PROPELLER SHAFTS & UNIVERSAL JOINTS • SECTION 7

CONTENTS

GENERAL DESCRIPTION

Two types of propeller shafts are used on Henry J Automobiles — a "cross and yoke" type propeller shaft and a "ball and trunnion" type shaft. A slip joint in the cross and yoke propeller shafts allows the shaft to compensate for longitudinal movement while the ball and trunnion shafts compensate for movement within the universal joints at each end.

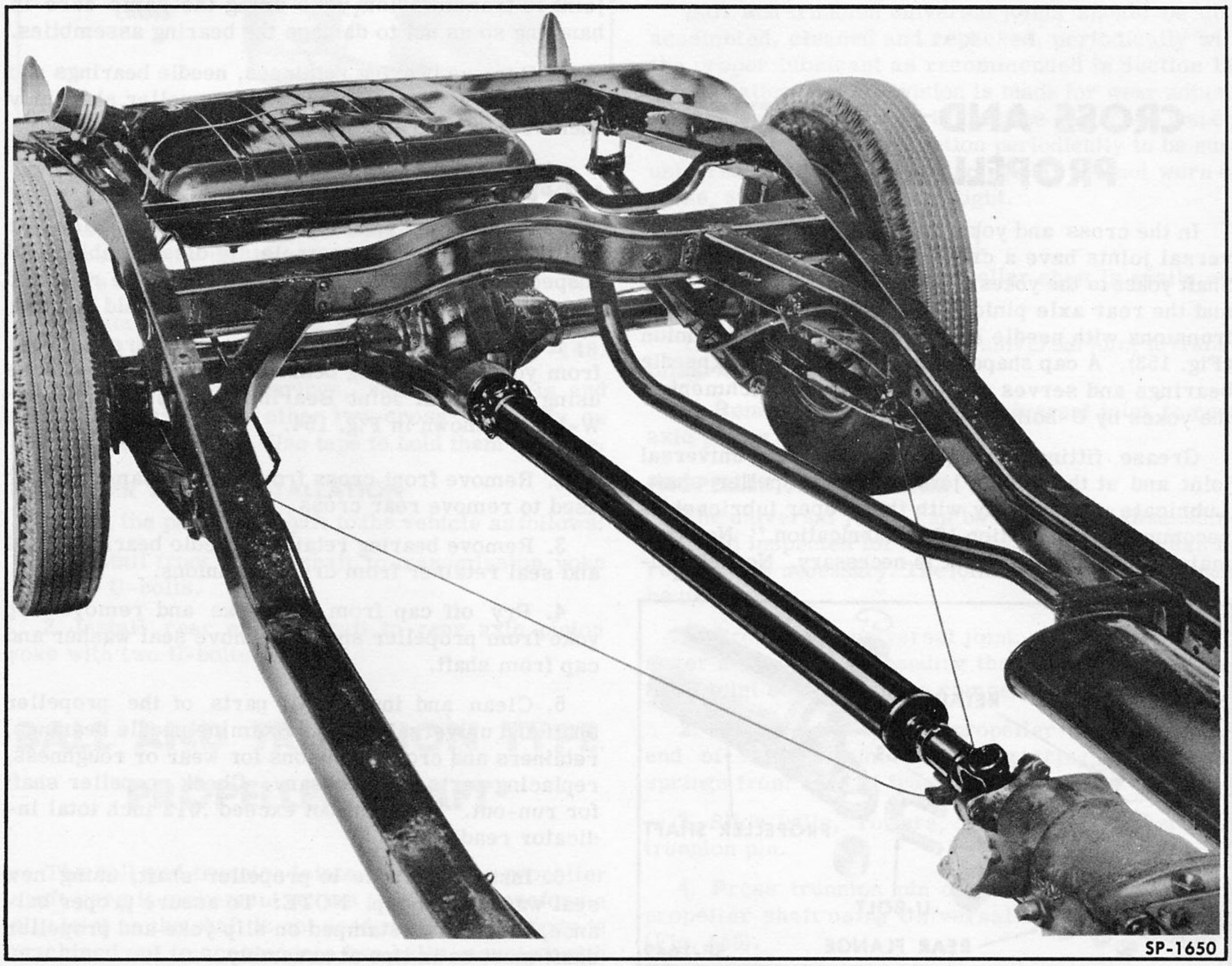

Fig. 152—Typical Propeller Shaft Installation

The two types of propeller shafts are not interchangeable nor are the same type shafts interchangeable between vehicles with standard transmission and those equipped with overdrive.

MAINTENANCE

The universal joints of a ball and trunnion type propeller shaft should be disassembled, cleaned and packed with grease periodically. The cross and yoke type shaft has grease fittings which also require lubrication periodically. Complete lubrication specifications are given in Section 17, "Lubrication." The shaft should be checked occasionally for presence of mud, tar, dents, etc. which can make it out of balance and cause vibration.

CROSS AND YOKE TYPE PROPELLER SHAFT

In the cross and yoke type installation, both universal joints have a cross connecting the propeller shaft yokes to the yokes on the transmission main shaft and the rear axle pinion shaft. Each cross has four trunnions with needle bearings around each trunnion (Fig. 153). A cap shaped retainer encloses the needle bearings and serves as a location for attachment to the yokes by U-bolts.

Grease fittings are provided at each universal joint and at the sliding joint in the propeller shaft. Lubricate periodically with the proper lubricant as recommended in Section 17, "Lubrication." No other maintenance or adjustment is necessary. No wear adjustments are provided; therefore, worn parts must be replaced. Inspect the propeller shaft installation periodically to be sure yoke bolts are tight and universal joints are in good condition.

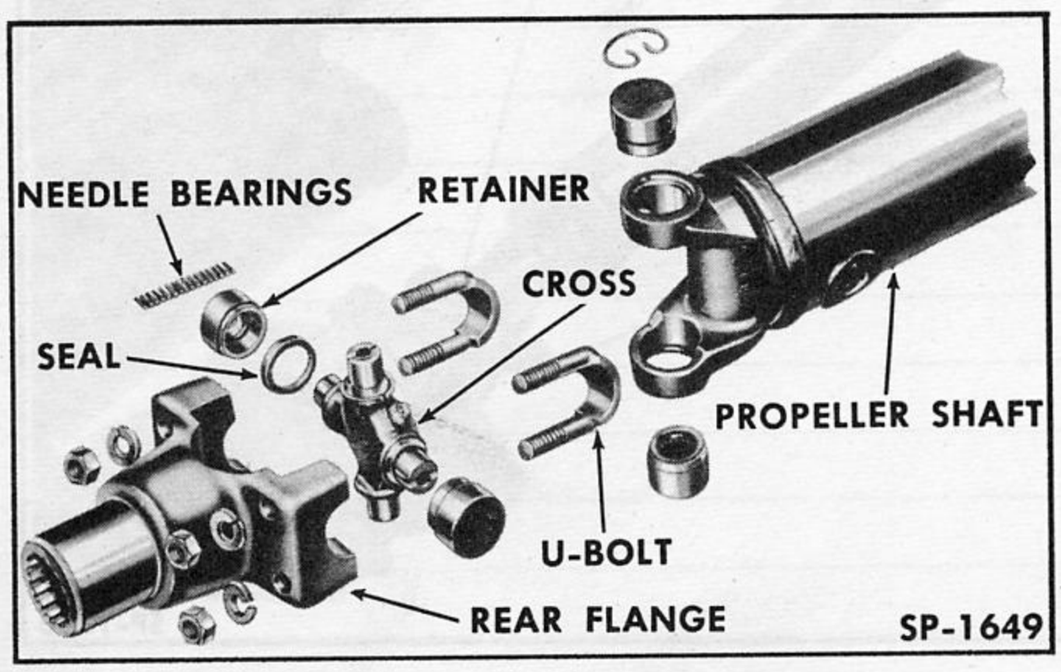

Fig. 153—Cross and Yoke Universal Joint—Exploded View

PROPELLER SHAFT REMOVAL

The following procedure covers removal of the propeller shaft assembly.

1. Remove the two U-bolts that attach rear universal joint to yoke at rear axle pinion. Pry bearing retainers out of yoke and immediately tape retainers to cross to prevent loss of needle bearings.

2. Lower rear end of propeller shaft carefully so as not to damage the bearing assemblies.

3. Remove the two loose bearing retainers, needle bearings and seals from cross trunnion.

4. Remove two U-bolts that attach front universal joint to transmission yoke using the same care in handling so as not to damage the bearing assemblies.

5. Remove bearing retainers, needle bearings and seals from cross trunnion. The propeller shaft may then be moved to a bench for further disassembly.

PROPELLER SHAFT REPAIR

The cross and yoke type universal joints and slip yoke (on shaft) can be completely disassembled and inspected for wear. Individual parts can be replaced as necessary. The following procedure should be used:

1. Remove snap rings and remove rear cross from yoke by pressing bearing retainers out of yoke using Universal Joint Bearing Clamp and Adapter W-148 as shown in Fig. 154.

2. Remove front cross from yoke in same manner used to remove rear cross.

3. Remove bearing retainer, needle bearings, seal and seal retainer from cross trunnions.

4. Pry off cap from slip yoke and remove slip yoke from propeller shaft. Remove seal washer and cap from shaft.

5. Clean and inspect all parts of the propeller shaft and universal joints. Examine needle bearings, retainers and cross trunnions for wear or roughness, replacing parts as necessary. Check propeller shaft for run-out. It should not exceed .012 inch total indicator reading.

6. Install slip yoke to propeller shaft, using new seal washer and cap. NOTE: To assure proper balance, the arrows stamped on slip yoke and propeller shaft must be in line at assembly.

7. Assemble needle bearings in retainers and

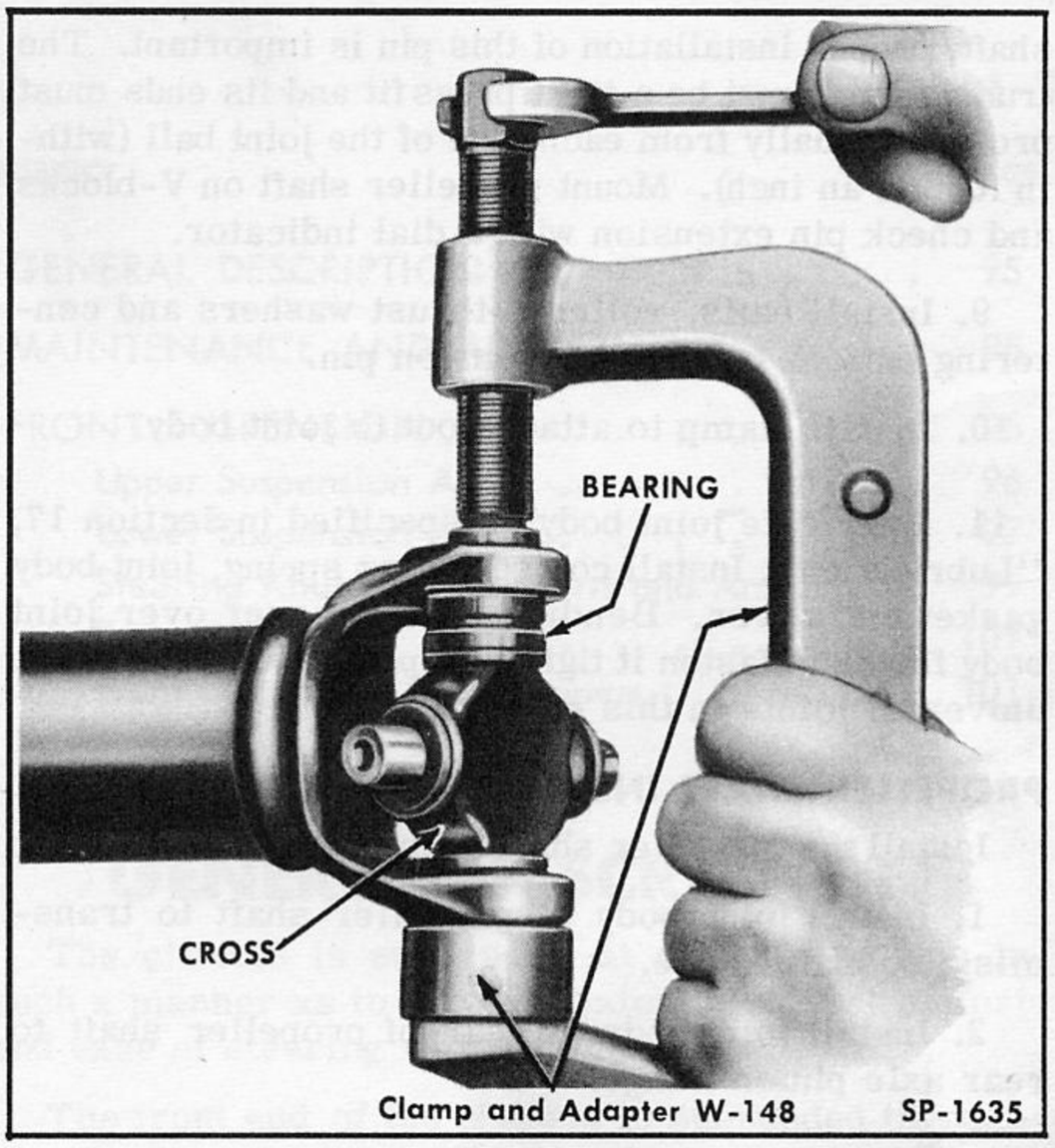

Fig. 154—Removing Cross Type Universal Joint Bearing

place retainers on cross trunnions. Use new seal washers. Apply universal joint lubricant to needle bearings before assembling to cross.

8. Install front and rear crosses to yokes using Universal Joint Bearing Clamp and Adapter W-148.

9. Install needle bearings, retainers, seals and seal retainers to the other two cross trunnions on both ends of the shaft. Use tape to hold them in place.

PROPELLER SHAFT INSTALLATION

Install the propeller shaft to the vehicle as follows:

1. Install front end of shaft to transmission yoke with two U-bolts.

2. Install rear end of shaft to rear axle pinion yoke with two U-bolts.

BALL AND TRUNNION TYPE PROPELLER SHAFT

The ball and trunnion joints on this type propeller shaft permit movement within the joint, therefore a slip joint on the shaft is not needed. The joint body is machined out to accomodate two balls mounted with needle bearings onto the ends of a pin which extends

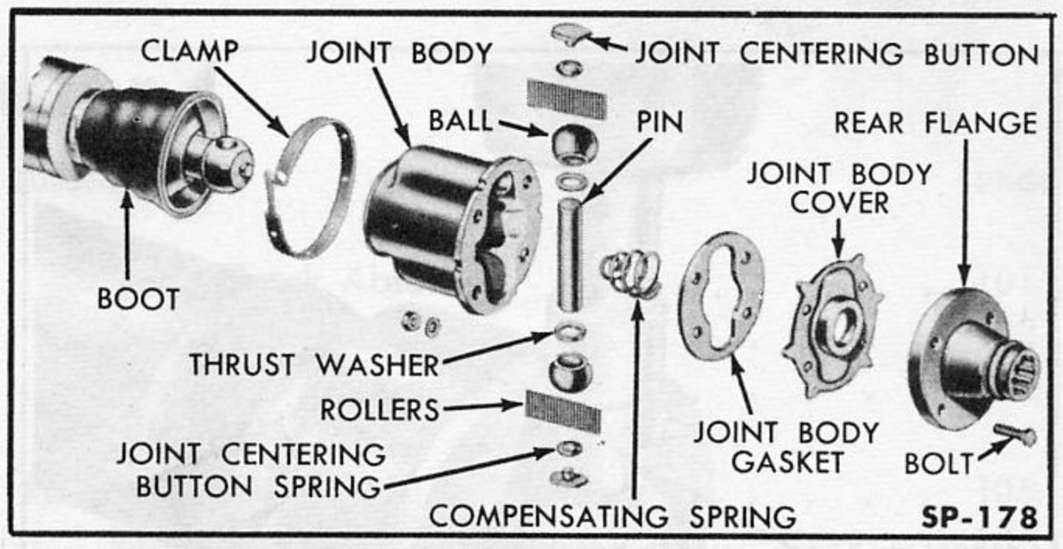

Fig. 155—Ball and Trunnion Universal Joint—Exploded View

through the propeller shaft. A compensating spring in each joint holds the propeller shaft tube centered between the universal joint bodies. The necessary telescopic movement of the propeller shaft is accomplished within the joint bodies.

Ball and trunnion universal joints should be disassembled, cleaned and repacked, periodically with the proper lubricant as recommended in Section 17, "Lubrication". No provision is made for wear adjustment; therefore, worn parts must be replaced. Inspect the propeller shaft installation periodically to be sure universal joint boots are intact, joints are not worn or loose, and flange bolts are tight.

PROPELLER SHAFT REMOVAL

The ball and trunnion propeller shaft is easily removed as follows:

1. Remove bolts attaching universal joint to transmission shaft flange.

2. Remove bolts attaching universal joint to rear axle pinion flange.

PROPELLER SHAFT REPAIR

The universal joints can be completely disassembled and inspected for wear. Individual parts can be replaced as necessary. The following procedure should be used:

1. From each universal joint, remove joint body cover and gasket by bending the attaching tabs away from joint body. Remove compensating spring.

2. Slide joint body onto propeller shaft to expose end of shaft. Remove two centering buttons and springs from ends of trunnion pin.

3. Slide balls, rollers, and thrust washers off trunnion pin.

4. Press trunnion pin out of joint ball at end of propeller shaft using Universal Joint Pin Jig C-552 (Fig. 156).

5. Remove boot clamps and slide joint body and

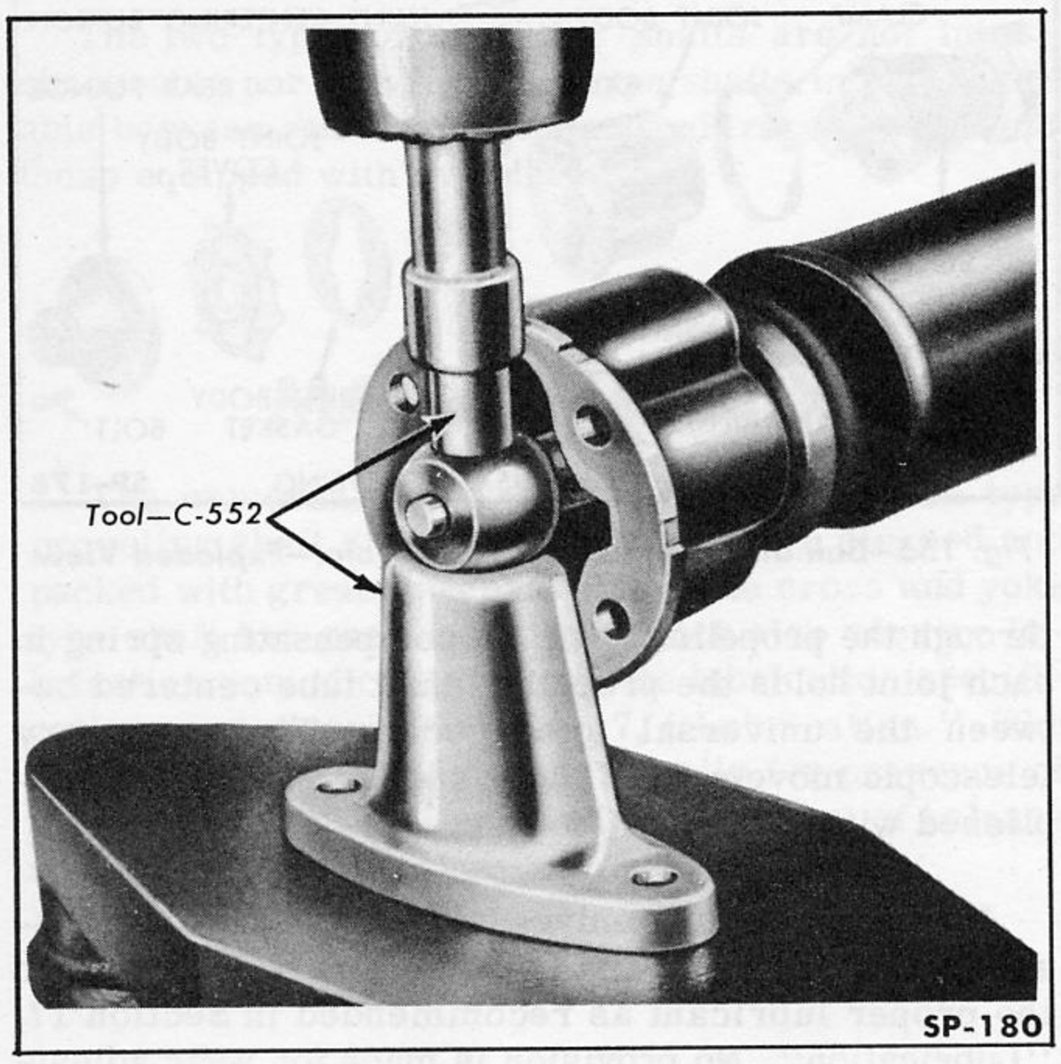

Fig. 156—Removing Trunnion Pin

boot off end of propeller shaft. Discard boot and clamps as a new boot and clamps should be used at assembly.

6. Clean all parts and inspect for wear and shaft distortion. Worn or damaged parts must be replaced. Deposits of dirt, tar, or undercoating material will affect the shaft balance and must be cleaned off. Deep dents in the tubular part of the shaft will also affect the alignment and balance necessitating shaft replacement. Check propeller shaft for run-out. It should not exceed .012 inch total indicator reading.

7. Install a new rubber boot on each end of shaft and fasten the clamp to attach boot to shaft. NOTE: If desired, the boot can be replaced without removing the pin and body. Merely slip the boot over the pin and work it through between the body and the shaft.

8. Slip the joint body over joint ball and onto propeller shaft. Press trunnion pin into hole in joint ball, using Universal Joint Pin Jig C-552. Since endwise location of the pin controls run-out and balance of the shaft, proper installation of this pin is important. The trunnion pin must be a tight press fit and its ends must protrude equally from each side of the joint ball (within .006 of an inch). Mount propeller shaft on V-blocks and check pin extension with a dial indicator.

9. Install balls, rollers, thrust washers and centering buttons on ends of trunnion pin.

10. Install clamp to attach boot to joint body.

11. Lubricate joint body as specified in Section 17, "Lubrication". Install compensating spring, joint body gasket and cover. Bending tabs of cover over joint body flange to fasten it tightly in place. Assemble both universal joints in this manner.

PROPELLER SHAFT INSTALLATION

Install the propeller shaft to the vehicle as follows:

1. Install joint body of propeller shaft to transmission shaft flange.

2. Install joint body at rear of propeller shaft to rear axle pinion flange.

SERVICE DIAGNOSIS

Vibration and noise from the drive line are the usual symptoms of propeller shaft difficulty. However these conditions do not necessarily indicate that trouble is in the propeller shaft installation. Frequently, vibration and noise seem to originate in the propeller shaft when actually the cause is found in some other unit such as the clutch, transmission, rear axle or loose sheet metal parts.

If vibration and noise are due to the propeller shaft, probably the shaft installation is out of balance. Check for the following:

1. Mud, tar or undercoating on the shaft.
2. Bent or dented shaft.
3. Worn or loose universal and/or slip joints.
4. Loose propeller shaft flange.
5. Lack of universal or slip joint lubrication.
6. Loose or damaged universal joint boot.