SECTION G

43-44-45000 POSITIVE TRACTION DIFFERENTIAL

CONTENTS

DIVISION I

SPECIFICATIONS AND ADJUSTMENTS

NOTE: All specifications and adjustments for the Positive Traction Differential are the same as are listed in Section F for standard differential. The only exception to this is the lubricant used in the Positive Traction Differential.

40-28 LUBRICATION OF POSITIVE TRACTION DIFFERENTIAL

The lubricant level should be checked every 6,000 miles. Maintain level between the bottom of the filler plug opening and 1/4 inch below the opening by adding Special Positive Traction Lubricant or equivalent available through the Buick Parts Department. Never use any lubricant other than this special lubricant, even for adding.

DIVISION II

DESCRIPTION AND OPERATION

40-29 DESCRIPTION OF POSITIVE TRACTION DIFFERENTIAL

Buick Positive Traction Differential is optional equipment on all Buicks. It is designed to perform all the desirable functions of a conventional differential and at the same time overcome its limitations. With a conventional differential, when one wheel is on a slippery surface, its pulling power is limited by the wheel with the lowest traction. Unlike the conventional differential, with the Positive Traction device, the anti-spinning action is limited by the wheel having the best traction thus limiting the possibility of becoming stuck.

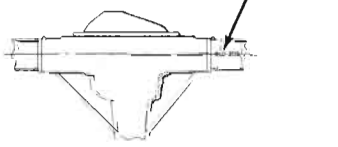
Positive Traction Differentials can be easily identified either by a stainless steel plate attached by a rear cover bolt or by an X in a circle stamped on the bottom of the right axle tube. See Figure 40-141. For flushing procedure, see paragraph 40-32.

Capacity of the differential assembly is 2-3/4 pints.

Buick Positive Traction Differential is not a fully locking type and will release before excessive driving force can be directed to one rear wheel. The safety value of this feature eliminates the possibility of dangerous steering reaction. When the rear wheels are under extremely unbalanced tractive conditions, such as having one wheel on ice and the other on dry pavement, wheel spin can occur if over-acceleration is attempted. However, even when wheel spin does occur, the major driving force is directed to the non-spinning wheel.

Another advantage of the Positive

AXLE RATIO	SERIES							
	43300, 43400, 43500, 43600, 44300 44407-17-39-67		44200 44455-65		44600		45000	
	STD. AXLE	P.T. AXLE	STD. AXLE	P.T. AXLE	STD. AXLE	P.T. AXLE	STD. AXLE	P.T. AXLE
2.56	LK	LV	—	—	—	—	—	—
2.78	LA	LN	—	—	OA	OP	NL	NY
2.93	OB	OW	MJ	MZ	OE	OX	NJ	NZ
3.08	LB	LO	—	—	—	—	NK	NT
3.23	LC	LP	MG	MT	—	—	NF	NW
3.36	LD	LR	MA	MN	LJ	LX	NG	NU
3.55	—	ON	—	MW	—	OR	—	NS
3.90	—	OO	—	MX	—	OS	—	NX
4.30	—	—	—	—	—	OT	—	—



(FIELD IDENTIFICATION)
FOR FIELD IDENTIFICATION, ALL AXLE ASSEMBLIES TO BE STAMPED WITH LETTERS 1/4" HIGH ON BOTTOM OF AXLE TUBE AS INDICATED FROM CHART. SAMPLE MARKING FOR 3.08 RATIO, (FOR 433 MODEL), DATE JULY 22, (DAY IN THE YEAR MFG'D.) WOULD BE.... STANDARD AXLES LB-203; POSITIVE TRACTION AXLES ⊗LO-203. 40-141 40-102

Figure 40-141—Identification of Positive Traction Differential

Traction Differential is that on uneven surfaces such as railroad tracks, chuck holes, etc., wheel action is not adversely affected. During power application on a conventional differential, when one wheel hits a bump and bounces clear of the road, it spins momentarily. When this rapidly spinning wheel again contacts the road, the sudden shock may cause the car to swerve. This action is also hard on tires and the entire drive train. With a Positive Traction Differential the free wheel rotates at the same speed as the wheel on the road, thereby minimizing adverse effects.

40-30 OPERATION OF POSITIVE TRACTION DIFFERENTIAL

The design of the Positive Traction Differential is basic and simple and is completely interchangeable with a conventional differential. The Positive Traction unit has coarse, spiral-threaded cone brakes installed behind the side gears. These brakes are statically spring preloaded to provide an internal resistance to the differential action within the case itself. This preload assures an adequate amount of pull when extremely low tractive conditions such as wet ice, mud or snow are encountered at one rear wheel. It also provides smooth transfer of torque when traveling over alternating tractive to non-tractive conditions at either rear wheel.

During application of torque to the axle, the initial spring loading of the cone brakes is supplemented by the gear separating forces between the side and spider gears which progressively increases the resistance in the differential. This unit is therefore an automatic throttle-sensitive device that provides greater resistance under greater torque loads. It should be remembered however, that this is not a positive lock differential and it will release before excessive driving force can be applied to one wheel.

CAUTION: When working on a car with Positive Traction Differential, never raise one rear wheel and run the engine with the transmission in gear. The driving force to the wheel on the floor could cause the car to move.

DIVISION III
SERVICE PROCEDURES

40-31 POSITIVE TRACTION DIFFERENTIAL SERVICE PROCEDURES

All differential service procedures are the same in the Positive Traction differential as in a conventional differential, except

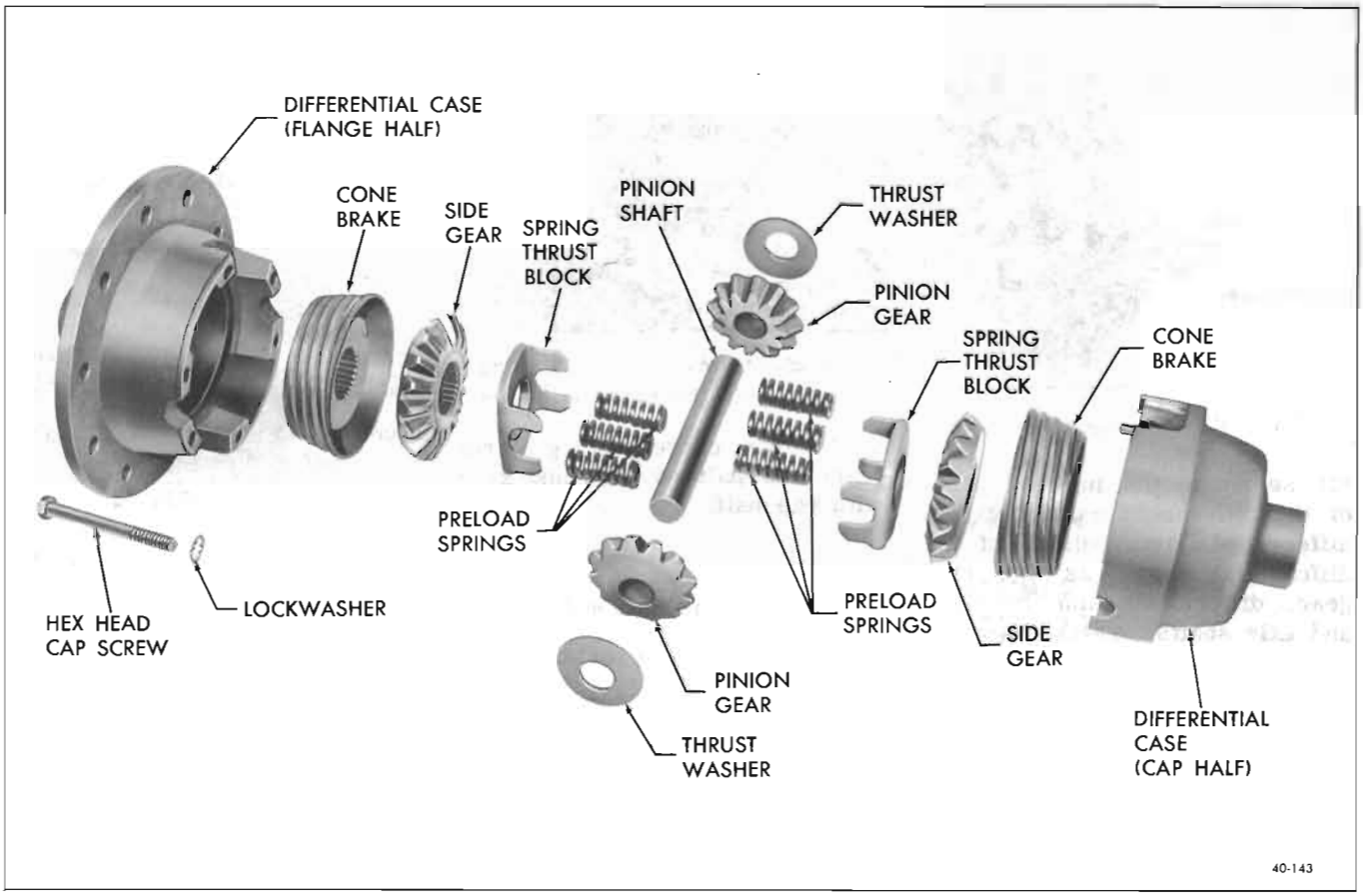


Figure 40-143—Positive Traction Differential - Exploded View

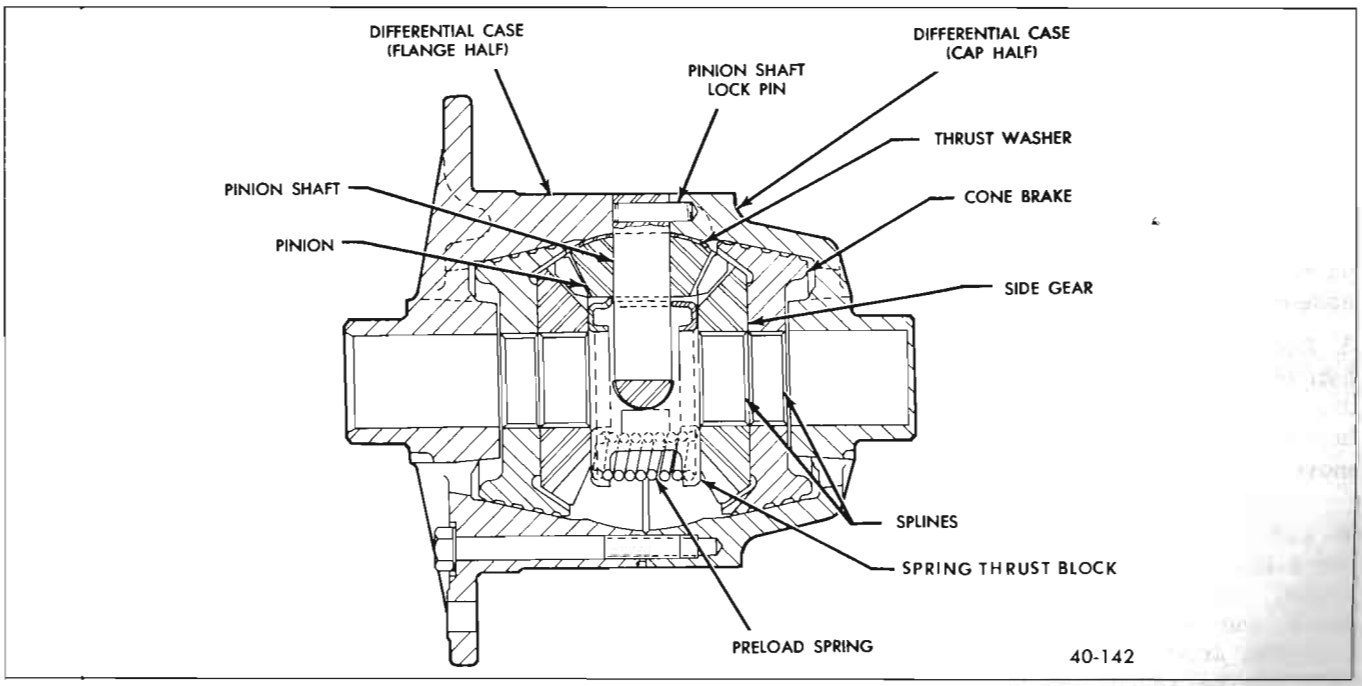


Figure 40-142—Positive Traction Differential

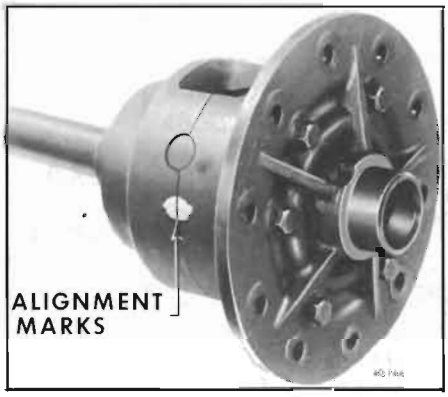


Figure 40-144—Alignment Marks

for servicing the internal parts of the differential assembly. All differential parts outside of the differential, such as the ring gear, differential side bearings and axle shafts, are the same in either differential assembly.

a. Disassembly of Differential

1. If ring gear or differential case is to be replaced, remove ring gear from case. Otherwise ring gear need not be removed.

2. If a differential side bearing is to be replaced, pull bearing outer race from case, using Remover J-2241-2 as described in Section F, paragraph 40-25 (b).

3. Clamp case assembly in a brass jawed vise by ring gear or by case flange.

4. Mark flange half of case and cover half with a center punch or paint to provide alignment for reassembly. See Figure 40-144.

5. Loosen six bolts holding cover half of case to cap half. Remove assembly from vise, place on bench with bolt heads up and remove bolts.

6. Lift flange half of case from cap half. Remove flange half, cone brake, preload springs, spring block and side gear shims if provided, from assembly so that they can be reinstalled in their original positions.

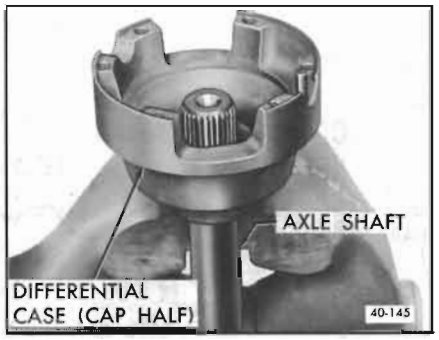


Figure 40-145—Axle Shaft & Cap Half of Differential Positioned in a Vise

7. Remove corresponding parts from cap half of case and keep with cap half.

b. Cleaning and Inspection of Parts

1. Make certain all parts are absolutely clean and dry.

2. Inspect pinion shaft, pinion and side gears, brake cone surfaces and corresponding cone seats in the case. The cone seats in the case should be smooth and free of any excessive scoring. Slight grooves or scratches indicating passage of foreign material are permissible and normal. The land surface on the heavy spirals of the male cones will duplicate the case surface condition. Replace any parts which are excessively scored, pitted or worn. Both halves of case must be replaced if one half is damaged or worn.

c. Assembly of Differential

CAUTION: When assembling the unit, use axle shafts as mounting tools to assure proper gear and cone spline alignment. Do not ignore this procedure as it will be impossible to install shafts at final assembly and attempting to force the shafts into position may result in damage to the spring thrust blocks or splines of axles, cone brake or side gear.

1. Clamp one axle shaft in a vise allowing three inches to extend

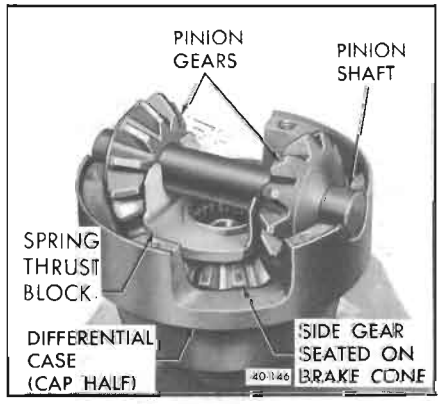


Figure 40-146—Installing Parts into Cap Half of Differential Case

above vise jaws. Then place the cap side of differential case over extended axle shaft with interior of case facing up. See Figure 40-145.

2. Install proper cone over axle shaft splines, seating it in position in cap half of case.

NOTE: Be certain that each cone is installed in proper case half because tapers and surfaces become matched and their positions should not be changed.

3. If unit was originally assembled with shims located between side gears and cones for backlash adjustment, reinstall side gear with shim so that gear may seat on shim. If unit was originally assembled without shims, reassemble the same way.

4. Place one spring thrust block in position over gear face in alignment with pinion gear shaft

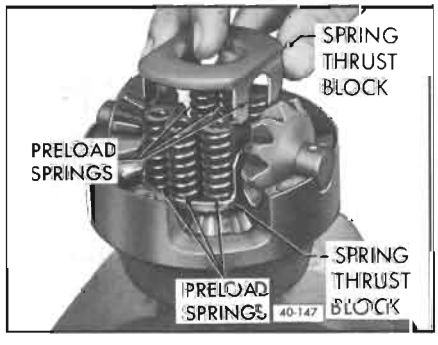


Figure 40-147—Installing Preload Springs and Second Thrust Block In Differential Case

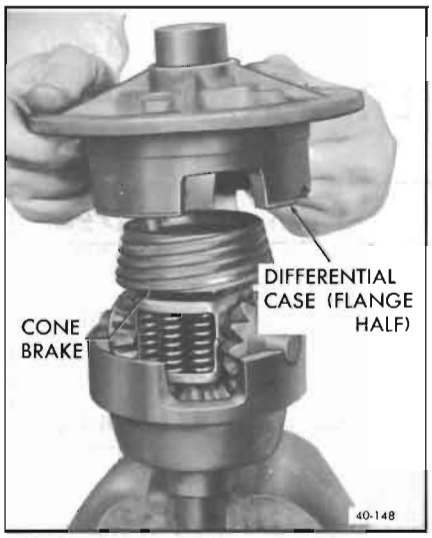


Figure 40-148—Installing Flange Half of Differential Case

grooves. Install pinion shaft, pinion gears and thrust washers into cap half of differential case in such a manner that pinion shaft retaining dowel can be inserted through pinion gear shaft into differential case. This prevents the pinion shaft from sliding out and causing damage to the carrier assembly. See Figure 40-146.

5. Place springs on spring thrust block that is already installed in case, then place second thrust block over springs. See Figure 40-147.

6. Install second side gear face down on spring thrust block so that side gear will mesh with pinion gears.

7. Place shim, if provided, and remaining cone over side gear.

8. Install flange side of differential assembly over cone in

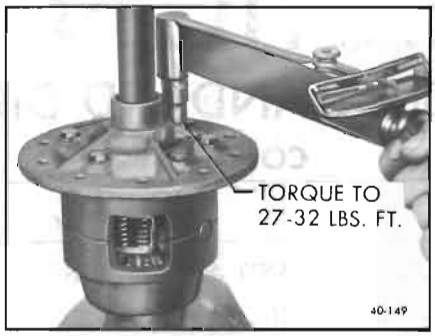


Figure 40-149—Torquing Differential Bolts

proper position to match alignment marks; insert two bolts finger tight 180° apart. See Figure 40-148.

9. Install other axle shaft through flange half of differential case rotating axle to enter cone splines and then side gear splines. Leaving the axle shaft in this position, insert remaining bolts and tighten to 27-32 lb. ft. See Figure 40-149.

40-32 POSITIVE TRACTION FLUSHING PROCEDURE

The following procedure is established for flushing the Positive Traction Differential in the event the wrong lubricant is accidentally added.

1. Drain original lubricant from differential housing.

2. Fill axle with a light, non-detergent engine oil.

3. Raise both rear wheels off floor.

4. With car properly supported, run car in "Drive" range for three to four minutes. Do not exceed 30 MPH on speedometer or accelerate or decelerate rapidly.

5. Remove oil from axle.

6. Repeat Steps 2, 3, 4 and 5. It is important that the axle be flushed two times to ensure complete removal of the original lubricant.

7. Fill differential housing with positive traction lubricant meeting Buick Spec. 723.

DIVISION IV

TROUBLE DIAGNOSIS

40-33 TESTING POSITIVE TRACTION DIFFERENTIAL

If there is a doubt that a Buick is equipped with a Positive Traction Differential, or to determine if this option is performing satisfactorily, a simple test can be performed.

1. Place transmission in neutral.

2. Raise one wheel off floor and place a block of wood in front and rear of opposite wheel.

3. Remove wheel cover and install torque wrench with extension on lug nut.

4. Disregard breakaway torque and observe only torque required to continuously turn wheel smoothly. If torque reading is less than 30 lb. ft., unit should be disassembled and repaired as required.