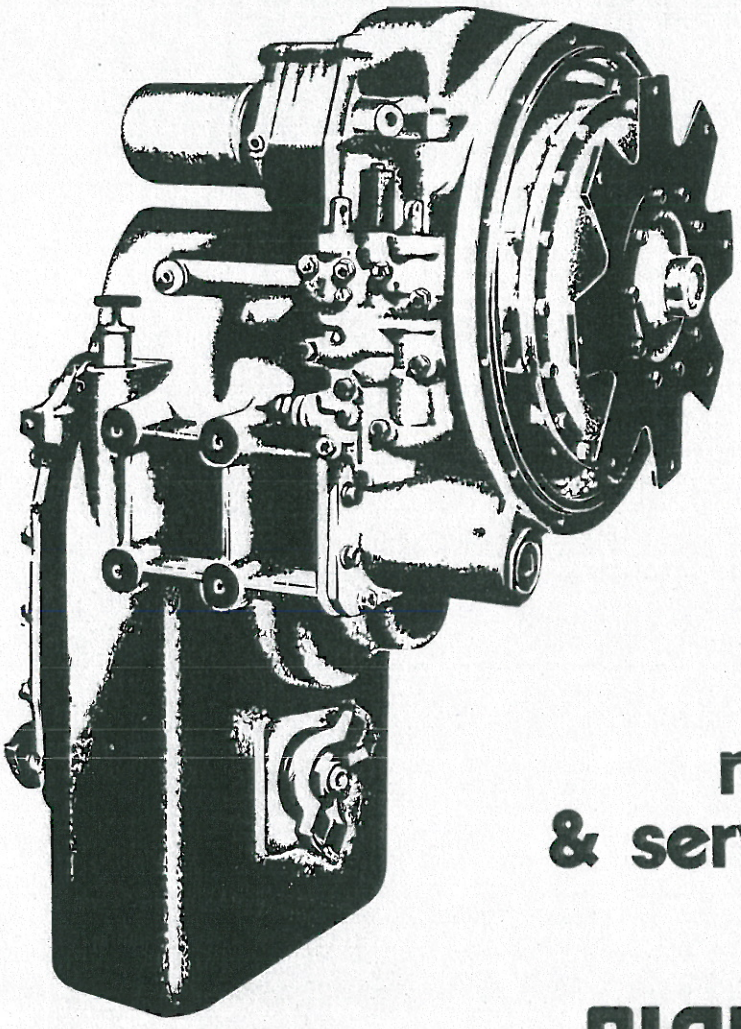
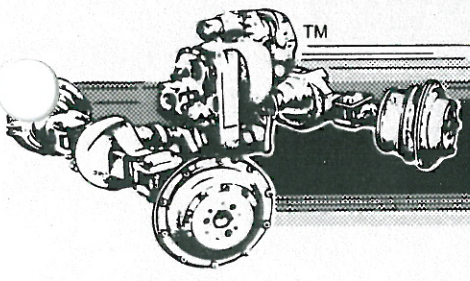
18000 powershift transmission

3 speed long drop output



maintenance & service manual



CLARK COMPONENTS INTERNATIONAL INC.

Power Transfer Systems

A Business Unit of Clark Equipment Co.

SM HR 183LD (Rev. 7-88)

Service Publications

I-77 at I-40, P.O. Box 1272

Statesville, NC 28677

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.

NOTES

NOTES

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 principal 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 Components International-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. Clark Components International does not warrant repair or replacement parts, nor failures resulting from the use thereof, which are not supplied by or approved by Clark Components International. IMPORTANT: **Always furnish the Distributor with the transmission serial and model number when ordering parts.**

TABLE OF CONTENTS

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:

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.

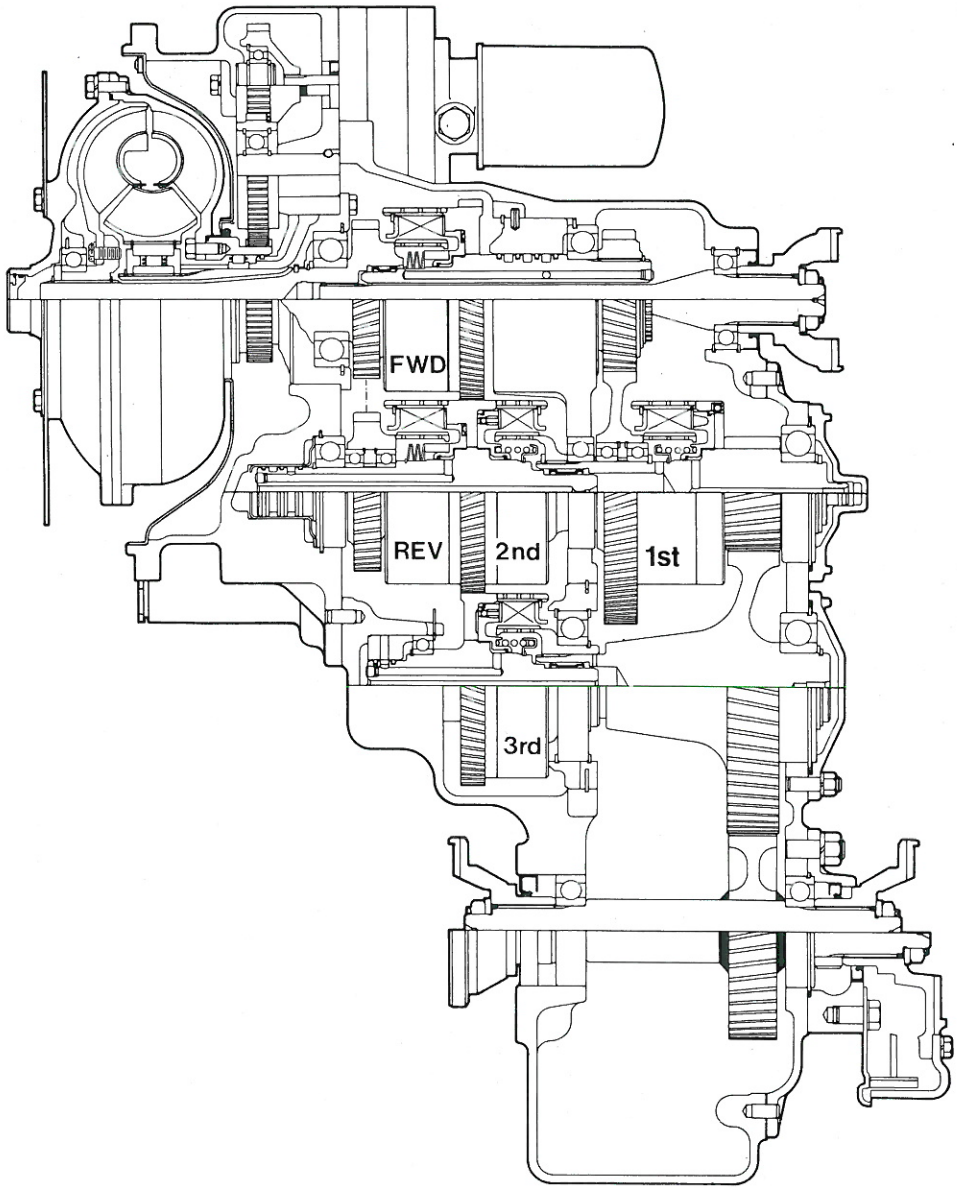
The shift control valve assembly consists of a valve body with selector valve spools. A detent ball and spring in the selector spool provides one position for each speed range. A detent ball and spring in the direction spool provides three positions, one each for forward, neutral and reverse.

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

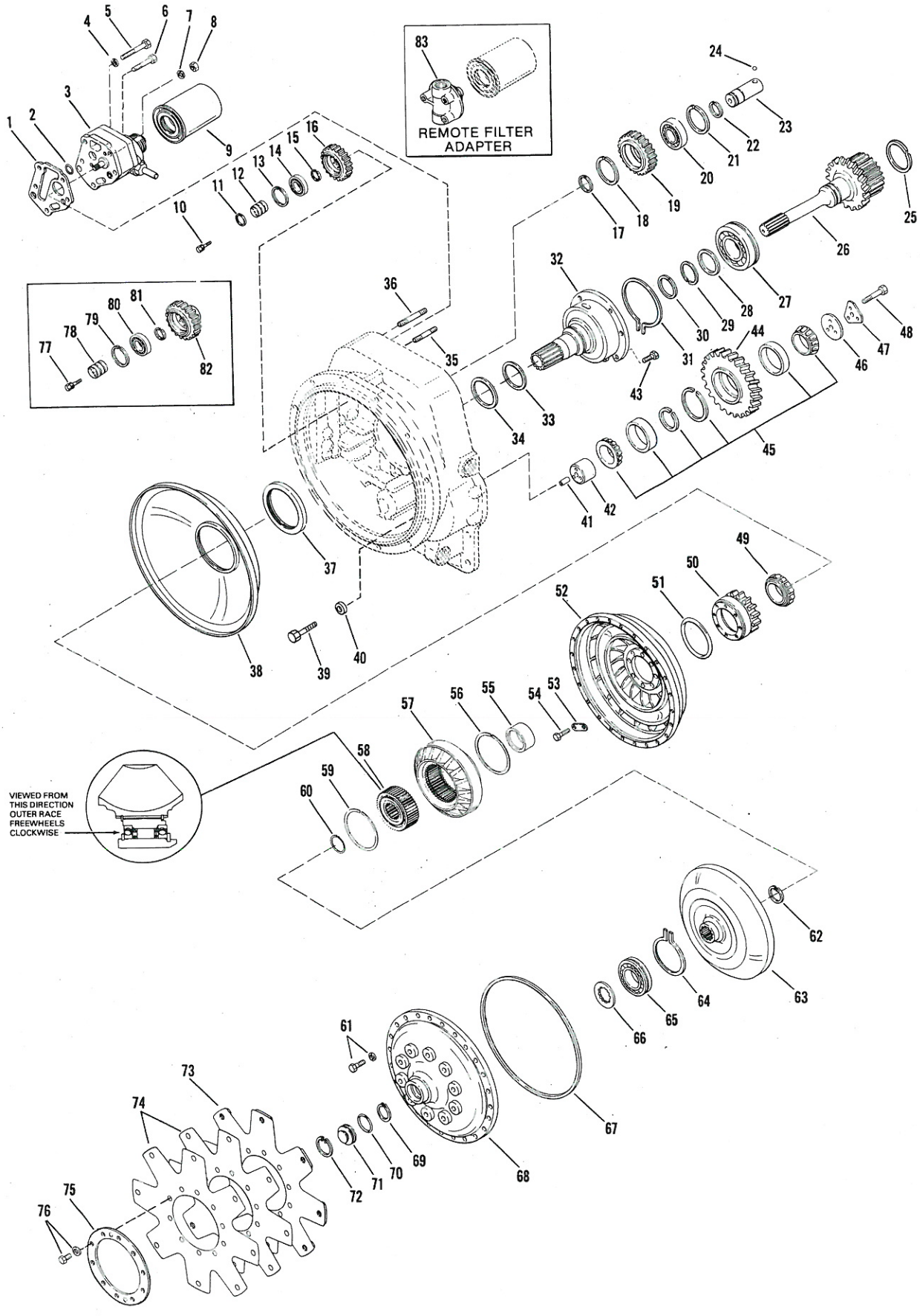

REMOTE FILTER ADAPTER
VIEWED FROM THIS DIRECTION OUTER RACE FREEWHEELS CLOCKWISE

Figure B

CLARK

HR18000 CONVERTER GROUP

ITEM	DESCRIPTION	QTY.
1	Pump to Housing Gasket	1
2	"O" Ring	1
3	Charging Pump Assembly	1
4	Pump Mounting Screw Lockwasher	3
5	Pump Mounting Screw	1
6	Pump Mounting Screw	2
7	Pump Mounting Stud Lockwasher	2
8	Pump Mounting Stud Nut	2
9	Filter Assembly	1
10	Bearing Support Screw & Lockwasher	2
11	Bearing Locating Ring	1
12	Pump Drive Bearing Support	1
13	Bearing Retaining Ring	1
14	Pump Drive Gear Bearing	1
15	Bearing Locating Ring	1
16	Pump Drive Gear	1
	Idler Gear Bearing Locating Ring	1
	Idler Gear Bearing Retaining Ring	1
19	Pump Drive Idler Gear	1
20	Idler Stub Shaft Bearing	1
21	Bearing Retaining Ring	1
22	Bearing Locating Ring	1
23	Idler Gear Stub Shaft	1
24	Stub Shaft Lockball	1
25	Baffle Ring	1
26	Turbine Shaft & Disc Hub Assembly	1
27	Turbine Shaft Bearing	1
28	Bearing Locating Washer	1
29	Bearing Retaining Ring	1
30	Piston Ring	1
31	Bearing Snap Ring	1
32	Reaction Member Support	1
33	Piston Ring Expander Spring	1
34	Piston Ring	1
35	Pump Mounting Stud	1
36	Pump Mounting Stud	1
37	Oil Seal	1
38	Oil Baffle Assembly	1
39	Reverse Idler Shaft Screw	3
40	Reverse Idler Shaft Screw Lockwasher	3
41	Reverse Idler Shaft Pin	1
42	Reverse Idler Shaft	1

ITEM	DESCRIPTION	QTY.
43	Reaction Member Support Screw	6
44	Reverse Idler Gear	1
45	Reverse Idler Gear Bearing Assembly	1
46	Bearing Retaining Plate	1
47	Lock Plate	1
48	Retaining Plate Screw	3
49	Impeller Hub Gear Bearing	1
50	Impeller Hub Gear	1
51	Impeller Hub "O" Ring	1
52	Impeller	1
53	Impeller to Hub Screw Lock Tab	4
54	Impeller to hub Screw	8
55	Reaction Member Spacer	1
56	Freewheel Outer Race Snap Ring	1
57	Reaction Member	1
58	Freewheel Assembly	1
59	Freewheel Outer Race Snap Ring	1
60	Reaction Member Retainer Ring	1
61	Impeller to Cover Screw and Lockwasher	18
62	Turbine Retaining Ring	1
63	Turbine	1
64	Turbine Hub Bearing Locating Ring	1
65	Turbine Hub Bearing	1
66	Bearing Retaining Washer	1
67	Impeller to Cover "O" Ring	1
68	Impeller Cover	1
69	Turbine Retaining Ring	1
70	Impeller Cover Bore Plug "O" Ring	1
71	Bore Plug	1
72	Bore Plug Retaining Ring	1
73	Drive Plate Assembly	1
74	Drive Plate	2
75	Drive Plate Backing Ring	1
76	Drive Plate Mounting Screw & Lockwasher	10
77	Bearing Support Screw & Lockwasher	2
78	Auxiliary Pump Drive Bearing Support	1
79	Bearing Retaining Ring	1
80	Pump Drive Gear Bearing	1
81	Bearing Locating Ring	1
82	Auxiliary Pump Drive Gear	1
83	Remote Filter Adaptor (Optional)	1

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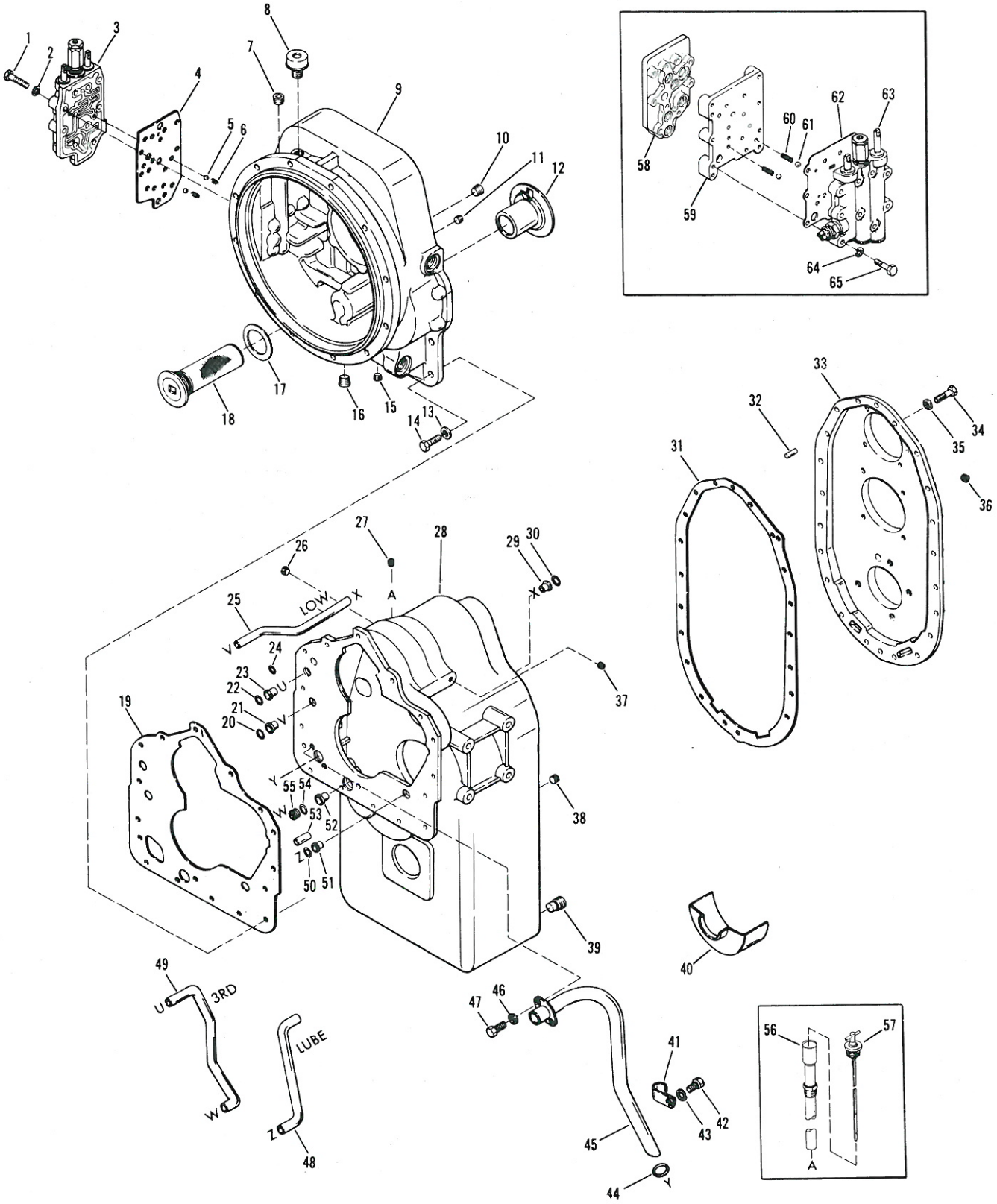


Figure C

HR 18000 LONG DROP CONVERTER AND TRANSMISSION CASE GROUP

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

Optional Remote Mounted Control Valve Parts

58	Remote Control Valve Adaptor Plate	1
59	Remote Control Valve Mounting Plate	1
60	Detent Spring	2
61	Detent Ball	2
62	Control Valve to Mounting Plate Gasket	1
63	Control Valve Assembly	1
64	Valve to Mounting Plate Screw Lockwasher	9
65	Valve to Mounting Plate Screw	9

CLARK

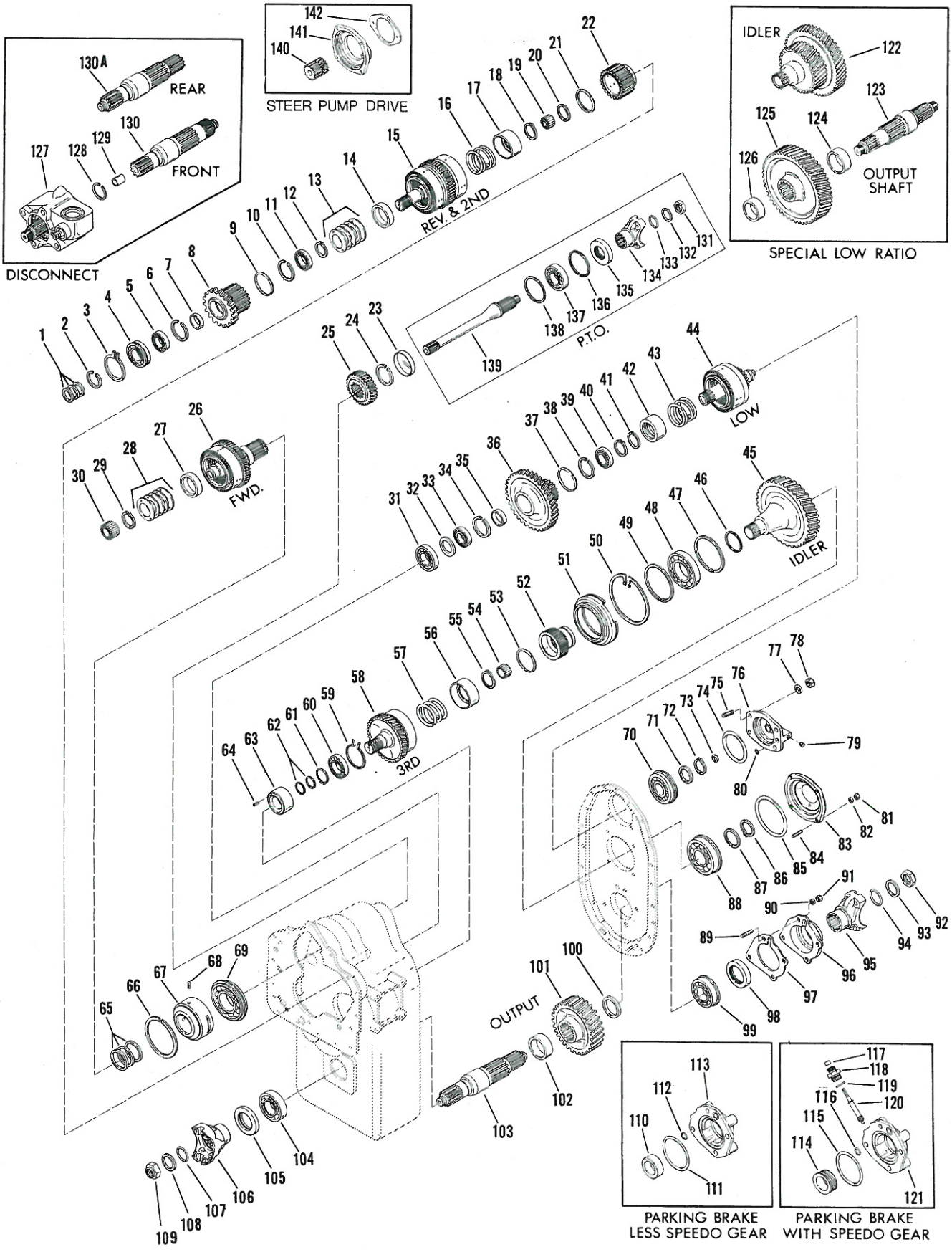
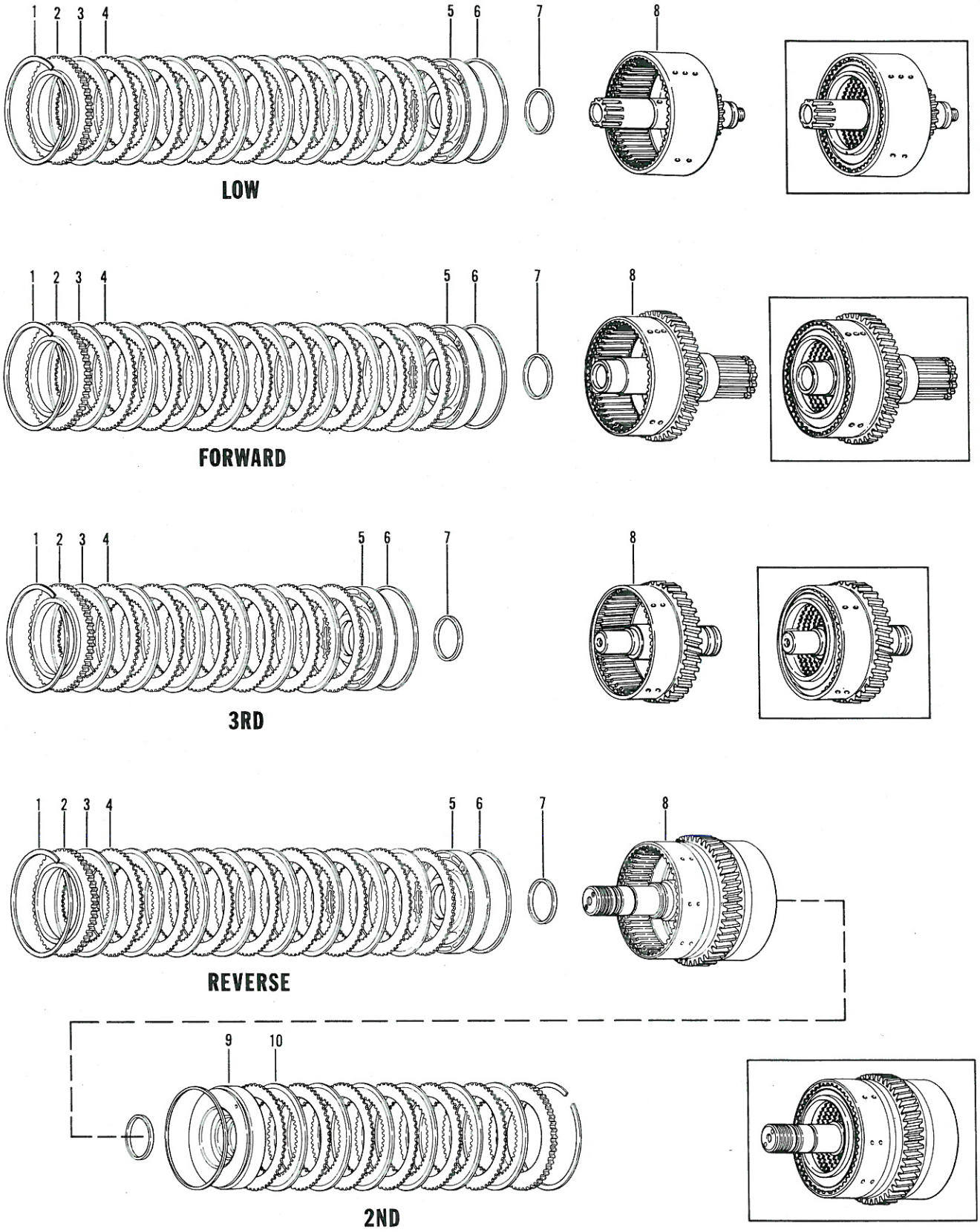


Figure D

18000 THREE SPEED LONG DROP GEAR AND CLUTCH GROUP

ITEM	DESCRIPTION	QTY.
1	Reverse and 2nd Shaft Piston Ring	3
2	Front Bearing Retaining Ring	1
3	Front Bearing Snap Ring	1
4	Reverse and 2nd Shaft Front Bearing	1
5	Clutch Driven Gear Bearing	1
6	Bearing Retaining Ring	1
7	Clutch Driven Gear Bearing Spacer	1
8	Reverse Clutch Gear and Hub Assembly	1
9	Baffle Ring	1
10	Bearing Retaining Ring	1
11	Clutch Driven Gear Bearing	1
12	Spring Retainer Snap Ring	1
13	Piston Return Belleville Springs	5
14	Piston Return Spring Spacer	1
15	Reverse and 2nd Clutch	1
16	Piston Return Spring	1
17	Spring Retainer	1
18	Spring Retainer Snap Ring	1
19	Reverse and 2nd Clutch Shaft Rear Bearing	1
20	2nd Clutch Disc Hub Snap Ring	1
21	Baffle Ring	1
22	2nd Clutch Disc Hub	1
23	Bore Plug	1
24	Gear Retainer Snap Ring	1
25	Forward Shaft Gear	1
26	Forward Clutch	1
27	Piston Return Spring Spacer	1
28	Piston Return Belleville Springs	5
29	Spring Retainer Snap Ring	1
30	Forward Clutch Shaft Pilot Bearing	1
31	Low Speed Clutch Shaft Front Bearing	1
32	Front Bearing Spacer	1
33	Low Speed Gear Bearing	1
34	Low Speed Gear Bearing Locating Ring	1
35	Low Speed Gear Spacer	1
36	Low Speed Gear and Hub Assembly	1
37	Baffle Ring	1
38	Low Speed Gear Bearing Locating Ring	1
39	Low Speed Gear Bearing	1
40	Low Speed Gear Bearing Retaining Ring	1
41	Spring Retainer Snap Ring	1
42	Spring Retainer	1
43	Piston Return Spring	1
44	Low Speed Clutch	1
45	Idler Shaft and Gear	1
46	Bearing Retaining Ring	1
47	Bearing Locating Ring	1
48	3rd Clutch Disc Hub Bearing	1
49	Bearing Locating Ring	1
50	Bearing Carrier Locating Ring	1
51	Bearing Carrier	1
52	3rd Speed Clutch Disc Hub	1
53	Baffle Ring	1
54	3rd Speed Clutch Shaft Pilot Bearing	1
55	Spring Retainer Snap Ring	1
56	Spring Retainer	1
57	Piston Return Spring	1
58	3rd Speed Clutch	1
59	3rd Speed Clutch Shaft Front Bearing Locating Ring	1
60	3rd Speed Clutch Shaft Front Bearing	1
61	3rd Speed Clutch Shaft Front Bearing Retaining Ring	1
62	3rd Speed Clutch Shaft Piston Ring	2
63	Piston Ring Outer Race	1
64	Outer Race Roll Pin	1
65	Forward Shaft Piston Ring	3
66	Piston Ring Sleeve Retainer Ring	1
67	Piston Ring Sleeve	1
68	Sleeve Roll Pin	1
69	Forward Clutch Shaft Rear Bearing	1
70	Low Speed Clutch Shaft Rear Bearing	1
71	Rear Bearing Support Washer	1
72	Rear Bearing Retaining Ring	1
73	Low Speed Clutch Shaft Piston Ring	1
74	Rear Bearing Cap "O" Ring	1
75	Bearing Cap Stud	4
76	Low Speed Clutch Shaft Rear Bearing Cap	1
77	Bearing Cap Stud Lockwasher	4
78	Bearing Cap Stud Nut	4
79	Bearing Cap Plug	1
80	Bearing Cap "O" Ring	1
81	Rear Bearing Cap Stud Nut	4
82	Rear Bearing Cap Stud Lockwasher	4
83	Idler Shaft Rear Bearing Cap	1
84	Rear Bearing Cap Stud	4
85	Rear Bearing Cap "O" Ring	1
86	Idler Shaft Rear Bearing Retainer Ring	1
87	Rear Bearing Support Washer	1
88	Idler Shaft Rear Bearing	1
89	Bearing Cap Stud	4
90	Bearing Cap Stud Lockwasher	4
91	Bearing Cap Stud Nut	4
92	Flange Nut	1
93	Flange Washer	1
94	Flange "O" Ring	1
95	Output Flange	1
96	Output Shaft Rear Bearing Cap	1
97	Bearing Cap Gasket	1
98	Rear Bearing Cap Oil Seal	1
99	Output Shaft Rear Bearing	1
100	Output Shaft Rear Bearing Spacer	1
101	Output Gear	1
102	Output Gear Spacer	1
103	Output Shaft	1
104	Output Shaft Front Bearing	1
105	Front Oil Seal	1
106	Output Flange	1
107	Flange "O" Ring	1
108	Flange Washer	1
109	Flange Nut	1
110 thru 142	Various Options	

CLARK



18000 SERIES 3 SPEED LONG DROP CLUTCH ASSEMBLY

Figure E

LOW CLUTCH GROUP

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

FORWARD CLUTCH GROUP

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

3RD CLUTCH GROUP

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

REVERSE AND 2ND CLUTCH GROUP

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

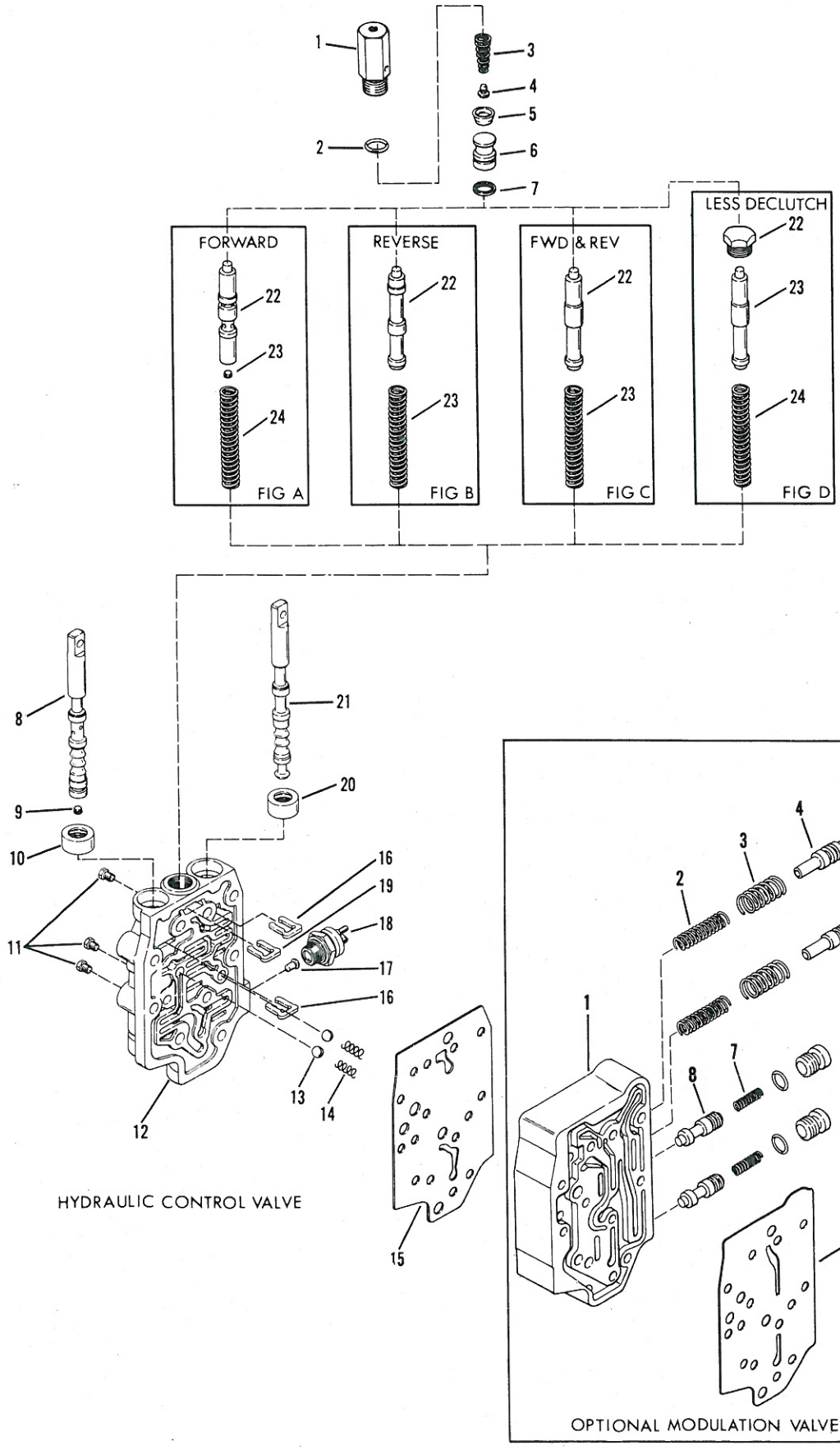

1
2
3
4
5
6
7
FORWARD
REVERSE
FWD & REV
LESS DECLUTCH
22
23
24
FIG A
FIG B
FIG C
FIG D
8
9
10
11
12
13
14
15
16
17
18
19
20
21
HYDRAULIC CONTROL VALVE
OPTIONAL MODULATION VALVE

Figure F

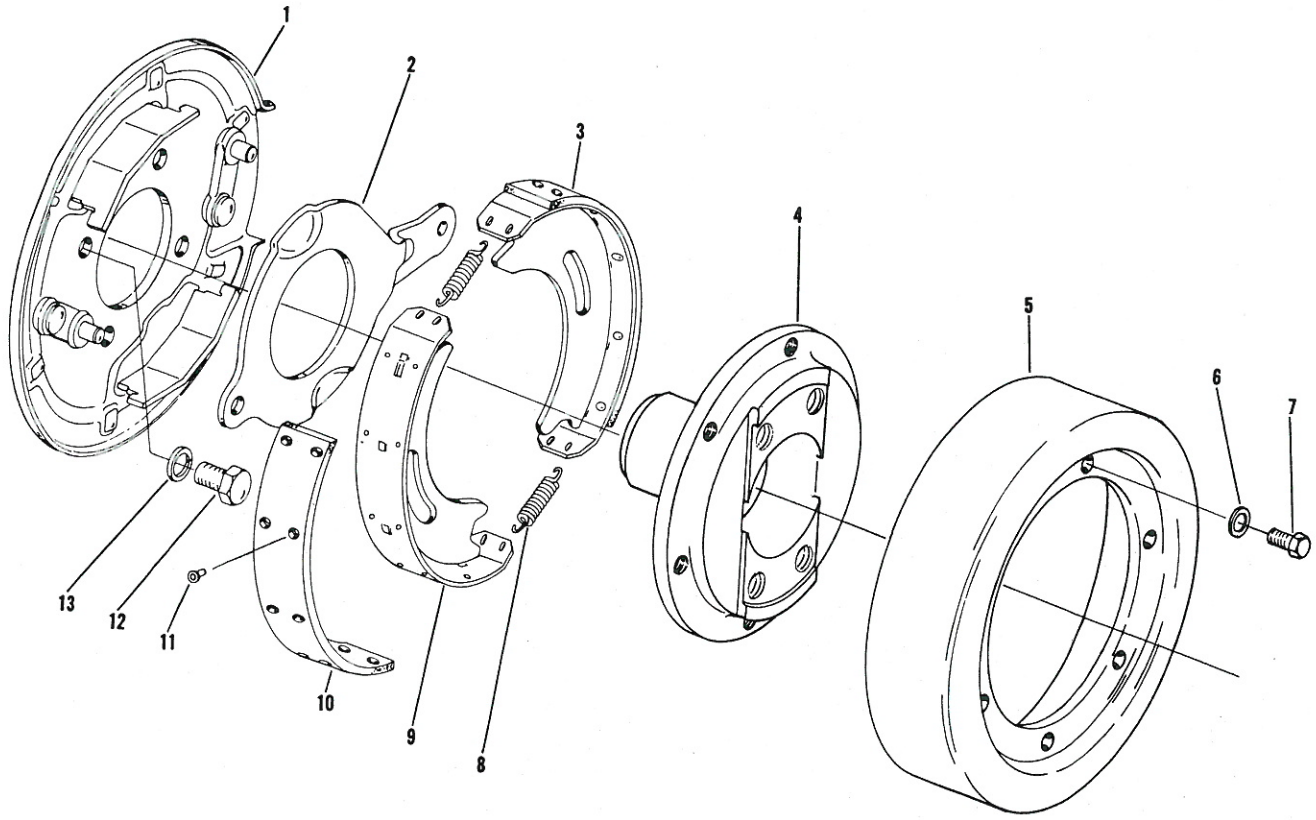
CONTROL VALVE ASSEMBLY

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

NOTE: Items 22 thru 24 are various declutch options.

MODULATOR VALVE ASSEMBLY (Optional)

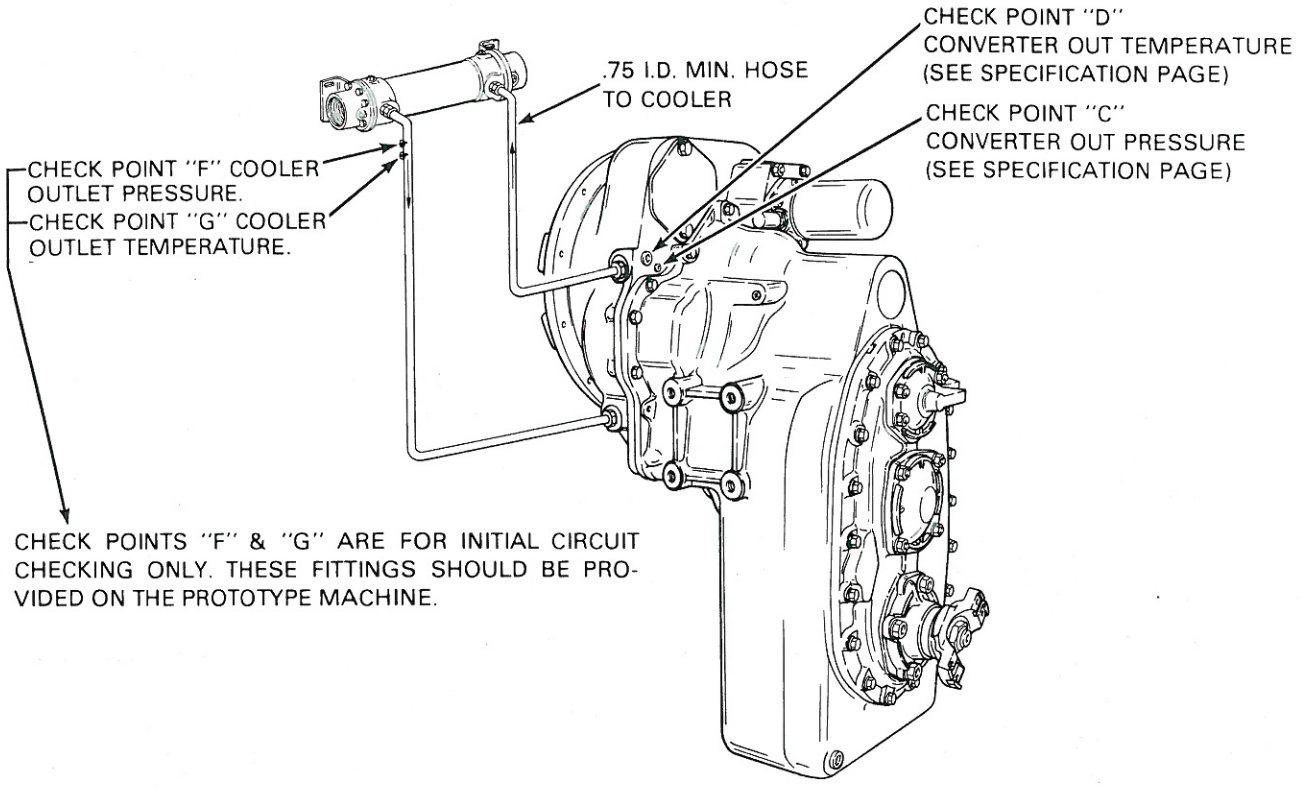
ITEM	DESCRIPTION	QTY.
1	Modulator Valve Housing	1
2	Accumulator Spring (Inner) Not Used on All Models	2
3	Accumulator Spring (Outer)	2
4	Accumulator Valve	2
5	Spool Stop Plug "O" Ring	4
6	Spool Stop Plug	4
7	Regulator Spring	2
8	Regulator Spool	2
9	Modulator Valve to Converter Housing Gasket	1



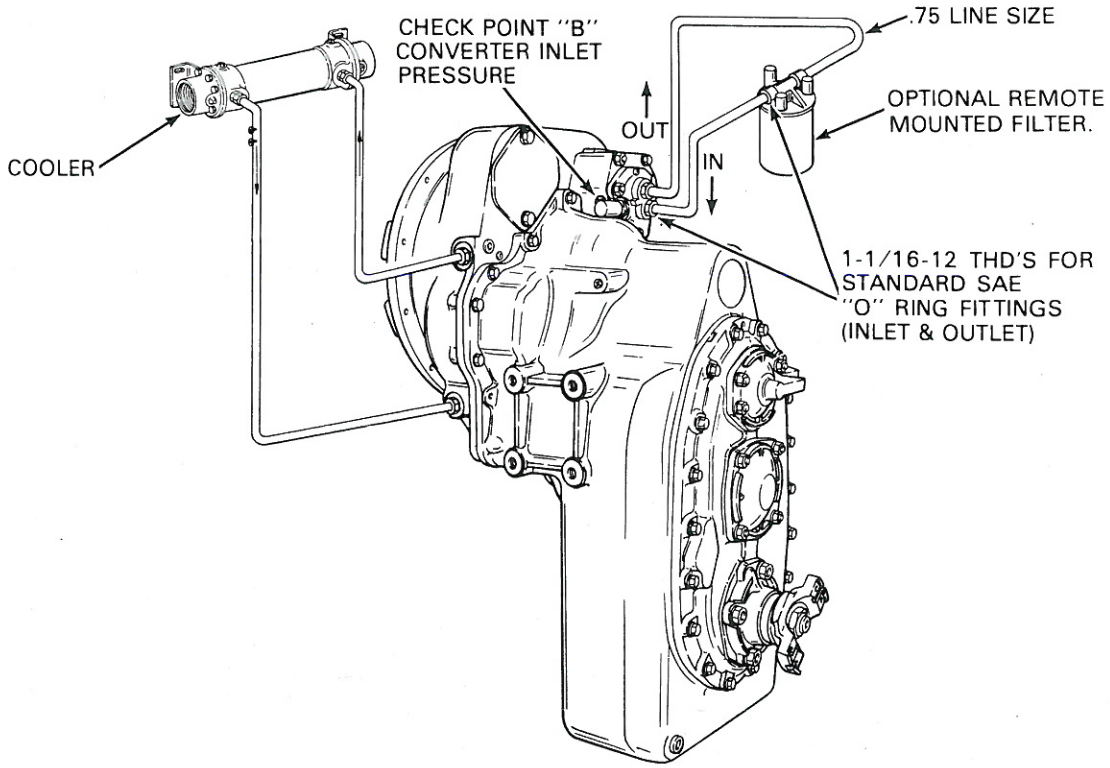
PARKING BRAKE GROUP

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

Figure G



18000 PLUMBING DIAGRAM
3 SPEED LONG DROP



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

Figure H

CLARK

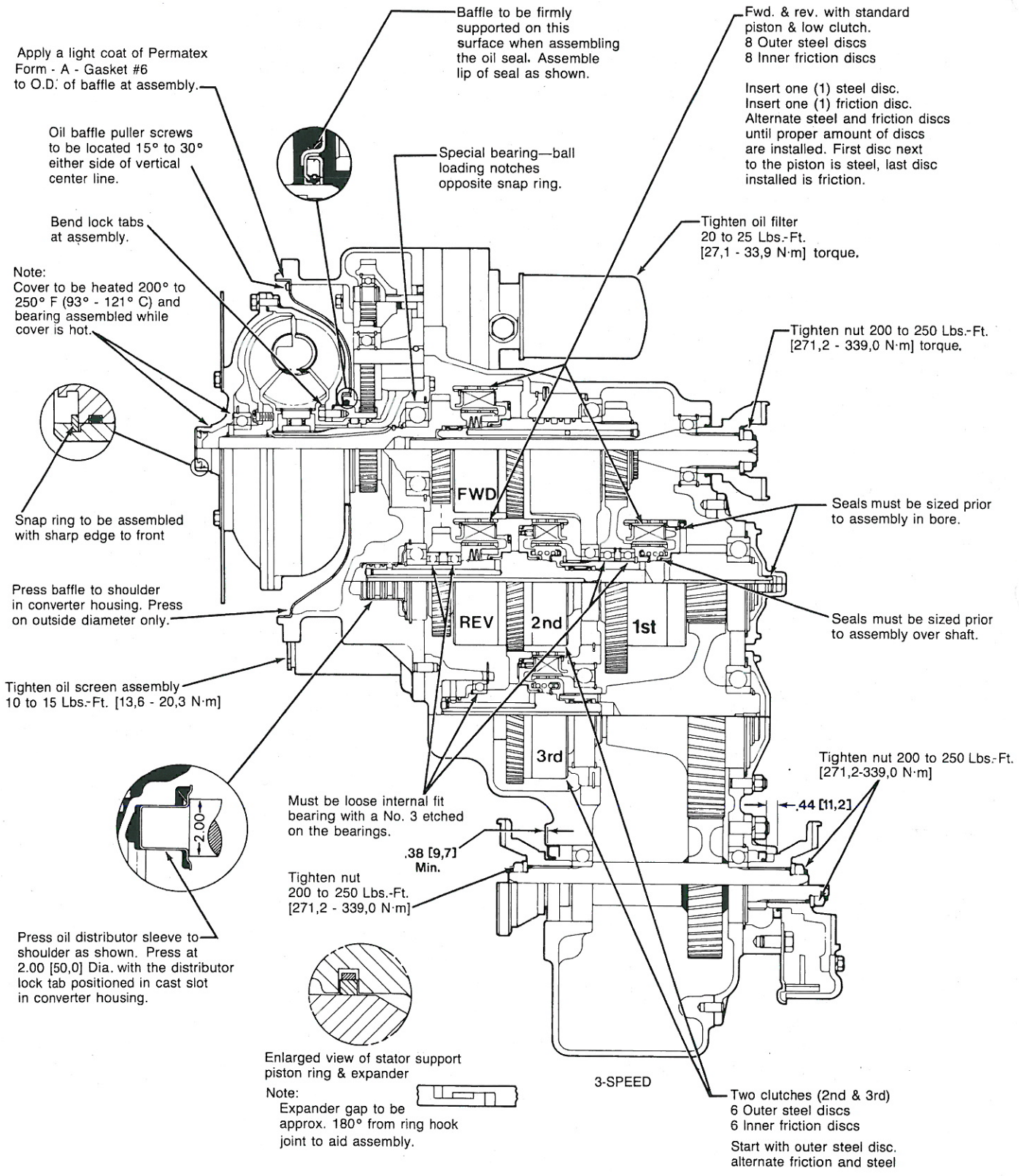
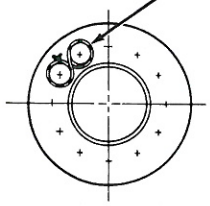


Figure 1

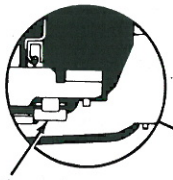
1. All lead in chamfers for oil seals, piston rings, & "O" rings must be smooth and free from burrs. Inspect at assembly.
2. Lubricate all piston ring grooves & "O" rings with oil before assembly.
3. Apply very light coat of Permatex No. 2 to O.D. of all oil seals before assembly.
4. After assembly of 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.



Torque capscrews 30 to 35 Lbs.-Ft. [40,7 - 47, 5 N·m]. Lockwire every (2) capscrews together as shown, lockwire must not protrude above capscrew head.

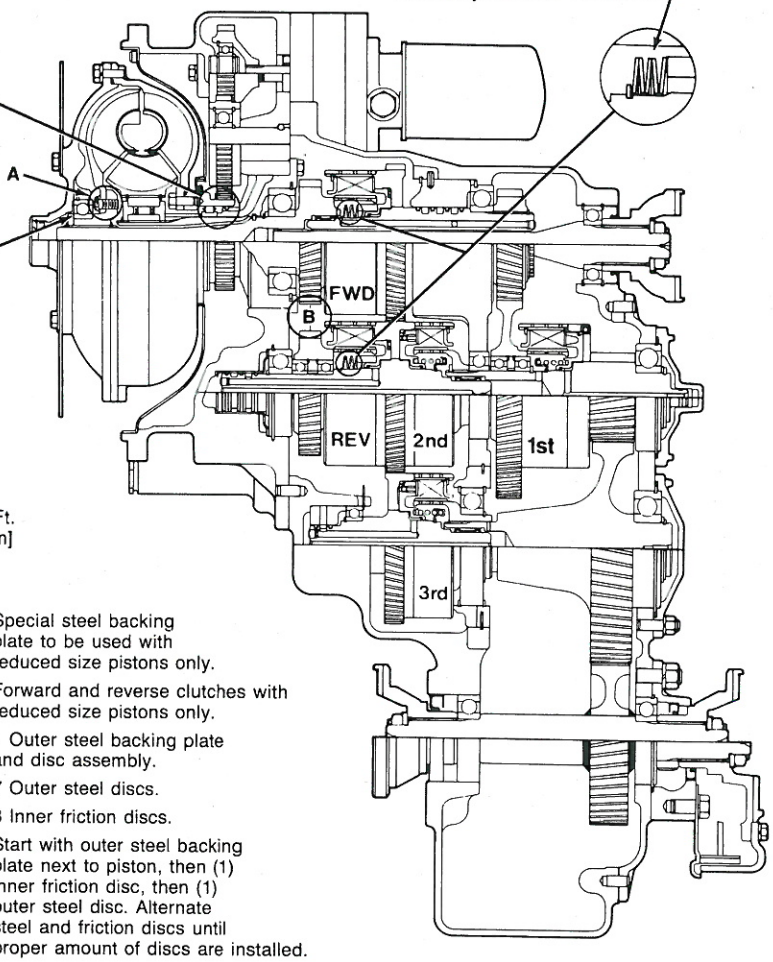
View **A**

Forward & Reverse Clutch Return Springs Concave side of first belleville spring to be placed against clutch piston. Remaining four springs of each clutch to be stacked alternately reversed as shown.



Bearing part No. must be "OUT". Chamfer must be "IN".

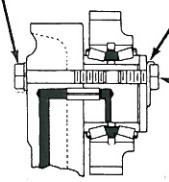
Must be loose internal fit bearing with a No. 3 etched on the bearing.



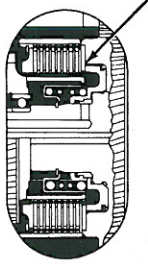
Torque 58 to 64 Lbs.-Ft. [78,7 - 86,7 N·m]

Bend lock tabs at ass'y.

Torque 58 to 64 Lbs.-Ft. [78,7 - 86,7 N·m]



View **B**
Standard Idler Gear



Special steel backing plate to be used with reduced size pistons only.

Forward and reverse clutches with reduced size pistons only.

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.

Grade 5

NOM. SIZE	FINE THREAD LB-FT	FINE THREAD [N·M]	COARSE THREAD LB-FT	COARSE THREAD [N·M]
.7500	223 - 245	[302,4 - 332,1]	200 - 220	[271,2 - 298,2]
.6250	128 - 141	[173,6 - 191,1]	113 - 124	[153,3 - 168,1]
.5625	91 - 100	[123,4 - 135,5]	82 - 90	[111,2 - 122,0]
.5000	64 - 70	[86,8 - 94,9]	57 - 63	[77,3 - 85,4]
.4375	41 - 45	[55,6 - 61,0]	37 - 41	[50,2 - 55,5]
.3750	26 - 29	[35,3 - 39,3]	23 - 25	[31,2 - 33,8]
.3125	16 - 20	[21,7 - 27,1]	12 - 16	[16,3 - 21,6]
.2500	9 - 11	[12,3 - 14,9]	8 - 10	[10,9 - 13,5]

Grade 8

FINE THREAD LB-FT	FINE THREAD [N·M]	COARSE THREAD LB-FT	COARSE THREAD [N·M]
315 - 347	[427,1 - 470,4]	282 - 310	[382,4 - 420,3]
180 - 198	[224,1 - 268,4]	159 - 175	[215,6 - 237,2]
128 - 141	[173,6 - 191,1]	115 - 127	[156,0 - 172,2]
90 - 99	[122,1 - 134,2]	80 - 88	[108,5 - 119,3]
58 - 64	[78,7 - 86,7]	52 - 57	[70,6 - 77,2]
37 - 41	[50,2 - 55,5]	33 - 36	[44,8 - 48,8]
28 - 32	[38,0 - 43,3]	26 - 30	[35,3 - 40,6]
11 - 13	[15,0 - 17,6]	9 - 11	[12,3 - 14,9]

Figure 1

CLARK

TYPICAL 18000 CROSS SECTION

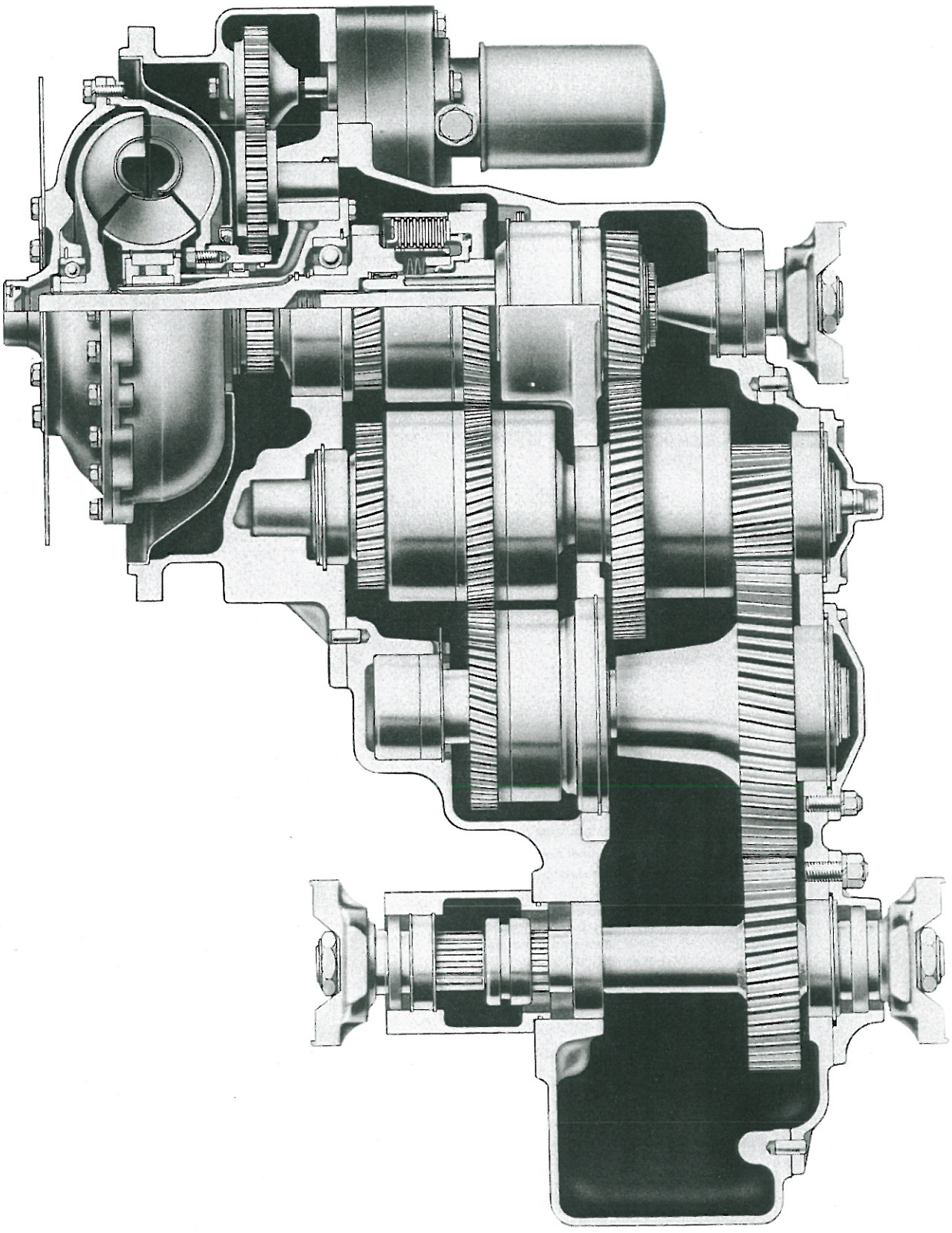


Figure J

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

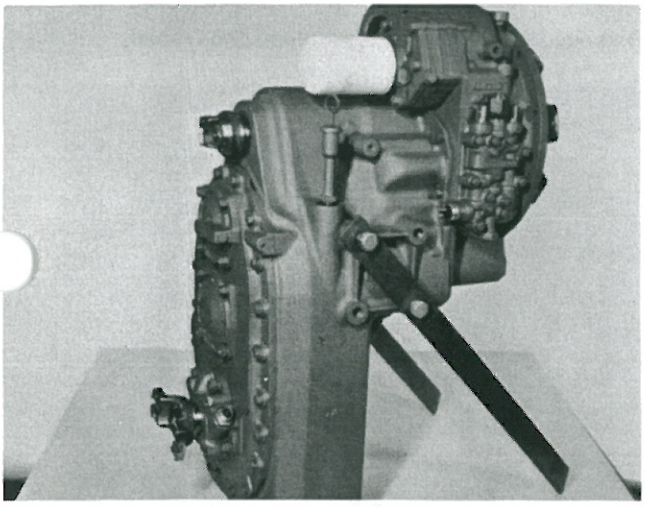


Figure 1
Side view of the 18000 series long drop transmission. The transmission being disassembled is a 3 speed.

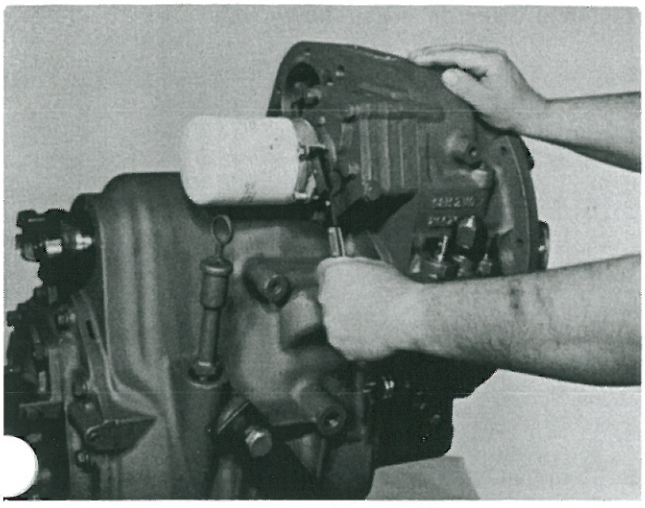


Figure 2
Loosen filter assembly.

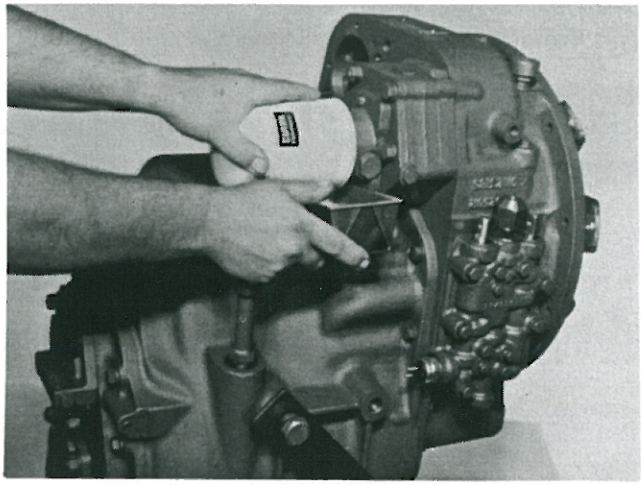


Figure 3
It is recommended a small pan be used to catch the oil left in the filter element. Remove filter element.

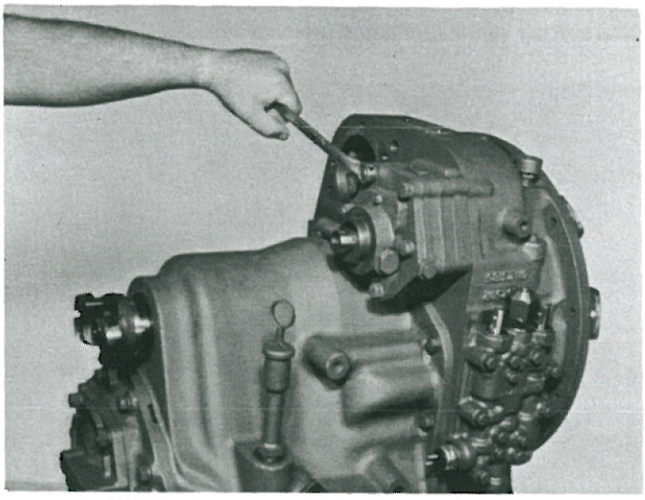


Figure 4
Remove pressure regulating valve and charging pump bolts and stud nuts.

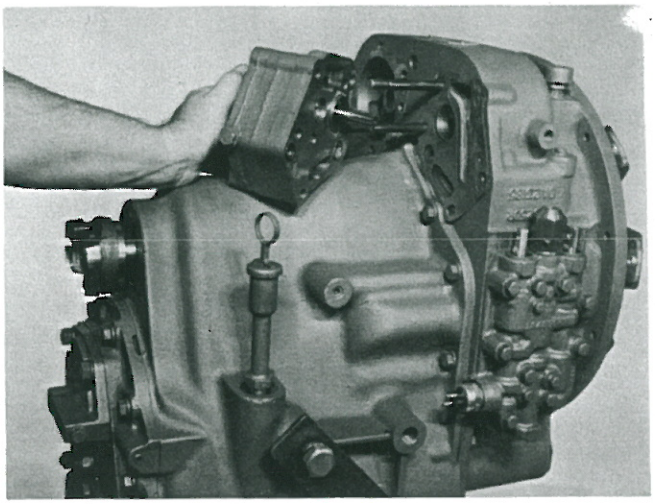


Figure 5
Remove valve and pump assembly.

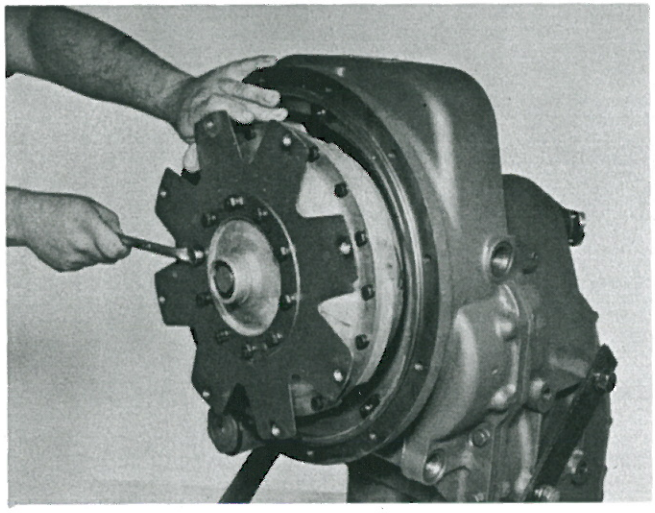


Figure 6
Remove drive plate mounting screws and washers.

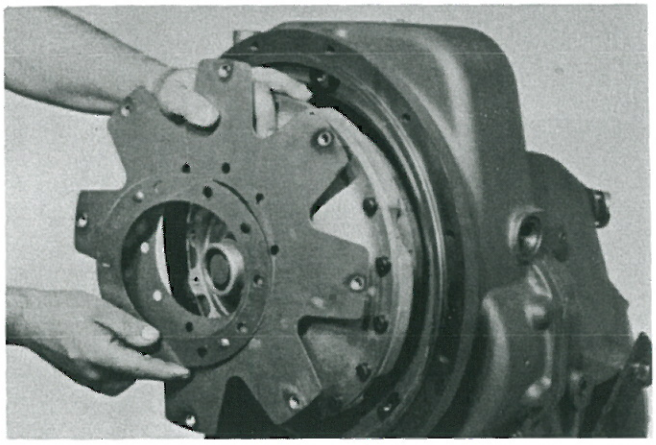


Figure 7
Remove Drive plate and backing ring.

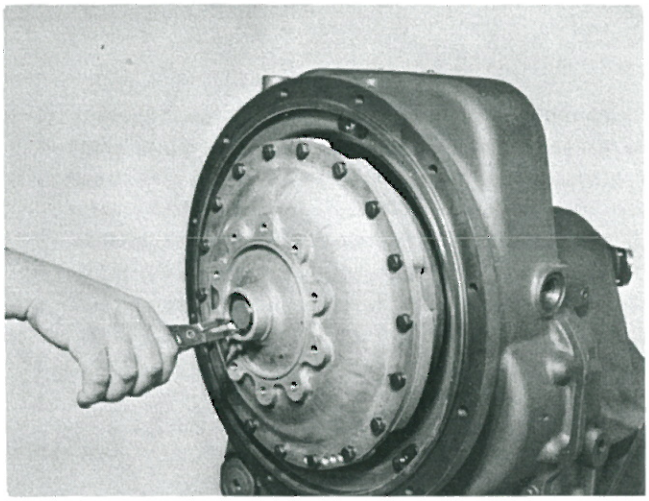


Figure 8
Remove impeller cover bore plug retainer ring.

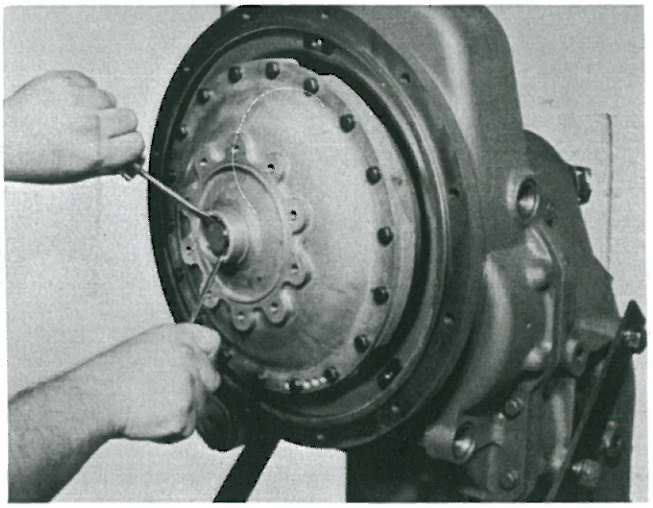


Figure 9
Using two small screw drivers as shown, remove bore plug.

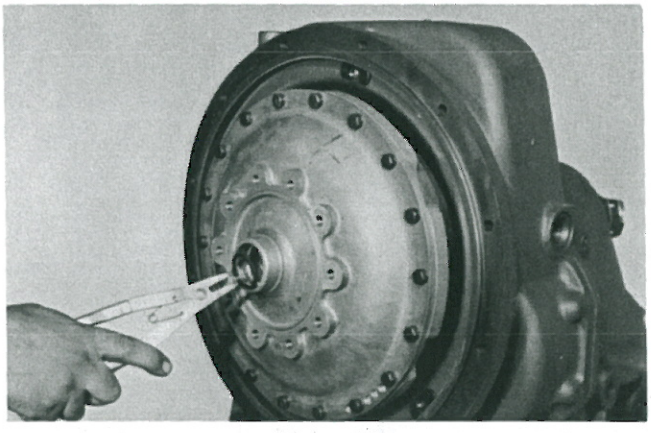


Figure 10
Through bore plug hole, remove turbine retaining ring. See Figure 10-A.

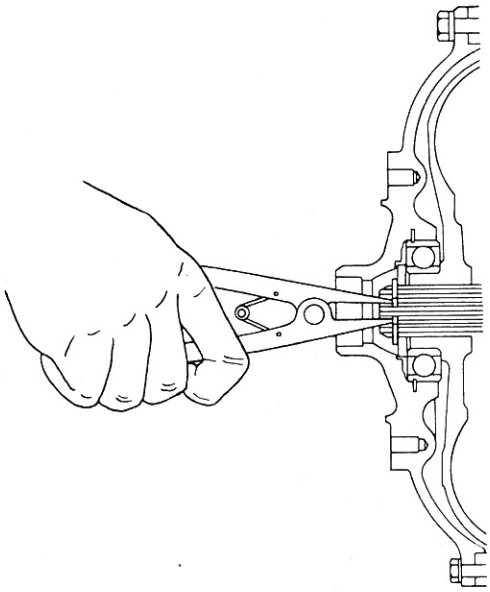


Figure 10-A

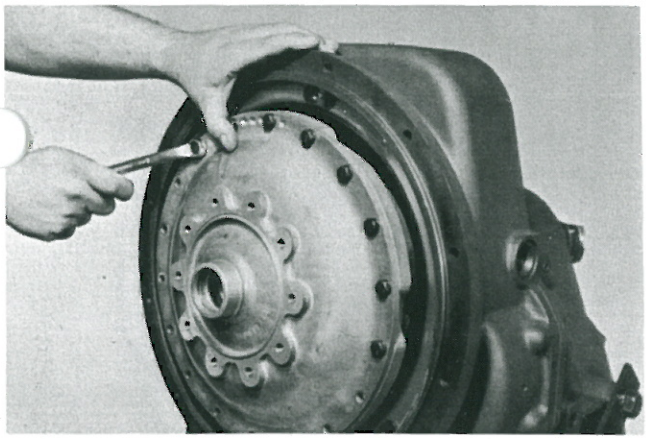


Figure 11
Remove impeller cover to impeller bolts.

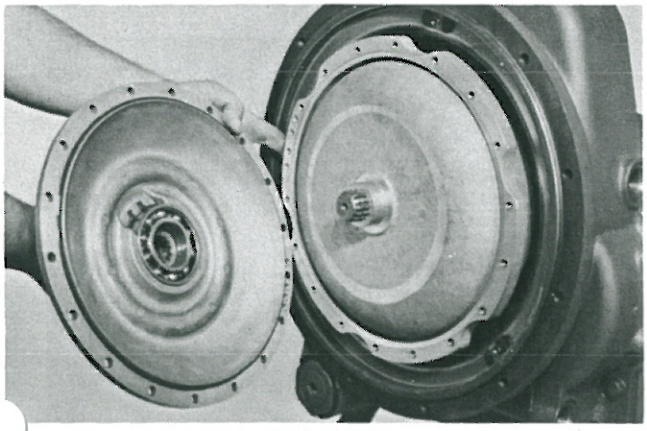


Figure 12
Remove impeller cover. **NOTE:** Turbine may remain in impeller cover bearing and will come off with impeller cover as shown in Figure 13.

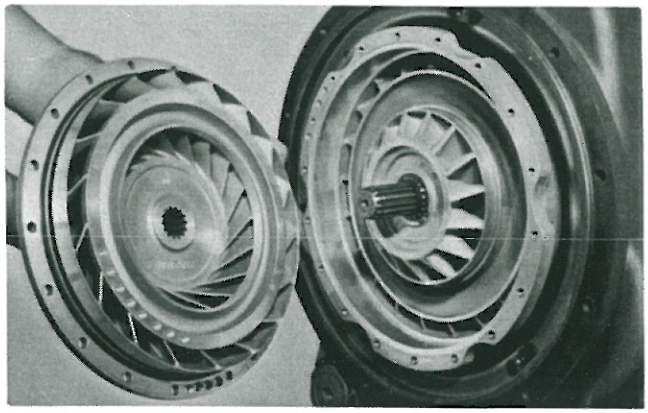


Figure 13
Impeller cover and turbine being removed as an assembly.

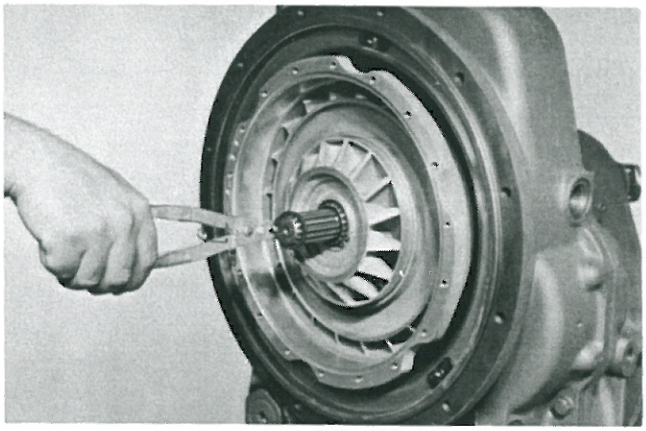


Figure 14
Remove turbine locating ring.

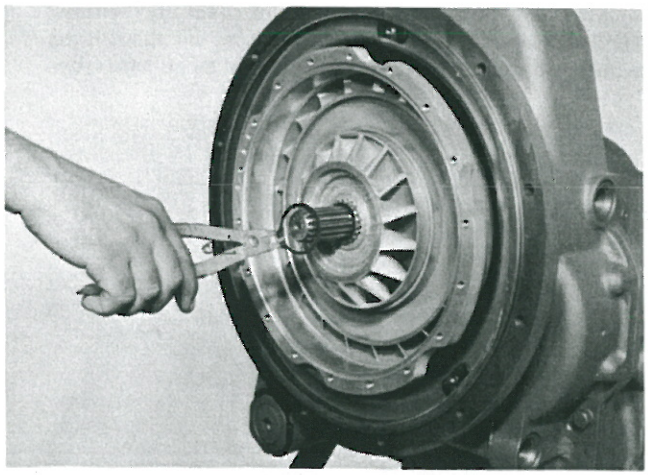


Figure 15
Remove reaction member retainer ring.

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

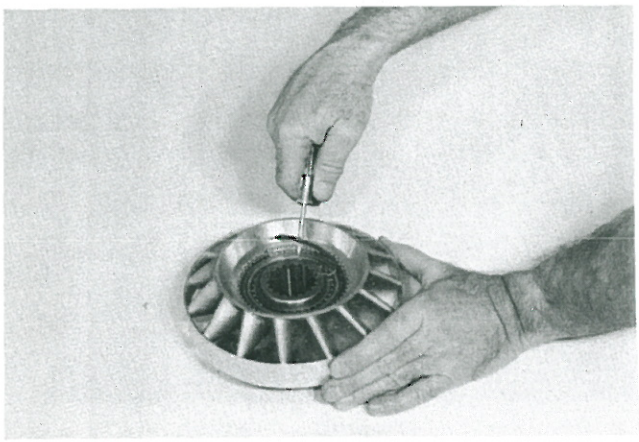


Figure 16

If either the reaction member or the freewheel assembly is to be replaced remove the front outer race to reaction member retainer ring.

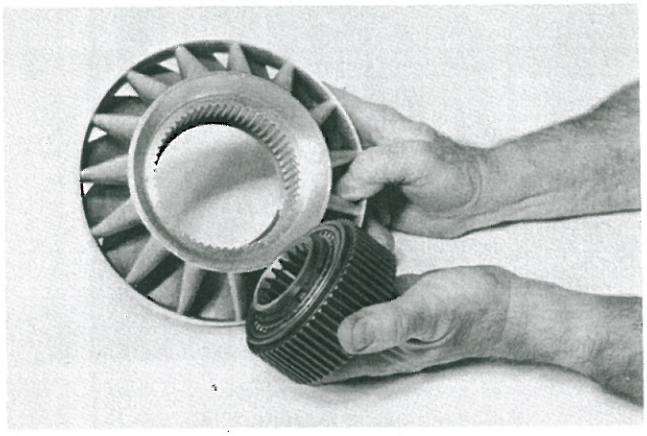


Figure 17

Remove freewheel assembly from the reaction member. **NOTE**: The freewheel assembly cannot be serviced. If the freewheel is damaged it must be replaced as an assembly.

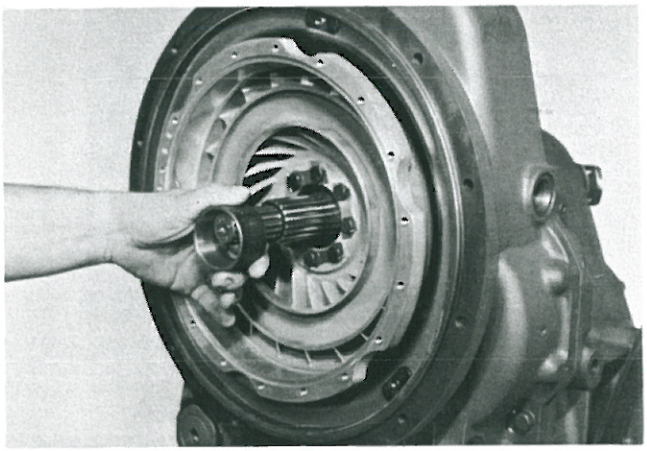


Figure 18

Remove reaction member spacer. Remove impeller and hub assembly.

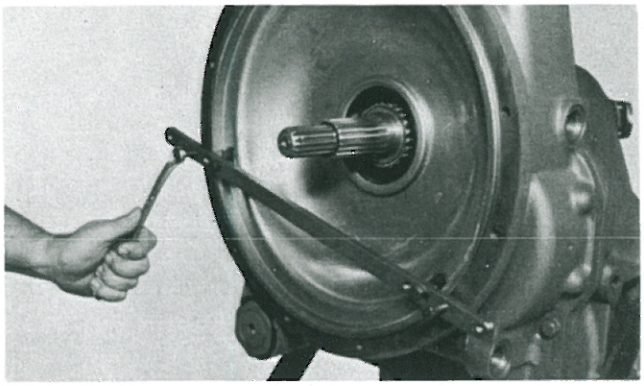


Figure 19

Using oil baffle puller holes provided, remove oil baffle. **NOTE**: Puller tool like shown can be fabricated from diagram shown in Figure 19-A.

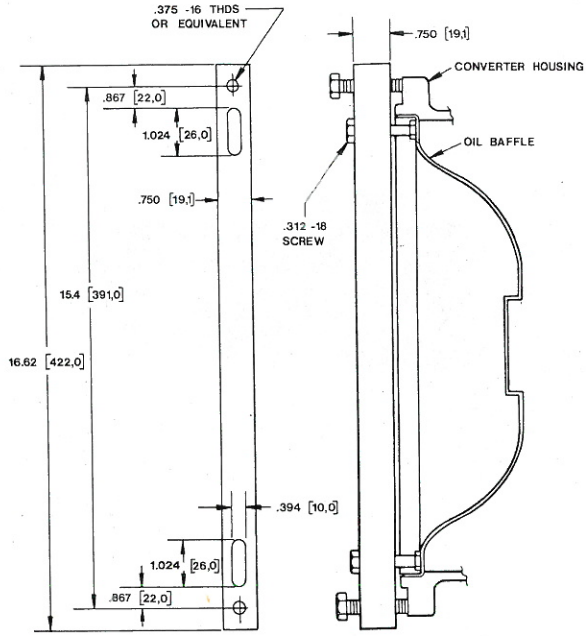


Figure 19-A

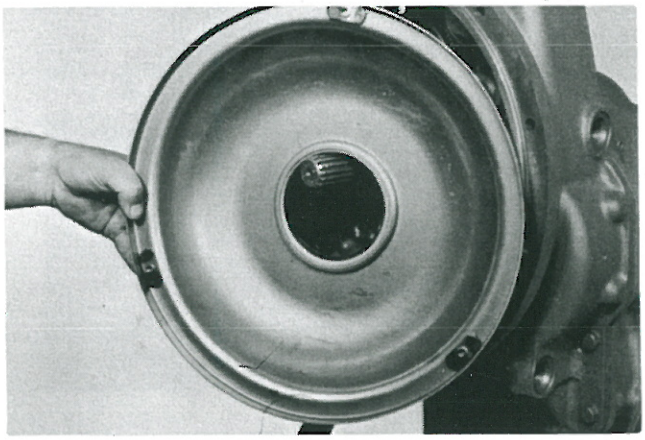


Figure 20

Oil baffle removed.

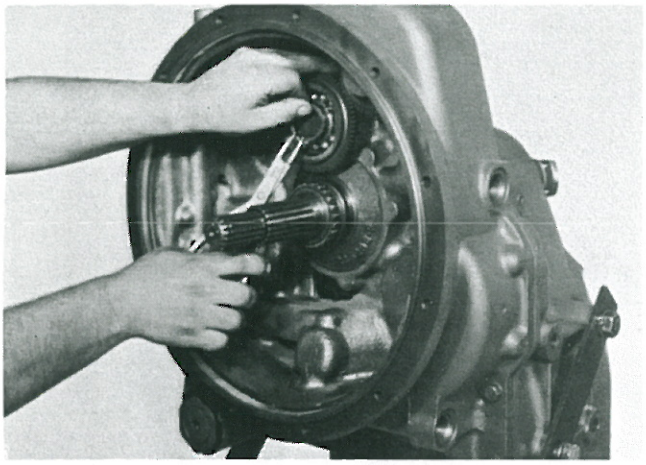


Figure 21
Remove pump drive idler gear retaining ring.

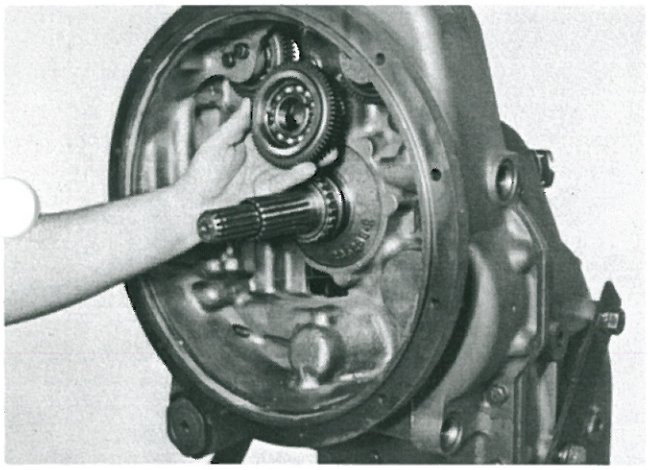


Figure 22
Remove idler gear and bearing assembly.

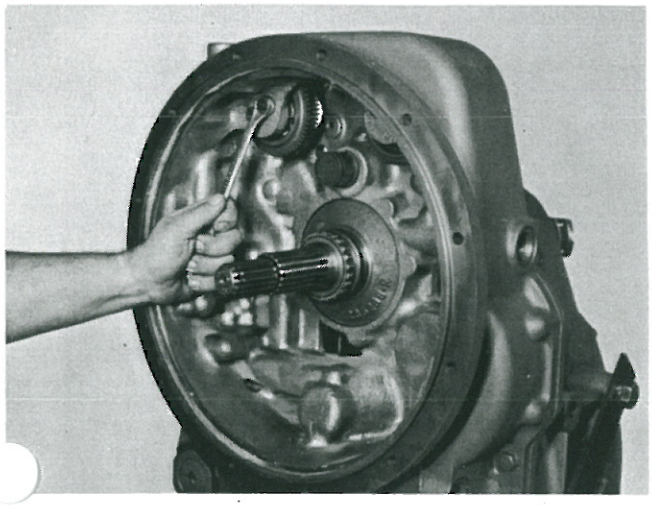


Figure 23
Remove pump drive bearing support screw and lockwasher.

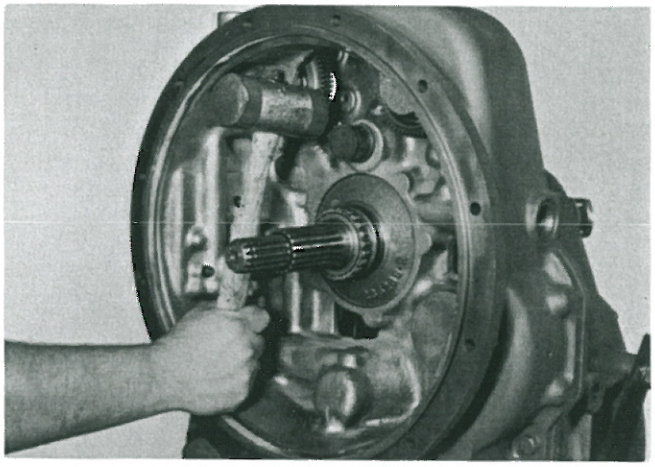


Figure 24
Using a soft hammer, tap pump drive gear and bearing support from housing.

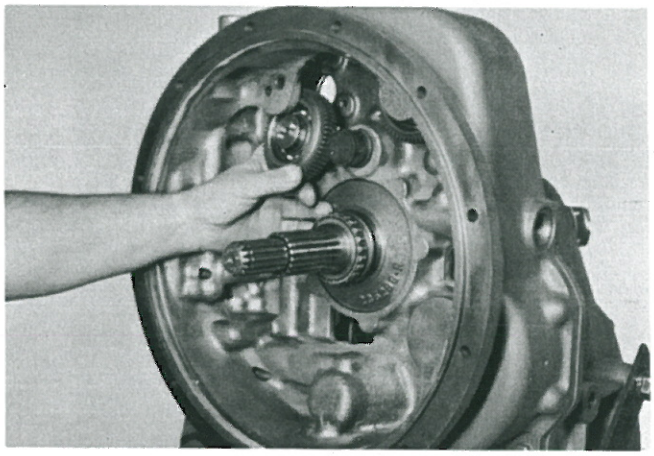


Figure 25
Remove gear and bearing assembly from housing.

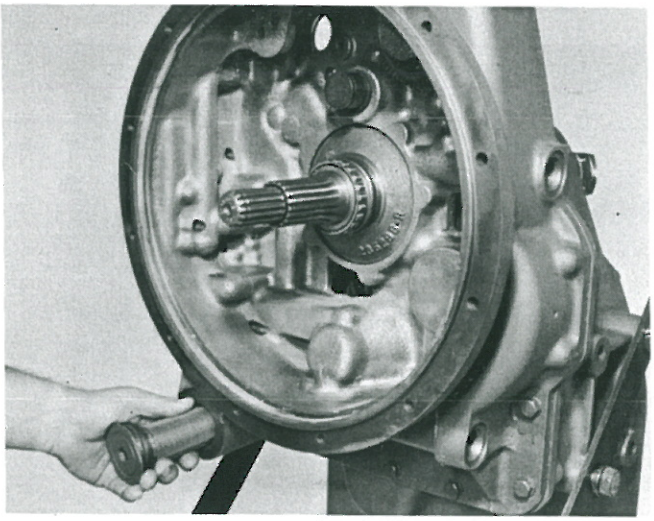


Figure 26
Remove sump screen assembly.

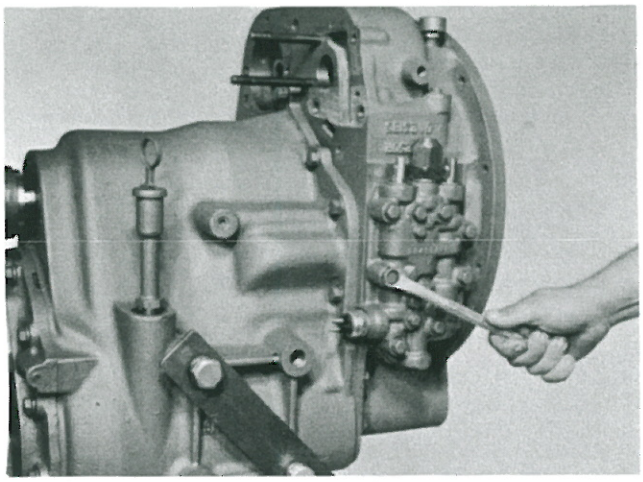


Figure 27

Remove control valve bolts and lockwashers.

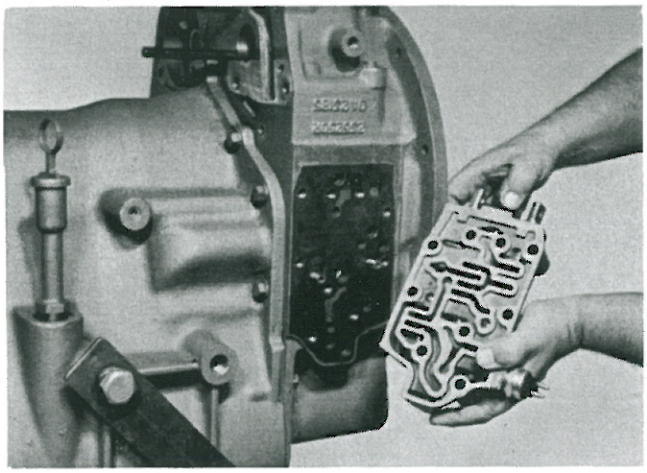


Figure 28

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

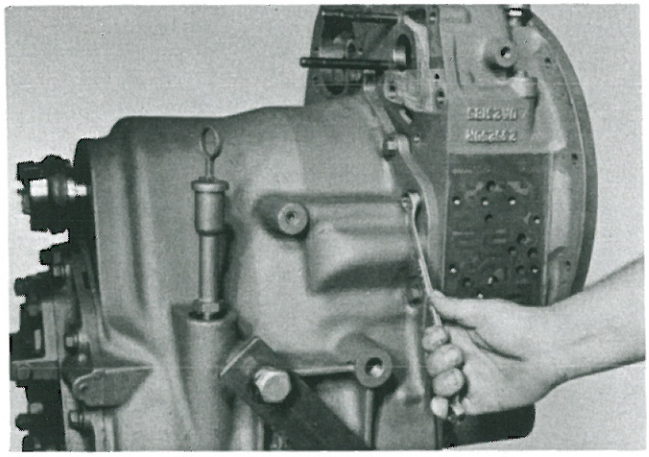


Figure 29

Remove all bolts but one securing transmission to converter housing.

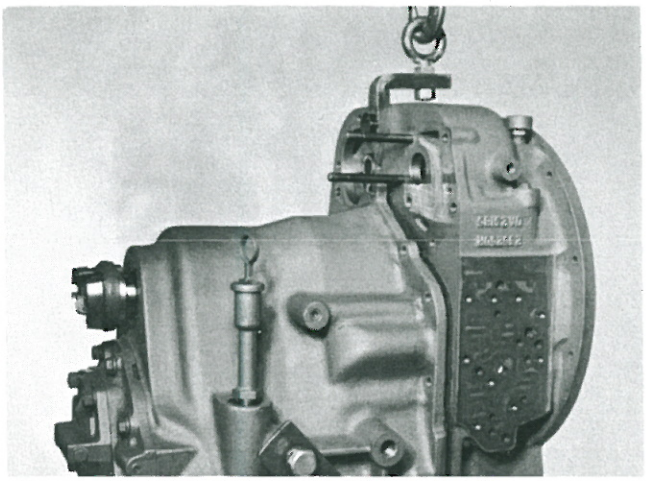


Figure 30

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

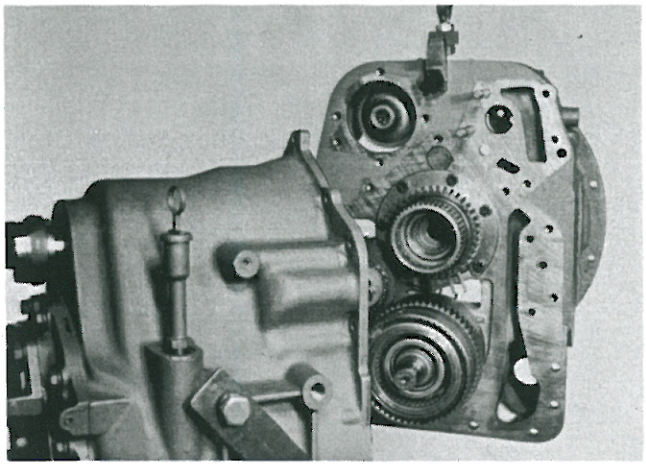


Figure 31

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

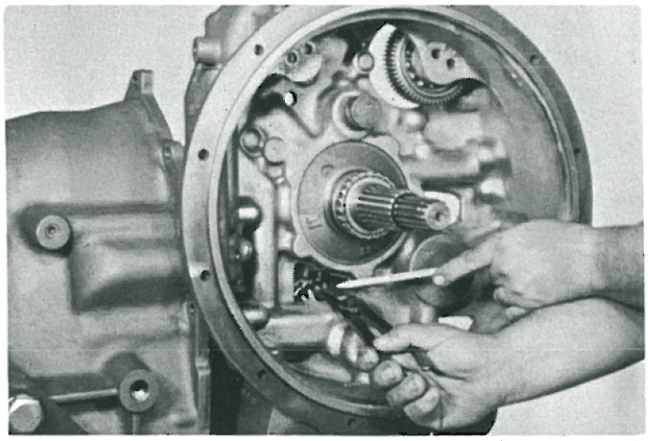


Figure 32

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

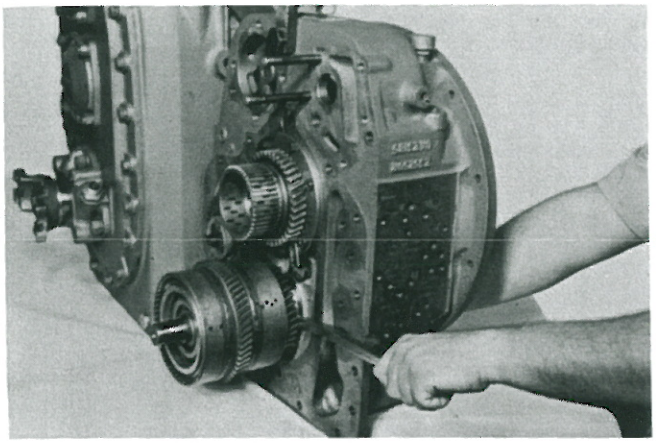


Figure 33
Holding snap ring open pry reverse and 2nd clutch assembly from converter housing.

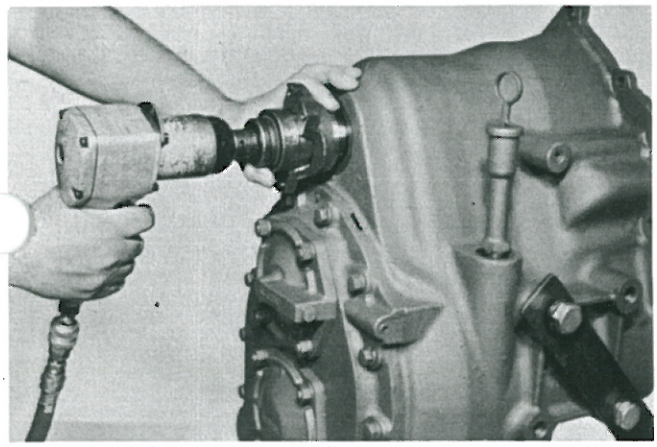


Figure 34
NOTE: P.T.O. is optional, if not used proceed to Figure 39. Using an impact wrench (if available), if not a flange retainer bar must be used to hold the companion flange from turning, loosen P.T.O. flange nut.

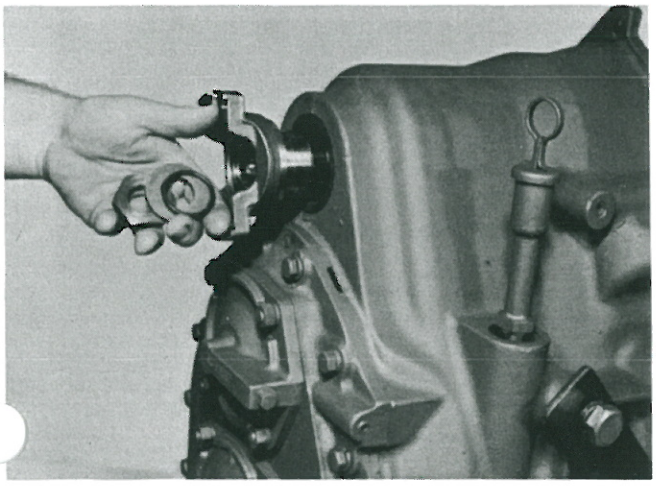


Figure 35
Remove flange nut, washer, "O" ring and flange.

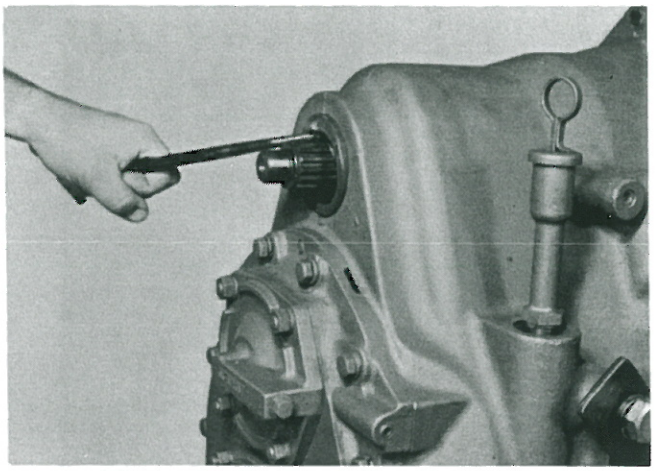


Figure 36
Using a pointed bar or screwdriver, pry oil seal from housing. Use caution as not to damage housing bore.

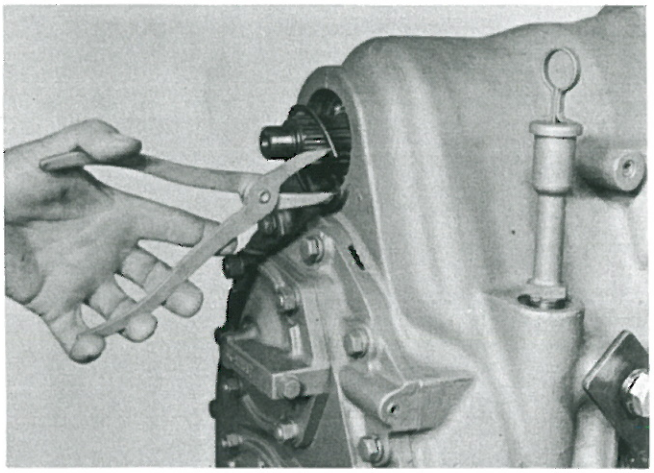


Figure 37
Remove P.T.O. bearing outer snap ring.

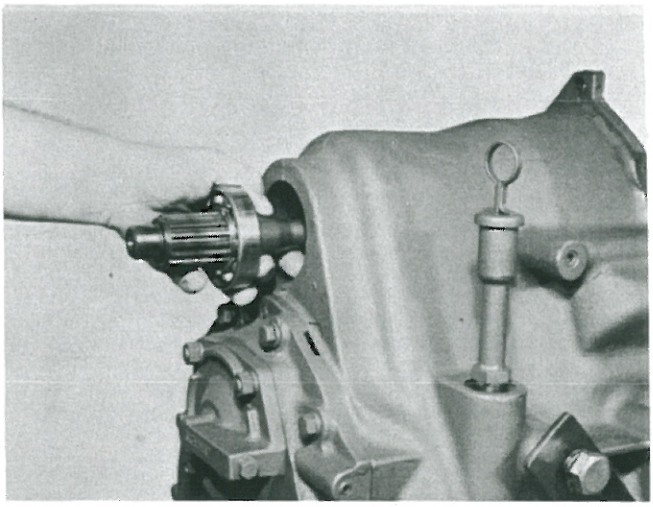


Figure 38
Remove P.T.O. shaft and bearing from housing.

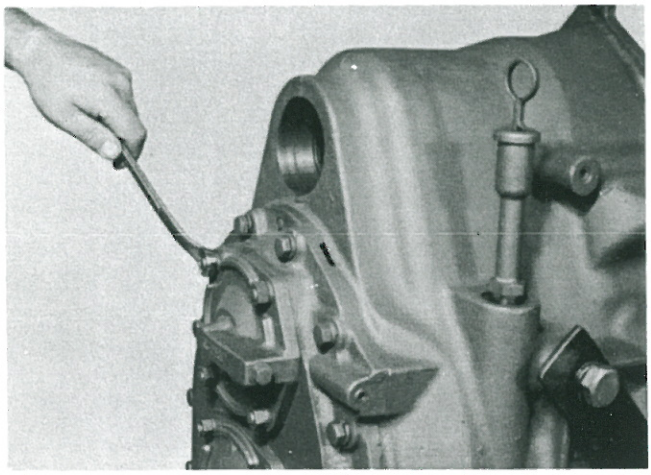


Figure 39
Remove low clutch rear bearing cap stud nuts and washers. Remove cap.

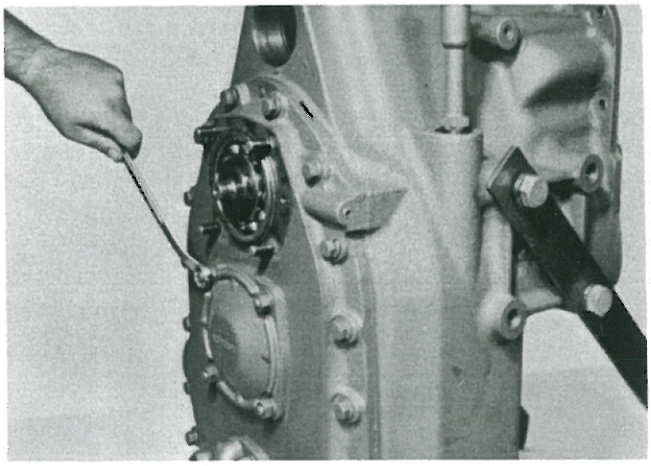


Figure 40
Remove idler shaft bearing cap stud nuts and washers.

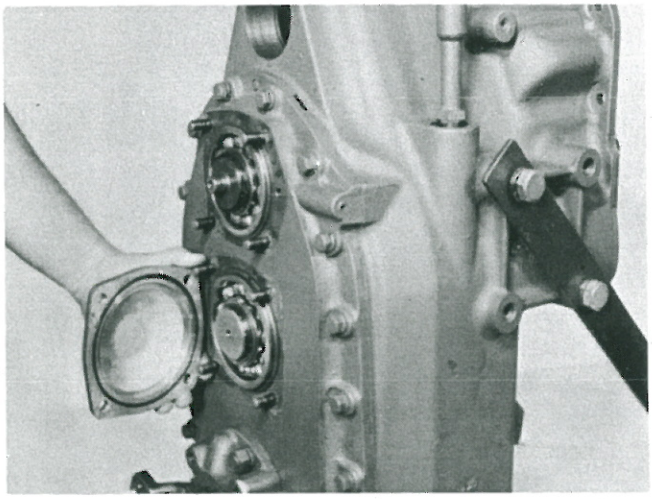


Figure 41
Remove bearing cap.

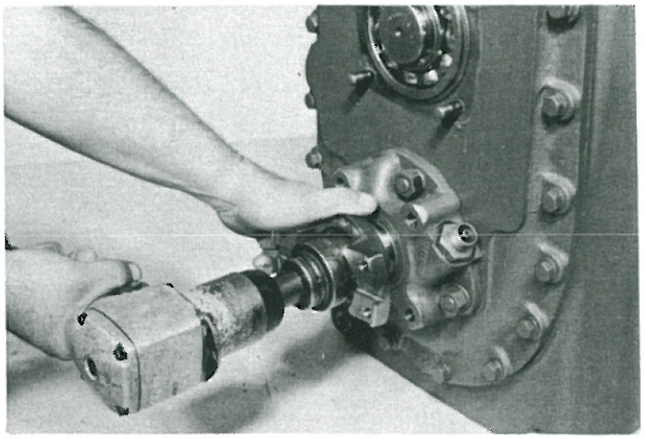


Figure 42
Using an impact wrench (if available), if not a flange retainer bar must be used to hold the companion flange from turning, loosen output flange nut.

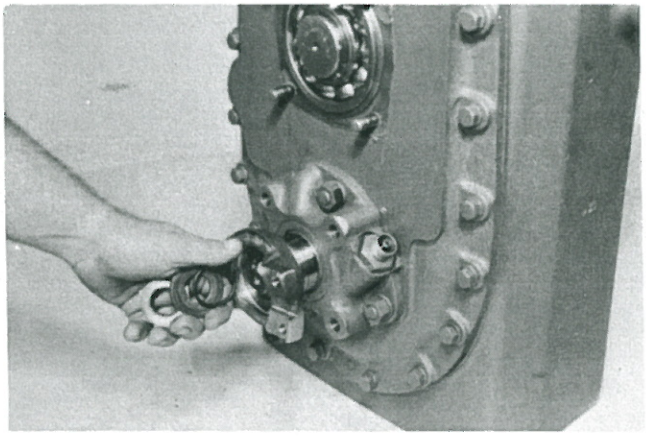


Figure 43
Remove flange nut, washer, "O" ring and flange. If a parking brake is used remove brake drum. Remove brake backing plate bolts and washers. Remove backing plate assembly.

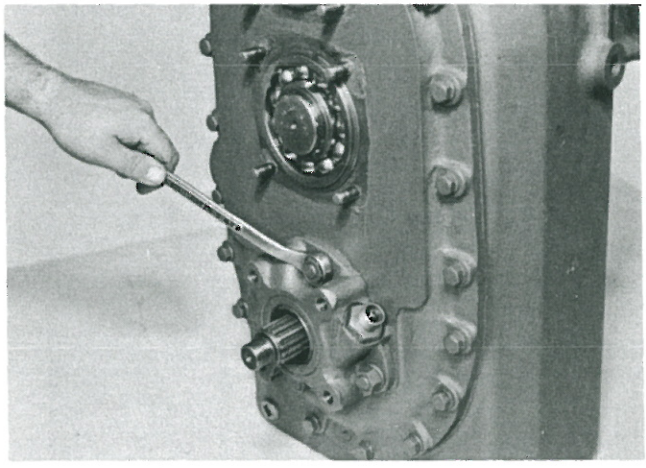


Figure 44
Remove output shaft bearing cap stud nuts and washers.

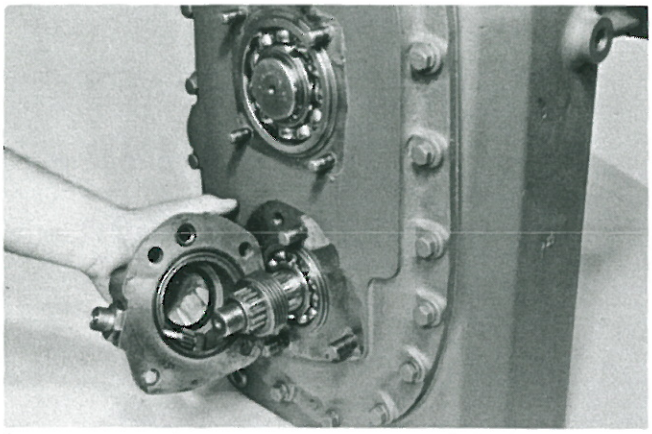


Figure 45
Remove output shaft bearing cap. Cap shown has optional speedometer gear. Remove speedometer drive gear from output shaft.

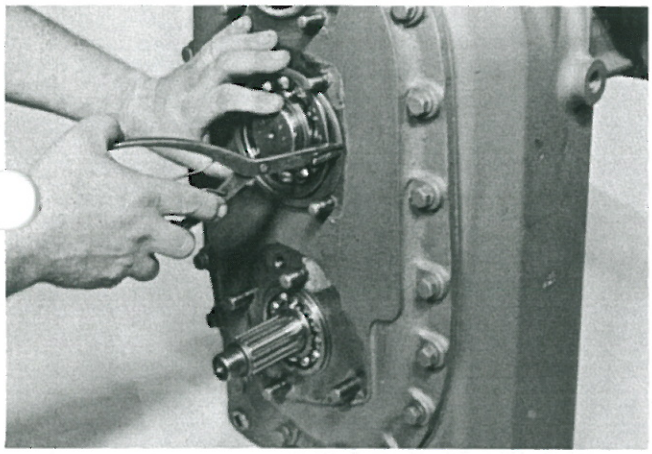


Figure 46
Remove low clutch, idler shaft and output shaft rear bearing locating rings.

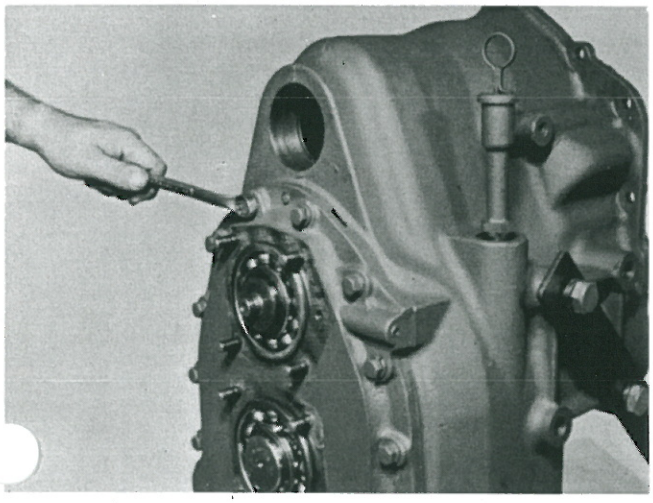


Figure 47
Remove rear cover bolts and washers.

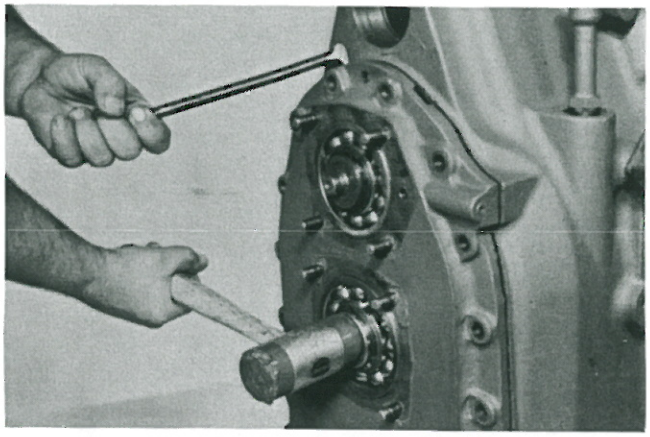


Figure 48
Using pry slots provided, pry cover from transmission housing. Using a soft hammer tap on low clutch, idler and output shafts to prevent cover from binding.

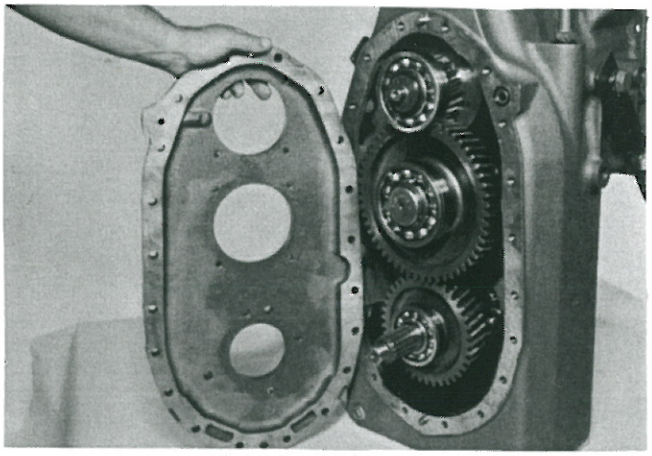


Figure 49
Rear cover removed

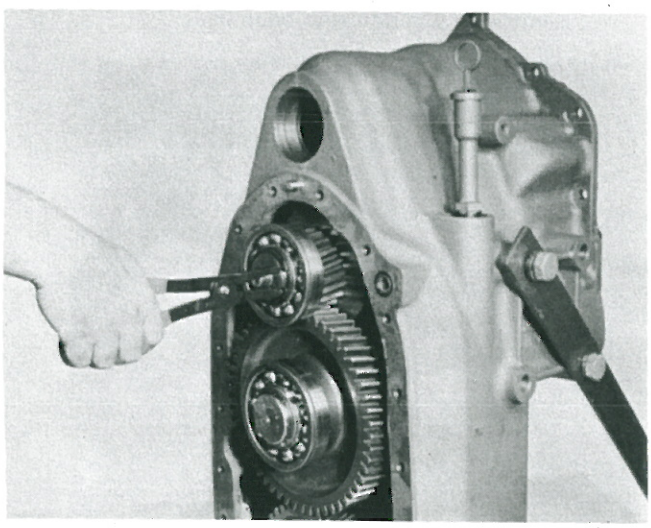


Figure 50
Remove low clutch rear bearing retainer ring.

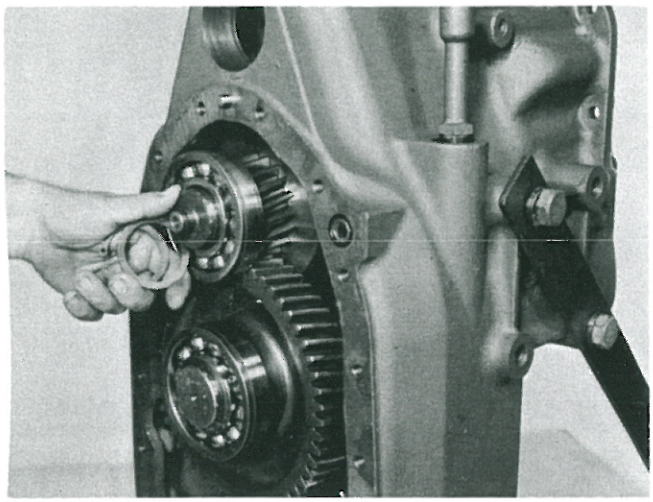


Figure 51
Low clutch rear bearing spacer and retainer ring.

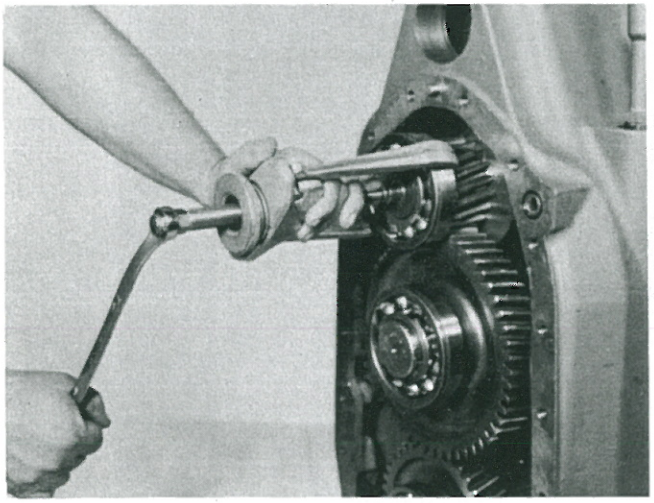


Figure 52
Remove low clutch rear bearing.

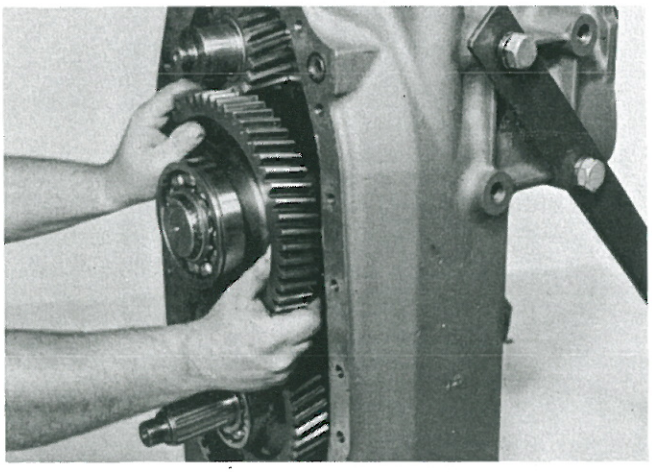


Figure 53
Remove idler gear and rear bearing as an assembly.

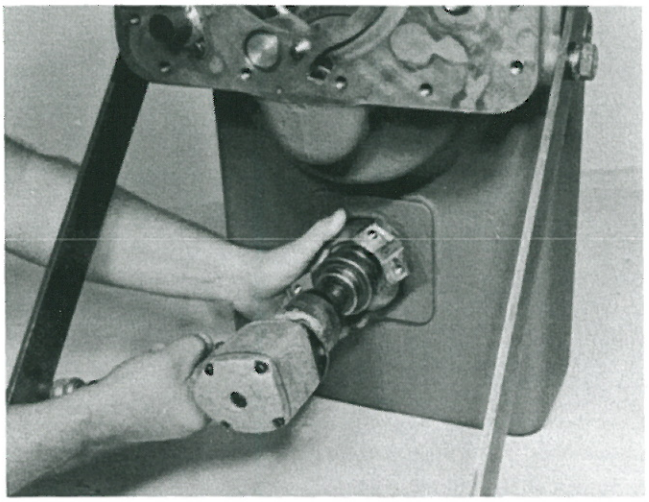


Figure 54
Remove output shaft front flange nut, washer, "O" ring and flange.

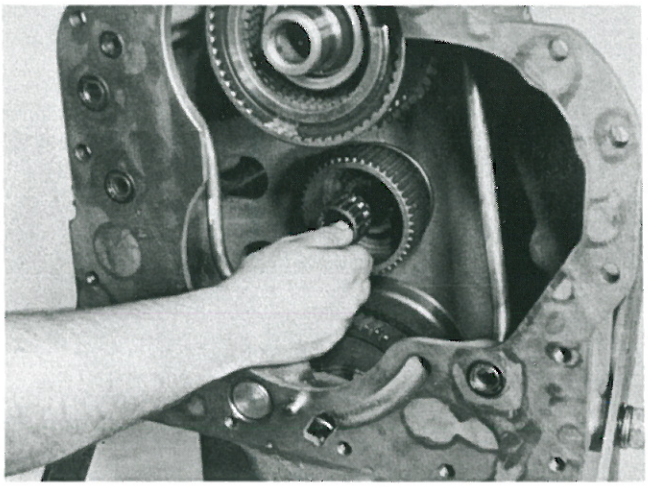


Figure 55
Remove reverse and 2nd clutch pilot bearing.

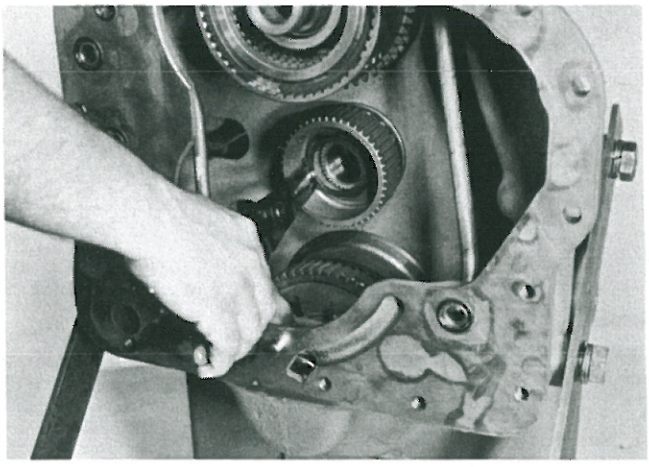


Figure 56
Remove 2nd clutch disc hub retainer ring.

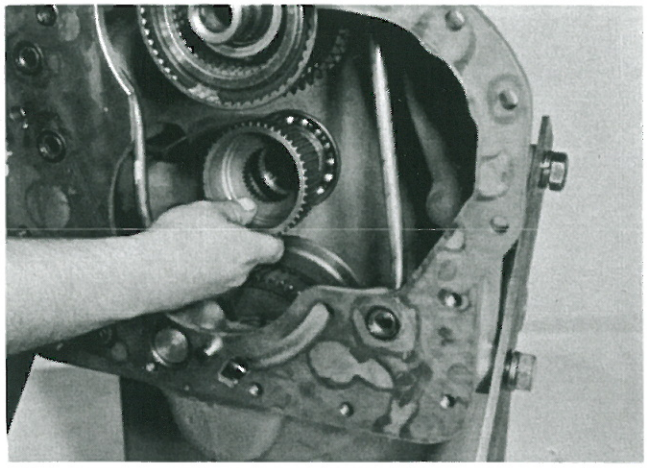


Figure 57
Remove disc hub.

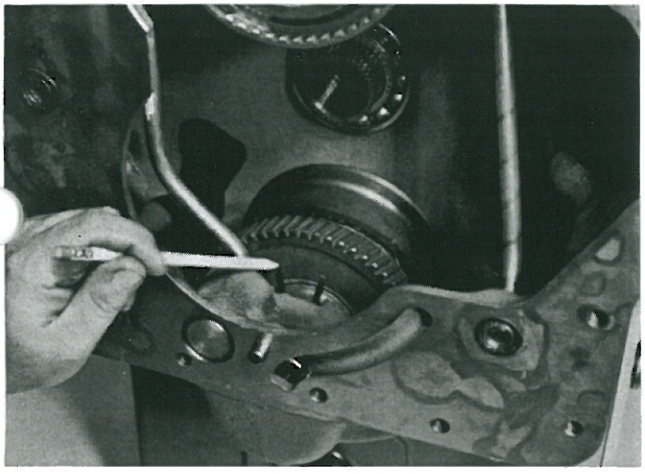


Figure 58
Compress ears on 3rd clutch front bearing locating ring. Remove ring from ring groove. It is not necessary to remove ring from clutch, it will come out when clutch is removed. See Figure 58-A.

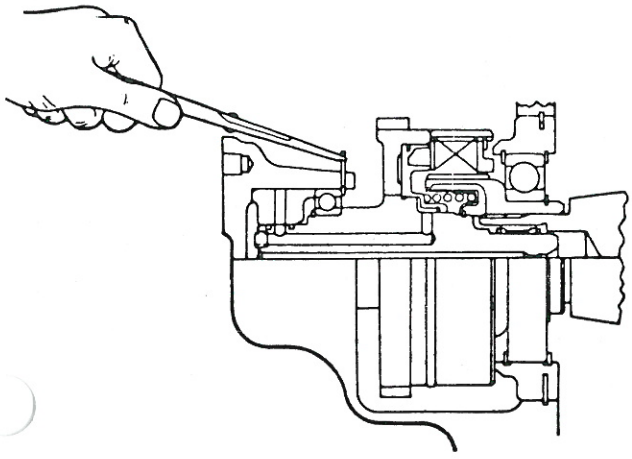


Figure 58-A

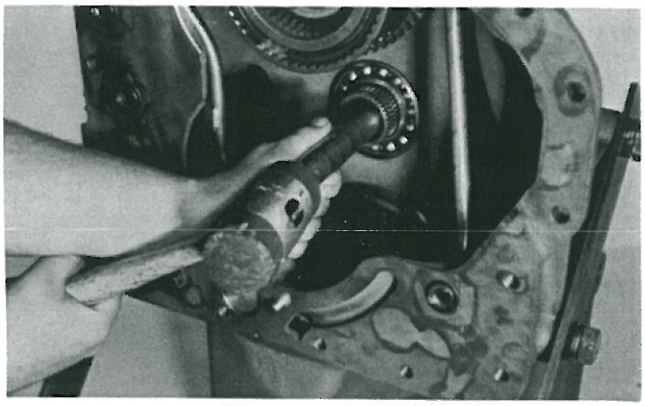


Figure 59
Tap low clutch assembly from housing. If possible it is recommended someone help in this operation to prevent the low clutch from dropping out of the case.

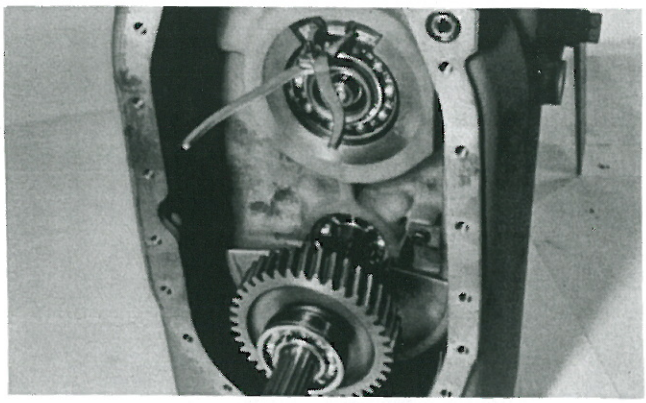


Figure 60
Using contracting type snap ring pliers as shown, contract 3rd clutch bearing carrier locating ring. Lock pliers to hold ring contracted.

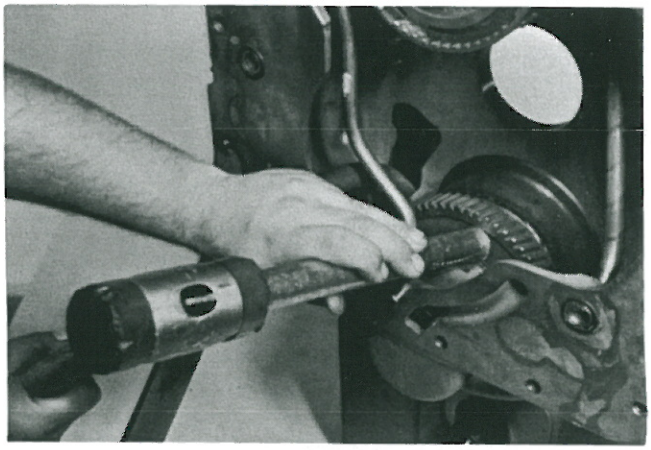


Figure 61
From front of transmission and using a soft bar tap 3rd speed clutch assembly from housing. If clutch seems difficult to remove recheck front and rear snap rings being sure they are clear of the ring groove.

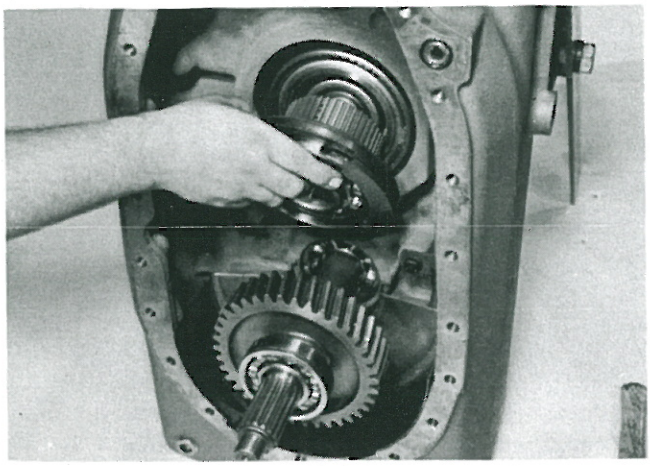


Figure 62
Remove bearing carrier, bearing and 3rd speed clutch disc hub.

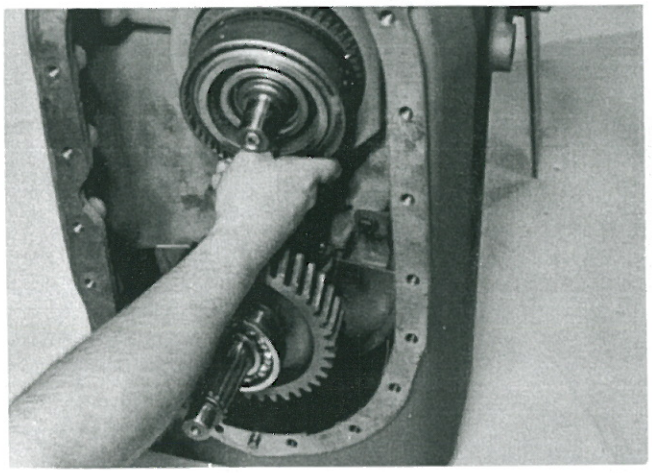


Figure 63
Remove 3rd speed clutch assembly.

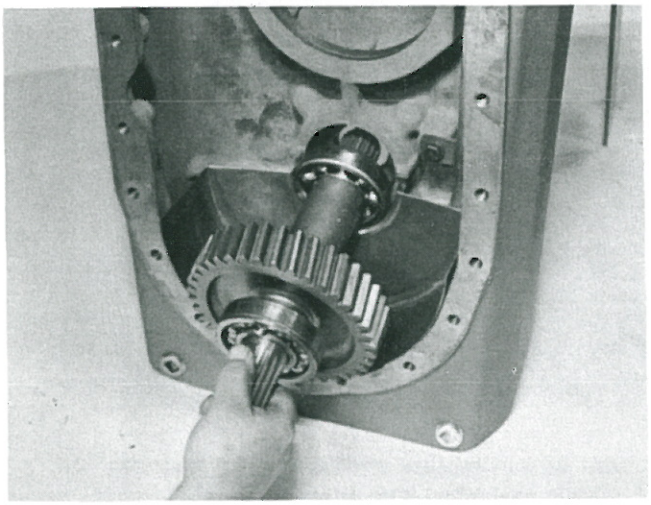


Figure 64
Remove output shaft and bearings as an assembly.

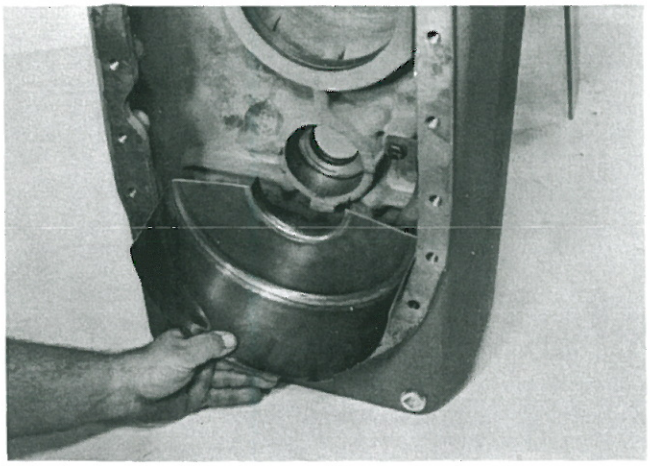


Figure 65
Remove oil sump oil baffle.

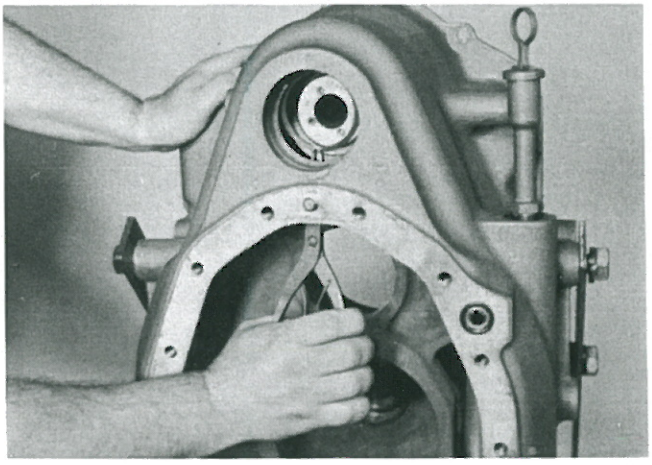


Figure 66
Remove forward clutch shaft drive gear retainer ring. See Figure 66-A.

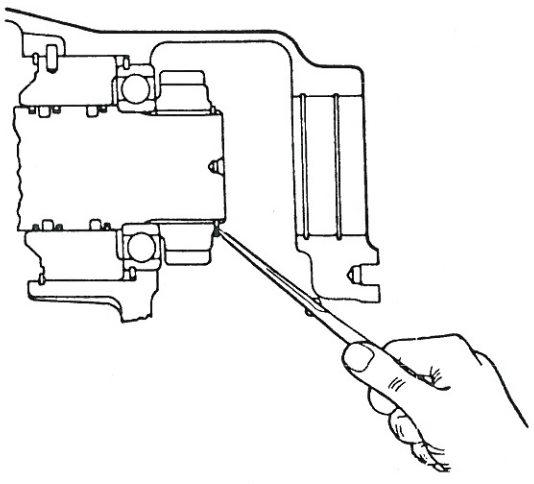


Figure 66-A

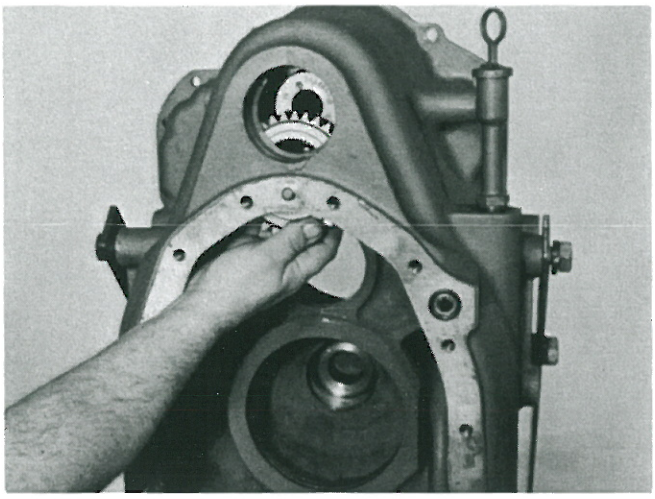


Figure 67
Remove forward clutch shaft drive gear.

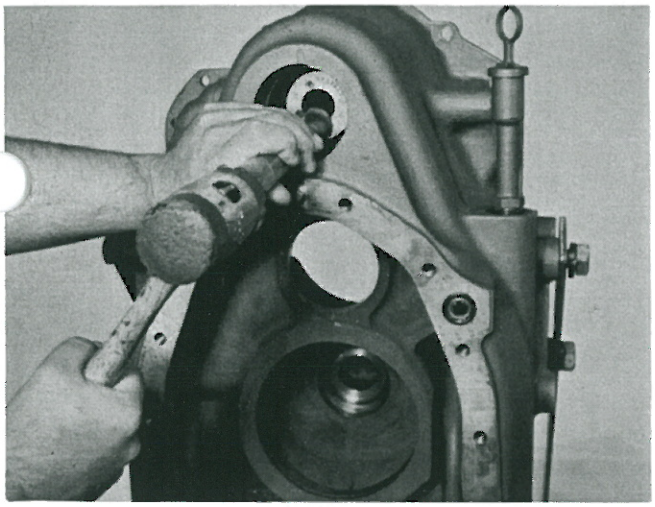


Figure 68
Tap forward clutch from rear bearing.

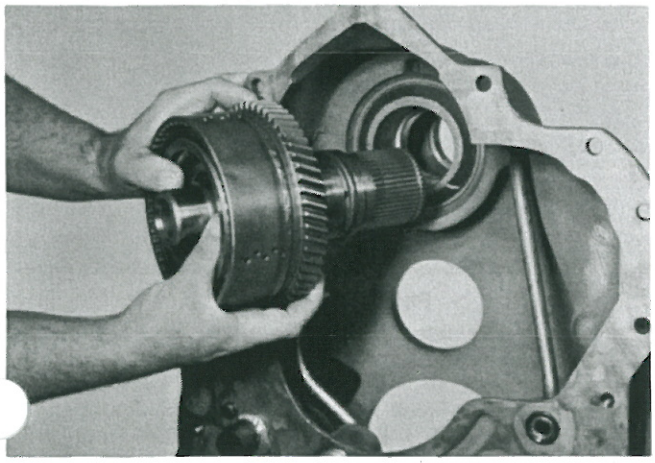


Figure 69
Remove forward clutch assembly.

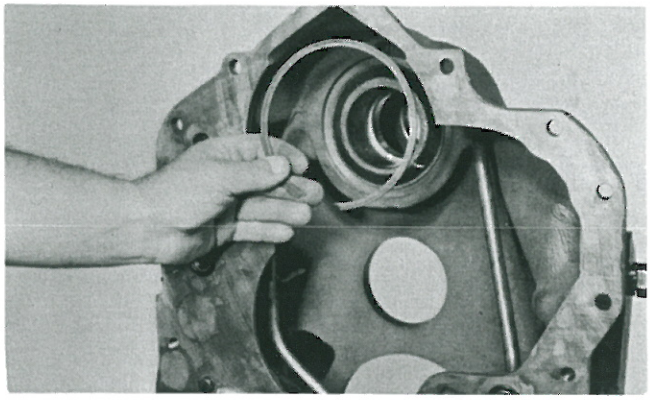


Figure 70
Remove forward clutch piston ring sleeve retainer ring.

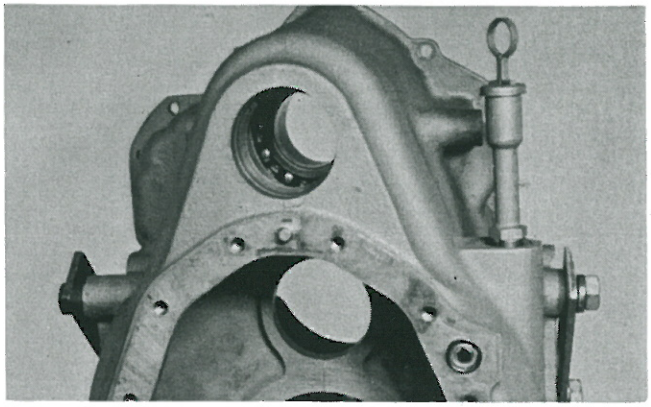


Figure 71
If piston ring sleeve or forward clutch rear bearing is to be replaced, tap bearing from rear of housing.

CLUTCH DISASSEMBLY

Low Clutch

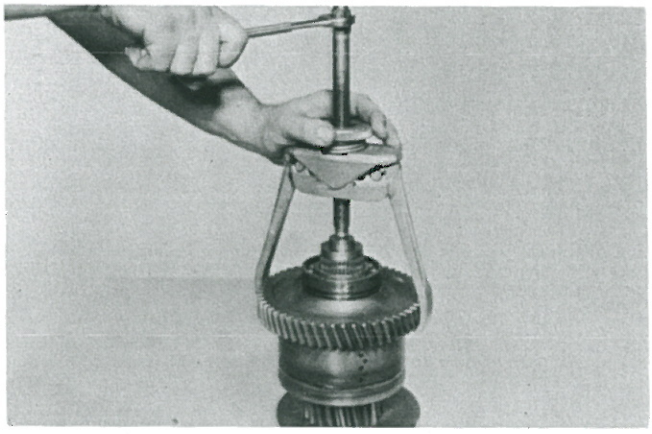


Figure 72
Remove low gear and hub, bearing spacer and low clutch front bearing.

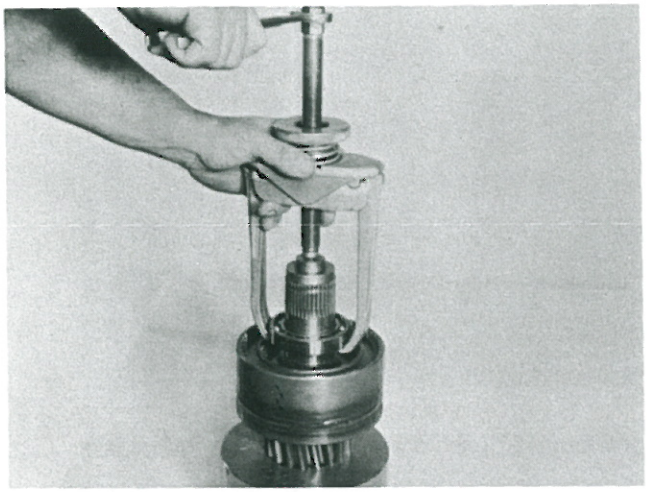


Figure 73
Remove low speed gear bearing.

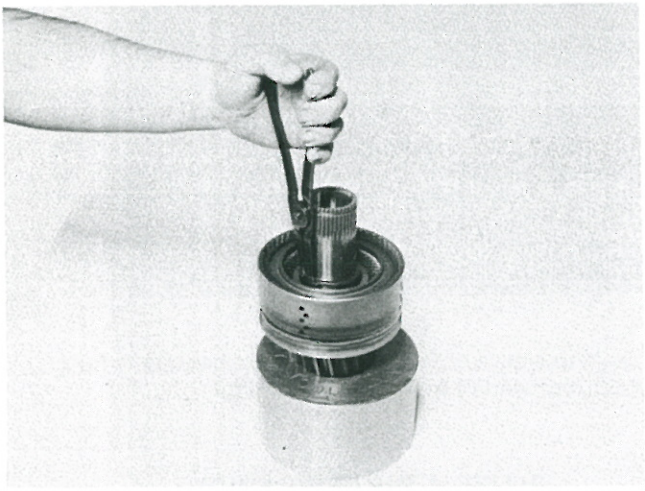


Figure 74
Remove low gear bearing locating ring.

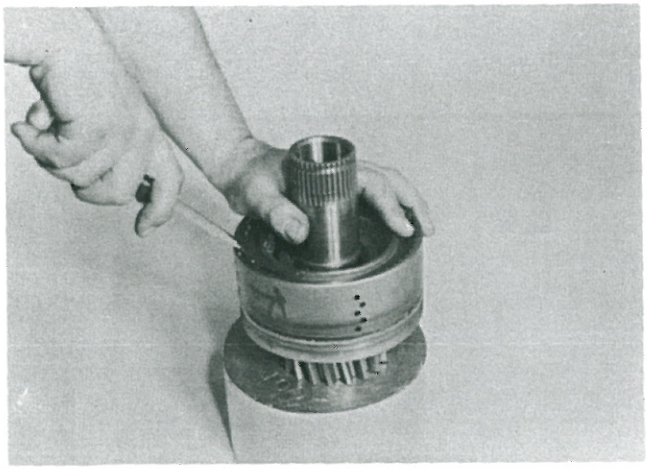


Figure 75
Remove end plate retainer ring.

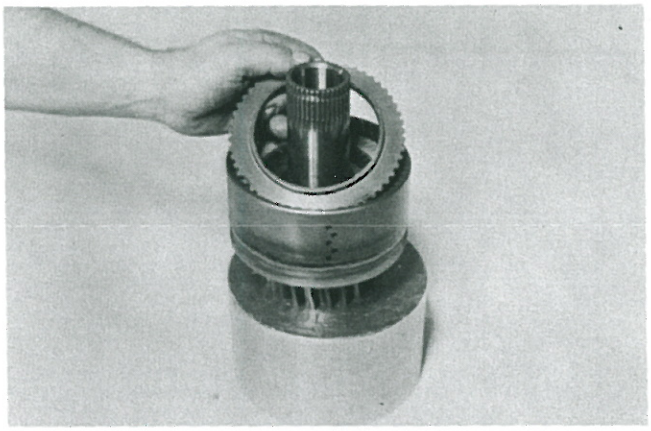


Figure 76
Remove end plate.

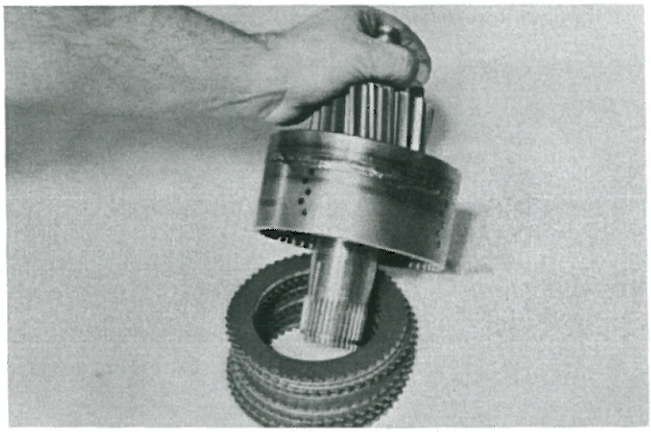


Figure 77
Turn clutch over. Remove inner and outer clutch discs. **Do not mix low clutch friction discs with friction discs in other clutches.**

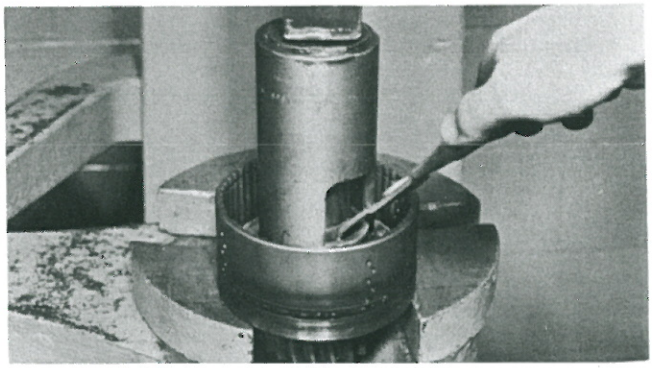


Figure 78
Remove clutch piston return spring. A sleeve with a portion removed is recommended for removing the clutch piston return spring, washer, and retainer ring. Sleeve shown is a common pipe, with a 1-1/2 x 1 [39,0x26,0mm] opening. The pipe is 6 x 3-1/4 x 2-3/4 [155,0x85,0x78,0mm]. Compress spring retainer washer. Through opening remove spring retainer snap ring. Release tension on spring retainer.

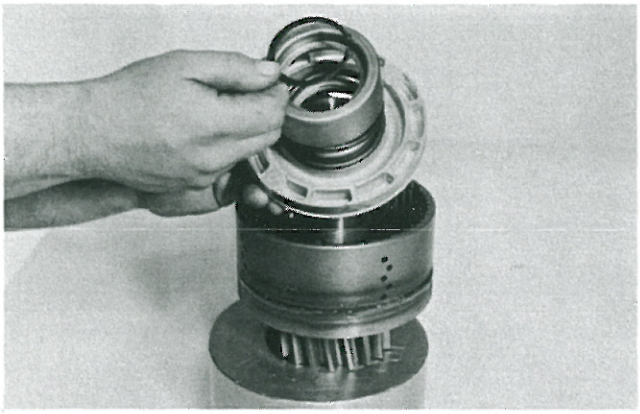


Figure 79

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

LOW CLUTCH REASSEMBLY

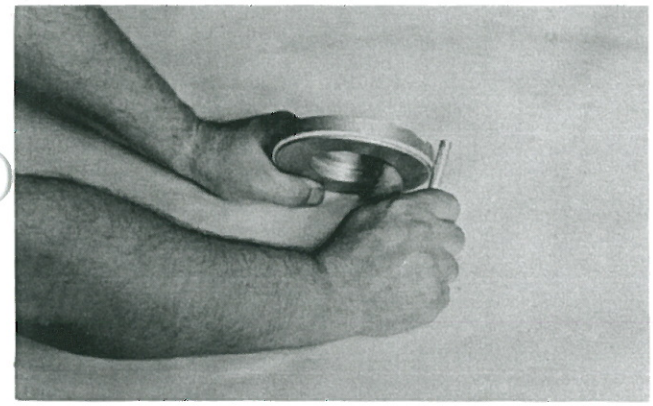


Figure 80

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.

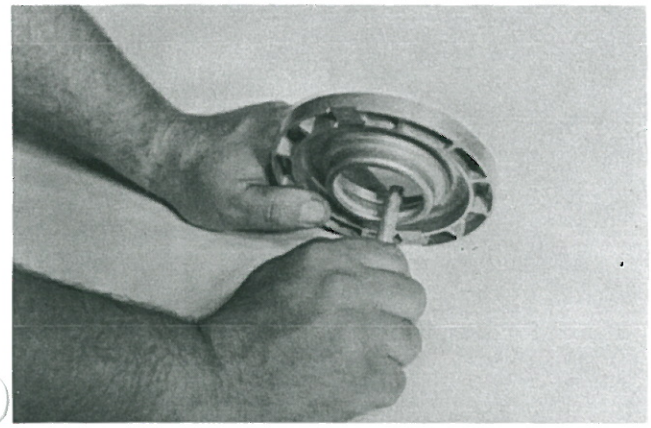


Figure 81

Install clutch piston inner seal ring and size as described in Figure 80.

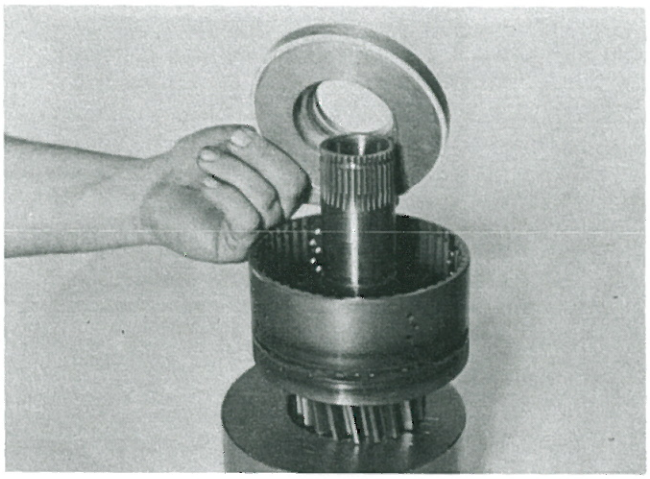


Figure 82

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

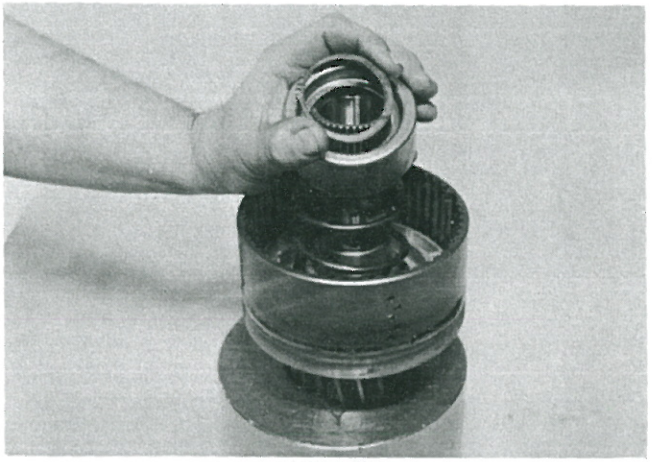


Figure 83

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

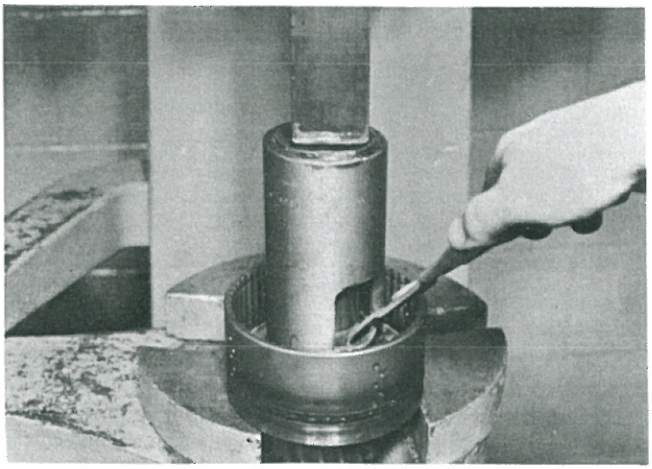


Figure 84

Compress spring and retainer. Install retainer snap ring.

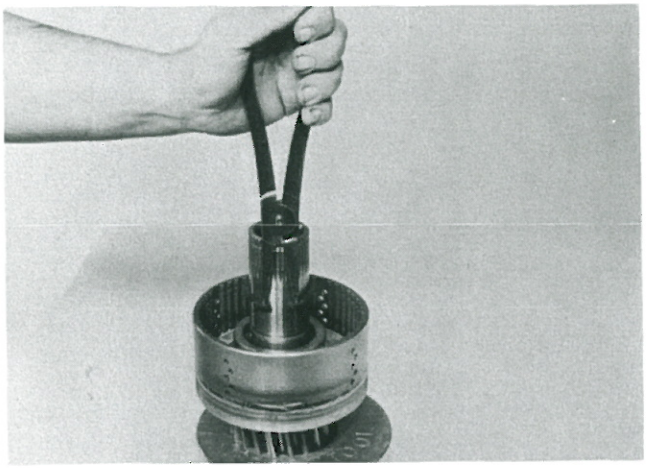


Figure 85
Install clutch inner bearing locating ring.

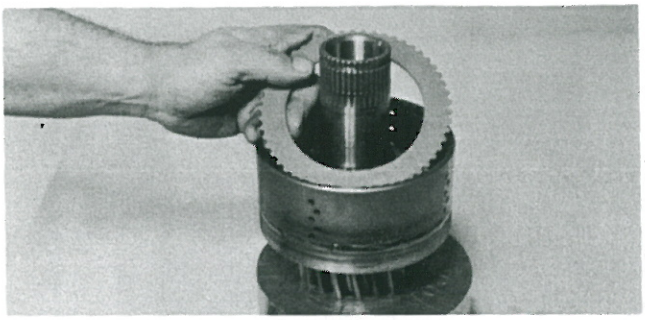


Figure 86
Install one steel disc.

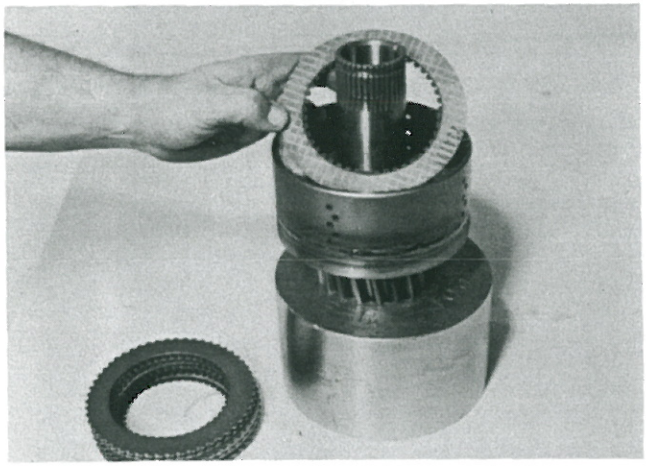


Figure 87
Install one friction disc. **NOTE:** The friction discs in the low clutch has a higher co-efficient rating than the friction discs in the other clutches therefore the discs must not be mixed. The low clutch friction disc has a yellow mark of nonsoluble paint on the outer diameter for permanent identification. 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.

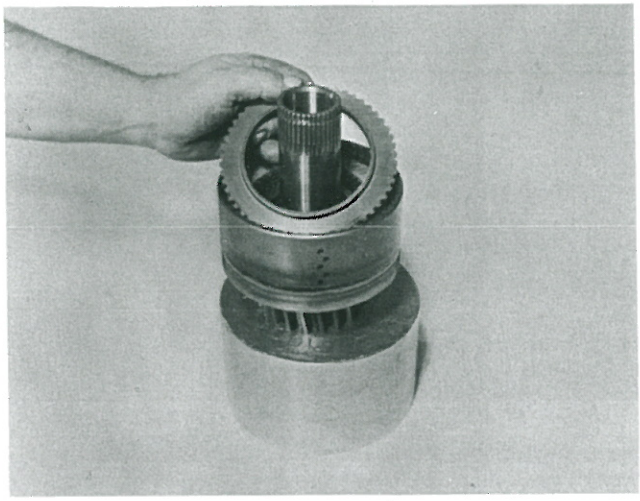


Figure 88
Install clutch disc end plate.

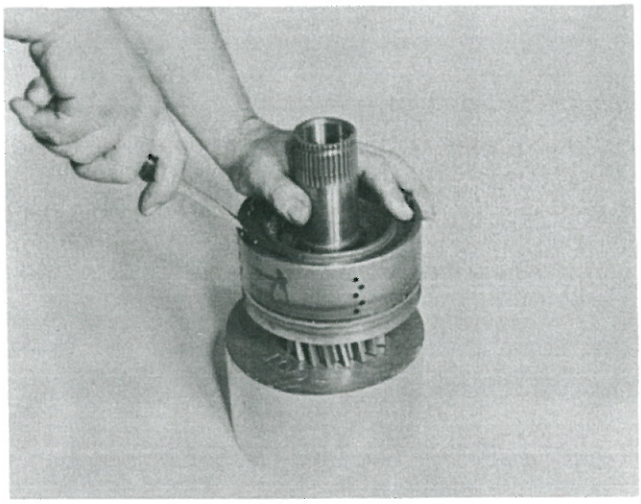


Figure 89
Install end plate retainer ring.

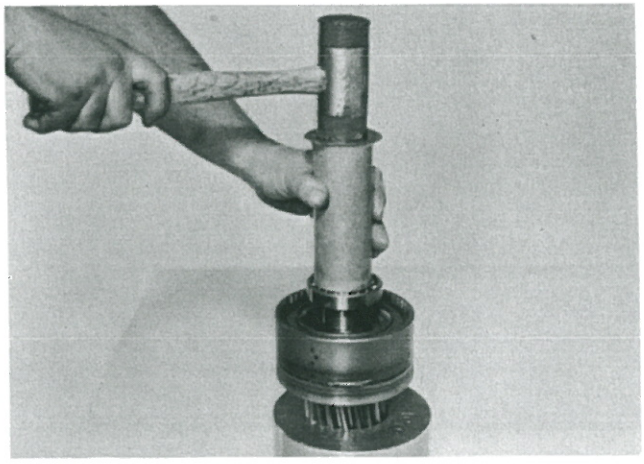


Figure 90
Install low speed gear inner bearing.

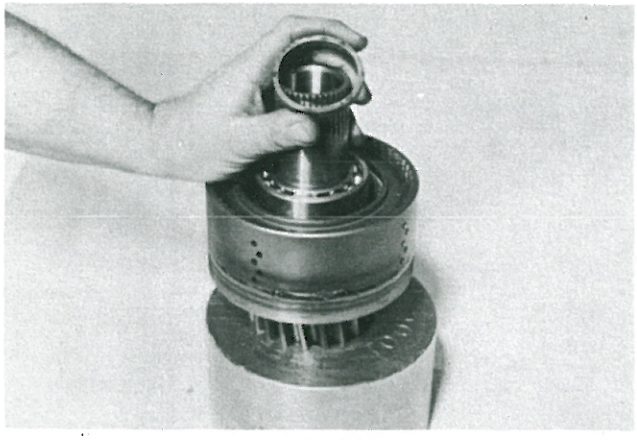


Figure 91
Install low speed gear bearing spacer.

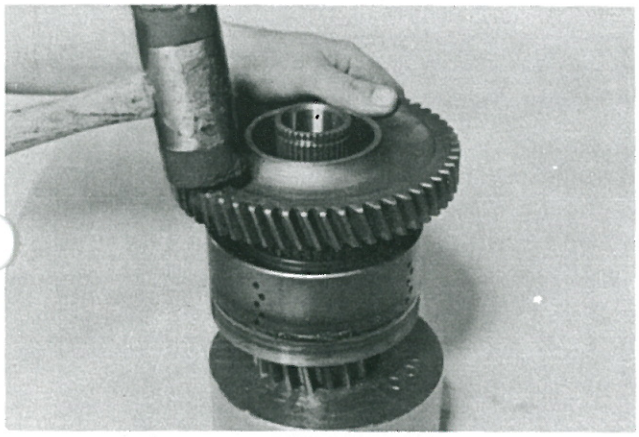


Figure 92
Install low clutch driven gear and hub into clutch drum. Align splines on clutch hub with internal teeth of friction discs. Tap gear into position. Do not force this operation. Gear splines must be in full position with internal teeth of all friction discs.

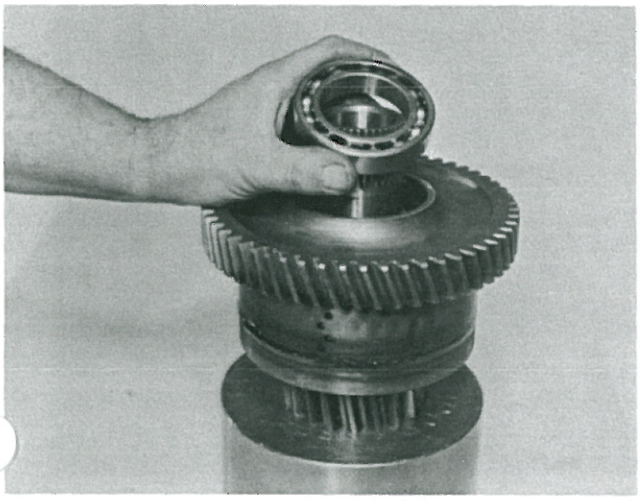


Figure 93
Install low speed gear outer bearing.

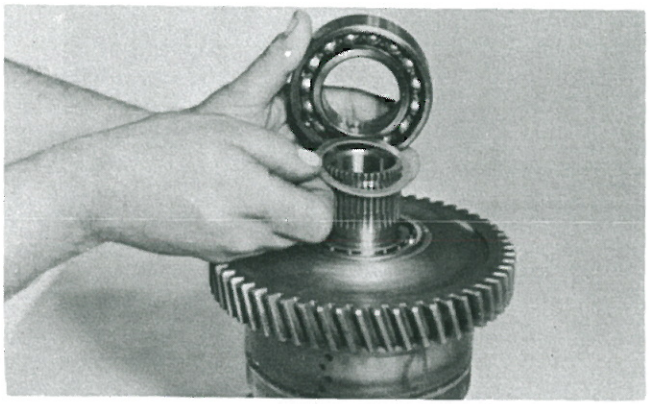


Figure 94
Position low gear front bearing spacer and bearing on clutch shaft.

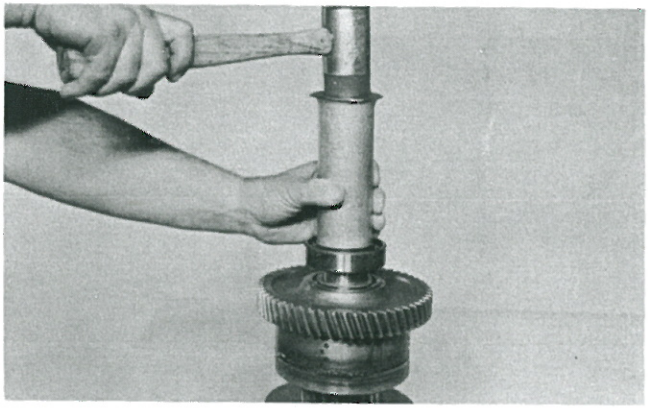


Figure 95
Tap bearing into position.

REVERSE AND 2nd CLUTCH DISASSEMBLY
(Reverse being disassembled)

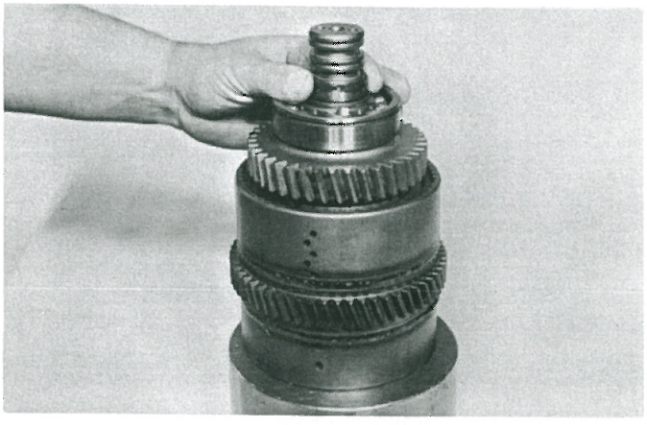


Figure 96
Remove clutch shaft piston rings.

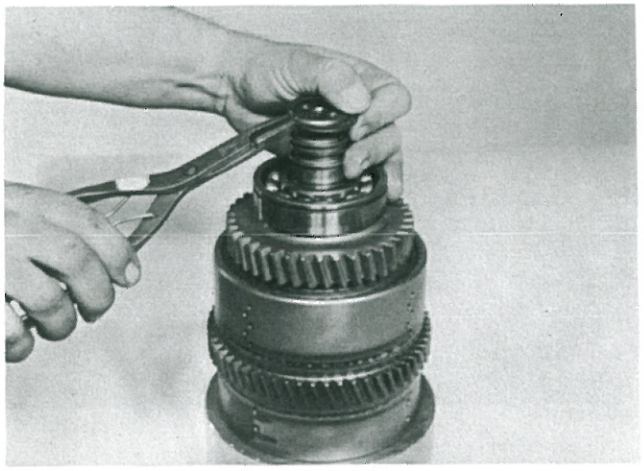


Figure 97
Remove front bearing retainer ring.

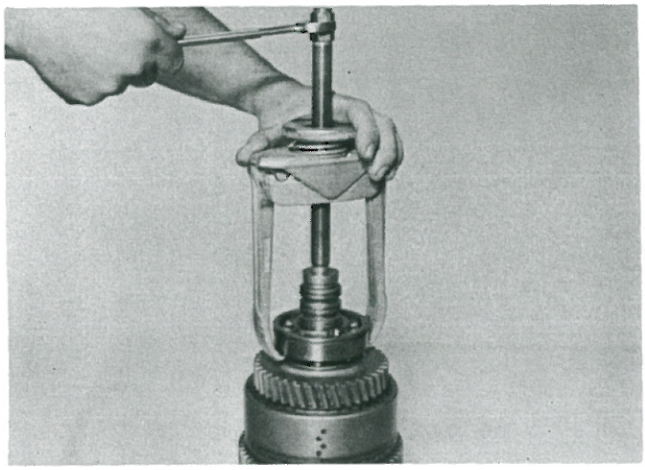


Figure 98
Remove front bearing.

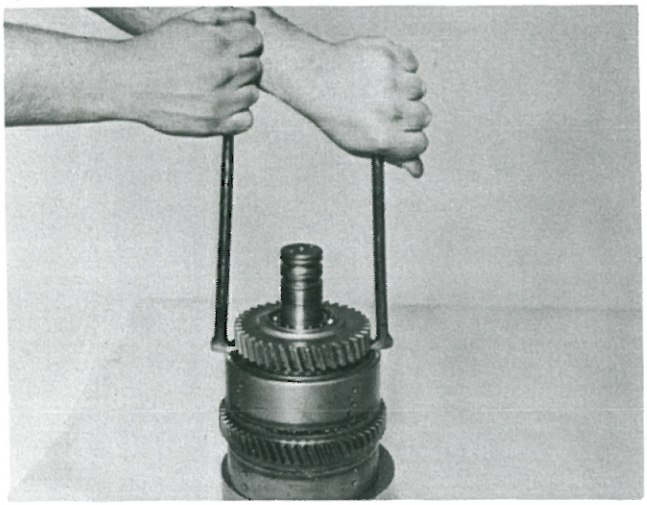


Figure 99
Pry reverse gear from clutch assembly far enough to use a gear puller.

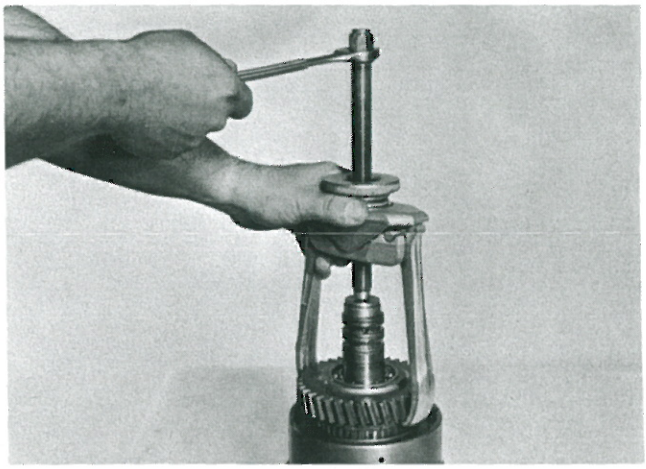


Figure 100
Remove gear as shown.

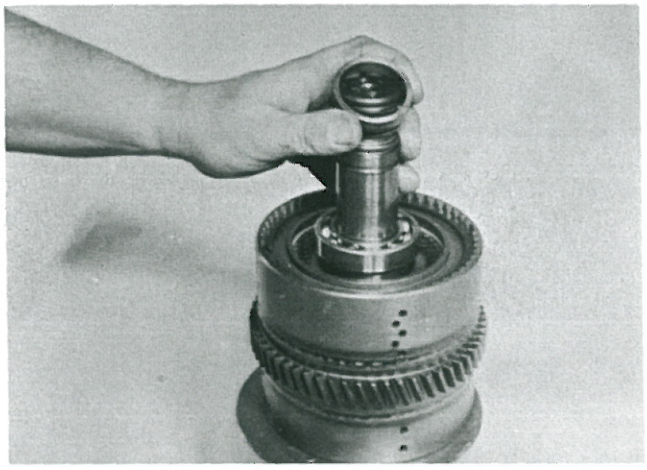


Figure 101
Remove bearing spacer.

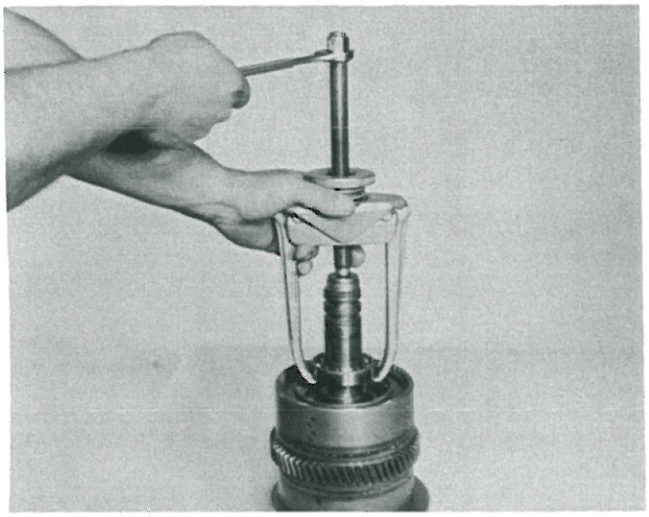


Figure 102
Remove inner bearing.

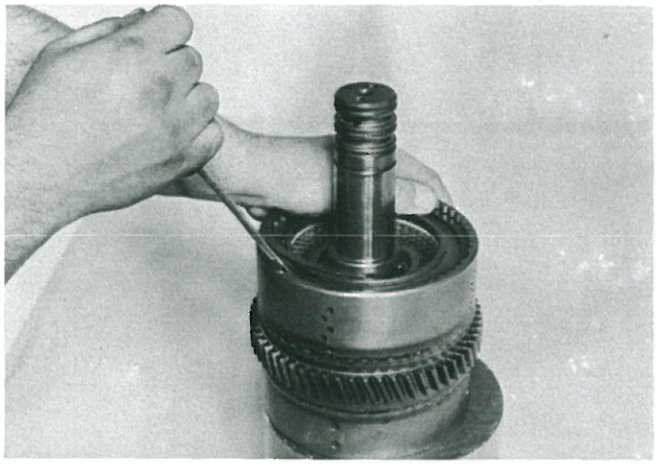


Figure 103
Remove end plate retainer ring.

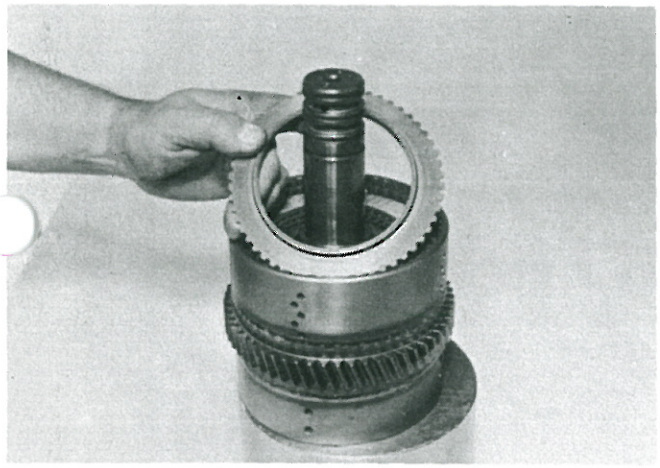


Figure 104
Remove end plate.

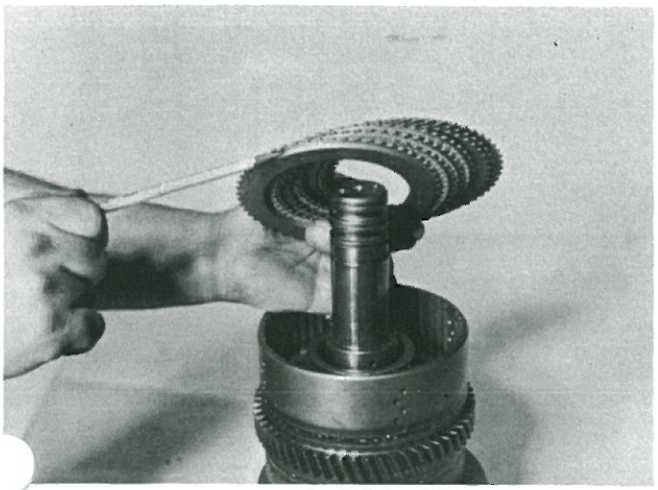


Figure 105
Remove clutch discs.

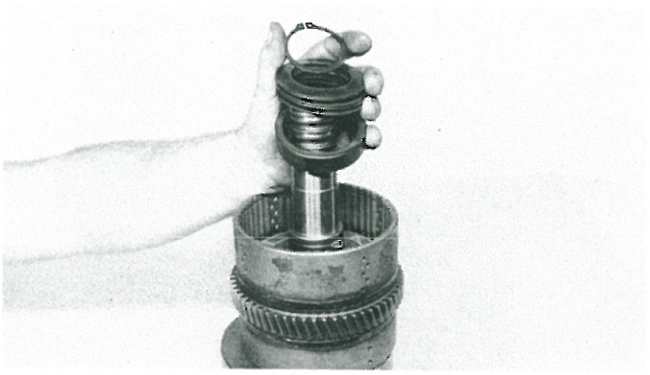


Figure 106
Refer to procedure shown in Figure 78 for removing return spring retainer ring. Remove ring, piston return Belleville spring washers and spacer. Turn clutch over and tap shaft on a block of wood to remove clutch piston. Repeat procedure for 2nd clutch disassembly.
NOTE: 2nd clutch will not have Belleville washers for piston return.

REVERSE AND 2ND CLUTCH REASSEMBLY
(Reverse being assembled)

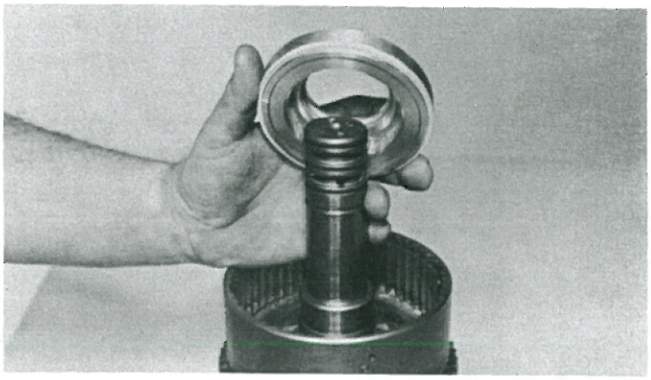


Figure 107
Install inner and outer clutch piston seal rings. Size rings as explained in Figure 80. Position piston in clutch drum.

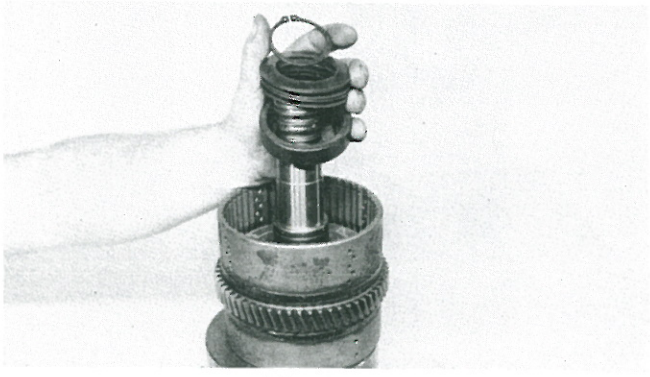


Figure 108
Install piston return spring spacer, Belleville spring washers and retainer ring.

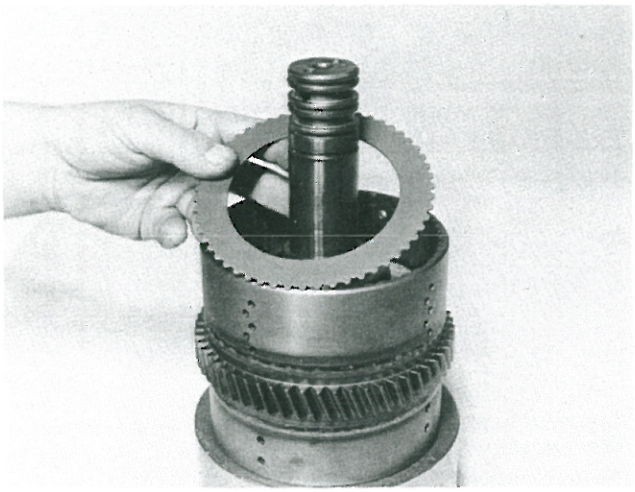


Figure 109
Install 1st steel disc.

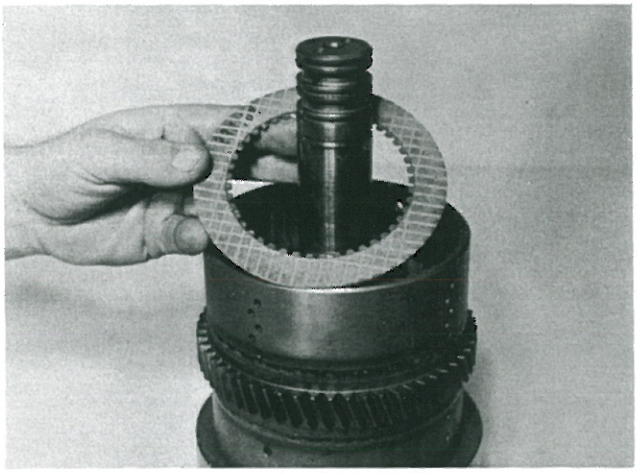


Figure 110
Install one friction disc.

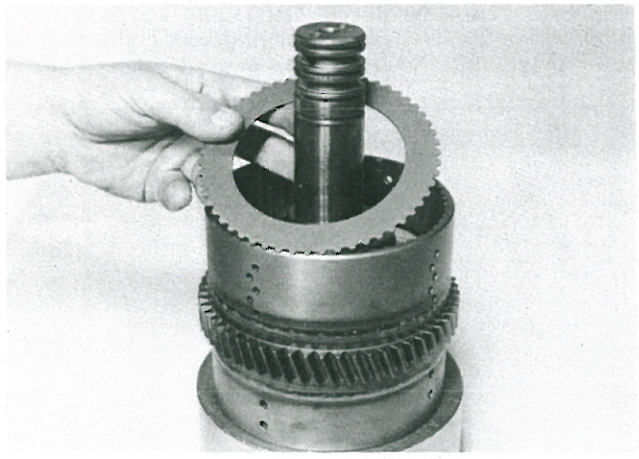


Figure 111
Install next steel disc. Alternate friction and steel discs until the proper amount of discs are installed. First disc next to the piston is steel, last disc installed is friction.

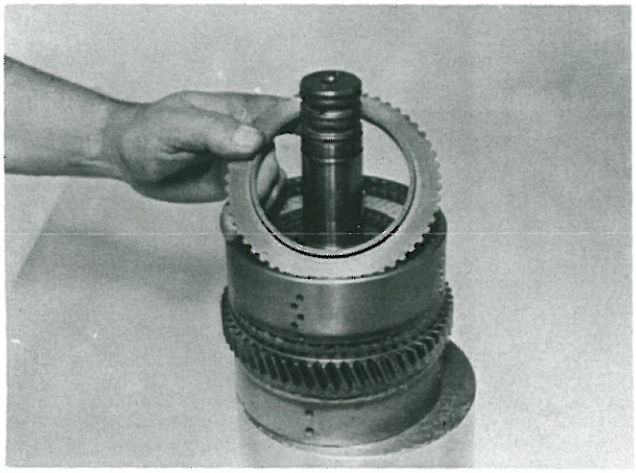


Figure 112
Install end plate.

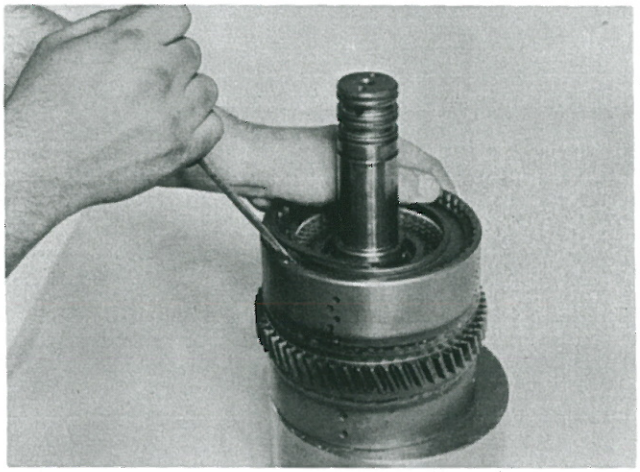


Figure 113
Install end plate retainer ring.

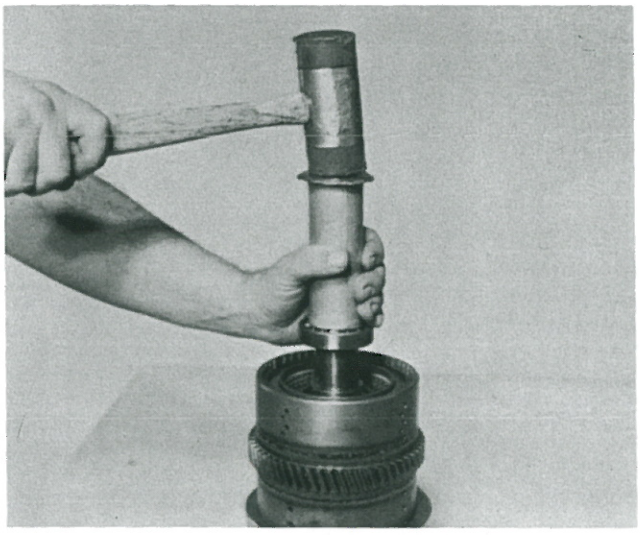


Figure 114
Install inner clutch driven gear bearing.

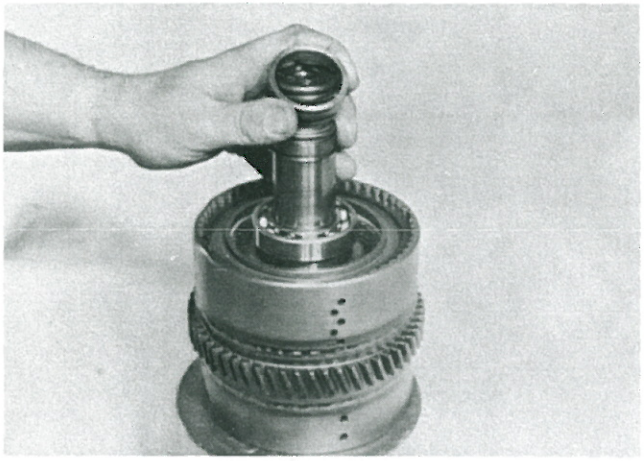


Figure 115
Install bearing spacer.

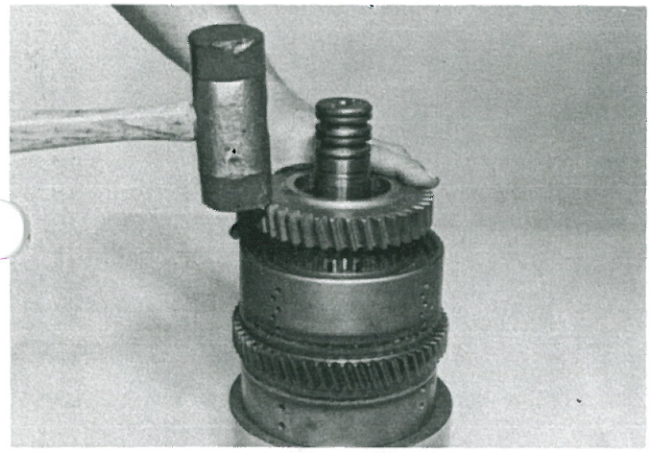


Figure 116
Install clutch driven gear into clutch drum. Align splines on clutch gear with internal teeth of friction discs. Tap gear into position. Do not force this operation. Gear splines must be in full position with internal teeth of all friction discs.

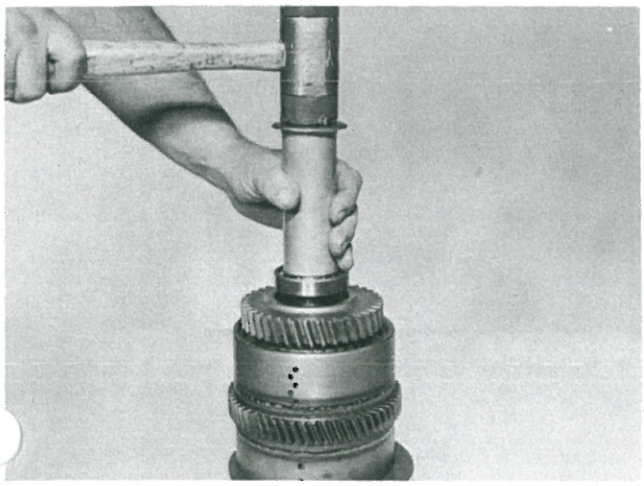


Figure 117
Install outer bearing.

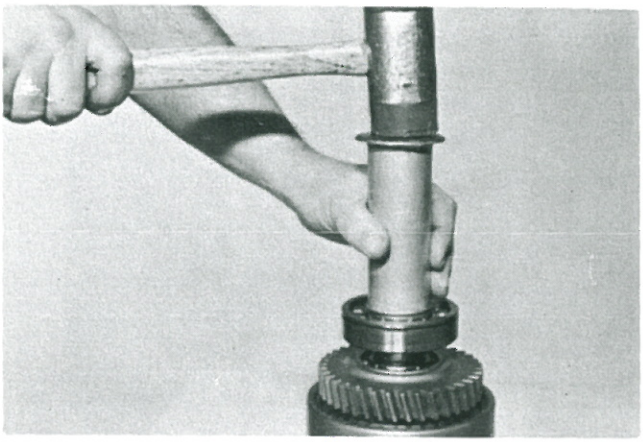


Figure 118
Install front bearing. **NOTE:** Snap ring groove in front bearing must be up.

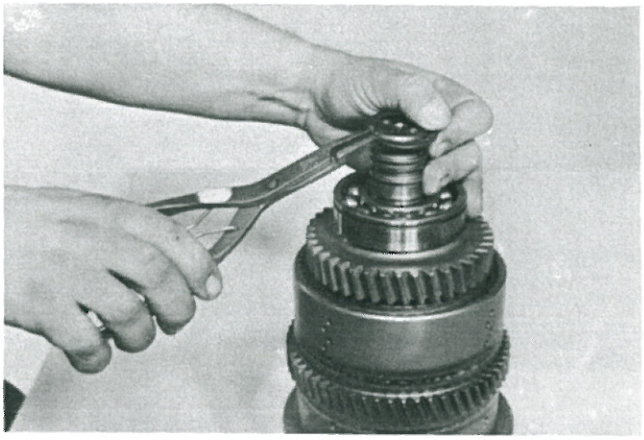


Figure 119
Install front bearing retainer ring.

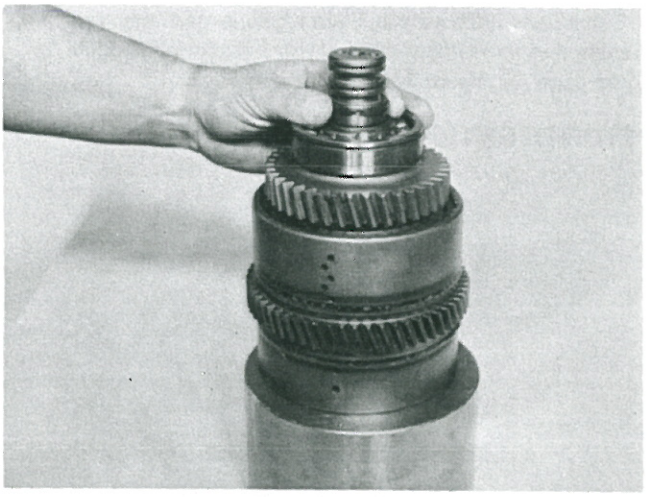


Figure 120
Install new clutch shaft piston rings. Grease rings to center on shaft to facilitate reassembly into transmission housing. **NOTE: 2nd clutch uses a return spring and not Belleville washers for piston return.**

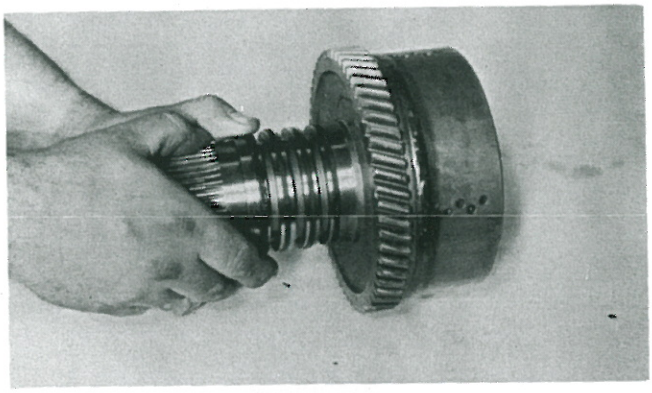


Figure 121
Forward clutch will disassemble and reassemble the same as the reverse clutch. Install new clutch shaft piston rings. Grease rings to facilitate reassembly.

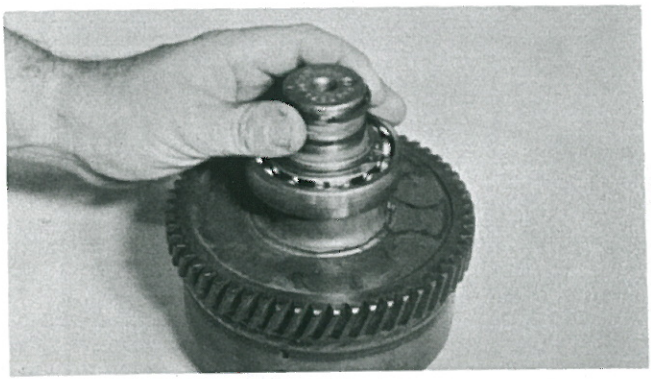


Figure 122
The 3rd speed clutch will disassemble and reassemble the same as the low clutch except for the friction discs. **See note in Figure 87.** Install new clutch shaft piston rings.

NOTE: Some units will have a lock nut type idler gear retention. Disassembly and reassembly of this type is explained in detail starting on page 47, Figure 221.

CONVERTER HOUSING DISASSEMBLY

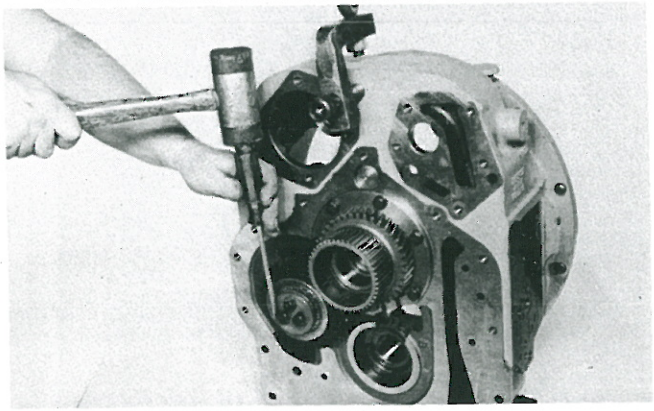


Figure 123
Straighten lockplate tabs from reverse idler capscrews.

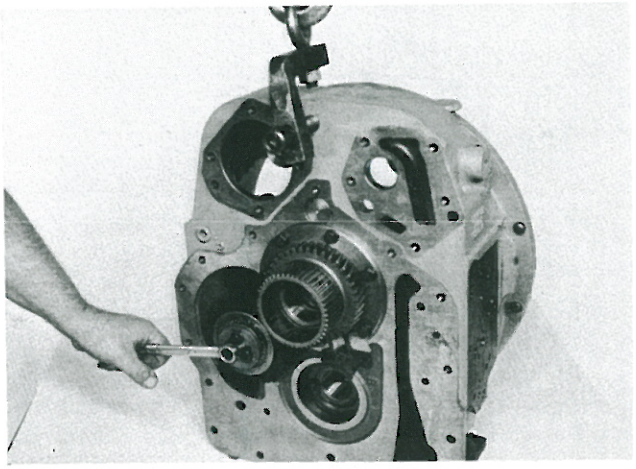


Figure 124
Remove reverse idler capscrews.

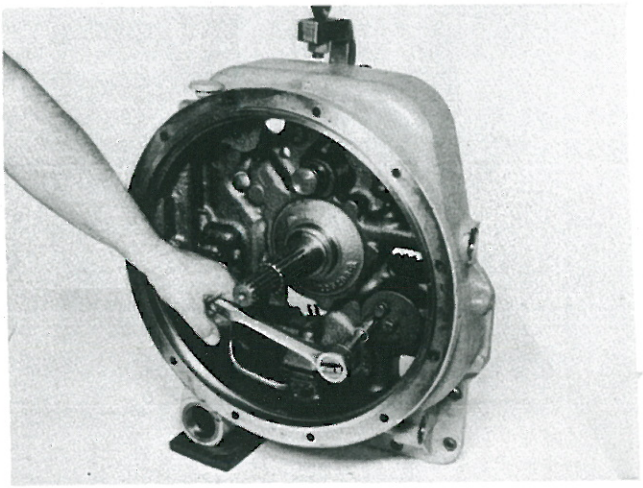


Figure 125
Remove reverse idler shaft front capscrews.

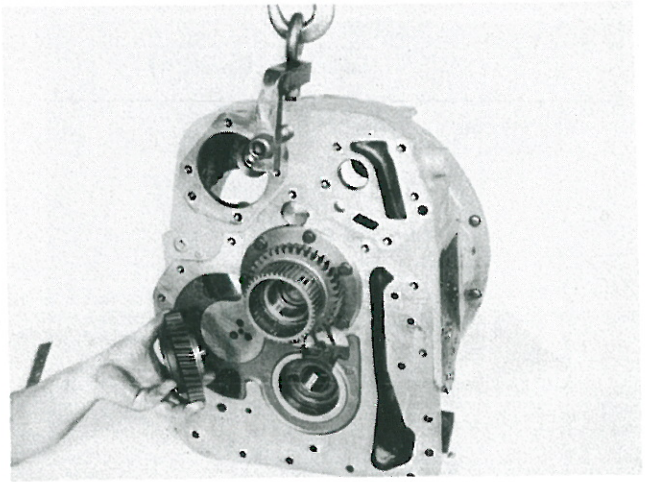


Figure 126
Remove reverse idler gear and bearing assembly.

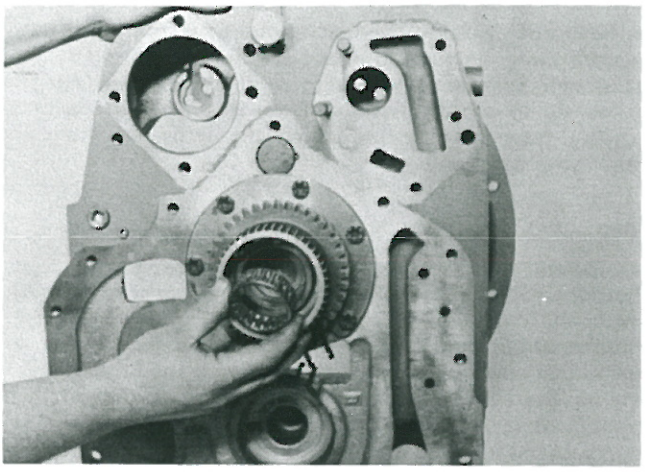


Figure 127
Remove forward shaft pilot bearing.

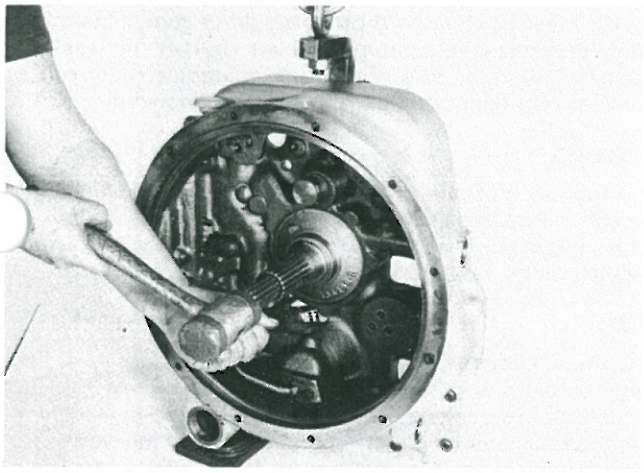


Figure 128
Using spreader type snap ring pliers spread ears on the turbine shaft bearing snap ring. Tap turbine shaft from converter housing.

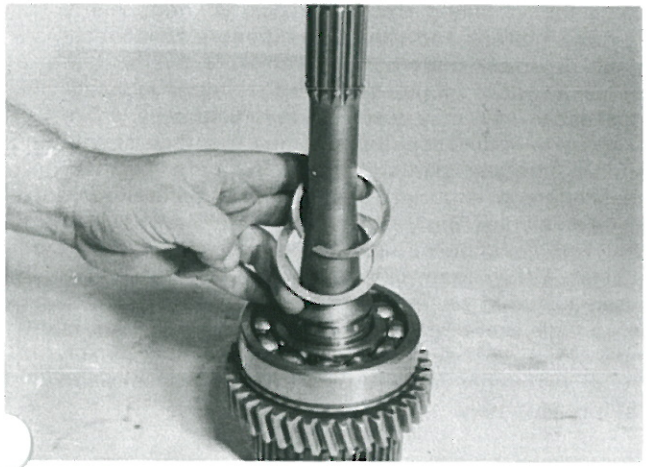


Figure 129
Remove oil sealing ring and turbine shaft bearing retainer ring and washer.

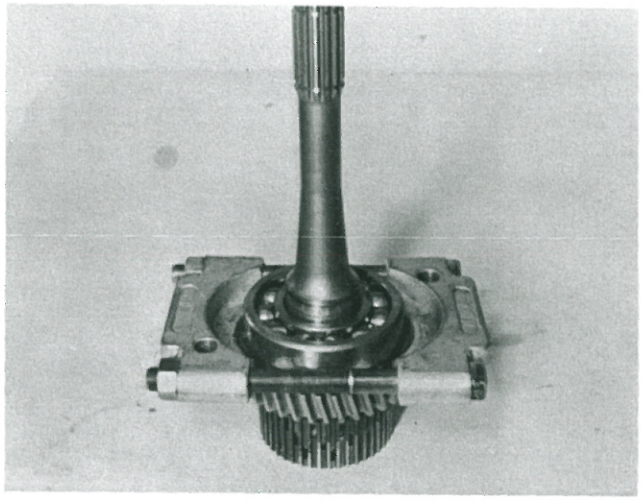


Figure 130
Recommended procedure for removing bearing.

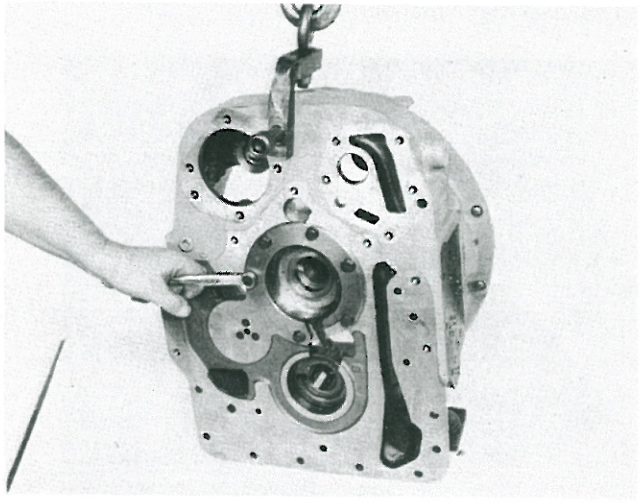


Figure 131
Remove reaction member support capscrews.

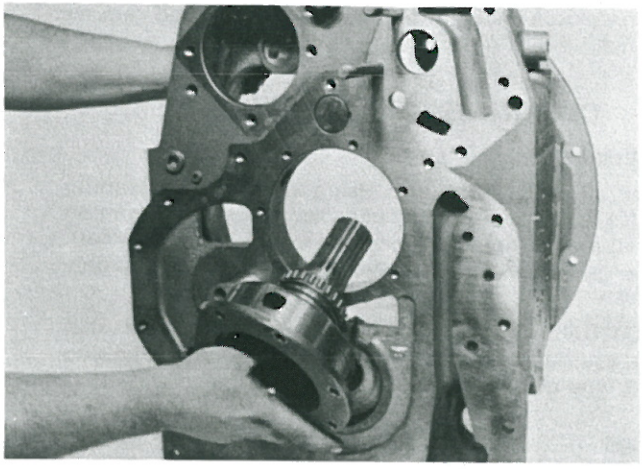


Figure 132
Tap reaction member support from housing.

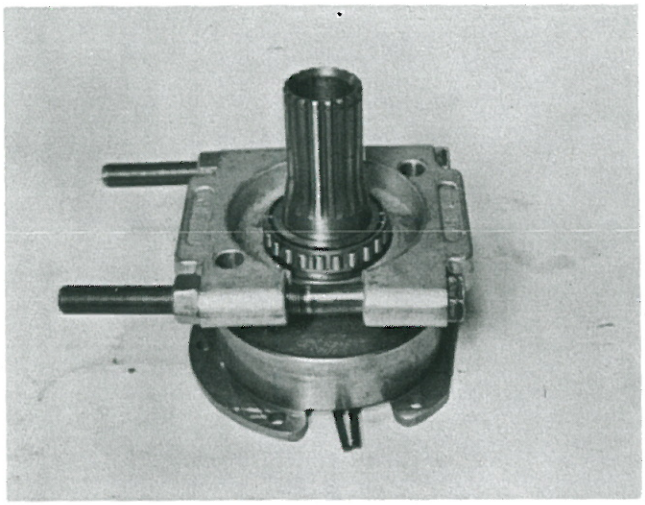


Figure 133

Remove bearing from support. Remove support oil sealing ring and sealing ring expander spring.

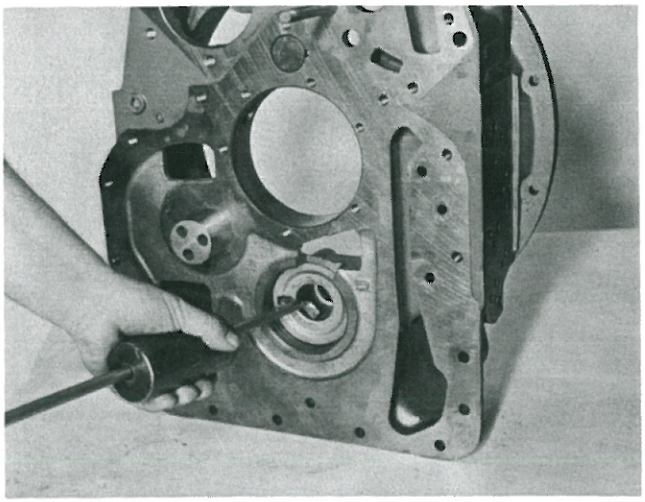


Figure 134

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

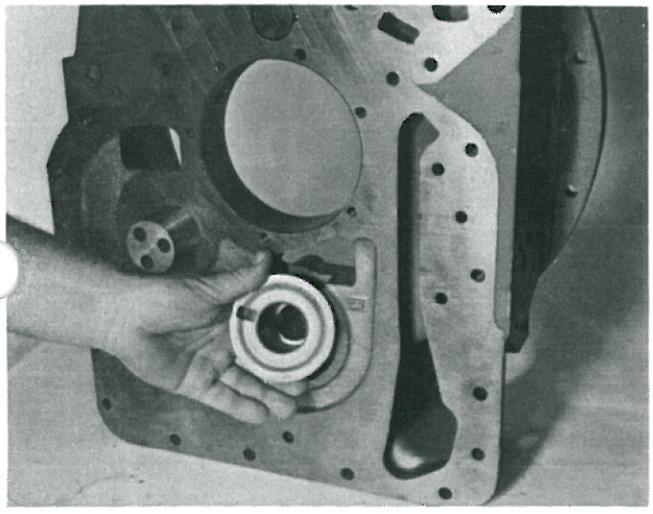


Figure 135
Install reverse clutch piston ring sleeve in housing.

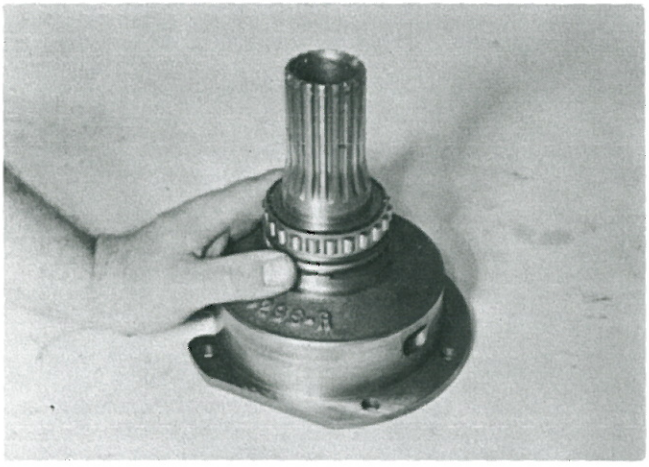


Figure 136
Install new sealing ring expander spring and oil sealing ring on support. Expander spring gap to be 180° from sealing ring hook joint. Press support bearing into position. **NOTE:** Bearing part number must be up.

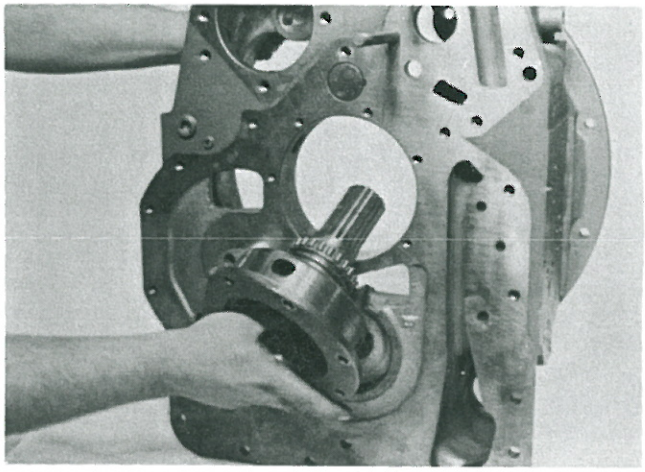


Figure 137
Position support in converter housing aligning holes of support with housing.

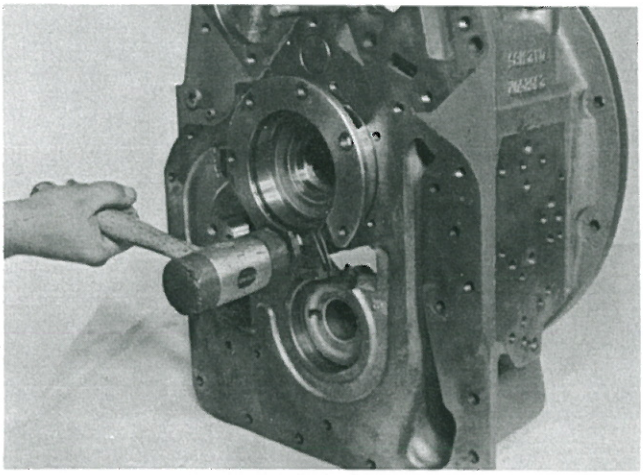


Figure 138
Tap support into position.

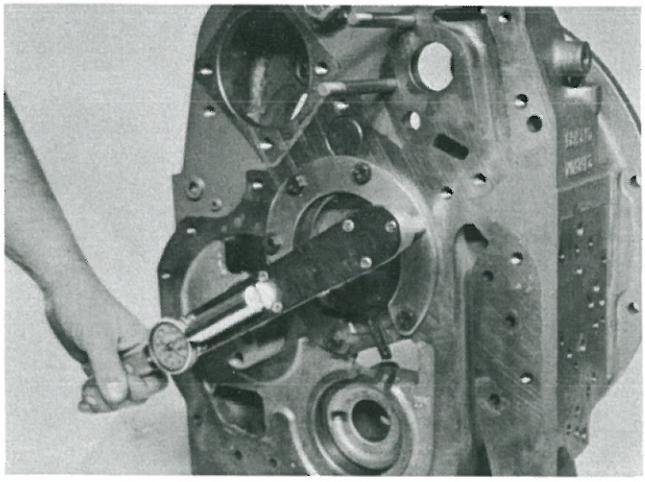


Figure 139
Tighten support bolts 23 to 25 ft. lbs. torque [31,2 - 33,9 N.m.].

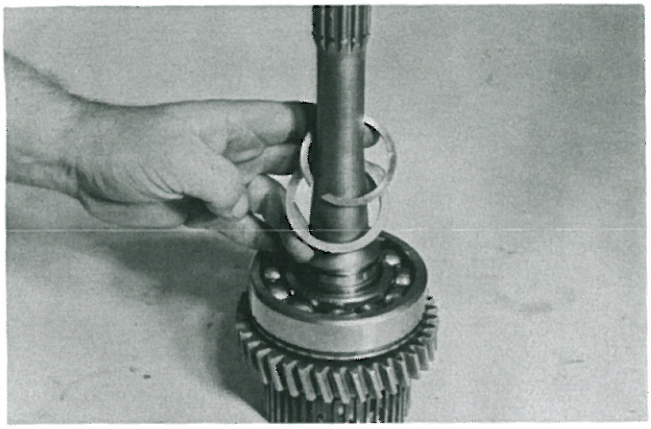


Figure 140

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

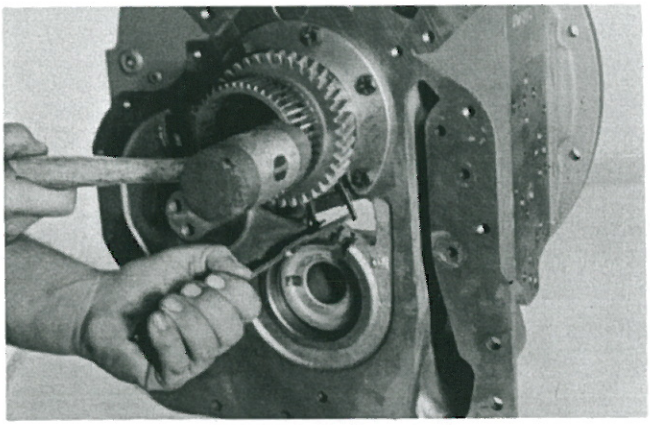


Figure 141

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

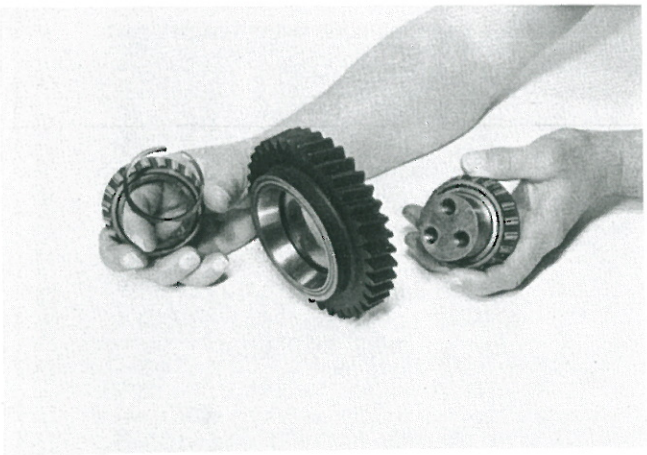


Figure 142

Press idler gear bearing on shaft. Install shaft and bearing in idler gear. Position spacer on shaft, press bearing on shaft into gear. **NOTE:** See Figure 228 for lock nut type idler shaft retention.

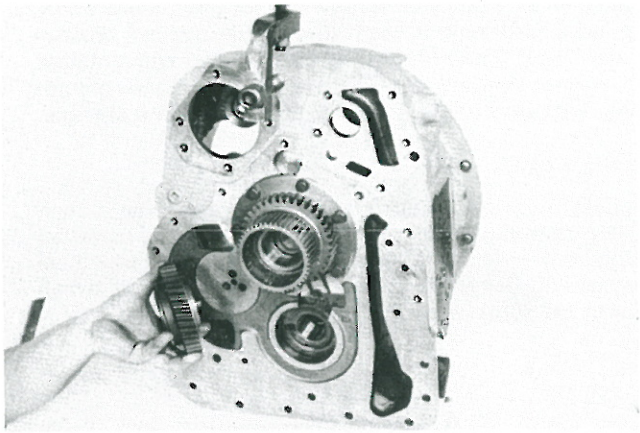


Figure 143

Position reverse idler and bearing assembly into converter housing. **NOTE:** Long hub of gear out.

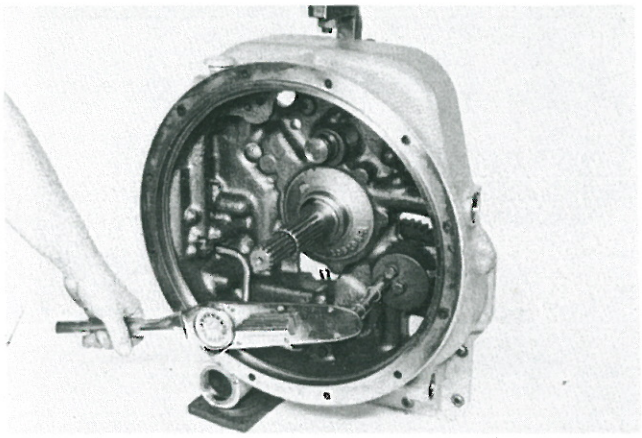


Figure 144

Install reverse idler shaft capscrews and lockwashers. Tighten 58 to 64 ft. lbs. torque [78,6 - 86,8 N.m.].

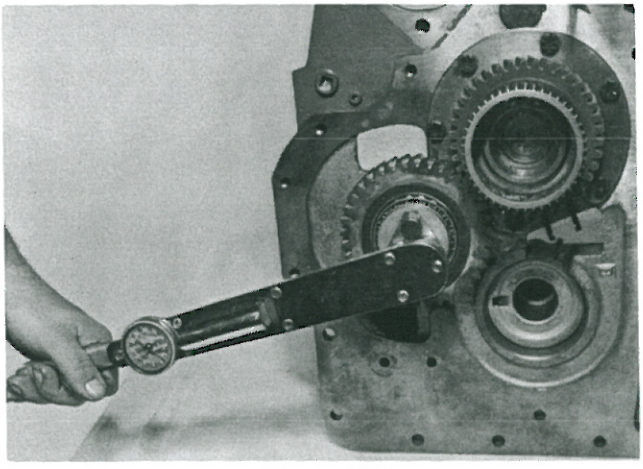


Figure 145

Install bearing retainer plate, lock plate and idler gear capscrews. Tighten capscrews 58 to 64 ft. lbs. torque [78,6 - 86,8 N.m.]. Bend lockplate tabs over capscrews heads to prevent loosening.

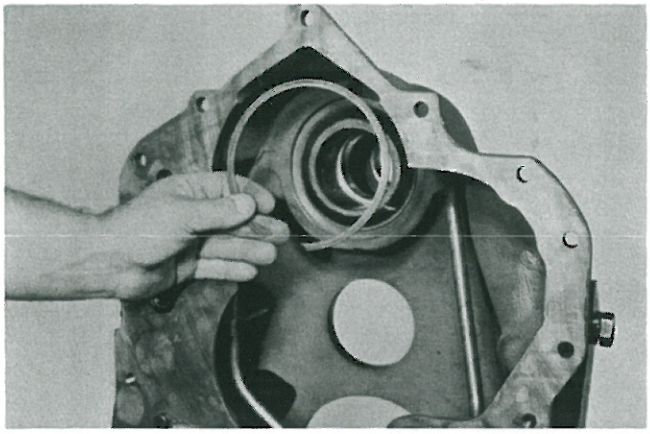


Figure 146

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.

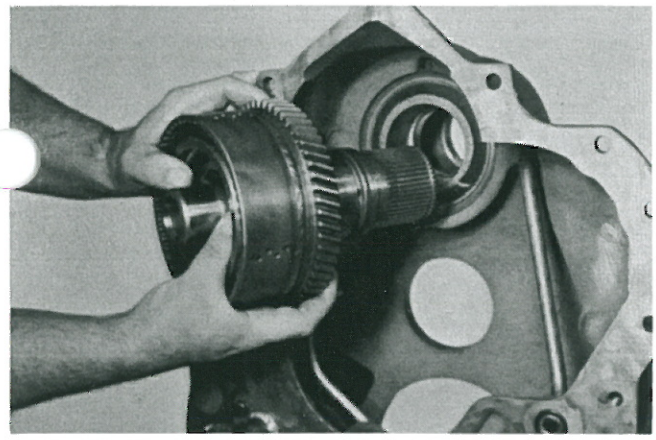


Figure 147

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

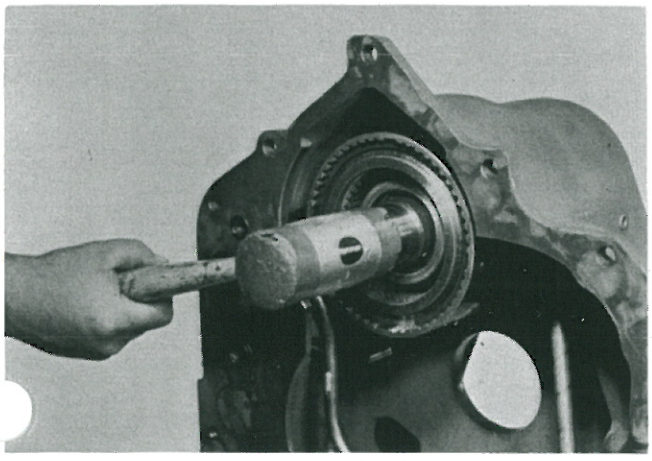


Figure 148

Tap clutch assembly into position.

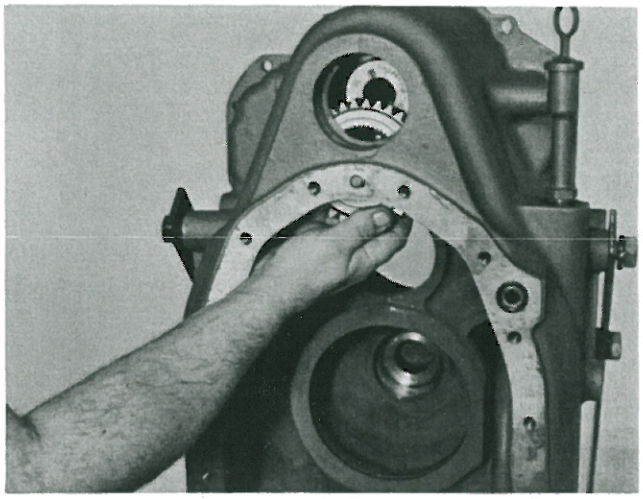


Figure 149

Position forward shaft gear on shaft.

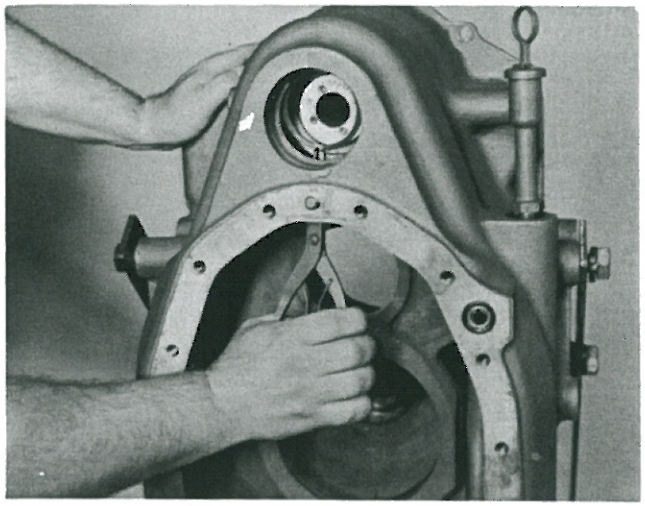


Figure 150

Install gear retainer ring. See Figure 150-A.

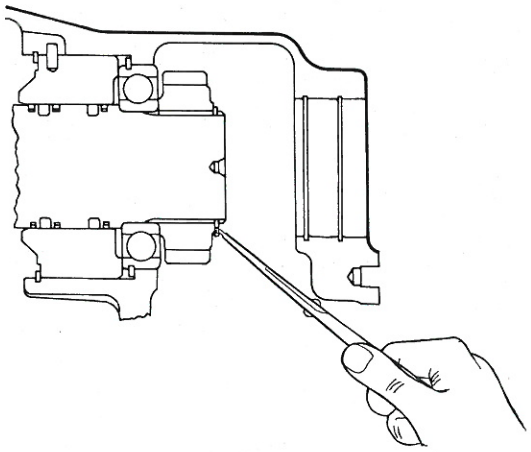


Figure 150-A

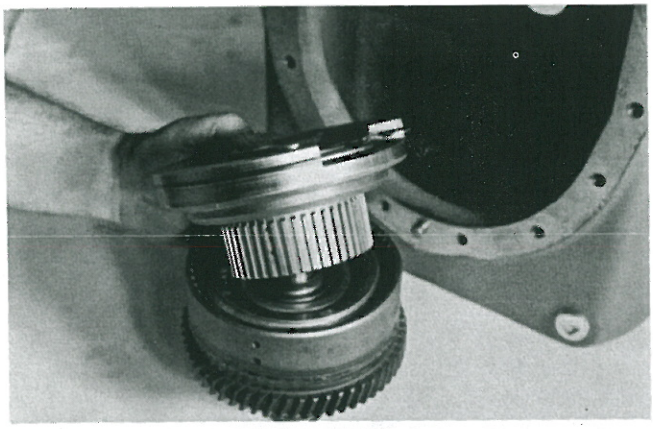


Figure 151

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.

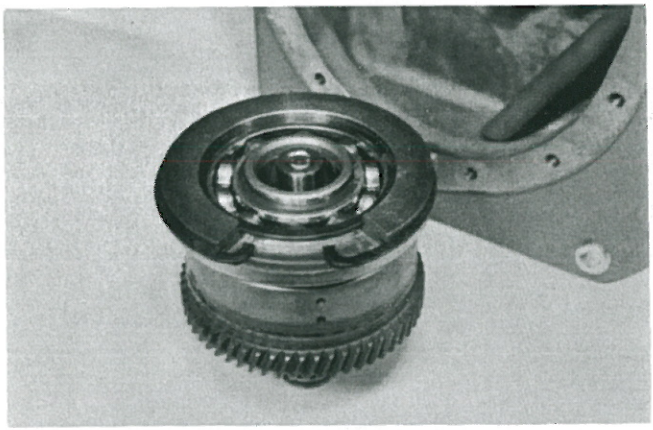


Figure 152

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.

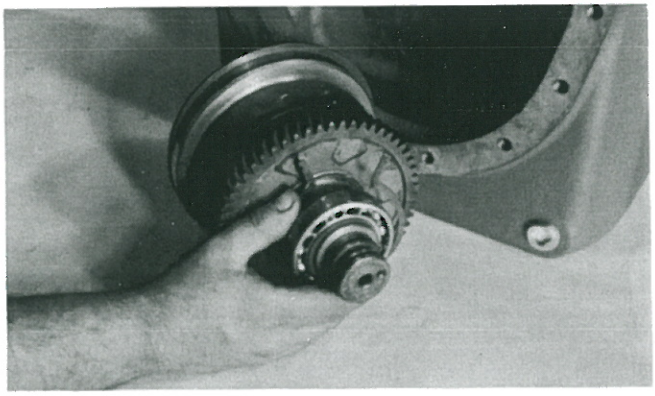


Figure 153

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

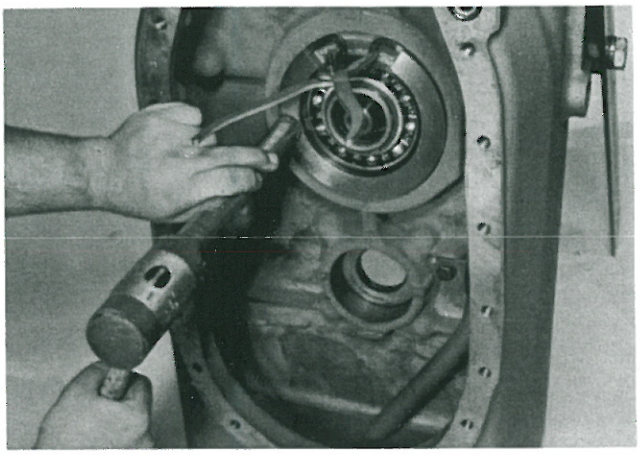


Figure 154

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.

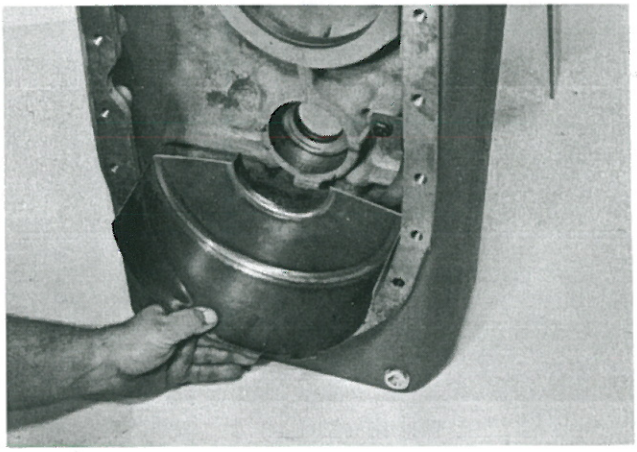


Figure 155

Position sump oil baffle in housing.

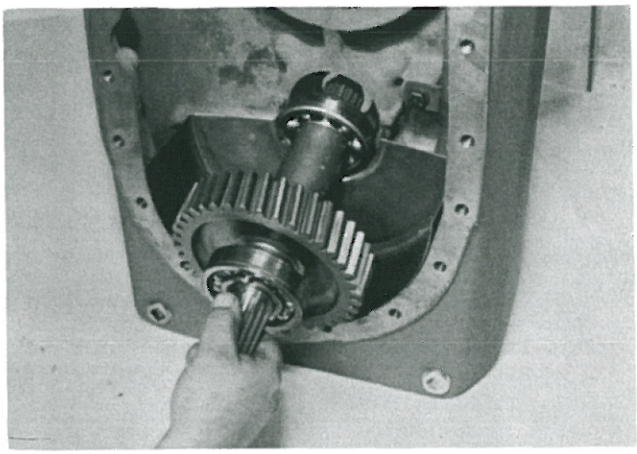


Figure 156

Install output shaft and bearing assembly in housing.

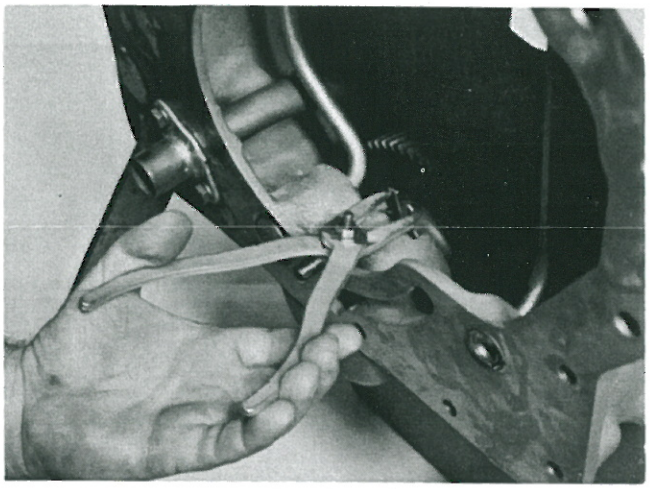


Figure 157

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

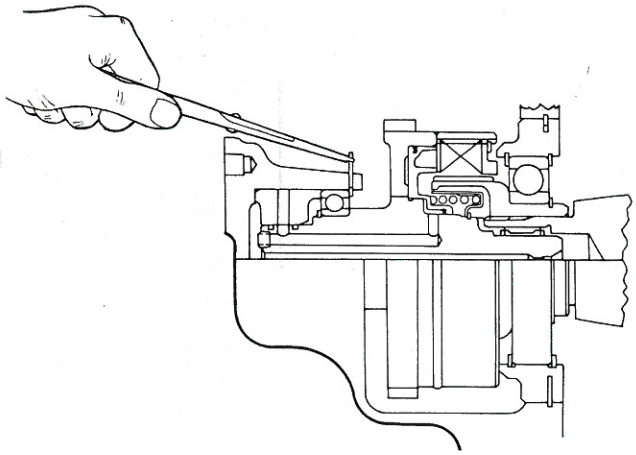


Figure 157-A

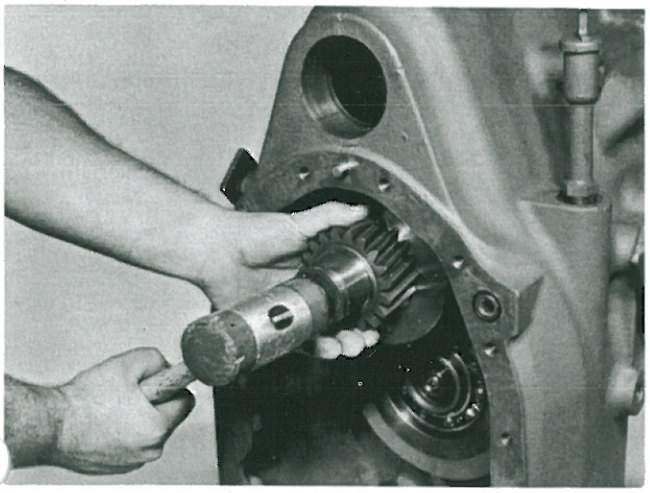


Figure 158

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

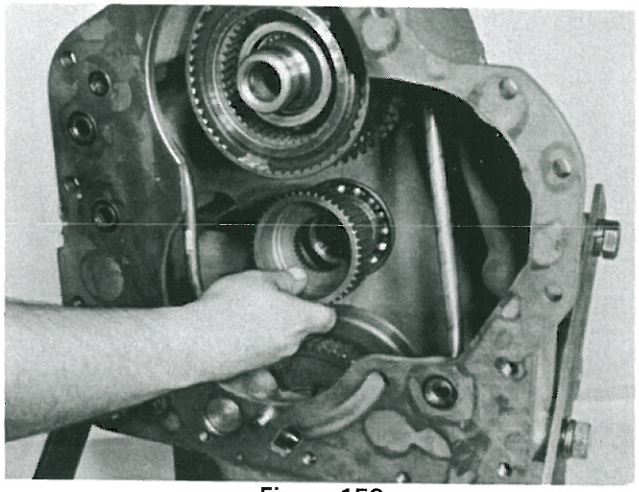


Figure 159

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

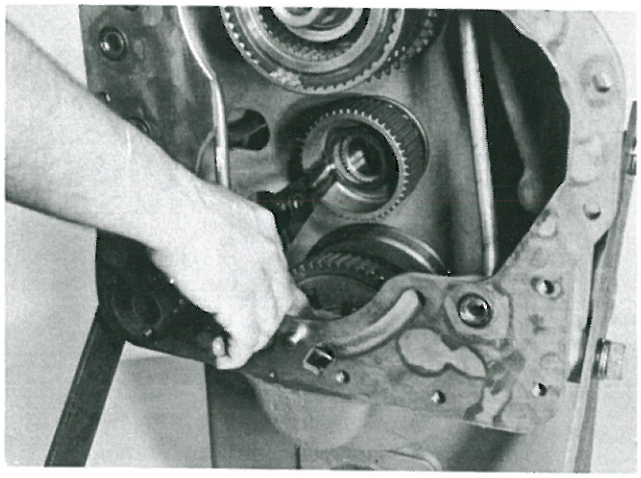


Figure 160

Install disc hub retainer ring.

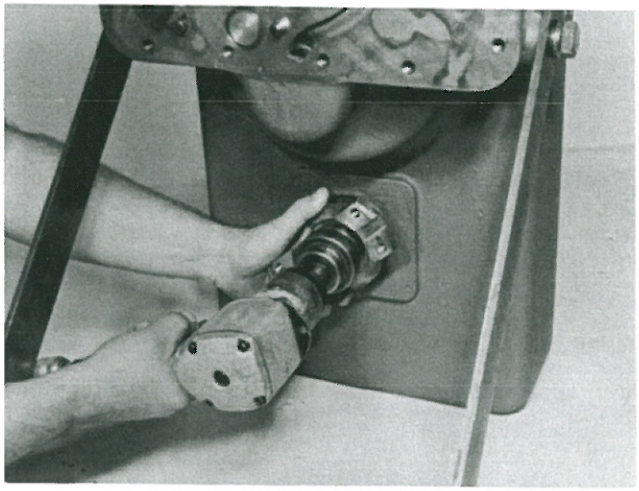


Figure 161

Install front output flange, new "O" ring, washer and nut. Tighten 200 to 250 ft. lbs. torque [271,2 - 339,0 N.m.]

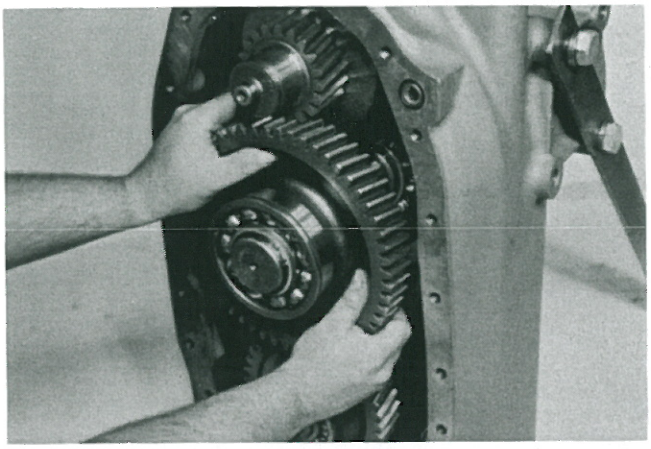


Figure 162

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).

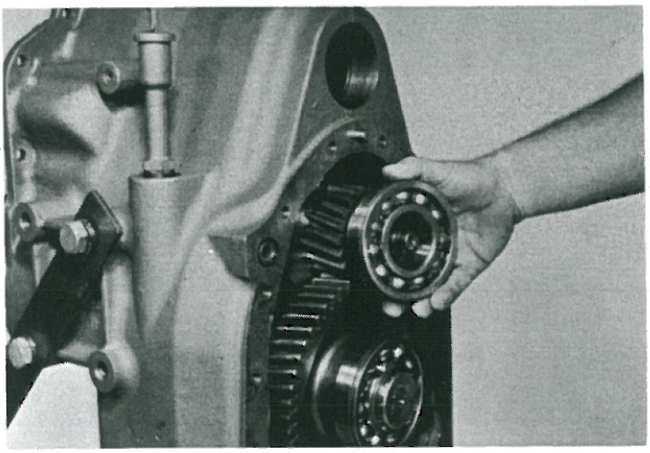


Figure 163

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

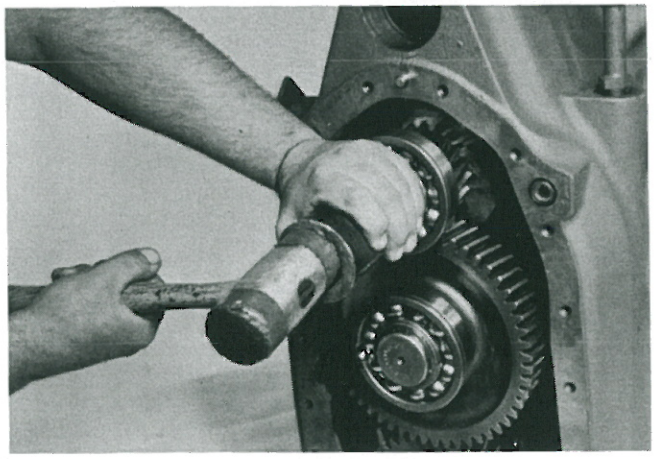


Figure 164

Tap bearing into position.

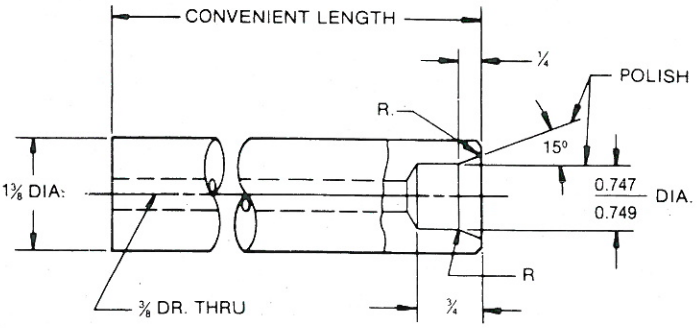


Figure 165

Low shaft oil sealing ring sizing tool.

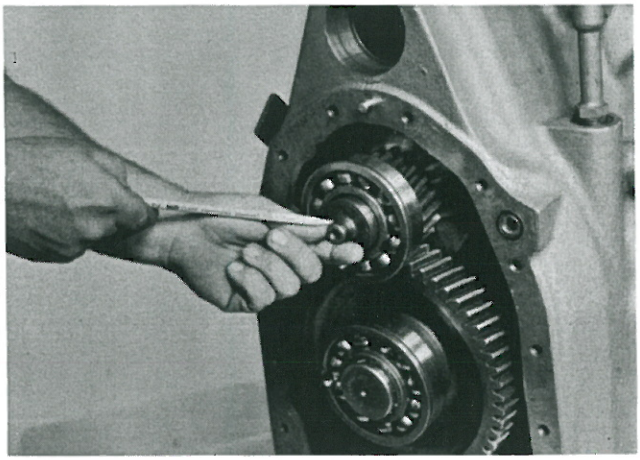


Figure 166

Install new oil sealing ring on low clutch shaft.

NOTE: New ring must be sized before installing low shaft bearing cap. To facilitate sizing, tool can be made from diagram in Figure 165.

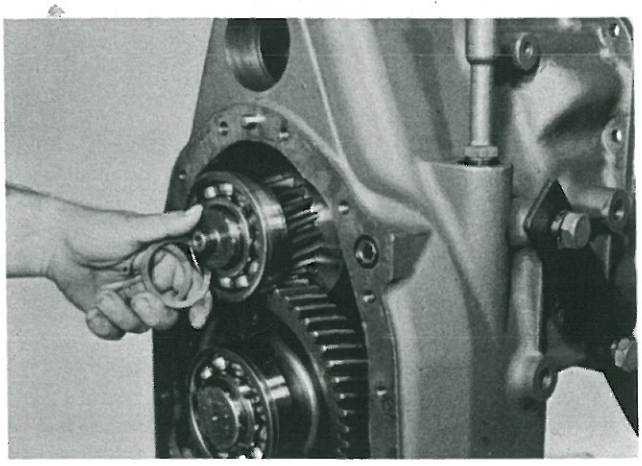


Figure 167

Install low shaft rear bearing spacer.

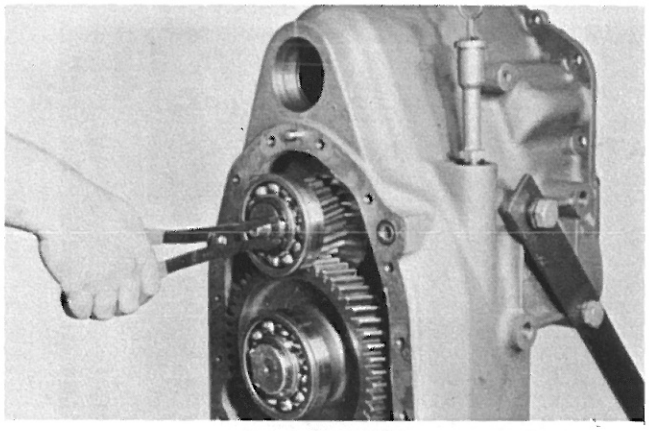


Figure 168
Install bearing retainer ring.

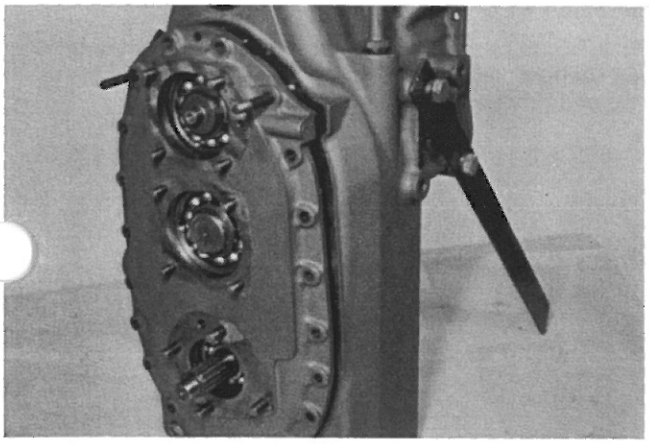


Figure 169
Position new gasket and "O" ring on rear of transmission housing. A thin coat of chassis grease will hold the gasket and "O" ring in place.

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.

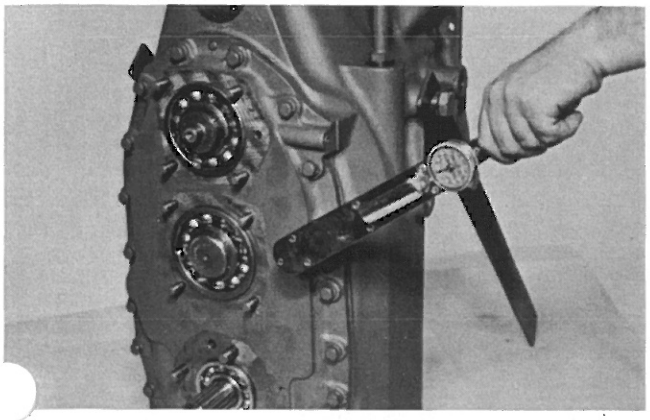


Figure 170
Tighten rear cover bolts 37 to 41 ft. lbs. torque [50,2 - 55,6 N.m.]

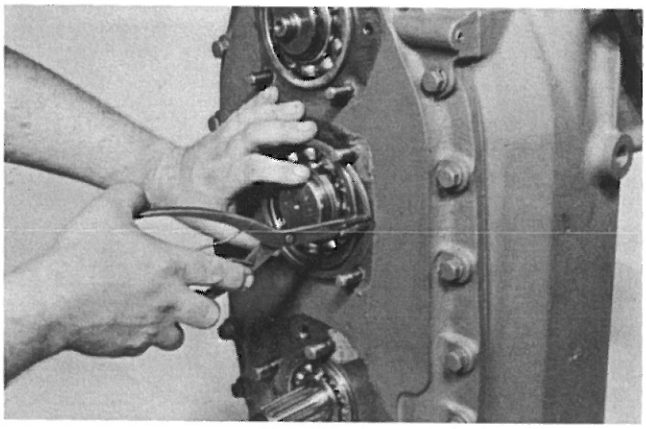


Figure 171
Install low, idler and output shaft rear bearing locating rings.

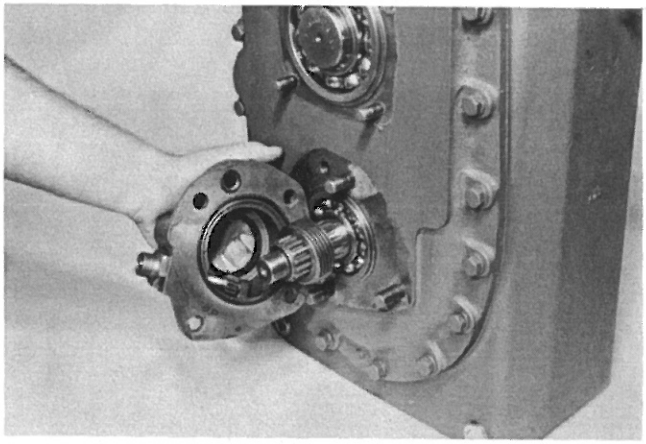


Figure 172
Apply a light coat of Permatex No. 2 to the outer diameter of the output oil seal. Press seal in bearing cap with lip of seal toward bearing side of bearing cap. Position new "O" rings on bearing cap. **NOTE:** Some units will have a gasket only between the cap and cover.

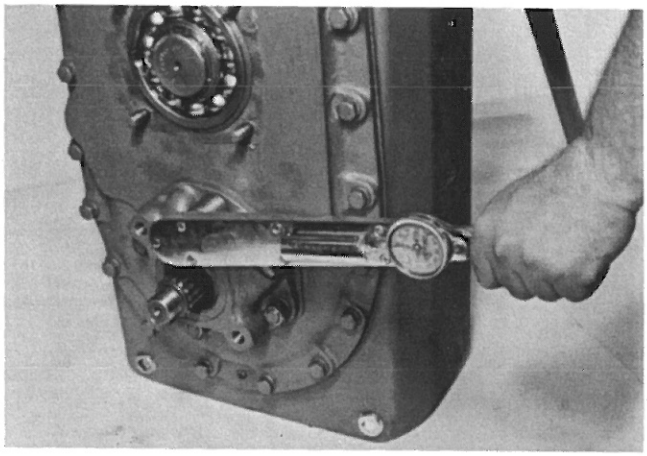


Figure 173
Install lockwashers and stud nuts. Tighten 91 to 100 ft. lbs. torque [123,4 - 135,6 N.m.].

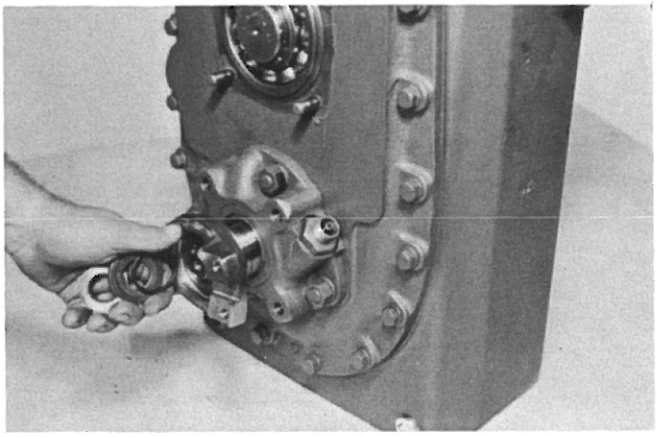


Figure 174

Install output flange, "O" ring, washer and flange nut. Block flange to prevent turning. Tighten flange nut 200 to 250 ft. lbs. torque [271,2 - 339,0 N.m.]

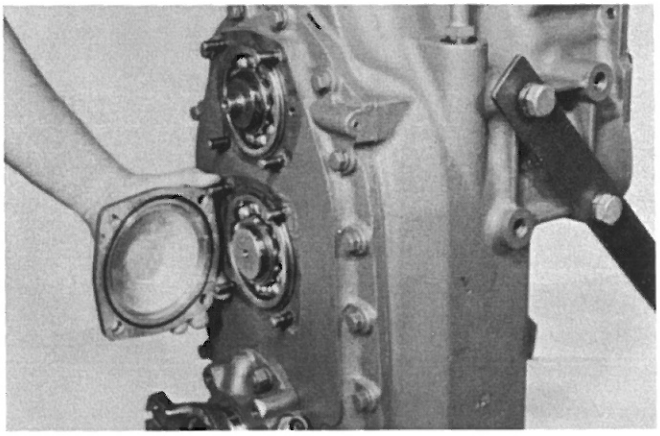


Figure 175

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

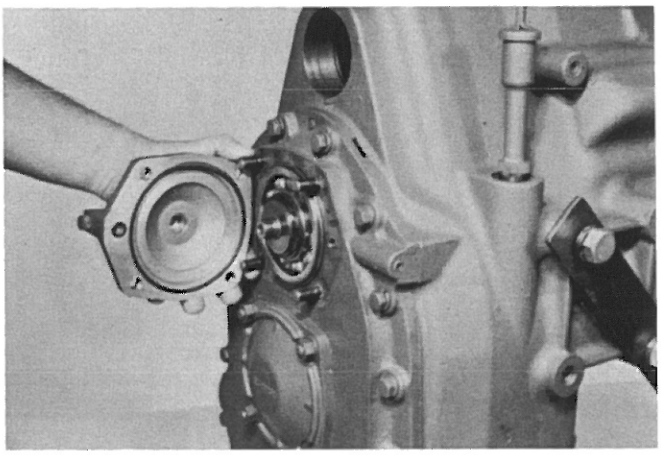


Figure 176

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.

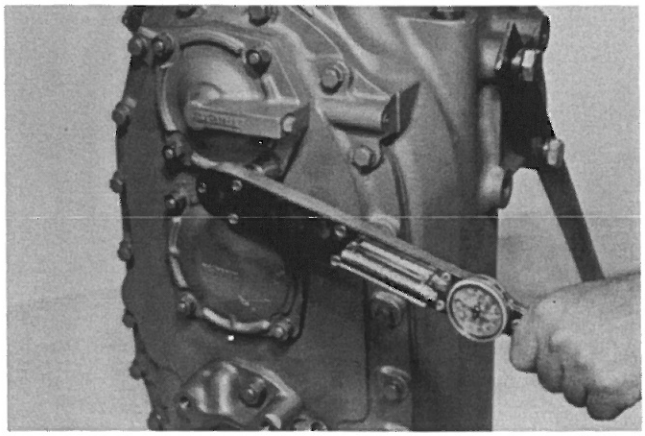


Figure 177

Tighten low shaft and idler shaft stud nuts 41 to 45 ft. lbs. torque [55,6 - 61,0 N.m.]

NOTE: P.T.O. is optional. If P.T.O. is not used, coat outer diameter of bore plug with Permatex No. 2. Tap bore plug in housing and proceed with Figure 182.

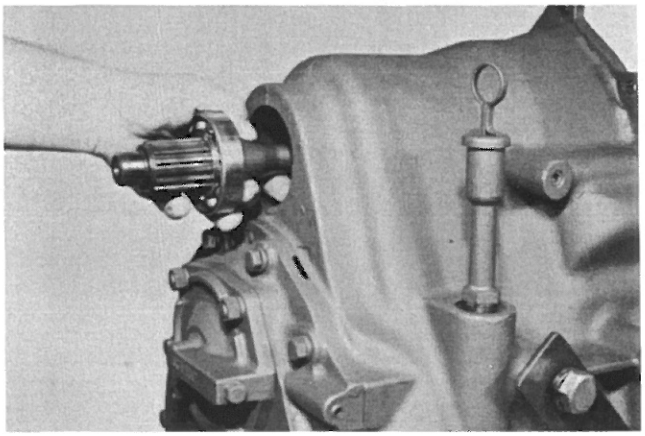


Figure 178

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

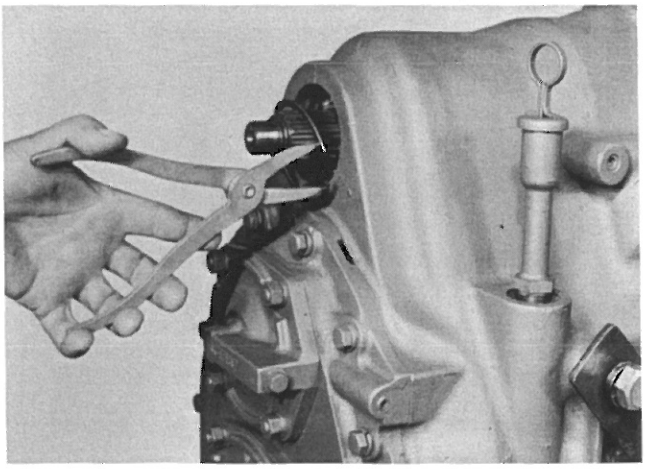


Figure 179

Install P.T.O. bearing retainer ring.

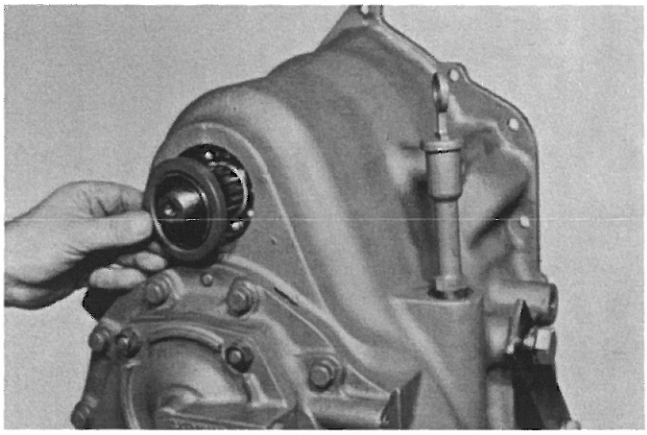


Figure 180

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

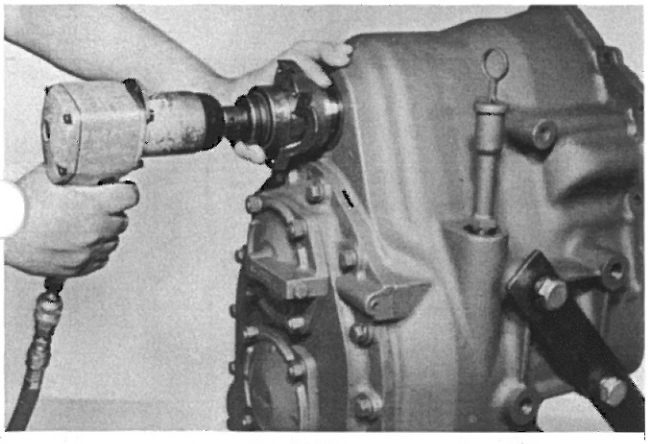


Figure 181

Install P.T.O. flange, new "O" ring, washer and nut. Tighten 200 to 250 ft. lbs. torque [271,2 - 339,0 N.m.]

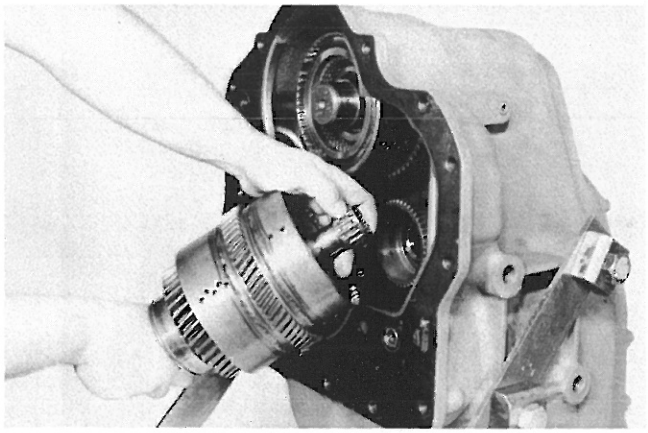


Figure 182

tall 2nd speed clutch shaft rear pilot bearing on shaft. 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.

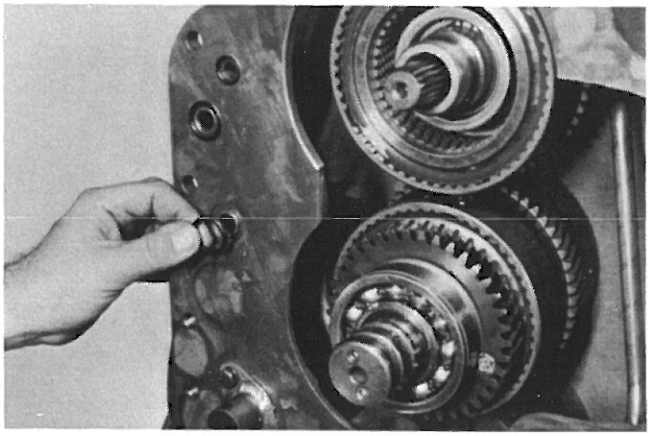


Figure 183

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

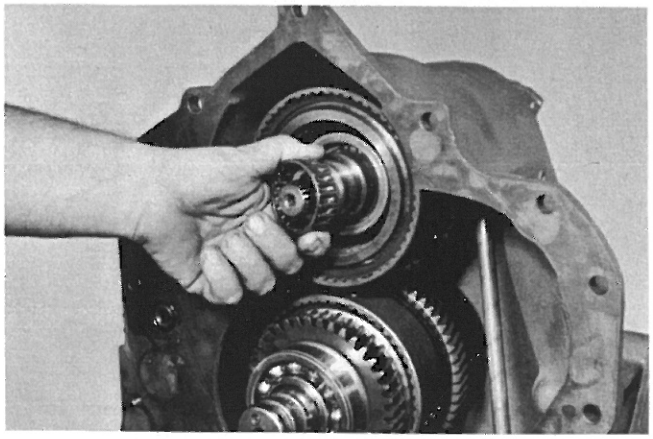


Figure 184

Install forward clutch pilot bearing.

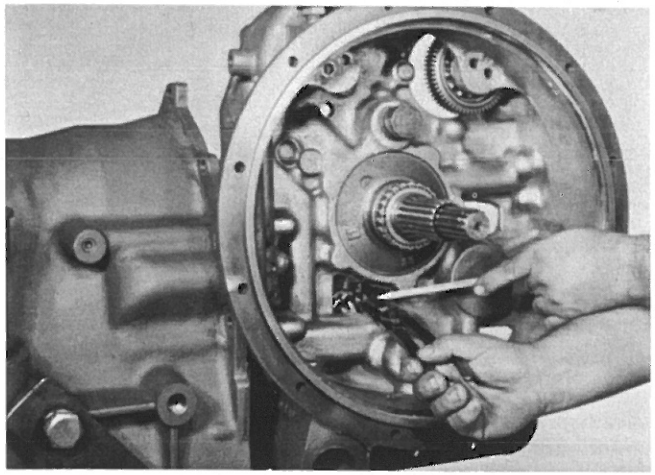


Figure 185

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 locating ring. Lock pliers open to hold snap ring open.

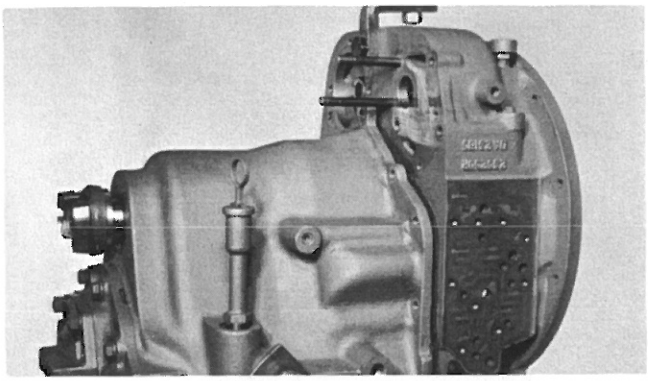


Figure 186

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

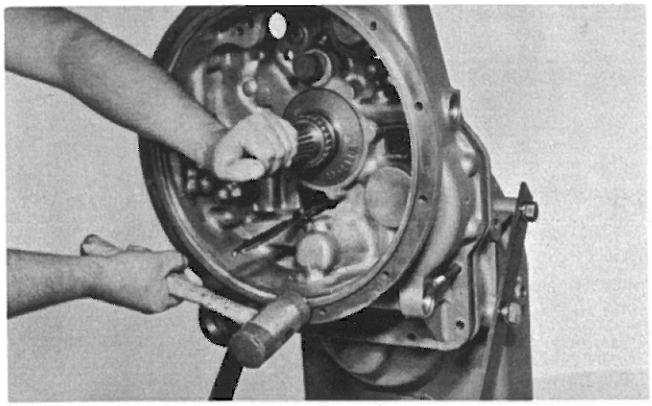


Figure 187

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

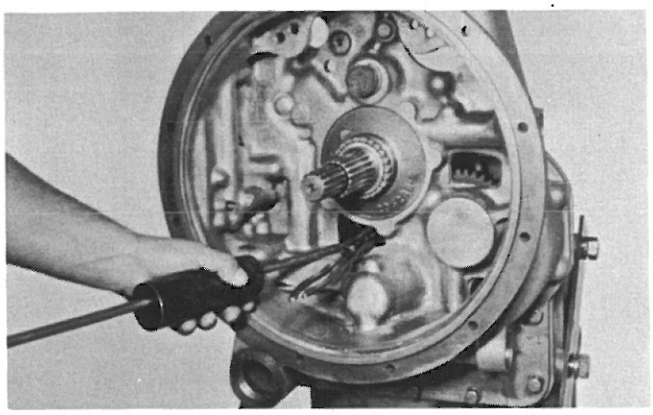


Figure 188

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.

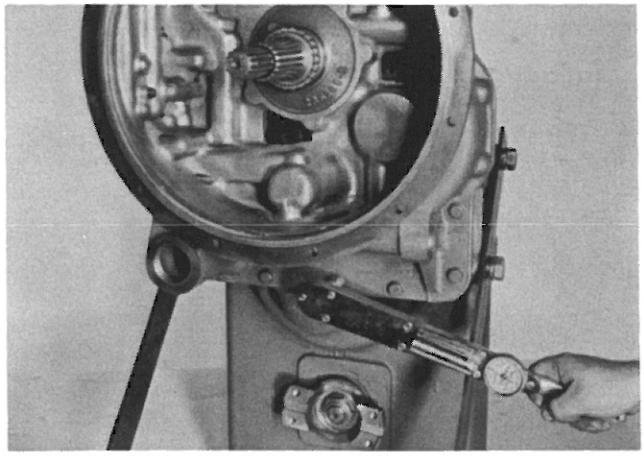


Figure 189

Remove converter housing aligning stud. Install converter housing and transmission housing capscrews. Tighten 37 to 41 ft. lbs. torque [50,2 - 55,6 N.m.].

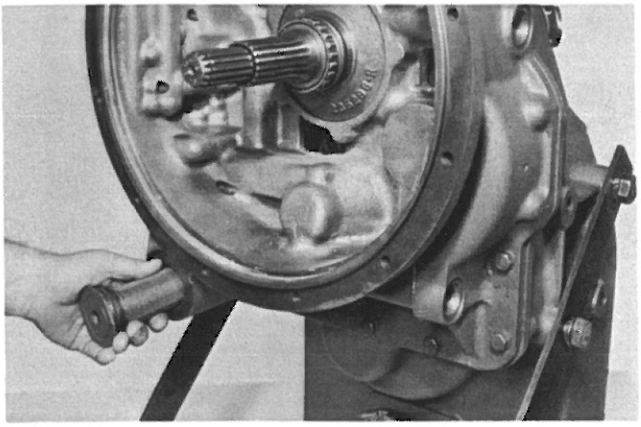


Figure 190

Position new gasket on sump screen, install screen assembly and tighten 10 to 15 ft. lbs. torque [13,6 - 20,3 N.m.].

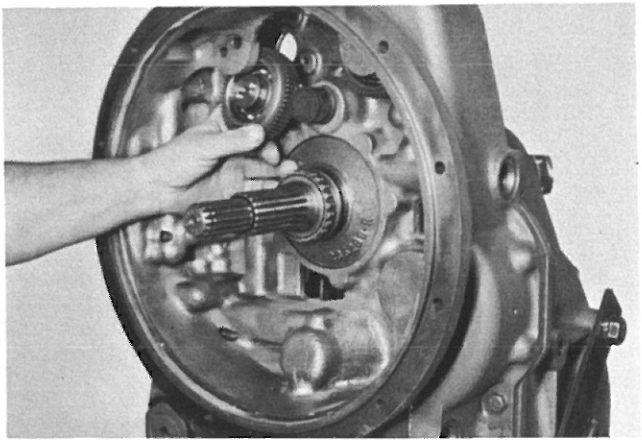


Figure 191

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

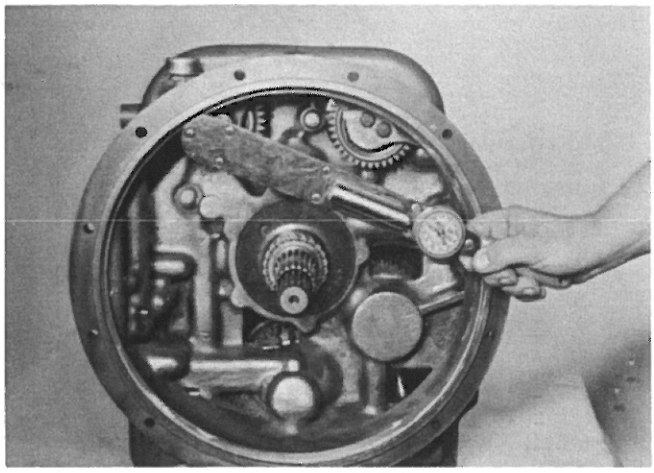


Figure 192

Tighten pump drive gear capscrews 23 to 25 ft. lbs. torque [31,2 - 33,9 N.m.].

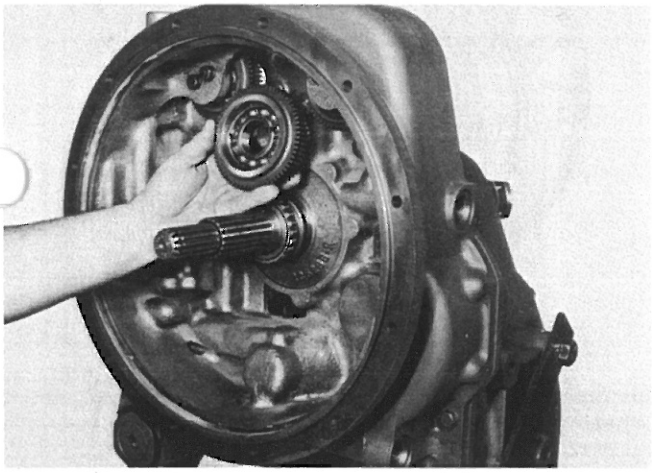


Figure 193

Position pump idler gear and bearing on stub shaft.

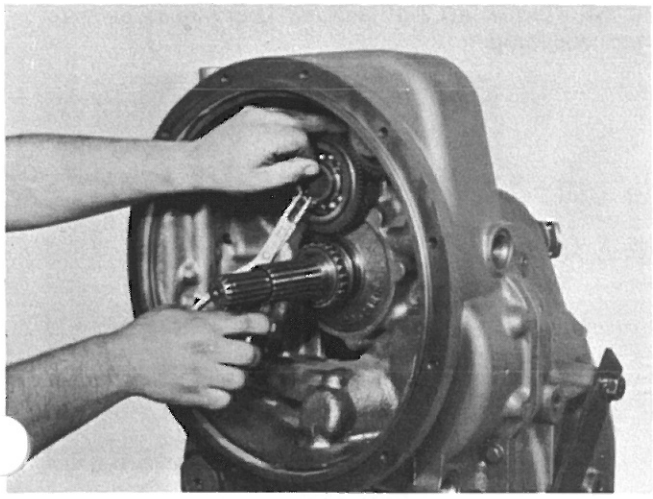


Figure 194

Install idler gear bearing locating ring.

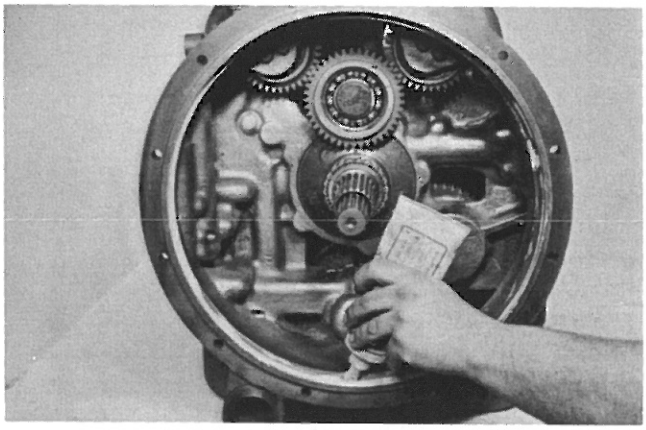


Figure 195

Apply a light coat of Permatex Form-A-Gasket #6 to O.D. of oil baffle or counter bore in converter housing. Remove immediately any excess sealant that could enter the oil circuit.

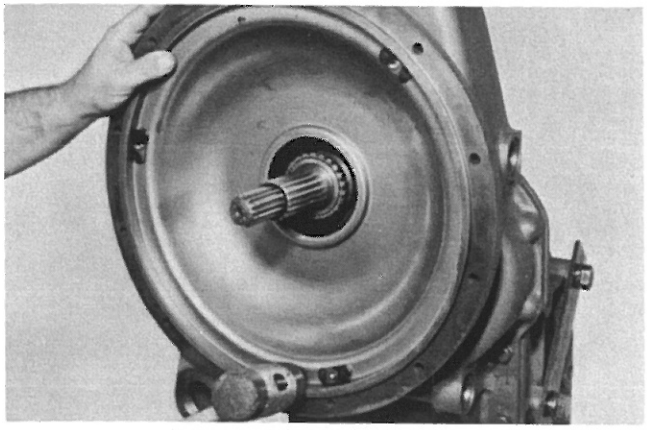


Figure 196

Assemble new oil baffle oil seal in baffle. Position oil baffle puller screw holes 15° to 30° either side of verticle center line. Tap baffle into position until baffle shoulders in converter housing.

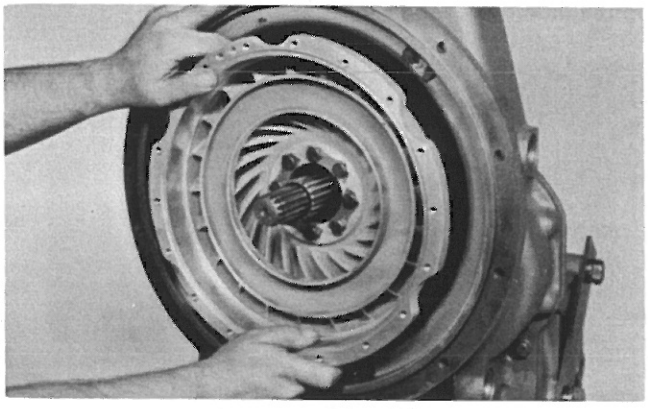


Figure 197

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.

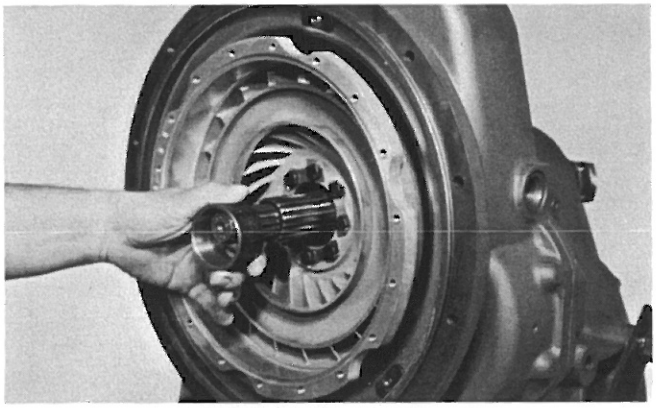


Figure 198

Position reaction member to impeller hub gear spacer on reaction member support. **NOTE:** If a fixed reaction member is used, install reaction member with thick side of blades out and retaining ring. Proceed to Figure 203.

FREEWHEEL REASSEMBLY

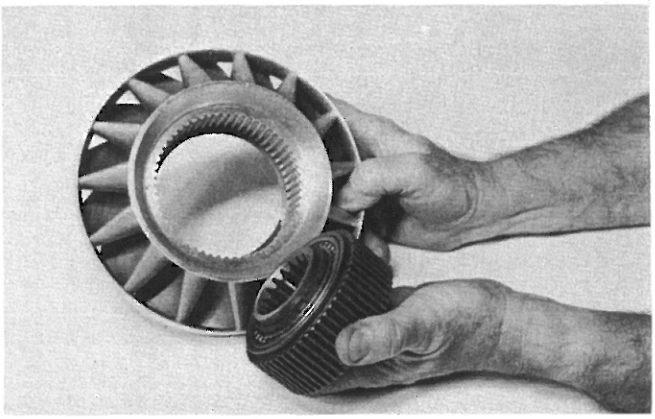


Figure 199

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

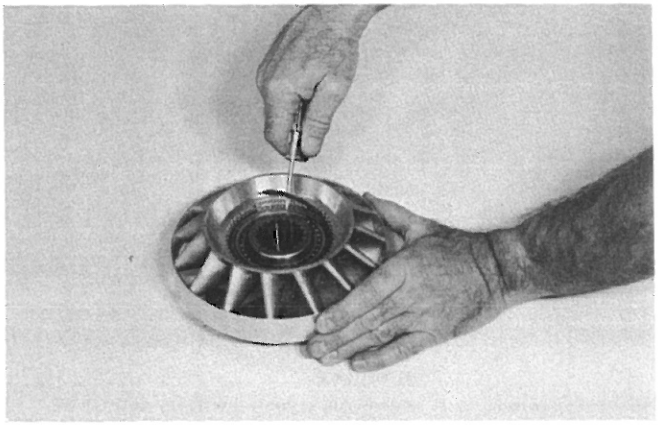


Figure 200

Install outer race to reaction member retainer ring.

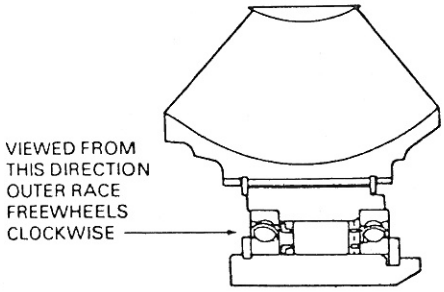


Figure 201

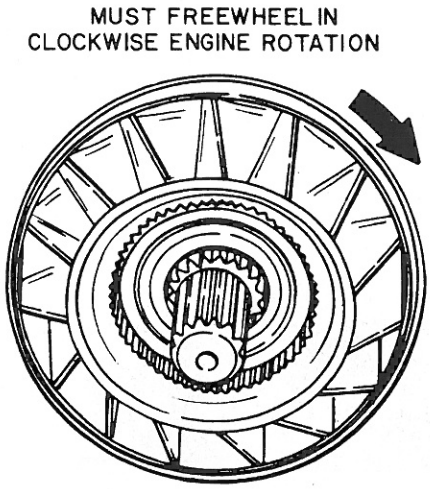


Figure 202

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

NOTE: Some units have a steel bolted on turbine hub. If either the turbine or hub is replaced, reassemble the hub in the turbine. Install bolts and washers. Tighten bolts 30 to 35 ft. lbs. Torque [40,7-47,4 N.m]. Lockwire in pairs to prevent loosening.

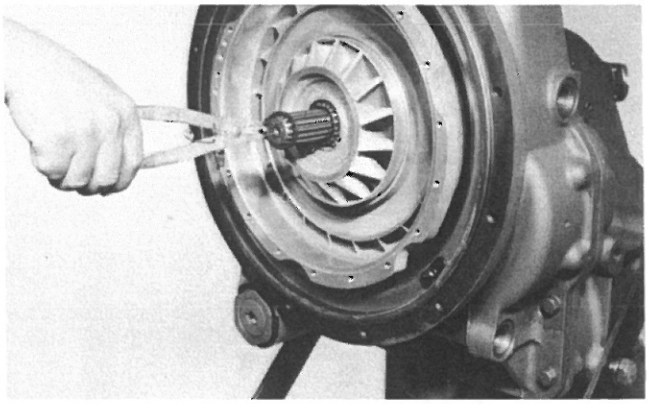


Figure 203

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

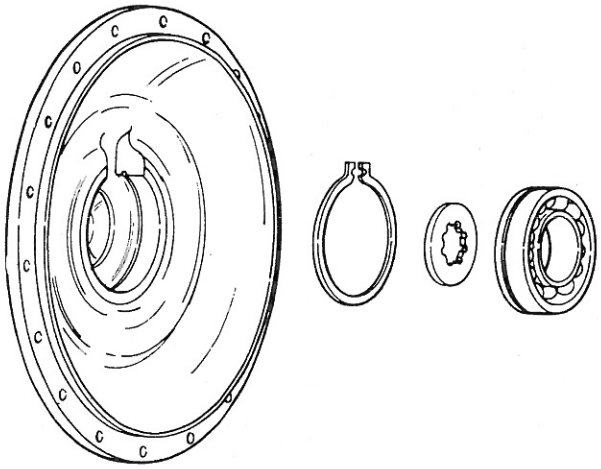


Figure 204

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.

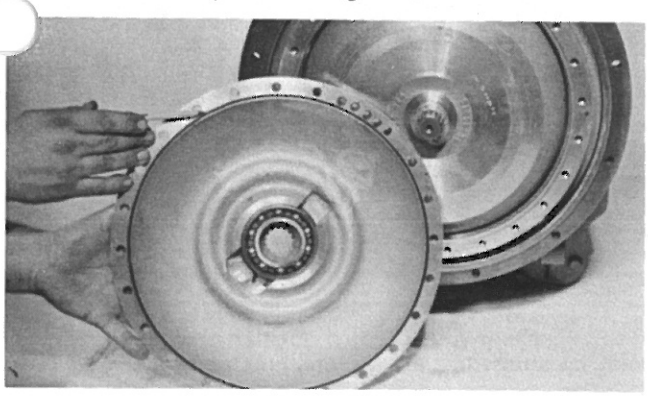


Figure 205

Position new "O" ring on impeller cover.

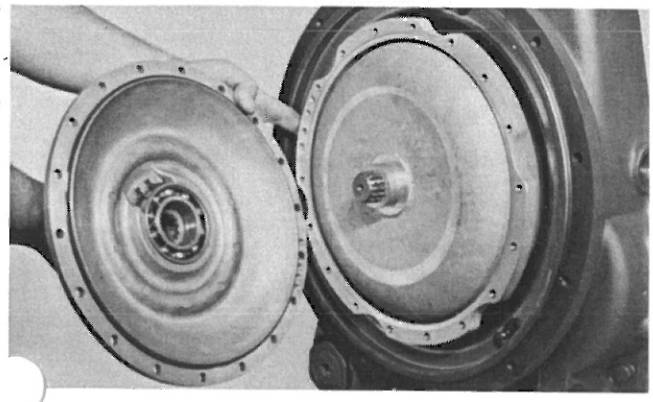


Figure 206

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

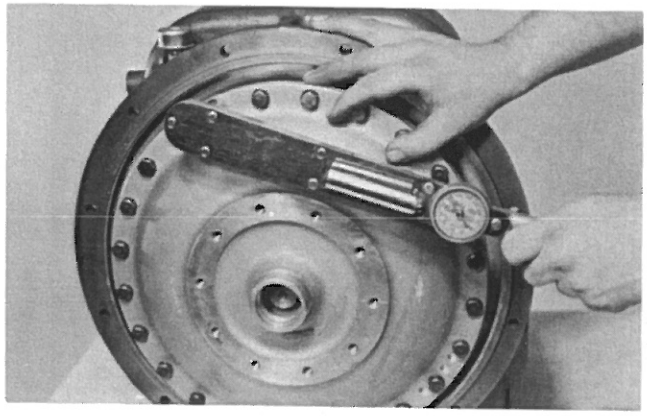


Figure 207

Install impeller cover to impeller capscrews and washers. Tighten 11" impeller cover capscrews 12 to 16 ft. lbs. torque [16,3 - 21,6 N.m.].

Tighten 12" impeller cover capscrews 23 to 25 ft. lbs. torque [31,2 - 33,9 N.m.].

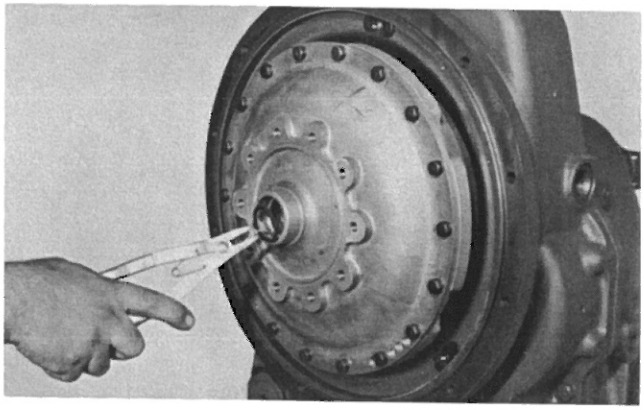


Figure 208

Install turbine retainer ring. See Figure 209

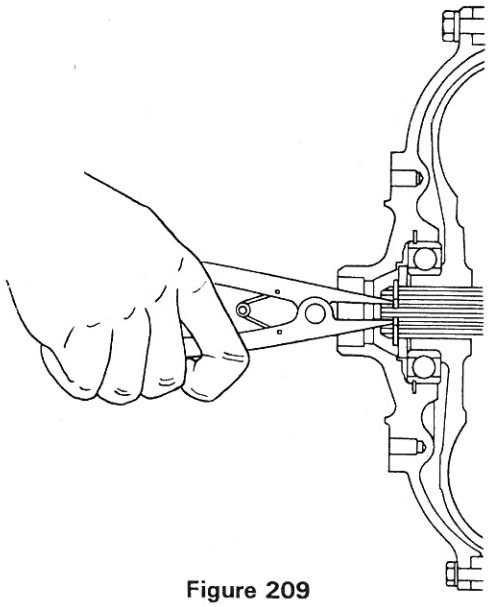


Figure 209

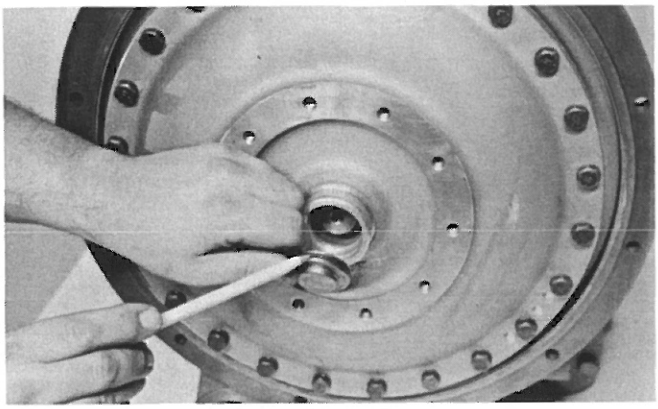


Figure 210

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

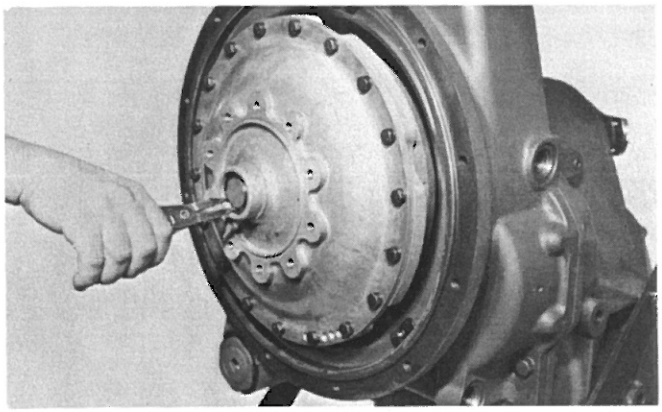


Figure 211

Install bore plug retainer ring.

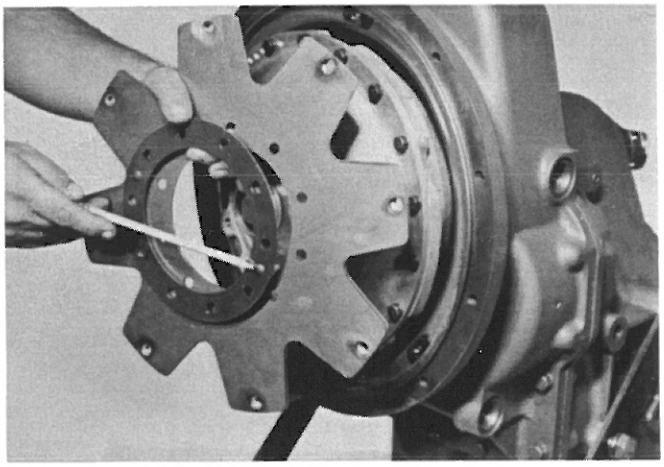


Figure 212

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.

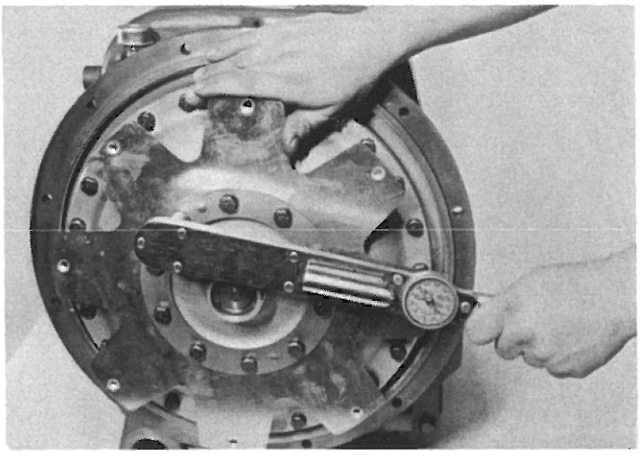


Figure 213

Tighten drive plate capscrews 23 to 25 ft. lbs. torque [31,2 - 33,9 N.m.].

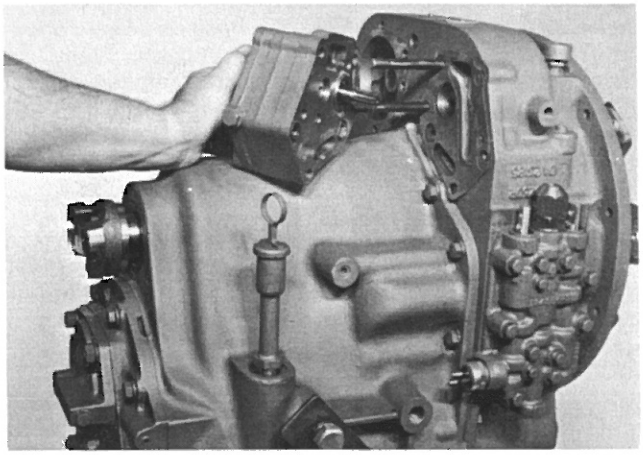


Figure 214

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

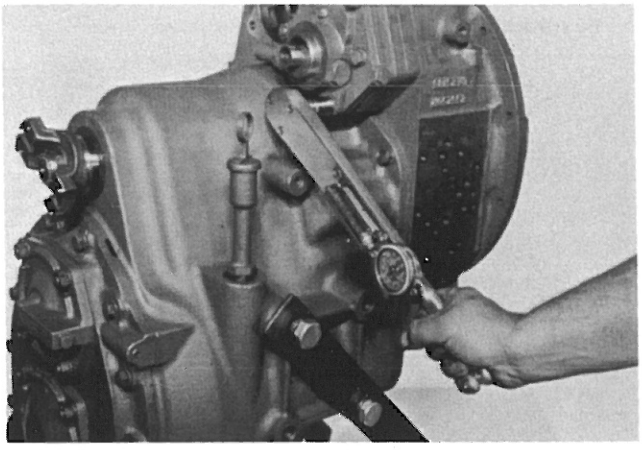


Figure 215

Tighten capscrews 37 to 41 ft. lbs. torque [50,2 - 55,6 N.m.] Tighten stud nuts 41 - 45 ft. lbs. torque [55,6 - 61,0 N.m.].

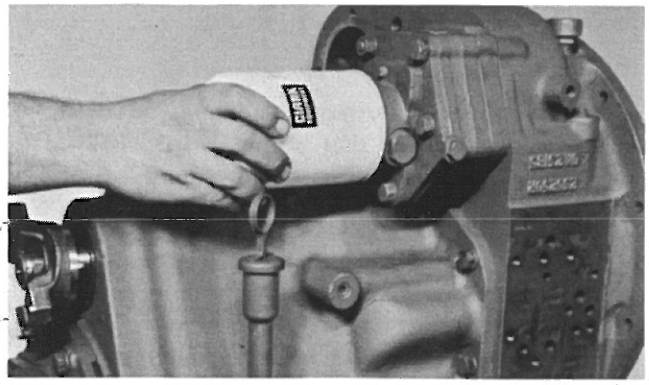


Figure 216

Install new oil filter. Tighten 20 to 25 ft. lbs. torque [27,1 - 33,9 N.m.].

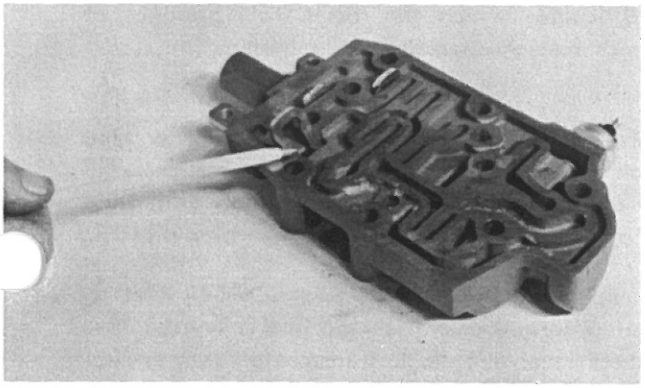


Figure 217

If the control cover valve spools are to be inspected or the spool oil seals changed, remove the valve spool stops 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.

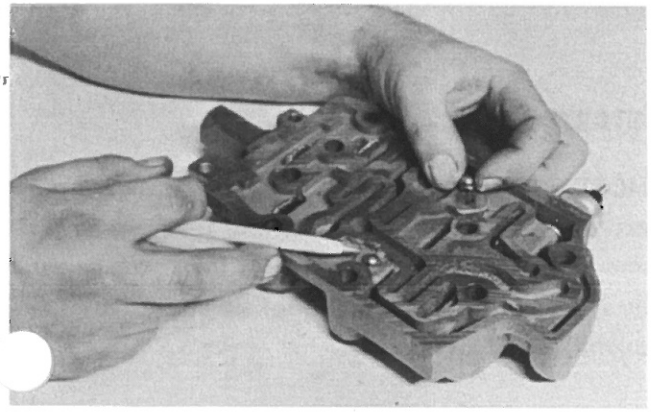


Figure 218

Position detent balls in housing.

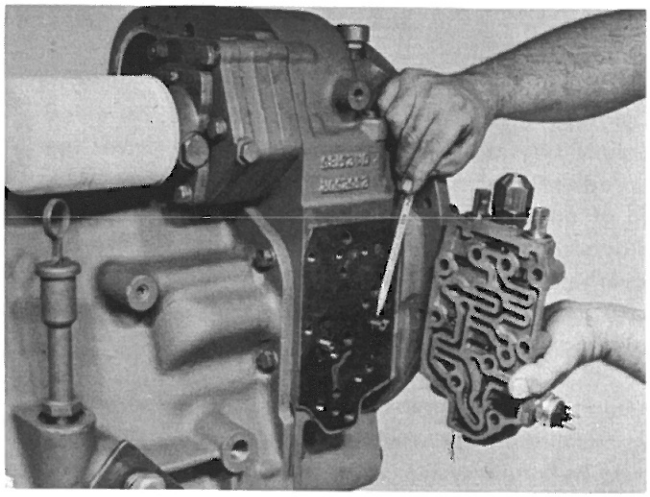


Figure 219

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

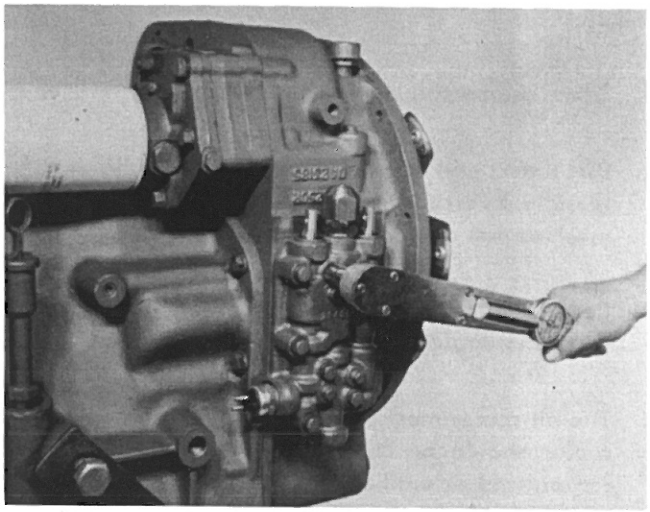


Figure 220

Tighten capscrews 23 to 25 ft. lbs. torque [31,2 - 33,9 N.m.].

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 **NEUTRAL.** Operating specifications: 25 P.S.I. [172,4 kPa] minimum pressure at 2000 R.P.M. engine speed **AND** a maximum of 70 P.S.I. [482,6 kPa] 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 psi [1241,1 - 1516,8 kPa] — 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, [34,5 kPa]If ,clutch pressure varies in any one clutch more than 5 psi, [34,5 kPa] 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 DAILY with engine running at 500-600 RPM and oil at 180° to 200° F. [82, 2 - 93, 3° C]. Maintain oil level to FULL mark.
NORMAL * DRAIN PERIOD	Every 500 hours, change oil filter element. Every 1000 hours, drain and refill system as follows: Drain with oil at 150° to 200° F. [65, 6 - 93, 3° C].

NOTE: It is recommended that filter elements be changed after 50 and 100 hours of operation on new and rebuilt or repaired units.

(a) Drain transmission and remove sump screen. Clean screen thoroughly and replace, using new gaskets.

(b) Drain oil filters, remove and discard filter elements. Clean filter shells and install new elements.

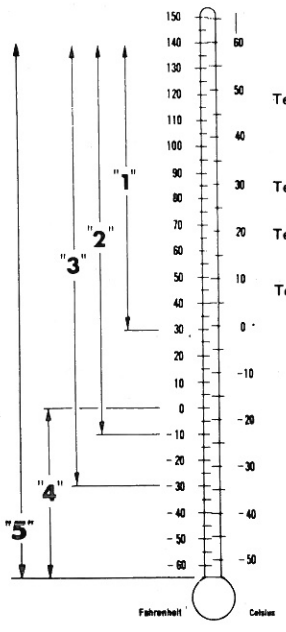
(c) Refill transmission to **LOW** mark.

(d) Run engine at 500-600 RPM to prime converter and lines.

(e) Recheck level with engine running at 500 - 600 RPM and add oil to bring level to **LOW** mark. When oil temperature is hot (180-200° F.) [82,2-93,3° C] make final oil level check. **BRING OIL LEVEL TO FULL MARK.**

RECOMMENDED LUBRICANTS FOR CLARK POWER SHIFTED TRANSMISSION AND TORQUE CONVERTERS

Prevailing Ambient Temperature



*Dexron is a registered trademark of General Motors Corporation.

Temperature Range	"1"	(a) C-2 Grade 30 (b) C-3 Grade 30 (c) Engine Oil:-Grade 30 API-CD/SE or CD/SF (d) MIL-L-2104C-Grade 30 (e) MIL-L-2104D-Grade 30
Temperature Range	"2"	(a) MIL-L-2104C-Grade 10 (b) MIL-L-2104D-Grade 10 (c) C-2 Grade 10 (d) C-3 Grade 10 (e) Engine Oil:-Grade 10 API-CD/SE or CD/SF (f) Quintolubric 822-220 (Non Phosphate Ester Fire Resistant Fluid)
Temperature Range	"3"	(a) *Dexron (b) *Dexron II D - **See Caution Below**
Temperature Range	"4"	(a) MIL-L-46167 (b) MIL-L-46167 A
Temperature Range	"5"	(a) Conoco Polor Start DN-600 Fluid

NOTES: Temperature ranges "2" and "3" may be used to lower ambient temperatures when sump preheaters are used. Temperature range "4" should be used only in ambient temperature range shown.

MODULATED SHIFT TRANSMISSIONS: H125, H200, H500, H600, 18000, 24000, 28000, 32000 & 34000 series transmissions with modulated shift use only C-3 or temperature range 3 items (a) & (b) *Dexron or *Dexron II D. **SEE CAUTION BELOW.** 3000, 4000, 5000, 6000, 8000 & 16000 series transmissions with modulated shift use only C-3 or temperature range 3 items (a) only *Dexron. Do **NOT** use *Dexron II D. **SEE CAUTION BELOW.**

CAUTION: *Dexron II D is not compatible with graphitic clutch plate friction material UNLESS IT MEETS THE APPROVED C-3 SPECIFICATIONS. *Dexron II D cannot be used in the 3000, 4000, 5000, 6000, 8000 or 16000 series power shift transmissions, or the HR28000, HR32000 & HR34000 series having converter lock-up, or the C270 series converter having lock-up UNLESS IT MEETS THE APPROVED C-3 SPECIFICATIONS.

Any deviation from this chart must have written approval from the application department of the Clark Components International Engineering and Marketing Department.

*** Normal drain periods and filter change intervals are for average environmental and duty-cycle conditions. Severe or sustained high operating temperatures or very dusty atmospheric conditions will cause accelerated deterioration and contamination. For extreme conditions judgment must be used to determine the required change intervals.**

CLARK

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:

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

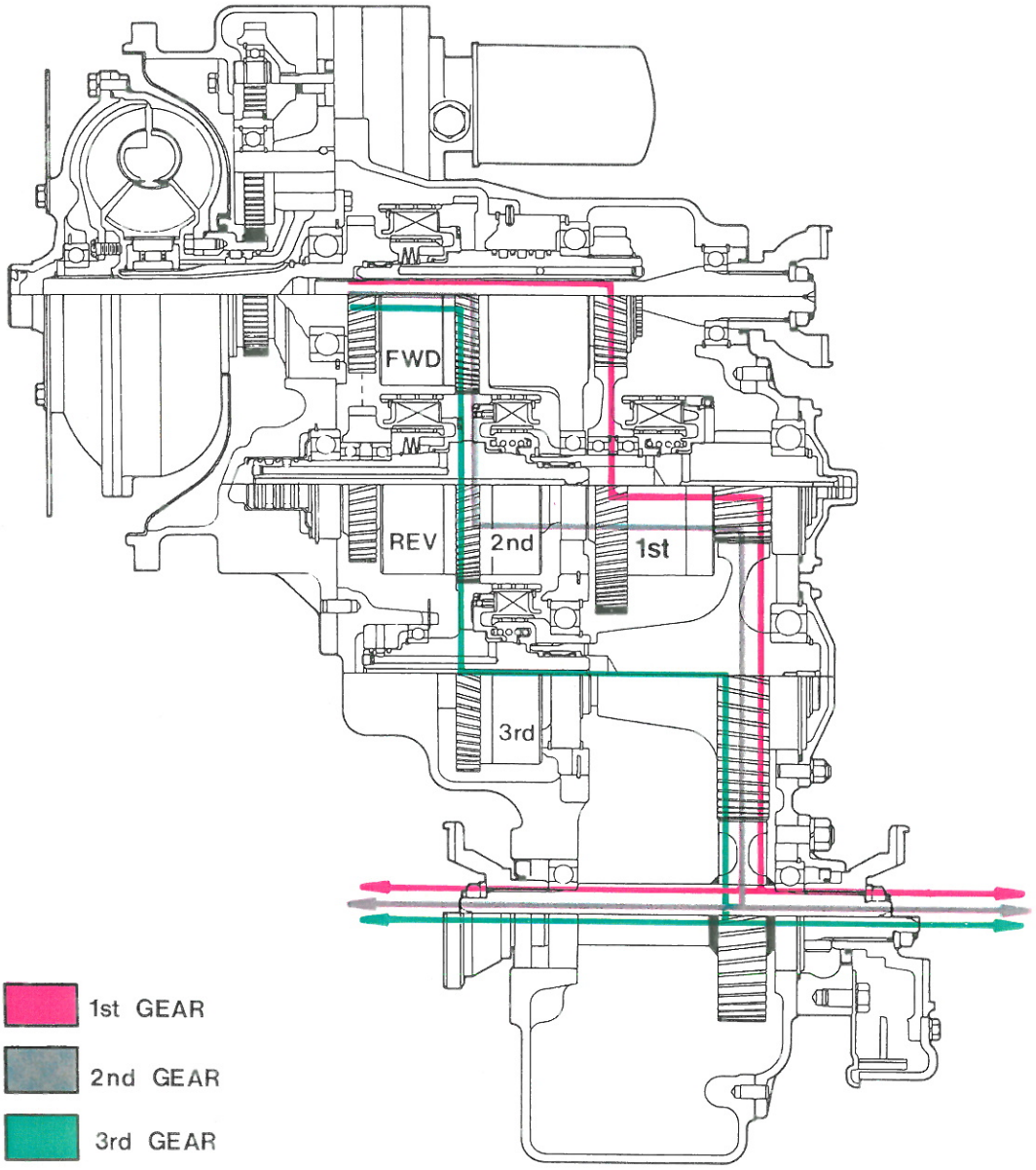
1. Worn oil sealing rings.	1. Remove, disassemble, and rebuild converter assembly.
2. Worn oil pump.	2. Replace.
3. Low oil level.	3. Fill to proper level.

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.

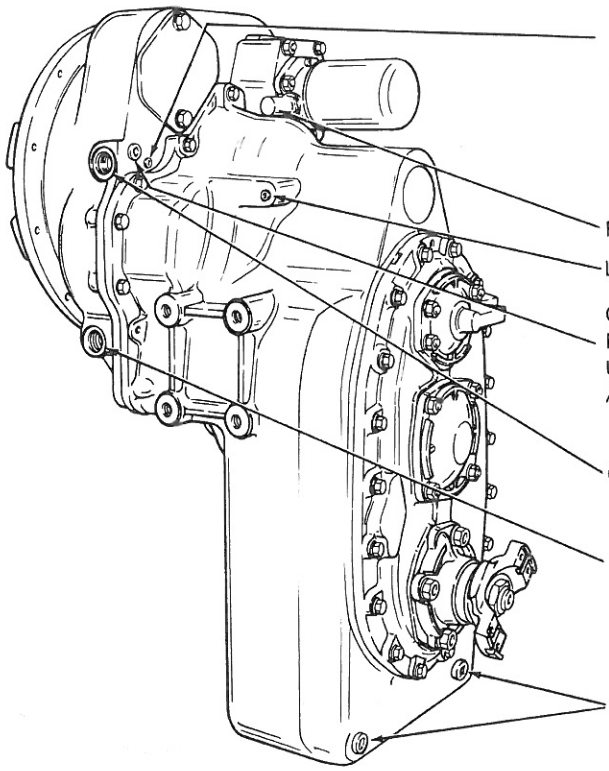
LACK OF POWER

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 "Overheating."



18000 3 SPEED TRANSMISSION LONG DROP
POWER FLOW

PRESSURE CHECK POINTS



CHECK POINT "C" CONVERTER OUTLET PRESSURE 25 P.S.I. [173 kPa] MINIMUM PRESSURE AT 2000 R.P.M. ENGINE SPEED AND A MAXIMUM OF 70 P.S.I. [483 kPa] OUTLET PRESSURE WITH ENGINE OPERATING AT NO LOAD GOVERNED SPEED.

PRESSURE REGULATOR VALVE

LUBE (CONSTRUCTION HOLE ONLY)

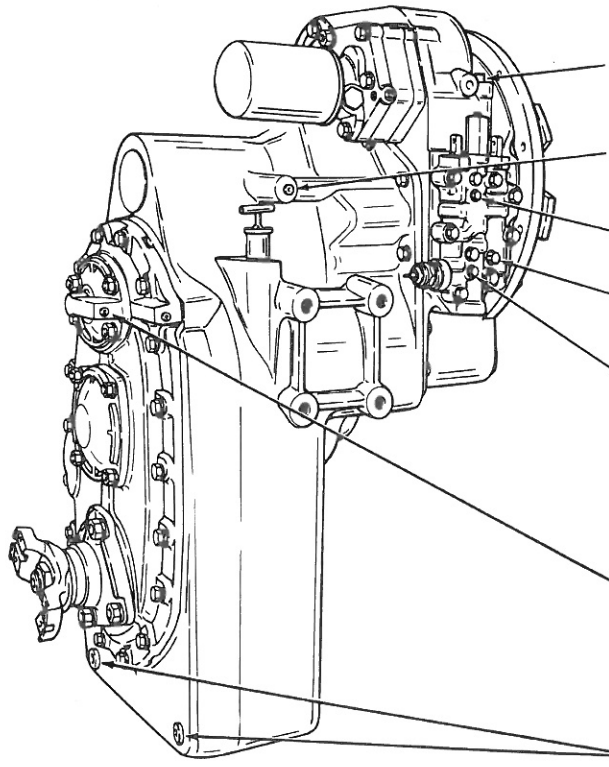
CHECK POINT "D" CONVERTER OUTLET TEMPERATURE RED LINE 250° F. [121° C] ½ N.P.T.F. PORT SIZE — MAY USE CLARK NO. 234033 (REF.) OR SAE NO. 2 TEMPERATURE PICKUP.

CONVERTER OUT

TO LUBE FROM COOLER

DRAIN

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



CHECK POINT "A" CLUTCH PRESSURE ¼ N.P.T.F. CLUTCH PRESSURE 180 TO 220 P.S.I. [1241 - 1516 kPa].

FWD. (CONSTRUCTION HOLE ONLY)

TRANSMISSION FWD. CLUTCH PRESSURE PORT (⅛ N.P.T.F.)

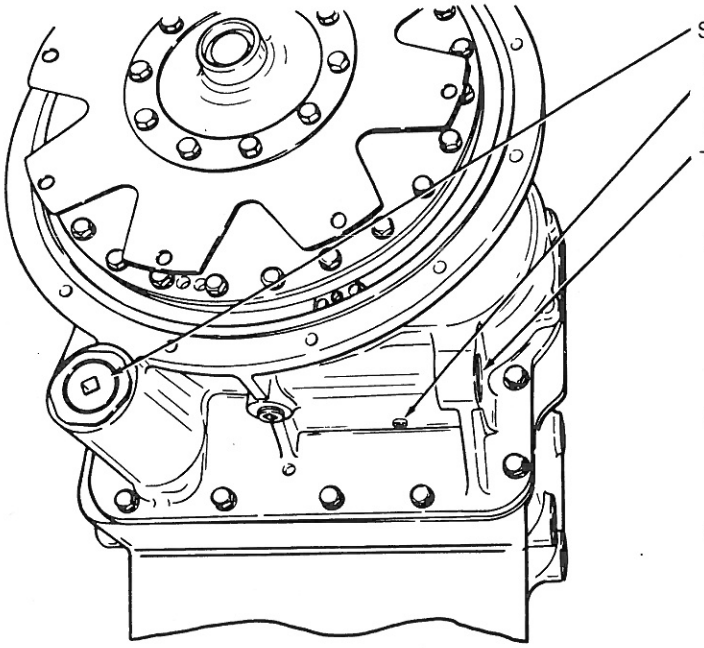
2ND

TRANSMISSION REV. CLUTCH PRESSURE PORT (⅛ N.P.T.F.)

THESE PORTS ARE PROVIDED FOR INSTALLATION OF BACK-UP WARNING LIGHT PRESSURE SWITCH OR HORN.

1ST (LOW)

DRAIN



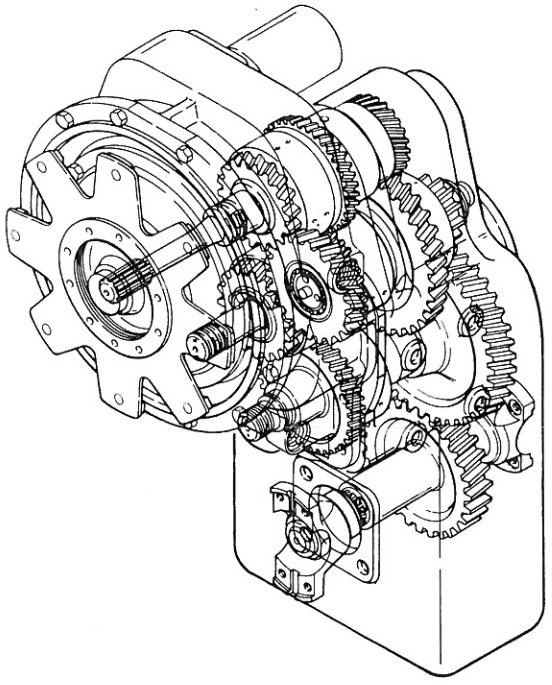
SUMP SCREEN

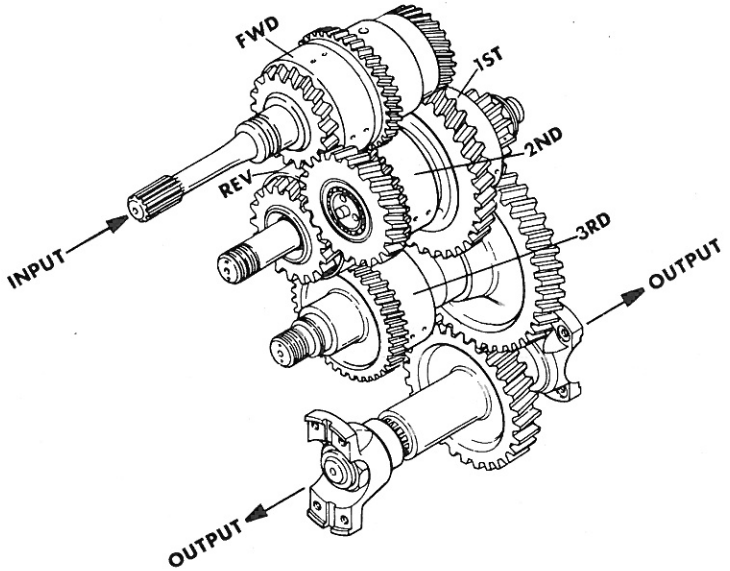
CHECK POINT "H" LUBE PRESSURE ⅛ N.P.T.F. 15-25 P.S.I. [103 - 172 kPa] @ 2000 RPM & 180° - 200° F [82,2-93,3° C] AT CONVERTER OUTLET.

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. [2068 kPa] CONTINUOUS OPERATION WITH 600 P.S.I. [4137 kPa] SURGE PRESSURE. REF. SAE 100RI 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

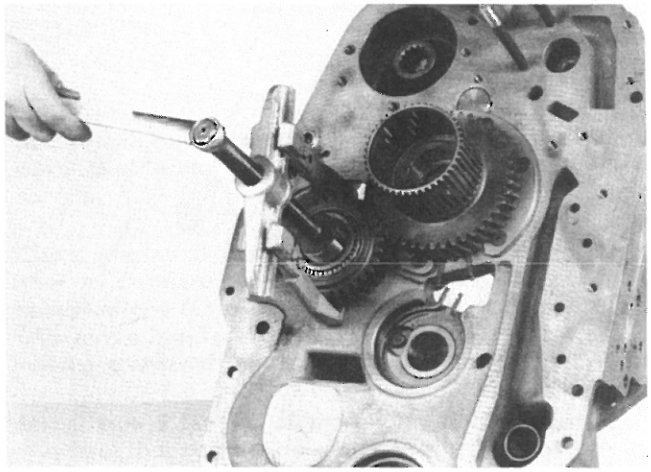


Figure 223
Remove idler gear and outer taper bearing from idler shaft.

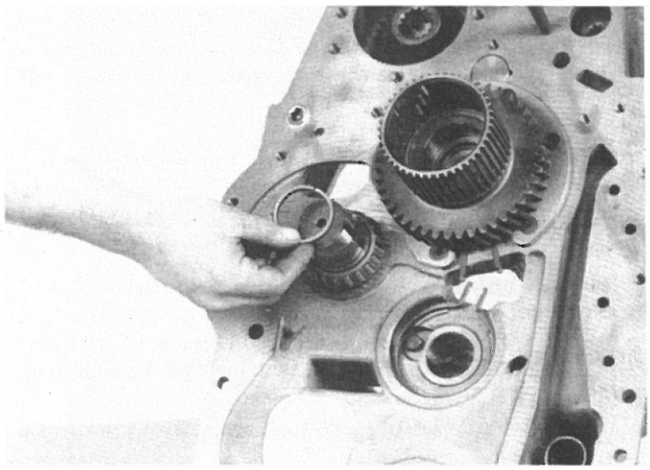


Figure 224
Remove bearing spacer.

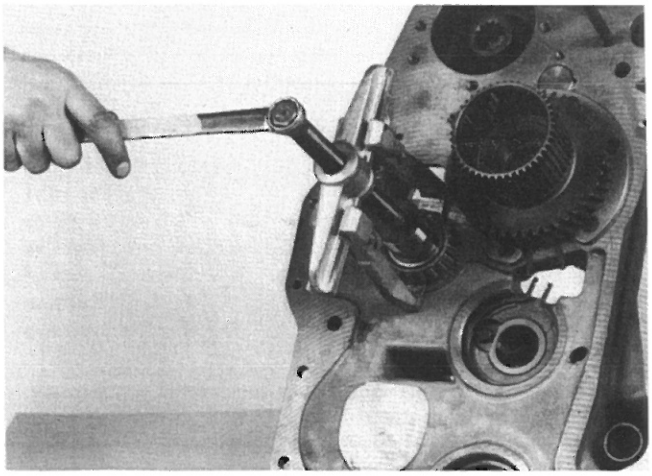


Figure 225
Remove inner taper bearing.

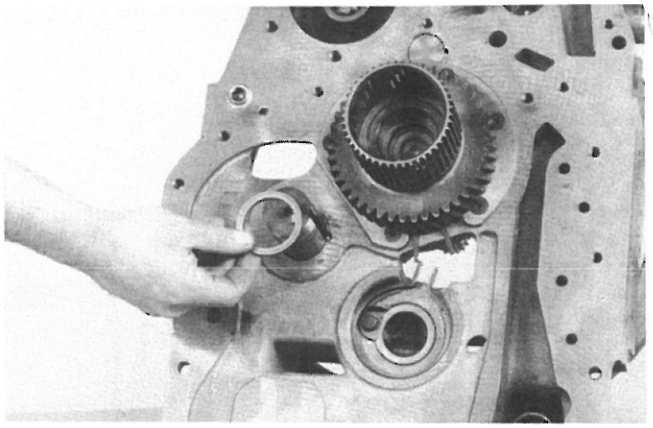


Figure 226
Remove bearing spacer.

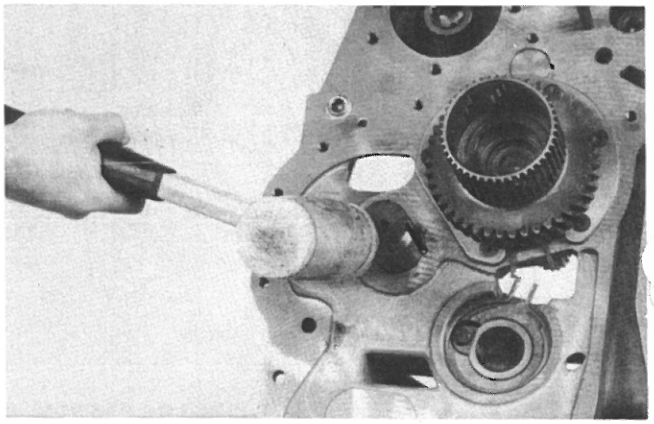


Figure 227
Remove idler shaft, use caution as not to lose shaft lock ball. Refer to page 23 for further disassembly.

REASSEMBLY OF LOCKNUT TYPE IDLER SHAFT

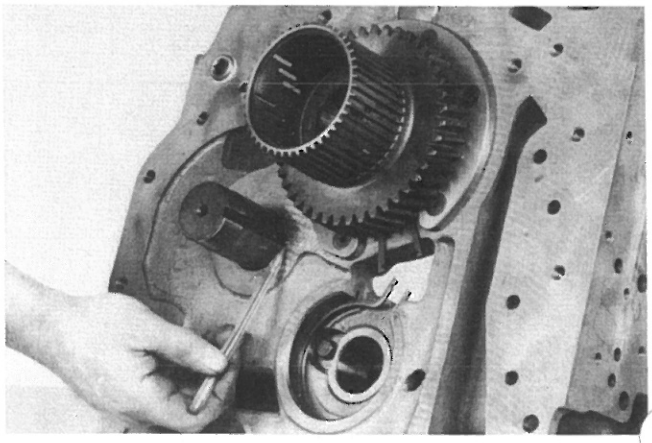


Figure 228
With new "O" ring on shaft, position idler shaft and lock ball in converter housing. Tap shaft into position. Note lock ball.

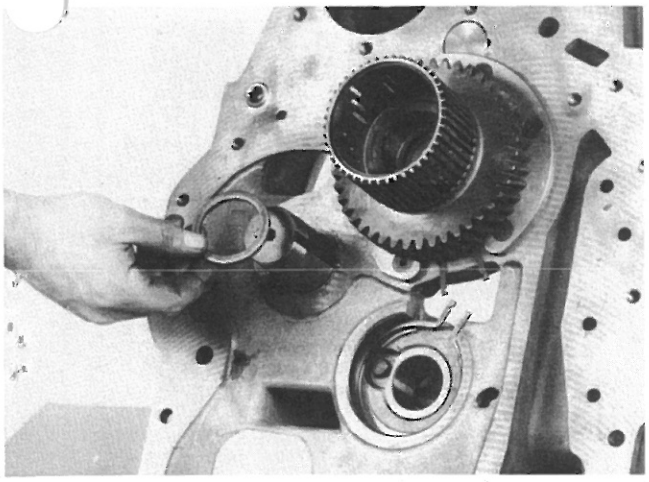


Figure 229
Install reverse idler shaft spacer.

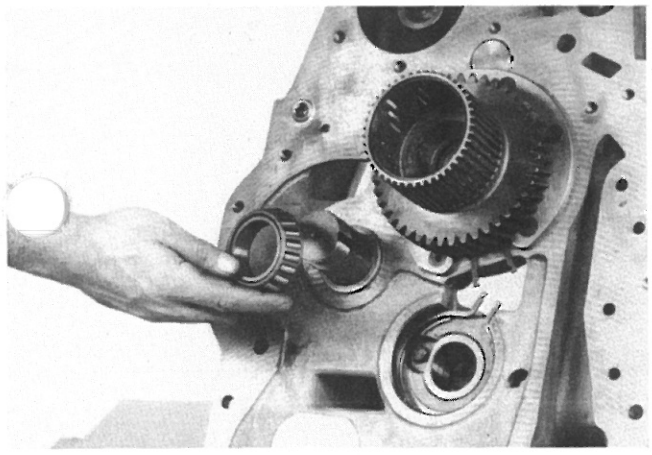


Figure 230
Install inner taper bearing on shaft with large diameter of taper down.

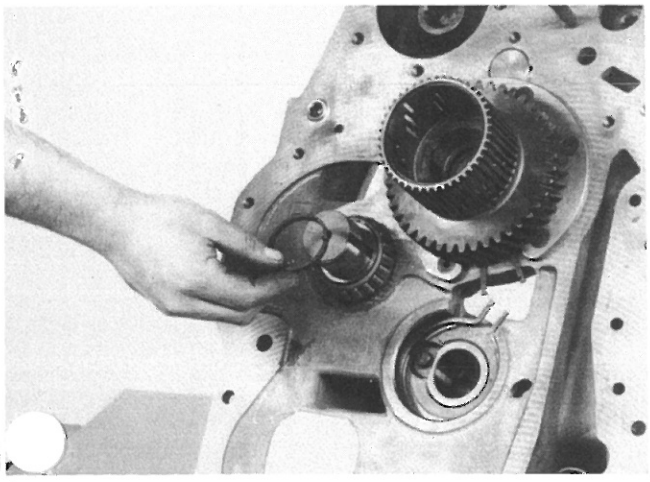


Figure 231
Position bearing spacer on shaft.

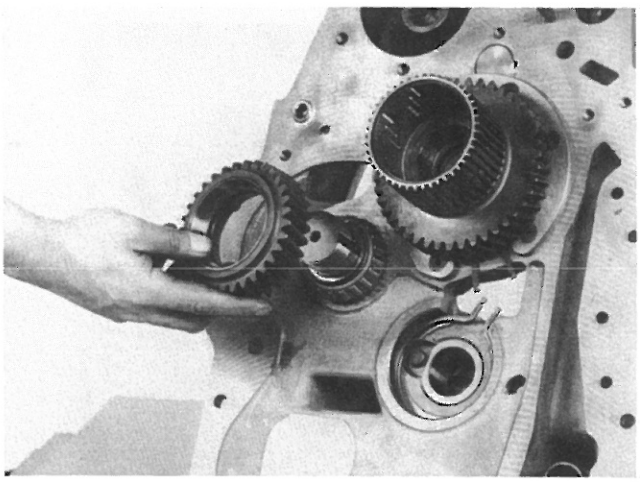


Figure 232
Position idler gear on bearing with hub of gear up.

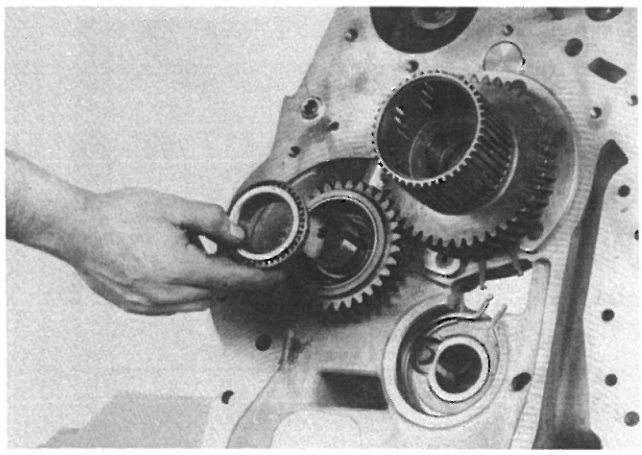


Figure 233
Install idler gear outer taper bearing with large diameter of taper up.

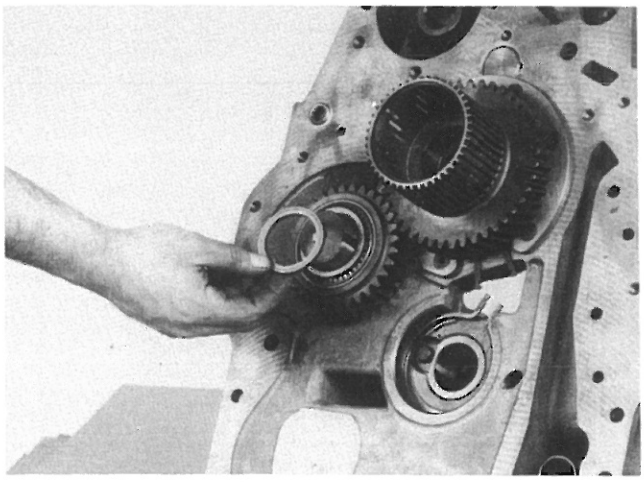


Figure 234
Position outer spacer on shaft.

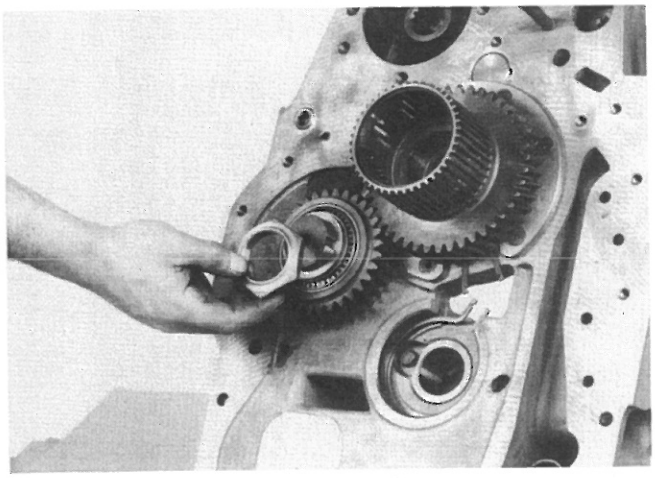


Figure 235
Install retainer nut.

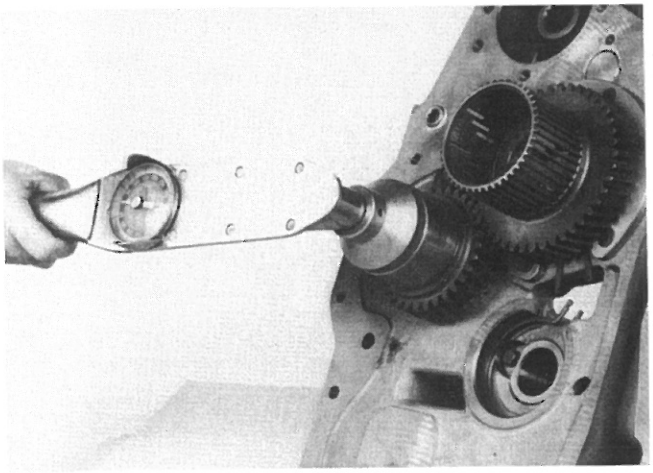


Figure 236
Tighten nut 200 - 250 ft. lbs. torque [271,2 - 338,8 N.m].

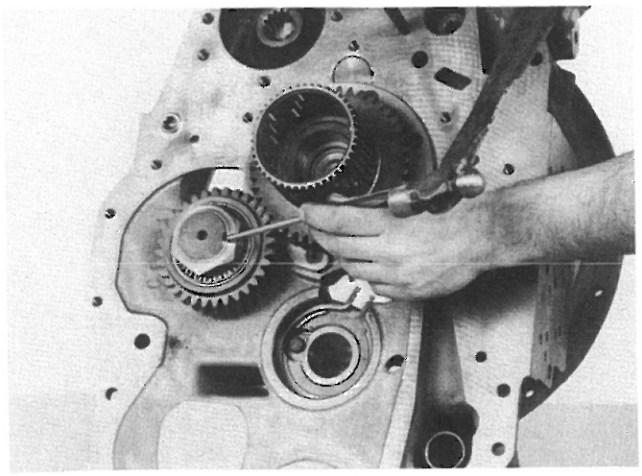
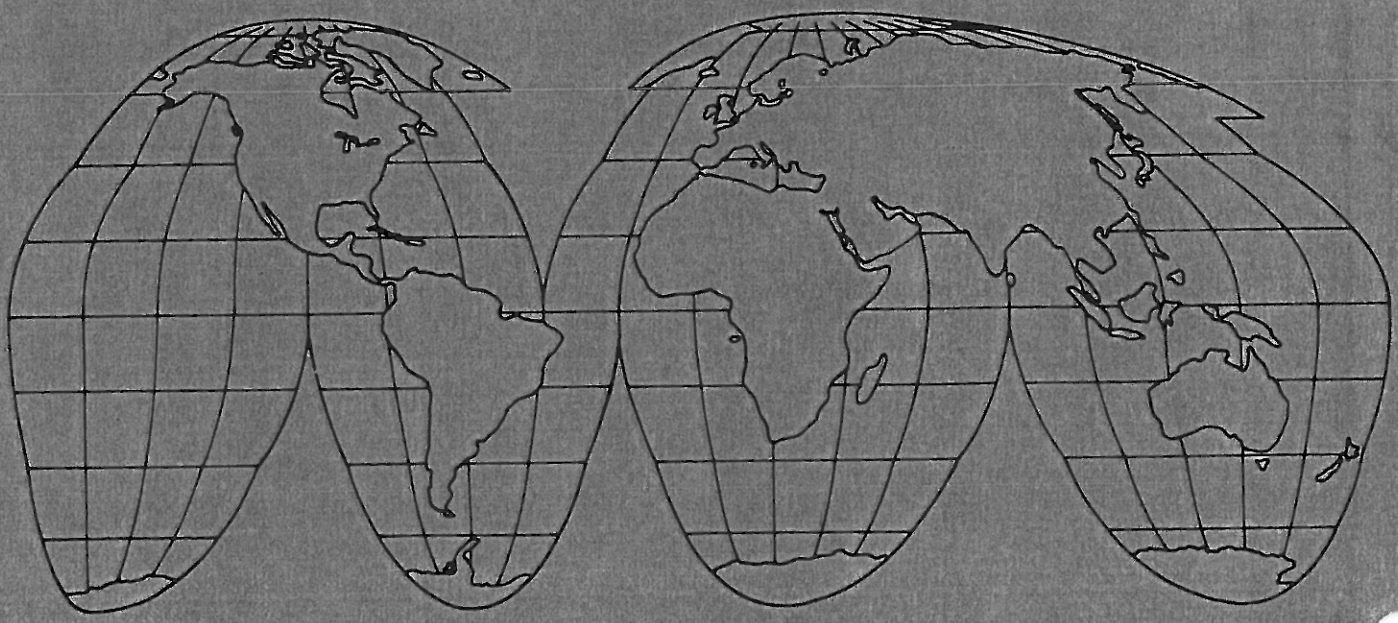


Figure 237
Stake nut securely in shaft notch.

Worldwide



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