

ous operation, causing increased wear, which will result in immediate and serious slipping.

With the demands for quieter operation, engine mountings have been made softer and in some cars the engines are free to move considerably. Sometimes clutch trouble has been stopped by replacing or tightening the engine mountings. In the case of chronic clutch chatter, a general tightening of the chassis often has proved effective. When we realize that the full power of the engine is transmitted through a clutch disk no larger than a dinner plate, it will be appreciated that any jerking resulting from looseness in the drive line can break momentarily the grip of the clutch, and cause a slight slip, which in itself is not serious but causes wear on the clutch facings over a period of time.

Looseness of rear-wheel hubs on axle shafts, or even looseness of the wheels on hubs over a period of time may cause clutch trouble. Also, excessive play between the pinion and ring gear within the rear axle, or between the differential side gears and the axle shafts, may result in trouble often diagnosed as a faulty clutch. And any looseness in the driveshaft, either in its splines or at the universal joint, may be the cause of mysterious clutch difficulty.

The nuts on the clutch fingers seen through the clutch-inspection opening should be adjusted only by manufacturers who have precision fixtures for the purpose. The fingers must be at exactly the same height. When the complete clutch pressure plate is assembled at the factory, all of the ten or more springs and the six or more fingers are checked accurately. In time the springs may become weakened and cause trouble, but if any attempt is made by an inexperienced person to compensate for this condition by adjusting the clutch finger nuts, slipping or grabbing is almost certain, with the result that further damage will be done.

In cars that have a torque-tube drive (tubular housing covering the torque tube between the transmission and rear axle), careless handling of the car may cause clutch trouble. For example, should an owner of such a car back up against a solid object, the impact would be transferred directly to the rear end of the motor, which is the clutch housing. This could cause misalignment between the clutch housing and the flywheel. Often, by tightening one flywheel bolt slightly more than another, this condition can be corrected within reasonable limits.

The clutch can also be affected by the faulty use of the choke. The jerky action of an engine that is operating on too rich a mixture, or missing for any other reason,

causes strain on the clutch. Another thing that is responsible for clutch difficulty is the use of too light a lubricant in the transmission, or too much of it, with the result that some may work forward onto the clutch and cause slipping or grabbing. A loose rear main bearing in the engine also may cause seepage of excess oil.

Transmission and engine noises occasionally are confused with rear-axle noise. To best isolate these noises, first observe approximate car speed and condition where supposed rear-axle noise is most pronounced. Then, with the car in a quiet place to avoid interfering noises, and car stationary, hold out the clutch with transmission in high gear and run the engine. Accelerate slowly through engine speeds corresponding to the car speeds at which axle noise was most pronounced and listen for sounds similar to the axle noise. Next, shift gears to neutral and again run engine at various speeds, while slowly letting the clutch engage while listening for idling noises in the transmission.

Difficulty in shifting gears can result from a sticking or dragging clutch caused by heavy oil, burred teeth on the shifting gears or worn bearings that throw the shaft out of line. Gears should be shifted without a particle of noise.

When gears do not stay in mesh, it is usually due to weak or broken springs in the gear-shifting shaft, plunger or lock.

Cross-section drawing of a representative friction clutch used with a manual-shift transmission, shown in the released position. The driven plate has a friction facing on both sides and slides on the splined shaft. When the clutch is engaged, the springs in the pressure plate force it against the flywheel

