

SERVICE MANUAL

SECTION V CLUTCH



Packard Motor Car Company
Detroit 32, Michigan

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SECTION V

CLUTCH

Description

The function of the clutch is to transmit engine torque from the engine to the transmission and to make it possible to connect and disconnect the engine crankshaft from the transmission clutch shaft.

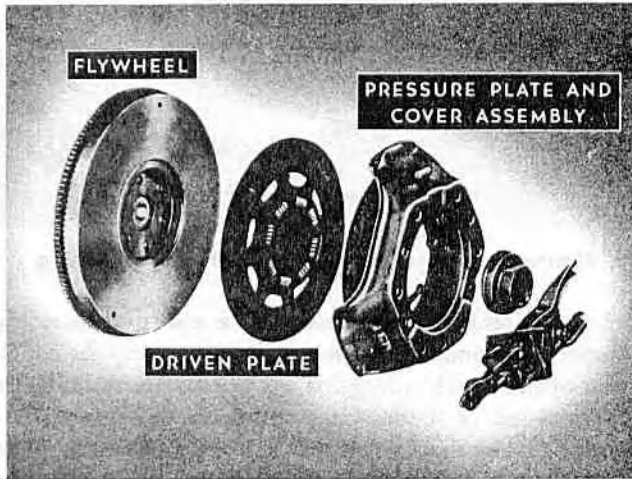


Figure 1—The Packard Clutch Consists of Three Main Members

The Packard single dry-plate type clutch consists of three main members; the flywheel, the clutch driven plate, and the pressure plate and cover assembly.

The clutch transmits engine torque by gripping the clutch driven plate between the flywheel and clutch pressure plate. The driven plate transmits the torque to the transmission clutch shaft through a splined hub and eight coil springs fitted around the hub.

The facing on the forward side of the driven plate contacts the smooth surface of the flywheel, while the facing on the rear side of the driven plate contacts the pressure plate. Contact pressure between the clutch facings and pressure plate is obtained by the use of nine coil springs between the cover plate and pressure plate.

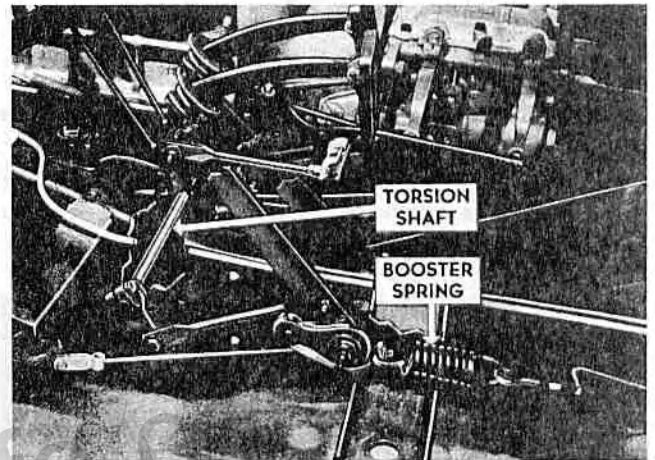


Figure 2—Clutch Release is Accomplished Through the Pedal, Torsional Relay Shaft, and Linkage

Three release levers are used to relieve the spring pressure, breaking the frictional contact between the pressure plate, driven plate facings, and flywheel. A ball thrust release bearing pressed against the levers disengages the clutch. The ball thrust bearing is actuated by a throw-out lever which is operated by the clutch pedal, torsional relay shaft, and linkage.

SERVICING THE CLUTCH

Transmission Removal



Figure 3—Removing the Propeller Shaft

Disconnect the speedometer cable. Disconnect the gear shifter rods from the levers on the transmission case. Disconnect the propeller shaft at the rear universal joint and remove the propeller shaft completely by slipping the front universal joint flange off the transmission main shaft.

Caution: Wire or tape the two bearings of the universal joints together to prevent them from falling off. This will prevent dirt from entering the bearings and will save time during reassembly.

On Overdrive Equipped Cars

Disconnect the overdrive control cable from the lever on the right side of the overdrive case. Disconnect the electrical leads at the governor, lockout switch, and solenoid. Identify the leads with tags to be sure to connect them at their proper location on reassembly. Re-

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move the governor, using tool J-4653. Remove the solenoid.

Use a jack or an auxiliary support bar to support the engine while the transmission is removed. Remove the rear engine support mounting and support cross members.

Remove the cap screws attaching the transmission to the flywheel housing. Using two pilots in the bolt holes, slip the transmission to the rear, so that the clutch release bearing pull-back spring may be unhooked. Remove the transmission.

Clutch Removal

Remove the flywheel lower housing. Remove the clutch release bearing and sleeve. Mark the clutch cover plate and flywheel, as shown in figure 4. Loosen the six cap screws that attach the clutch cover to the flywheel in succession until the clutch cover is free.

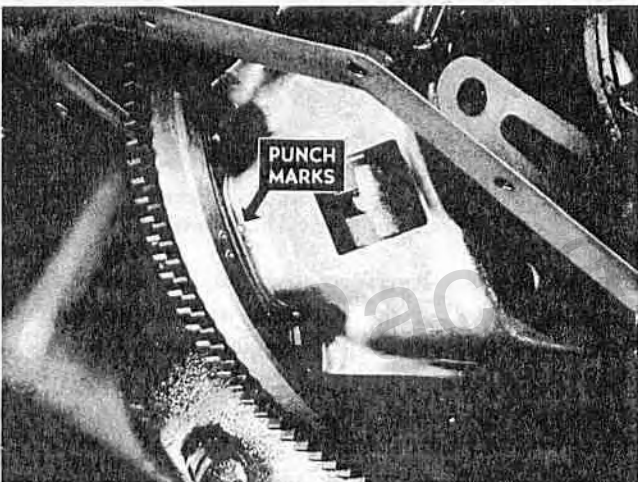


Figure 4—Punch Marks on the Flywheel and Cover Plate

Remove the clutch cover and pressure plate and the clutch driven plate from the flywheel housing. Remove the clutch shaft pilot bearing using tool J-164 or J-489.

Cleaning and Inspection

Clean the pressure plate and cover with a stiff brush. Blow out the dust particles. Clean the contact surface of the pressure plate and flywheel with a clean cloth moistened with cleaning solvent. Wipe the dirt from the clutch shaft pilot bearing and the clutch release bearing with a clean dry cloth. Do *not* wash these bearings with cleaning solvent.

Inspect the clutch shaft pilot bearing and clutch release bearing. Check by rotating the bearings by hand, as shown in figure 5. If rotation is lumpy or not smooth, install a new bearing.

Inspect the condition of the pressure plate and cover assembly. If the pressure plate is worn, scored, or



Figure 5—Inspecting the Clutch Release Bearing

checked, install a new pressure plate and cover assembly. Inspect the condition of the release levers and the condition of the clutch springs. If the release levers are worn or damaged, or if the clutch springs have become overheated or lost their tension, install a new pressure plate and cover assembly. It is *not* recommended to attempt to service the pressure plate or cover. Install a new assembly.

Inspect the condition of the contact surface of the flywheel. If the flywheel is worn, scored, or damaged, install a new flywheel. A flywheel that is not scored too badly may be resurfaced.

Inspect the condition of the clutch driven plate and facings. If the facings are worn, scored, or grease soaked, install a new clutch driven plate. Inspect the condition of the clutch driven plate hub torque springs. If they are broken or damaged, install a new clutch driven plate.

Inspect the clutch release linkage and relay shaft. Replace any worn parts, and lubricate linkage and relay shaft.

Flywheel Housing Alignment

When checking for causes of hard shifting in the transmission and jumping out of gear, check the flywheel housing alignment with the clutch removed, as follows:

Install a dial indicator, with the bracket attached to one of the flywheel cap screws. See figure 6. Adjust the bracket so that the indicator plunger is against the flat milled surface at the rear end of the flywheel housing. Turn the indicator dial until the pointer reads zero. Rotate the engine crankshaft until the indicator circles the flywheel housing and a correct reading can be obtained. Run-out should not exceed .033 inch total indicator reading. Install a new housing if the reading is out of limits.

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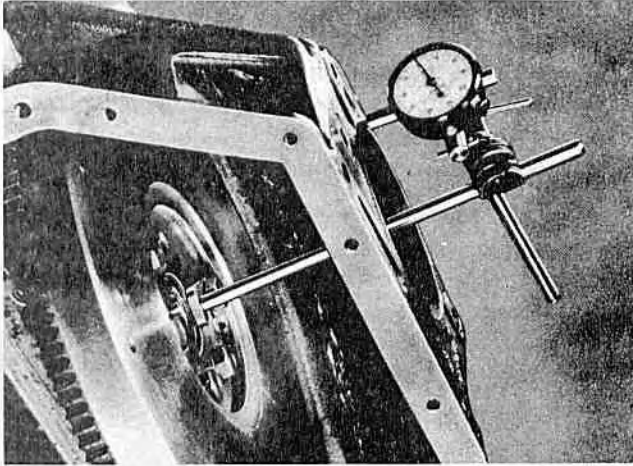


Figure 6—Dial Indicator and Bracket Attached to the Flywheel Screw

Check the flywheel housing bore in the same manner, except place the plunger of the indicator on the inside of the bore. See figure 7. Out-of-round of the bore should not exceed .005" total indicator reading. Install a new housing if the reading is out of limits.

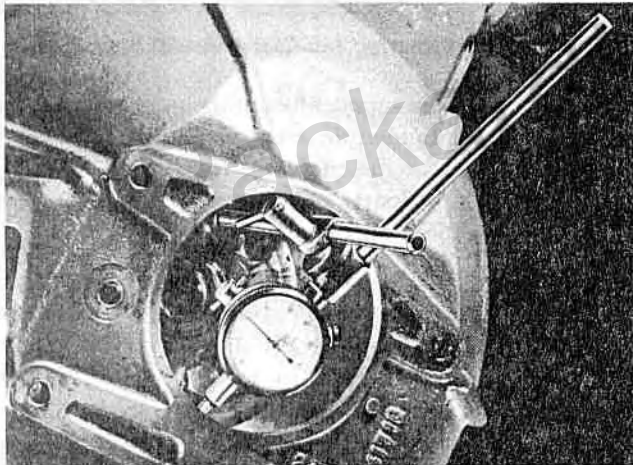


Figure 7—Checking the Flywheel Housing Bore

Clutch Installation

Pack the clutch shaft pilot bearing with short fiber wheel bearing grease and install the pilot bearing with the open side toward the front of the engine and the shielded side toward the rear.

When installing a new clutch driven plate, try the splines of the plate on the splines of the clutch shaft for free movement. Coat the splines of the clutch shaft *very sparingly* with a medium cup grease or "Lubriplate."

Hold the clutch cover and pressure plate assembly and clutch driven plate in place, with the damper springs of the driven plate away from the flywheel. Be sure the marks on the cover plate and flywheel line up.

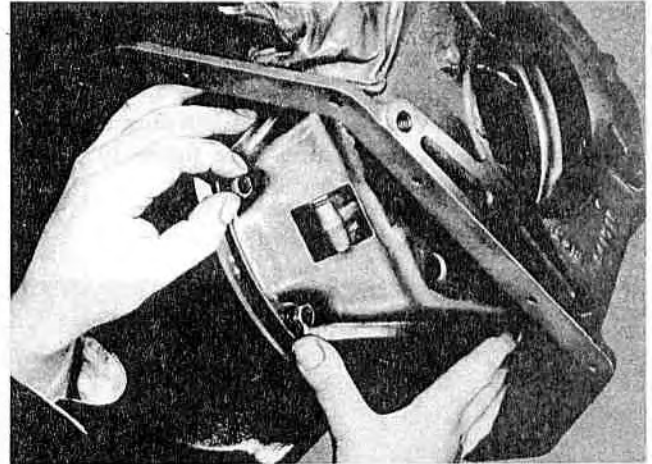


Figure 8—Installing the Clutch Pressure Plate and Driven Plate

Start the clutch cover to flywheel cap screws. See figure 8. *Do not tighten them at this time.*

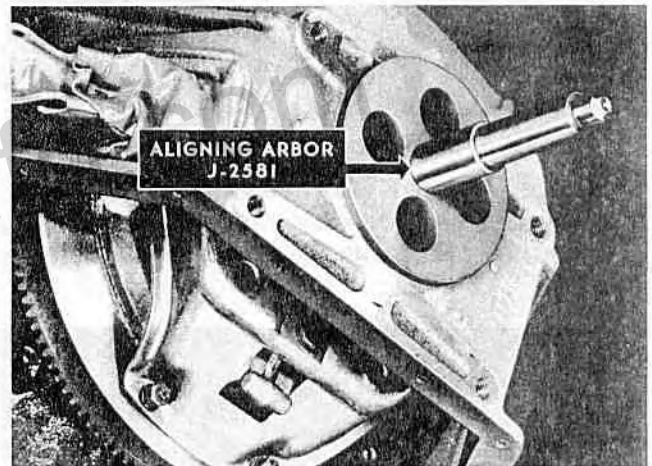


Figure 9—Aligning the Clutch Driven Plate Using Aligning Arbor

Insert the clutch driven plate aligning arbor, J-2581, through the clutch driven plate and into the clutch

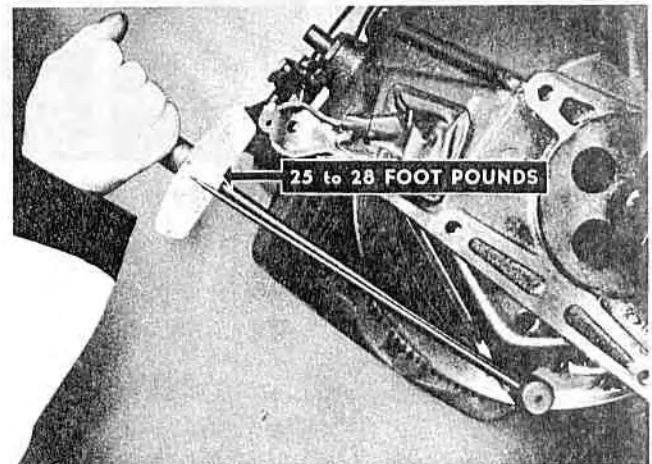


Figure 10—Torque Tightening the Clutch Cover to Flywheel Cap Screws

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shaft pilot bearing as shown in figure 9.

Tighten the clutch cover to flywheel cap screws a few turns each in progression until they are all tight. It is advisable to use a torque wrench, tightening these cap screws to 25 to 28 foot pounds. See figure 10. Install a clutch release bearing and sleeve.

Transmission Installation

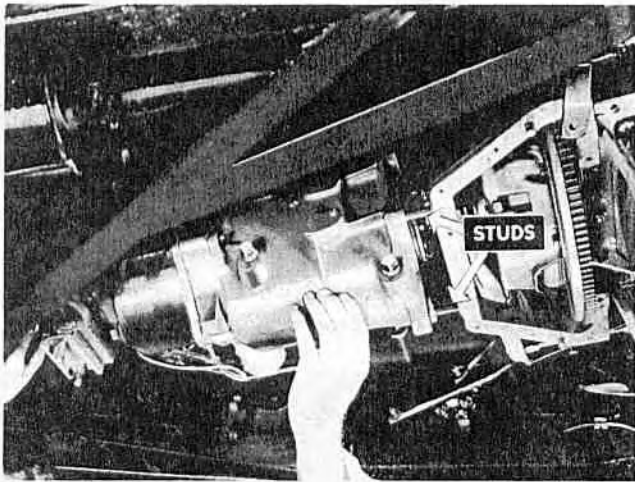


Figure 11—Installing the Transmission

Install two 1/2 inch pilot studs into the two lower holes in the flywheel housing. Install the transmission, guiding it into place with the pilot studs, as shown in figure 11.

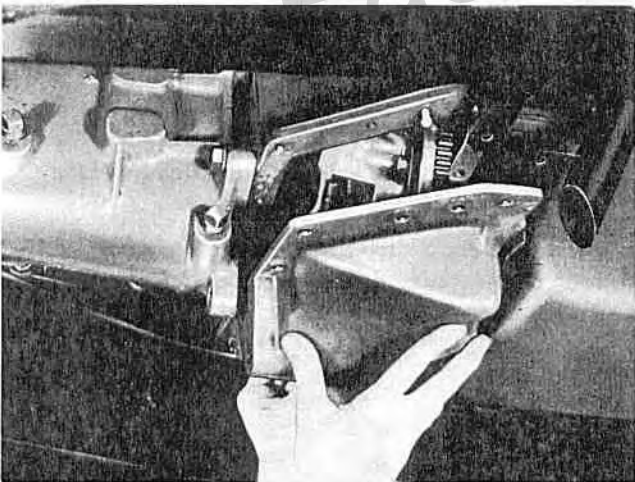


Figure 12—Installing the Flywheel Lower Housing

Caution: Care must be taken that the transmission clutch shaft does not rest on, bend, or dish the clutch driven plate. Remove the pilot studs and install and tighten all the cap screws attaching the transmission to the flywheel housing. Connect the clutch release bearing pull-back spring.

Install the lower flywheel housing. Adjust the clutch pedal free play to 1 1/2". See figure 13.

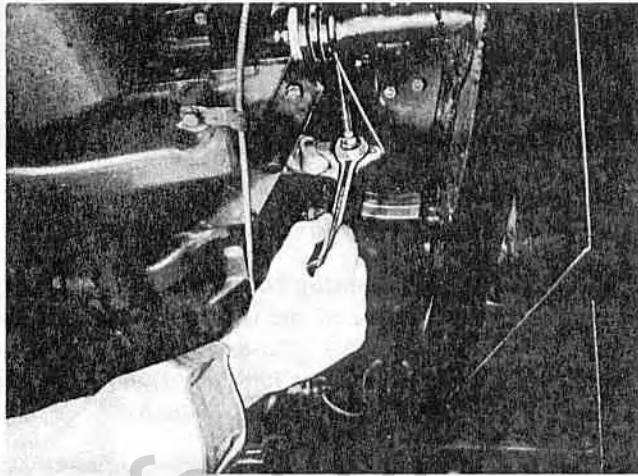


Figure 13—Adjusting the Clutch Pedal Free Play

Install the engine support mounting and support cross member. Do not tighten the attaching bolts to the frame cross member. Rock the engine back and forth to stabilize the engine supports. Tighten the engine support mounting attaching bolts.

Remove the jack from under the engine. Connect the gearshift rods to their respective levers. Connect the speedometer cable. Connect the universal joint.

On Overdrive Equipped Cars

Install the governor, and tighten using tool J-4653. Connect the governor leads, lockout switch, and the solenoid electrical leads. Energize the solenoid by grounding the terminal of the governor with a jumper lead. Install the solenoid while energized, making sure the plunger rod ball is engaged in the pawl. Remove the jumper lead from the governor. Connect the overdrive control cable to the lever on the left side of the overdrive case.

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TROUBLE SHOOTING AND CORRECTIVE MEASURES

CONDITION	POSSIBLE CAUSE	CORRECTION
1. Clutch slips badly in all gears.	(a) Worn clutch driven plate facings.	(a) Recondition clutch. Install new driven plate.
	(b) Overheated pressure plate. Weak springs. Broken clutch springs.	(b) Recondition clutch. Install new pressure plate and cover assembly.
	(c) Scored flywheel or pressure plate.	(c) Recondition clutch. Install new flywheel, pressure plate and cover, or both.
	(d) Insufficient clutch pedal free play.	(d) Adjust clutch pedal free play to 1½ inches.
2. Extreme clutch pedal pressure required to disengage clutch by pedal operation.	(a) Clutch pedal booster spring disconnected or missing.	(a) Install clutch pedal booster spring.
	(b) Clutch pedal binding on clutch and brake pedal support shaft.	(b) Free up and lubricate clutch pedal on support shaft.
	(c) Clutch relay lever out of alignment or binding.	(c) Free up and align relay lever.
3. Clutch grabs when starting in low or reverse.	(a) Oil or grease on driven plate facings.	(a) Recondition clutch. Install new driven plate. Clean pressure plate and flywheel. Eliminate source of oil or grease.
	(b) Broken driven plate facings or pressure plate.	(b) Recondition clutch. Install new driven plate. Install new pressure plate and cover assembly.
	(c) Hub of driven plate not sliding freely on transmission clutch shaft.	(c) Recondition clutch. Free up driven plate hub or install new plate.
4. Clutch chatters when starting in low or reverse.	(a) Oil or grease on driven plate, flywheel, or pressure plate.	(a) Recondition clutch. Install new driven plate. Clean pressure plate and flywheel. Eliminate source of oil or grease.
	(b) Binding of clutch pedal linkage.	(b) Free up clutch pedal linkage and adjust.
	(c) Loose engine mountings.	(c) Tighten engine mountings.
	(d) Driven plate facings loose.	(d) Recondition clutch. Install new driven plate.
	(e) Broken driven plate facings or pressure plate.	(e) Recondition clutch. Install new driven plate. Install new pressure plate.
	(f) Worn or incorrect adjustment of release levers.	(f) Recondition clutch. Install new pressure plate and cover assembly.

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TROUBLE SHOOTING AND CORRECTIVE MEASURES—Continued

CONDITION	POSSIBLE CAUSE	CORRECTION
5. Dragging or incomplete release.	(a) Excessive pedal free play.	(a) Adjust clutch pedal free play to 1½ inches.
	(b) Worn or incorrect adjustment of release levers.	(b) Recondition clutch. Install new pressure plate and cover assembly.
	(c) Loose or broken driven plate facings.	(c) Recondition clutch. Install new driven plate.
	(d) Bent or dished driven plate.	(d) Recondition clutch. Install new driven plate.
	(e) Hub of driven plate not sliding freely on transmission clutch shaft.	(e) Recondition clutch. Free up driven plate hub or install new driven plate.
6. Spinning, causing gear clash.	Clutch driven plate spinning is often confused with dragging. A clutch which releases properly will spin for a few seconds after being released. This is caused by its own momentum. Gear clash when shifting from neutral to low or reverse, is usually caused by clutch spinning, and can only be overcome by releasing the clutch and allowing the driven plate to stop before shifting into low or reverse.	
7. Clutch does not disengage fully. Gears clash in low or reverse gear. Severe operation.	(a) Distorted clutch driven plate.	(a) Recondition clutch, install new driven plate.
	(b) Grease on clutch driven plate facings.	(b) Recondition clutch, install new driven plate.