

Figure 1—Borg & Beck Clutch (9 1/4 inch) Disassembled

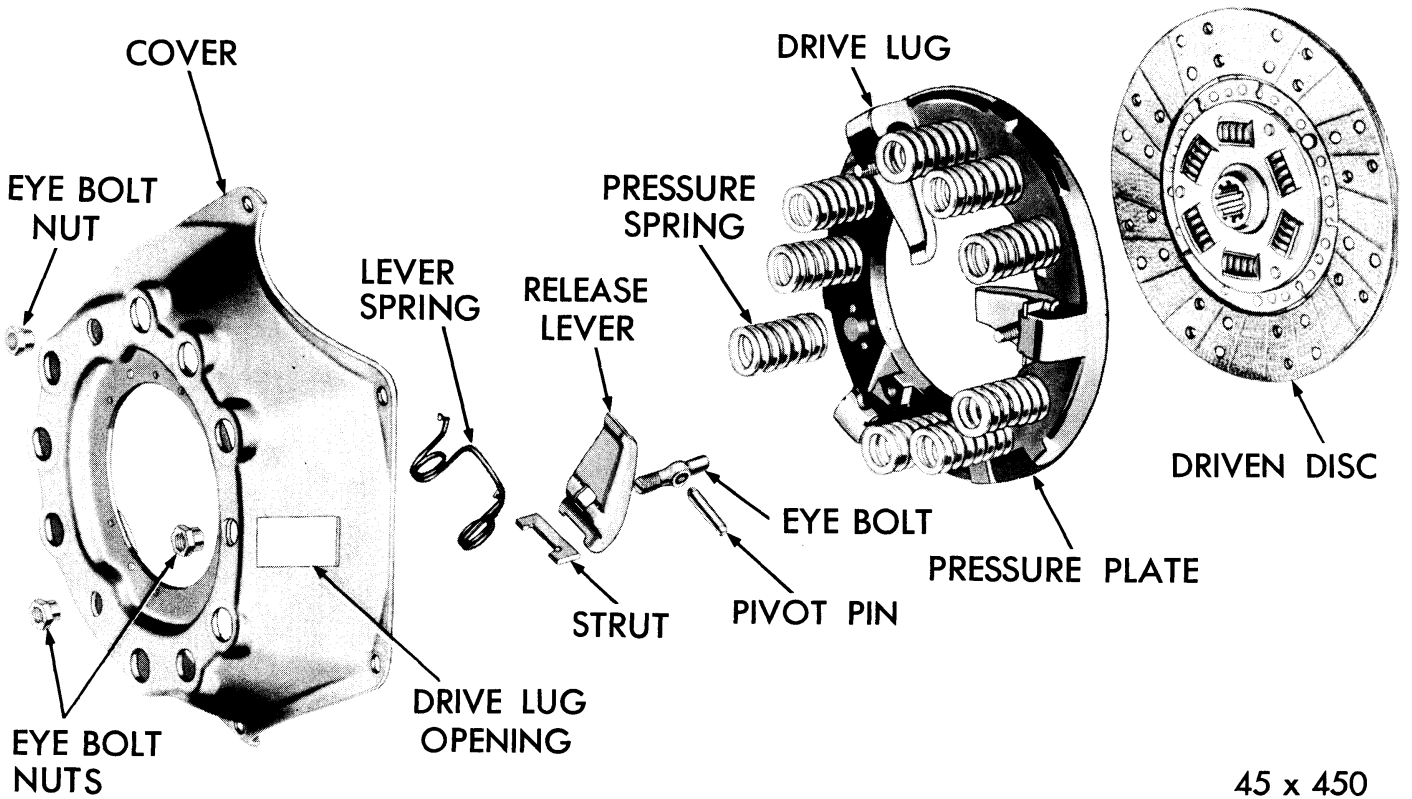


Figure 2—Borg & Beck Clutch (10 inch) Disassembled

# PART ONE—CHASSIS

## SECTION IV—CLUTCH

	Pages
<b>Data and Specifications</b> .....	<b>60</b>
<b>1. Clutch Pedal Adjustments</b> .....	<b>59</b>
<b>2. Clutch Assembly</b> .....	<b>59</b>
<b>3. Clutch Shaft Pilot Bushing</b> .....	<b>64</b>
<b>4. Clutch Release Bearing</b> .....	<b>64</b>
<b>5. Diagnosis Procedures</b> .....	<b>64</b>

### 1. CLUTCH PEDAL ADJUSTMENTS

The clutch pedal is suspended from a bracket mounted to the dash panel. See Figure 3. Note that only two adjustments are provided—pedal free play and pedal pressure.

#### CLUTCH PEDAL FREE PLAY

One inch pedal free play is necessary to insure proper clearance between the release bearing and levers.

To adjust the clutch pedal free play, turn the clutch release fork rod adjusting nut until  $\frac{3}{16}$  inch free movement of the clutch fork outer end is obtained. See Figure 3. This adjustment, if correctly set, will give the necessary 1 inch free play at the pedal.

#### CLUTCH PEDAL

The adjustment of the clutch pedal overcenter spring controls the amount of pedal pressure required to release the clutch. See Figure 3. The correct adjustment is to tighten the eye bolt sleeve nut on the clutch pedal overcenter spring bolt finger tight with the pedal in the depressed position then tighten four complete turns.

### 2. CLUTCH ASSEMBLY

Clutch service usually involves only the replacement of the disc. It is not practical to repair or reline a disc, as there is no satisfactory method of checking or repairing the dampener and cushion springs in the disc. On the other hand, the clutch pressure plate assembly seldom requires replacement. It can be adjusted and the component parts can be replaced.

When working on the clutch assembly always check the clutch finger height adjustment and the pressure plate for parallelism. Test the clutch pressure plate springs for proper tension. Carefully inspect the flywheel and pressure plate for evidence of burning or heat checks.

### REMOVAL

To remove the clutch disc and clutch cover and pressure plate assembly, disconnect the propeller shaft, speedometer cable, parking brake cable, and gear shift control rods. Then remove the transmission.

When removing the transmission pull it straight back until the pinion shaft clears the clutch disc, before lowering the transmission. This will avoid bending the clutch disc. Remove the clutch cover pan. Mark the clutch cover and flywheel so that they can be installed in their original position to maintain balance.

### CLUTCH DISC

Carefully inspect the clutch disc for worn or loose lining, broken cushion springs, distortions, or evidence of oil or grease on the facing. If grease or oil are present discard the disc. Locate the source of the oil or grease leak and correct it. Inspect the rear main bearing oil seals and front of transmission for evidence of oil leakage.

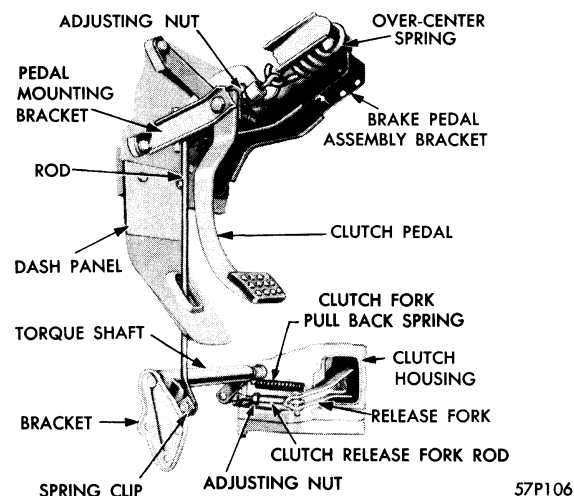
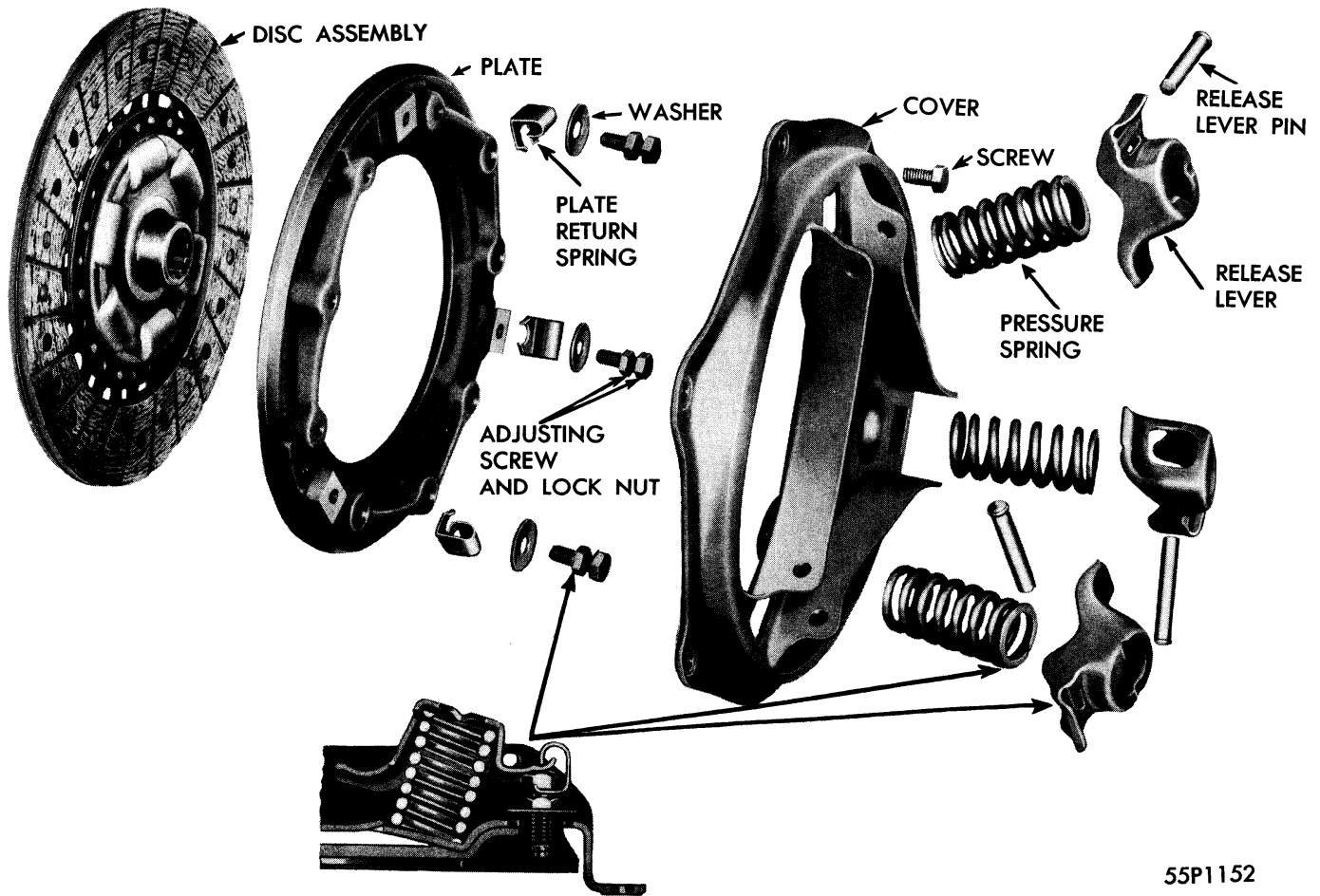


Figure 3—Measuring Clutch Pedal Free Play



55P1152

Figure 4—Auburn Clutch (9 1/4 inch) Disassembled

### CLUTCH DATA AND SPECIFICATIONS

Models	P-30	LP-1	P-31	LP-2
Clutch Models	Borg and Beck or Auburn		Borg and Beck	
Outside Diameter of Disc.	9 1/4 in. 10 in. spec. equip.		10 in. Std. 10 1/2 in. spec. equip.	
Number of Springs in Pressure Plate	9 1/4 in. B & B-6 springs 9 1/4 in. Auburn-3 springs 10 in. B & B-9 springs		10 in. B & B-9 springs 10 1/2 in. B & B-9 springs 11 in. B & B-12 springs (350 cu. in. engine)	
Type	Single Plate—Dry—Ventilated			

### TORQUE SPECIFICATIONS

Clutch housing to cylinder block screws	30 to 35 ft. lbs.
Clutch cover assembly to flywheel screws	
9 1/4 in. clutch 5/8 in. bolt	15 ft. lbs.
10 and 10 1/2 in. clutch 3/8 in. bolt	30 ft. lbs.
11 in. clutch 3/8 in. bolt	30 ft. lbs.

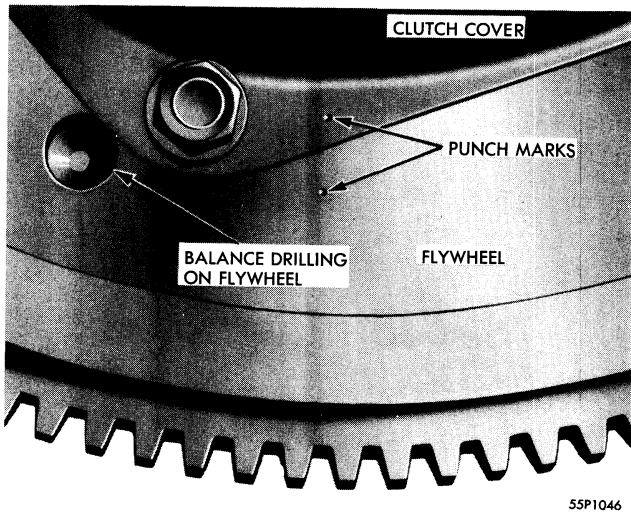


Figure 5—Punch Marks on Clutch Cover and Flywheel

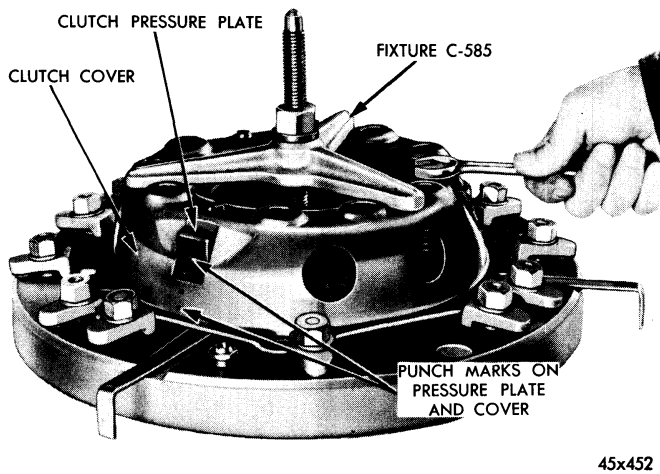


Figure 6—Clutch Cover and Pressure Plate Assembly in Fixture C-585

#### DISASSEMBLY (BORG AND BECK CLUTCH)

Mark the cover and pressure plate with a punch (Figure 5) so that they can be assembled in their original positions in order to maintain balance.

With the assembly on fixture C-585, See Figure 6, install the three-legged spider over the center screw, so that it rests directly against the top of the clutch cover. Install the plain thrust washer and hexagon compression nut. Turn down the nut to compress the springs.

With the springs under compression, remove the clutch release lever eye bolt nuts and slowly relieve the spring pressure by unscrewing the compression nut. Then, lift off the cover.

To remove a release lever, grip the lever and eye bolt between the thumb and fingers so that the flat side of the lever and the open end of the eye bolt are close together. Also, keep the eye bolt pin seated in the socket in the lever. See Figure 7.

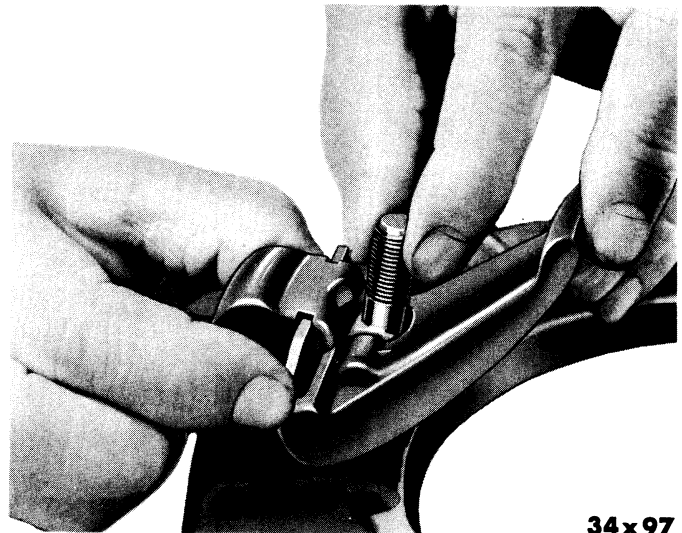


Figure 7—Removing or Installing Release Lever

34x97

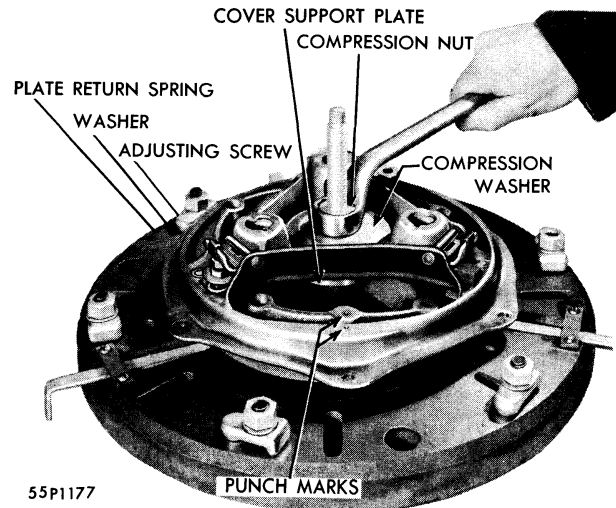


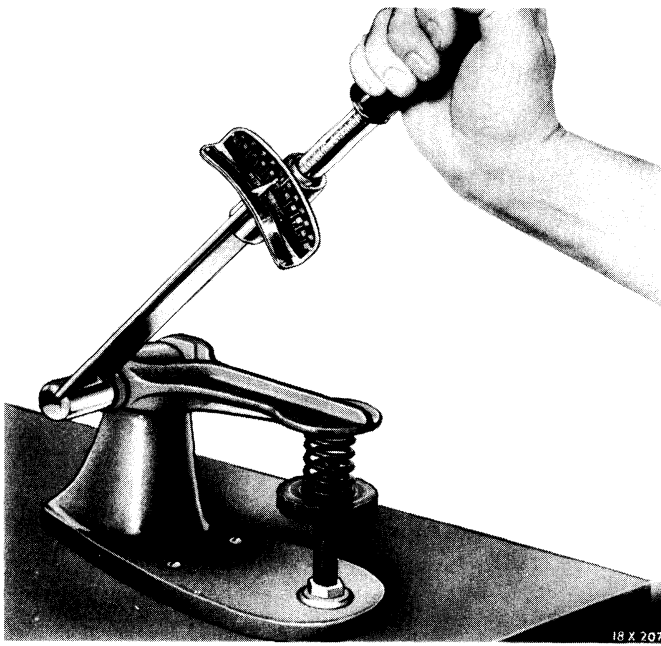
Figure 8—Disassembling Auburn Clutch in Fixture C-585

The strut can then be lifted over the ridge on the end of the lever, making it possible to lift the lever and eye bolt off the pressure plate.

#### DISASSEMBLY (AUBURN CLUTCH)

Adaptors are available for use with fixture C-585 for this operation.

First, place the cover support plate, C-585-33, over the main screw of the fixture. Then install the clutch cover assembly on fixture C-585. See Figure 8. Mark cover and pressure plate with punch and install compression washer C-585-33 and fully compress the finger. Remove adjusting screw, washer and plate return spring. Place a 1/2 inch steel block, C-585-32, under outer end of each finger. Back off the compression nut slowly until the release levers rise and contact the steel blocks. Remove the nut and compression washer. Then lift off the cover.



**Figure 9—Testing Clutch Pressure Spring Tool  
Shown in No. C-647**

To remove a pressure spring, force each release lever downward by hand, take out the block and release the finger slowly.

To remove the release levers from the cover, grind off one end of the pin and drive out the pin.

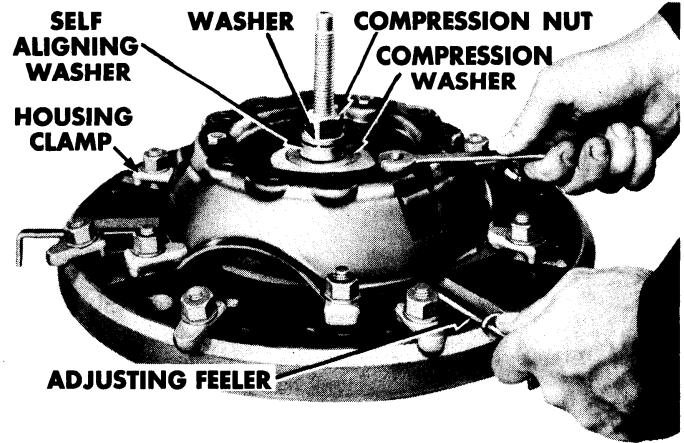
#### INSPECTION

If the pressure plate is scored or warped, it should be replaced. If any other parts are damaged or indicate excessive wear, they should be replaced. Check the pressure plate springs (Figure 9) for correct pressure with special tool C-647. Refer to chart for correct spring pressures at the indicated checking height.

On the Auburn clutch, inspect the pressure plate return springs by comparing with a new spring. If springs appear to be weak, install new springs.

#### ASSEMBLY (BORG AND BECK CLUTCH)

Place the pressure plate on the base of the clutch fixture. Hold the threaded eye of the eye bolt between the thumb and index finger, with the lever end resting on the second finger. See Figure 10. Insert the strut upward and tilting it at the same time, it will pass over



**Figure 10—Adjusting Clutch Release Levers  
(Borg and Beck)  
Fixture shown is C-585**

the ridge on the lower end of the lever, and drop into the groove in the lever.

Position the release lever springs and place the pressure springs over the bosses on the pressure plate. Place the clutch cover over the pressure plate assembly and match up the punch marks so that these parts will be in their original positions. Install the correct thickness spacer on the center screw of the fixture. See Chart on this page. Install the compression plate, self-aligning washer, thrust washer and the compression nut on the center screw. Make sure the pressure springs are seated in the embossed seats of the cover. Tighten the compression nut on the fixture and install the release lever eye bolt nuts.

#### CLUTCH RELEASE LEVER ADJUSTMENT (BORG AND BECK)

Place the correct thickness spacer on the center screw of the fixture. Refer to Chart on this page for spacer thickness. Install the compression plate, the self-aligning washer, the plain thrust washer and the compression nut. Tighten nut until the levers are fully compressed. Install clutch housing clamps over the bolt holes and tighten them securely. Adjust the release levers until each of the feeler gauges has the same slight "drag" or "feel" when pushed in and out. Tighten release lever nuts to decrease "drag" and loosen to increase "drag."

#### CLUTCH FIXTURE SPACERS

Clutch Assembly Model Number	Size	Fixture C-585 Spacer Number
Auburn 100131-1	9¼ in.	43
Borg and Beck 1384	9¼ in.	19
Borg and Beck 1376	10 in.	21
Borg and Beck 1418	10½ in.	21
Borg and Beck 1464	11 in.	19

## CLUTCH PRESSURE SPRINGS

Type	Clutch Assembly Model No.	Number of Springs and Identification	Spring Pressure and Checking Height
9¼ in. Auburn	100131-1	3 dark blue springs	254 to 280 lbs. @ 1 <sup>13</sup> / <sub>16</sub> in.
9¼ in. Borg & Beck	1384	6 white springs	239 to 251 lbs. @ 1½ in.
10 in. Borg & Beck	1376	9 brown springs	224 to 236 lbs. @ 1 <sup>11</sup> / <sub>16</sub> in.
10 in. Borg & Beck	1463	9 white springs	239 to 255 lbs. @ 1½ in.
10½ in. Borg & Beck	1418	9 white springs	239 to 251 lbs. @ 1½ in.
10½ in. Borg & Beck	1461	12 unpainted springs	185 to 205 lbs. @ 1½ in.
11 in. Borg & Beck	1464	6 white springs 6 tan springs	235 to 255 lbs. @ 1½ in. 150 to 170 lbs. @ 1½ in.

Recheck release lever adjustment to make certain each one is adjusted properly. Stake the release lever nut. See Figure 10.

**IMPORTANT**

*When removing the clutch cover assembly from the fixture, loosen the housing clamps first, and then remove the compression nut. This procedure will avoid imposing unequal strain on the release levers.*

**ASSEMBLY (AUBURN CLUTCH)**

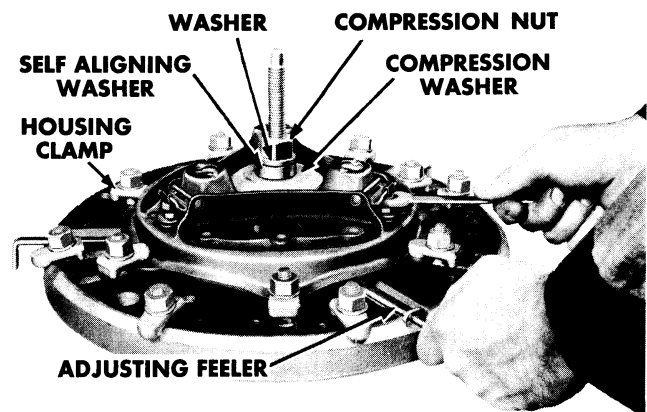
Assemble the levers to the cover and peen over the ends of the lever pins. Install the pressure spring between the lever and the cover. Make sure the springs rest on the bosses of the cover and are seated in the embossed seats of the levers. Press down on the release lever and then insert steel blocks under the outer ends of the levers. Place the pressure plate on the fixture and place the cover assembly over the pressure plate. Match up the punch marks so the parts are in their original positions. Place the number 43 spacer on the center screw of the fixture. Install the compression plate, self-aligning washer, thrust washer and the compression nut on the center screw. Tighten the compression nut on the fixture. Install the washers and adjusting screws in the pressure plate. Release the fixture compression nut slowly and install the pressure plate return springs.

**NOTE**

*Do not lubricate parts of the clutch pressure plates assembly with ordinary oil or grease. Use a suitable lubricant such as Lubriplate on drive lugs and fingers.*

**CLUTCH RELEASE LEVER ADJUSTMENT (AUBURN)**

Install clutch cover plate assembly on fixture and make certain that the housing clamps line up with the holes. Assemble the Number 20 thickness spacer on the center screw. Install the compression washer, the self-aligning washer, and the compression nut and tighten nut until the release levers are completely compressed. Install clutch housing clamps and tighten securely. Adjust clutch release levers until each of the three feeler gauges has the same slight "drag" or "feel," when being pushed in and out. Tighten the release lever



SSP1178

**Figure 11—Adjusting Clutch Release Lever (Auburn)**

screws to decrease "drag" or loosen them to increase "drag." Then re-check the adjustment of each lever to make certain the adjustment is correct and tighten lock nuts. See Figure 11.

**INSTALLATION OF CLUTCH**

Apply a small amount of short fiber grease in the clutch shaft pilot bushing. Clean the surfaces of the flywheel and pressure plate thoroughly. Then, hold the clutch cover plate and disc assembly in place (driven disc is to be installed with long part of hub on the side away from the flywheel). Insert clutch disc aligning arbor, C-360, through the hub of the driving disc into the pilot bushing in the crankshaft. See Figure 12.

Line up the punch marks on the cover and flywheel. Bolt the cover plate loosely on the flywheel so that these parts are lined up in their original positions. To avoid distortion of clutch cover, tighten each bolt a few turns in progression until they are tight. Tighten bolts to torque as specified.

When installing the transmission, care must be taken not to "dish" or bend the clutch disc. Support the transmission so that the drive pinion can be guided through the clutch disc. After installation, tighten the transmission to clutch housing screws from 45 to 50 foot pounds. Then, adjust clutch pedal free travel.

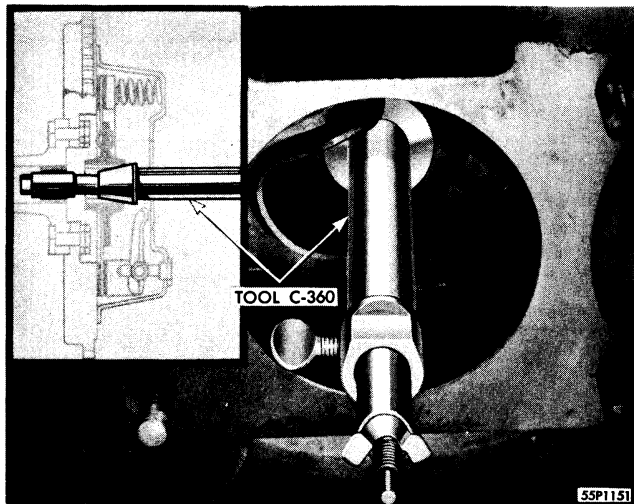


Figure 12—Clutch Disc Aligning Arbor

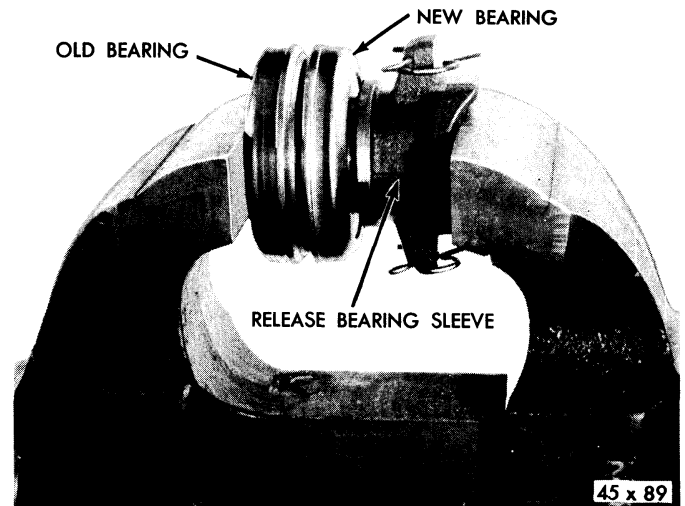


Figure 14—Installing Clutch Release Bearing

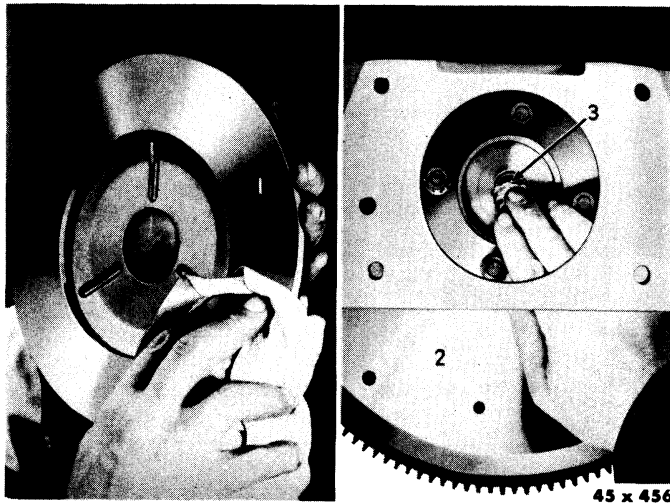


Figure 13—Lubricating Pilot Bushing

### 3. CLUTCH SHAFT PILOT BUSHING

#### REMOVAL

Use tool C-3185 to remove worn or scored pilot bushings.

Screw the tapered pilot into the bushing, allowing the pilot to cut its own threads until a solid grip is obtained. Insert the puller screw and rotate, forcing the bushing out.

#### INSTALLATION

When installing a new pilot bushing, slide over the pilot of tool C-3181 and drive into place with a soft hammer. This causes the bushing to tighten up on the pilot. Install the cup and puller nut and tighten, removing the tool from the bushing. This action burnishes the bushing to correct size.

Lubricate the bushing (Figure 13) with about a half-teaspoon of short fiber grease. Insert the grease in the bushing, not on the end of the pinion shaft.

#### NOTE

Be sure the clutch pressure plate (1) and the fly-wheel face (2) are perfectly clean. Insert about  $\frac{1}{2}$  teaspoonful Short Fiber Grease in pilot bushing (3).

### 4. CLUTCH RELEASE BEARING

Exercise care when installing a new clutch release bearing to avoid damaging the bearing race. Never drive the bearing on the sleeve with a hammer.

Installation can be accomplished by placing the front sides of the old and new bearings together and aligning them against the release bearing sleeve. Then place the bearings and sleeve in a vise and press the new bearing on the sleeve. See Figure 14. Turn the bearings as they are pressed together. The new bearing must be flush with the shoulder of the release bearing sleeve.

### 5. DIAGNOSIS PROCEDURES

#### SLIPPING

To test for a slipping clutch, start the engine, set the hand brake and shift into high gear. Then, release the clutch pedal and accelerate the engine slowly. The engine should stall immediately if the clutch is not slipping.

1. *PEDAL FREE PLAY*—Inspect for sufficient pedal free play, which may prevent the clutch from engaging completely.

2. *CLUTCH DISC*—Inspect for burned, worn, or oil soaked clutch disc facings.

3. *PRESSURE PLATE SPRINGS*—Inspect for weak or broken pressure plate springs. Test each coil spring for weakness. If the paint on a spring is burnt or coils are too close together, the spring is probably weak.



**CHATTERING**

This condition can be determined by vibration that may occur during clutch engagement.

1. **CLUTCH DISC**—Inspect for oil or grease on facings. Before replacing disc, determine the source of the leak. Oil may come from a leaky rear main bearing, the transmission, or from use of excessive lubricant in the pilot bushing.

2. **PRESSURE PLATE**—Inspect for a cocked pressure plate. If the pressure plate does not meet the disc evenly, chatter may result. If the clutch release levers are not adjusted properly, the pressure plate will not meet the disc evenly.

**DRAGGING**

This condition exists when the clutch is slow in disengaging, or will not completely release. When this occurs, the gears may be difficult to shift without clashing.

1. **PEDAL FREE PLAY**—Inspect for excessive pedal free play which might prevent the clutch from releasing completely.

2. **CLUTCH DISC**—Inspect for a bent clutch disc. If the disc is bent, it will not be parallel with flywheel and pressure plate, and disengagement will not be complete.

3. **CLUTCH RELEASE LEVERS**—Inspect adjustment of clutch release levers. Disengagement may be uneven and cause the clutch to drag if release levers are improperly adjusted.

4. **CLUTCH DISC HUB**—Make sure clutch disc hub does not bind on the drive pinion shaft. If it does bind, a dragging condition may be created.

5. **RETURN SPRINGS (AUBURN)**—Inspect for broken or weak return springs.

**PEDAL STIFF OR BINDING**

1. **CLUTCH LINKAGE**—Inspect clutch linkage for rust or corrosion. Inspect for bent or misaligned linkage.

2. **OVERCENTER SPRING**—Check adjustment of free play and overcenter spring if clutch pedal is hard to operate, or the pedal will not return properly.

**NOISES**

1. **RELEASE BEARING**—A high-pitched noise, occurring only with the engine running, the transmission in NEUTRAL, and the clutch pedal down, usually indicates that the release bearing should be replaced.

2. **RELEASE LEVERS**—A rattling noise may develop when an uneven release lever causes the release bearing to shuffle on its sleeve.

3. **PILOT BUSHING**—A high-pitched noise, occurring only with the engine running, the transmission in GEAR, and the clutch pedal down, may indicate that the pilot bushing is tight, worn or dry. The noise is usually more evident in low or second gear than it is in high gear.

4. **CLUTCH DISC**—If a metallic grinding noise, similar to a rear axle gear or bearing noise, if heard, it may be caused by improper functioning of the clutch disc damper unit, and the disc should be replaced. This noise is usually evident when the car is accelerated from 25 to 30 MPH, or when decelerated from 50 to 35 MPH.

5. **PRESSURE PLATE ASSEMBLY**—If a whining noise is heard when the engine is accelerated and the clutch disengaged (pedal down), it may be due to excessive clearance between the pressure plate lugs and the openings in the stamped cover.

If a squeaky noise is heard while the clutch pedal is being operated, it may be due to the pressure plate release levers, or the drive lugs rubbing on the cover. Work Lubriplate between the clutch cover and the drive lugs using feeler stock.