SAGINAW VANE TYPE

Chevrolet
Dodge
Ford ("E" Models Only)
GMC
International Harvester
Jeep
Plymouth

DESCRIPTION

The Saginaw vane type power steering pump can be identified by the "ham can" shape of the fluid reservoir. Internally, rectangular pumping vanes carried by a shaft driven rotor move fluid from intake to pressure cavities of cam ring. As rotor begins to rotate, centrifugal force throws vanes against inside surface of cam ring to pick up residual oil, which is then forced into high pressure area. As more oil is picked up by the vanes, oil is forced into the cavities of the thrust plate and through two cross-over holes in the cam ring and pressure plate (which empty into high pressure area between pressure plate and housing end plate). Filling high pressure area causes oil to flow under vanes in slots of rotor, forcing vanes to follow inside oval surface of cam ring. As vanes rotate to small area of cam ring, oil is forced out from between vanes.

LUBRICATION, TROUBLE SHOOTING & TESTING

See Power Steering General Servicing in this section.

REMOVAL & INSTALLATION

POWER STEERING PUMP

Loosen pump adjusting bolt (or nut) and pump mounting bolts, then withdraw pump drive belt. Disconnect pressure and return hoses from pump and cap ends to prevent loss of fluid and entry of dirt. Remove bolts attaching pump mounting bracket to engine, and withdraw pump, pulley, and mounting bracket as an assembly. To install, reverse removal procedure and bleed hydraulic system.

OVERHAUL

CAUTION – *When clamping pump in vise, be careful not to exert excessive force on front hub of pump as bushing may become distorted.*

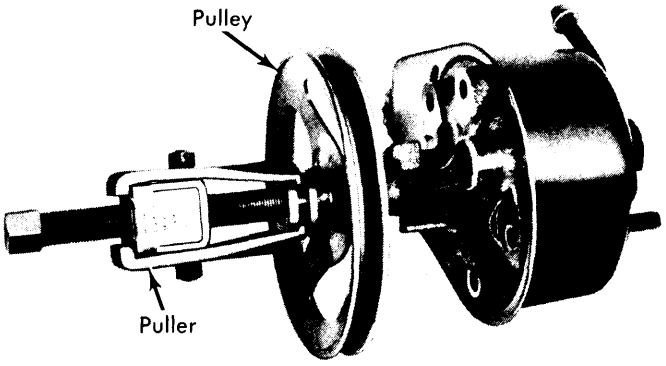

Fig. 1 Using Pulley to Remove Pump Pulley

Disassembly – **1)** Using a suitable puller, withdraw pulley from shaft. **CAUTION** – *Do not hammer pulley off shaft or internal damage may occur.* Drain pump reservoir, clean exterior of unit, and remove mounting bracket(s). Clamp pump (with shaft pointing downward) in a soft jawed vise, making sure vise grips pump at square boss and shaft housing. Remove pressure line union and "O" ring seal. Remove reservoir retaining stud(s), then tap against filler tube to loosen reservoir on pump body. Remove reservoir from body, then withdraw and discard all "O" ring seals.

2) Using a 1/8" diameter punch, tap end plate retaining ring around until one end of ring is near hole in pump body. Insert punch in hole far enough to disengage ring from groove in pump bore, then use a screwdriver and pry ring out of body. Tap end plate with a soft faced hammer to break it loose; the spring located under the end plate should push plate up. Remove pump body from vise.

Fig. 2 Disengaging and Removing Retaining Ring for End Plate of Pump

3) Place pump in inverted position on flat surface, and tap end of drive shaft with soft-faced hammer to loosen pressure plate, rotor, and thrust plate assembly from body. Lift pump body off rotor assembly (flow control valve and spring should also slide out of bore). Remove and discard end plate and pressure plate "O" rings. Pry drive shaft oil seal from body using a screwdriver.

4) Inspect seal bore in housing for burrs, nicks, or score marks that would allow oil to by-pass outer seal surface. Lift pressure plate and cam ring from rotor, then remove rotor vanes. Clamp drive shaft in soft-jawed vise, with rotor and thrust plate facing up, and remove rotor lock ring from shaft, using care not to nick shaft or rotor. Slide rotor and thrust plate off shaft, and remove shaft from vise.

SAGINAW VANE TYPE (Cont.)

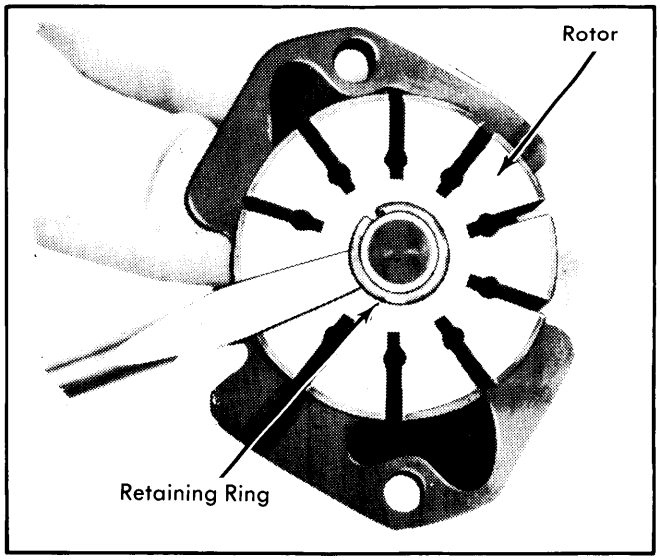

Fig. 3 Removing the Rotor Retaining Ring

Cleaning & Inspection – 1) Clean all pump components in a suitable solvent and blow dry. **CAUTION** – *Do not immerse drive shaft seal in solvent.* Inspect flow control valve assembly for wear, scoring, burrs, or other damage. Check all machined surfaces of body for scratches or burrs which might allow leaks. Mating surfaces on"O" ring seats require special attention.

NOTE – *Cam ring is treated with "Lubrite" which leaves a dull gray-black finish on wear surface. Wavy grain appearance inside cam ring is normal.*

2) Inspect pump body drive shaft bushing for excessive wear. If replacement is required, replace pump body and bushing as an assembly. Inspect end cover for nicks and burrs on surface for "O" ring, then polish with a small oil stone if necessary.

3) Inspect rotor ring for roughness or irregularities. Use a small oil stone to correct minor irregularities and replace ring if outside cam surface is badly worn or scored. Check thrust plate and pressure plate for scoring and wear. To remove light scoring, carefully lap using crocus cloth until surface is smooth and flat, then clean thoroughly.

4) Check fit of vanes in rotor to ensure that they slide freely but fit snugly into slots. Use an oil stone to remove burrs or irregularities from vanes. If vanes are excessively loose in slots, the rotor requires replacement. Scoring on rotor may be removed by careful laping using crocus cloth, and then cleaning thoroughly.

Reassembly – 1) **NOTE** – *Lubricate all "O" rings and seal areas with power steering fluid.* Place pump body on a flat surface. Drive a new shaft seal into bore using a 7/8" or 15/16" socket. Drive seal in until it bottoms on shoulder in bore. **CAUTION** – *Excessive force will distort seal.* Lubricate seal with power steering fluid, then clamp body in vise with shaft pointing downward. Install end plate and pressure plate "O" rings in grooves of body.

2) With drive shaft clamped, splined end up, in a soft-jawed vise, install thrust plate on shaft with smooth, ported side up. Slide rotor over splines with counter bore of rotor facing down. Install rotor lock ring making sure it is seated in groove. Install two dowel pins in holes in pump cavity. Carefully insert drive shaft, rotor, and thrust plate assembly in pump cavity, indexing location holes with dowel pins.

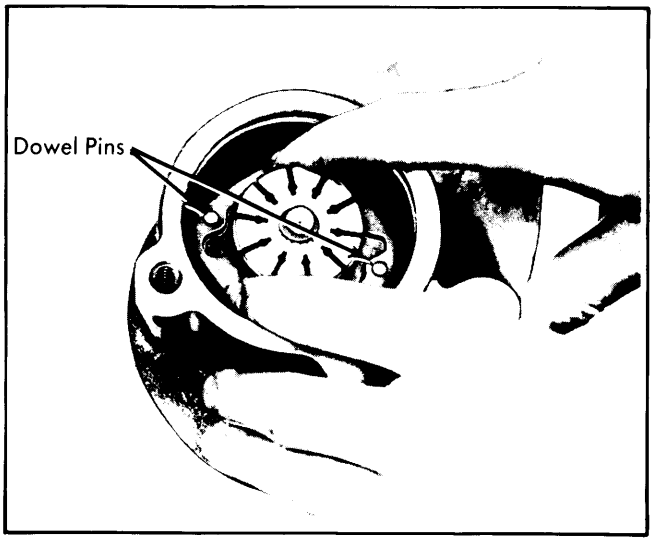

Fig. 4 Installing Drive Shaft Assembly and Aligning Location Holes with Dowel Pins

3) Slide cam ring over rotor and onto dowel pins, with arrow on ring facing up. Install vanes in rotor slots with radius edge facing out towards cam ring inner surface. Position pressure plate on dowel pins. Place a 1 1/4" socket in groove of pressure plate, and seat entire assembly on "O" ring in pump cavity by pressing down on socket with both thumbs.

4) Place spring in groove in pressure plate and position end cover lip edge up over spring. Press end cover down below retaining ring groove with thumb, and install retaining ring, making sure ring is seated in groove. Care should be taken to prevent cocking end cover in bore or distorting assembly.

5) Using a punch, tap retaining ring ends around in groove until opening is opposite flow control valve bore. This is necessary for maximum retention of retaining ring. Install new reservoir "O" ring, mounting stud "O" rings, and flow control valve "O" ring on pump body, then carefully position reservoir on pump body. Align mounting stud holes until studs can be started in threads.

6) Using a soft-faced hammer, tap reservoir down on pump and install flow control valve spring and valve assembly. Install new "O" ring seal on pressure hose fitting. **CAUTION** – *Be sure "O" ring is installed on upper groove.* Install pressure hose fitting and tighten mounting studs. Tighten hose fitting and rear mounting stud(s). Remove pump assembly from vise, and install mounting bracket(s) and drive pulley. **CAUTION** – *Do not hammer pulley on shaft.*

SAGINAW VANE TYPE (Cont.)

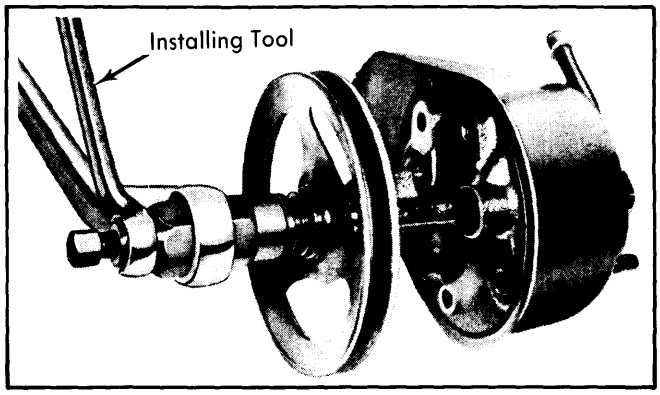

Fig. 5 Pressing Pump Pulley into Position

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs.
Reservoir-to-Pump Body	35
Pump Pulley Nut	
Chevrolet & GMC	60
International Harvester	40
Pressure Hose Fitting	
Ford	30
All Others	35
Flow Control Fitting	35

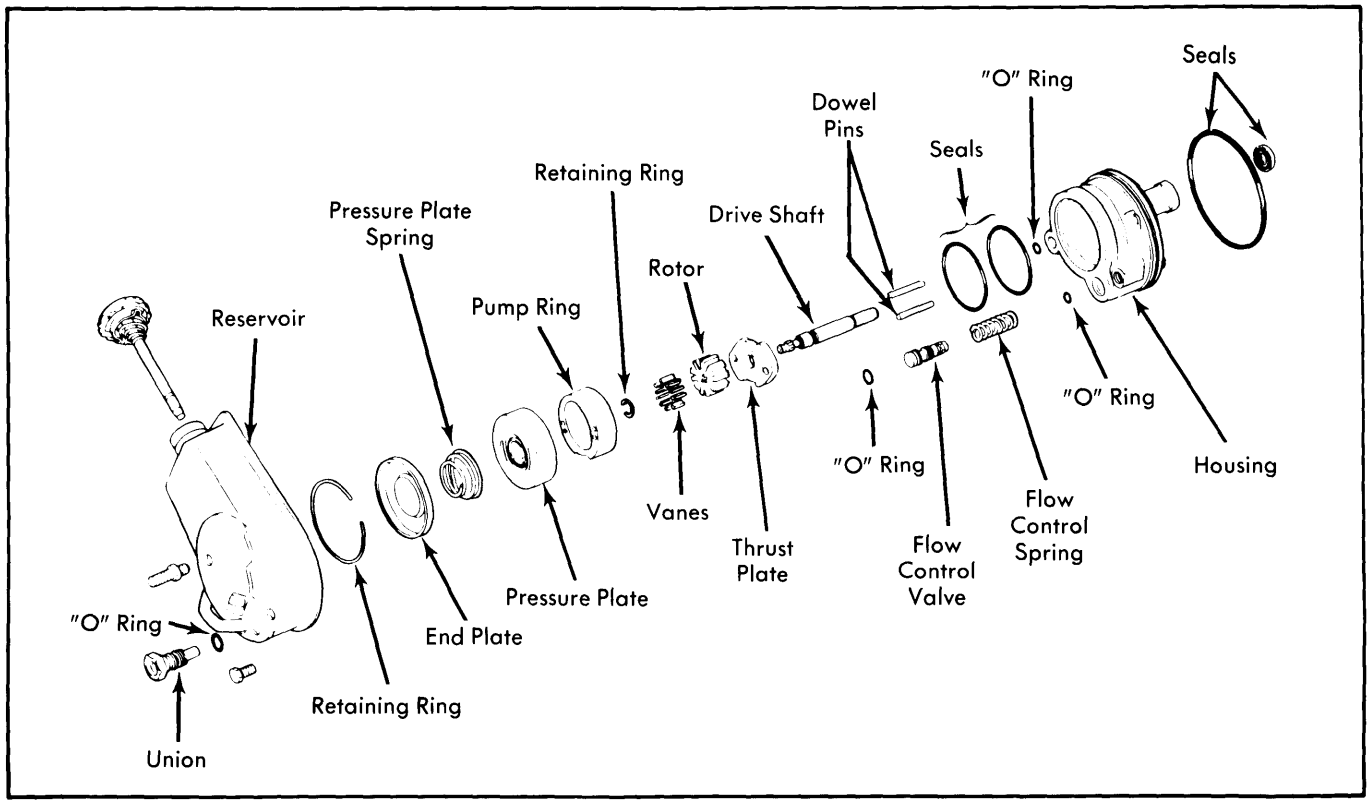

Fig. 6 Exploded View of Power Steering Pump