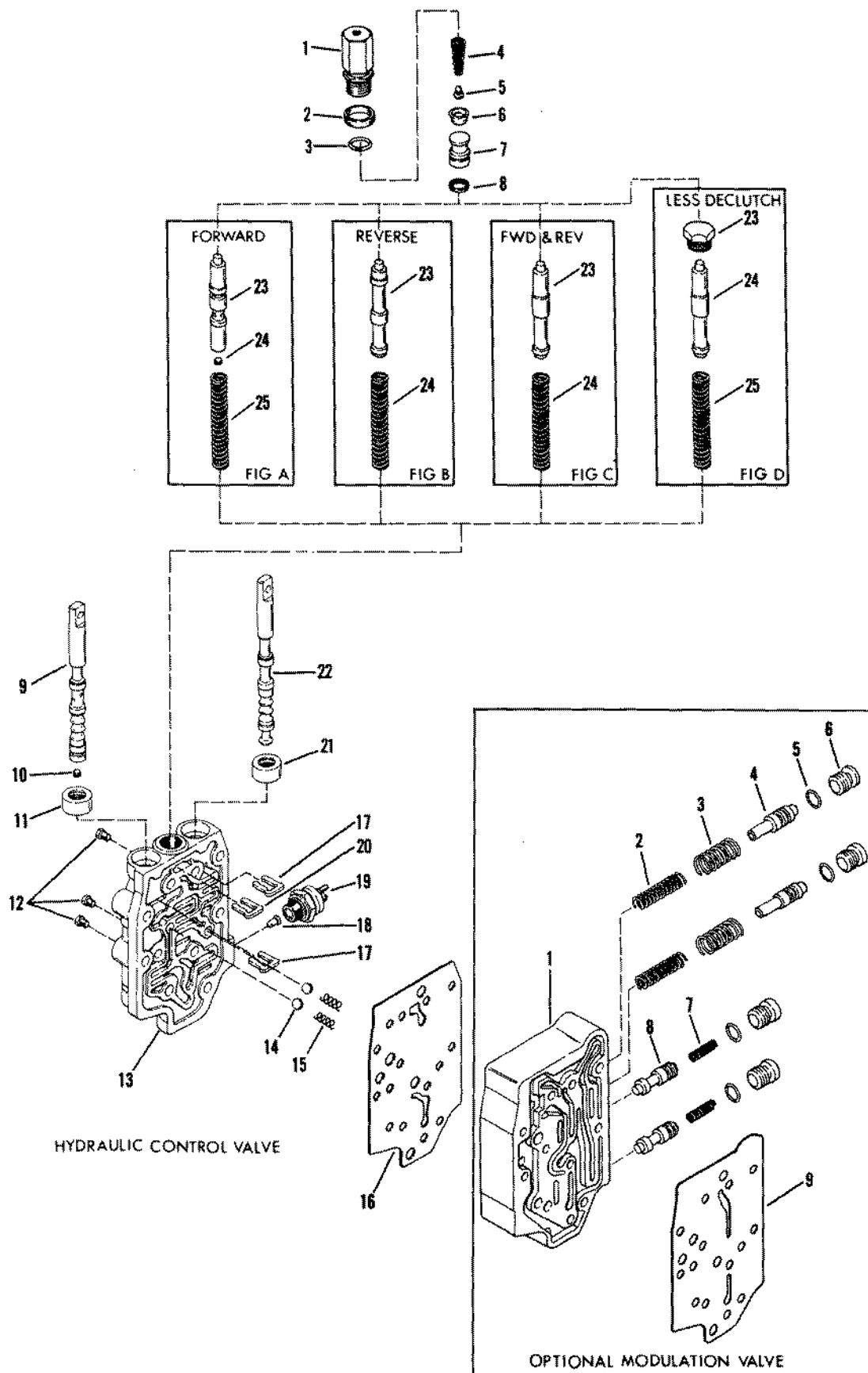


Figure F

## CONTROL VALVE ASSEMBLY

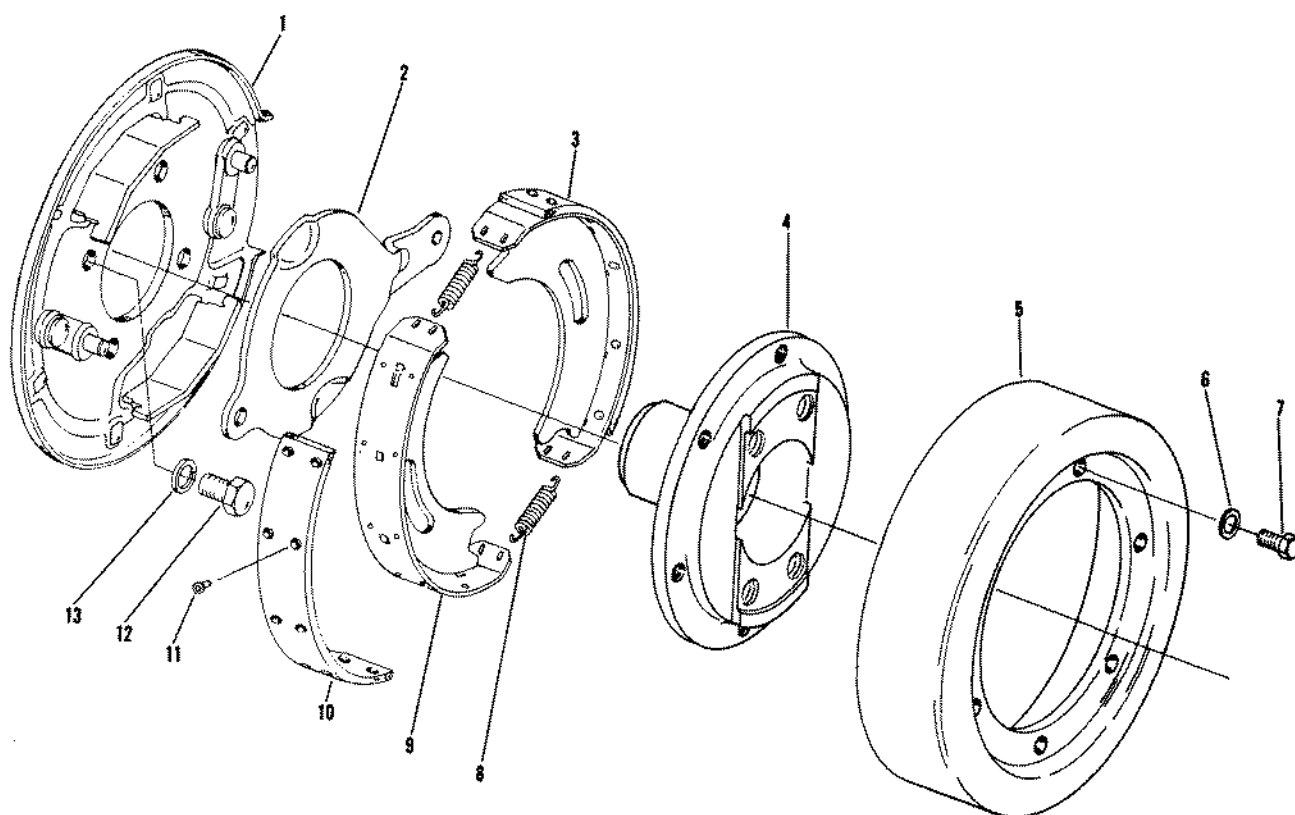
ITEM	DESCRIPTION	QTY.
1	Hydarulic Actuator Assembly .....	1
2	Band Seal .....	1
3	Piston Housing "O" Ring .....	1
4	Piston Balance Spring .....	1
5	Spring Retainer Pin .....	1
6	Piston Seal .....	1
7	Piston .....	1
8	Glyd Ring .....	1
9	Speed Selector Spool .....	1
10	Spool Plug .....	1
11	Oil Seal .....	1
12	Pipe Plug .....	3
13	Control Valve Housing .....	1
14	Detent Ball .....	2
15	Detent Spring .....	2
16	Control Valve Gasket .....	1
17	Valve Spool Stop .....	2
18	Neutral Switch Actuating Pin .....	1
19	Neutral Switch .....	1
20	Declutch Spool Stop .....	1
21	Oil Seal .....	1
22	Forward and Reverse Valve Spool .....	1

**NOTE:** Items 23 thru 25 are various declutch options.

MODULATOR VALVE ASSEMBLY  
(Optional)

ITEM	DESCRIPTION	QTY.
1	Modulator Valve Housing .....	1
2	Accumulator Spring (Inner) Not Used on All Models .....	2
3	Accumulator Spring (Outer) .....	2
4	Accumulator Valve .....	2
5	Spool Stop Plug "O" Ring .....	4
6	Spool Stop Plug .....	4
7	Regulator Spring .....	2
8	Regulator Spool .....	2
9	Modulator Valve to Converter Housing Gasket .....	1

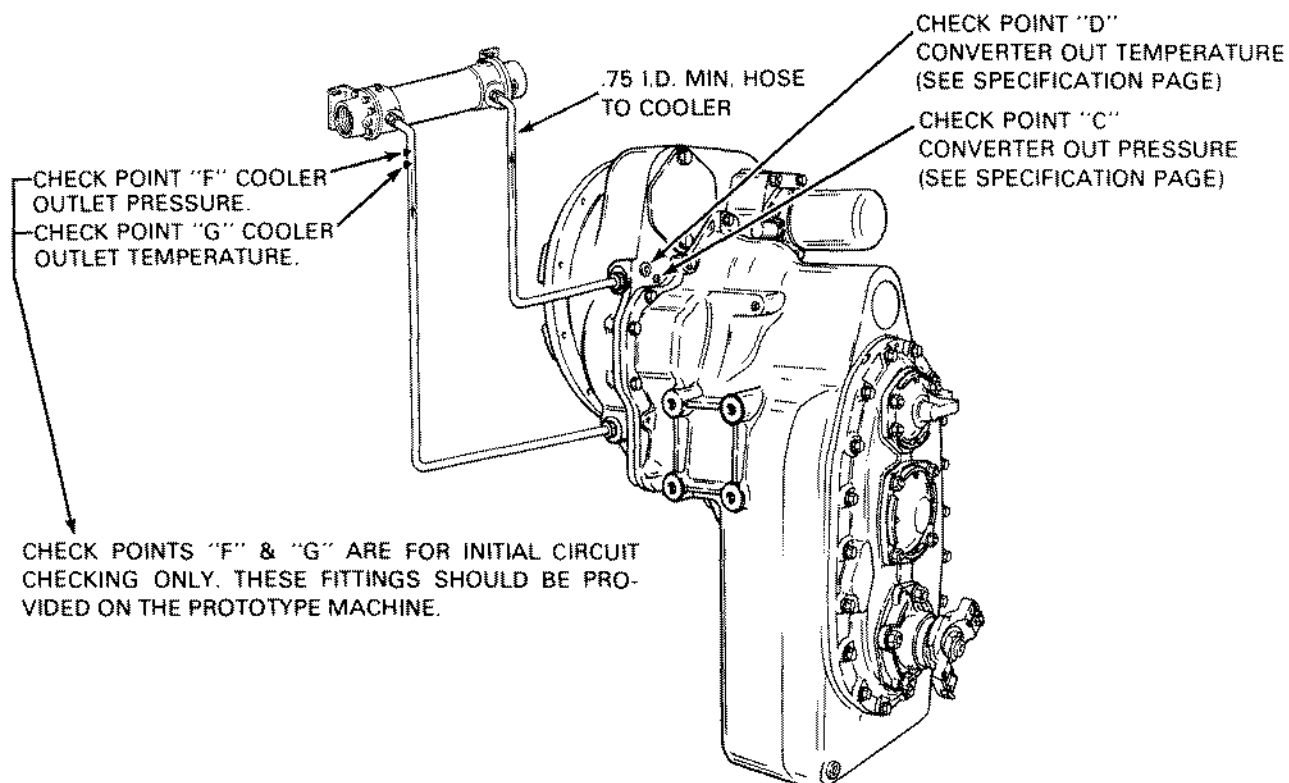




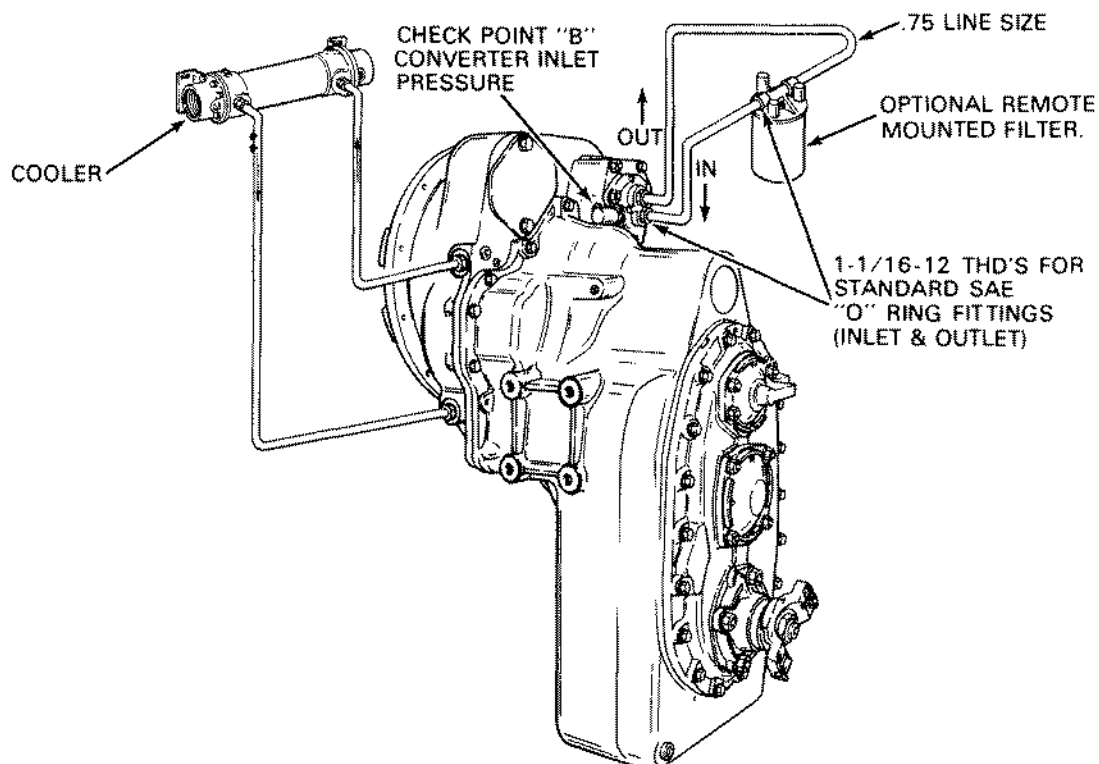
## PARKING BRAKE GROUP

ITEM	DESCRIPTION	QTY.	ITEM	DESCRIPTION	QTY.
1	Backing Plate Assembly .....	1	8	Return Spring .....	2
2	Actuating Lever .....	1	9	Brake Shoe, See Item 3 .....	
3	Brake Shoe and Lining .....	2	10	Brake Lining .....	2
4	Brake Flange .....	1	11	Brake Lining Rivet .....	20
5	Brake Drum .....	1	12	Backing Plate Screw .....	4
6	Brake Drum to Flange Screw Lockwasher .....	6	13	Backing Plate Screw Lockwasher .....	4
7	Brake Drum to Flange Screw .....	6			

Figure G



**18000 PLUMBING DIAGRAM  
3 SPEED LONG DROP**



**18000 PLUMBING DIAGRAM  
3 SPEED LONG DROP  
(WITH REMOTE FILTER)**

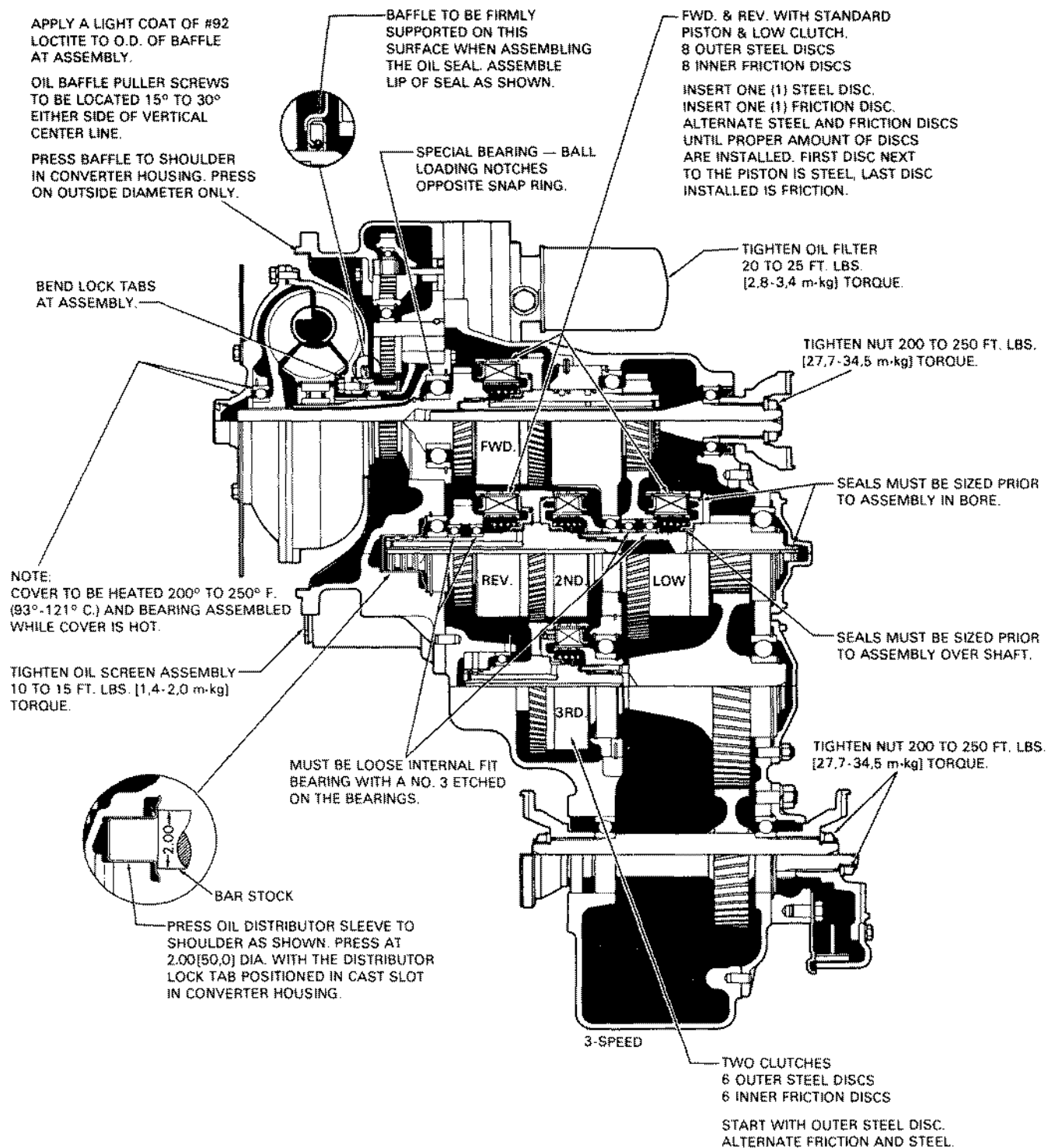
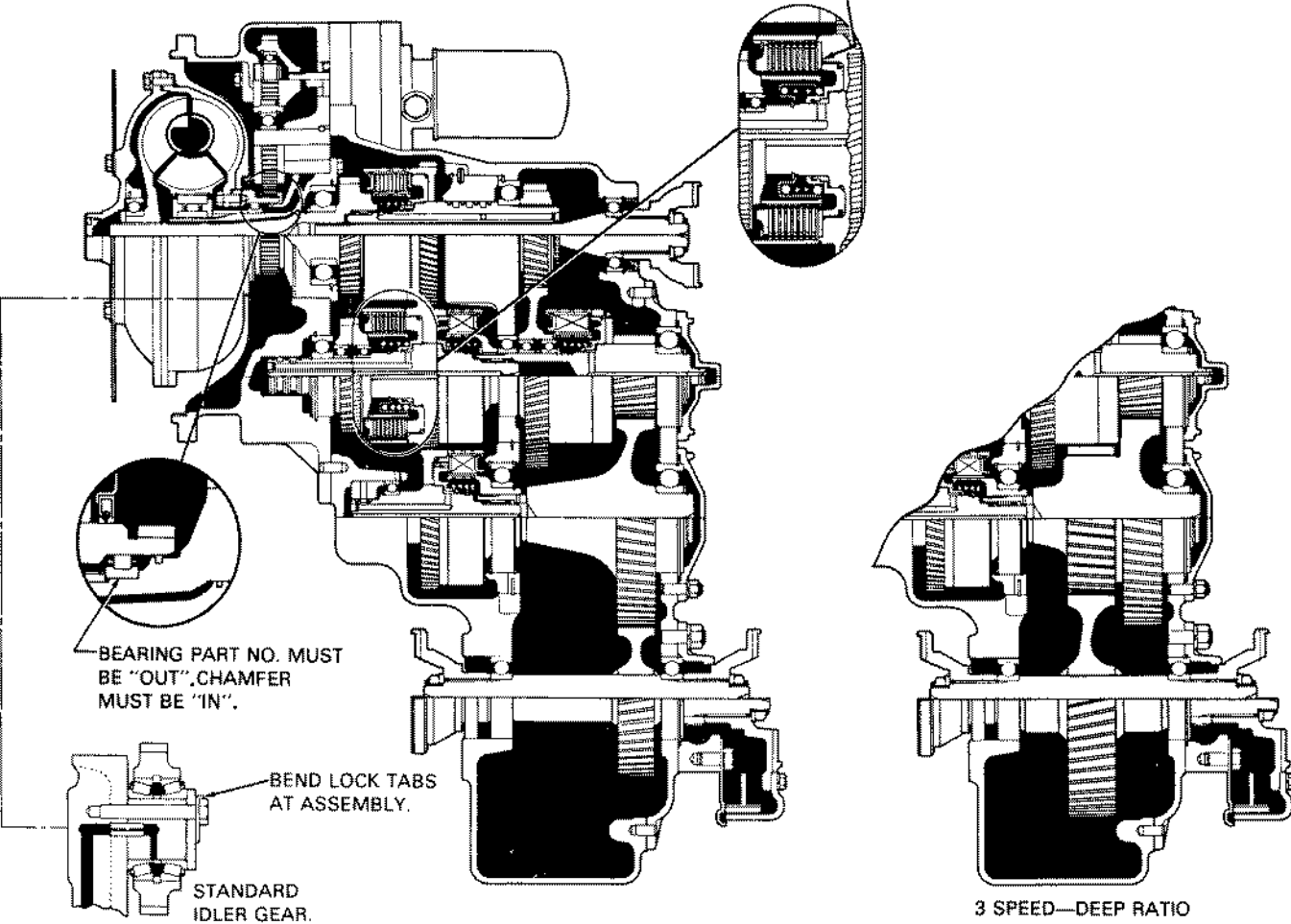


Figure 1

- 1. ALL LEAD IN CHAMFERS FOR OIL SEALS, PISTON RINGS, & "O" RINGS MUST BE SMOOTH AND FREE FROM BURRS. INSPECT AT ASSEMBLY.
- 2. LUBRICATE ALL PISTON RING GROOVES & "O" RINGS WITH OIL BEFORE ASSEMBLY.
- 3. APPLY VERY LIGHT COAT OF PERMATEX NO. 2 TO O.D. OF ALL OIL SEALS BEFORE ASSEMBLY.
- 4. AFTER ASSEMBLY OF PARTS USING LOCTITE OR PERMATEX THERE MUST NOT BE ANY FREE OR EXCESS MATERIAL THAT COULD ENTER THE OIL CIRCUIT.
- 5. APPLY A LIGHT COAT OF #92 LOCTITE TO ALL PIPE PLUGS.
- 6. APPLY A THIN COATING OF GREASE BETWEEN SEAL LIPS ON LIP TYPE SEALS PRIOR TO ASSEMBLY.

SPECIAL STEEL BACKING PLATE TO BE USED WITH REDUCED SIZE PISTONS.

FORWARD AND REVERSE CLUTCHES WITH REDUCED SIZE PISTONS.  
1 OUTER STEEL BACKING PLATE AND DISC ASSEMBLY.  
7 OUTER STEEL DISCS.  
8 INNER FRICTION DISCS.  
START WITH OUTER STEEL BACKING PLATE NEXT TO PISTON, THEN (1) INNER FRICTION DISC, THEN (1) OUTER STEEL DISC. ALTERNATE STEEL AND FRICTION DISCS UNTIL PROPER AMOUNT OF DISCS ARE INSTALLED.



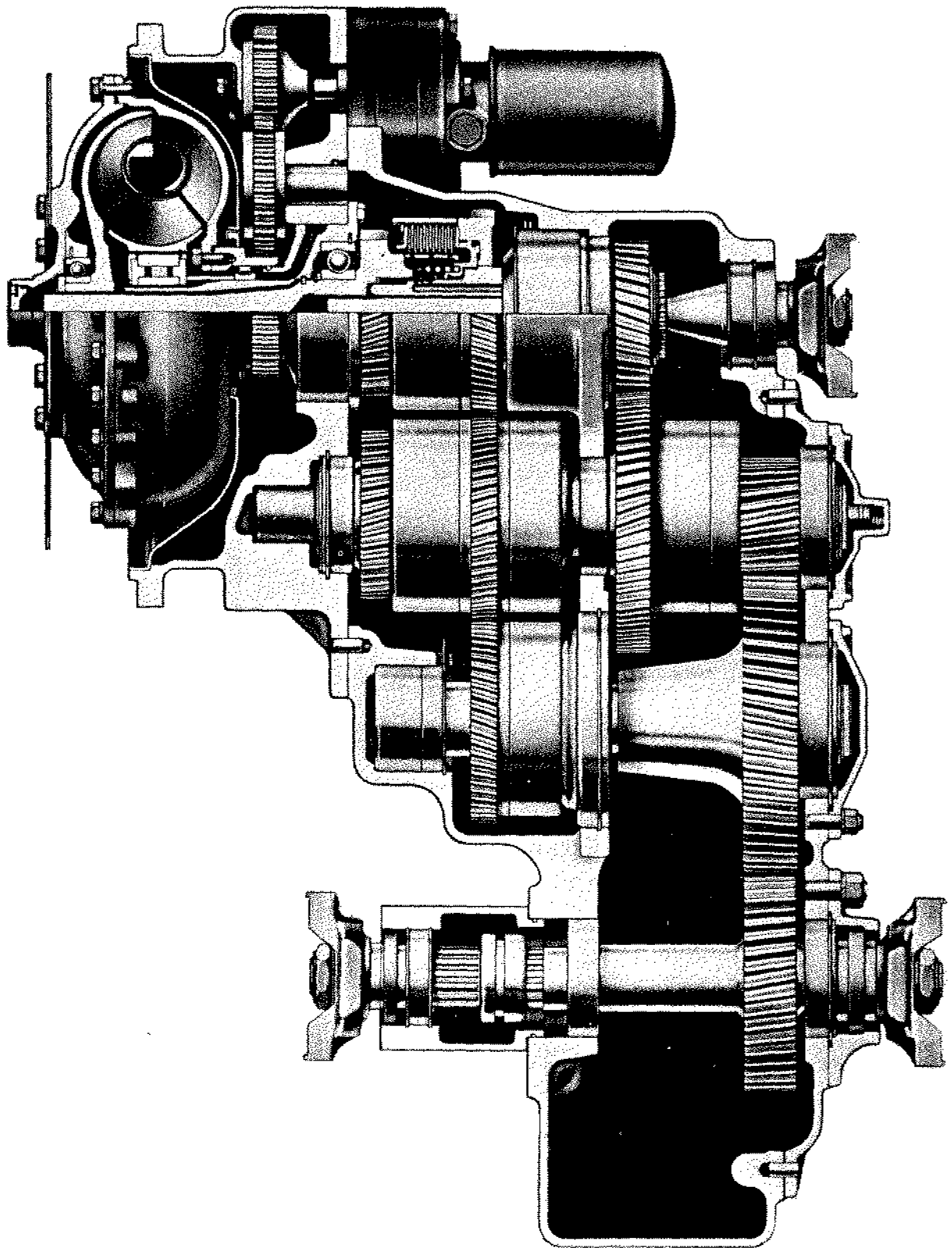
NOMINAL SIZE		GRADE 5	
		FINE THREAD TORQUE FT. LBS.	COARSE THREAD TORQUE FT. LBS.
1/4	.2500	9-11 [1,2-1,5 m·kg]	8-10 [1,1-1,4 m·kg]
5/16	.3125	16-20 [2,2-2,8 m·kg]	12-16 [1,7-2,2 m·kg]
3/8	.3750	26-29 [3,6-4,0 m·kg]	23-25 [3,2-3,4 m·kg]
7/16	.4375	41-45 [5,7-6,2 m·kg]	37-41 [5,1-5,6 m·kg]
1/2	.5000	64-70 [8,9-9,7 m·kg]	57-63 [7,9-8,7 m·kg]
9/16	.5625	91-100 [12,6-13,8 m·kg]	82-90 [11,3-12,4 m·kg]

Figure 1

**CLARK**

**CLARK**

**TYPICAL 18000 CROSS SECTION**



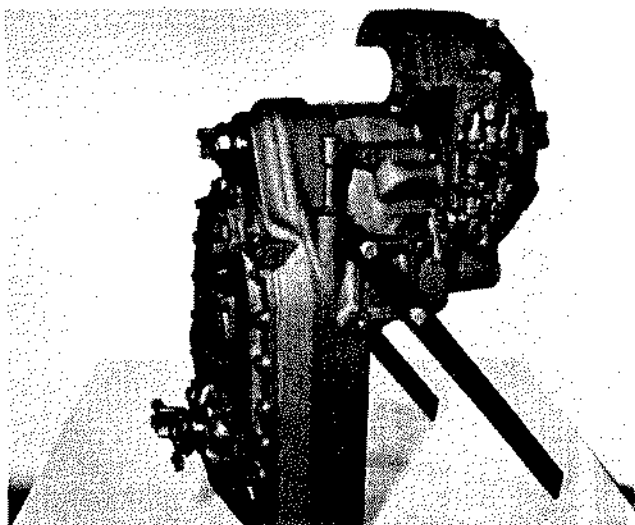
**Figure J**

## MAINTENANCE AND SERVICE

The instructions contained herein cover the disassembly and reassembly of the transmission in a sequence that would normally be followed after the unit has been removed from the machine and is to be completely overhauled. It must also be understood that this is a basic 18000 transmission with many options. All 18000 transmissions are very similar to trouble shoot, disassemble, repair, and reassemble.

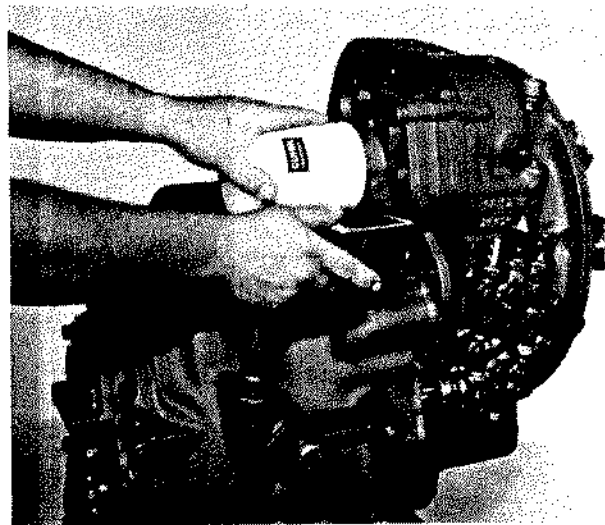
**CAUTION:** Cleanliness is of extreme importance and an absolute must in the repair and overhaul of this unit. Before attempting any repairs, the exterior of the unit must be thoroughly cleaned to prevent the possibility of dirt and foreign matter entering the mechanism.

## DISASSEMBLY



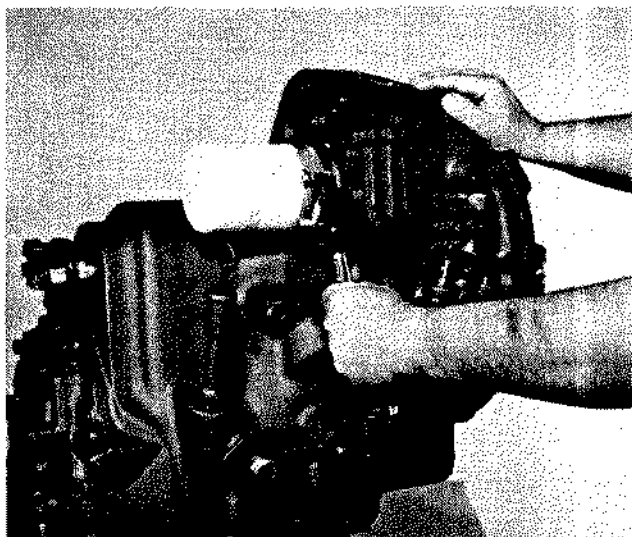
**Figure 1**

Side view of the 18000 series long drop transmission. The transmission being disassembled is a 3 speed.



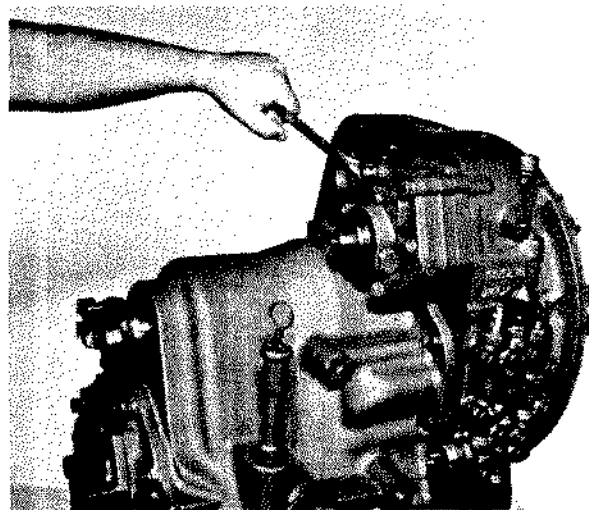
**Figure 3**

It is recommended a small pan be used to catch the oil left in the filter element. Remove filter element.



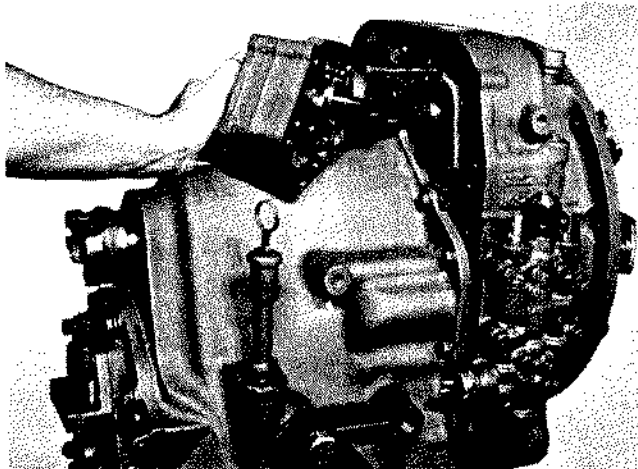
**Figure 2**

Loosen filter assembly.

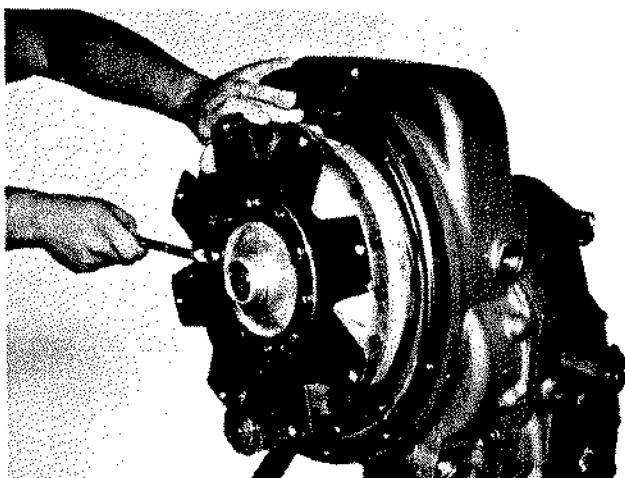


**Figure 4**

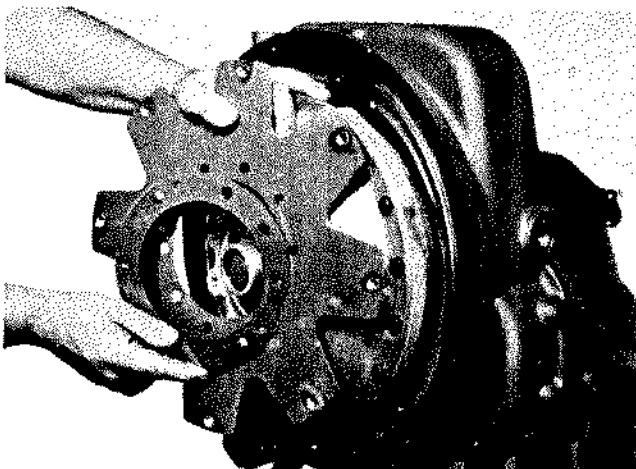
Remove pressure regulating valve and charging pump bolts and stud nuts.



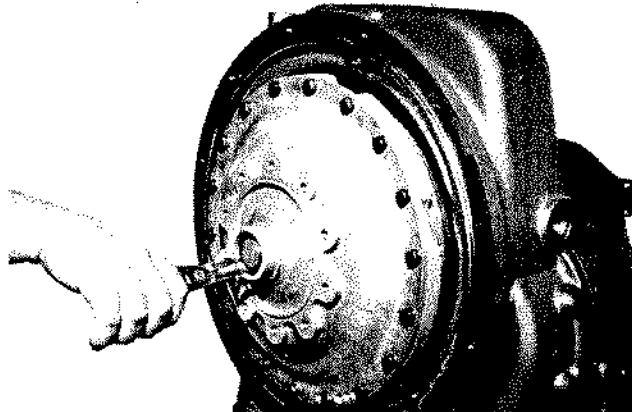
**Figure 5**  
Remove valve and pump assembly.



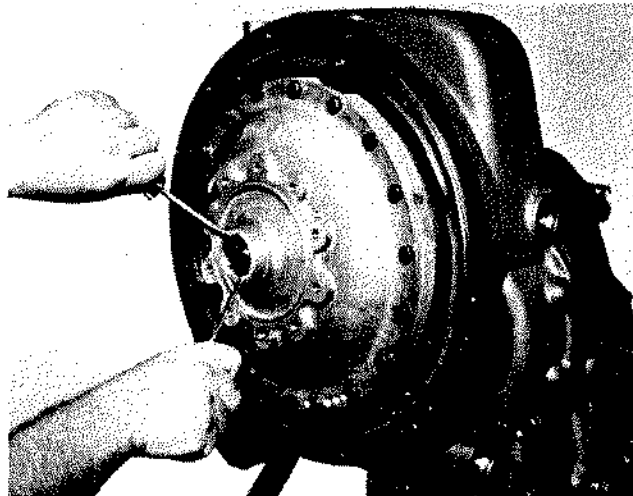
**Figure 6**  
Remove drive plate mounting screws and washers.



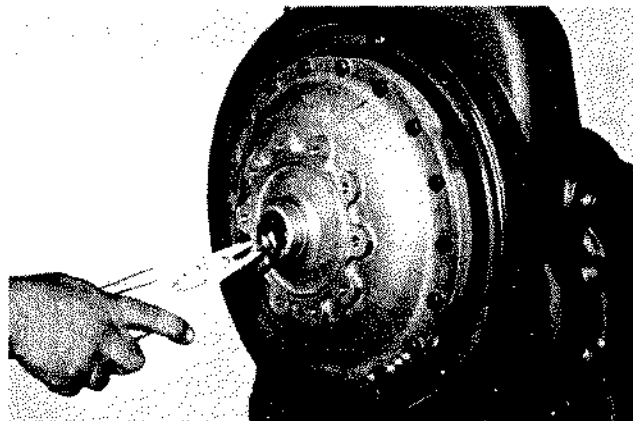
**Figure 7**  
Remove Drive plate and backing ring.



**Figure 8**  
Remove impeller cover bore plug retainer ring.



**Figure 9**  
Using two small screw drivers as shown, remove bore plug.



**Figure 10**  
Through bore plug hole, remove turbine retaining ring. See Figure 10-A.

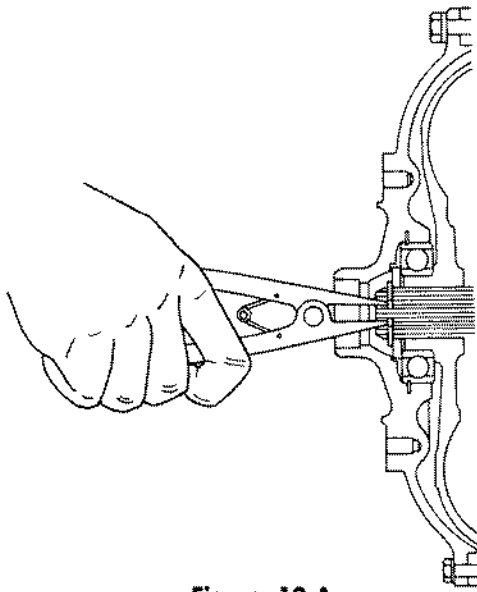


Figure 10-A

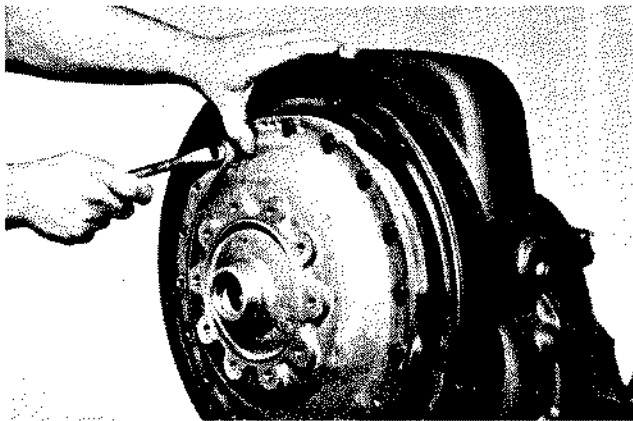


Figure 11

Remove impeller cover to impeller bolts.

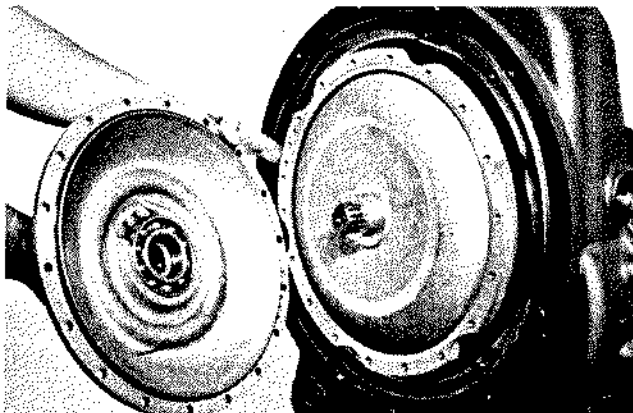


Figure 12

Remove impeller cover. **NOTE:** Turbine may remain in impeller cover bearing and will come off with impeller cover as shown in Figure 13.

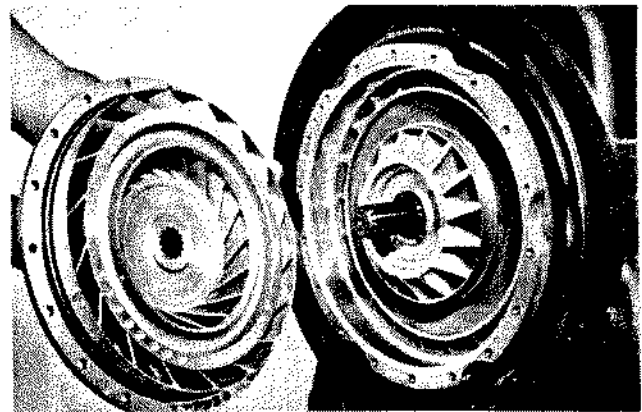


Figure 13

Impeller cover and turbine being removed as an assembly.

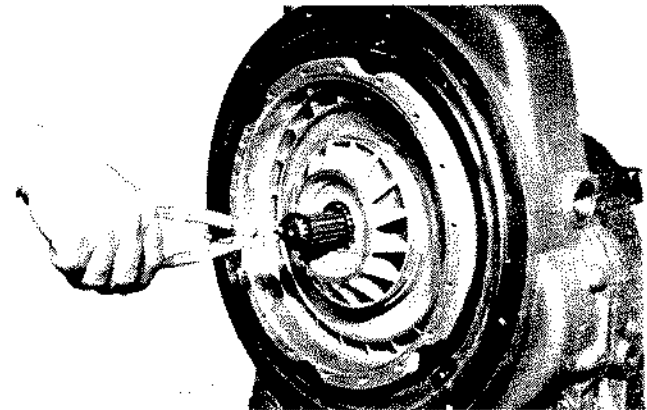


Figure 14

Remove turbine locating ring.

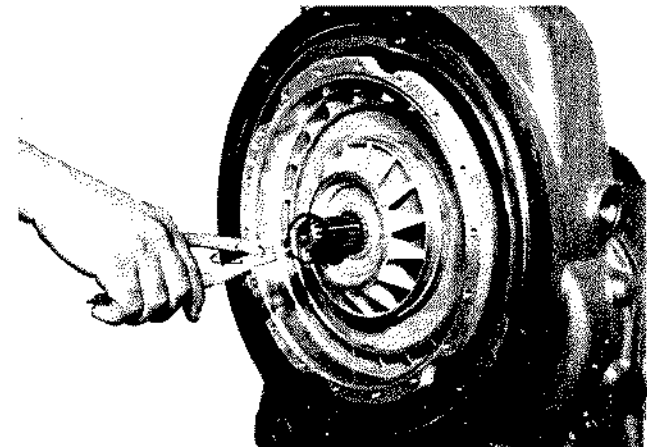


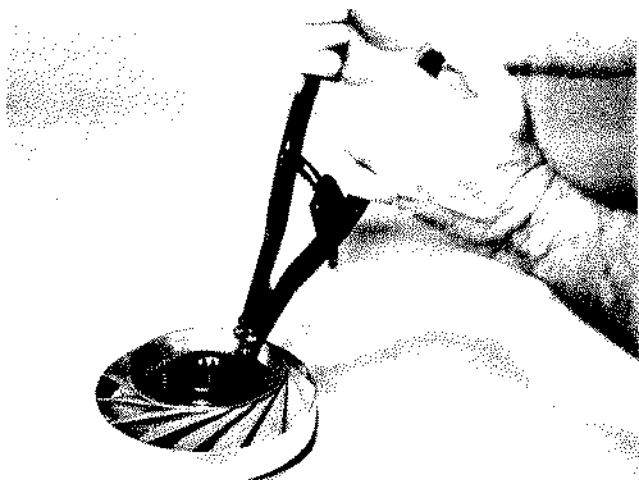
Figure 15

Remove reaction member retainer ring.

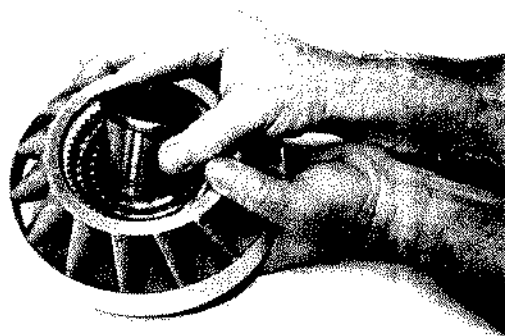
**NOTE:** Some units will have a fixed reaction member and some units will have a freewheeling reaction member. The fixed is a one piece and the freewheeling is an assembly. Remove as an assembly.



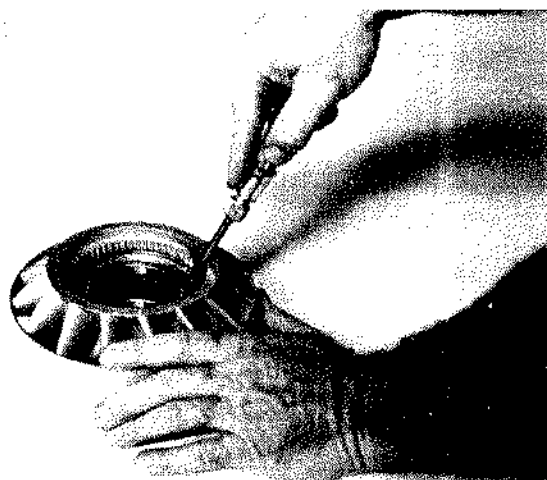
## FREEWHEEL DISASSEMBLY



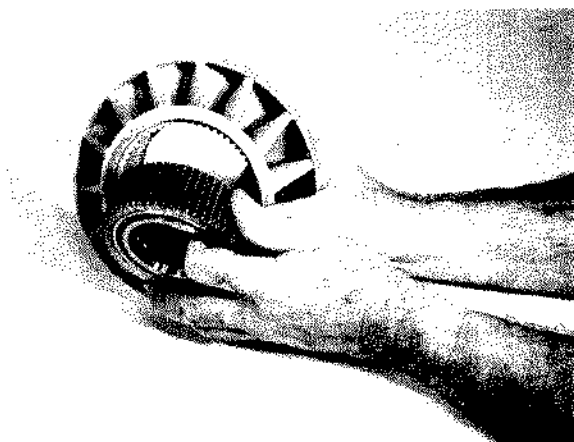
**Figure 16**  
Remove rear inner race retainer ring.



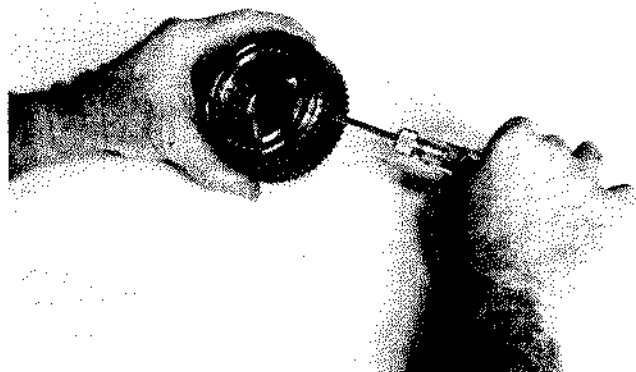
**Figure 17**  
Remove inner race.



**Figure 18**  
Remove front outer race to reaction member retainer ring.



**Figure 19**  
Remove outer race.



**Figure 20**  
Using a screw driver as shown in two access holes 180° apart, pry front bearing from outer race.



**Figure 21**  
Slide sprang assembly from outer race. Tapping on rear bearing outer race only remove bearing from freewheel outer race.

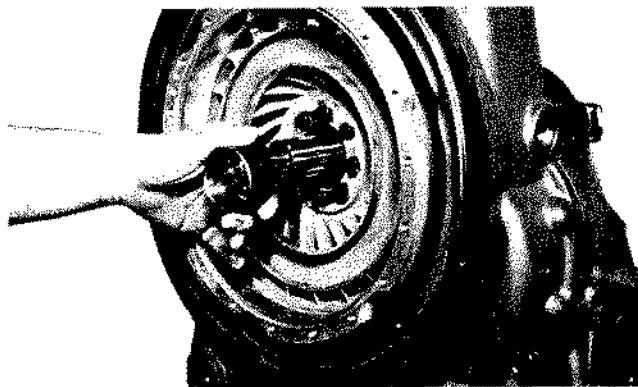


Figure 22

Remove reaction member spacer. Remove impeller and hub assembly.

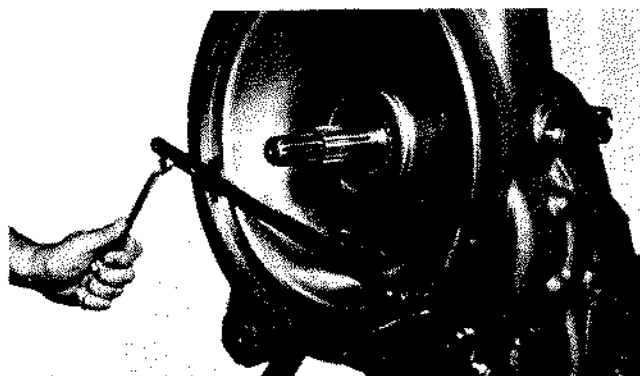


Figure 23

Using oil baffle puller holes provided, remove oil baffle. **NOTE:** Puller tool like shown can be fabricated from diagram shown in Figure 23-A.

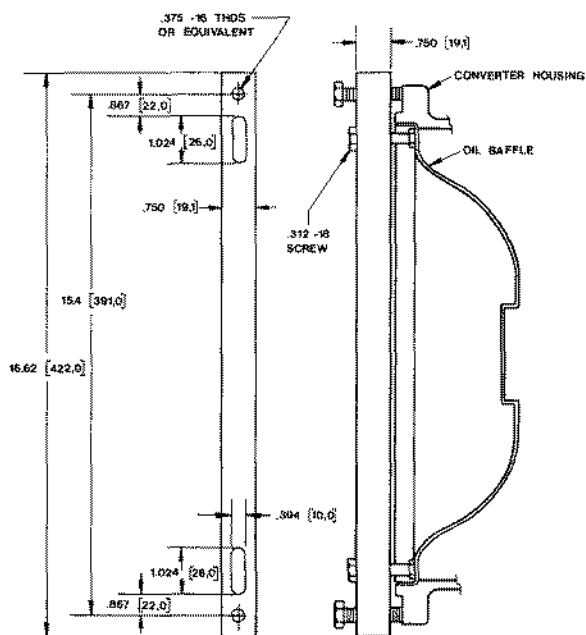


Figure 23-A

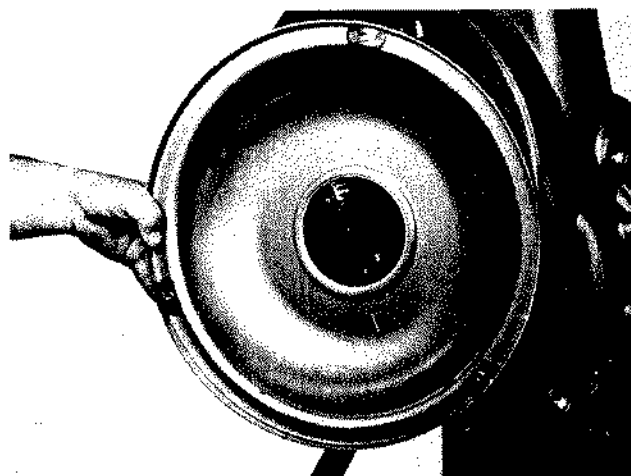


Figure 24

Oil baffle removed.

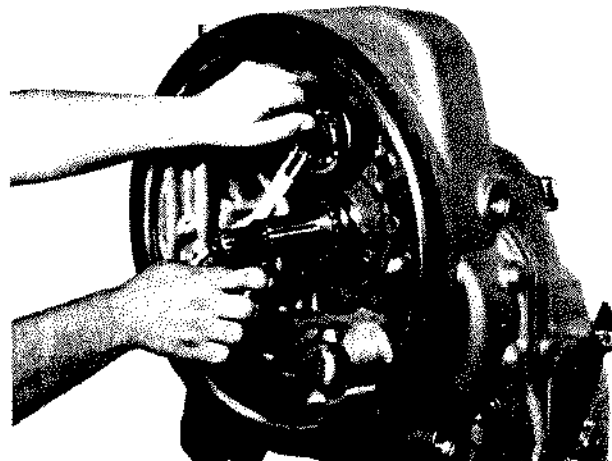


Figure 25

Remove pump drive idler gear retaining ring.

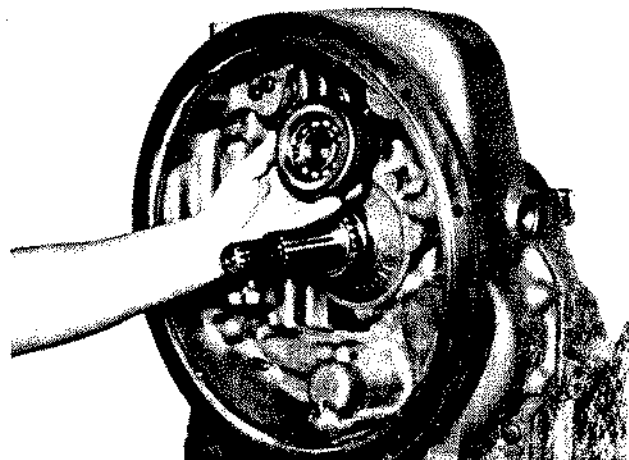


Figure 26

Remove idler gear and bearing assembly.

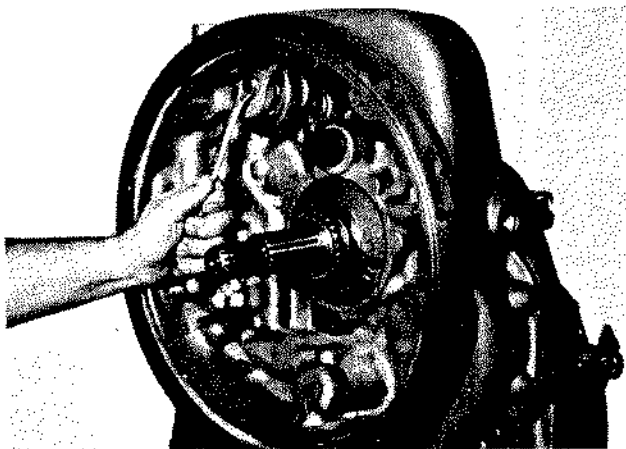


Figure 27

Remove pump drive bearing support screw and lock-washer.

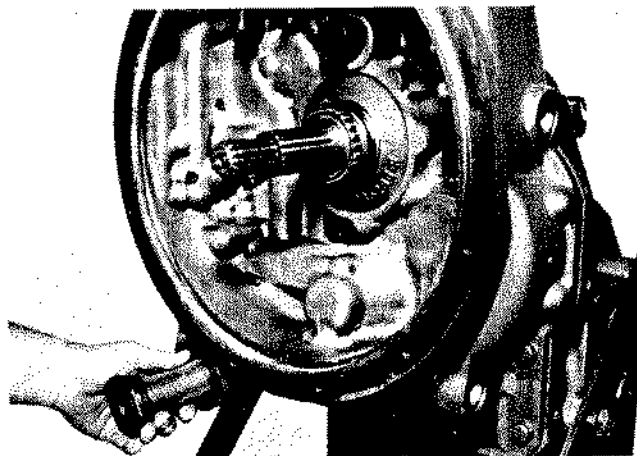


Figure 30

Remove sump screen assembly.

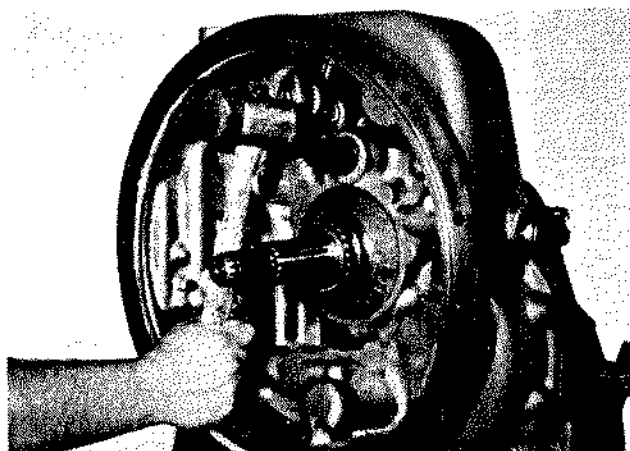


Figure 28

Using a soft hammer, tap pump drive gear and bearing support from housing.

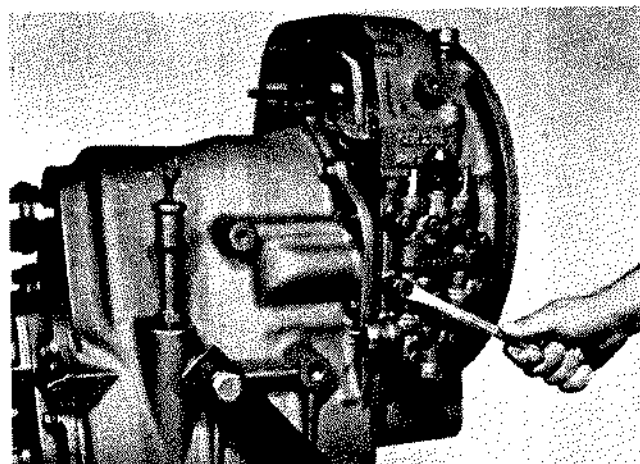


Figure 31

Remove control valve bolts and lockwashers.

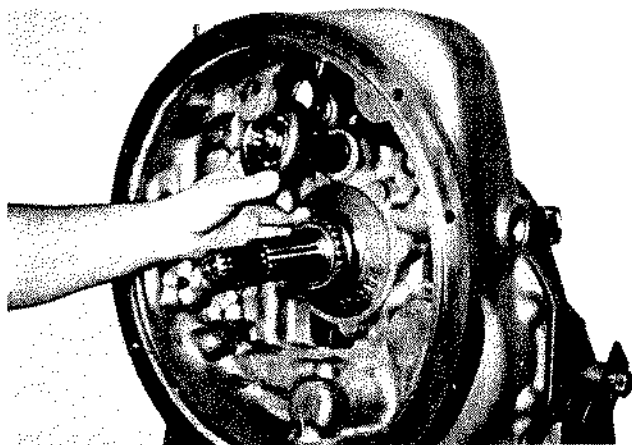


Figure 29

Remove gear and bearing assembly from housing.

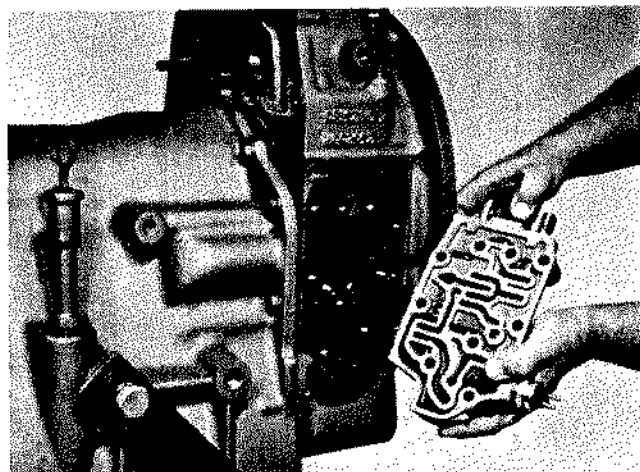


Figure 32

Remove control valve assembly. Use caution as not to lose detent springs and balls.

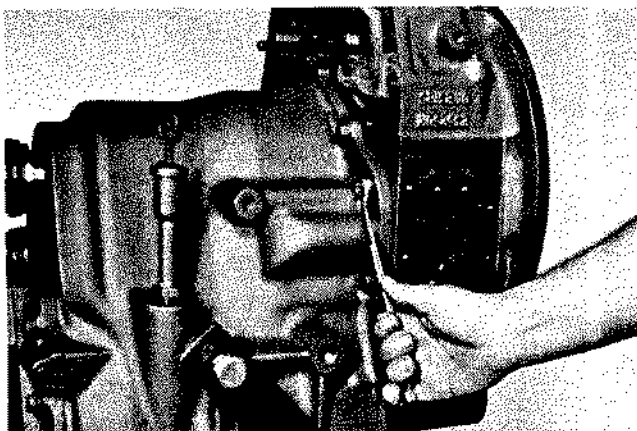


Figure 33

Remove all bolts but one securing transmission to converter housing.

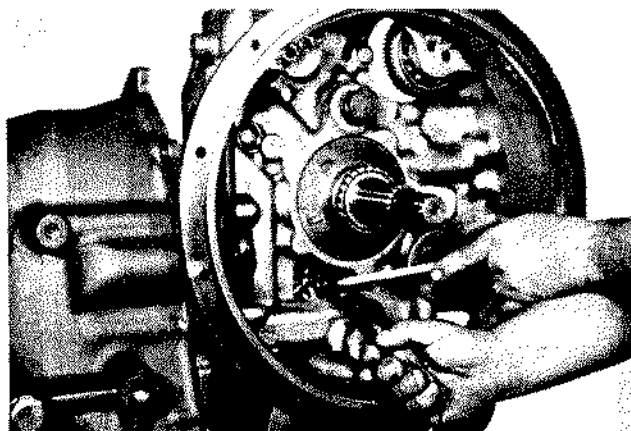


Figure 36

Using spreading type snap ring pliers, spread ears on the reverse clutch front bearing retaining ring.

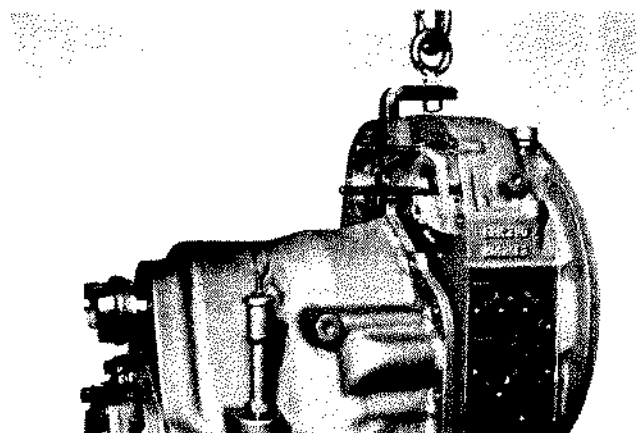


Figure 34

Support converter housing with a chain hoist. Remove remaining bolt.

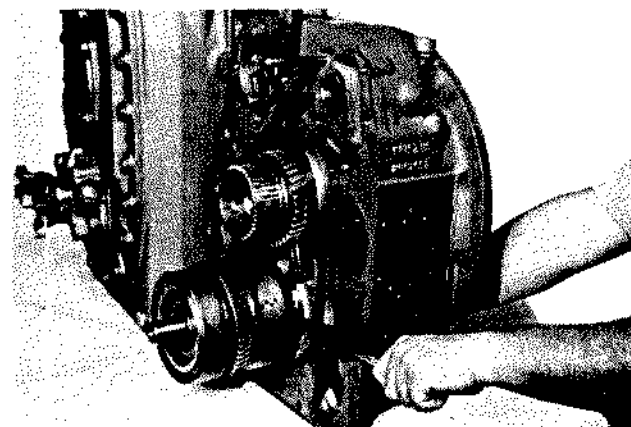


Figure 37

Holding snap ring open pry reverse and 2nd clutch assembly from converter housing.

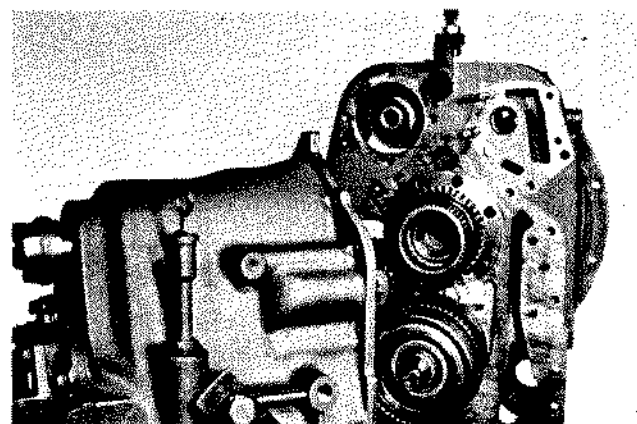


Figure 35

Separate converter housing from transmission case assembly. **NOTE:** Reverse and 2nd clutch will remain in converter housing.

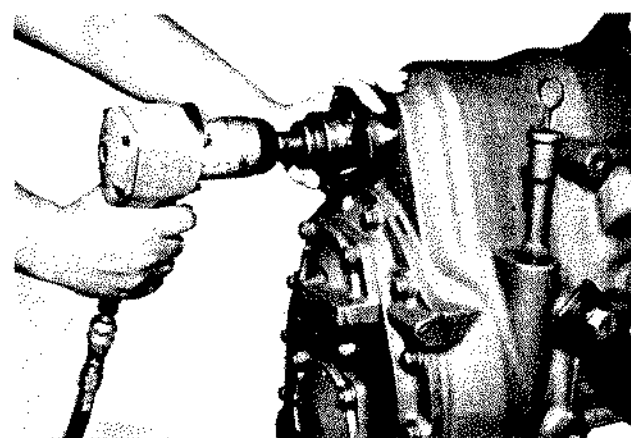


Figure 38

**NOTE:** P.T.O. is optional, if not used proceed to Figure 43. Using an impact wrench (if available), if not a flange retainer bar must be used to hold the companion flange from turning, loosen P.T.O. flange nut.

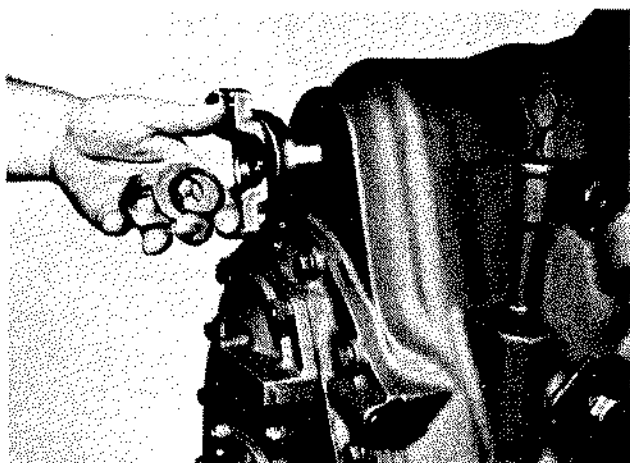


Figure 39

Remove flange nut, washer, "O" ring and flange.

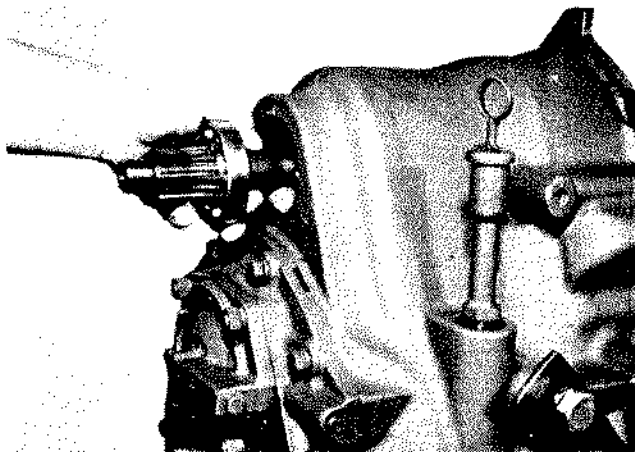


Figure 42

Remove P.T.O. shaft and bearing from housing.

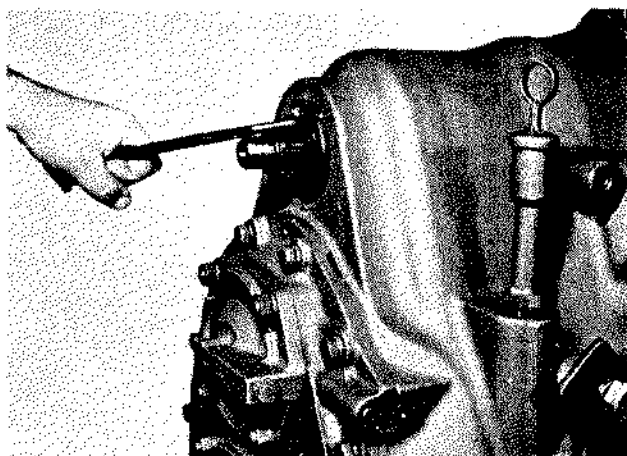


Figure 40

Using a pointed bar or screwdriver, pry oil seal from housing. Use caution as not to damage housing bore.

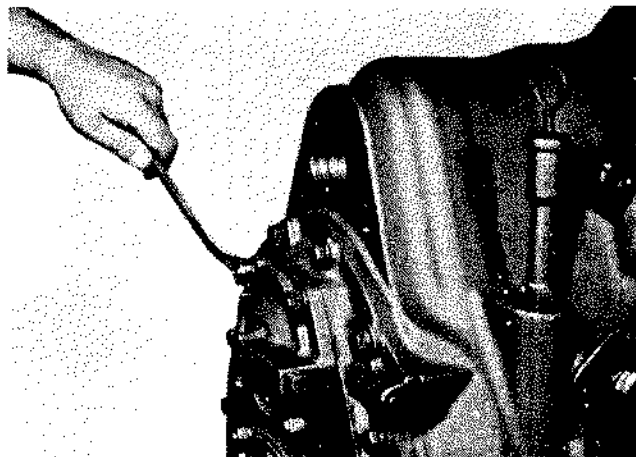


Figure 43

Remove low clutch rear bearing cap stud nuts and washers. Remove cap.

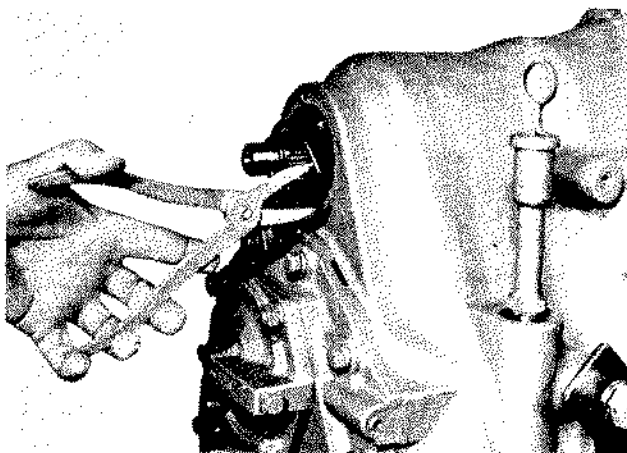


Figure 41

Remove P.T.O. bearing outer snap ring.

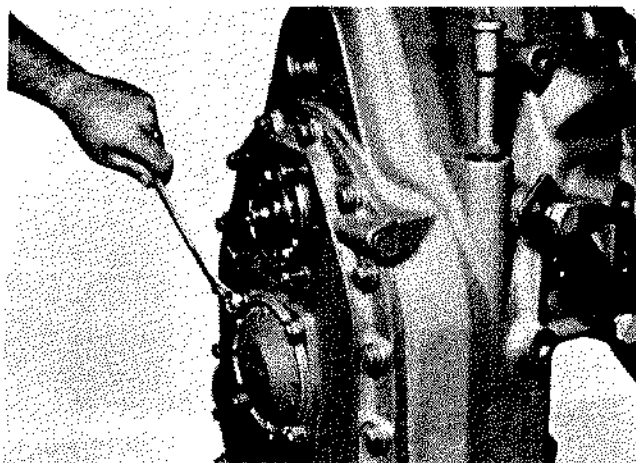
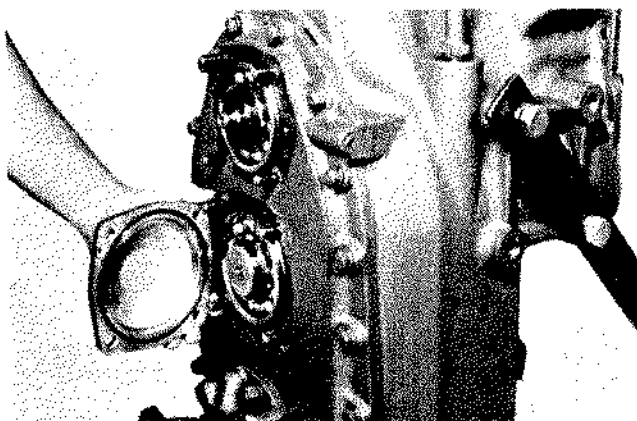
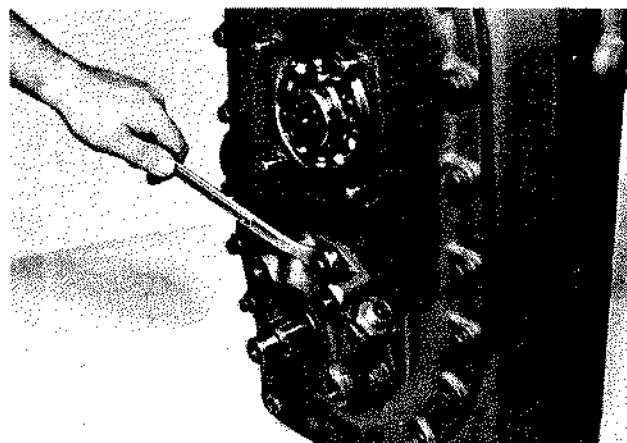


Figure 44

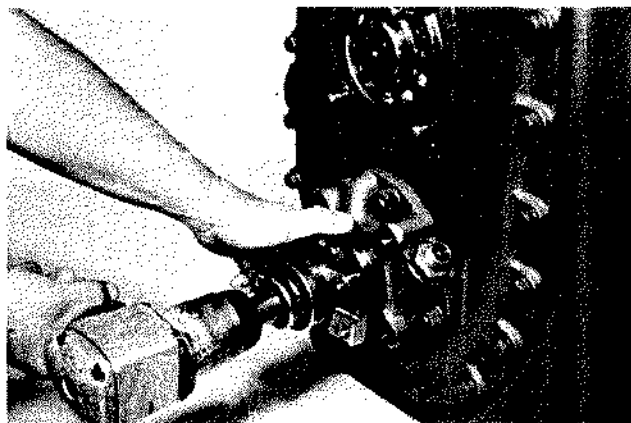
Remove idler shaft bearing cap stud nuts and washers.



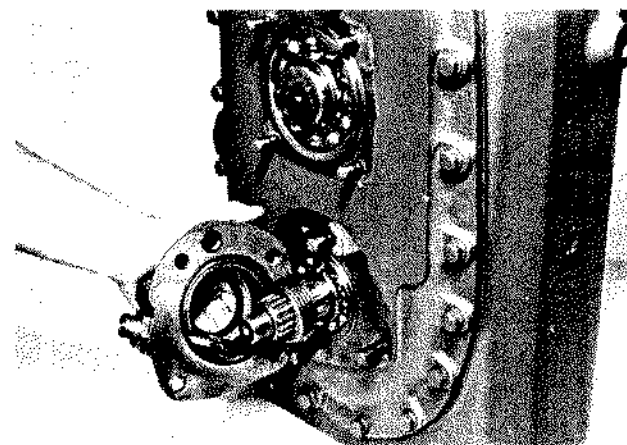
**Figure 45**  
Remove bearing cap.



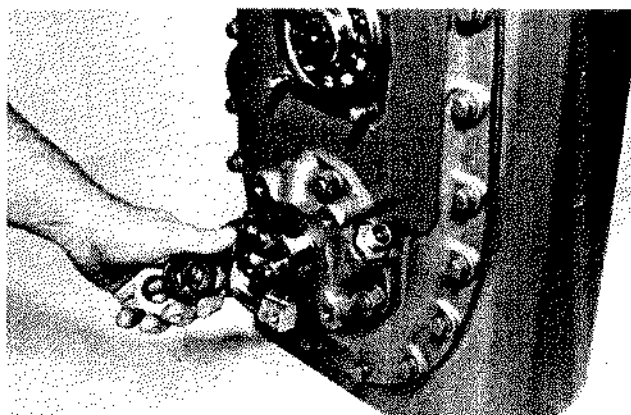
**Figure 48**  
Remove output shaft bearing cap stud nuts and washers.



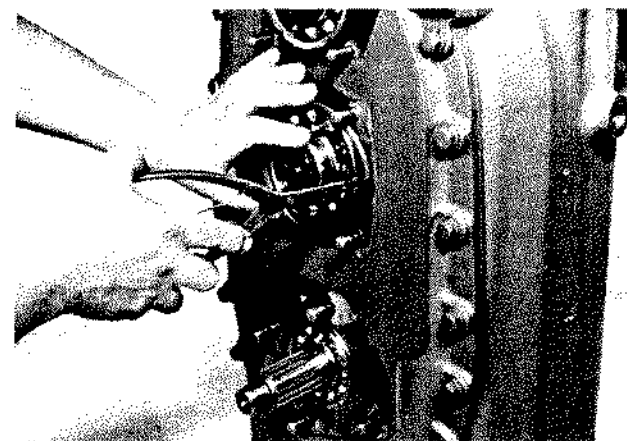
**Figure 46**  
Using an impact wrench (if available), if not a flange retainer bar must be used to hold the companion flange from turning, loosen output flange nut.



**Figure 49**  
Remove output shaft bearing cap. Cap shown has optional speedometer gear. Remove speedometer drive gear from output shaft.

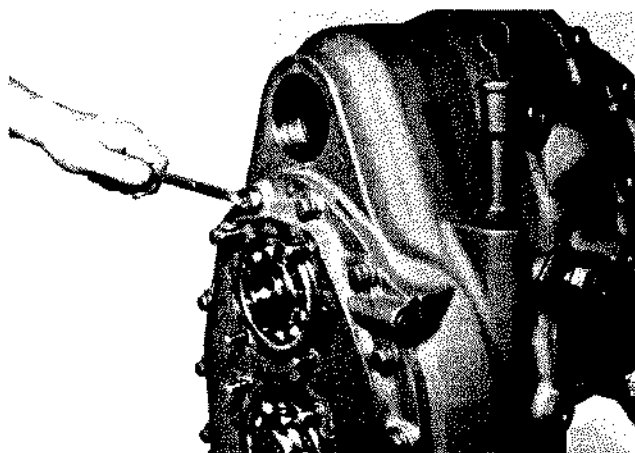


**Figure 47**  
Remove flange nut, washer, "O" ring and flange. If a parking brake is used remove brake drum. Remove brake backing plate bolts and washers. Remove backing plate assembly.

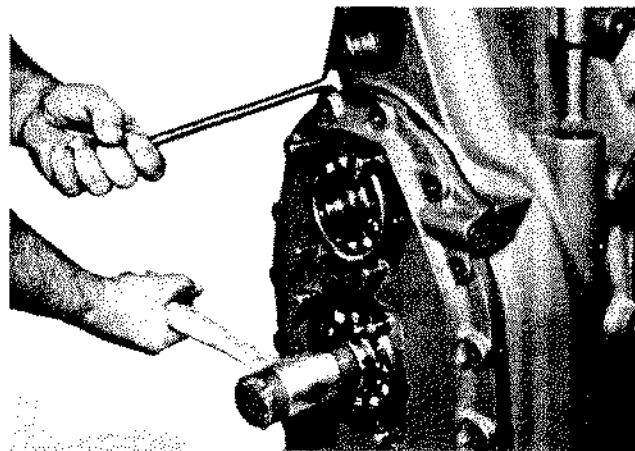


**Figure 50**  
Remove low clutch, idler shaft and output shaft rear bearing locating rings.

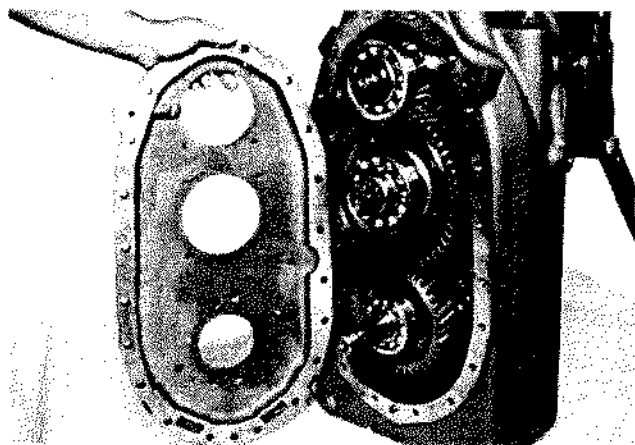




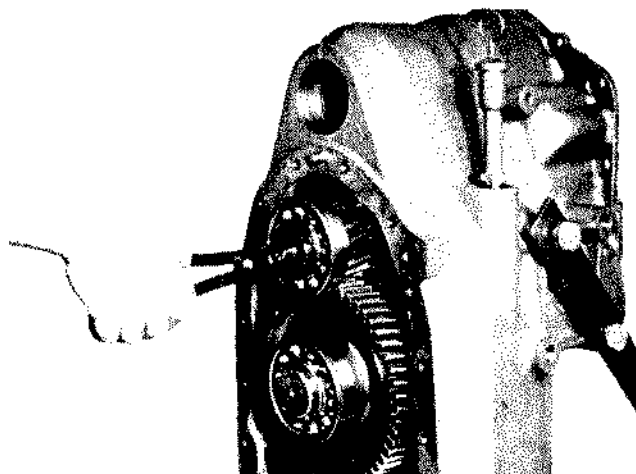
**Figure 51**  
Remove rear cover bolts and washers.



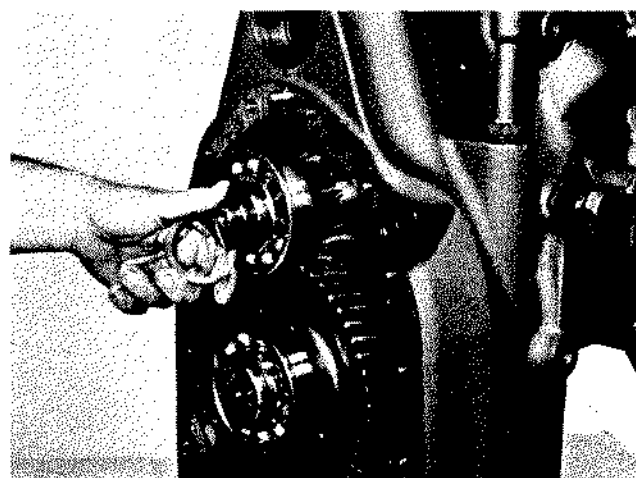
**Figure 52**  
Using pry slots provided, pry cover from transmission housing. Using a soft hammer tap on low clutch, idler and output shafts to prevent cover from binding.



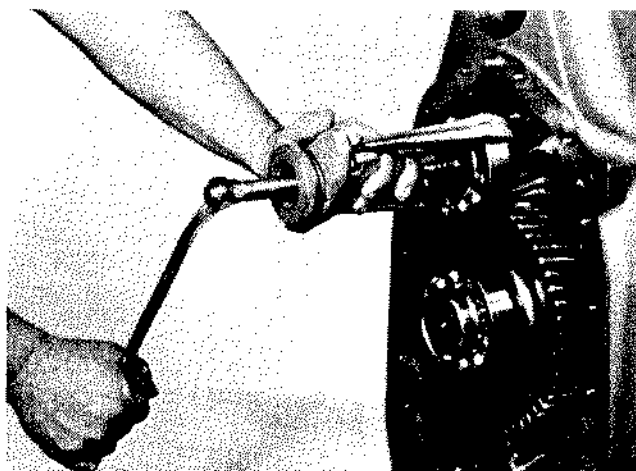
**Figure 53**  
Rear cover removed



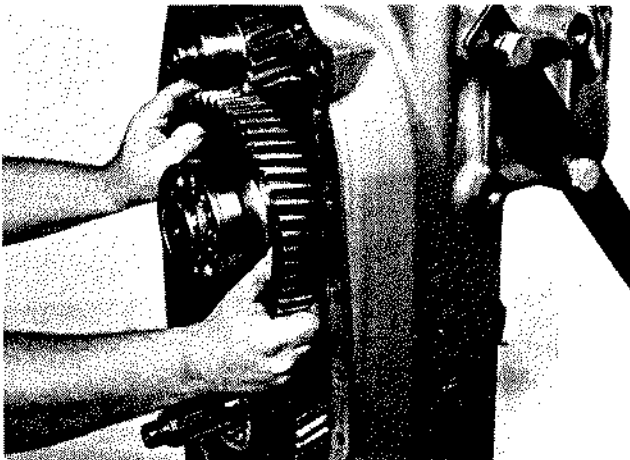
**Figure 54**  
Remove low clutch rear bearing retainer ring.



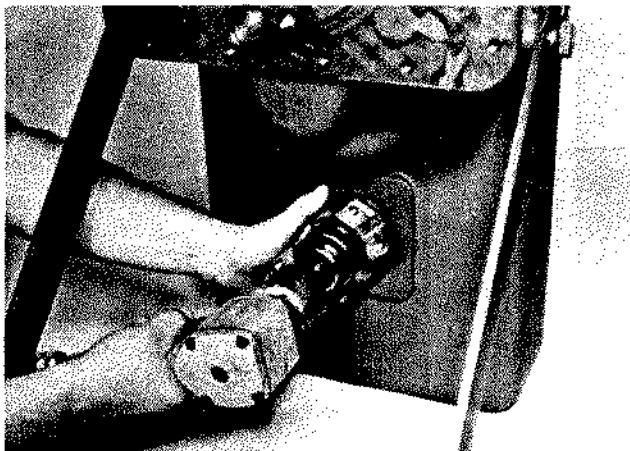
**Figure 55**  
Low clutch rear bearing spacer and retainer ring.



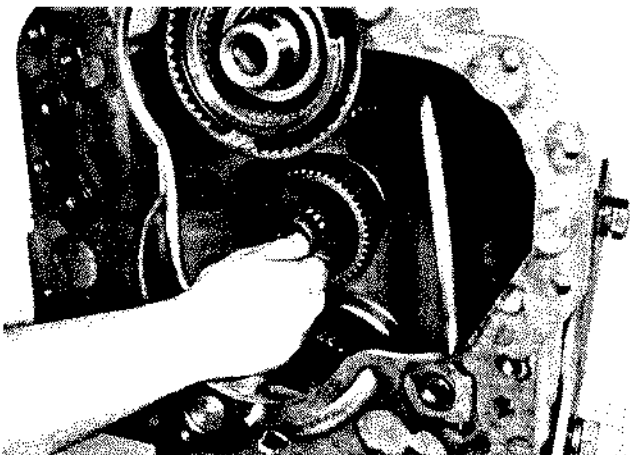
**Figure 56**  
Remove low clutch rear bearing.

**Figure 57**

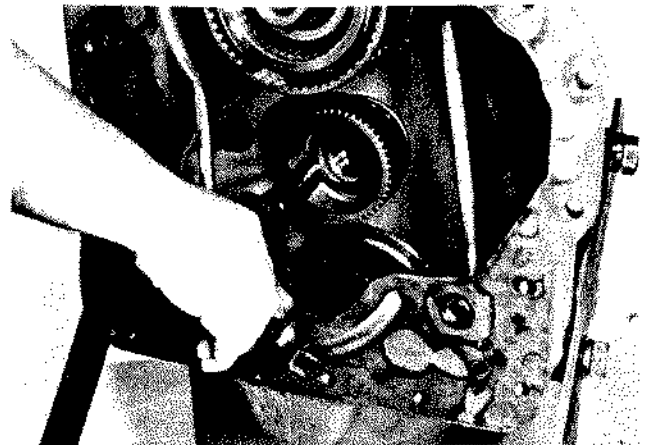
Remove idler gear and rear bearing as an assembly.

**Figure 58**

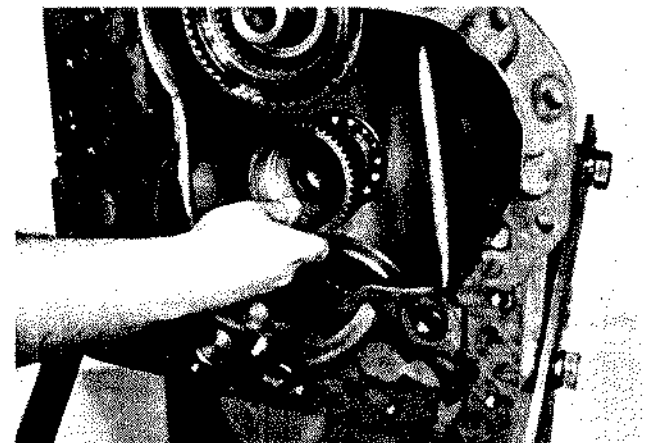
Remove output shaft front flange nut, washer, "O" ring and flange.

**Figure 59**

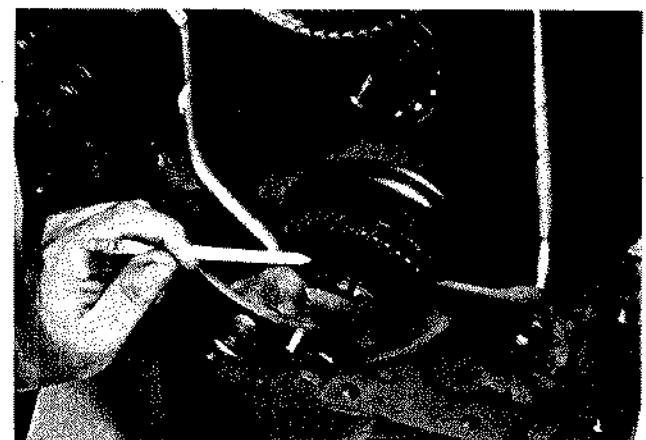
Remove reverse and 2nd clutch pilot bearing.

**Figure 60**

Remove 2nd clutch disc hub retainer ring.

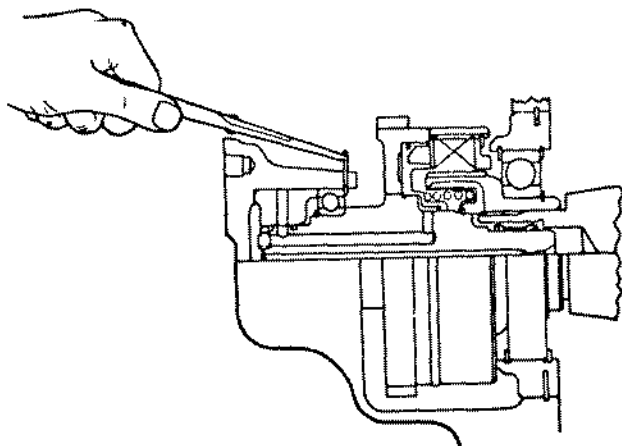
**Figure 61**

Remove disc hub.

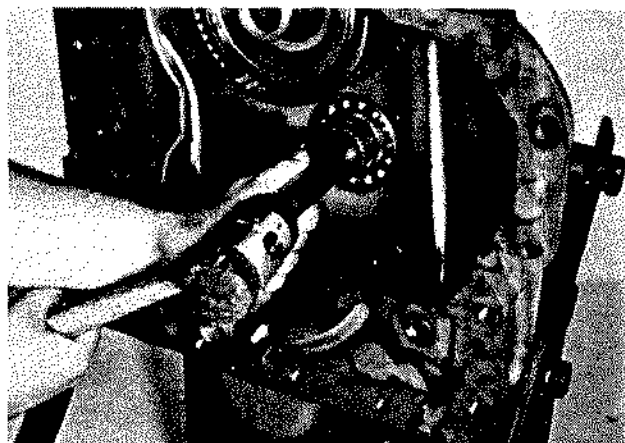
**Figure 62**

Compress ears on 3rd clutch front bearing locating ring. Remove ring from ring groove. It is not necessary to remove ring from clutch, it will come out when clutch is removed. See Figure 62-A.



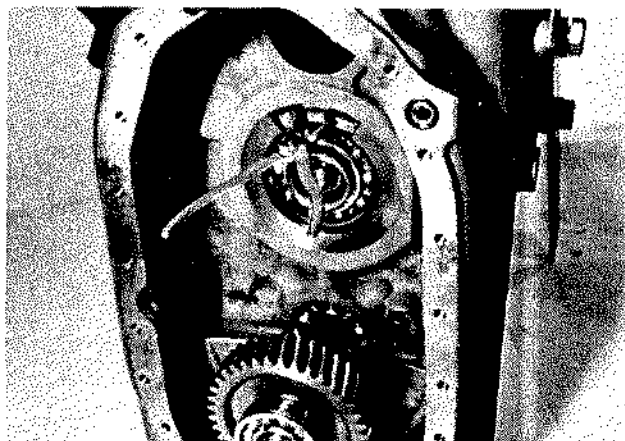


**Figure 62-A**



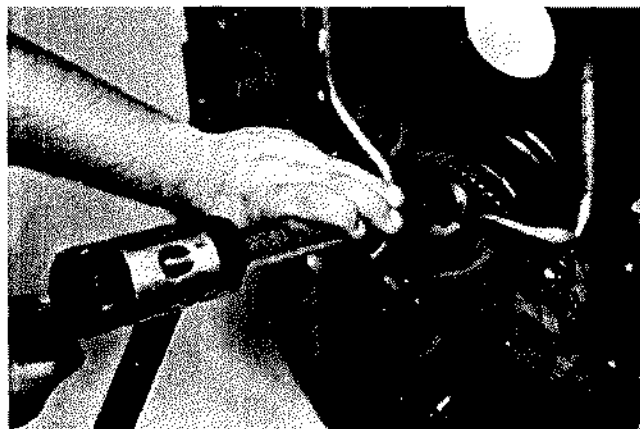
**Figure 63**

Tap low clutch assembly from housing. If possible it is recommended someone help in this operation to prevent the low clutch from dropping out of the case.



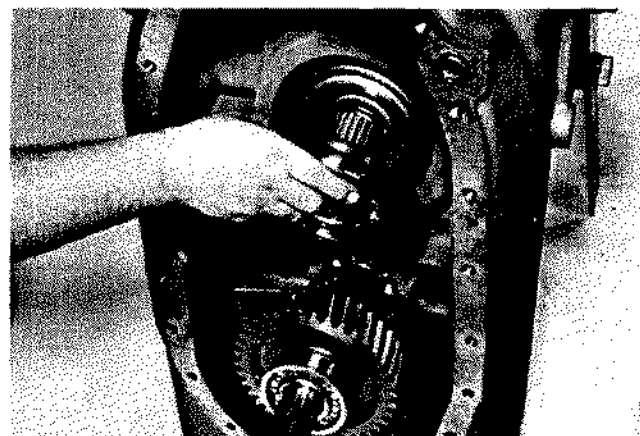
**Figure 64**

Using contracting type snap ring pliers as shown, contract 3rd clutch bearing carrier locating ring. Lock pliers to hold ring contracted.



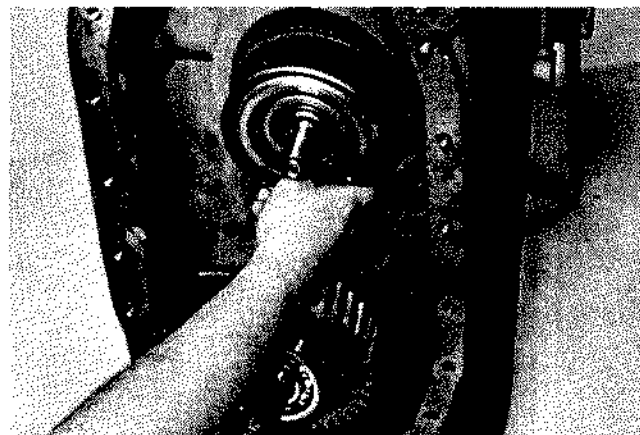
**Figure 65**

From front of transmission and using a soft bar tap 3rd speed clutch assembly from housing. If clutch seems difficult to remove recheck front and rear snap rings being sure they are clear of the ring groove.



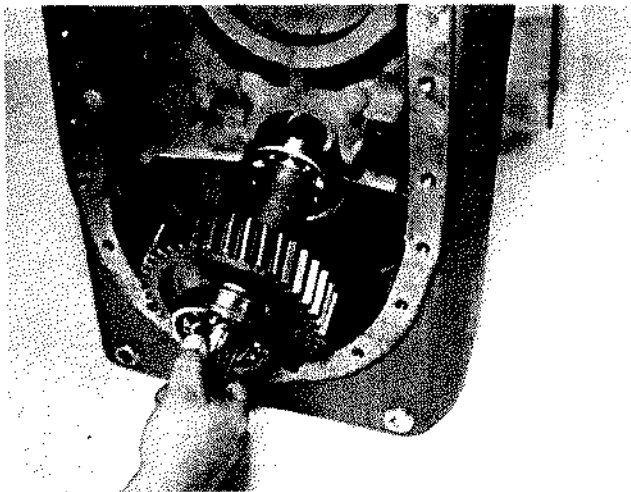
**Figure 66**

Remove bearing carrier, bearing and 3rd speed clutch disc hub.



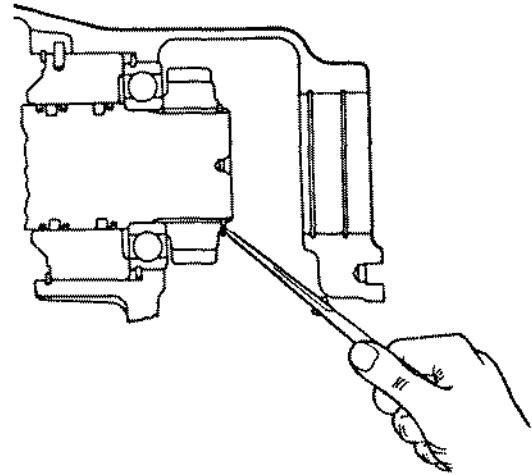
**Figure 67**

Remove 3rd speed clutch assembly.

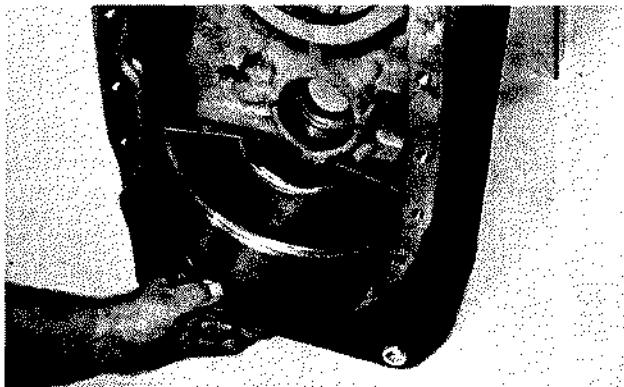


**Figure 68**

Remove output shaft and bearings as an assembly.

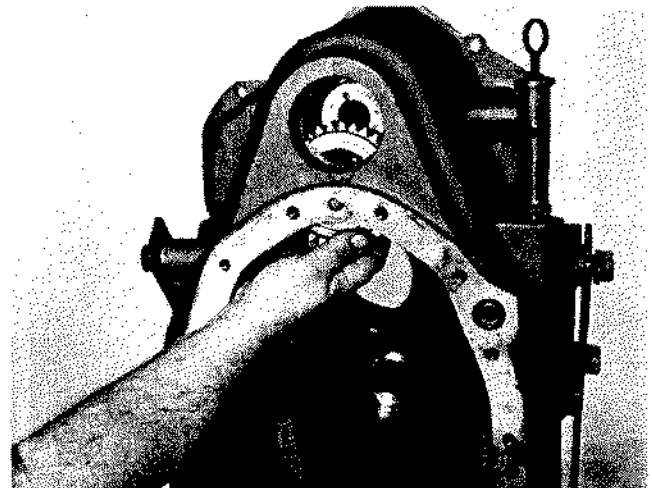


**Figure 70-A**



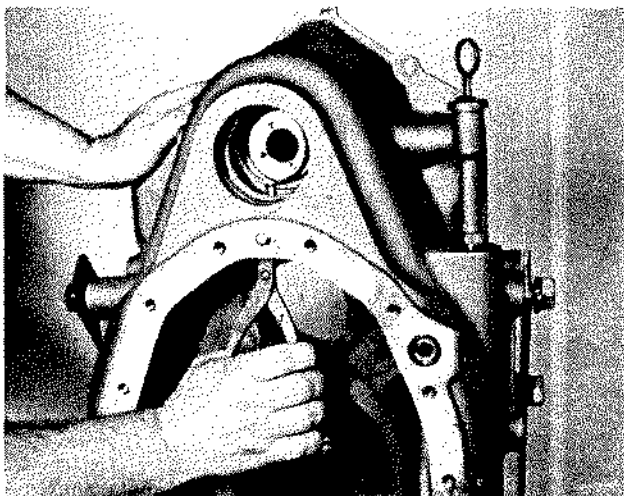
**Figure 69**

Remove oil sump oil baffle.



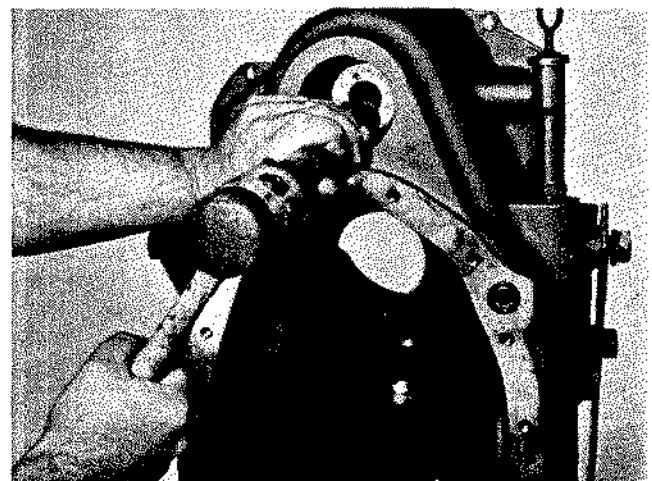
**Figure 71**

Remove forward clutch shaft drive gear.



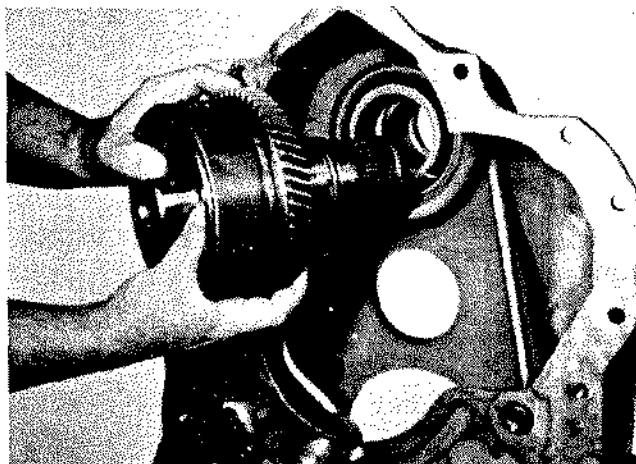
**Figure 70**

Remove forward clutch shaft drive gear retainer ring. See Figure 70-A.

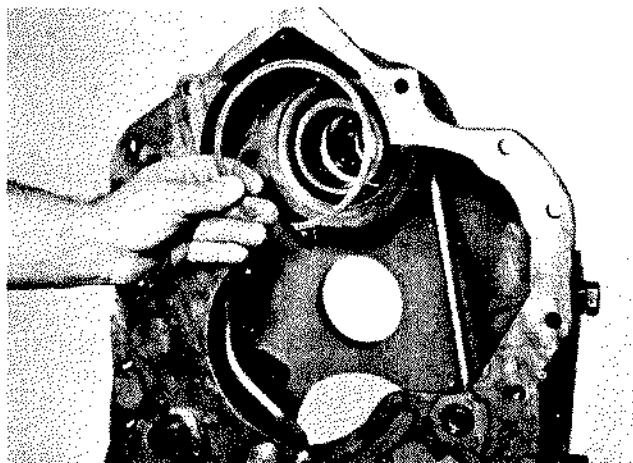


**Figure 72**

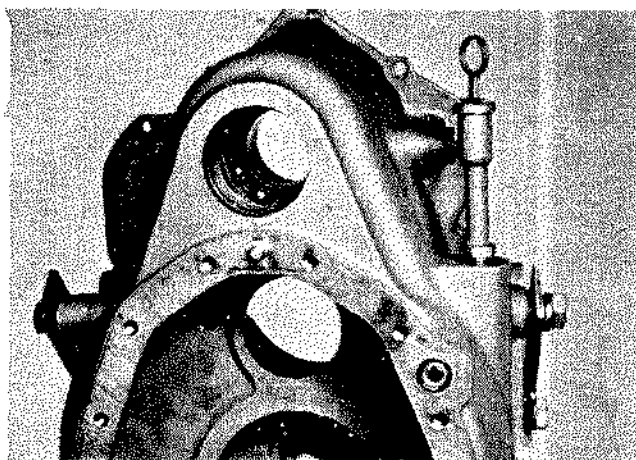
Tap forward clutch from rear bearing.



**Figure 73**  
Remove forward clutch assembly.



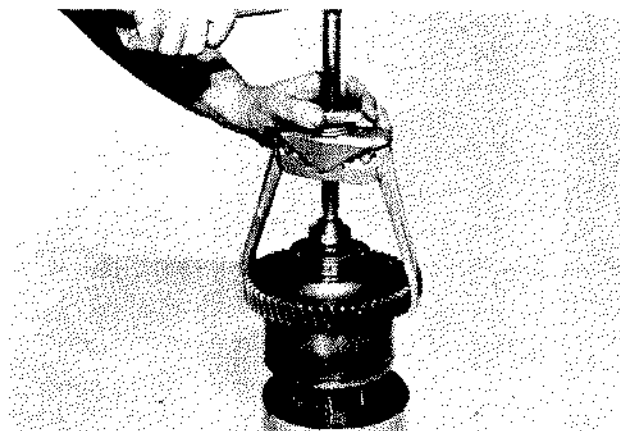
**Figure 74**  
Remove forward clutch piston ring sleeve retainer ring.



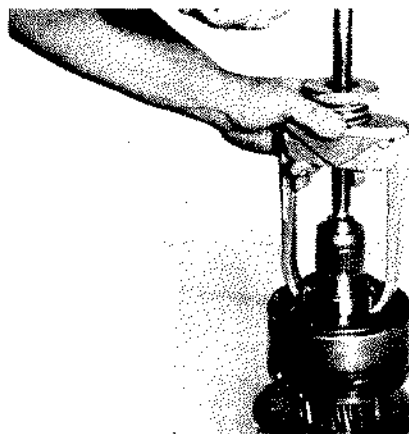
**Figure 75**  
If piston ring sleeve or forward clutch rear bearing is to be replaced, tap bearing from rear of housing.

## CLUTCH DISASSEMBLY

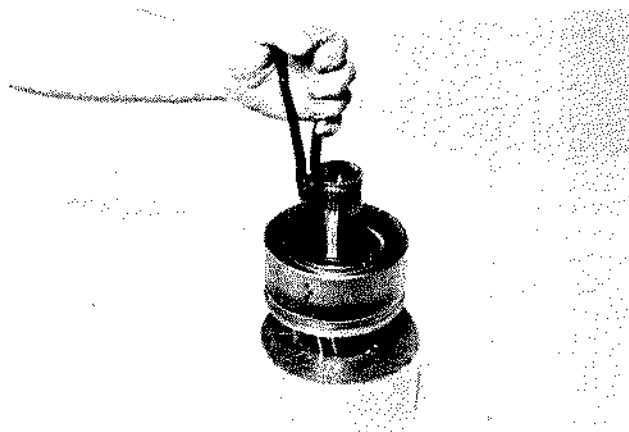
### Low Clutch



**Figure 76**  
Remove low gear and hub, bearing spacer and low clutch front bearing.



**Figure 77**  
Remove low speed gear bearing.



**Figure 78**  
Remove low gear bearing locating ring.

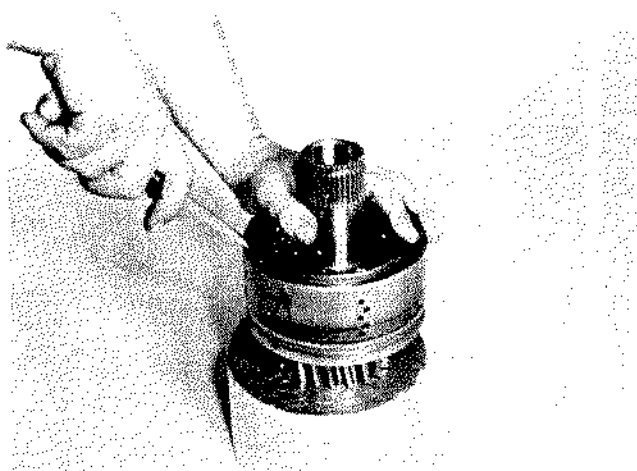


Figure 79

Remove end plate retainer ring.

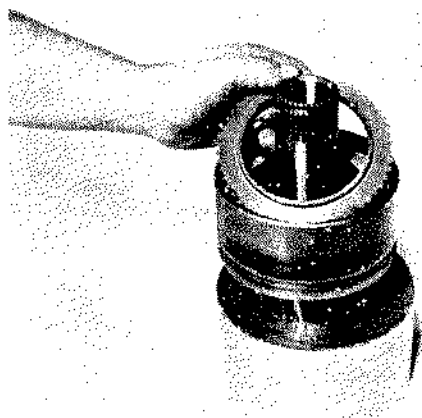


Figure 80

Remove end plate.

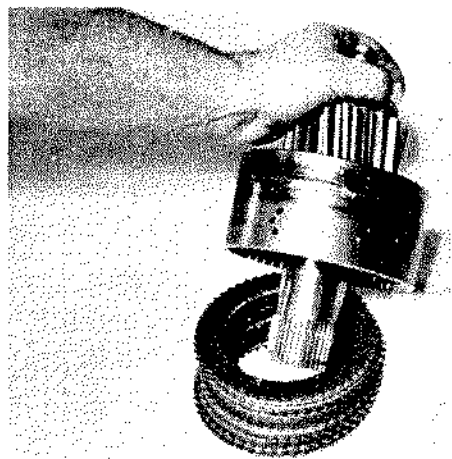


Figure 81

Turn clutch over. Remove inner and outer clutch discs.

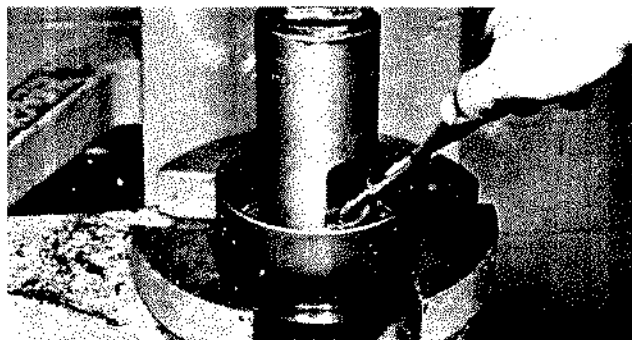


Figure 82

Remove clutch piston return spring. A sleeve with a portion removed is recommended for removing the clutch piston return spring, washer, and retainer ring. Sleeve shown is a common pipe, with a 1-1/2 x 1 [39,0x26,0mm] opening. The pipe is 6 x 3-1/4 x 2-3/4 [155,0x85,0x78,0mm]. Compress spring retainer washer. Through opening remove spring retainer snap ring. Release tension on spring retainer.

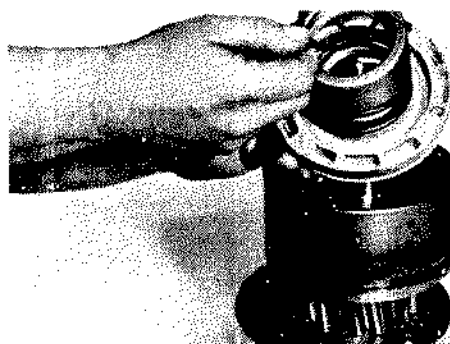


Figure 83

Remove spring retainer and spring. Turn clutch over and tap clutch shaft on a block of wood to remove clutch piston.

## LOW CLUTCH REASSEMBLY

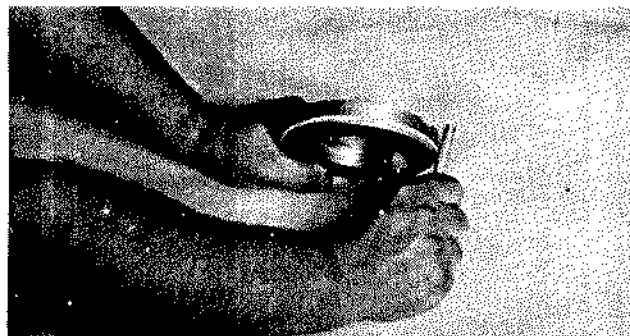
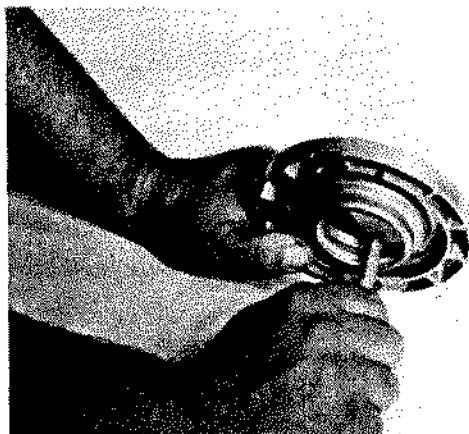
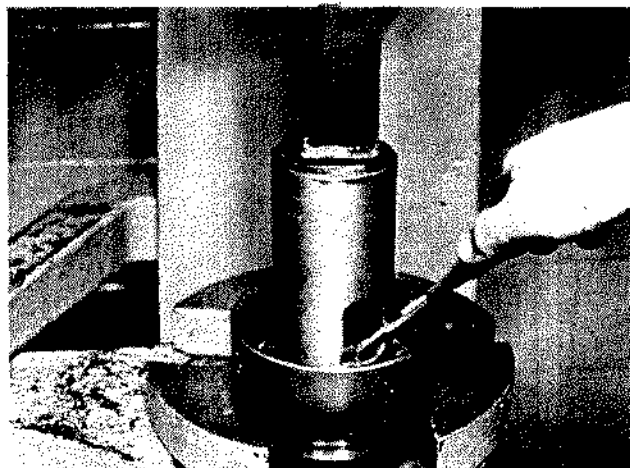


Figure 84

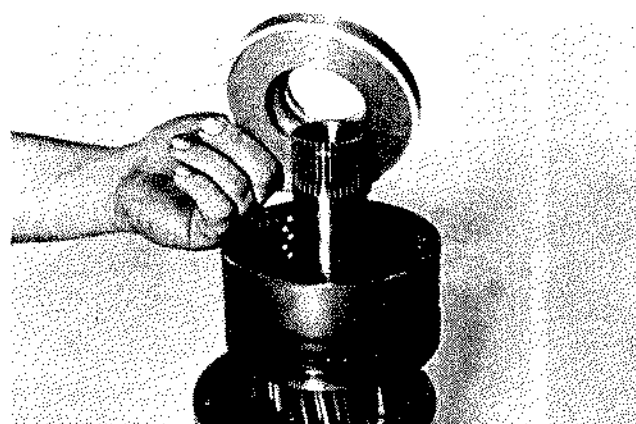
Install clutch piston outer seal ring. **NOTE:** Ring must be sized before installing in clutch drum. Sizing is best accomplished by rotating piston while holding a round object against the new seal ring as shown. Rotate piston until seal ring is flush with outer diameter of piston.

**Figure 85**

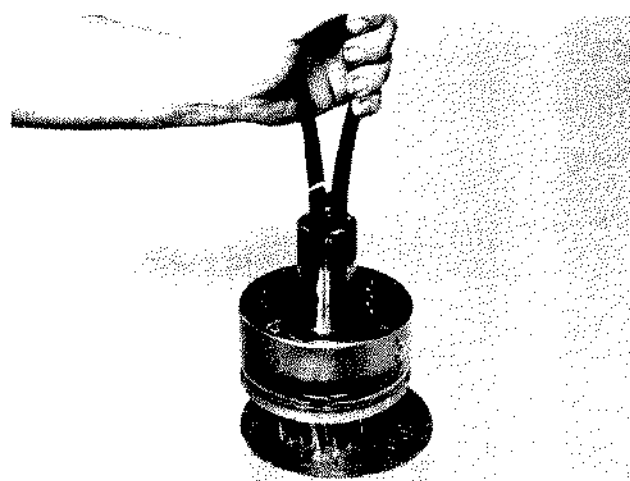
Install clutch piston inner seal ring and size as described in Figure 84.

**Figure 88**

Compress spring and retainer. Install retainer snap ring.

**Figure 86**

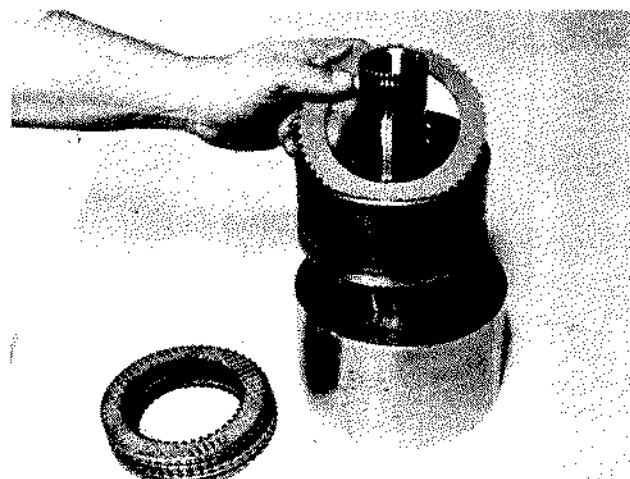
Position piston in low clutch drum as shown. Use caution as not to damage inner and outer piston sealing rings.

**Figure 89**

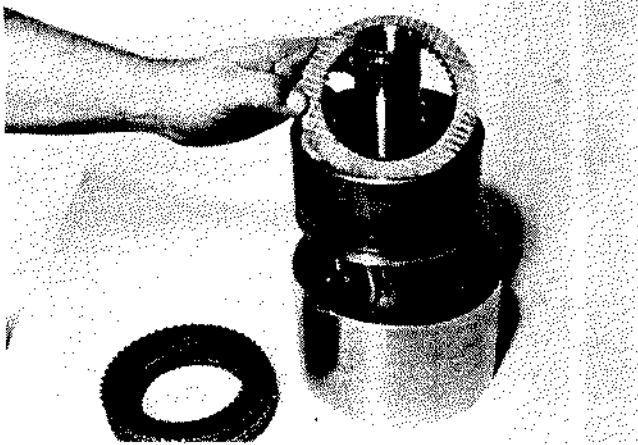
Install clutch inner bearing locating ring.

**Figure 87**

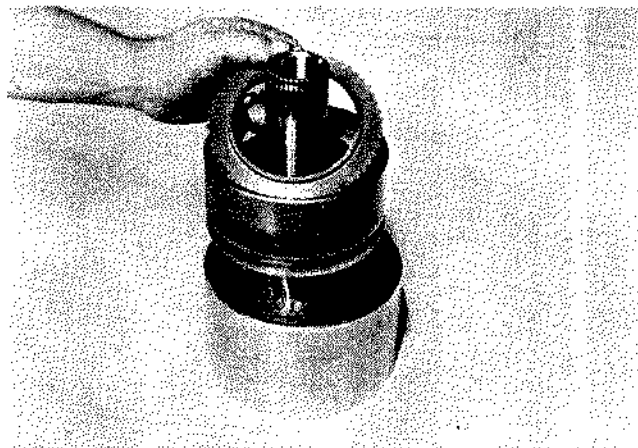
Position piston return spring, spring retainer, and snap ring in clutch drum.

**Figure 90**

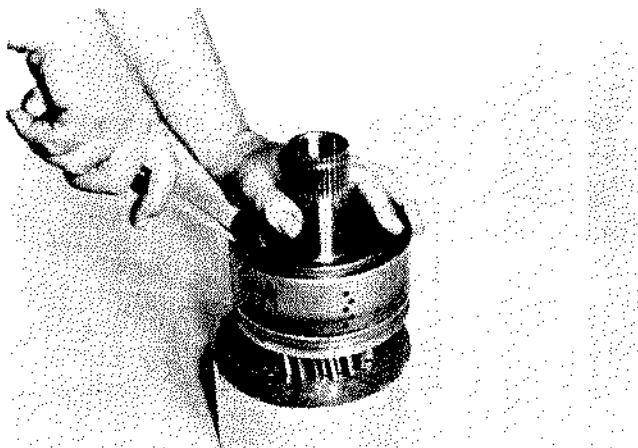
Install one steel disc.

**Figure 91**

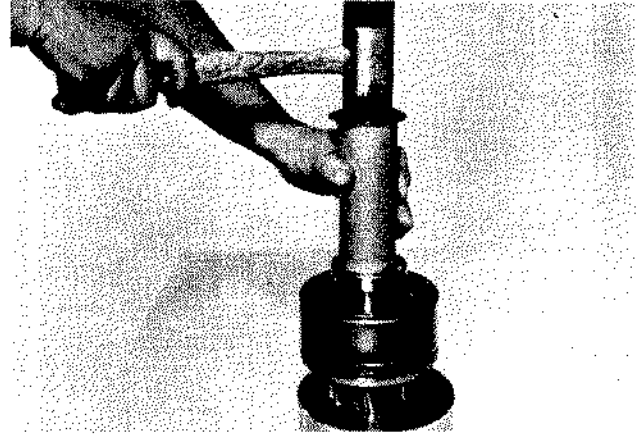
Install one friction disc. Alternate steel and friction discs until the proper amount of discs are installed. First disc next to the piston is steel, last disc installed is friction.

**Figure 92**

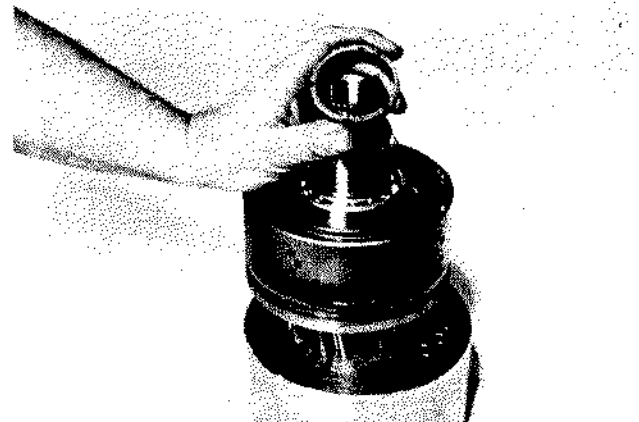
Install clutch disc end plate.

**Figure 93**

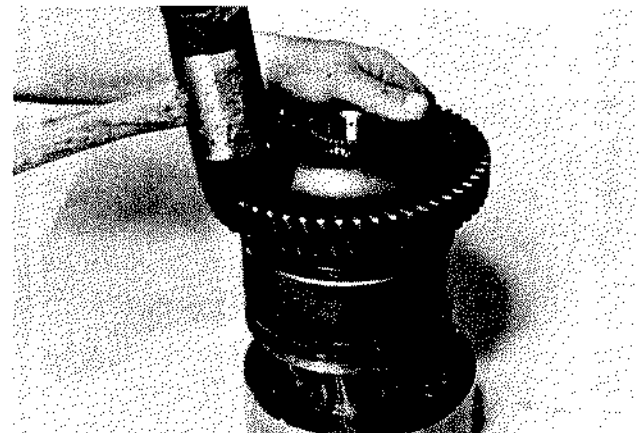
Install end plate retainer ring.

**Figure 94**

Install low speed gear inner bearing.

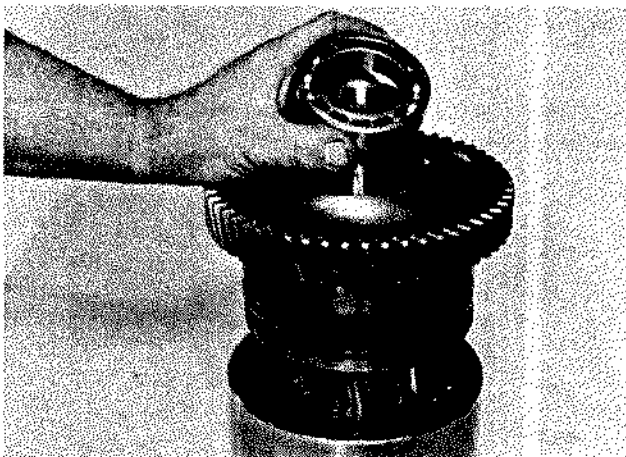
**Figure 95**

Install low speed gear bearing spacer.

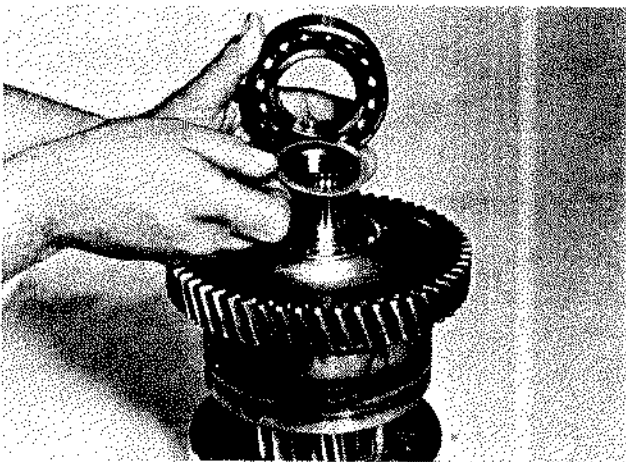
**Figure 96**

Install low clutch driven gear and hub into clutch drum. Align splines on clutch hub with internal teeth of friction discs. Tap gear into position. Do not force this operation. Gear splines must be in full position with internal teeth of all friction discs.

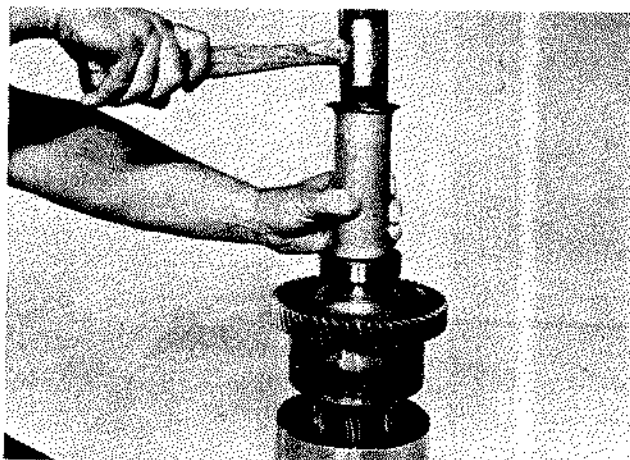




**Figure 97**  
Install low speed gear outer bearing.

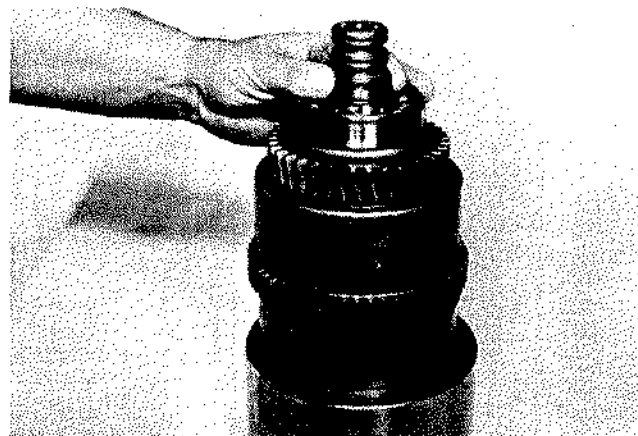


**Figure 98**  
Position low gear front bearing spacer and bearing on clutch shaft.

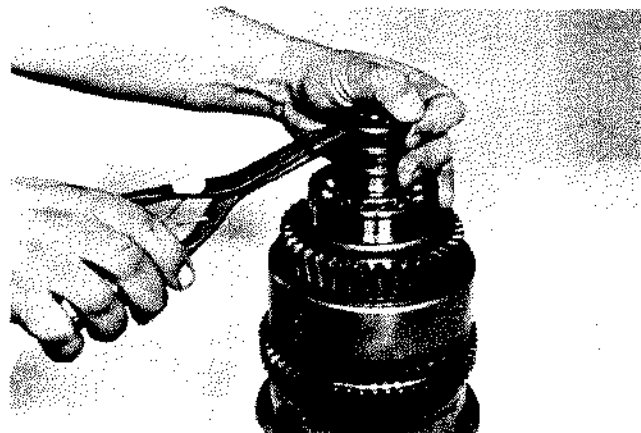


**Figure 99**  
Tap bearing into position.

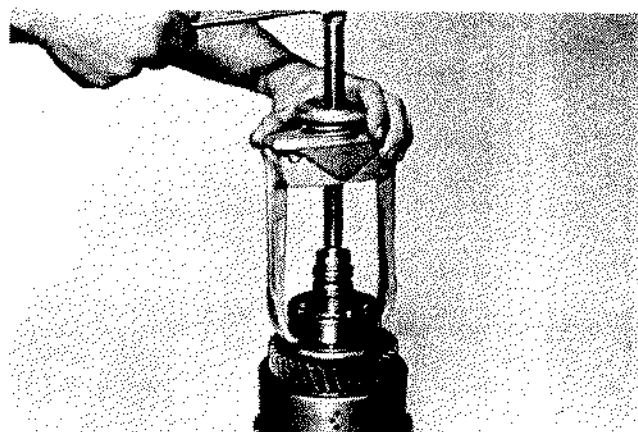
**REVERSE AND 2nd CLUTCH DISASSEMBLY**  
(Reverse being disassembled)



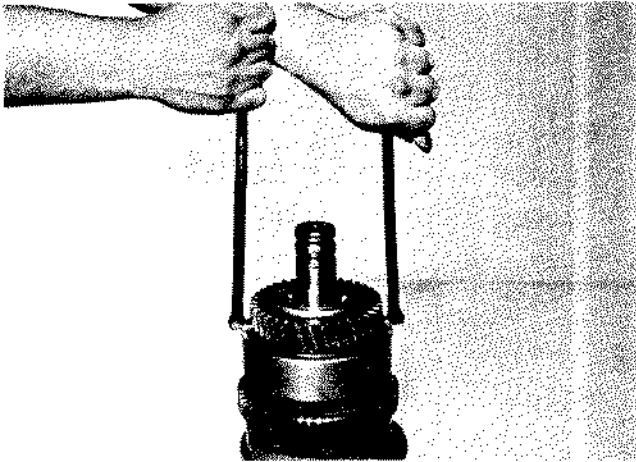
**Figure 100**  
Remove clutch shaft piston rings.



**Figure 101**  
Remove front bearing retainer ring.

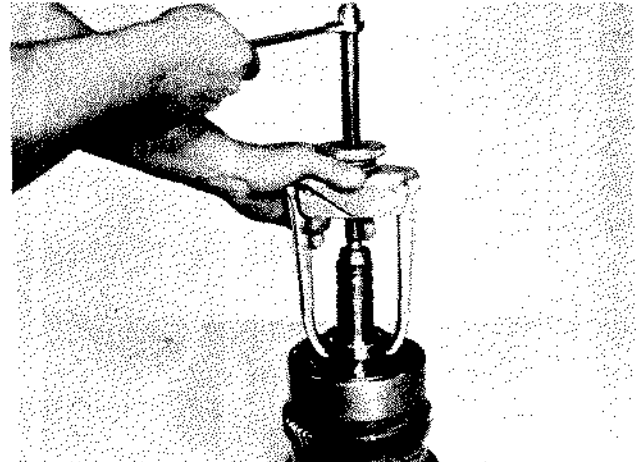


**Figure 102**  
Remove front bearing.



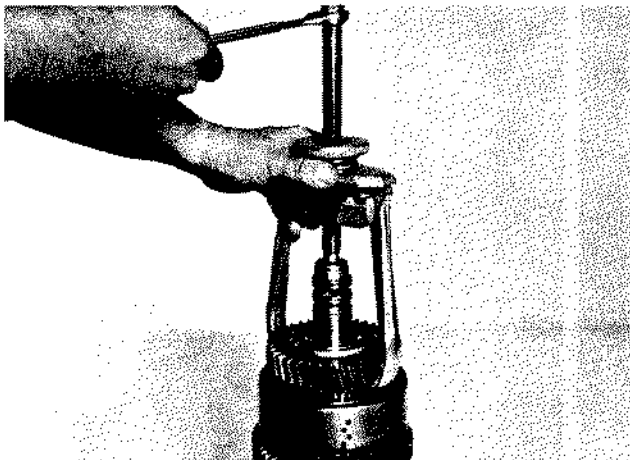
**Figure 103**

Pry reverse gear from clutch assembly far enough to use a gear puller.



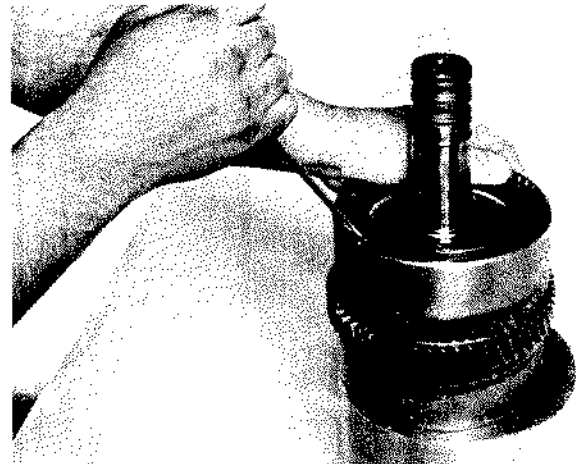
**Figure 106**

Remove inner bearing.



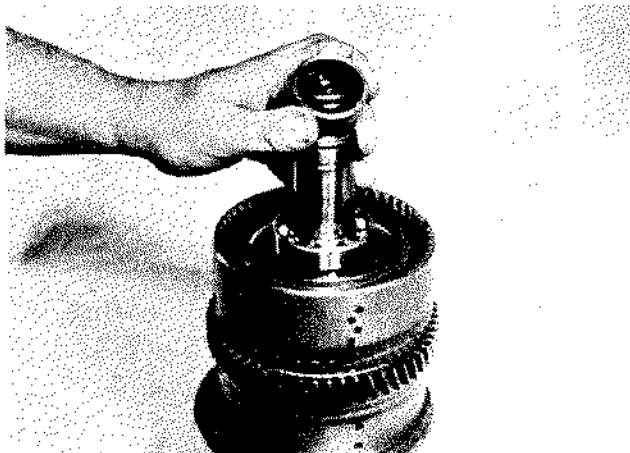
**Figure 104**

Remove gear as shown.



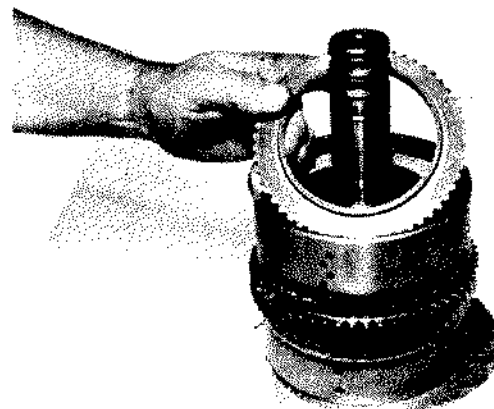
**Figure 107**

Remove end plate retainer ring.



**Figure 105**

Remove bearing spacer.



**Figure 108**

Remove end plate.



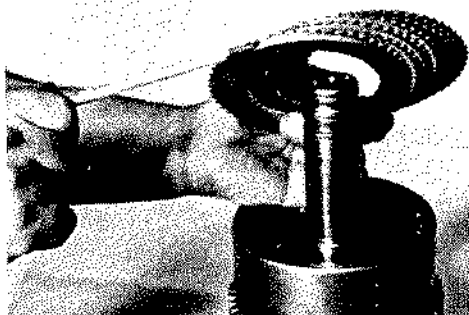


Figure 109

Remove clutch discs. **NOTE:** In units equipped with modulation the forward and reverse clutches will have a reduced size clutch piston. The steel clutch plate next to the piston will have a backing ring on it as shown.

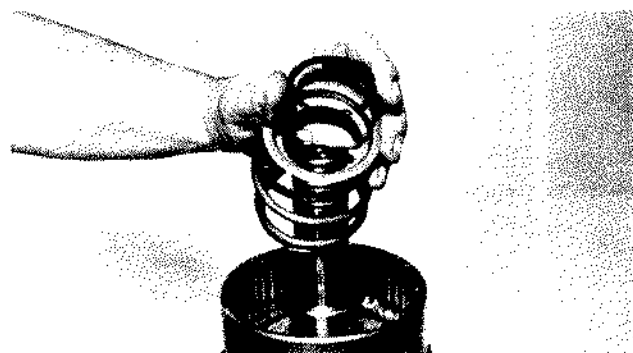


Figure 110

Refer to procedure shown in Figure 82 for removing return spring retainer ring. Remove ring, spring retainer and return spring. Turn clutch over and tap shaft on a block of wood to remove clutch piston. Repeat procedure for 2nd clutch disassembly.

### REVERSE AND 2ND CLUTCH REASSEMBLY



Figure 111

Install inner and outer clutch piston seal rings. Size rings as explained in Figure 84. Position piston in clutch drum. **NOTE:** Low clutch, 2nd clutch or 3rd clutch will not have reduced size pistons. This is for modulation in forward and reverse only.



Figure 112

Install return spring, spring retainer and retainer ring.

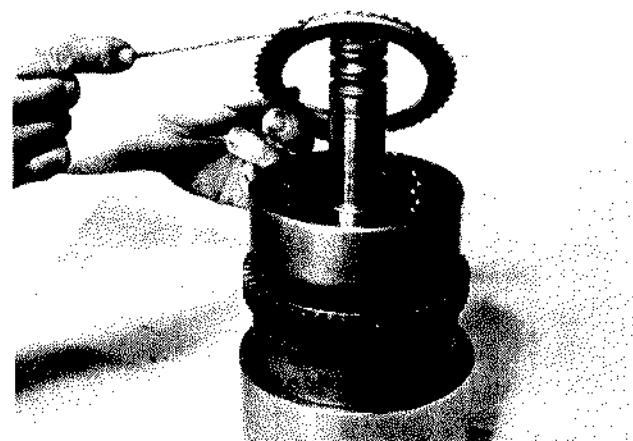


Figure 113

Install 1st steel disc with backing ring next to piston. **NOTE:** This disc is used only in forward and reverse modulated clutches.

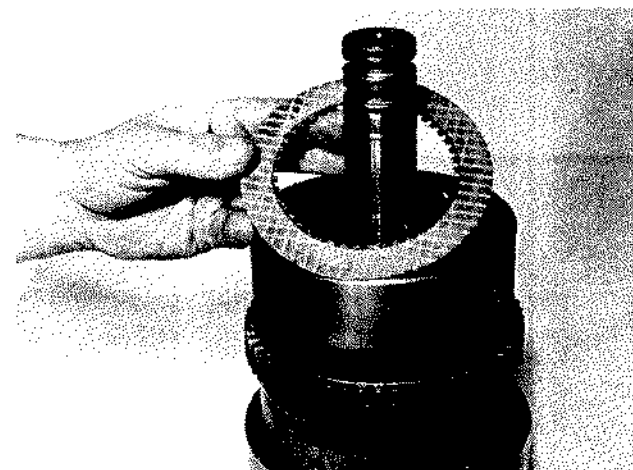
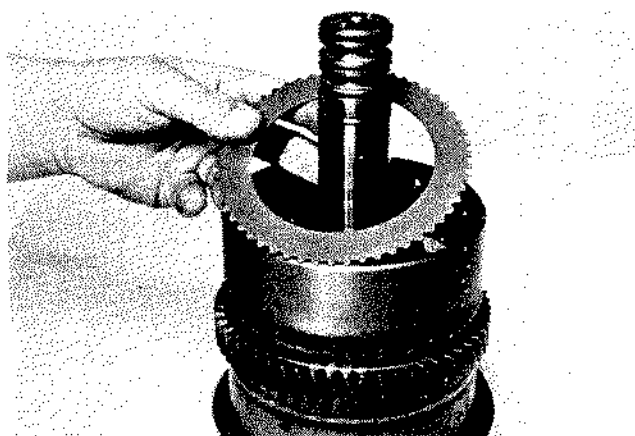
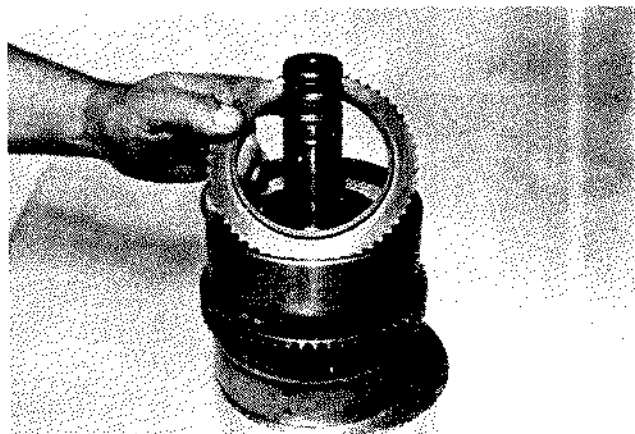
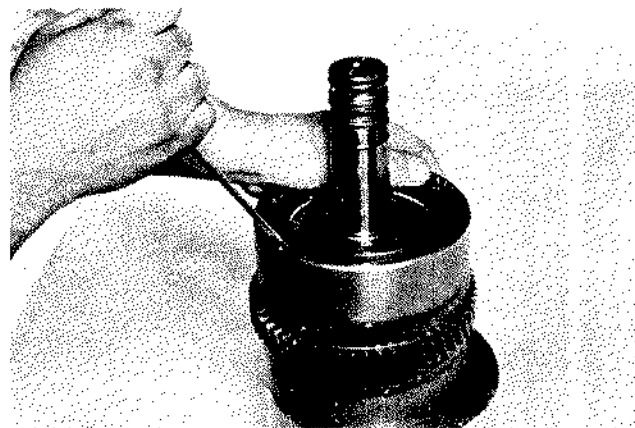
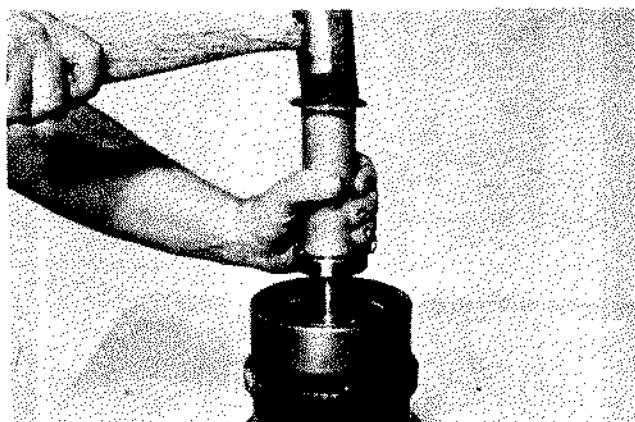


Figure 114

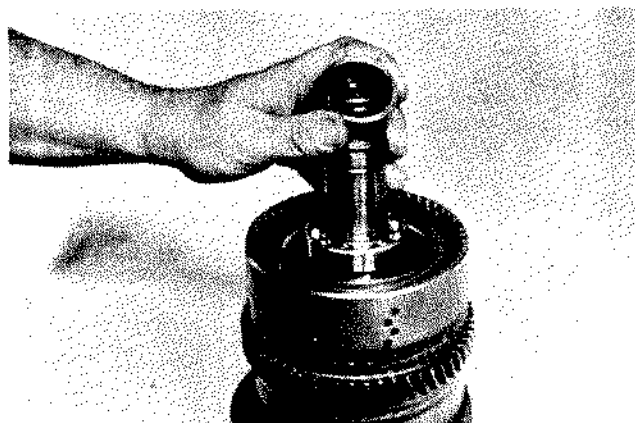
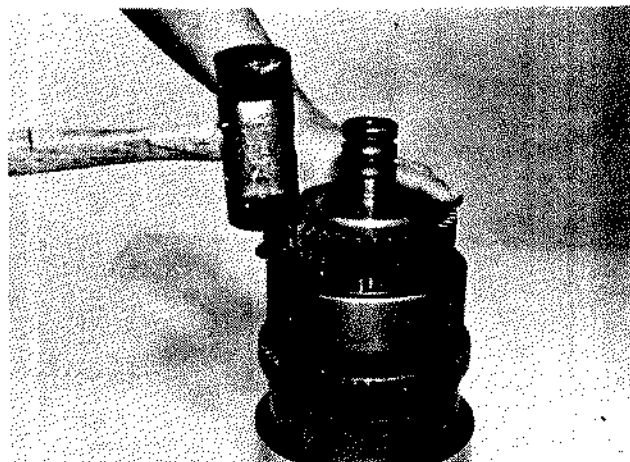
Install one friction disc.

**Figure 115**

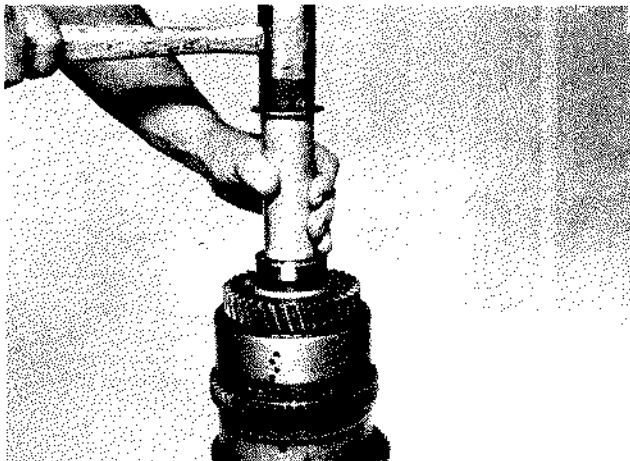
Install one steel disc. Alternate friction and steel discs until the proper amount of discs are installed. First disc next to the piston is steel, last disc installed is friction. **NOTE:** On forward and reverse modulated clutches the first steel disc will have a backing ring on it.

**Figure 116**  
Install end plate.**Figure 117**  
Install end plate retainer ring.**Figure 118**

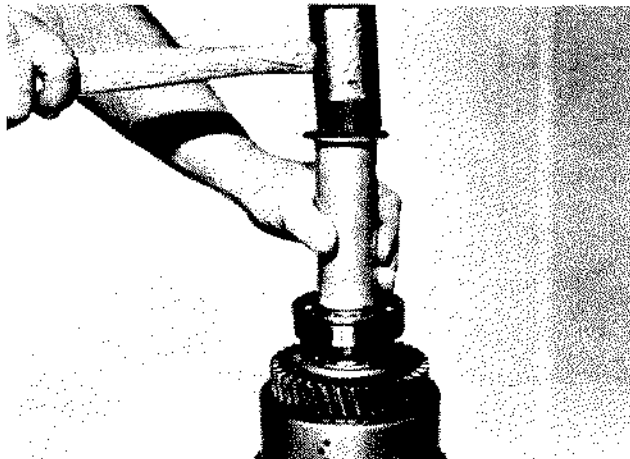
Install inner clutch driven gear bearing.

**Figure 119**  
Install bearing spacer.**Figure 120**

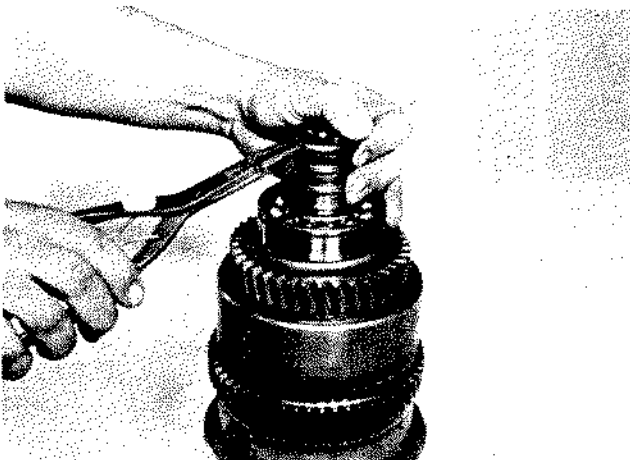
Install clutch driven gear into clutch drum. Align splines on clutch gear with internal teeth of friction discs. Tap gear into position. Do not force this operation. Gear splines must be in full position with internal teeth of all friction discs.



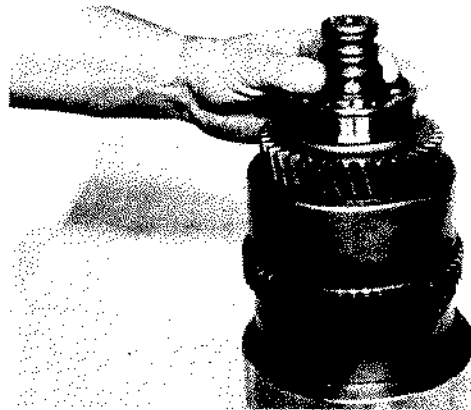
**Figure 121**  
Install outer bearing.



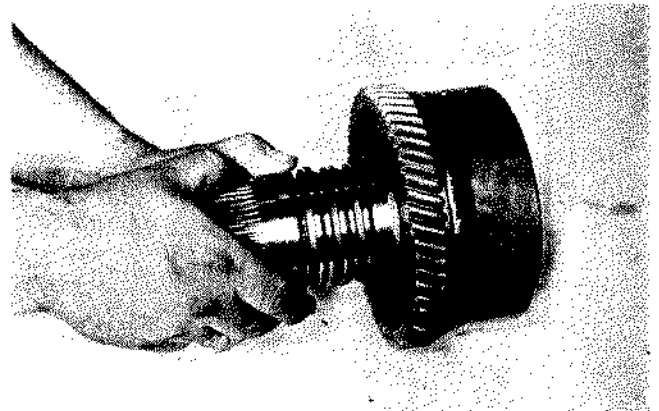
**Figure 122**  
Install front bearing. **NOTE:** Snap ring groove in front bearing must be up.



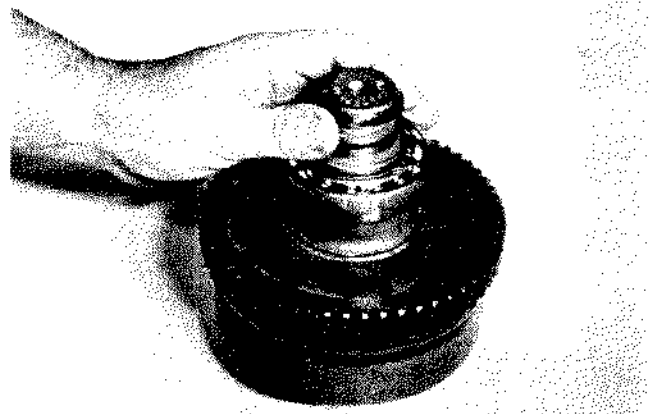
**Figure 123**  
Install front bearing retainer ring.



**Figure 124**  
Install new clutch shaft piston rings. Grease rings to center on shaft to facilitate reassembly into transmission housing.



**Figure 125**  
Forward clutch will disassemble and reassemble the same as the reverse clutch. Install new clutch shaft piston rings. Grease rings to facilitate reassembly.



**Figure 126**  
The 3rd speed clutch will disassemble and reassemble the same as the forward. Install new clutch shaft piston rings.

## CONVERTER HOUSING DISASSEMBLY

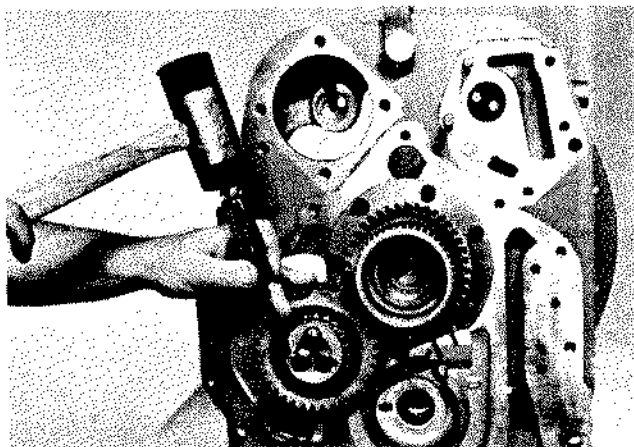


Figure 127

Straighten lockplate tabs from reverse idler capscrews.

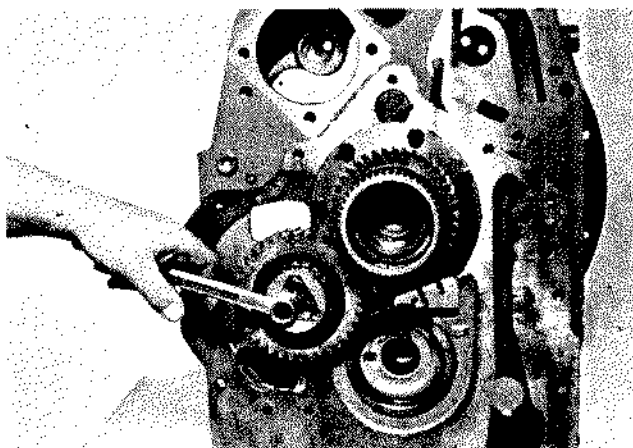


Figure 128

Remove reverse idler capscrews.

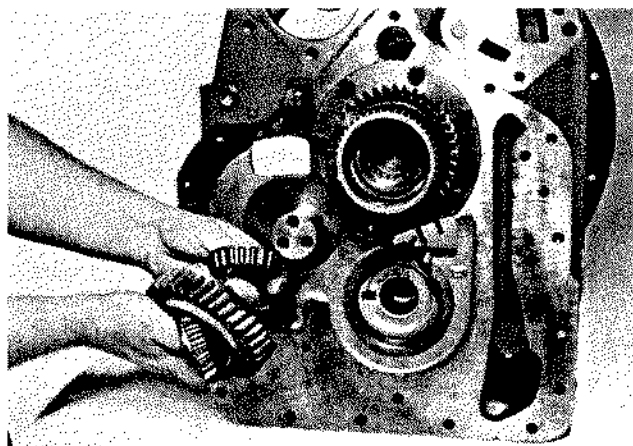


Figure 129

Remove reverse idler gear and bearing assembly.

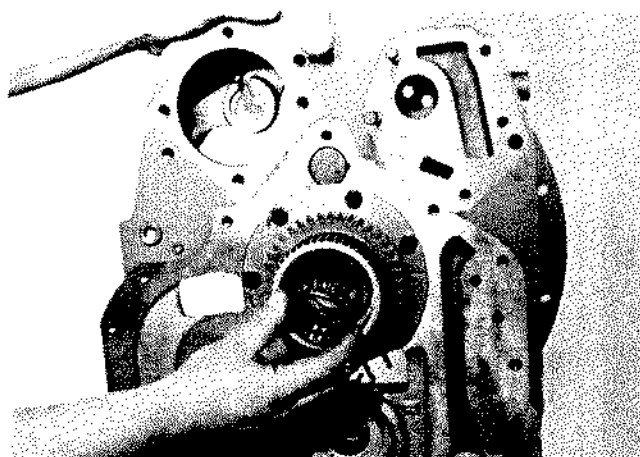


Figure 130

Remove forward shaft pilot bearing.

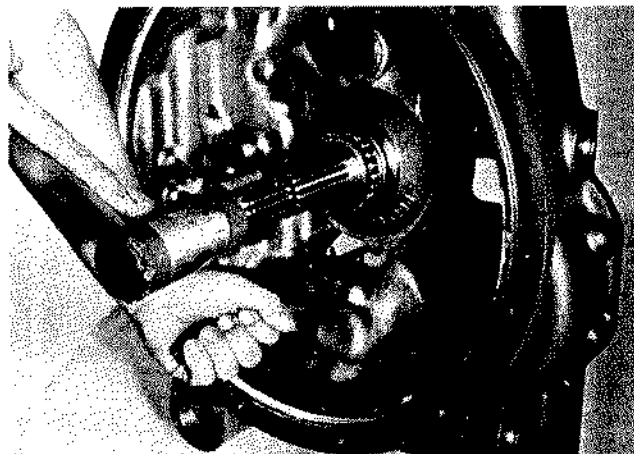


Figure 131

Using spreader type snap ring pliers spread ears on the turbine shaft bearing snap ring. Tap turbine shaft from converter housing.

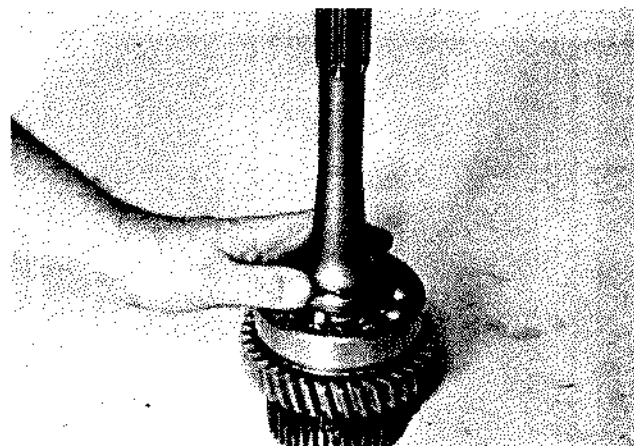
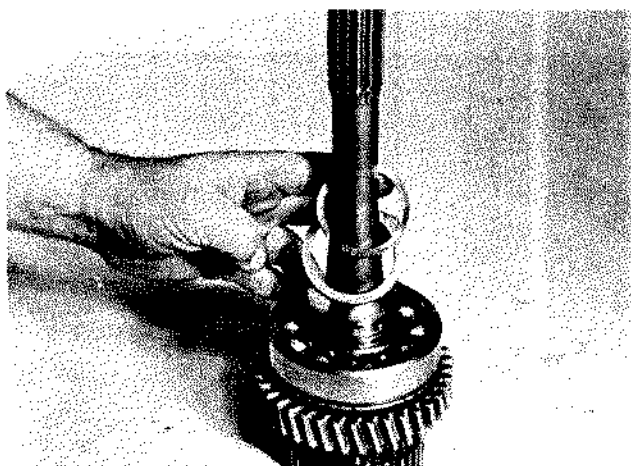
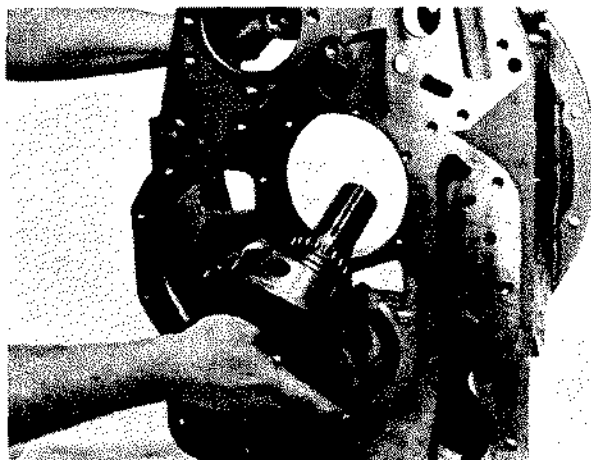


Figure 132

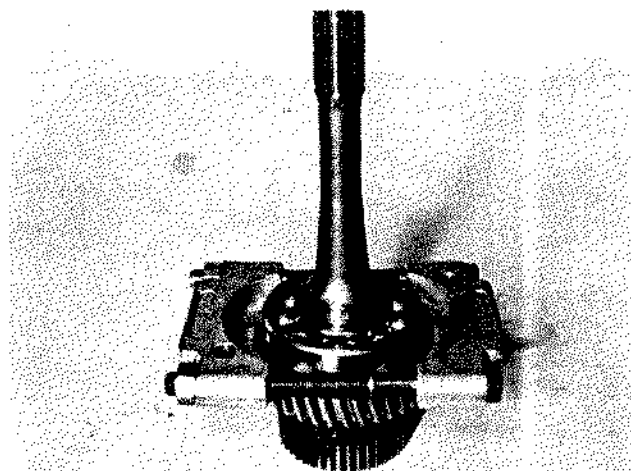
Remove turbine shaft piston ring.



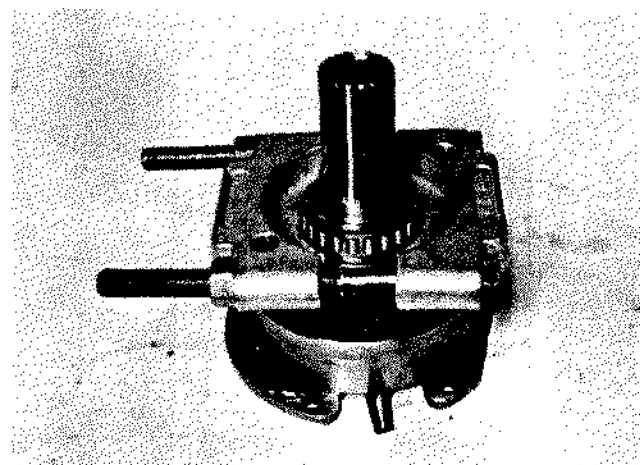
**Figure 133**  
Remove turbine shaft bearing retainer ring and washer.



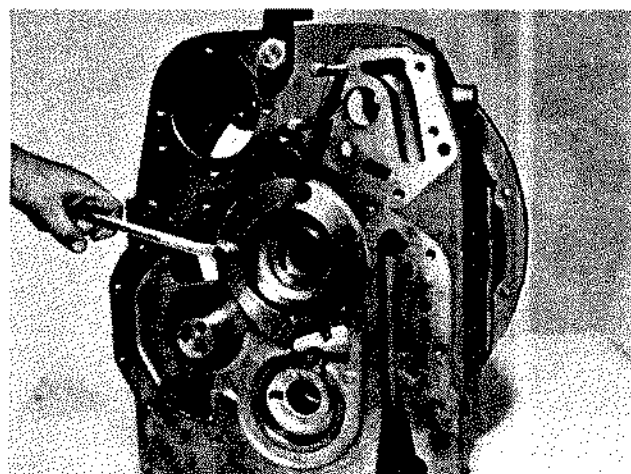
**Figure 136**  
Tap reaction member support from housing.



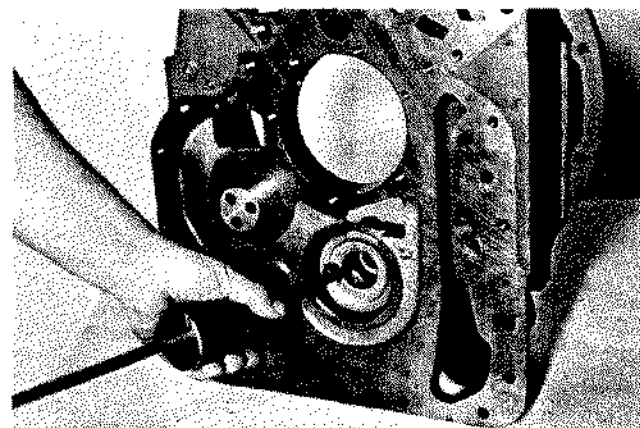
**Figure 134**  
Recommended procedure for removing bearing.



**Figure 137**  
Remove bearing from support. Remove support oil sealing ring and sealing ring expander spring.



**Figure 135**  
Remove reaction member support capscrews.



**Figure 138**  
If reverse clutch piston ring sleeve is to be replaced, remove as shown.



## CLEANING AND INSPECTION

### CLEANING

Clean all parts thoroughly using solvent type cleaning fluid. It is recommended that parts be immersed in cleaning fluid and moved up and down slowly until all old lubricant and foreign material is dissolved and parts are thoroughly cleaned.

**CAUTION:** Care should be exercised to avoid skin rashes, fire hazards and inhalation of vapors when using solvent type cleaners.

#### Bearings

Remove bearings from cleaning fluid and strike larger side of cone flat against a block of wood to dislodge solidified particles of lubricant. Immerse again in cleaning fluid to flush out particles. Repeat above operation until bearings are thoroughly clean. Dry bearings using moisture-free compressed air. Be careful to direct air stream across bearing to avoid spinning. Do not spin bearings when drying. Bearings may be rotated slowly by hand to facilitate drying process.

#### Housings

Clean interior and exterior of housings, bearing caps, etc., thoroughly. Cast parts may be cleaned in hot solution tanks with mild alkali solutions providing these parts do not have ground or polished surfaces. Parts should remain in solution long enough to be thoroughly cleaned and heated. This will aid the evaporation of the cleaning solution and rinse water. Parts cleaned in solution tanks must be thoroughly rinsed with clean water to remove all traces of alkali. Cast parts may also be cleaned with steam cleaner.

**CAUTION:** Care should be exercised to avoid skin rashes and inhalation of vapors when using alkali cleaners.

All parts cleaned must be thoroughly dried immediately by using moisture-free compressed air or soft, lintless absorbent wiping rags free of abrasive materials such as metal filings, contaminated oil or lapping compound.

### INSPECTION

The importance of careful and thorough inspection of all parts cannot be overstressed. Replacement of all parts showing indication of wear or stress will eliminate costly and avoidable failures at a later date.

#### Bearings

Carefully inspect all rollers, cages and cups for wear, chipping or nicks to determine fitness of bearings for further use. Do not replace a bearing cone or cup individually without replacing the mating cup or cone at the same time. After inspection, dip bearings in clean light oil and wrap in clean lintless cloth or paper to protect them until installed.

### Oil Seals, Gaskets and Retaining Rings

Replacement of spring load oil seals, "O" rings, metal sealing rings, gaskets and snap rings is more economical when unit is disassembled than premature overhaul to replace these parts at a future time. Further loss of lubricant through a worn seal may result in failure of other more expensive parts of the assembly. Sealing members should be handled carefully, particularly when being installed. Cutting, scratching, or curling under of lip of seal seriously impairs its efficiency. Apply a thin coat of Permatex No. 2 on the outer diameter of the oil seal to assure an oil tight fit into the retainer. When assembling new metal type sealing rings, same should be lubricated with coat of chassis grease to stabilize rings in their grooves for ease of assembly of mating members. Lubricate all "O" rings and seals with recommended type Automatic Transmission Fluid before assembly.

### Gears and Shafts

If magna-flux process is available, use process to check parts. Examine teeth on all gears carefully for wear, pitting, chipping, nicks, cracks or scores. If gear teeth show spots where case hardening is worn through or cracked, replace with new gear. Small nicks may be removed with suitable hone. Inspect shafts and quills to make certain they are not sprung, bent, or splines twisted, and that shafts are true.

### Housing, Covers, etc.

Inspect housings, covers and bearing caps to be certain they are thoroughly cleaned and that mating surfaces, bearing bores, etc., are free from nicks or burrs. Check all parts carefully for evidence of cracks or condition which would cause subsequent oil leaks or failures.

## REASSEMBLY

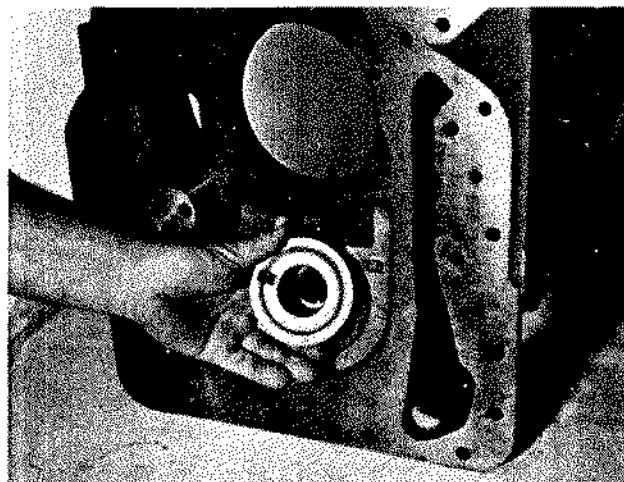


Figure 139

Install reverse clutch piston ring sleeve in housing.



Figure 140

Install new sealing ring expander spring and oil sealing ring on support. Expander spring gap to be  $180^\circ$  from sealing ring hook joint. Press support bearing into position. **NOTE:** Bearing part number must be up.

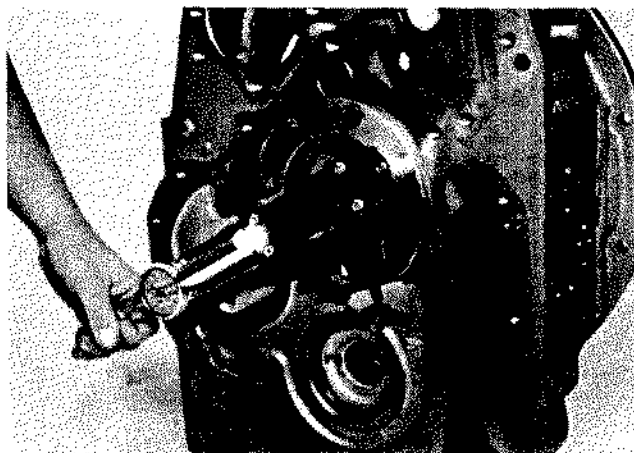


Figure 143

Tighten support bolts 23 to 25 ft. lbs. torque [3,2-3,4 m.kg].

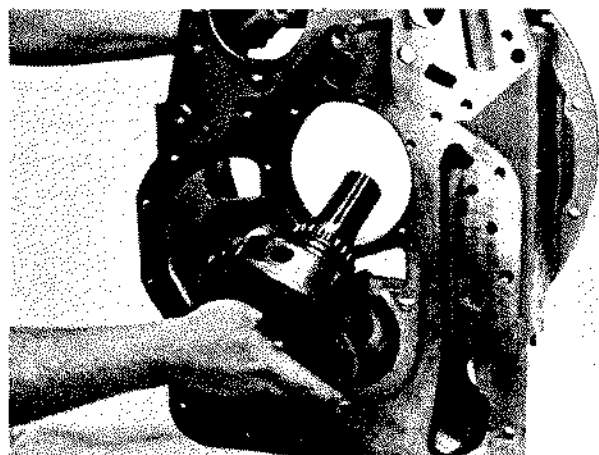


Figure 141

Position support in converter housing aligning holes of support with housing.

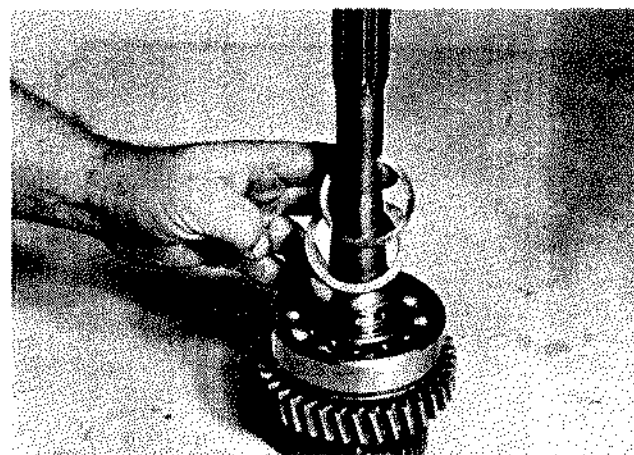


Figure 144

Press turbine shaft bearing into position. Install bearing washer and retainer ring.

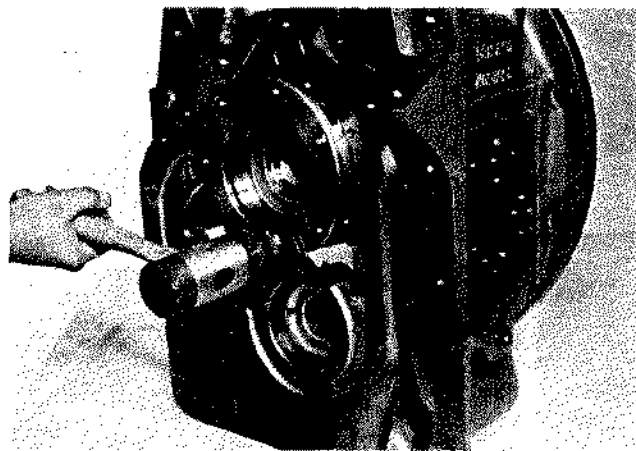


Figure 142

Tap support into position.

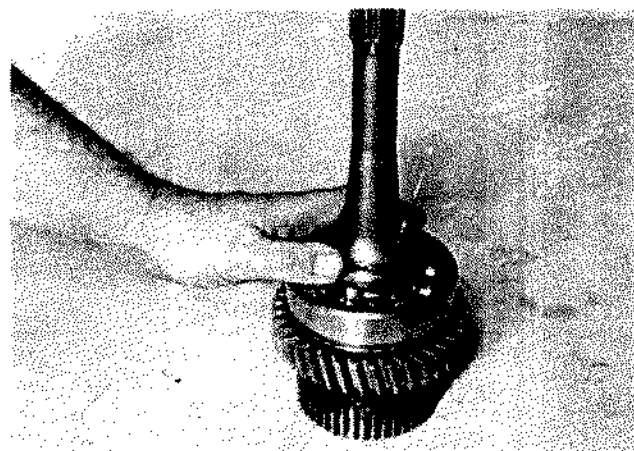
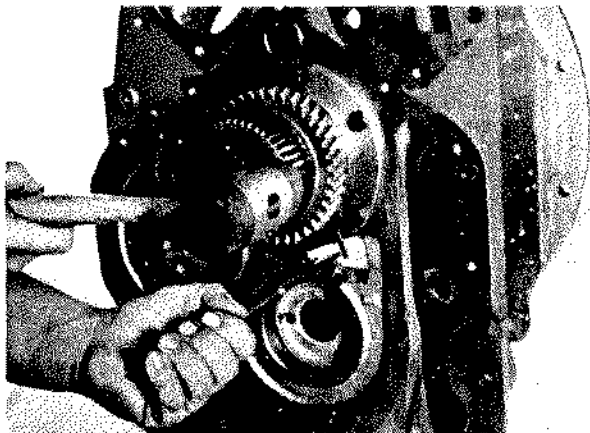


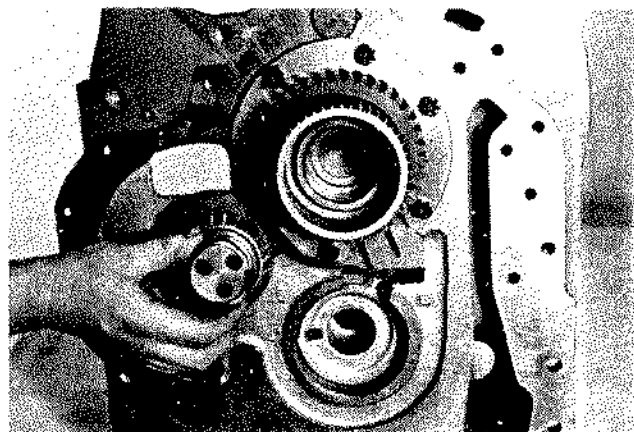
Figure 145

Install new turbine shaft piston ring.



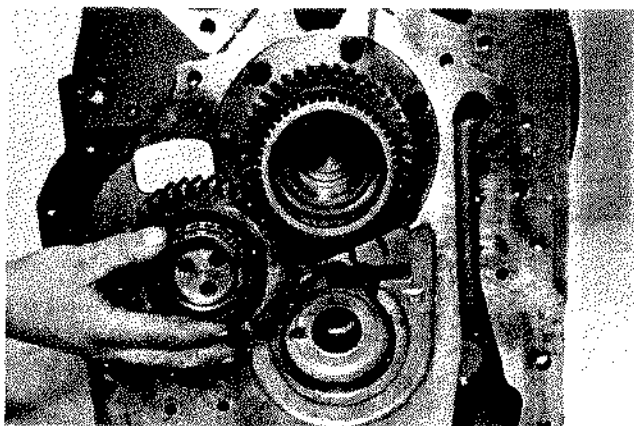
**Figure 146**

Spread ears on turbine shaft bearing retainer ring located in reaction member support. Tap turbine shaft into position.



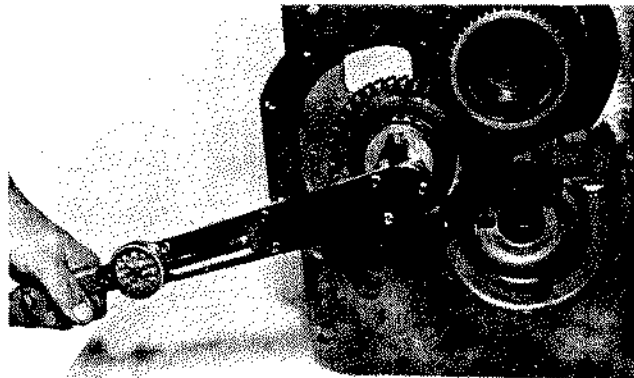
**Figure 147**

Position reverse idler inner bearing and bearing spacer on shaft.



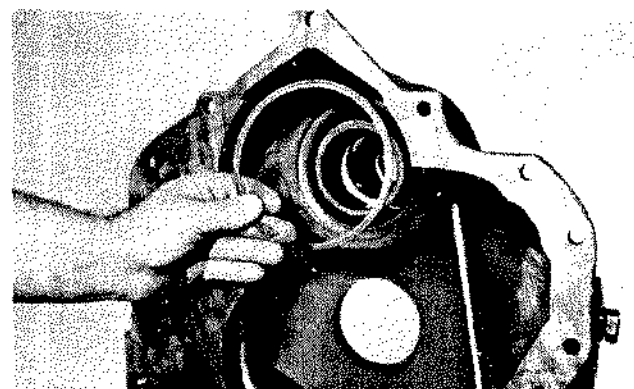
**Figure 148**

Position idler gear on shaft and bearing. **NOTE:** Long hub of gear out. Install outer taper bearing in gear.



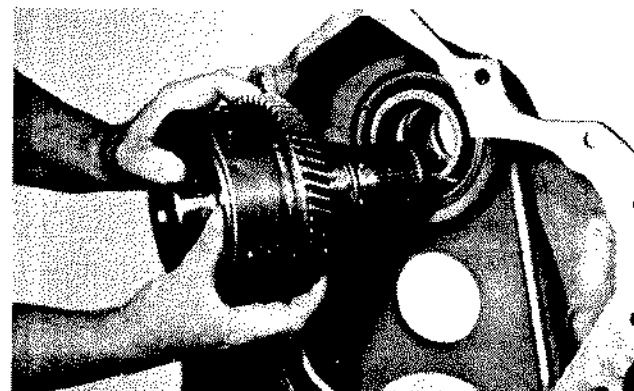
**Figure 149**

Install bearing retainer plate, lock plate and idler gear capscrews. Tighten capscrews 37 to 41 ft. lbs. torque [5,1 - 5,6 m.kg]. Bend lockplate tabs over capscrew heads to prevent loosening.



**Figure 150**

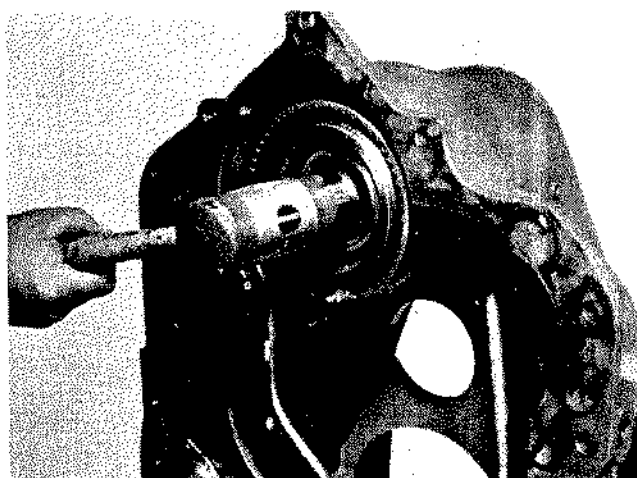
Tap forward clutch shaft rear bearing into bearing bore with bearing snap ring toward front of housing. Align roll pin in forward clutch shaft piston ring sleeve with groove in housing. Tap sleeve into position and secure with sleeve retainer ring.



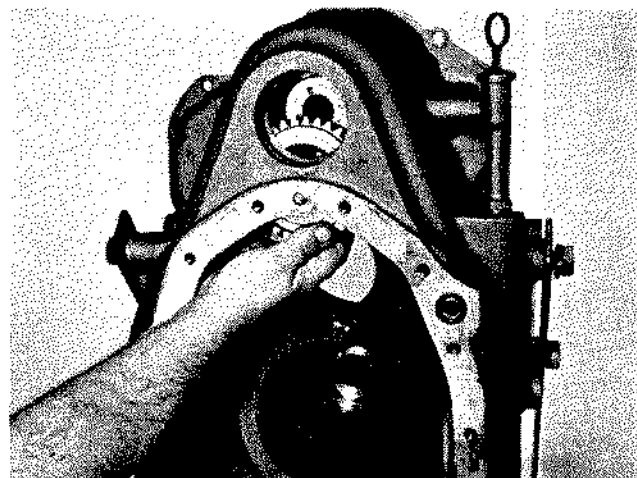
**Figure 151**

Position forward clutch assembly into transmission housing. Use caution as not to damage forward shaft piston rings.

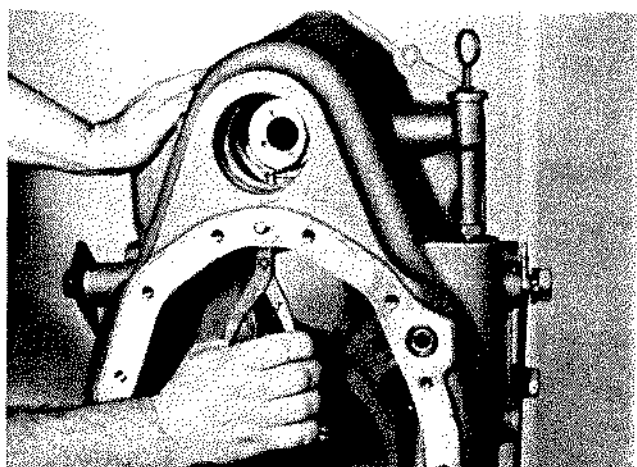




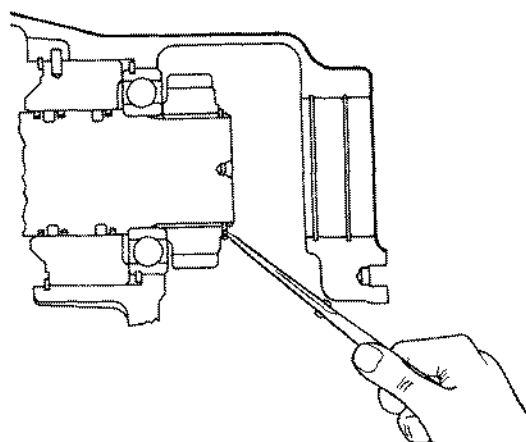
**Figure 152**  
Tap clutch assembly into position.



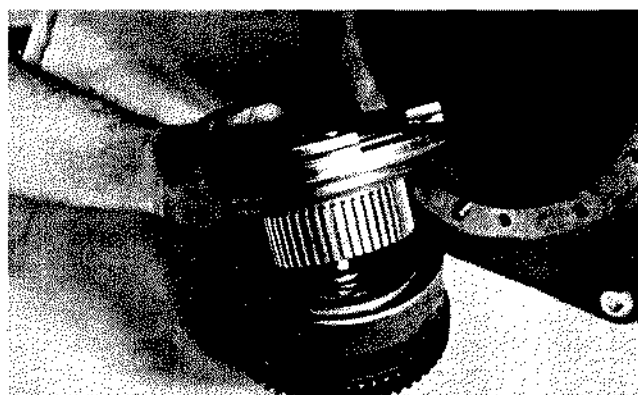
**Figure 153**  
Position forward shaft gear on shaft.



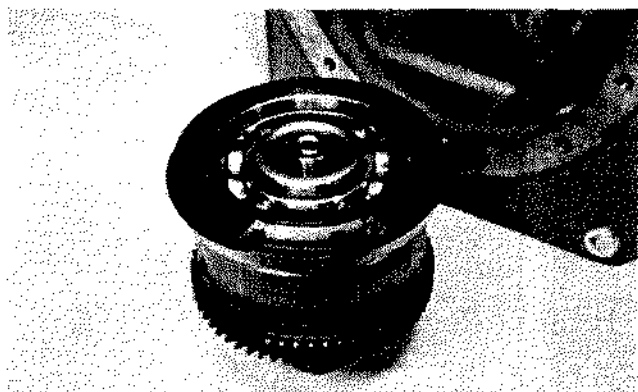
**Figure 154**  
Install gear retainer ring. See Figure 154-A.



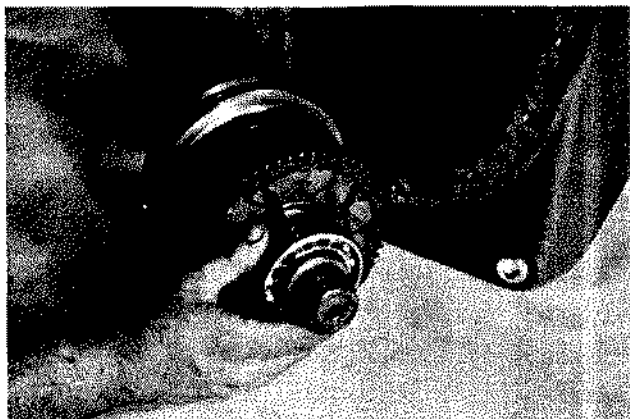
**Figure 154-A**



**Figure 155**  
If 3rd speed clutch rear bearing carrier was disassembled press bearing into carrier against locating ring. Secure bearing with retainer ring. Press 3rd speed clutch disc hub into bearing and secure with retainer ring. Position disc hub and bearing carrier on 3rd speed clutch.

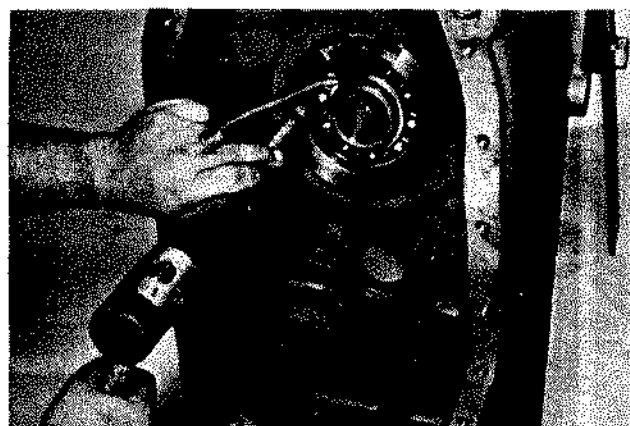


**Figure 156**  
Align splines on disc hub with internal teeth of friction discs in clutch. Do not force this operation. Disc hub splines must be in full position with internal teeth of all friction discs.



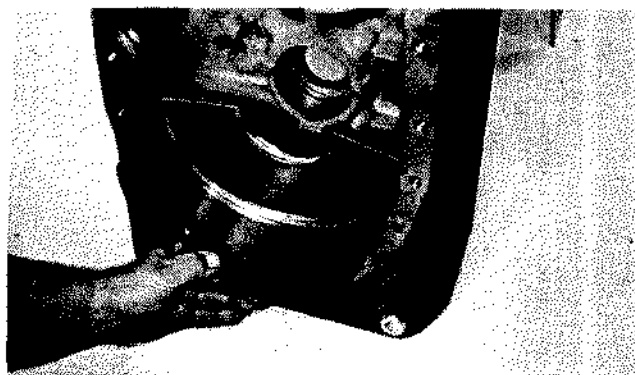
**Figure 157**

Position the 3rd clutch front bearing locating ring on clutch assembly. Ring will be installed in housing ring groove later in the text.



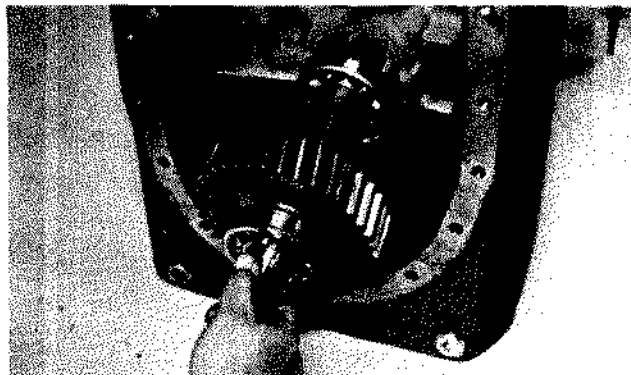
**Figure 158**

Using contracting type snap ring pliers as shown, lock pliers to hold ring contracted. Tap 3rd speed clutch assembly and bearing carrier into housing until snap ring groove in housing is aligned with snap ring. Remove pliers being sure snap ring is in full position in snap ring groove.



**Figure 159**

Position sump oil baffle in housing.



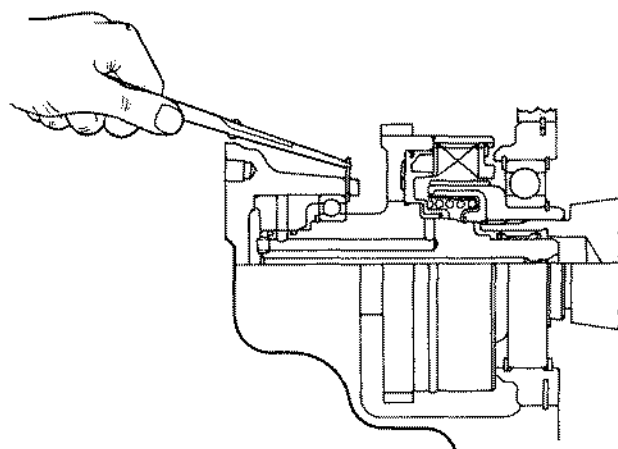
**Figure 160**

Install output shaft and bearing assembly in housing.

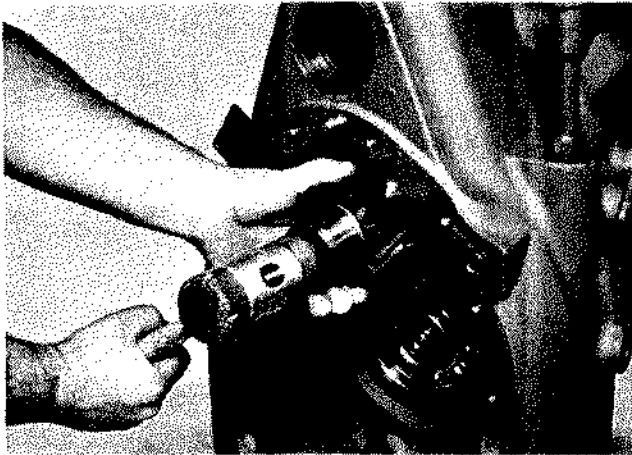


**Figure 161**

From front of housing install 3rd speed clutch front bearing retainer ring. **NOTE:** Be certain ring is in full position in ring groove.

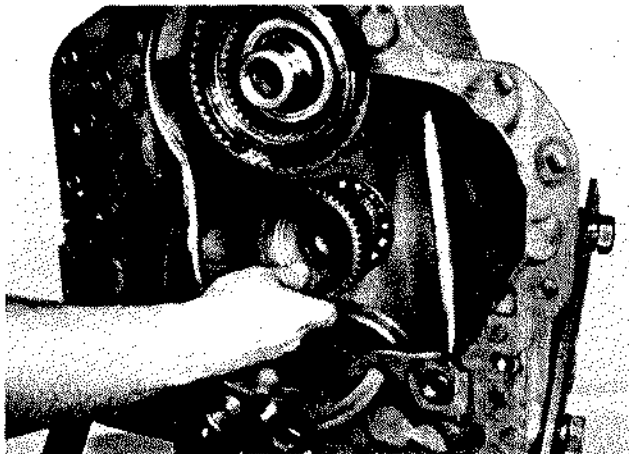


**Figure 161-A**



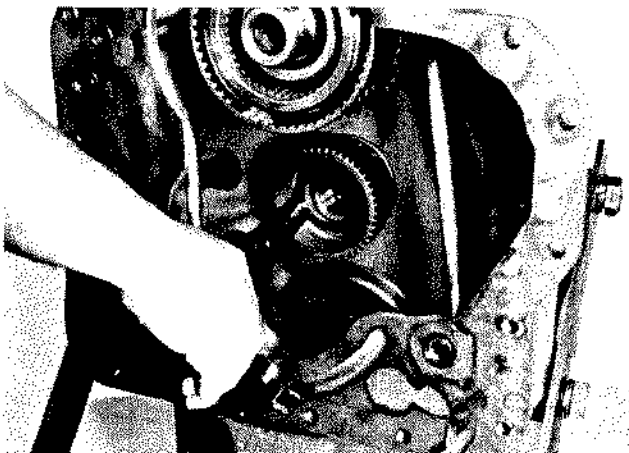
**Figure 162**

From rear of housing position low speed clutch in bearing bore. Tap clutch in place.



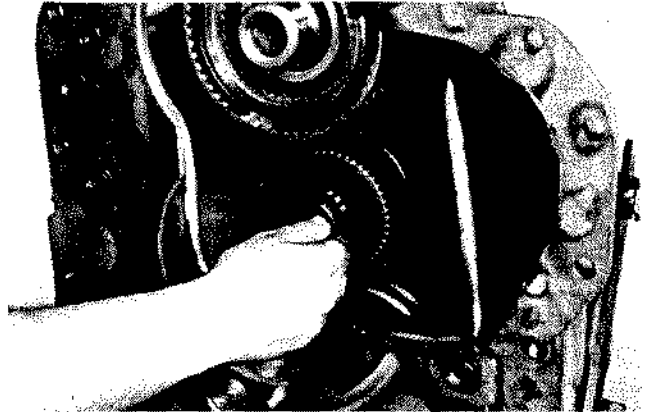
**Figure 163**

From front of housing install 2nd speed clutch disc hub on low clutch shaft.



**Figure 164**

Install disc hub retainer ring.



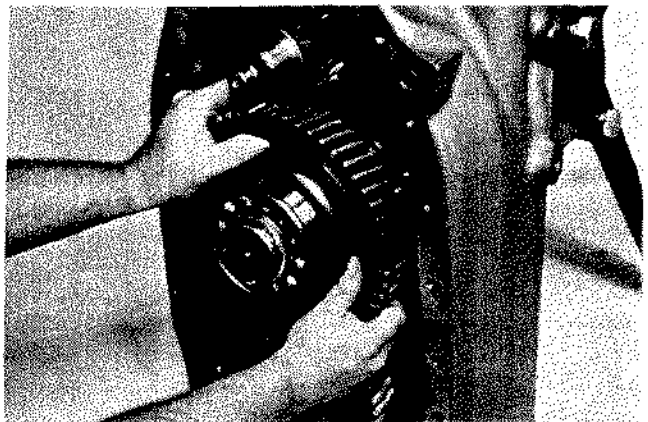
**Figure 165**

Position 2nd speed clutch shaft pilot bearing in low clutch shaft.



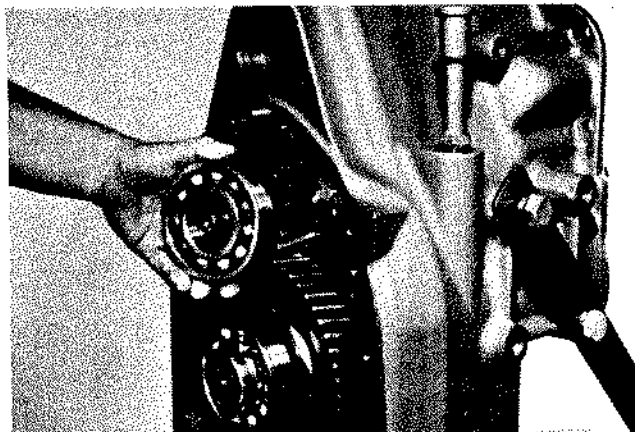
**Figure 166**

Install front output flange, new "O" ring, washer and nut. Tighten 200 to 250 ft. lbs. torque [27,7 - 34,5 m.kg].



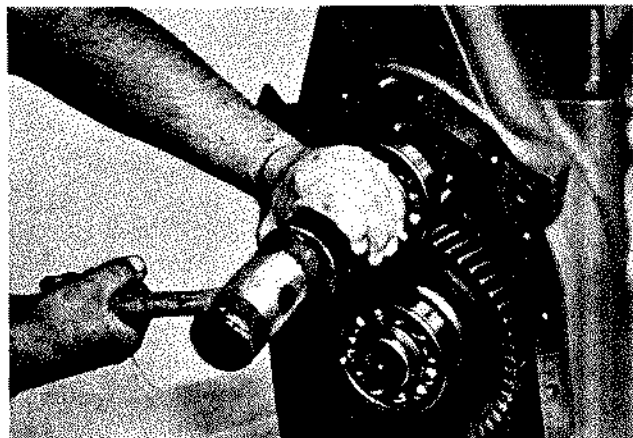
**Figure 167**

Position idler shaft and bearing assembly in end of 3rd speed clutch. **NOTE:** If special low ratio is incorporated, the idler shaft will have two gears on it. (Unit shown is a standard ratio.)



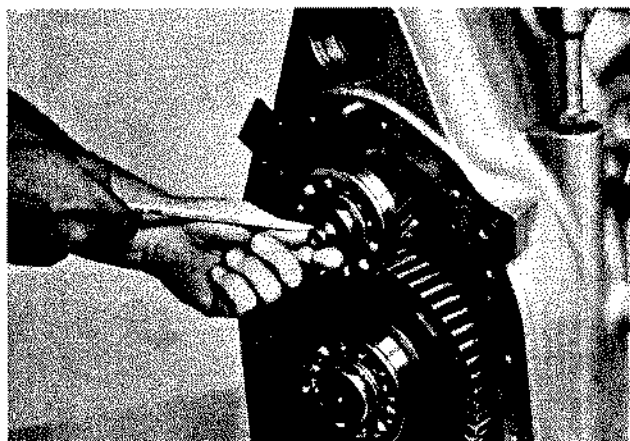
**Figure 168**

Position low clutch rear bearing on shaft, with snap ring groove out.



**Figure 169**

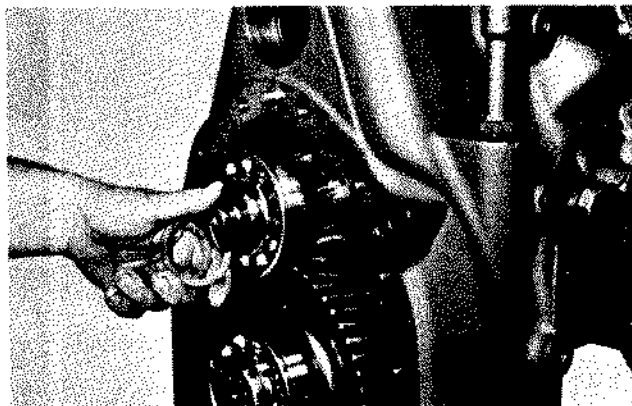
Tap bearing into position.



**Figure 170**

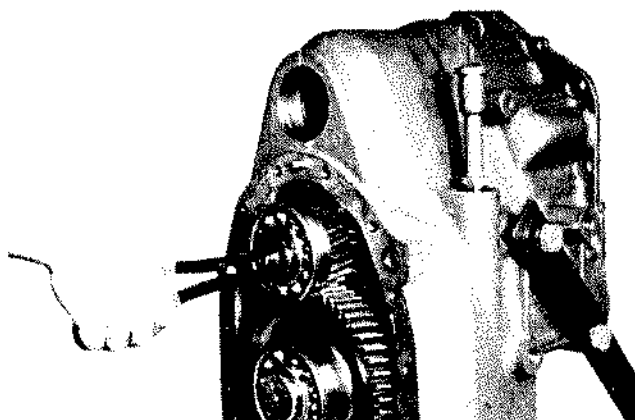
Install new oil sealing ring on low clutch shaft.

**NOTE:** New ring must be sized before installing low shaft bearing cap.



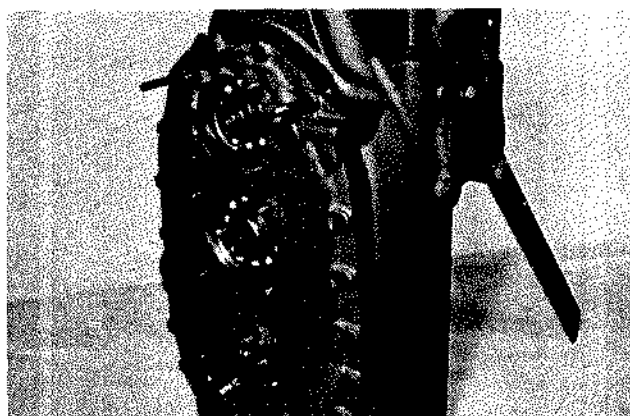
**Figure 171**

Install low shaft rear bearing spacer.



**Figure 172**

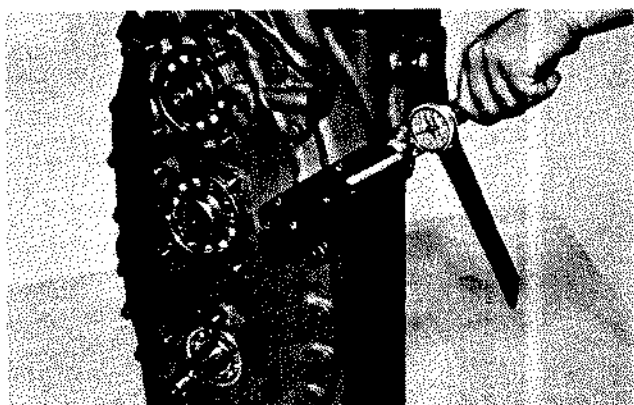
Install bearing retainer ring.



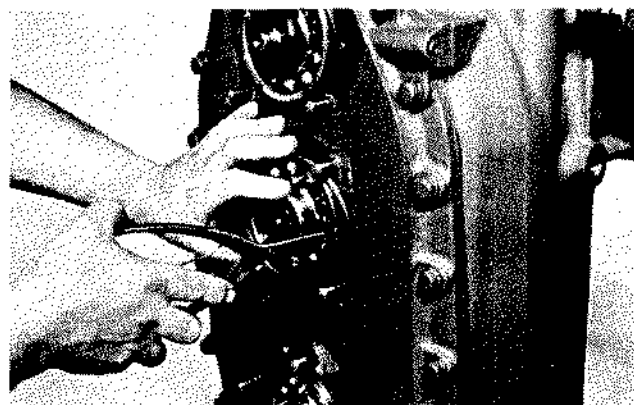
**Figure 173**

Position new gasket and "O" ring on rear of transmission housing. A thin coat of chassis grease will hold the gasket and "O" ring in place.

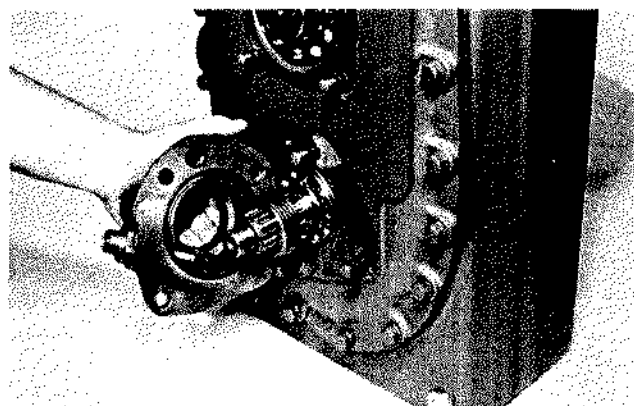
Install rear cover. Note two aligning studs to facilitate cover to housing assembly. Tap cover in place aligning shaft bearings with bearing bores. Remove studs and install cover bolts and lockwashers.

**Figure 174**

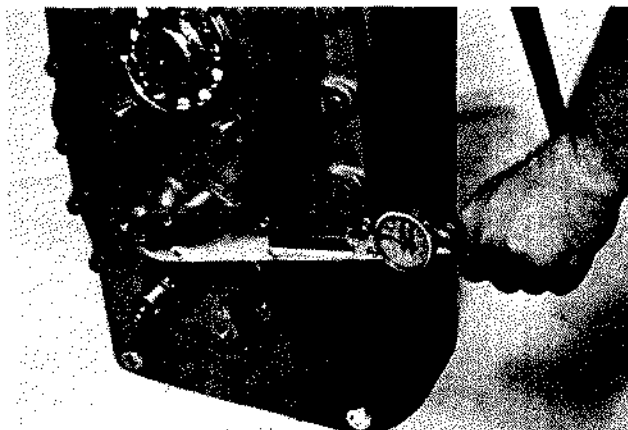
Tighten rear cover bolts 37 to 41 ft. lbs. torque [5,1-5,6 m.kg].

**Figure 175**

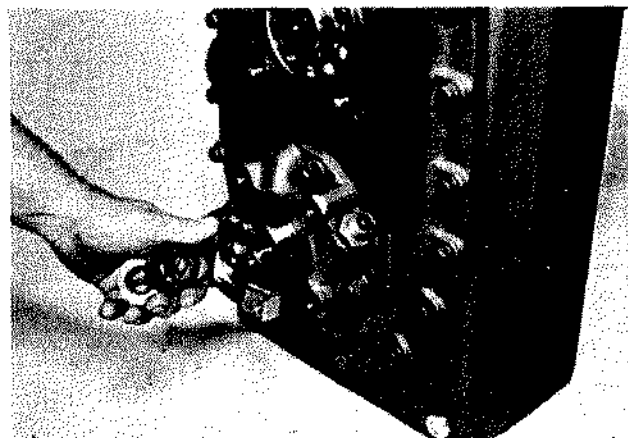
Install low, idler and output shaft rear bearing locating rings.

**Figure 176**

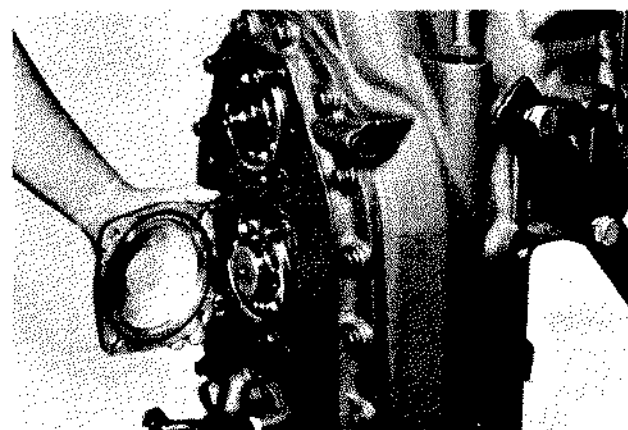
Apply a light coat of Permatex No. 2 to the outer diameter of the output oil seal. Press seal in bearing cap with lip of seal toward bearing side of bearing cap. Position new "O" rings on bearing cap. **NOTE:** Some units will have a gasket only between the cap and cover.

**Figure 177**

Install lockwashers and stud nuts. Tighten 91 to 100 ft. lbs. torque [12,6 - 13,8 m.kg].

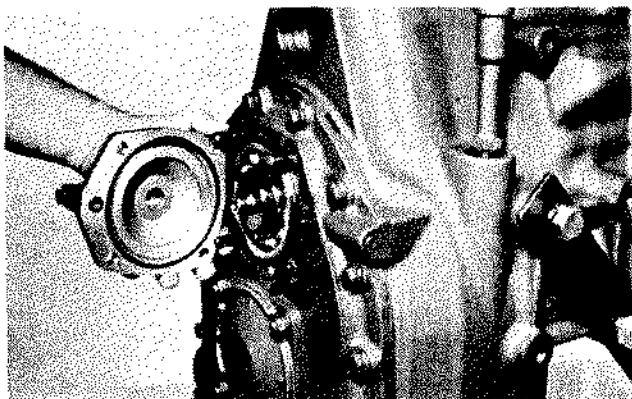
**Figure 178**

Install output flange, "O" ring, washer and flange nut. Block flange to prevent turning. Tighten flange nut 200 to 250 ft. lbs. torque [27,7 - 34,5 m.k.g].

**Figure 179**

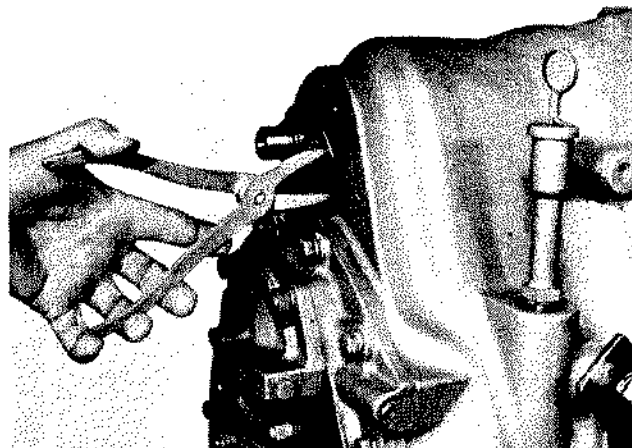
Position new "O" ring on idler shaft bearing cap. Install cap on studs and secure with lockwashers and nuts.





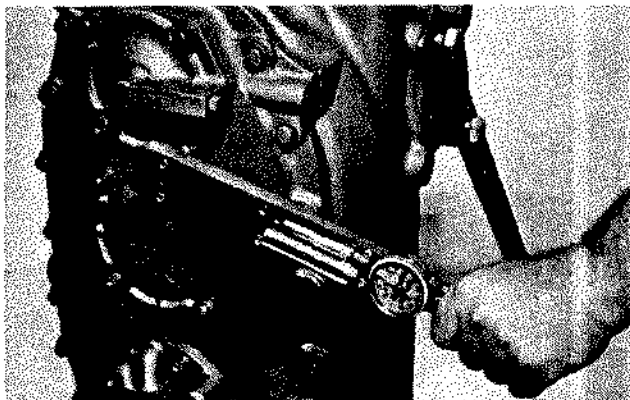
**Figure 180**

Install new bearing cap and low clutch pressure port "O" rings on low shaft bearing cap. Position bearing cap on low shaft. Install washers and stud nuts.



**Figure 183**

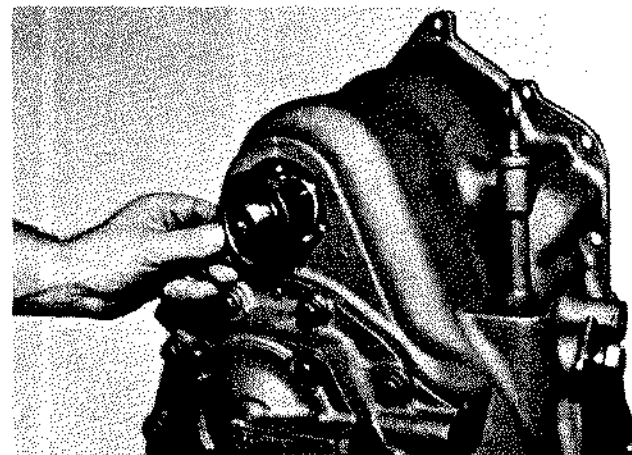
Install P.T.O. bearing retainer ring.



**Figure 181**

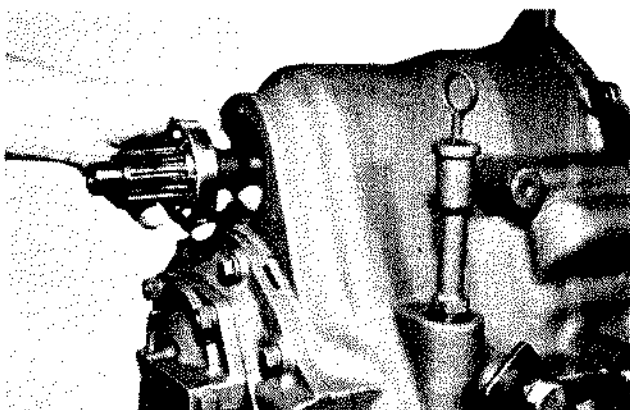
Tighten low shaft and idler shaft stud nuts 41 to 45 ft. lbs. torque [5,7 - 6,2 m.kg].

**NOTE:** P.T.O. is optional. If P.T.O. is not used, coat outer diameter of bore plug with Parmatex No. 2. Tap bore plug in housing and proceed with Figure 186.



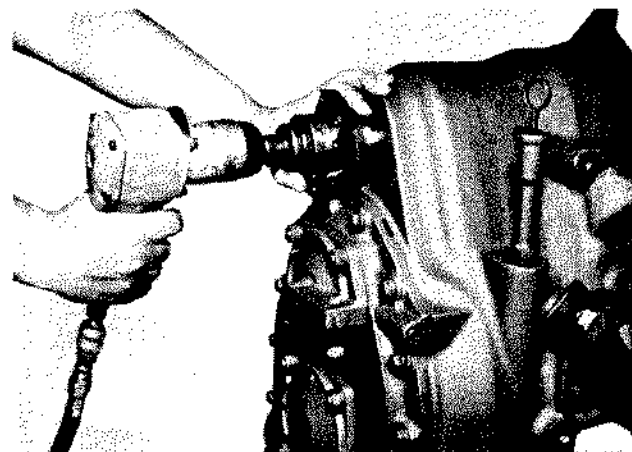
**Figure 184**

Coat outer diameter of P.T.O. seal with Permatex No.2. Install seal in housing with lip of seal toward the inside.



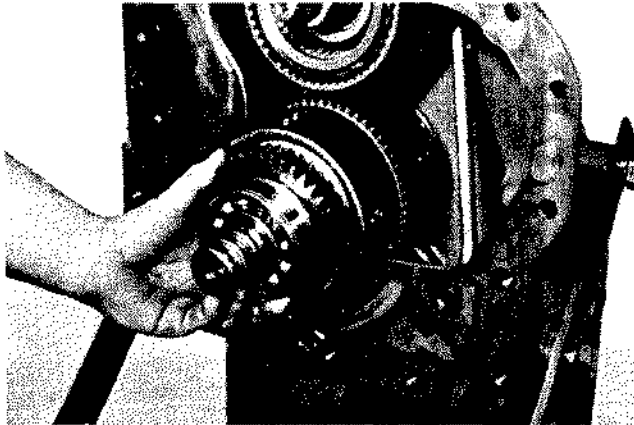
**Figure 182**

Position P.T.O. shaft and bearing in housing. Tap in place.

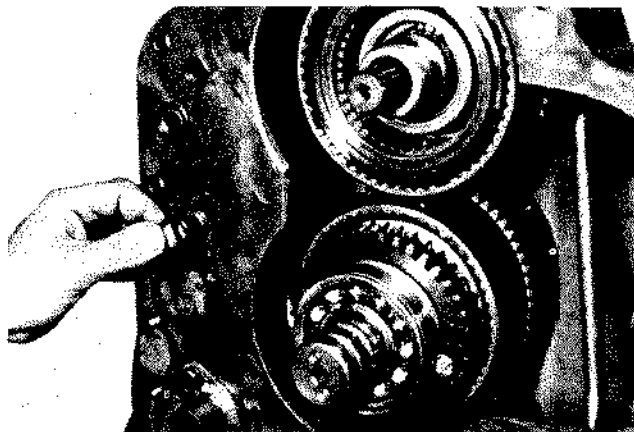


**Figure 185**

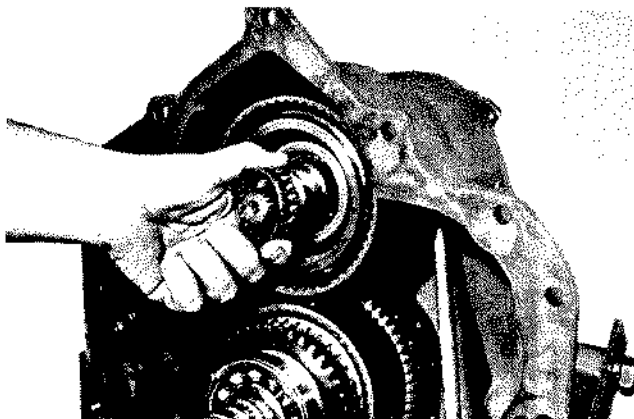
Install P.T.O. flange, new "O" ring, washer and nut. Tighten 200 to 250 ft. lbs. torque [27,7 - 34,5 m.kg].

**Figure 186**

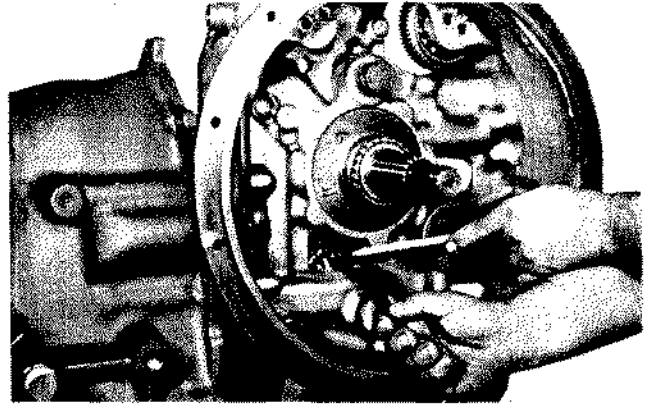
Position reverse and 2nd speed clutch on disc hub aligning splines of disc hub with internal teeth of 2nd speed clutch friction discs. Disc hub must be in full position with friction discs. Do not force this operation.

**Figure 187**

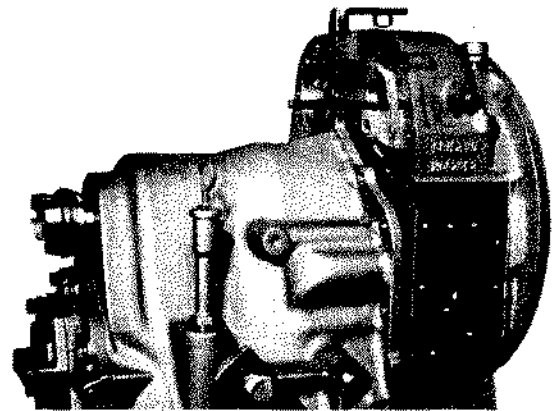
Install new "O" rings on front of transmission housing. A thin coat of chassis grease will hold "O" rings in place.

**Figure 188**

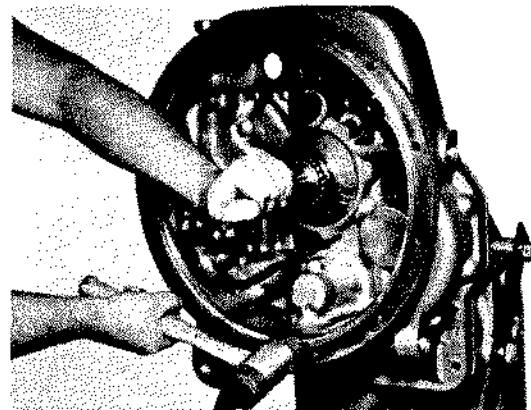
Install forward clutch pilot bearing.

**Figure 189**

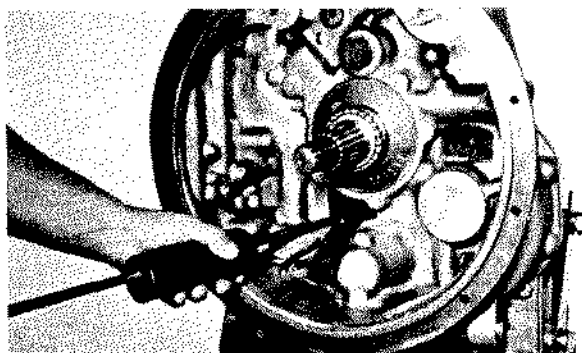
Position new gasket on front of transmission housing. A thin coat of chassis grease will hold gasket in place. Spread ears on the reverse clutch front bearing. Lock pliers open to hold snap ring open.

**Figure 190**

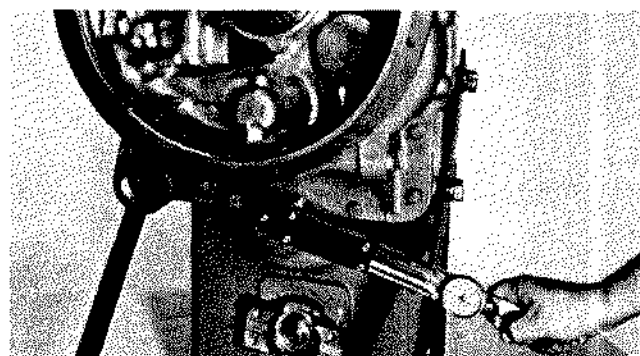
Position converter housing assembly on transmission case. Use caution as not to disturb housing "O" rings or gasket.

**Figure 191**

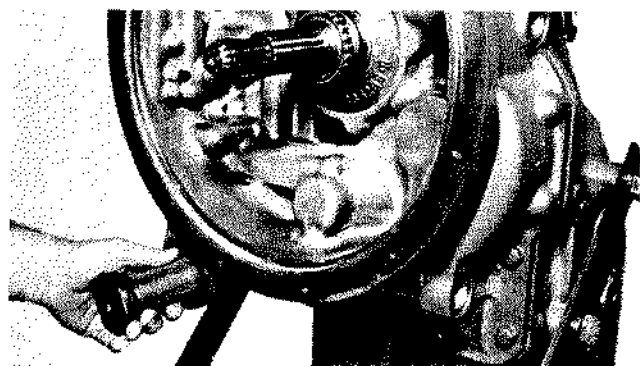
Tap converter housing in place. Use caution as not to damage reverse clutch front piston ring. Note aligning stud.

**Figure 192**

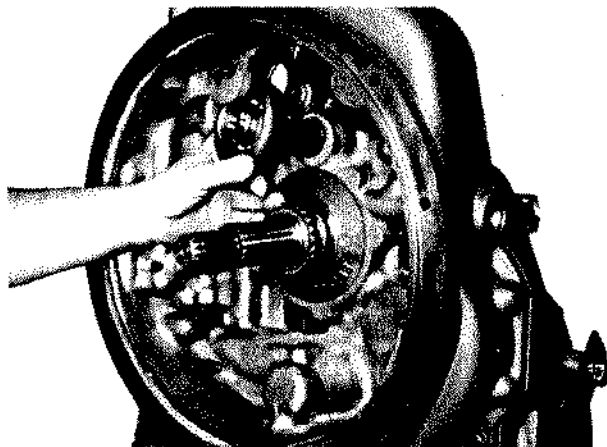
Install a cap screw in the front and one in the rear of the converter housing and snug up but do not tighten. This will hold the converter housing to the transmission housing. Using a hook type hammer puller as shown, pull the reverse clutch gear toward the front of the converter housing. This will move the reverse and 2nd clutch assembly forward to align the snap ring groove in the bearing with the snap ring in the housing. Being certain bearing snap ring is in full position in snap ring groove, remove pliers.

**Figure 193**

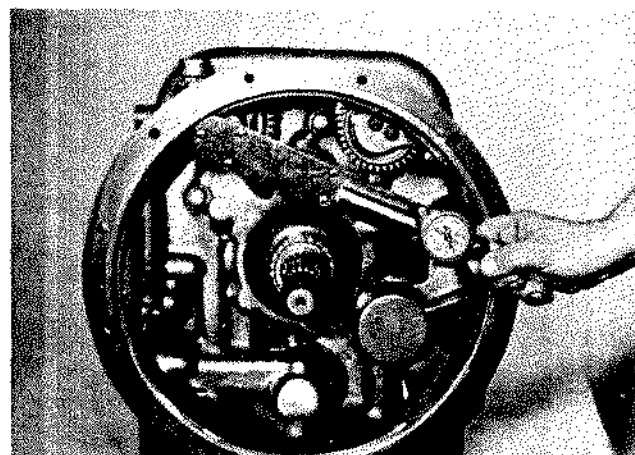
Remove converter housing aligning stud. Install converter housing and transmission housing cap screws. Tighten 37 to 41 ft. lbs. torque [5,1 - 5,6 m.kg].

**Figure 194**

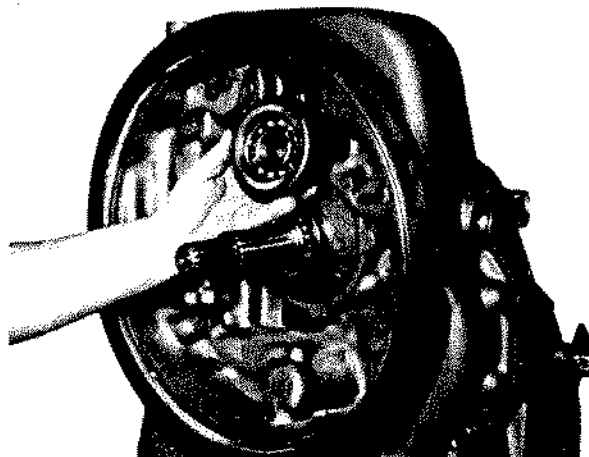
Position new gasket on sump screen, install screen assembly and tighten 10 to 15 ft. lbs. torque [1,4-2,0 m.kg].

**Figure 195**

Install auxiliary and charging pump drive gear. Snug cap screws to hold gears in place.

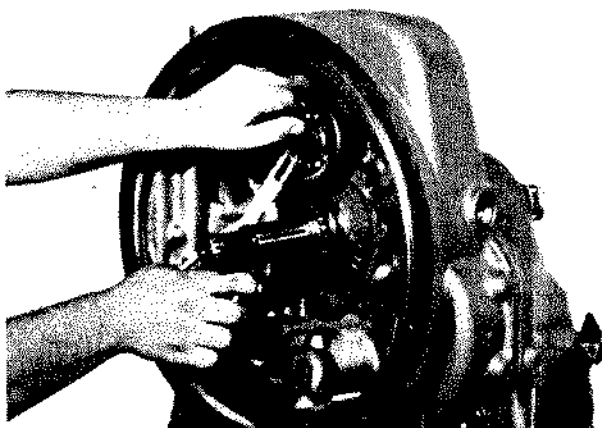
**Figure 196**

Tighten pump drive gear cap screws 23 to 25 ft. lbs. torque [3,2 - 3,4 m.kg].

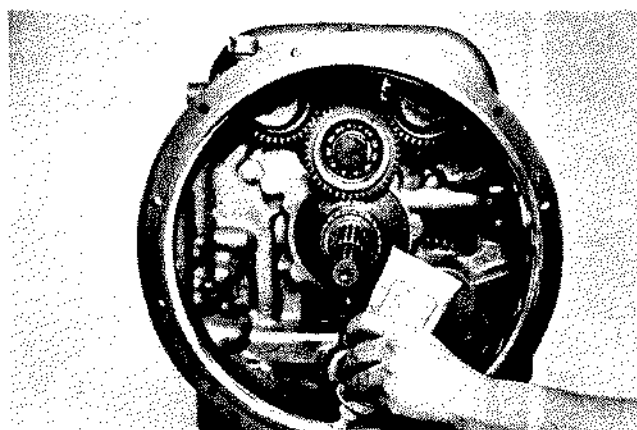
**Figure 197**

Position pump idler gear and bearing on stub shaft.

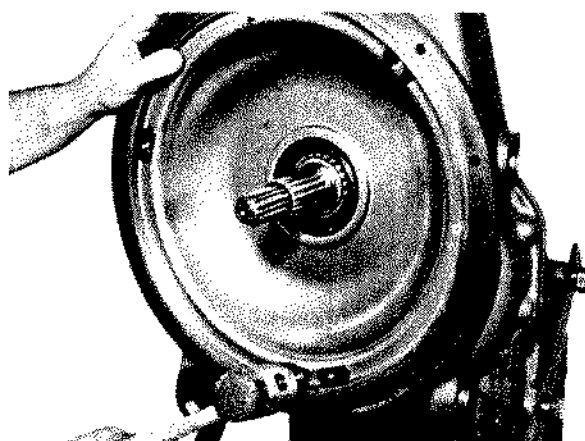




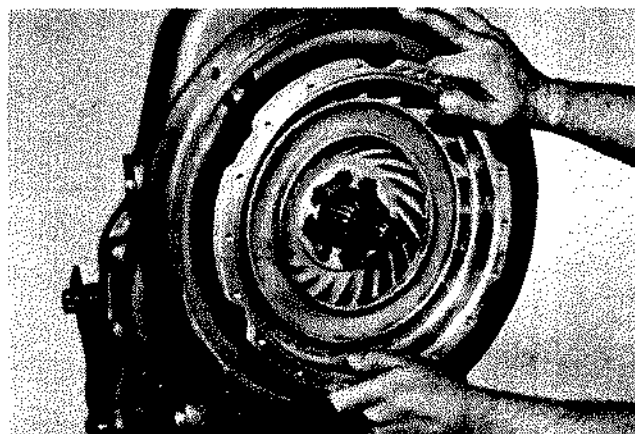
**Figure 198**  
Install idler gear bearing locating ring.



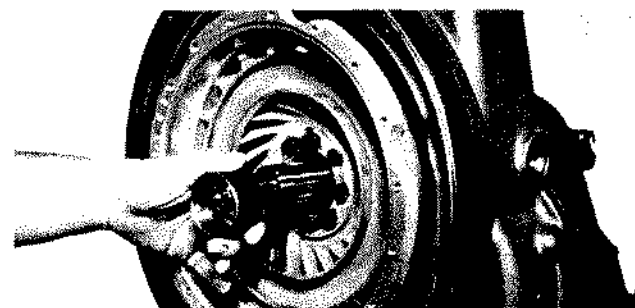
**Figure 199**  
Apply a light coat of #92 Loctite to O.D. of oil baffle or counter bore in converter housing. Remove immediately any excess sealant that could enter the oil circuit.



**Figure 200**  
Assemble new oil baffle oil seal in baffle. Position oil baffle puller screw holes  $15^{\circ}$  to  $30^{\circ}$  either side of vertical center line. Tap baffle into position until baffle shoulders in converter housing.



**Figure 201**  
Install impeller and hub assembly using caution as not to damage the oil baffle oil seal. **NOTE:** Use extreme caution as not to cut, break or unhook the oil sealing ring on the support.



**Figure 202**  
Position reaction member to impeller hub gear spacer on reaction member support. **NOTE:** If a fixed reaction member is used, install reaction member and retaining ring. Proceed to Figure 214.

## FREEWHEEL REASSEMBLY



**Figure 203**  
Outer race showing lead in chamfer. This chamfer must be up when installing sprag assembly.

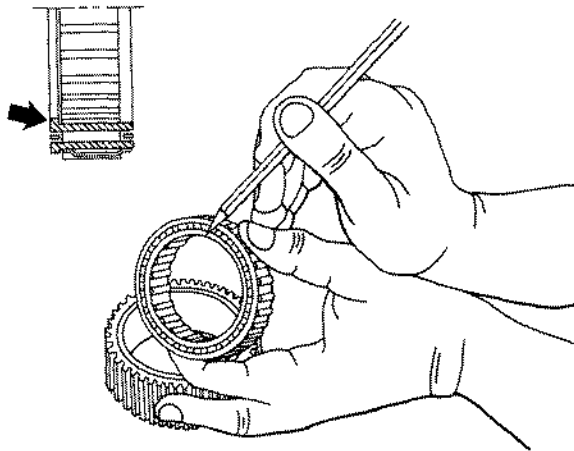


Figure 204

Install sprag assembly into chamfered side of outer race with sprag cage flange down.

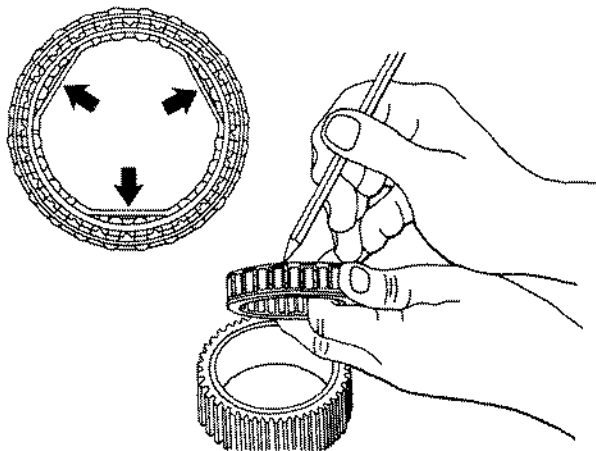


Figure 205

Note brass cross bar clips are up when sprag cage flange is down. Note drag strips (shown by arrows) are also up when installing sprag assembly in outer race.



Figure 206

Slide sprag assembly into outer race. Use care when positioning sprag assembly in outer race. **DO NOT FORCE THIS OPERATION.**



Figure 207

Tap rear bearing into outer race. **NOTE: Bearing part number must be in.**



Figure 208

Tap front bearing into outer race. **NOTE: Bearing part number must be in.**

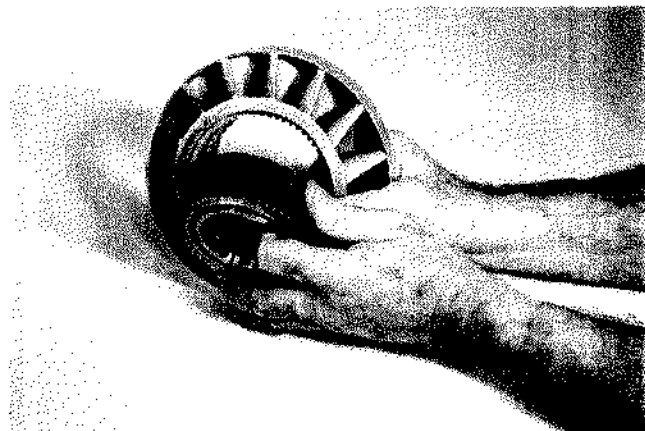


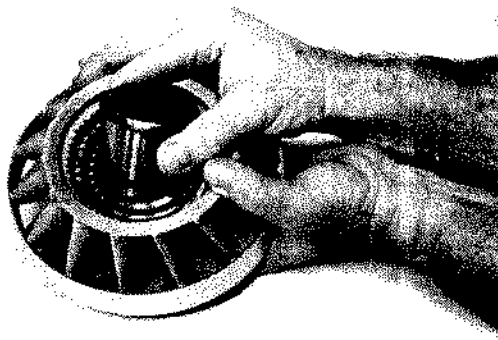
Figure 209

Install outer race and sprag assembly in reaction member. **NOTE: Undercut shoulder of race must go toward the rear of the reaction member.**



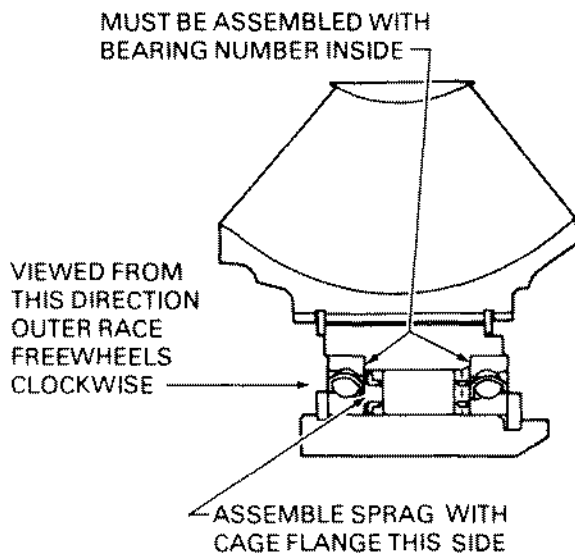
**Figure 210**

Install outer race to reaction member retaining ring.



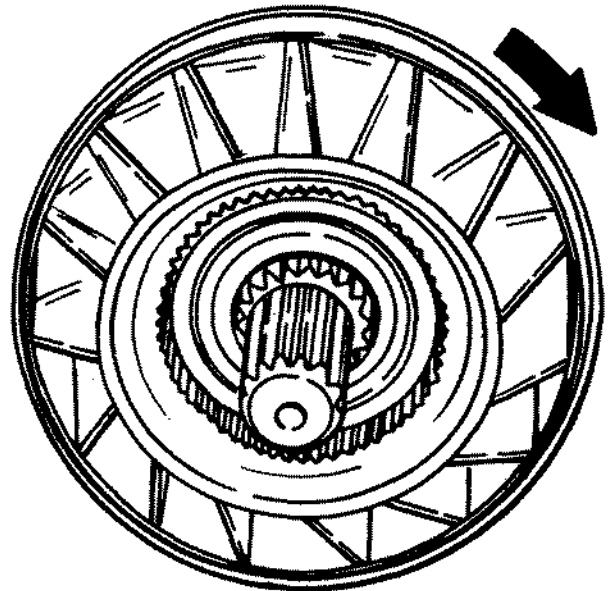
**Figure 211**

From the front of the reaction member install the free-wheel inner race. Install inner race rear retainer ring.



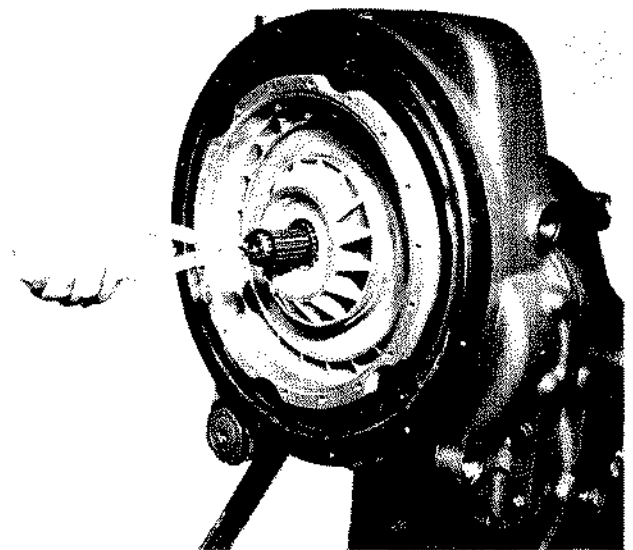
**Figure 212**

**MUST FREEWHEEL IN  
CLOCKWISE ENGINE ROTATION**



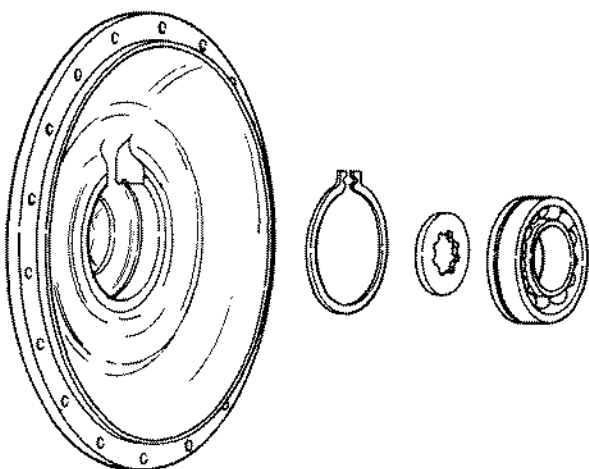
**Figure 213**

Install reaction member on support. Check rotation of freewheeling reaction member to be sure of proper freewheel assembly. Install reaction member retaining ring.

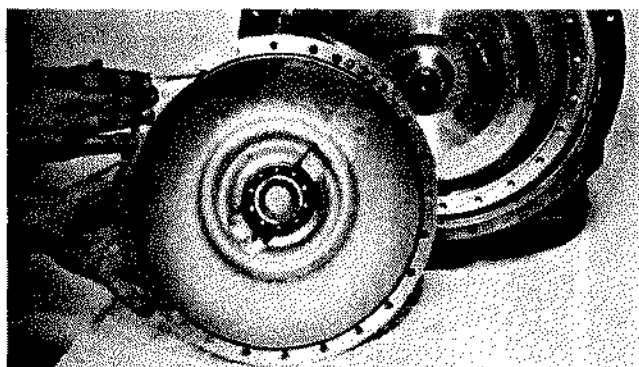


**Figure 214**

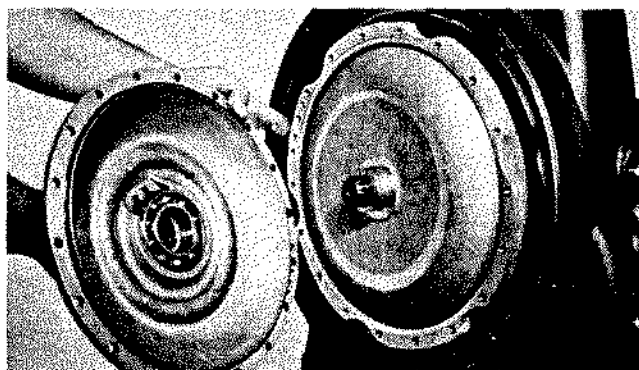
Position inner turbine locating ring on turbine shaft. Install turbine on shaft.

**Figure 215**

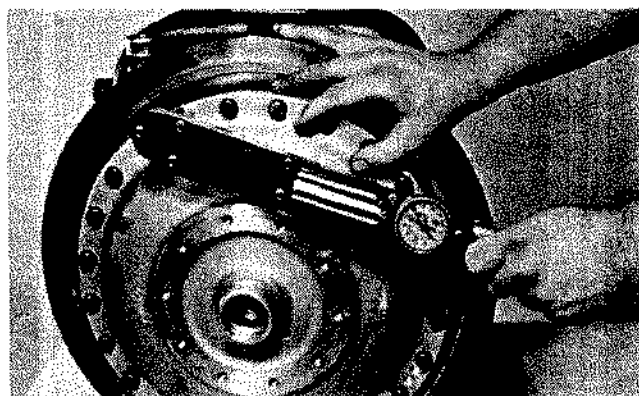
If the impeller cover bearing retaining washer or bearing was replaced, use the following procedure for reassembly. Heat cover 200° to 250° F [93°-121° C]. Position snap ring in groove. Place bearing retainer washer in cover. While cover is hot press bearing into position spreading ears on snap ring at the same time. Align snap ring groove in bearing with snap ring. Release snap ring. Check ring to be certain it is in full position in groove.

**Figure 216**

Position new "O" ring on impeller cover.

**Figure 217**

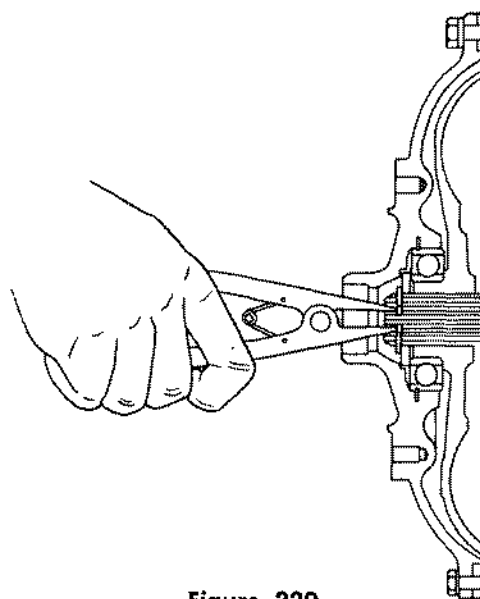
Install impeller cover assembly on impeller. Use caution as not to damage "O" ring. Bearing retainer plate must be aligned with the turbine shaft.

**Figure 218**

Install impeller cover to impeller capscrews and washers. Tighten 11" impeller cover capscrews 12 to 16 ft. lbs. torque [1,6 - 2,2 m.kg]. Tighten 12" impeller cover capscrews 23 to 25 ft. lbs. torque [3,2 - 3,4 m.kg].

**Figure 219**

Install turbine retainer ring. See Figure 220.

**Figure 220**

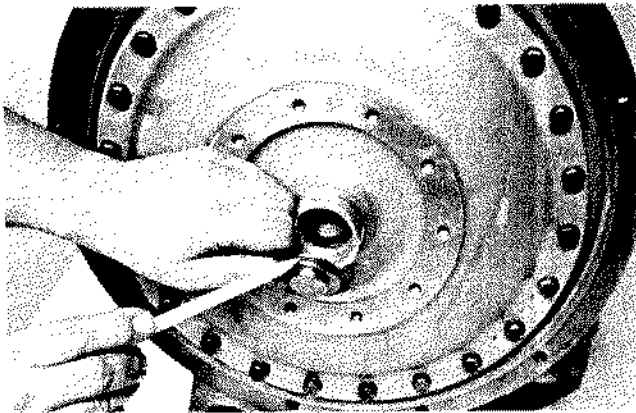


Figure 221

Position new "O" ring on impeller cover bore plug, lubricate ring to facilitate reassembly. Install plug in cover.

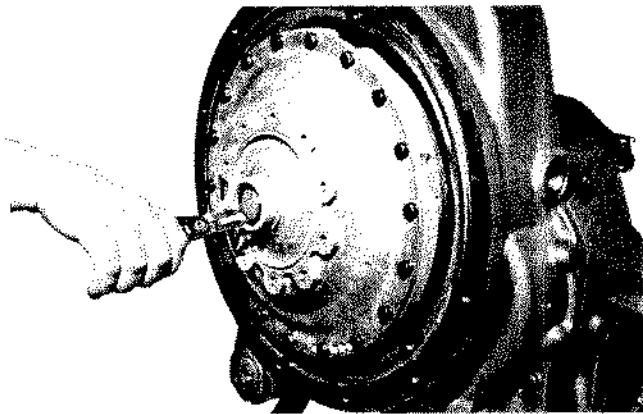


Figure 222

Install bore plug retainer ring.

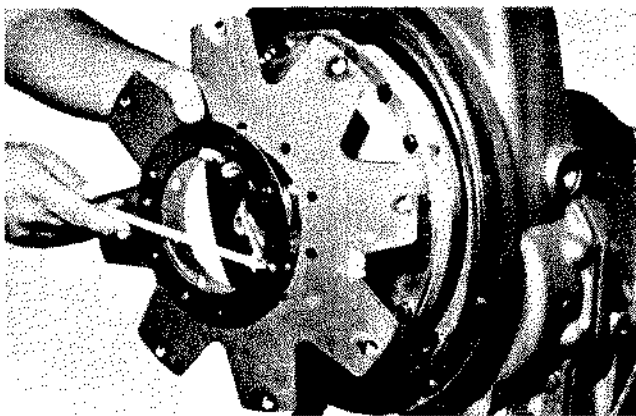


Figure 223

Position drive plate and weld nut assembly on impeller cover with weld nuts toward cover. Align intermediate drive plate and backing ring with holes in impeller cover. **NOTE:** Two dimples 180° apart in backing ring must be out (toward engine flywheel). Install capscrews and washers.

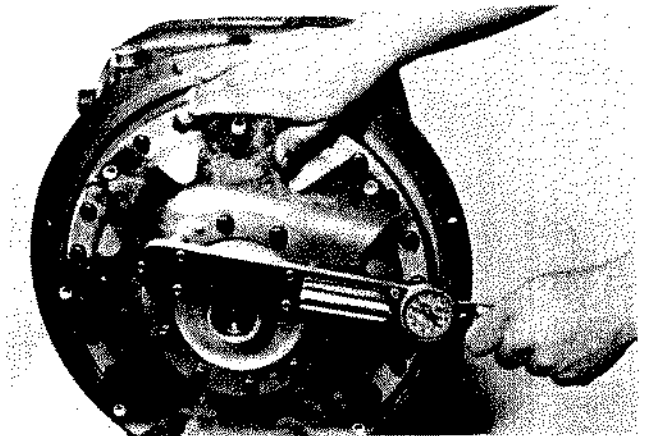


Figure 224

Tighten drive plate capscrews 23 to 25 ft. lbs. torque [3,2 - 3,4 m.kg].

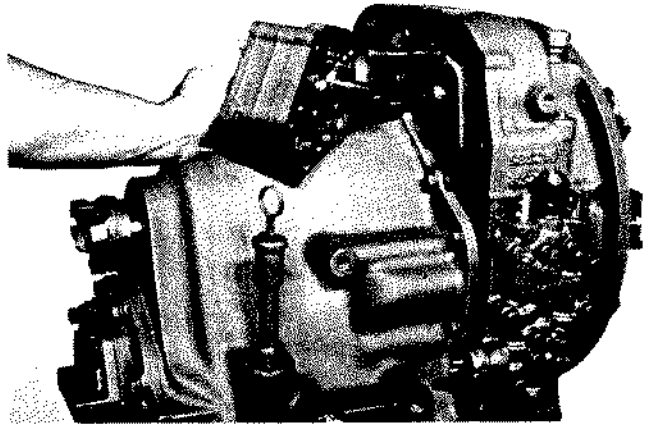


Figure 225

Using a new gasket and "O" ring, position charging pump assembly on studs. Install washers, nuts and capscrews.

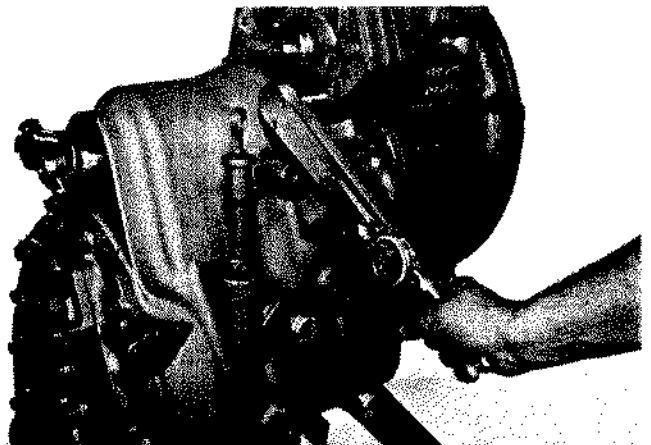


Figure 226

Tighten capscrews 37 to 41 ft. lbs. torque [5,1 - 5,6 m.kg]. Tighten stud nuts 41-45 ft. lbs. torque [5,7 - 6,2 m.kg].

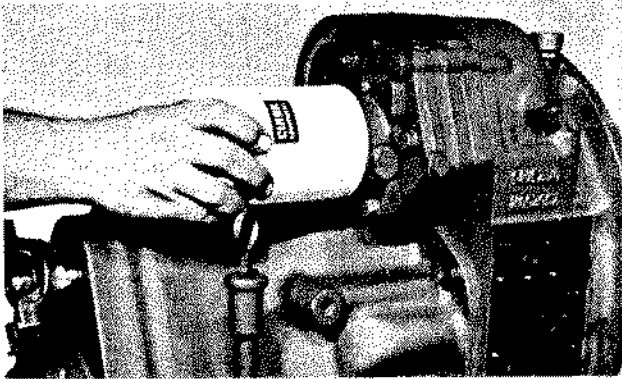


Figure 227

Install new oil filter. Tighten 20 to 25 ft. lbs. torque [2,8 - 3,4 m.kg].

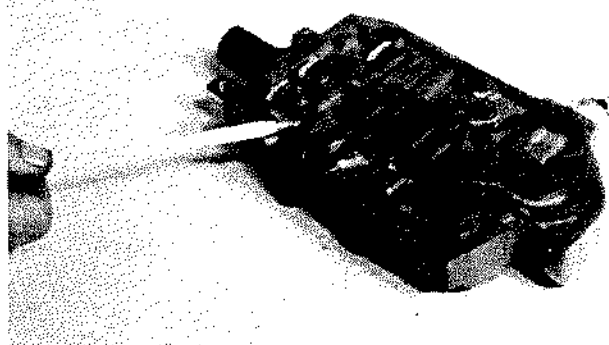


Figure 228

If the control cover valve spools are to be inspected or the spool oil seals changed, remove the valve spool tops as shown and pull spools out of oil seals. Always replace oil seals if valve spools are removed for inspection. Sharp edges on valve spool will cut lip of oil seal. When replacing oil seal, pick old seal out of housing using caution as not to damage oil seal bore. Install new seal in control valve. **NOTE:** When installing speed and direction selector spools through oil seal use extreme caution as not to cut lip of oil seal.

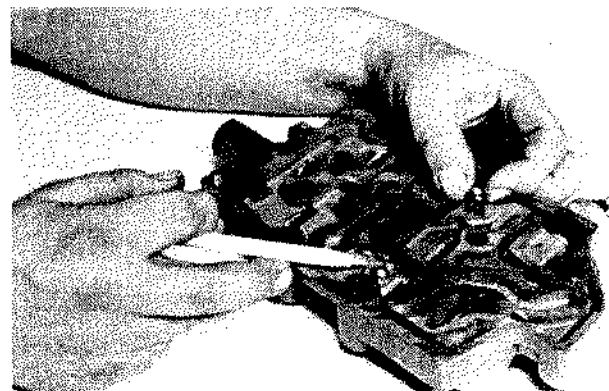


Figure 229

Position detent balls in housing.

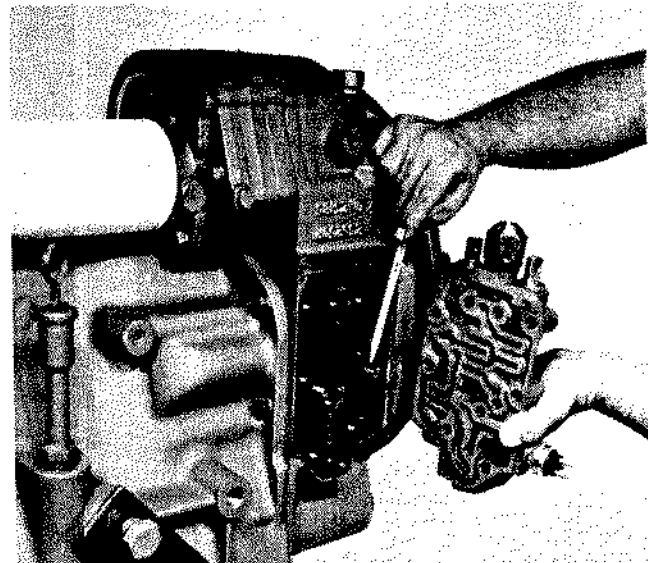


Figure 230

Position new gasket and detent springs on converter housing. Install control valve and valve to housing capscrews and washers.

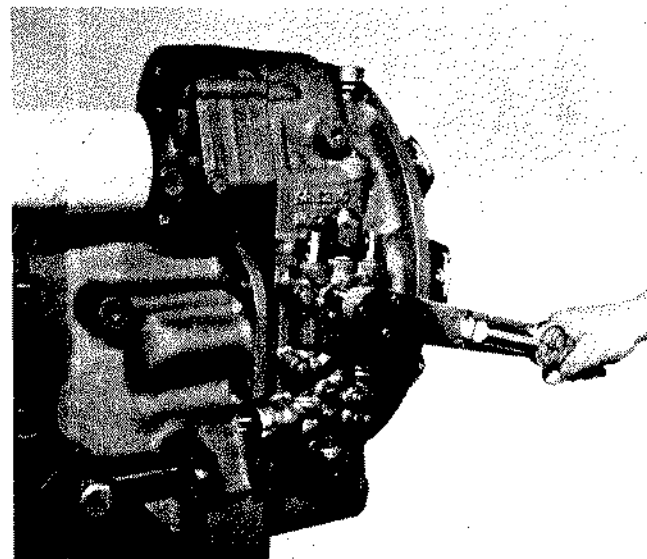


Figure 231

Tighten capscrews 23 to 25 ft. lbs. torque [3,2 - 3,4 m.kg].



## SERVICING MACHINE AFTER TRANSMISSION OVERHAUL

The transmission, torque converter, and its allied hydraulic system are important links in the drive line between the engine and the wheels. The proper operation of either unit depends greatly on the condition and operation of the other; therefore, whenever repair or overhaul of one unit is performed, the balance of the system must be considered before the job can be considered completed.

After the overhauled or repaired transmission has been installed in the machine, the oil cooler, and connecting hydraulic system must be thoroughly cleaned. This can be accomplished in several manners and a degree of judgment must be exercised as to the method employed.

The following are considered the minimum steps to be taken:

1. Drain engine system thoroughly.
2. Disconnect and clean all hydraulic lines. Where feasible, hydraulic lines should be removed from machine for cleaning.
3. Replace oil filter elements, cleaning out filter cases thoroughly.
4. The oil cooler must be thoroughly cleaned. The cooler should be "back flushed" with oil and compressed air until all foreign material has been removed. Flushing in direction of normal oil flow will not adequately clean the cooler. If necessary, cooler assembly should be removed from

machine for cleaning, using oil, compressed air and steam cleaner for that purpose. **DO NOT** use flushing compounds for cleaning purposes.

5. On remote mounted torque converters remove drain plug from torque converter and inspect interior of converter housing, gears, etc. If presence of considerable foreign material is noted, it will be necessary that converter be removed, disassembled and cleaned thoroughly. It is realized this entails extra labor; however, such labor is a minor cost compared to cost of difficulties which can result from presence of such foreign material in the system.
6. Reassemble all components and use only type oil recommended in lubrication section. Fill transmission through filler opening until fluid comes up to **LOW** mark on transmission dipstick.

Run engine two minutes at 500-600 RPM to prime torque converter and hydraulic lines. Recheck level of fluid in transmission with engine running at idle (500-600 RPM).

Add quantity necessary to bring fluid level to **LOW** mark on dipstick. Recheck with hot oil (180-200° F.) [82, 2-93, 3° C].

Bring oil level to **FULL** mark on dipstick.

7. Recheck all drain plugs, lines, connections, etc., for leaks and tighten where necessary.

## TOWING OR PUSH STARTING

Before towing the vehicle, be sure to lift the rear wheels off the ground or disconnect the driveline to avoid damage to the transmission during towing.

**NOTE:** If the transmission has 4 wheel drive, disconnect both front and rear drivelines. Because of the design of the hydraulic system, the engine **cannot** be started by pushing or towing.

## SPECIFICATIONS AND SERVICE DATA—POWER SHIFT TRANSMISSION AND TORQUE CONVERTER

CONVERTER OUT PRESSURE	Converter outlet oil temp. 180°-200° F. [82,3°-93,3° C]. Transmission in <b>NEUTRAL</b> . Operating specifications: 25 P.S.I. [1,76 Kg/cm <sup>2</sup> ] minimum pressure at 2000 R.P.M. engine speed AND a maximum of 70 P.S.I. [4,92 Kg/cm <sup>2</sup> ] outlet pressure with engine operating at no-load governed speed.
CONTROLS	Forward and Reverse — Manual Speed Selection — Manual
CLUTCH TYPE	Multiple discs, hydraulically actuated, spring released, automatic wear compensation and no adjustment. All clutches oil cooled and lubricated.
CLUTCH INNER DISC	Friction.
CLUTCH OUTER DISC	Steel

### OIL FILTRATION

Full flow oil filter safety by-pass, also strainer screen in sump at bottom of transmission case.

### CLUTCH PRESSURE

180-220 p.s.i. [12,7-15,4 kg/cm<sup>2</sup>] — With parking brake set (see note), oil temperature 180 - 200° F. [82,2-93,3° C], engine at idle (400 to 600 RPM), shift thru direction and speed clutches. All clutch pressure must be equal within 5 psi. [0,4 kg/cm<sup>2</sup>]. If clutch pressure varies in any one clutch more than 5 psi. [0,4 kg/cm<sup>2</sup>] repair clutch.

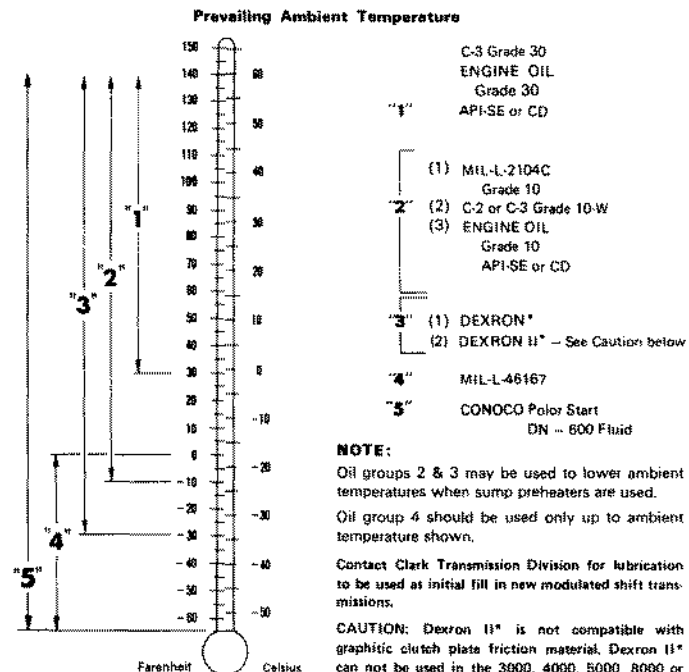
**NOTE:** Never use service brakes while making clutch pressure checks. Units having brake actuated declutching in forward and/or reverse will not give a true reading.

**ALWAYS USE PARKING BRAKE WHEN MAKING CLUTCH PRESSURE CHECKS.**

## LUBRICATION

TYPE OF OIL	See Lube Chart.
CAPACITY	Consult Operator's Manual on applicable machine model for system capacity. Torque Converter, Transmission and allied hydraulic system must be considered as a whole to determine capacity.
CHECK PERIOD	Check oil level <b>DAILY</b> with engine running at 500-600 RPM and oil at 180 to 200° F. [82,2 - 93,3° C]. Maintain oil level to <b>FULL</b> mark.
DRAIN PERIOD	Every 250 hours, change oil filter element. Every 500 hours, drain and refill system as follows: Drain with oil at 150 to 200° F. [65, 6 - 93, 3° C]. <ol style="list-style-type: none"> <li>Drain transmission and remove sump screen. Clean screen thoroughly and replace, using new gaskets.</li> <li>Drain oil filters, remove and discard filter elements. Clean filter shells and install new elements.</li> <li>Refill transmission to <b>LOW</b> mark.</li> <li>Run engine at 500-600 RPM to prime converter and lines.</li> <li>Recheck level with engine running at 500-600 RPM and add oil to bring level to <b>LOW</b> mark.. When oil temperature is hot (180-200° F.) [82, 2-93, 3° C] make final oil level check. <b>BRING OIL LEVEL TO FULL MARK.</b></li> </ol>

### RECOMMENDED LUBRICANTS FOR CLARK POWER SHIFTED TRANSMISSION AND TORQUE CONVERTERS



#### NOTE:

Oil groups 2 & 3 may be used to lower ambient temperatures when sump preheaters are used.  
Oil group 4 should be used only up to ambient temperature shown.

Contact Clark Transmission Division for lubrication to be used as initial fill in new modulated shift transmissions.

**CAUTION:** Dexron II\* is not compatible with graphitic clutch plate friction material. Dexron II\* can not be used in the 3600, 4000, 5000, 8000 or T6000 series power shift transmissions, or the HR28000 series having converter lock-up, or the C270 series converter having lock-up.

\*Dexron is a registered trademark of General Motors Corporation.

## TROUBLE SHOOTING GUIDE For The HR Model, 18000 Transmission

The following data is presented as an aid to locating the source of difficulty in a malfunctioning unit. It is necessary to consider the torque converter charging pump, transmission, oil cooler, and connecting lines as a complete system when running down the source of trouble since the proper operation of any unit therein depends greatly on the condition and operations of

the others. By studying the principles of operation together with data in this section, it may be possible to correct any malfunction which may occur in the system.

**TROUBLE SHOOTING PROCEDURE BASICALLY CONSISTS OF TWO CLASSIFICATIONS: MECHANICAL AND HYDRAULIC.**



## MECHANICAL CHECKS

Prior to checking any part of the system from a hydraulic standpoint, the following mechanical checks should be made:

1. A check should be made to be sure all control lever linkage is properly connected and adjusted at all connecting points.

2. Check shift levers and rods for binding or restrictions in travel that would prevent full engagement. Shift levers by hand at control valve, if full engagement cannot be obtained, difficulty may be in control cover and valve assembly.

## HYDRAULIC CHECKS

Before checking on the torque converter, transmission, and allied hydraulic system for pressures and rate of oil flow, it is essential that the following preliminary checks be made.

1. Check oil level in transmission. This should be done with oil temperatures of 180 to 200° F. [82,2-93,3° C]. DO NOT ATTEMPT THESE CHECKS WITH COLD OIL. To bring the oil temperature to this specification it is necessary to either work the machine or "stall" out

the converter. Where the former means is impractical, the latter means should be employed as follows:

Engage shift levers in forward and high speed and apply brakes. Accelerate engine half to three-quarter throttle.

Hold stall until desired converter outlet temperature is reached. **CAUTION: FULL THROTTLE STALL SPEEDS FOR AN EXCESSIVE LENGTH OF TIME WILL OVERHEAT THE CONVERTER.**

## LOW CLUTCH PRESSURE

Cause	Remedy
1. Low oil level.	1. Fill to proper level.
2. Clutch pressure regulating valve spool stuck open.	2. Clean valve spool and housing.
3. Faulty charging pump.	3. Replace pump.
4. Broken or worn clutch shaft or piston sealing rings.	4. Replace sealing rings.
5. Clutch piston bleed valve stuck open.	5. Clean bleed valves thoroughly.

## LOW CONVERTER CHARGING PUMP OUTPUT

1. Low oil level.	1. Fill to proper level.
2. Suction screen plugged.	2. Clean suction screen.
3. Defective oil pump.	3. Replace pump.

## OVERHEATING

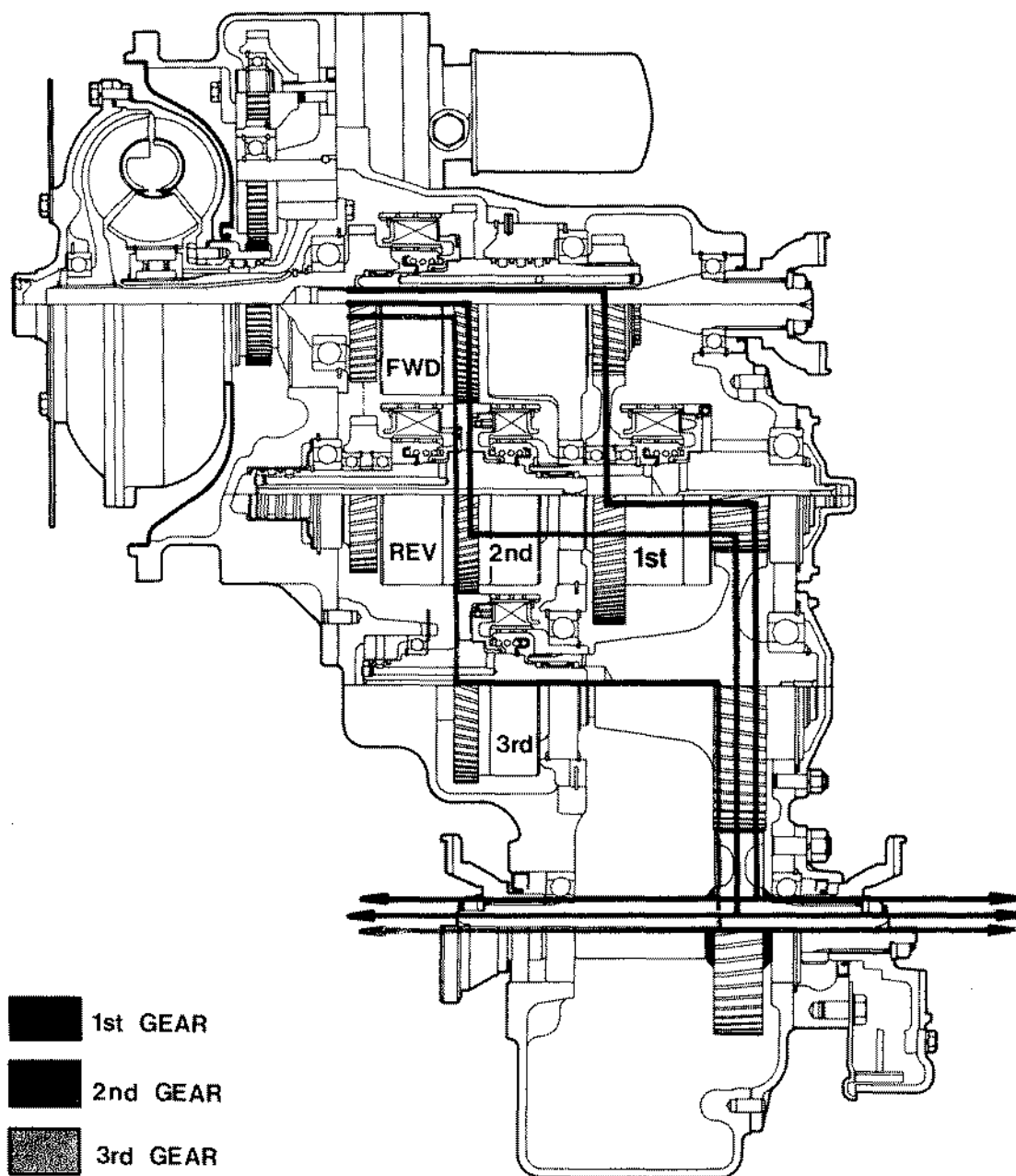
1. Worn oil sealing rings.	1. Remove, disassemble, and rebuild converter assembly.
2. Worn oil pump.	2. Replace.
3. Low oil level.	3. Fill to proper level.

## NOISY CONVERTER

1. Worn oil pump.	1. Replace.
2. Worn or damaged bearings.	2. A complete disassembly will be necessary to determine what bearing is faulty.

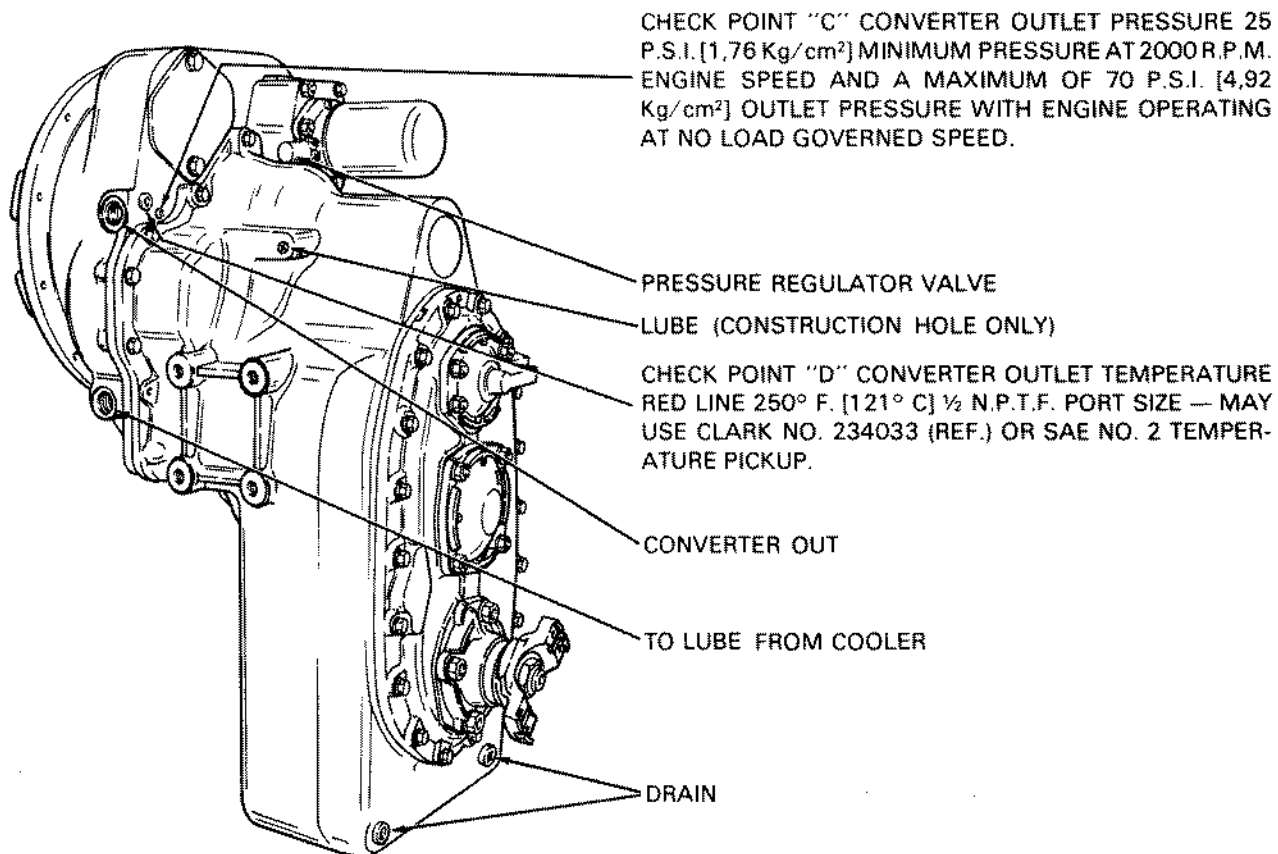
## LACK OF POWER

1. Low engine RPM at converter stall.	1. Tune engine check governor.
2. See "Overheating" and make same checks.	2. Make corrections as explained in "Over-Heating."

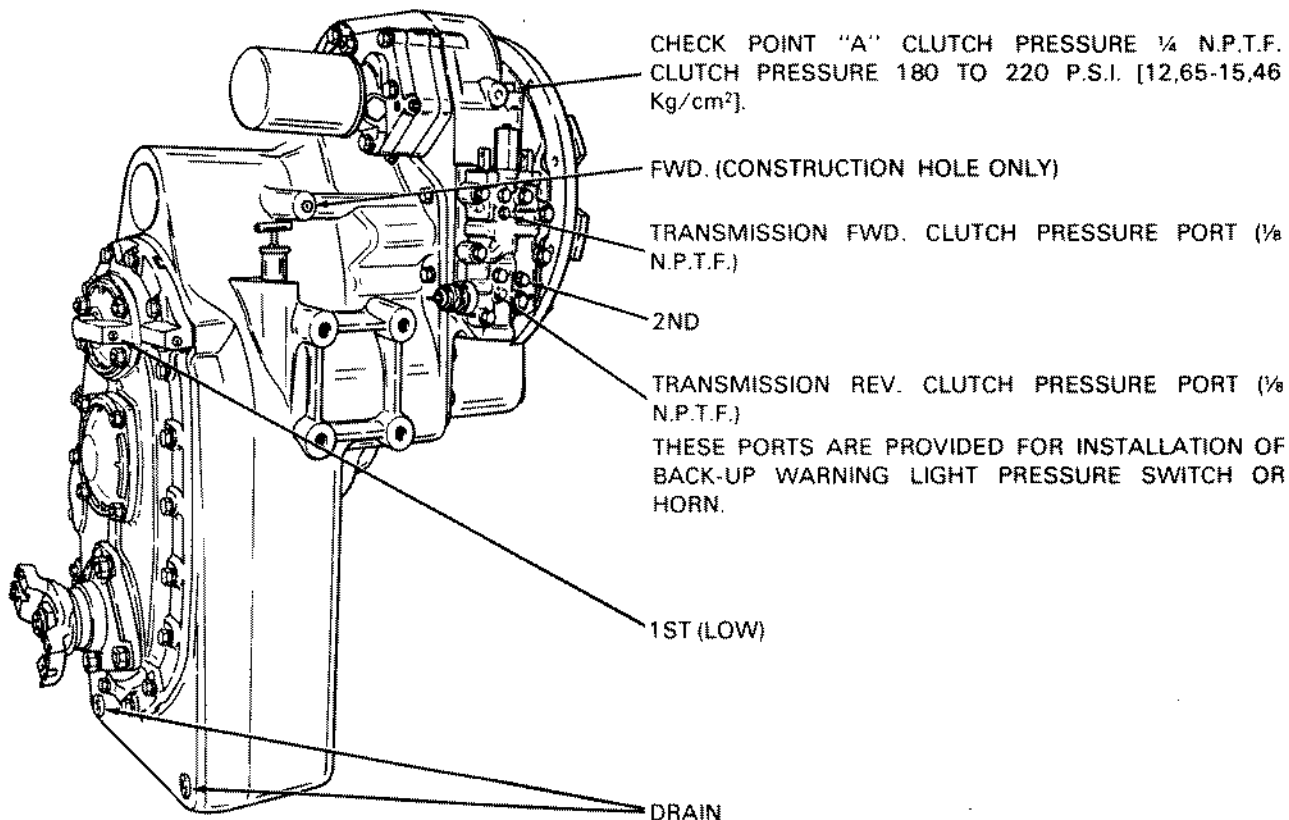


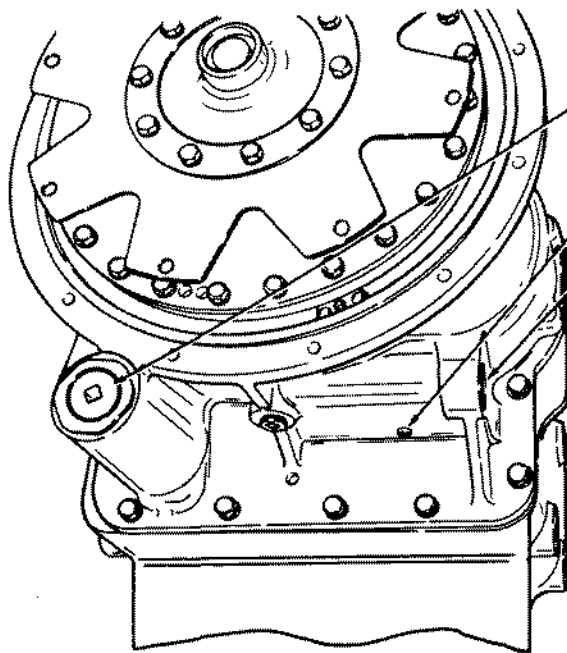
18000 3 SPEED TRANSMISSION LONG DROP  
POWER FLOW

## PRESSURE CHECK POINTS



CHECK POINTS A & D SHOULD BE MONITORED BY GAUGES LOCATED IN OPERATOR'S COMPARTMENT.





SUMP SCREEN

CHECK POINT "H" LUBE PRESSURE  $\frac{1}{8}$  N.P.T.F. 15-25 P.S.I. [1,1-1,7 Kg/cm<sup>2</sup>] @ 2000 RPM & 180°-200° F [82,2-93,3° C] AT CONVERTER OUTLET.

TO LUBE FROM COOLER

#### HOSE LINE OPERATING REQUIREMENTS:

##### 1. PRESSURE LINES:

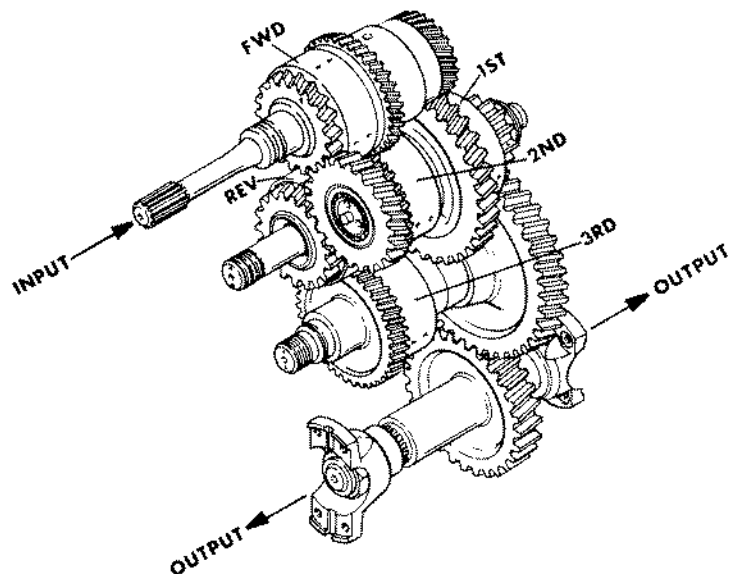
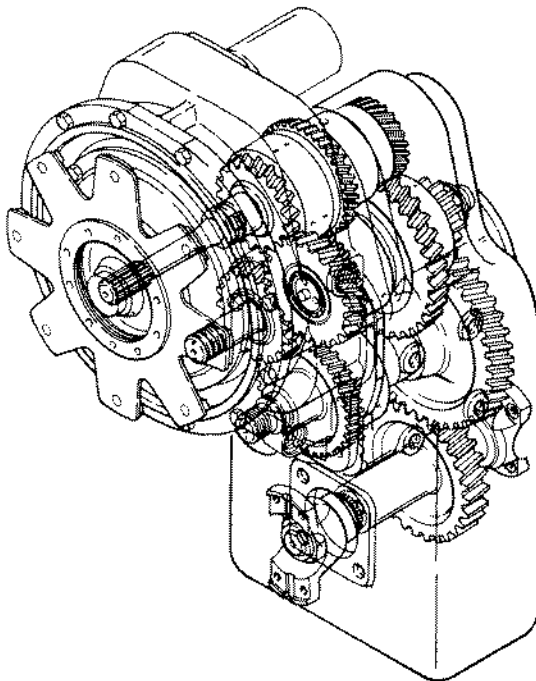
AMBIENT TO 250° F [121° C] FOR CONTINUOUS OPERATION. MUST WITHSTAND 300 P.S.I. [21,09 Kg/cm<sup>2</sup>] CONTINUOUS OPERATION WITH 600 P.S.I. [42,19 Kg/cm<sup>2</sup>] SURGE PRESSURE. REF. SAE 100R1 HYDRAULIC HOSE.

##### 2. OIL SPECIFICATIONS:

SEE CLARK DWG. NO. 236647 FOR CLARK RECOMMENDATIONS FOR USE IN TORQUE CONVERTERS & POWER SHIFT TRANSMISSIONS.

##### 3. ALL HOSE LINES USED MUST CONFORM TO SAE

SPEC. NO. SAE J1019 TESTS & PROCEDURES FOR HIGH-TEMPERATURE TRANSMISSION OIL HOSE, LUBRICATING OIL HOSE & HOSE ASSEMBLIES.



**18000 SERIES-3 SPEED LONG DROP  
CLUTCH AND GEAR ARRANGEMENT**