GROUP 4

CLUTCH, S-M TRANSMISSIONS

SECTIONS IN GROUP 4

SECTION 4-A

4400 CLUTCH

CONTENTS OF SECTION 4-A

4-1 CLUTCH SPECIFICATIONS

a. Tightening Specifications

Part	Location	Thread Size	Torque Ft.-Lbs.
Bolt	Clutch Cover to Flywheel	3/8-16 x 1	30-40
Stud	Clutch Release Fork Ball	3/16-16	35-45
Bolt	Transmission to Flywheel	1/2-13 x 1 1/2	45-60
Bolt	Flywheel Housing to Cylinder Block	3/8-16 x 1 1/4	30-40

b. Clutch Specifications

Type	Single Plate Dry Disc
Pedal Pressure	28 - 30 lbs.
Pedal Lash	3/4" to 1"
Driven Plate Diameter	10 13/32"
Driven Plate Facings	Woven Asbestos
Number of Facings	2
Facing Attachment	Riveted
Facing Area (Sq. in.)	106.81
Vibration Damping	6 Springs

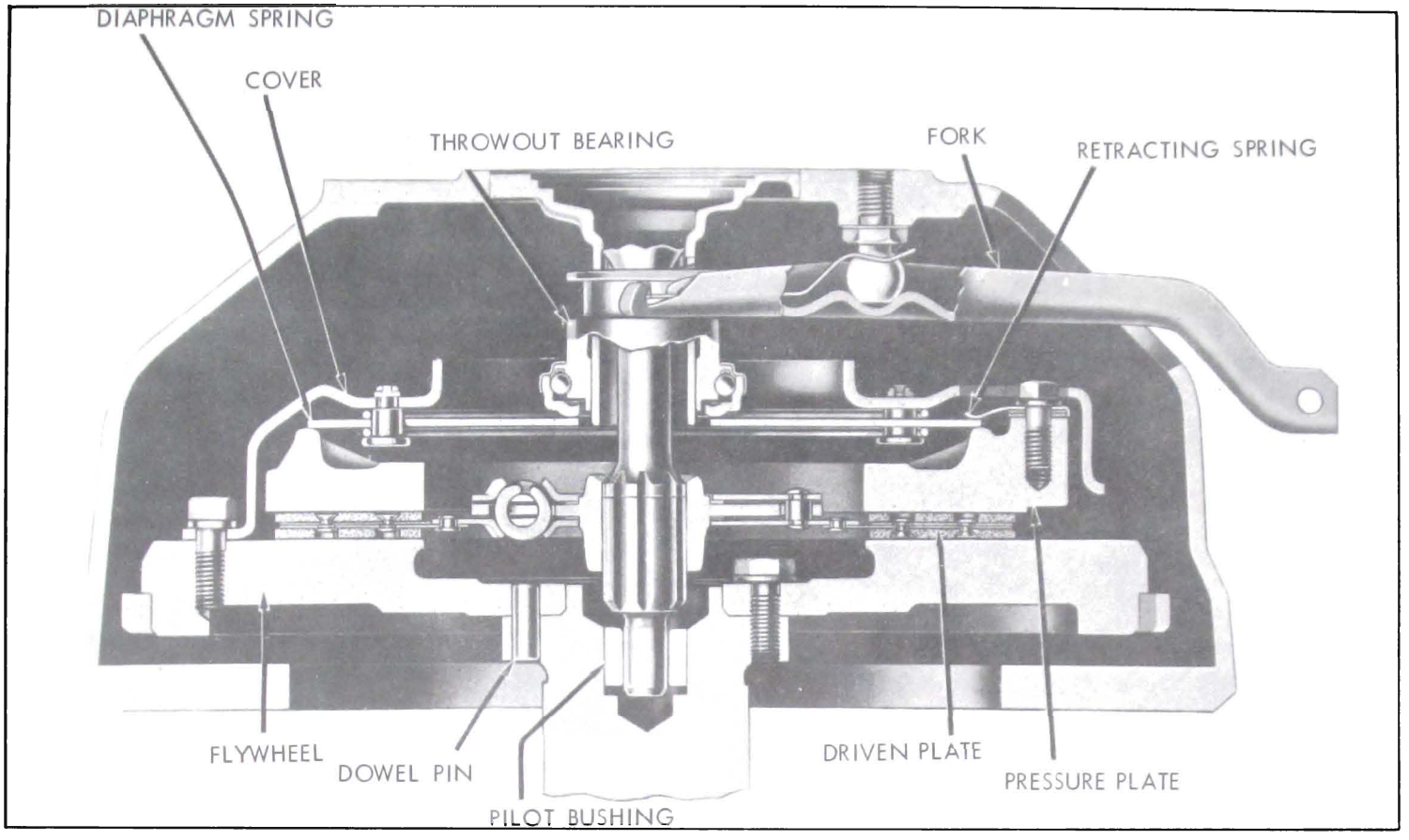

Figure 4-1—Standard Clutch

4-2 CLUTCH DESCRIPTION

All 4400 synchromesh cars are equipped with a single plate dry disc clutch, using a diaphragm spring assembly. See Figure 4-1.

a. Release

Depressing the clutch pedal causes movement of the clutch fork in the direction shown in Figure 4-2. Actual operation of the linkage in this operation is explained in paragraph C below. The clutch fork, pivoting on a ball stud, acts upon the throw out bearing. The bearing in turn, forces the tangs of the diaphragm spring in the direction shown in Figure 4-2. The diaphragm spring, being retained in the clutch cover by 9 rivets and 2 wire rings, is mounted in such a way that the spring can pivot or dish on these rings, again reversing the direction of force. This force is applied directly to the 3 retracting springs which, in turn, pull the pressure plate rearward and out of contact with the driven plate.

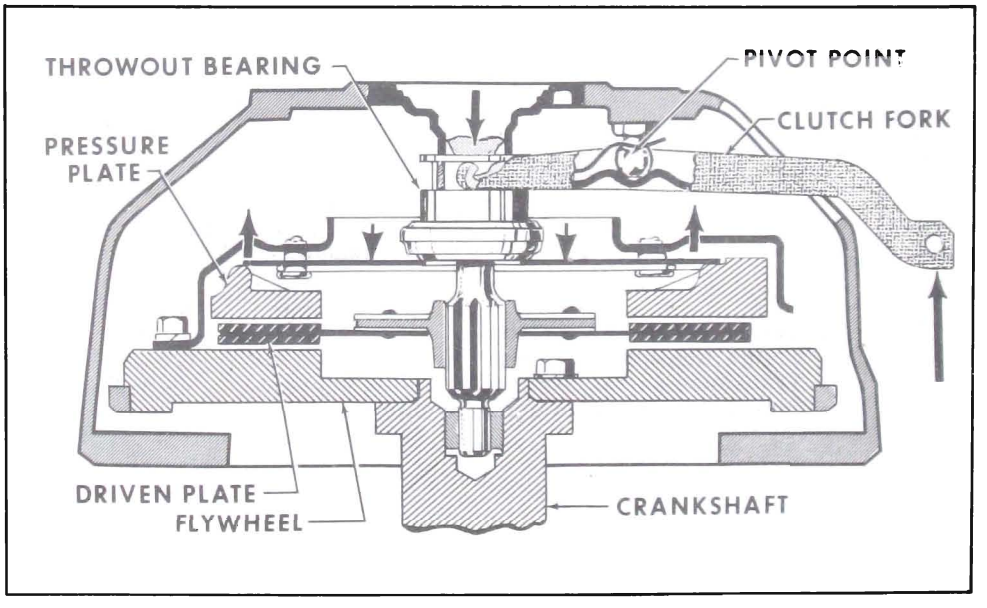

Figure 4-2—Clutch Releasing Action

b. Clutch Driven Plate

The clutch driven plate assembly is mounted with a free sliding fit on the transmission main drive

gear and is keyed to the gear by ten splines. The front end of the main drive gear is piloted by a bushing pressed into a recess in the rear end of the engine crankshaft. See Figure 4-1.

The outer area of the driven plate is divided into segments which are formed in low waves to provide springs between the plate facings and thereby cushion engagement of the clutch. A molded facing, grooved to give release, is riveted to each side of every segment of the plate. When the clutch is fully released, the waved segments cause the facings to spread approximately .055" and the movement of pressure plate provides an additional clearance of approximately .030" to assure full release of driven plate. See Figure 4-2.

The driven plate assembly is designed to prevent torsional periods of the engine from being transmitted to the transmission gears and causing rattle. This is accomplished by driving the plate hub through torsional coil springs and providing frictional dampening by means of friction between disc and the nuts.

c. Clutch Linkage

The clutch pedal is the suspended type and pivots on a shaft which extends thru a bracket bolted to the cowl. The pedal arm returns against a rubber bumper. See Figure 4-3.

The clutch operating rod extends from the clutch pedal thru the cowl, where it is retained to the equalizer operating rod by a washer and clip. The clutch equalizer operating rod is joined with the operating lever by the equalizer shaft. Projections extending from the spherical ends of the equalizer shaft interlock with the equalizer rod at one end, and the equalizer lever at the other. The entire equalizer unit is supported by a pivot stud attached to the crankcase, and a bracket attached to the frame. See Figure 4-3.

A rod, threaded at one end, is attached to the equalizer lever and is provided with a locking nut for adjustment purposes. The other end is spherical and pivots in an indentation in the clutch fork. Movement of the equalizer assembly is thus transmitted to the clutch fork. Pedal return is provided by a spring between the clutch fork and the frame.

4-3 CLUTCH TROUBLE DIAGNOSIS

a. Excessive Pedal Pressure

The normal pressure required to depress the clutch pedal varies between 28 and 33 lbs. Minimum pedal pressure is required when the car is new. It is a normal condition for the pedal pressure to increase as mileage increases. If excessive pressure is encountered (over 40 lbs.), it is logical to suspect a worn driven plate. However, linkage bind due to misadjustment or lack of lubrication can also increase pedal pressure.

b. Noise

Squeaking and grinding noises during clutch pedal operation are usually caused by heavy friction in the release linkage or internal parts of clutch assembly. Before condemning the throw-out bearing, thoroughly lubricate equalizer and, if necessary, lubricate internal working parts of clutch as described in paragraph 4-5.

c. Clutch Grab or Chatter

A very slight amount of oil on driven plate facings will cause clutch grab and chatter. A new driven plate must be installed if original plate facings contain oil since removal of oil from facings is not practical.

When oil is found on facings, examine pilot bushing, transmission drainback, rear engine bearing, and oil leaks which might drain back into clutch housing between upper and lower flywheel housings.

d. Clutch Drag or Failure to Release

To test for clutch drag or failure to release depress clutch pedal to toeboard and put into low gear. Hold pedal depressed and shift transmission to neutral, wait about 15 seconds with pedal depressed and again shift into low gear. If clutch is not releasing completely a gear clash will occur.

If test shows that clutch is not releasing properly, check clutch pedal lash (par. 4-4) and check release linkage for lost motion. Correct as necessary and again test for clutch drag.

If clutch drag cannot be corrected in release linkage, remove clutch and check height of release levers. Check driven plate for oil soaked or cracked facings, also for run-out and free movement on main drive gear (par. 4-6).

e. Clutch Slipping

First make certain that clutch pedal is adjusted for specified lash (3/4" to 1") and that pedal is not binding. One type of clutch slippage is sometimes wrongly diagnosed as due to a weak clutch spring. This slippage occurs during gear shifting, and full engagement of the clutch is not obtainable until the engine speed is reduced. After full engagement is obtained, no further slippage occurs during acceleration or

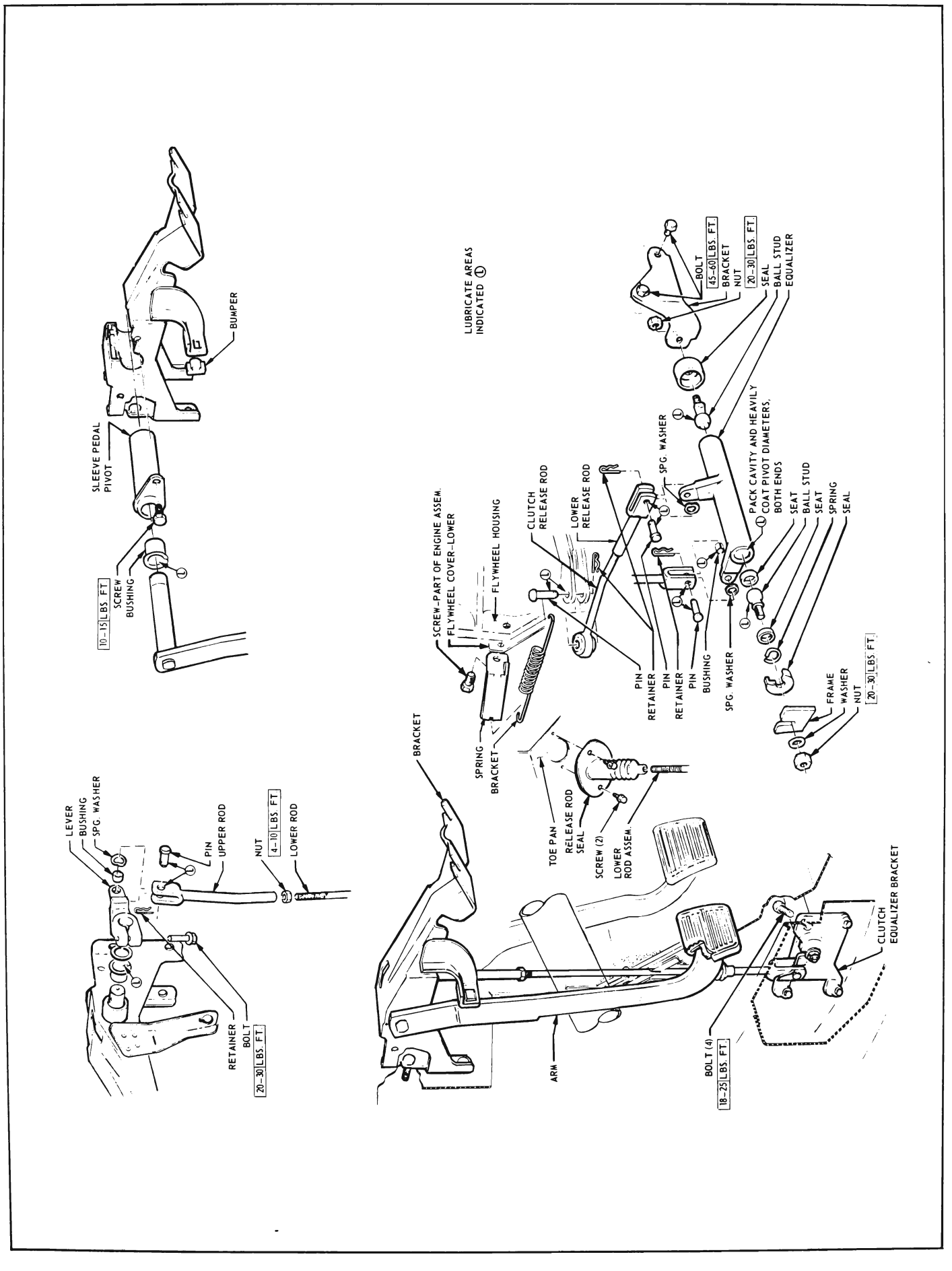

Figure 4-3—Clutch Linkage

under full load. This condition is usually due to the clutch driven plate hub sticking on the splines of the transmission main drive gear. Correction can be made by removing the clutch and thoroughly cleaning splines of driven plate and clutch gear then applying a light coating of Lubriplate.

4-4 CLUTCH ADJUSTMENT

Pedal lash (free pedal) must be adjusted occasionally to compensate for normal wear of clutch facings. As the driven plate wears thinner, pedal lash decreases.

It is very important to maintain pedal lash at all times. Insufficient pedal lash will cause the throw-out bearing to ride against the diaphragm spring tangs constantly, resulting in abnormal wear of these parts. It may also cause clutch slippage and abnormal wear of the driven plate, flywheel, and pressure plate if pressure on the spring tangs is enough to prevent positive engagement of the clutch.

Check pedal lash (free pedal) by pushing on the pedal pad with the hand. Pedal lash should be 3/4" to 1" measured at the pedal pad. (See Figure 4-3).

Adjust pedal lash as follows:

1. Check pedal at full release position, making sure it contacts rubber stop.

2. Adjust clutch release rod to give zero lash at pedal.

3. Back off release rod 3 full turns.

4. Check pedal lash. If not between 3/4" and 1", adjust release rod further.

5. When lash is at desired dimension, tighten locknut. Torque to 5-15 ft. lbs.

4-5 REMOVAL, LUBRICATION AND INSTALLATION OF CLUTCH

a. Removal from Vehicle

1. Remove transmission as outlined in Section 4-C.

2. Remove clutch throw-out bearing from the fork.

3. Remove clutch fork tension spring from fork. Disconnect clutch fork push rod.

4. Disconnect clutch fork from ball stud by forcing it toward the center of the vehicle.

5. Mark clutch cover and flywheel with a center punch so that cover can be reinstalled in the same position on flywheel in order to preserve engine balance.

6. Loosen the clutch attaching bolts one turn at a time until diaphragm spring is released.

7. Support pressure plate and cover assembly while removing last bolts, then remove pressure plate, then the driven plate.

8. Remove three drive-strap to pressure plate bolts and retracting springs and remove pressure plate from clutch cover.

NOTE: When disassembling, note position of grooves on edge of pressure plate and cover. These marks must be aligned in assembly to maintain balance.

9. The clutch diaphragm spring and two pivot rings are riveted to the clutch cover. Spring, rings and cover should be inspected for excessive wear or damage and if there is a defect, it is necessary to replace the complete cover assembly.

b. Lubrication of Clutch

Lubrication of the clutch release equalizer is required when the clutch is overhauled; if lubrication becomes necessary between overhauls to eliminate squeaks or excessive pedal pressure, the clutch must be removed from the car.

1. Very sparingly apply wheel bearing lubricant in pilot bushing in crankshaft. If too much lubricant is used, it will run-out on face of flywheel when hot and ruin the driven plate facings. Make sure that surface of flywheel is clean and dry.

2. Make sure that splines in driven plate hub are clean and apply a light coat of Lubriplate.

Apply a light coat of Lubriplate on transmission drive gear splines. Slide driven plate over transmission drive gear several times. Remove driven plate and wipe off all excess lubricant pushed-up by hub of plate. Driven plate facings must be kept clean and dry.

3. Fill groove in throw-out bearing with wheel bearing lubricant (See Figure 4-5). Make sure transmission front bearing retainer sleeve is clean and apply a light coat of wheel bearing lubricant. Slide throw-out bearing over transmission retainer several times. Remove throw-out bearing and wipe off all excess lubricant pushed up by hub of bearing.

4. Apply Lubriplate to ball stud in flywheel housing and to ball seat in clutch fork.

5. Check clutch pilot bearing for excessive wear or damage. If replacement is necessary, remove with J-1448. To replace bearing use J-1522 as shown in Figure 4-4.

c. Installation

1. Install the pressure plate in the cover assembly, lining up the groove on the edge of the pressure plate with the groove on the edge of the cover.

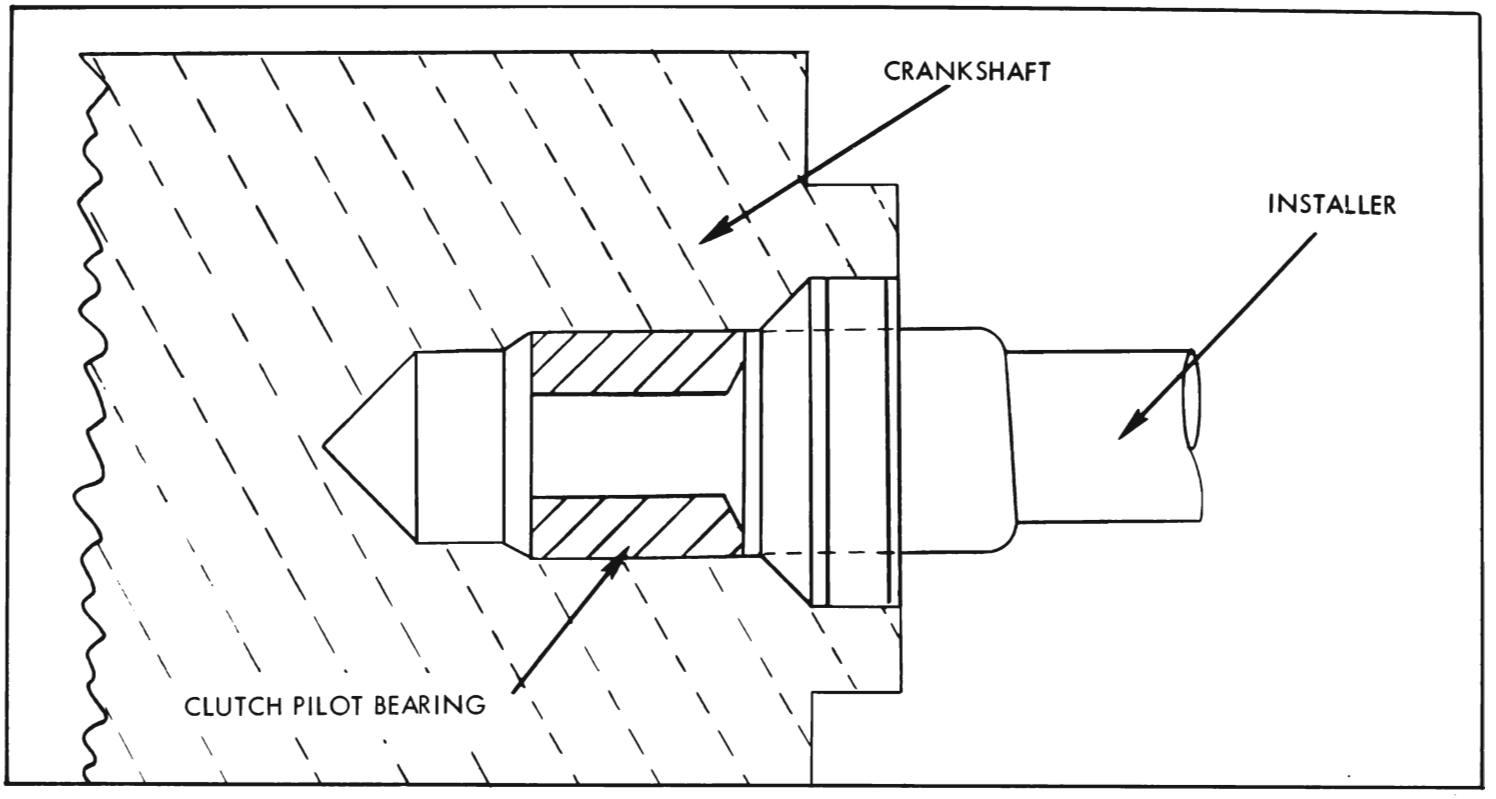

Figure 4-4—Pilot Bearing Installation

2. Install pressure plate retracting springs and drivestrap to pressure plate bolts and lock washers. Torque to 11 ft. lbs. The clutch is now ready to be installed.

3. With clutch fork in housing, but not on ball stud, install clutch disc, pressure plate and cover assembly. Support them with a spare clutch gear. Be sure to align marks on clutch cover with marks on flywheel.

4. Install bolts in every other hole in cover assembly first and pull down slowly until tight. Then install remaining 3 bolts.

5. Remove clutch gear used as a pilot.

6. Replace clutch fork on the ball stud.

7. Lubricate the recess on the inside of the throw-out bearing collar and coat the throw-out fork groove with a small amount of wheel bearing grease. See Figure 4-5. Do not use too much lubricant.

8. Install throw-out bearing to the clutch fork, and install linkage.

9. Install transmission as outlined in Section 4-3.

4-6 INSPECTION OF CLUTCH

Wash all metal parts of clutch, except release bearing and driven plate, in suitable cleaning solution to remove dirt and grease. Soaking release bearing in cleaning solution would permit solution to seep into bearing and destroy the lubricant. Soaking driven plate

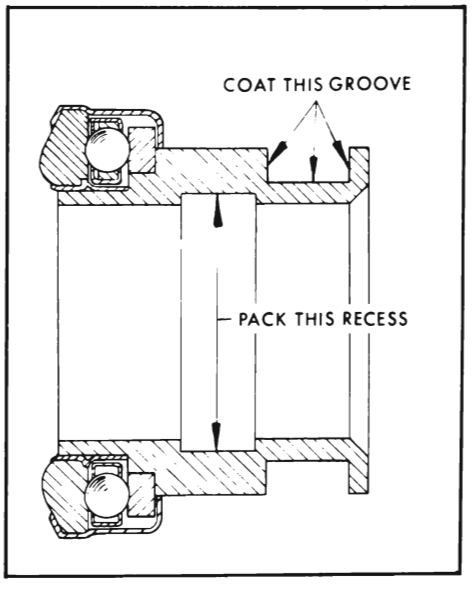

Figure 4-5—Throw-out Bearing Lubrication

in cleaning solution would damage the facings.

1. Flywheel and Pressure Plate. Examine friction surfaces of flywheel and pressure plate for scoring or roughness. Slight roughness may be smoothed with fine emery cloth, but if surface is deeply scored or grooved the part should be replaced.

2. Clutch Cover. Inspect clutch cover for cracks or distortion. Check clearance between pressure plate driving lugs and edges of slots in cover, using feeler gauges. The clearance should be .005" to .008"; excessive clearance may cause rattle when engine is intermittently accelerated with clutch disengaged.

3. Clutch Driven Plate. Inspect driven plate for condition of facings, loose rivets, broken or very loose torsional springs, and flattened cushion springs.

If facings are worn down near rivets or are oily, the plate assembly should be replaced. A very slight amount of oil on clutch facings will cause clutch grab and chatter. A large amount of oil on facings will cause slippage. Removal of oil by solvents or by buffing is not practical since oil will continue to bleed from facing material when hot.

When oil is found on driven plate facings, examine transmission drainback hole, pilot bushing, engine rear main bearing and other points of oil leakage.

Test the fit of driven plate hub on transmission main drive gear for an easy sliding fit.

4. Bearings. Inspect clutch release bearing for scoring or excessive wear on front contact face. Test for roughness of balls and races by pressing and turning front race slowly. Inspect main drive gear pilot bushing in crankshaft. If bushing is rough or worn it should be replaced.

Regardless of whether the old plate or a new one is to be installed, the plate should be checked for run-out. This check

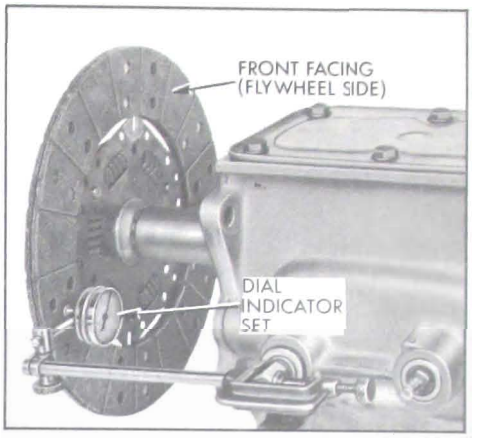

Figure 4-6—Checking Driven Plate for Run-Out

can be made by sliding the driven plate, front side first, over the transmission main drive gear until it is tight on the spline, then setting up a dial indicator to bear against the plate facing as shown in Figure 4-6. While holding firmly against front end of main drive gear to take up play in main drive gear bearing, slowly rotate driven plate and observe the amount of run-out shown by indicator. If run-out of front facing exceeds .025" the plate should not be used since it is not practical to correct excessive run-out by bending.