

# SERVICE Counselor

PACKARD MOTOR CAR COMPANY



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## Servicing the Differential

26th Series

When diagnosing rear axle complaints, extreme care should be used to be sure that the noise in question is not caused by rough rear wheel bearings, noisy muffler or tire tread, or worn universal joints. Refer to shop manual "Rear Axle Trouble Shooting Section."

Rear axle noise is generally a hum or, in severe cases, a growl. The tone of this hum or growl will usually change depending on whether the car is coasting or being driven by the engine. This noise is usually caused by rough pinion bearings or by a pinion and ring gear that are rough, improperly adjusted, or have improper tooth contact.

In cases where the noise is continuous and does not change on the pull or coast, the rear wheel bearings or tires may be the cause.

Muffler noise can usually be duplicated with the car standing still by very slowly opening and closing the throttle with a slight load on the engine.

If excessive backlash is the complaint, carefully check the condition of the universal joints before condemning the rear axle. Check the rear axle driving pinion for preload and end play and, if evident, the universal joint flange retaining nut should be checked for tightness. If loose, it may be carefully tightened and the pinion bearing preload rechecked. Avoid over-tightening.

If excessive backlash is still evident, it is no doubt due to excessive end play in the differential gears which causes excessive backlash between the differential gears and pinions.

When a rear axle is noisy on turns only, the cause is generally chipped or rough differential gears and pinions, or improper backlash between differential gears and pinions.

Noises heard on turns may also result from rough front or rear wheel bearings which might be improperly diagnosed as differential noise.

### Cleaning

Before disassembling the differential unit, the differential assembly and the *inside* of the carrier should be carefully washed with kerosene and blown dry with compressed air. (Cleaning the outside of the carrier at this time may result in dirt and grit getting into the bearings of the differential assembly.)

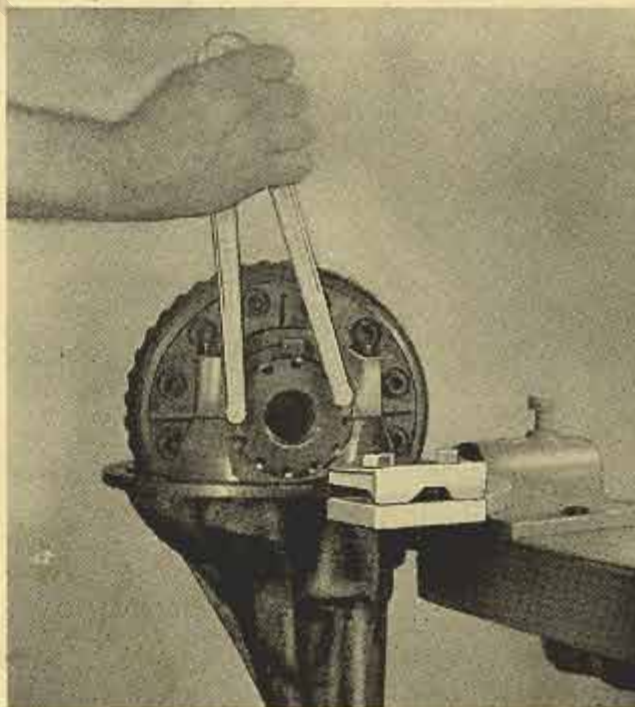


Fig. 1

### Differential Disassembly

Place the differential carrier in a differential carrier holder J-3289, Fig. 1. If broken teeth are found or if there is any evidence of chips or particles going



through the teeth, use a dial indicator against the back side of the ring gear to measure the run-out of the differential case before disassembly. Install a new differential case if the run-out exceeds .004".

Mark the carrier side bearing caps, bearing adjusting nuts, and pedestals with punch marks. These marks will indicate the bearing cap location and approximate bearing adjustment during assembly.

Remove the carrier bearing cap screws. Hold the ring gear and differential case in place with one hand, and lightly tap the bearing caps loose with a hammer. Lift off the differential case, bearings, bearing caps, adjusting nuts and caps. The bearing cap, bearing cup, and adjusting nut should be kept together until assembly. This will assist the serviceman in obtaining the approximate side-bearing adjustment during assembly.

Remove the ring gear attaching cap screws. Tap the outside of the ring gear with a soft hammer to loosen it and lift the ring gear from the differential case.



Fig. 2

Drive out the differential pinion shaft lock pin, using a pin punch and hammer, Fig. 2. Drive out the pinion shaft.

Remove the differential pinions, pinion thrust washers, axle shaft thrust block, differential side gears and thrust washers.

While holding the universal joint flange in a vise, remove the flange nut using socket wrench J-5512. Using a soft hammer, drive the universal joint flange off of the pinion shaft.

Drive out the pinion, sleeve and rear bearing using a soft hammer. Be careful that the pinion gear does not strike the base of the carrier pedestal. Drive out the front pinion bearing and pinion oil seal using a soft driver.

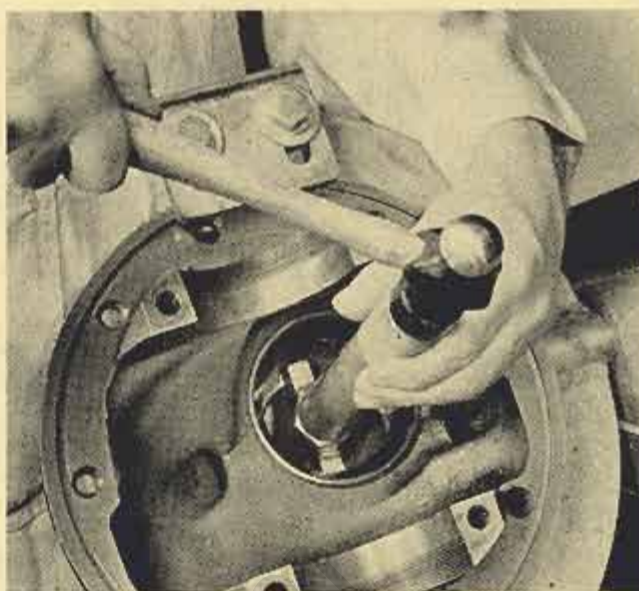


Fig. 3

Drive out the front pinion bearing cup using remover J-3235A and driver handle J-872-5 as shown in Fig. 3. Drive out the rear pinion bearing cup using remover J-5521 and driver handle J-872-5 as shown in Fig. 4.

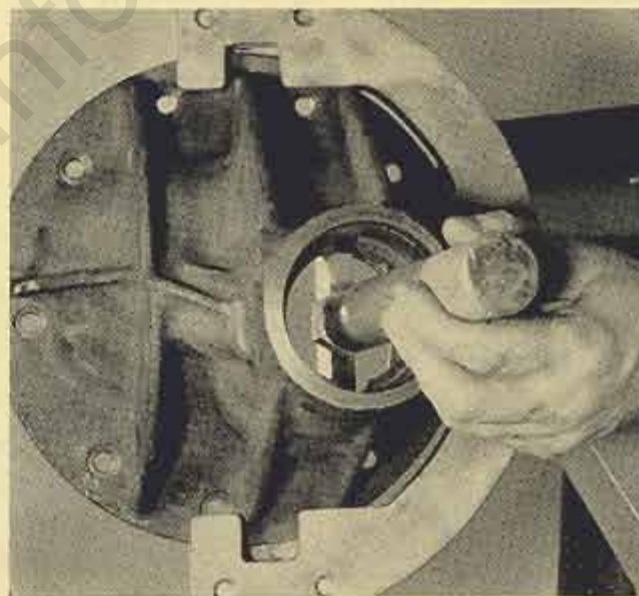


Fig. 4

#### *Cleaning and Inspection*

Clean the differential case and all of the parts thoroughly.

Inspect all gears for wear, scores, pits, chips or improper tooth contact. Inspect the thrust surfaces of the differential pinions and side gears for scores or wear.

Note: The ring gear and pinion are matched and must be replaced as a pair if either part requires replacement.

Check the fit of the universal joint flange splines on the pinion splines. They should have a snug sliding fit.





Fig. 13

With cup grease, coat the differential pinion thrust washers and stick them to the outer (thrust) end of the pinions. Place the pinions in mesh with the side gears opposite each other and rotate the side gears with the pinions until the bores of the pinions line up with the pin bore in the differential case, Fig. 13.

Start the pinion pin into the differential case so the lockpin hole will align with the lockpin hole in the case. As the pinion pin is pushed into the case, install the thrust block. Push the pinion pin all the way in until the lockpin hole registers with the lockpin hole in the case.

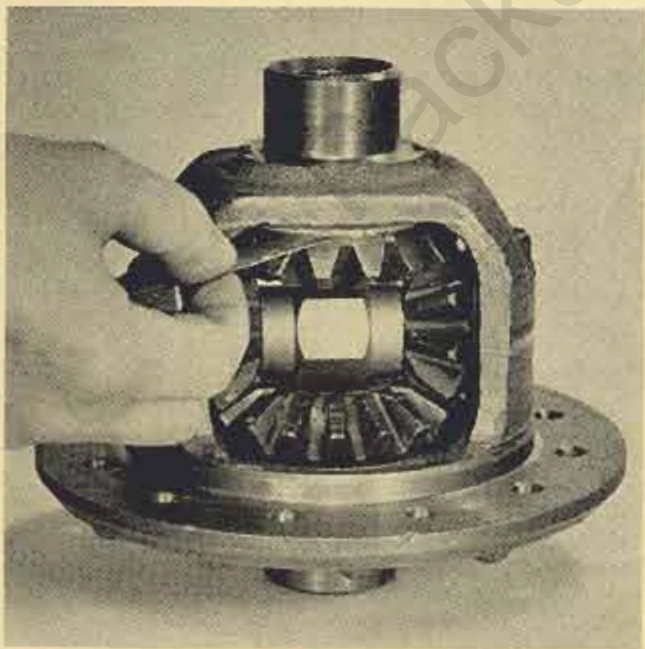


Fig. 14

Measure the end play of each side gear using a feeler gauge, Fig. 14. The end play should be  $.0015''$

to  $.003''$ . If the end play is not within these limits, it will be necessary to remove the side gear thrust washers, and replace them with thrust washers of the correct thickness. The side gear thrust washers are available in  $.031$  inch,  $.036$  inch,  $.041$  inch and  $.046$  inch thickness. When proper end play is obtained and the pinion pin is installed, drive in the lockpin and stake the edge of the lockpin hole in the case.

Install the ring gear on the differential case; after making sure that the back face of the ring gear and the mating face of the differential case flange are free from dirt and burrs. Install the ring gear cap screws and tighten evenly. Torque tighten to 50 to 55 foot pounds.

Lubricate the differential side bearings and place the bearing cups on the bearings.

Place the differential case assembly into the carrier, install the side bearing adjusting nuts in place and turn the adjusting nuts a few turns to be sure they are in the threads properly. Install the bearing caps so that the cap screw holes line up with the carrier, install and tighten the cap screws tight enough to hold the adjusting nuts in place, but still permit them to be turned so that the gear lash and bearing preload can be adjusted.

Temporarily adjust the ring gear to pinion lash to approximately  $.010$  inch.

The differential side bearing preload is determined by measuring the spread of the carrier pedestals, using a large outside caliper and a  $.010''$  feeler gauge.

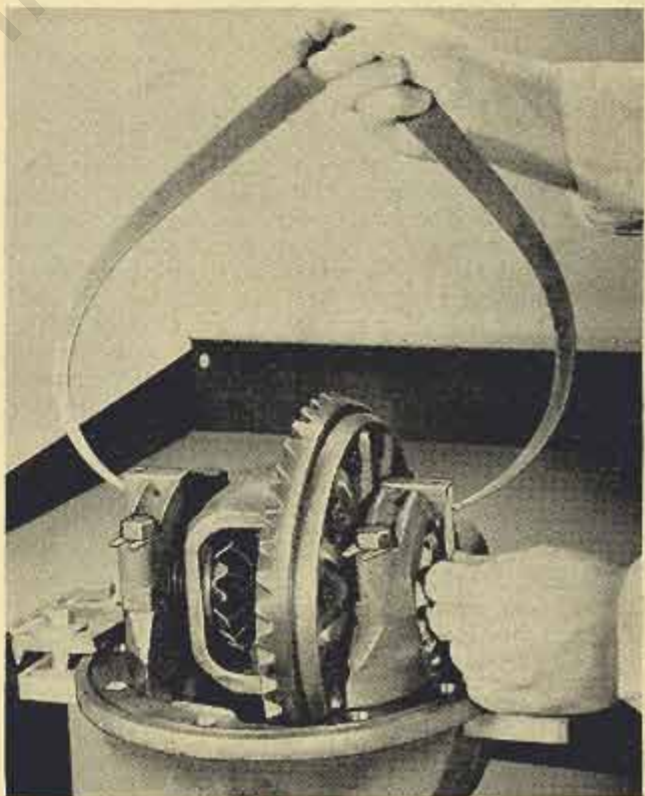


Fig. 15

Back off the side bearing adjusting nut on the ring gear side one full turn so that a little end play can be felt in the differential case. Place the caliper and a



.010" feeler gauge on the pedestals as shown in Fig. 15, adjust the caliper so that its jaws contact the feeler gauge and the opposite boss as shown. Lock the caliper so its adjustment will not be disturbed.

Tighten the side bearing adjusting nut on the ring gear side the full turn that it was previously backed off. Tighten the side bearing adjusting nut opposite from the ring gear side until the caliper jaws will just contact both cap bosses without the feeler gauge.

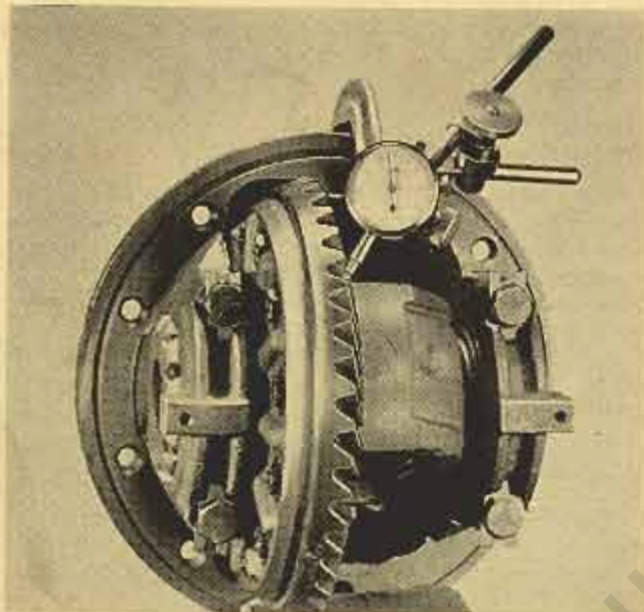


Fig. 16

The ring gear to pinion lash may be measured by mounting a dial indicator, Fig. 16, on the carrier flange, with the indicator plunger against a ring gear tooth. The ring gear to pinion lash should be .004 to .008 inch. The lash may be reduced by moving the ring gear nearer the pinion, or may be increased by moving the ring gear away from the pinion. Movement of the ring gear may be obtained by turning both side bearing adjusting nuts the same amount in the same direction, without disturbing the side bearing preload. The adjusting nuts may be turned using the differential side bearing adjuster J-3232 as shown in Fig. 1.

Note: Tightening one adjusting nut one notch and loosening the other one notch will change the gear lash approximately .004".

Tighten the side bearing cap bolts, recheck gear lash, bend over the lock plates and install the side bearing adjusting nut cotter pins.

Install a new carrier sealing ring holding it in place with heavy fibre grease, install the plastic seals on the carrier studs and install the carrier in the axle housing and tighten all the carrier nuts.

Early rear axles with two pedestal set screws—torque tighten the pedestal set screws to 2 foot pounds (24 in. lbs.). Set screws *must* be held with an Allen wrench to prevent overtightening while tightening the lock nuts.

Late rear axles with one pedestal set screw—torque tighten the one pedestal set screw 2 to 3 foot pounds (25 to 35 in. lbs.). Set screw *must* be held with an Allen wrench to prevent overtightening while tightening the lock nut.

## Shock Absorbers and Spring Data

### 26th Series

#### FRONT SPRINGS

Body	Trans.	Part No.	Load & Rate
2692-95-97-62-65	Std. & O.D.	446570	1950 x 90
2692-95-97-62-65	Ultra.	446442	2040 x 90
2677	Std. & O.D.	446442	2040 x 90
2679-78-72	Std. & O.D.	446443	2120 x 90
2677	Ultra.	446443	2120 x 90
2679-78-72	Ultra.	446444	2200 x 90
2652	Ultra.	446447	2280 x 90
2650-51	Std., O.D. & Ultra.	387552	2450 x 120
2613-Amb. & Hearse	Std., O.D. & Ultra.	395726	2900 x 172
2633-Amb. & Hearse	Std., & O.D.	446208	2180 x 121
2633-Amb. & Hearse	Ultra.	387866	2250 x 120

#### REAR SPRINGS

2692-95-97-62-65	Std., O.D. & Ultra.	446571	950 x 110
2677	Std., O.D. & Ultra.	446014	990 x 110
2679	Std., O.D. & Ultra.	446079	1040 x 110
2678-72	Std., O.D. & Ultra.	446327	1090 x 110
2652	Ultra.	446327	1090 x 110
2650-51	Std., O.D. & Ultra.	446192	1500 x 155
2613-Ambulance	Std., O.D. & Ultra.	443828	1600 x 225
Hearse (End Loader)	Std., O.D. & Ultra.	443828	1600 x 225
Hearse (3 way)	Std., O.D. & Ultra.	418352	
		Left	2100 x 225
		418351	
		Right	2000 x 225
2633-Amb. & Hearse	Std., O.D. & Ultra.	446192	1500 x 155

#### CONTINENTAL TIRE CARRIER

##### REAR SPRINGS

2692-95-97-62-65	446014	990 x 110
2677	446079	1040 x 110
2679	446327	1090 x 110

#### SHOCK ABSORBERS

##### FRONT

Body	Part No.	Color Identification
2692-95-97-62-65-77-79-}	446233	Plain
78-72-52	446233	Plain
2633	446235	Plain
2613	446361	Plain
2650-51	446361	Plain

##### Rear

2692-95-97-62-65	446239	Plain
2677-79-78	446238	Blue
2672-52	446349	White
2613	446240	Plain
2633	446241	Plain
2650-51	446362	Plain

## Carburetor Choke Setting Changed "WCFB" Carburetor

### 26th Series

The choke setting on the "WCFB 985S" model carburetor has been changed to on the index mark instead of 1½ points rich. This new setting reduces the possibility of flooding the engine during cold starts.

Please make this change in your Service Counselors, Vol. 26, No. 11, November, 1952 "Mechanical Specifications and Adjustments," Vol. 27, No. 1, January, 1953, "WCFB Carburetor Model 985S."