

GROUP 4

CLUTCH, S-M TRANSMISSION

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SECTION 4-A

CLUTCH

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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.	13/16-16	35-45
Bolt	Transmission to Flywheel Housing.	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	V-6	V-8
Pedal Pressure	Single Plate Dry Disc 28 to 33 lbs.	
Pedal Lash	See Par. 4-3	
Driven Plate Diameter	9 1/8"	10 13/32"
Driven Plate Facings	Woven Asbestos	
Number of Facings	2	
Facing Attachment	Riveted	
Facing Area	71.88	103.5
Vibration Damping	6 Torsional Springs	

4-2 CLUTCH DESCRIPTION

All synchronesh cars are equipped with a single plate dry disc clutch, and incorporates a diaphragm type spring assembly. See Figure 4-1.

a. Releasing Action

Depressing the clutch pedal causes movement of the clutch fork in the direction shown in

Figure 4-2. Actual operation of the clutch 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. This again reverses 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.

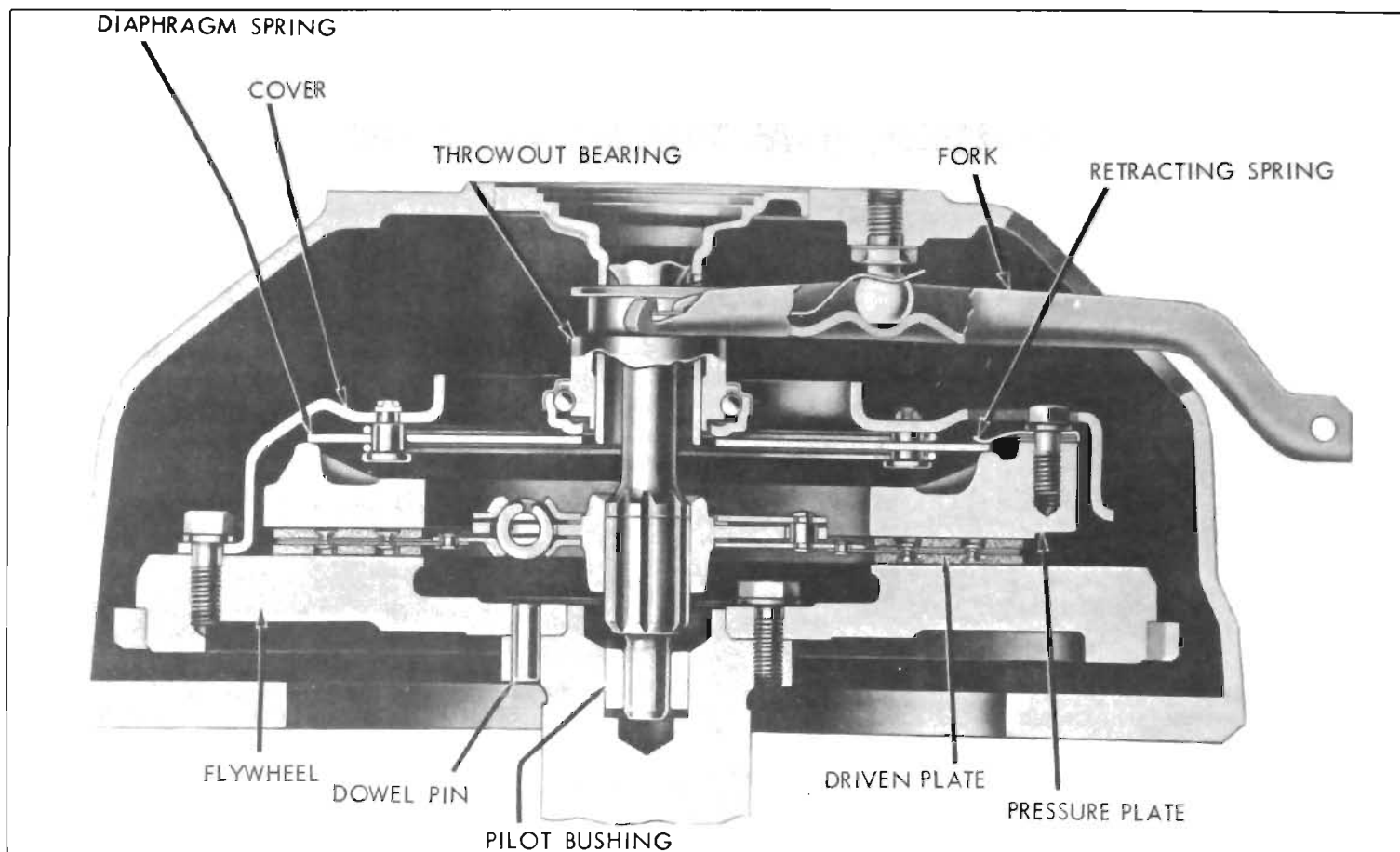


Figure 4-1—Standard Clutch

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 .045". The movement of pressure plate provides an additional clearance of approximately .030" to assure

full release of the 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 molded frictional washers.

c. Clutch Linkage

The clutch pedal is the suspended

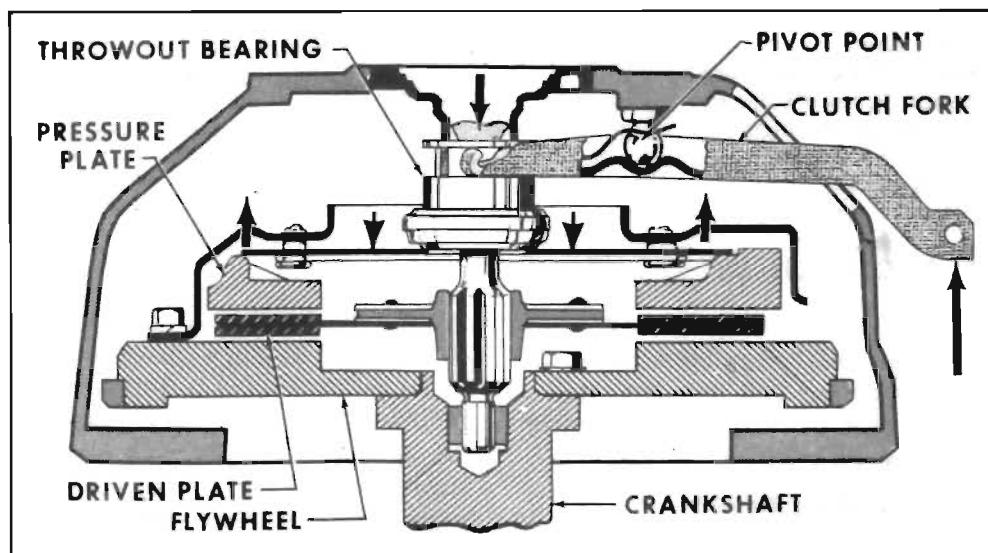


Figure 4-2—Clutch Releasing Action

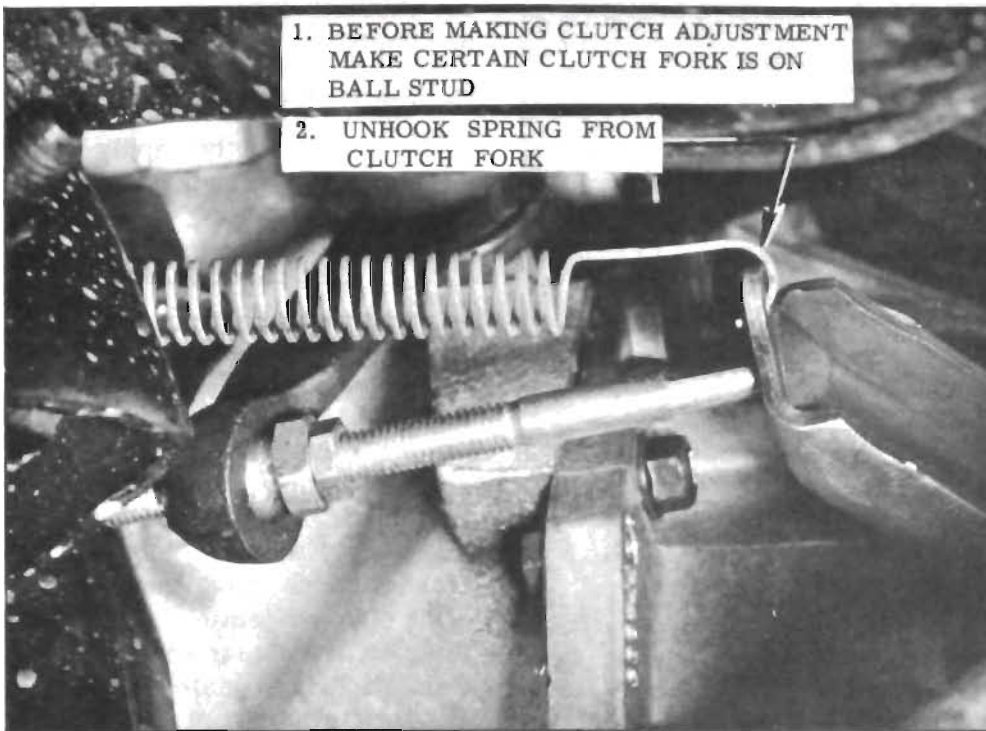


Figure 4-3—Removing Clutch Fork Spring

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 4-6.

The clutch operating rod extends from the clutch pedal thru the cowl, where it is retained to the outer equalizer operating lever by a washer and clip. The clutch outer equalizer lever is joined with the inner equalizer lever by the equalizer shaft assembly. Projections extending from the spherical ends of the equalizer shaft interlock with the equalizer levers at each end. The entire equalizer unit is supported by a pivot stud attached to the crankcase, and a bracket attached to the frame. See Figure 4-6.

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 and the frame.

4-3 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 5/8" to 7/8" measured at the pedal pad. (See Figure 4-6).

a. 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.

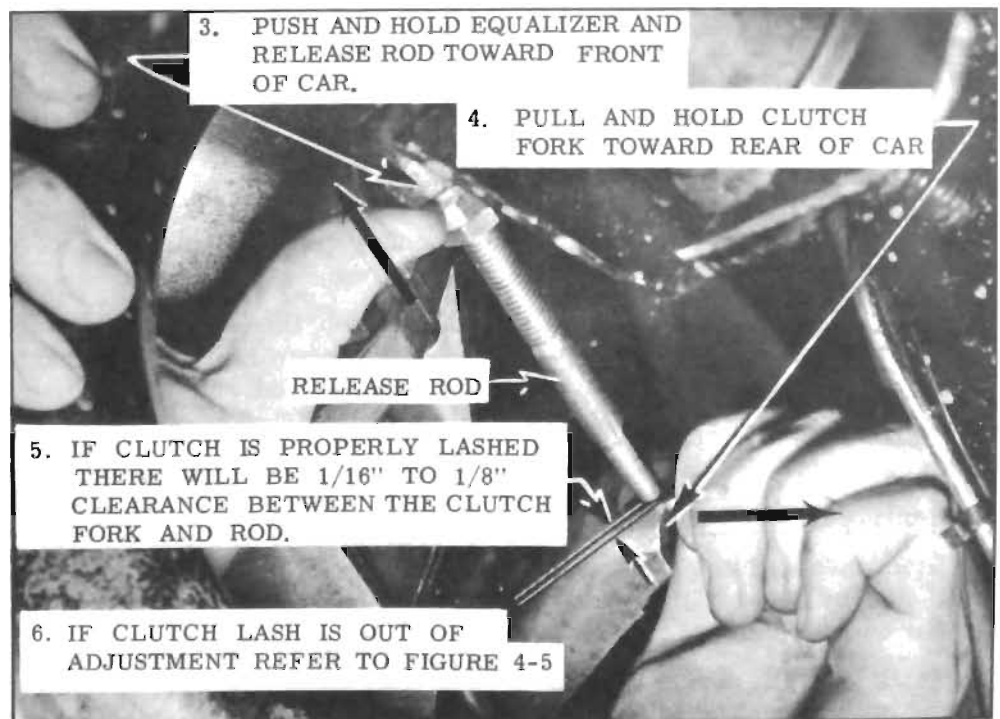


Figure 4-4—Checking Clutch Adjustment

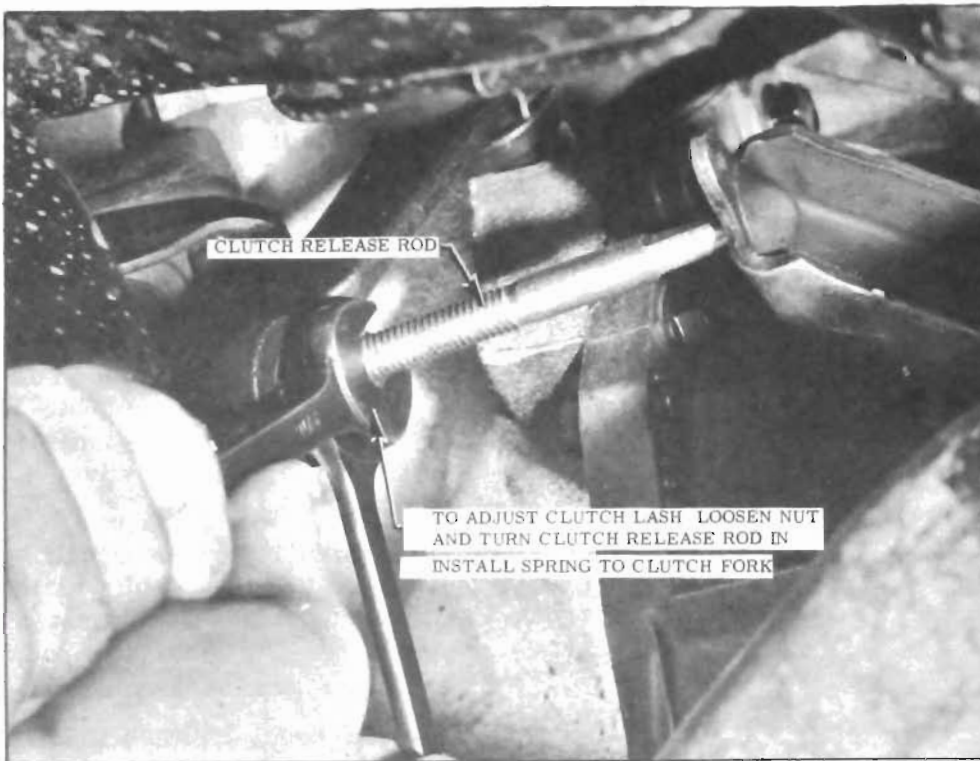


Figure 4-5—Adjusting Clutch

4. Check pedal lash. If not between 5/8" to 7/8", adjust release rod further.

b. Proceed as shown in Figures 4-3, 4-4 and 4-5 for an alternate method of adjusting clutch lash:

4-4 REMOVAL LUBRICATION AND INSTALLATION OF CLUTCH

a. Removal from Vehicle

1. Remove transmission as outlined in Paragraph 4-9.
2. Remove clutch throw-out bearing from the clutch fork.
3. Remove pedal return spring from clutch fork.
4. Remove flywheel housing.
5. Disconnect clutch fork from ball stud by forcing it toward the center of the vehicle.
6. Mark clutch cover and flywheel with a center punch so that cover can be reinstalled in the same position of the flywheel in order to preserve engine balance.

7. Loosen the clutch attaching bolts one turn at a time to avoid bending of clutch cover flange until diaphragm spring is released.

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

NOTE: Use extreme care to keep clutch driven plate CLEAN.

9. If it becomes necessary to disassemble pressure plate, proceed as follows:

a. 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.

b. 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

1. Very sparingly apply wheel bearing lubricant in pilot bushing in crankshaft.

NOTE: If too much lubricant is used, it will run out on face of flywheel when hot and ruin the driven plate facings.

2. Make sure that splines in the driven plate hub are clean and apply a light coat of wheel bearing lubricant. Apply a light coat of wheel bearing lubricant 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.

NOTE: Driven plate facings must be kept clean and dry.

3. Fill groove in throw-out bearing with wheel bearing lubricant. See Figure 4-8. Make sure transmission front bearing retainer 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. Clean and apply wheel bearing lubricant to ball stud in flywheel housing and to the seat in clutch fork.

5. Check clutch pilot bearing for excessive wear or damage. If replacement is necessary, remove bearing with J-1448. For installation use Driver J-1522.

NOTE: Very sparingly apply wheel bearing lubricant in pilot bushing. If too much lubricant is used, it will run out on face of flywheel when hot and ruin the driven plate facings.

c. Inspection of Clutch

Wash all metal parts of clutch, except release bearing and driven

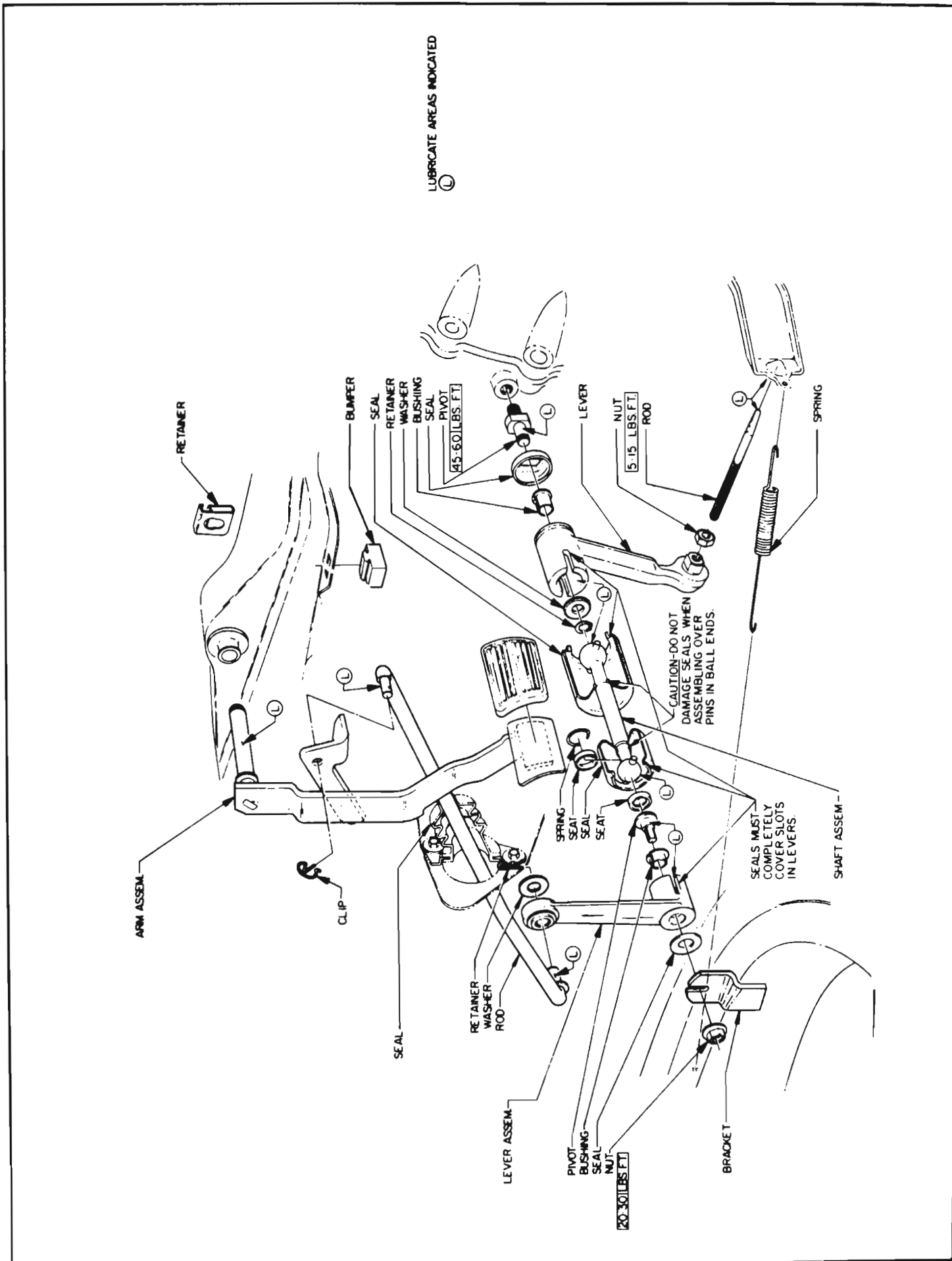


Figure 4-6—Clutch Linkage

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 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 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.

3. 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 can be made by sliding the driven

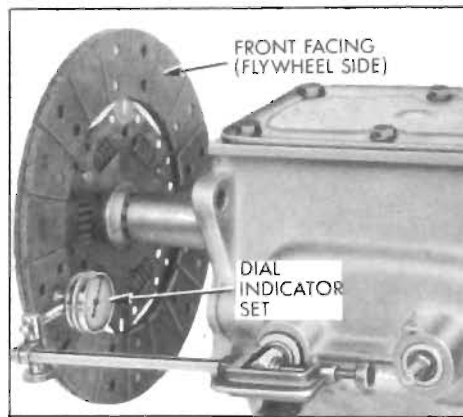


Figure 4-7—Checking Driven Plate For Run-Out

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 4-7. While holding firmly against front end of 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.

d. Installation of Clutch

1. If the pressure plate was disassembled, follow steps a and b.

a. 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.

b. Install pressure plate retracting springs and drive-strap to pressure plate bolts and lock washers and tighten to 11 ft. lbs. torque. The clutch is now ready to be installed.

2. Install the pressure plate and driven plate. Support both assemblies with a spare main drive gear.

NOTE: Be sure to align marks on clutch cover with the mark made of the flywheel on disassembly.

3. Install all bolts so that clutch is drawn in place square with flywheel. Each bolt must be drawn one turn at a time to avoid bending the clutch cover flange. Torque bolts to 30-40 ft. lbs.

4. Lubricate the ball stud and clutch fork with wheel bearing lubricant and install clutch fork.

NOTE: Check and insure that fork retaining spring is tight on pivot ball stud.

5. Install flywheel housing.

CAUTION: Insure that dowel pins are in place in crankcase.

6. Lubricate the recess on the inside of the throw-out bearing collar. See Figure 4-7.

CAUTION: Be careful not to use too much lubricant.

7. Install throw-out bearing assembly and hook up all clutch linkage.

NOTE: Make certain clutch fork is seated in throw-out bearing. (See Figures 4-1 and 4-2)

8. Install transmission as outlined in Paragraph 4-9.

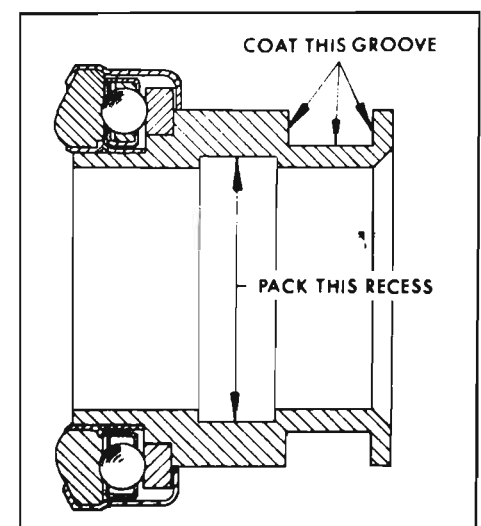


Figure 4-8—Throw-Out Bearing Lubrication

4-5 CLUTCH TROUBLE DIAGNOSIS

SYMPTOM AND PROBABLE CAUSE	PROBABLE REMEDY
FAILS TO RELEASE (PEDAL PRESSED TO FLOOR—SHIFT LEVER DOES NOT MOVE FREELY IN AND OUT OF REVERSE GEAR)	
a. Improper linkage adjustment	a. Adjust linkage
b. Improper pedal travel	b. Trim bumper stop and adjust linkage
c. Loose linkage	c. Replace bushings
d. Faulty pilot bearing	d. Replace bearing
e. Faulty driven disc	e. Replace disc
f. Fork off ball stud	f. Install properly and lubricate fingers at throw-out bearing
g. Clutch disc hub binding on clutch gear spline	g. Repair or replace clutch gear
SLIPPING	
a. Improper adjustment (no lash)	a. Adjust linkage (See Par. 4-3)
b. Oil soaked driven disc	b. Install new disc and correct oil leak at its source
c. Worn facing or facing torn from disc	c. Replace disc
d. Warped pressure plate or flywheel	d. Replace same
e. Weak diaphragm spring	e. Replace cover assembly
f. Driven plate not seated in	f. Make 20-50 normal starts
g. Driven plate overheated	g. Allow to cool—Check lash
GRABBING	
a. Oil on facing or burned or glazed facings	a. Install new disc
b. Worn splines on clutch gear	b. Replace transmission clutch gear
c. Loose engine mountings	c. Tighten or replace mountings
d. Warped pressure plate or flywheel	d. Replace pressure plate or flywheel
e. Burned or smeared resin on flywheel or pressure plate	e. Sand off if superficial, replace burned or heat checked parts
RATTLING—TRANSMISSION CLICK	
a. Weak retracting springs	a. Replace springs
b. Throw-out fork loose on ball stud or in bearing groove	b. Check ball stud and retaining spring and replace if necessary
c. Oil in driven plate damper	c. Replace driven disc
d. Driven plate damper spring failure	d. Replace driven disc

4-5 CLUTCH TROUBLE DIAGNOSIS (Cont'd)

SYMPTOM AND PROBABLE CAUSE	PROBABLE REMEDY
THROW-OUT BEARING NOISE WITH CLUTCH FULLY ENGAGED	
<ul style="list-style-type: none"> a. Improper adjustment b. Throw-out bearing binding on transmission bearing retainer c. Insufficient tension between clutch fork spring and ball stud d. Fork improperly installed e. Weak linkage return spring 	<ul style="list-style-type: none"> a. Adjust linkage b. Clean, relubricate, check for burrs, nicks, etc. c. Replace fork d. Install properly e. Replace spring
NOISY	
<ul style="list-style-type: none"> a. Worn throw-out bearing b. Fork off ball stud (Heavy clicking) 	<ul style="list-style-type: none"> a. Replace bearing b. Install properly and lubricate fork fingers at bearing
PEDAL STAYS ON FLOOR WHEN DISENGAGED	
<ul style="list-style-type: none"> a. Bind in linkage b. Springs weak in pressure plate 	<ul style="list-style-type: none"> a. Lubricate and free up linkage b. Replace
HIGH PEDAL EFFORT	
<ul style="list-style-type: none"> a. Bind in linkage b. Driven plate worn 	<ul style="list-style-type: none"> a. Lubricate and free up linkage b. Replace driven plate