½ TON REAR AXLE WITH POSITRACTION

INDEX

GENERAL DESCRIPTION

The Eaton Limited Slip Differential, available for ½ ton rear axles, directs greater driving force to the wheel with the better traction through disc clutches between side gears and case engaged by the tendency of the pinions to force side gears outward as drive is transmitted through the system.

There are 14 clutch discs, seven located between side gear and case at each side of the differential. Four discs of each set are driven by the differential case through two tangs spaced 180 degrees apart. The other three discs are splined directly to the differential side gear hub.

The differential unit (fig. 34) is installed in a conventional ½ ton rear axle housing and the only difference in service procedures are the Diagnosis, Disassembly, Assembly and Adjustment operations described below.

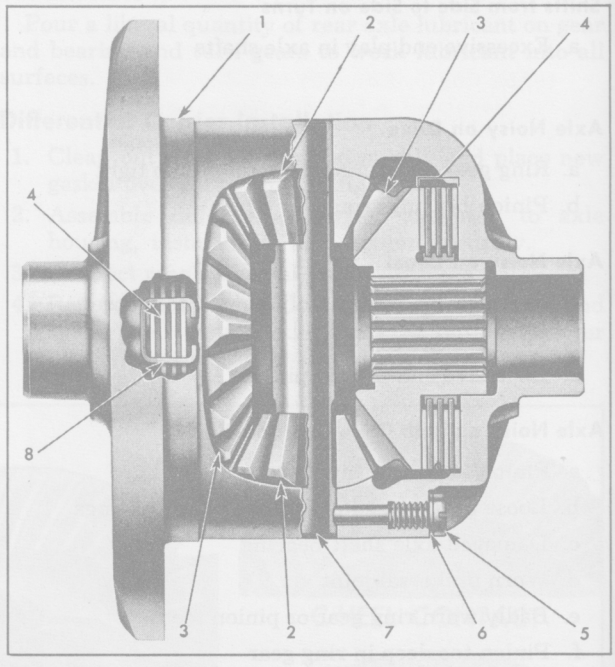

Fig. 34—Positraction Differential Assembly

1. Differential Case
2. Pinion
3. Side Gear
4. Clutch Discs and Shim
5. Lock Screw
6. Lockwasher
7. Pinion Shaft
8. Guide

SERVICE OPERATIONS

COMPLAINT DIAGNOSIS

Improper operation of the Positraction differential is generally indicated in one of two ways:

1. Improper drive when one wheel is on excessively slippery surface.
2. Excessive backlash or lost motion in the vehicle driveline.

Improper Drive With One Wheel Having Less Traction

Under some operating conditions where one rear wheel is on excessively slippery surface and the opposite wheel is on a good traction surface, it may be necessary to lightly apply the parking brake (usually three or four notches) to produce enough resistance to the spinning wheel to energize the differential clutch plates.

Energizing of the clutch plates is independent of acceleration; therefore, a very slow application of the throttle on starting is recommended to provide maximum traction by preventing "break away" of the non-slipping wheel.

The Positration units can be effectively tested for correct operation by placing one rear wheel on clean dry pavement and the other on ice, mud, grease, etc.

It can easily be determined whether or not the non-slipping wheel is providing pulling power. The procedure can then be repeated with the opposite wheel on the dry and slippery surface.

***CAUTION:** The warning posted in the vehicle cab near the jack storage area regarding operation of the unit while on a jack should not be interpreted as a means of testing. Its only intention is to point out that a possibility does exist that the differential could become energized under certain conditions and force the vehicle off the jack.*

Excessive Backlash or Lost Motion in Vehicle Driveline

Excessive lost motion or backlash in the vehicle driveline might be due to excessive backlash in the transmission, propeller shaft spline universal joint, ring gear and pinion, the axle shaft spline or the differential.

The lost motion (backlash) in the axle can be measured as follows:

1. Jack up one rear wheel.
2. Place transmission in gear or in (P) park position.
3. Measure the travel of the raised wheel on a 10″ radius from the wheel center. This total movement should not exceed 1¼″ in a new unit. (Slightly more is allowed if the unit has been in service for any length of time.) If the movement is measured on a 6″ radius, the movement should not exceed ¾″. In order to restrict the backlash to the axle only, make certain that the universal joint at the differential does not move during the check.

If the movement exceeds 1¼″, the Positraction unit may be serviced as outlined below.

DIFFERENTIAL ASSEMBLY

Disassembly

1. Remove pinion shaft lock screw (fig. 35) and remove shaft from case.
2. Rotate pinion to openings in case, hold side gears from dropping and remove pinions.
3. Remove side gears, clutch discs, shims and guides, one side at a time (fig. 36) noting location of discs, shims and guides to aid in reassembly.

Cleaning and Inspection

1. Thoroughly clean and dry all parts.
2. Check all gears for chipped or worn teeth.
3. Check spherical seat of pinions and mating seats in case.
4. Inspect case for wear or other causes of malfunctioning. Replace if damaged.
5. Check fit of differential pinion gears on shaft. Replace gears on shaft if execessively worn. Gears must be replaced in sets.
6. Inspect clutch discs and side gears for excessive wear or scoring. Replace all damaged parts.

Fig. 35—Removing Pinion Shaft Lock Screw

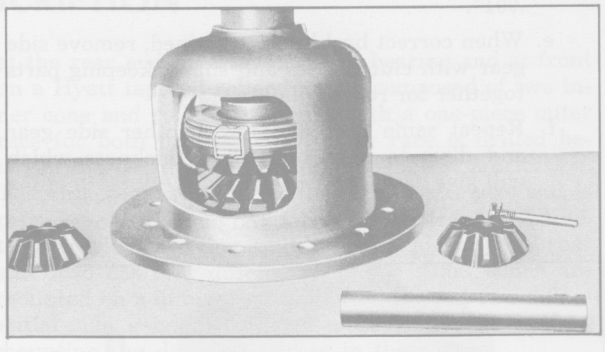

Fig. 36—Side Gear and Clutch Disc Removal

Assembly and Adjustments

1. Apply coating of lubricant to all clutch discs and stack four eared discs and three splined discs alternately on each side gear (see Figure 37). Place same shims which were removed, or equivalent amount, on the outside eared disc of each clutch stack.
2. Set pinion-to-side gear backlash as follows (fig. 38).
   a. Install one side gear, with shims and clutch discs, in the case and install pinions and pinion shaft.
   b. Compress clutch stack by inserting a screwdriver or other wedge between side gear and pinion shaft.
   c. Install micrometer with button against gear tooth as shown in Figure 38 and check backlash.
   d. If backlash is more than .006″ add shim between clutch disc and case. If backlash is less than

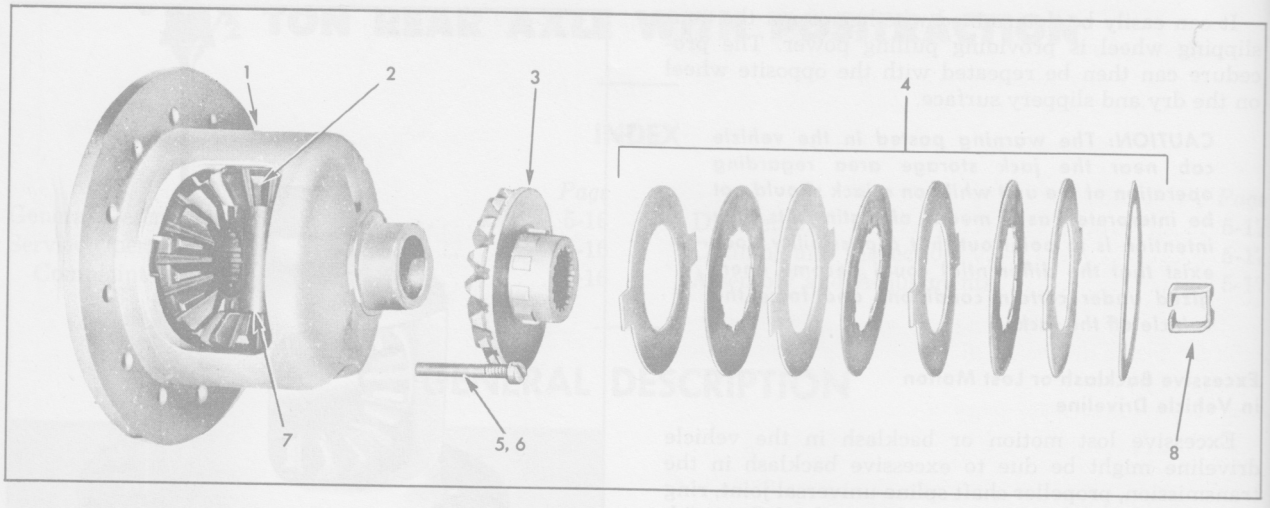

Fig. 37—Details and Relative Location of Parts

1. Differential Case
2. Pinion
3. Side Gear
4. Clutch Discs and Shim
5. Lock Screw
6. Lockwasher
7. Pinion Shaft
8. Guide

.001″ decrease shim thickness. A .002″ shim increase will decrease backlash approximately .001″.

e. When correct backlash is obtained, remove side gear with clutch discs and shims, keeping parts together for re-installation.

f. Repeat same procedures with other side gear and discs to determine shim thickness which will give .001″-.006″ backlash.

3. Apply lubricant to guides and places one over ears at each side of each clutch stack so chamfered corner of guides face away from side gear (fig. 39).

4. Install one side gear with guides, discs and shims, then position case so side gear stays in place and install side gear, guides, discs and shims in other side of case. Install pinions, pinion shaft and lock screw but do not tighten screw.

5. Check the assembly by inserting an axle shaft in one side of differential and rotating to make sure differential action is satisfactory.

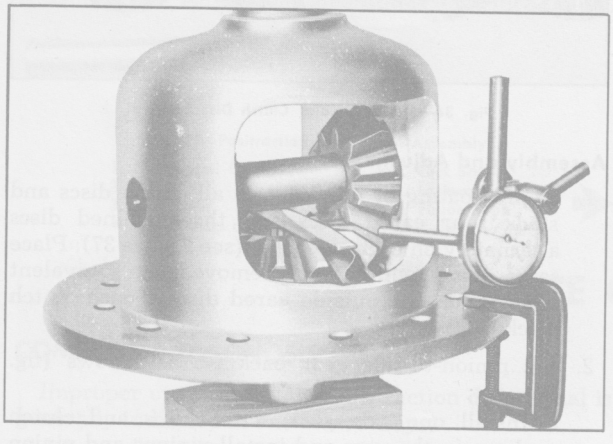

Fig. 38—Gauging Pinion-to-Side Gear Backlash

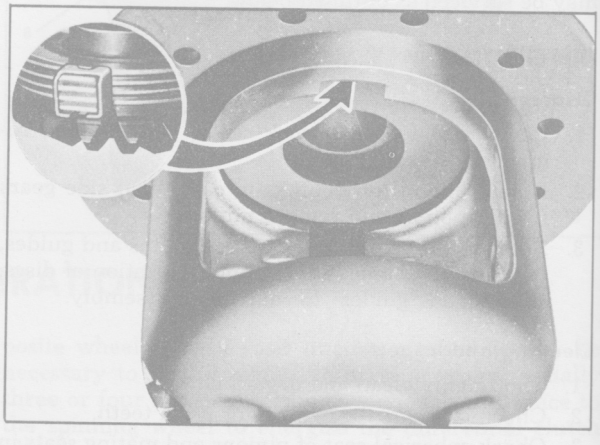

Fig. 39—Guide Positioned on Clutch Stack