TRANSMISSION OVERDRIVE

INDEX

OVERDRIVE HOUSING

Removal from Adapter

1. Place car on stand jacks.
2. Remove drain plug and drain overdrive.
3. Disconnect wires from solenoid and from governor switch.
4. Disconnect speedometer cable from driven gear fitting.
5. Remove propeller shaft as outlined in Section 4.

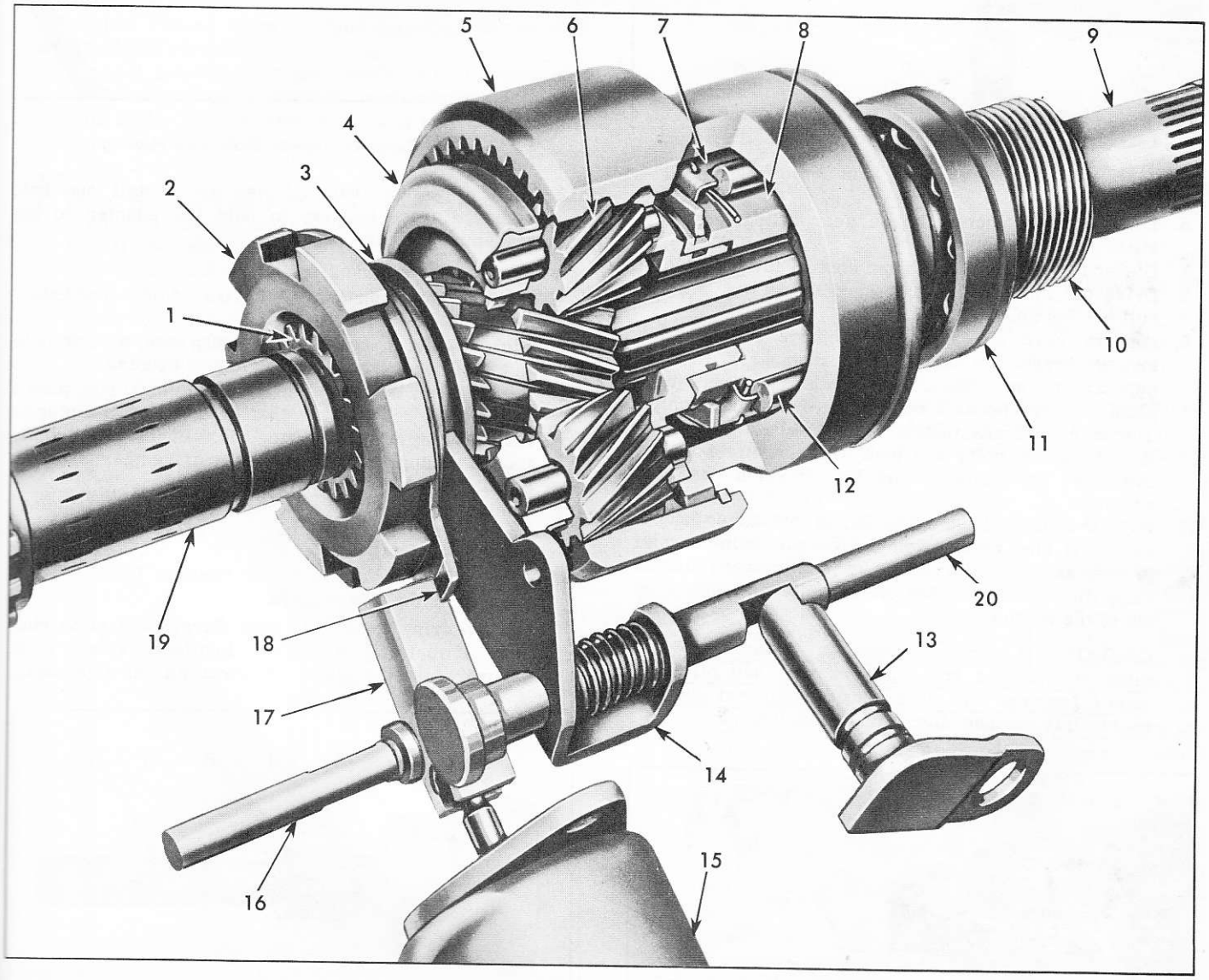

Fig. 1B—Overdrive Cross Section

1. Sun Gear
2. Sun Gear Control Plate
3. Sun Gear Shift Collar
4. Pinion Cage Assembly
5. Output Shaft Ring Gear
6. Pinion
7. Clutch Cam Roller Retainer
8. Cam
9. Output Shaft
10. Speedometer and Governor Drive Gear
11. Output Shaft Bearing
12. Clutch Cam Roller
13. Control Shaft and Lever
14. Shift Fork
15. Solenoid Assembly
16. Plunger
17. Sun Gear Pawl
18. Blocker Ring
19. Transmission Mainshaft (Typical)
20. Shift Rail

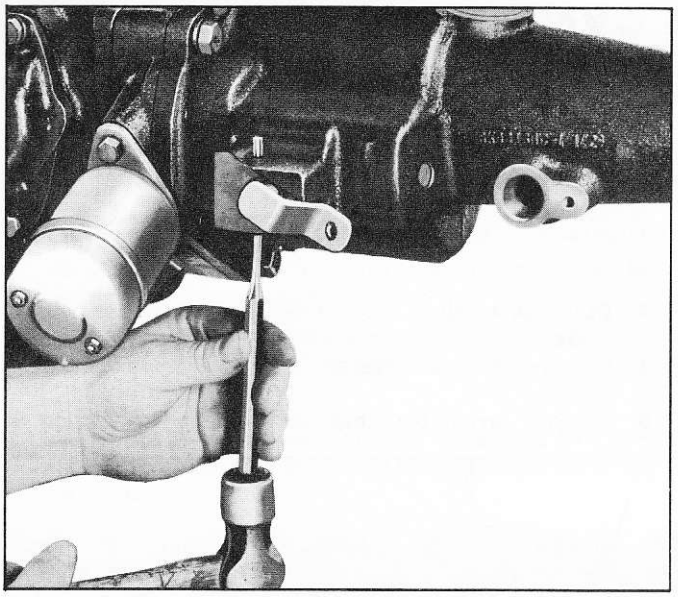

Fig. 2B—Removing Control Shaft Tapered Pin

6. Remove speedometer driven gear fitting, gear and shaft.
7. Disconnect control cable from control lever.
8. Drive out the control shaft tapered pin (fig. 2B) and pull control shaft out.
9. Support rear of engine and remove transmission support bracket to mount bolts and washers. Remove support to frame bolts, lock washers and nuts (also plain washers beneath bolt heads on left side only): Then remove transmission support.
10. Remove seven bolts and lock washers attaching the overdrive housing to the transmission case and adapter.
11. Pull overdrive housing including overdrive output shaft and ring gear assembly to rear, being careful to keep adapter from pulling away from transmission case (fig. 3B) (catch the clutch rollers as they drop out of the retainer).

CAUTION: If adapter moves away from transmission case the transmission mainshaft pilot needle bearings will drop out of clutch gear and necessitate disassembly of transmission.

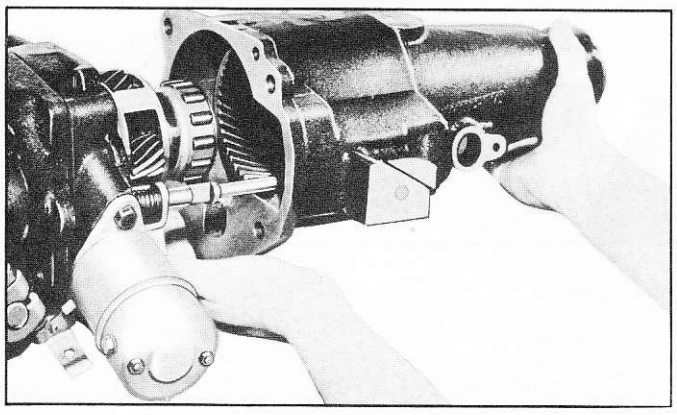

Fig. 3B—Removing Overdrive Housing and Shaft Assembly

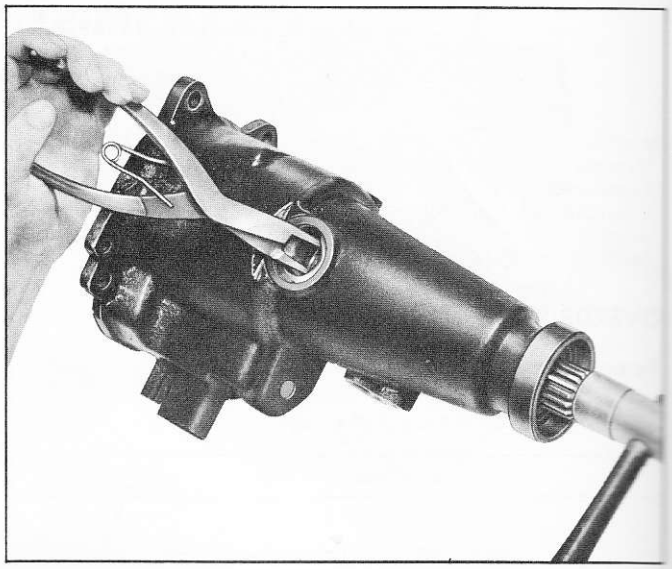

Fig. 4B—Removing Output Shaft from Housing

12. Remove gasket from adapter and install one bolt removed from housing to hold the adapter to the transmission case.

Disassembly

1. Remove governor and pinion if not previously removed.
2. Pierce plug in rear bearing snap ring access hole in top of housing and pry plug out of housing.
3. Spread rear bearing snap ring with snap ring pliers and lightly tap end of shaft with a soft hammer to free bearing from snap ring (fig. 4B), then pull shaft, including ring gear, speedometer drive gear and rear bearing, from housing.
4. Remove shift rail retractor spring from housing.
5. Remove output shaft rear bearing snap ring from housing.
6. Remove oil seal and press bushing from rear of housing, using Tool J-5778.
7. Remove ring gear snap ring (large) and slide ring gear off shaft (fig. 5B). The oil collector ring is spun securely to the shaft to form an oil tight seal.

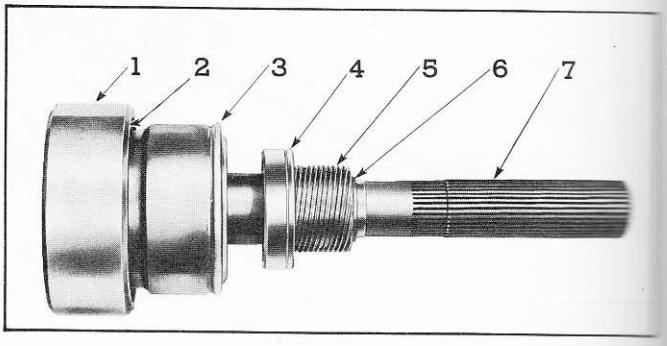

Fig. 5B—Overdrive Output Shaft Assembly

1. Ring Gear
2. Snap Ring
3. Oil Collector Ring (Part of Shaft)
4. Rear Bearing
5. Speedometer and Governor Drive Gear
6. Snap Ring
7. Output Shaft

8. Remove speedometer drive gear (small) snap ring from output shaft.
9. Support front face of bearing and tap end of shaft to start speedometer drive gear off shaft. If necessary to use arbor press to start gear (fig. 6B) do not press shaft more than 3/8" through bearing or woodruff key in shaft may gouge bearing. Pull gear off shaft.
10. Remove woodruff key and slide bearing off shaft.

Cleaning and Inspection

As each part is removed from the housing assembly, wash in cleaning solvent, dry, and protect from subsequent dirt accumulation.

Inspect housing, shift rail retractor spring, shift fork spring, snap rings, gears and bearings for cracks, defects or damage and substitute new parts where necessary.

If clutch rollers show surface markings of any kind they should be replaced.

A general inspection of the overdrive parts remaining on the transmission mainshaft, particularly the clutch cam and roller retainer assembly and the shift rail and fork assembly, should be made at this time.

Assembly

1. Slide rear bearing straight on shaft with snap ring groove in bearing away from ring gear end of shaft.
2. Install woodruff key in shaft, start speedometer drive gear onto shaft and align keyway in gear with key in shaft. Tap gear tight against bearing and install small snap ring.
3. Engage ring gear on teeth of overdrive shaft and install large snap ring in ring gear.
4. Using Tool J-5778, press bushing into housing flush with bore for seal. Coat I.D. of bushing with transmission lubricant. Coat new oil seal with Permatex

Fig. 6B—Removing Speedometer Drive Gear

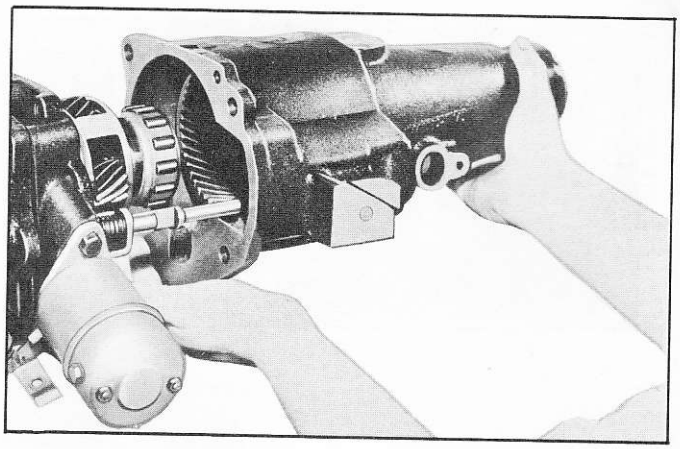

Fig. 7B—Installing Housing and Shaft Assembly

or equivalent and install in housing, using Tool J-5154. Prelubricate new seal between lips with cup grease.

5. Install output shaft rear bearing snap ring in slot in housing.
6. Install shift rail retractor spring inside housing and insert long 3/8" drift pin through spring to align spring with holes in housing.
7. Slide output shaft assembly into housing until rear bearing contacts snap ring. Spread snap ring and push shaft in until snap ring engages bearing.
8. Install new plug in snap ring access hole in top of housing.

Installation to Adapter

1. Snap a tight fitting rubber band around clutch cam roller retainer, insert rollers under rubber band in retainer and, with low gear of transmission engaged, turn retainer and rollers counter-clockwise until rollers are in their low position.
2. Remove the one bolt holding adapter to transmission case and install gasket on case.
3. Position shift rail so flat for control shaft faces outward, then start housing, output shaft and ring gear assembly into place with shift rail entering spring in housing (fig. 7B) while the output shaft is being turned counter-clockwise as it assembles over the clutch rollers. Slide housing against adapter. Install seven bolts and lock washers to adapter and case.
4. Install control shaft lever "O" ring seals, shaft and lever, clutch shaft locating pin and connect control wire to lever.
5. Install governor assembly and speedometer driven gear, shaft and fitting.
6. Notice the transmission support (Crossmember) is shaped so the upper surface has a slight slant when the bottom is flat. Position the support so the slant is down toward the rear of the vehicle, align the mounting holes with the holes in the frame and install the support-to-frame bolts, washers and nuts.
7. Install the support-to-mounting block bolts and washers.
8. Install propeller shaft as outlined in Section 4.

PARTS AT REAR OF ADAPTER

Removal

1. Remove overdrive housing, output shaft and ring

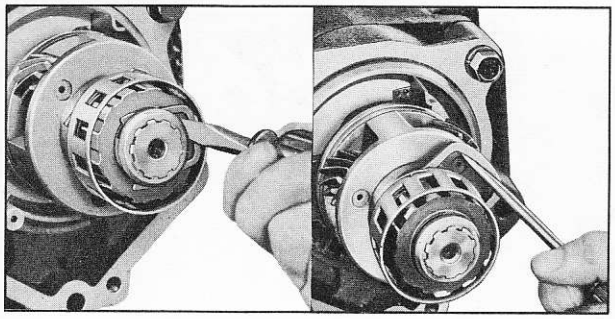

Fig. 8B—Removing Clutch Cam Retaining Clips

gear assemblies as outlined in preceding pages.

2. Pull "U" clips at each end of clutch cam (fig. 8B) and slide the cam and roller retainer from pinion cage hub and transmission mainshaft. If roller retainer or cam is to be replaced separate these pieces by pulling retainer out until the hooked ends of spring can be pulled out of holes in cam.
3. Slide pinion cage assembly off sun gear and mainshaft.
4. Remove sun gear and shift rail assemblies from shaft (fig. 9B). Shift rail collar may be separated from sun gear by removing snap rings at either end of collar. Shift rail, fork, and spring may be separated by removing snap ring between cupped washer and shift fork.
5. Remove sun gear solenoid, oil seal and cable bracket (fig. 10B).
6. Remove large snap ring from adapter (fig. 11B) and remove sun gear control plate retainer. Then slide control plate and blocker ring out of adapter (fig. 12B). If control plate or blocker ring is to be replaced they may be separated by pulling blocker ring off plate.
7. Lift sun gear pawl out of adapter.

Cleaning and Inspection

As each part is removed from the rear of the transmission, wash in cleaning solvent, dry, and protect from subsequent dirt accumulation.

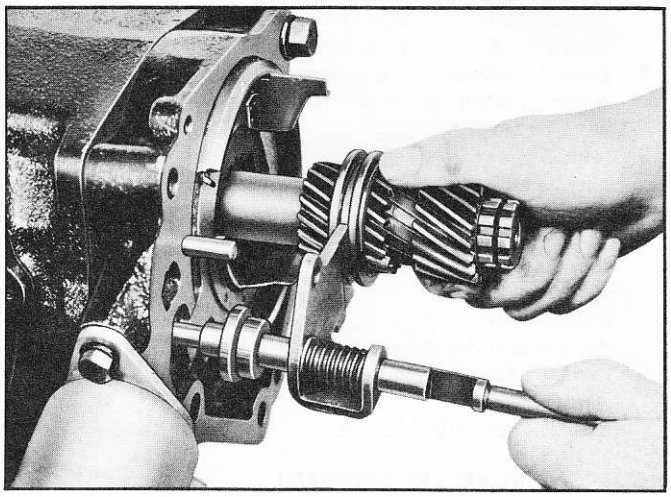

Fig. 9B—Removing Sun Gear, Shift Rail and Plunger Assemblies

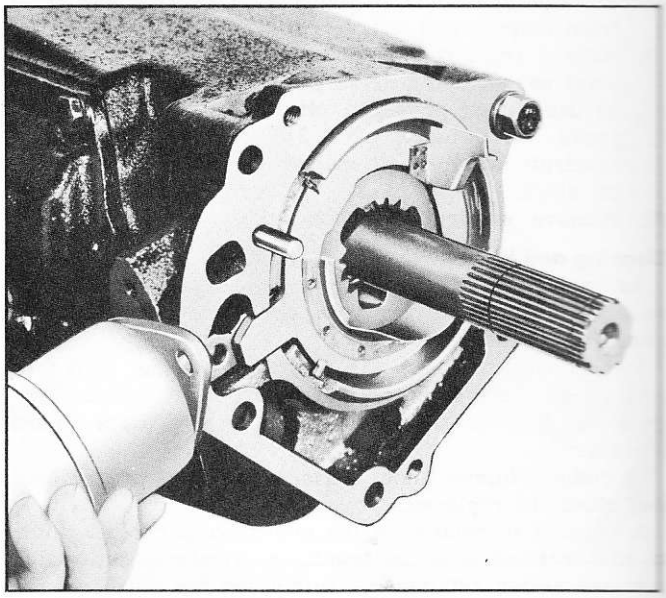

Fig. 10B—Removing Solenoid

1. Inspect "U" clips, control plate retainer, control plate, blocker ring and pawl for defects or damage and substitute new parts where necessary.
2. Inspect the fit and tension of the blocker ring on hub as follows:
   a. Push one end of ring toward the other. The ring should grip and hold to the hub. If the ring does not hold when correctly installed (flat surface of ring facing out), it should be replaced.
   b. Push one end of ring away from opposite end and check the frictional drag required to slide the ring around the hub as follows:
      (1) Hold one lug of control plate in a soft jawed vise and hook a spring balance into the notch of the nearest blocker ring lug (fig. 15B).
      (2) Measure the pull required to rotate the ring

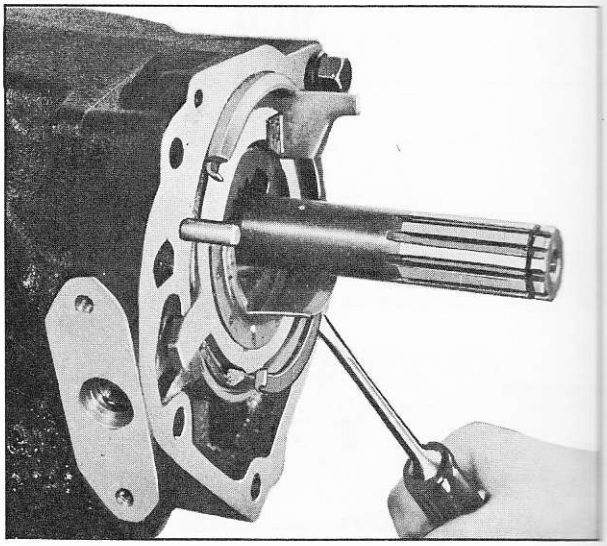

Fig. 11B—Removing Control Plate Retainer Snap Ring

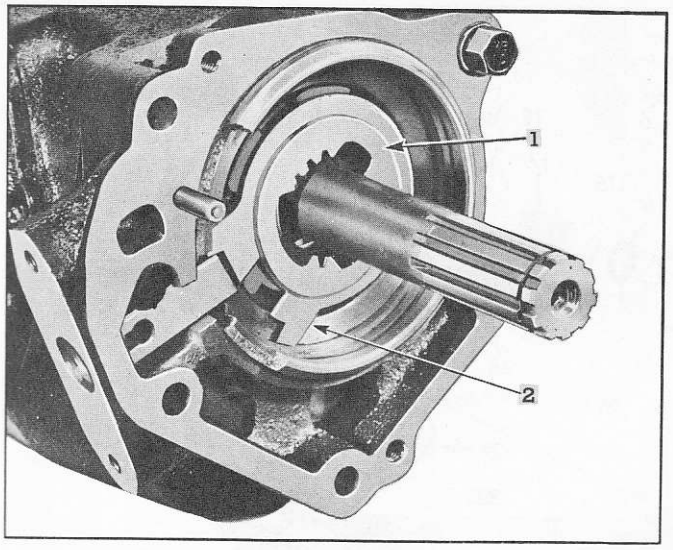

Fig. 12B—Control Plate, Blocker Ring and Pawl Positions for Assembly

1. Control Plate 2. Blocker Ring

after it has started moving. The pull should be 4-6 pounds on new parts, which will fall to 1-1 1/2 pounds when thoroughly broken in. While low friction may be corrected by squeezing the ring together for a tighter fit, installation of new parts is recommended.

3. Inspect the clutch cam and if the 12 flat surfaces show slight lengthwise indentations, replace the cam. If rollers show markings of any kind, they should all be replaced.
4. Test the tension of the cam retaining springs after the assembly has been thoroughly washed. (The springs are designed to twist the cam to return the rollers to the high side of the cam). Hold hub of cam and turn roller retainer counter-clockwise, then release retainer. The retainer should snap back quickly. If the action is slow or retarded, replace the springs or the complete assembly.

NOTE: If the spring tension is weak or retarded, the unit will free-wheel at all times.

5. When installing springs be sure both springs are coiled in the same direction (clockwise when looking toward flanged end of retainer), with "S" end of springs hooked into holes in retainer (fig. 16B) and opposite ends hooked into holes in cam.
6. Inspect the shift rail, fork, and spring for cracks, burrs or damage and replace defective parts.
7. When shift rail, fork and spring are assembled, make sure the parts bear the correct relationship as shown in Figure 17B, with snap ring inside cupped washer.

Installation

1. Insert sun gear pawl in adapter with notched side up.
2. If blocker ring was removed from control plate, position ring on plate with flat surface of ring facing out, then start the assembly over transmission mainshaft with ring toward rear. Slide the assembly into position with slot in ring toward sun gear pawl (fig. 12B).

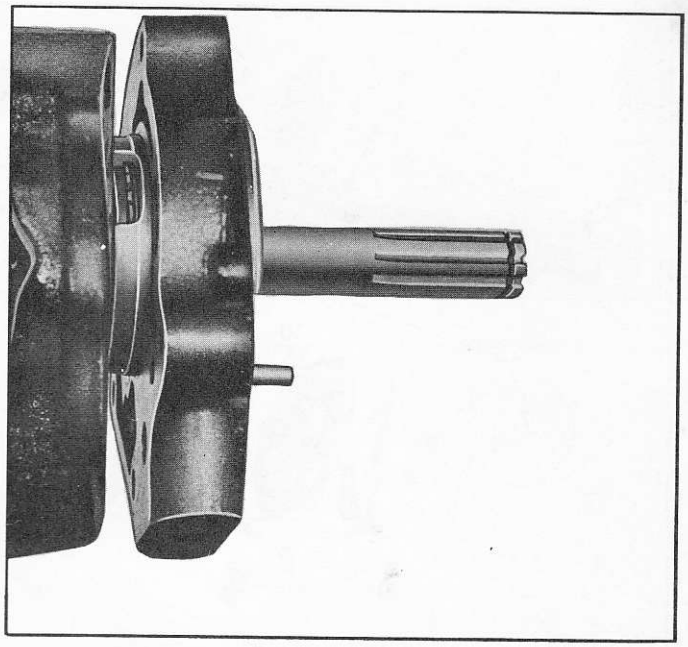

Fig. 13B—Removing Adapter from Transmission Case

3. Slide control plate retainer over mainshaft, against control plate and install snap ring in adapter.
4. Install solenoid oil seal, solenoid, and cable bracket.
5. Start the sun gear onto the mainshaft. Hold shift rail so arm of fork fits in collar on sun gear and forward end of shift rail enters opening in adapter and transmission case (fig. 9B). Slide both assemblies forward so pin in adapter locates the fork, and sun gear engages control plate.
6. Install pinion cage assembly over mainshaft and sun gear, turning cage assembly clockwise to engage sun gear.
7. If free wheeling cam and roller retainer were separated, assemble these parts by positioning springs so both are coiled clockwise when looking at flanged end of retainer (fig. 16B), then place retainer over slotted end of cam, hook free ends of springs in holes in cam, turn retainer clockwise and push springs into place around cam.
8. Slide cam and roller retainer assembly over mainshaft and pinion cage hub. Install "U" clips at each end of free wheeling cam.

Lubrication

The transmission and overdrive unit are connected with oil passages so the same oil is used for both. However, the following precautions must be used in the filling, in order that the proper amount of oil may be carried.

1. In making the initial filling, first fill the overdrive unit with the proper oil until oil runs out the filling hole, then replace plug. Fill the transmission with the same type of oil, until oil runs out the filling hole, then replace plug.
2. In subsequent filling (at each chassis lubrication), inspect the transmission only, for oil level, and fill as necessary.

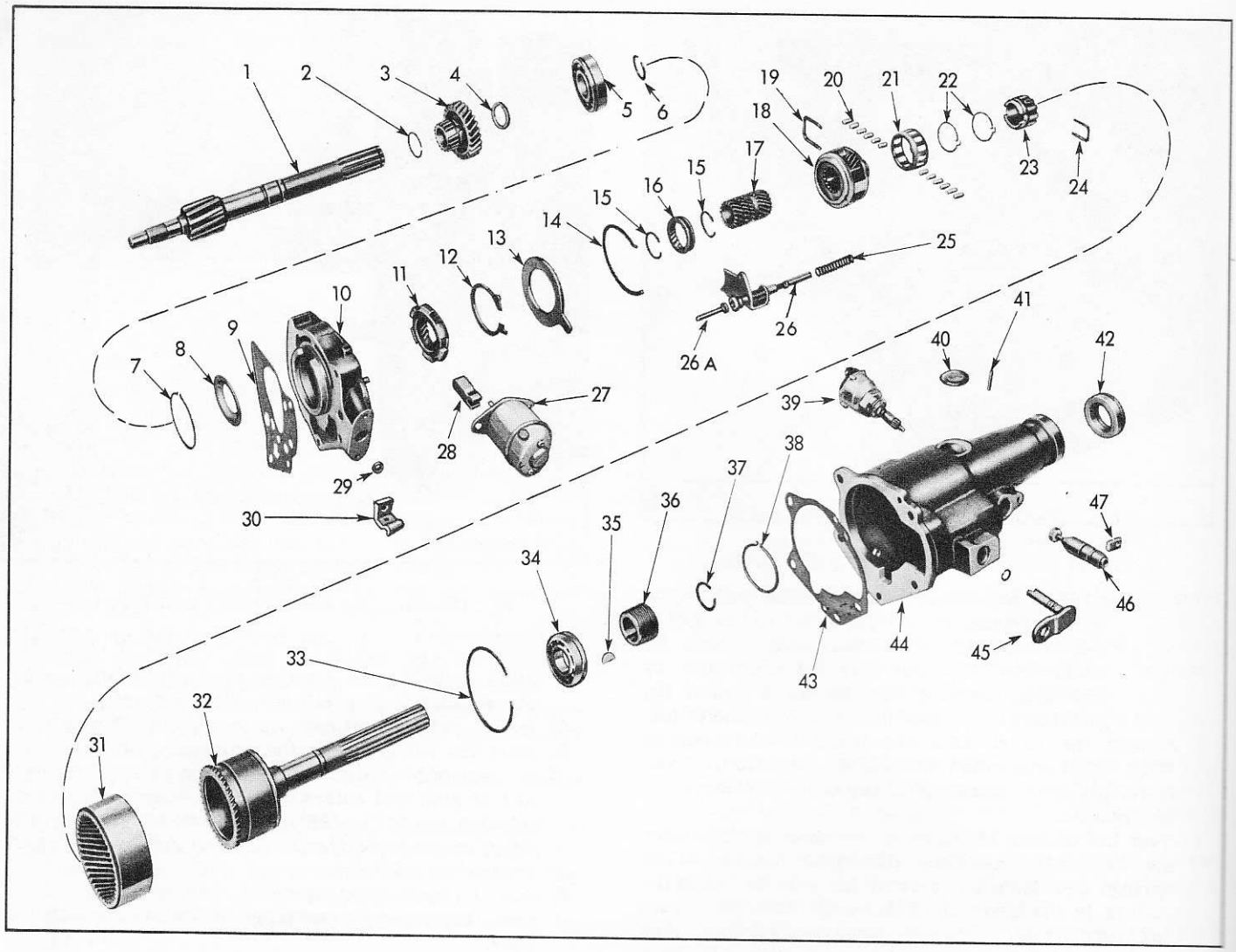

Fig. 14B—Layout of Overdrive Parts (Typical)

1. Transmission Mainshaft
2. Energizing Spring
3. Second Speed Gear
4. Thrust Washer
5. Mainshaft Bearing
6. Snap Ring
7. Snap Ring
8. Oil Baffle
9. Gasket
10. Adapter
11. Sun Gear Control Plate
12. Blocker Ring
13. Control Plate Retainer
14. Control Plate Retainer Snap Ring
15. Shift Rail Collar Snap Ring
16. Shift Rail Collar
17. Sun Gear
18. Pinion Cage Assembly
19. Cam Retaining "U" Clip (Large)
20. Cam Rollers
21. Cam Roller Cage
22. Roller Cage Retracting Spring
23. Free-Wheeling Cam
24. Cam Retaining "U" Clip (Small)
25. Shift Rail Retractor Spring
26. Shift Rail Assembly (Also see Fig. 17B)
26a. Plunger
27. Sun Gear Solenoid
28. Sun Gear Pawl
29. Sun Gear Pawl Rod Oil Seal
30. Control Cable Bracket
31. Ring Gear
32. Output Shaft
33. Ring Gear Snap Ring
34. Output Shaft Bearing
35. Woodruff Key
36. Speedometer Drive Gear
37. Drive Gear Snap Ring
38. Bearing Snap Ring
39. Governor Switch
40. Plug
41. Control Shaft Locating Pin
42. Oil Seal
43. Gasket
44. Overdrive Housing
45. Shift Rail Control Shaft and Lever
46. Speedometer Driven Gear and Fitting
47. Lock Plate

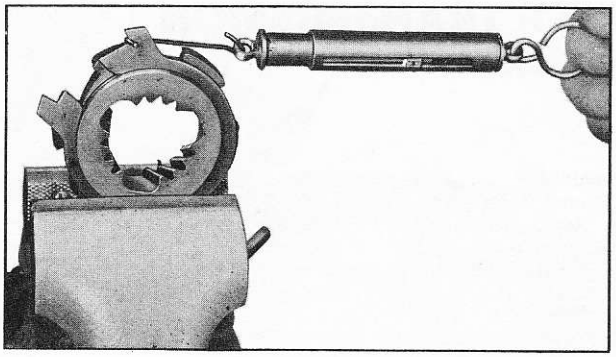

Fig. 15B—Measuring Blocker Ring Tension

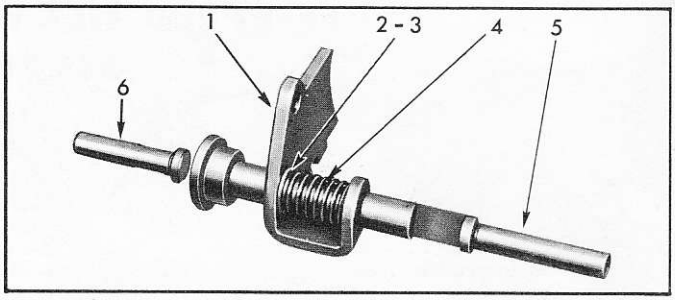

Fig. 17B—Shift Rail, Plunger, Fork and Spring Assembly

1. Fork
2. Snap Ring
3. Washer
4. Spring
5. Shift Rail
6. Plunger

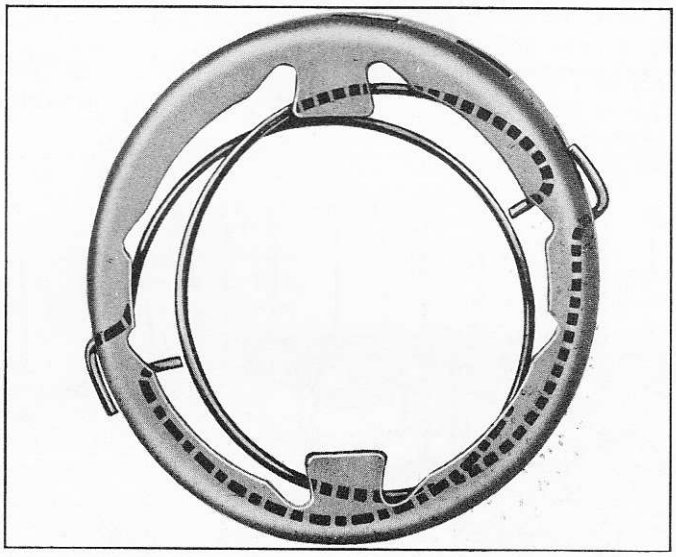

Fig. 16B—Installation of Cam Roller Retaining Springs