G.M. LIMITED SLIP DIFFERENTIAL (CONE BRAKE TYPE)

Buick
Chevrolet
Oldsmobile
Pontiac

NOTE – *Some models use other units. See G.M. Limited Slip Differential (Clutch Pack Type) in this section.*

DESCRIPTION

Two pinion limited slip differential within a two piece case, using spring loaded cone brakes behind each side gear to direct major driving force to wheel with most traction.

REMOVAL & INSTALLATION

NOTE – *Rear axle procedures involving removal and installation, ring gear, side bearings, drive pinion, or axle shafts, see appropriate rear axle data for each car model.*

DISASSEMBLY

NOTE – *General Motors does not recommend overhaul of this unit. Procedures given are intended for cleaning and inspection only. If internal parts show signs of excessive wear or damage, entire unit must be replaced.*

1) Before disassembling case, check side bearings for visible damage of rollers and outer races. Place outer race onto its matched roller assembly, and turn slowly applying hand load, if race turns smoothly and no visible damage is found, bearing can be reused. NOTE – *Side bearings and races are matched parts and must be kept together.* Inspect fit of inner races on case hubs by prying against shoulders at puller recesses. Bearing inner races must be tight on hubs. NOTE – *If either bearing is loose on case, entire case must be replaced.*

2) Secure one axle shaft in vise with splined end extending 3" above jaws. Insert gear case on axle shaft. Install pilot J-23406, or equivalent, in side bearing. Using bearing puller J-22888-1, or equivalent, remove both differential side bearings.

3) Scribe alignment mark on differential gear case and ring gear. Loosen 12 ring gear to case screws. NOTE – *Screws have left hand threads.* Remove only 3 of the 12 screws and install guide pins J-23316-1 or equivalent. Remove case from axle and place on bench, with ring gear facing down. Remove nine retaining screws. Tap on guide pins to unseat and remove ring gear.

4) Alternately loosen 8 screws holding case halves together until halves separate. *WARNING – Gear case is spring loaded. DO NOT remove screws until case halves separate.* After halves separate remove all 8 screws. Remove left case half, using care to prevent cone clutch and side gear from falling. Use a thin blade screwdriver to remove left side gear from cone clutch. Remove upper spring retainer from unit. Remove preload springs and shims.

NOTE – *Shims are used in some units between side gear and brake cone to maintain backlash between pinion gears and side gears.*

CLEANING & INSPECTION

Clean all parts. Inspect pinion and side gears, pinion shaft, and thrust washers for wear or damage. Cone seats in case should be smooth and free from scoring (slight grooves or scratches are permissable). Cone surface will duplicate cone seat. If one half of case is worn or damaged, both halves must be replaced.

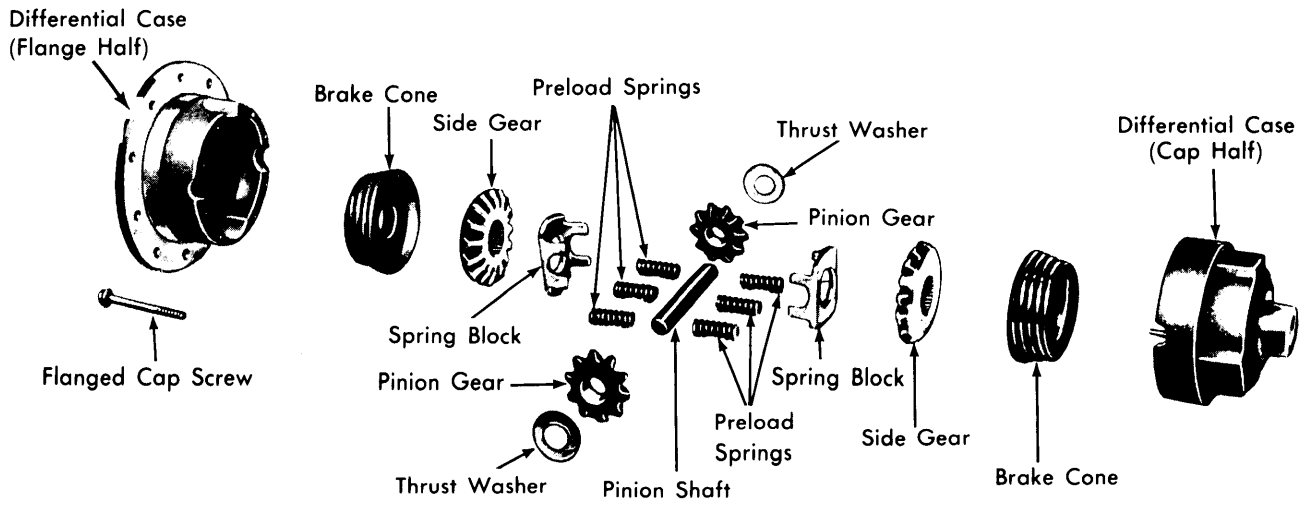

Fig. 1 Exploded View of Warner-Motive Differential Assembly (Typical Cone Brake Type)

G.M. LIMITED SLIP DIFFERENTIAL (CONE BRAKE TYPE) (Cont.)

REASSEMBLY

1) All parts must be assembled in their original position. Lubricate all parts with differential lubricant. Secure axle in vise with splined end extending 3" above vise, to use as a holding and assembly fixture. Place right half of gear case on axle shaft. Install right cone clutch over axle shaft. Install right side gear over axle into right cone clutch.

2) Install inner spring retainer, and springs in right half of gear case with tab on retainer opposite opening in gear case. Make sure springs are properly seated. Install pinion gears and thrust washers on cross shaft, and install cross shaft lock pin. Install cross shaft, pinion gears, and thrust washers.

3) Install upper spring retainer with tab on retainer opposite opening in gear case and aligned with tab on other retainer. After retainer is installed be sure spring seats on retainer are centered in spring. Position left side gear on upper spring retainer. Install left cone clutch on left side gear, making sure splines in cone clutch align with splines in left side gear. Position left half of gear case on right half. Install gear screws finger tight.

4) Install left axle to align splines in cone clutch with splines in left side gear. Leaving axle shaft in place tighten gear case screws to 30 ft. lbs. Remove left axle. Remove gear case from axle in vise. Install guide pins in ring gear. Using alignment marks made on disassembly, align ring gear case, and install ring gear. Using a soft mallet tap ring gear down onto case. Remove guide pins and install remaining screws. Alternately tighten ring gear screws to 85 ft. lbs.

5) Position bearing and side bearing installer J-23317, or equivalent, and using an arbor press install side bearings onto gear case.

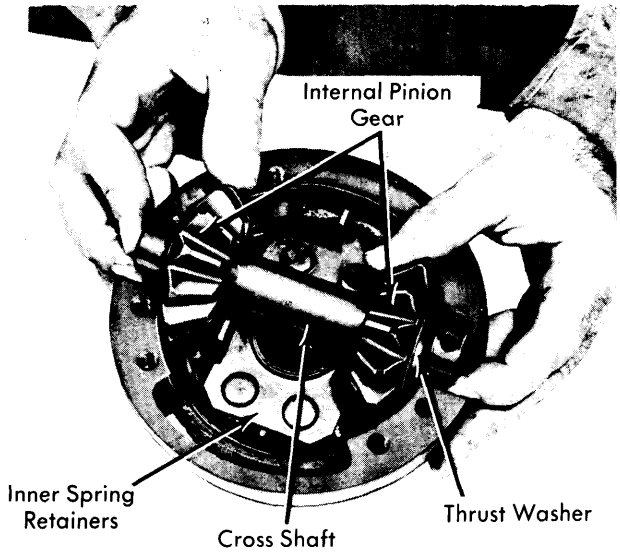

Fig. 2 Removing and Installing Pinion Gears

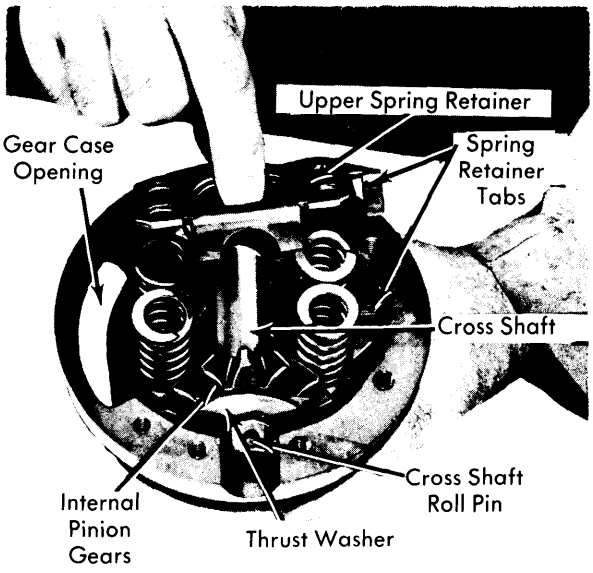

Fig. 3 Removing and Installing Upper Spring Retainer