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TO BE NOTED AND INITIALED BY	

PACKARD MOTOR CAR COMPANY

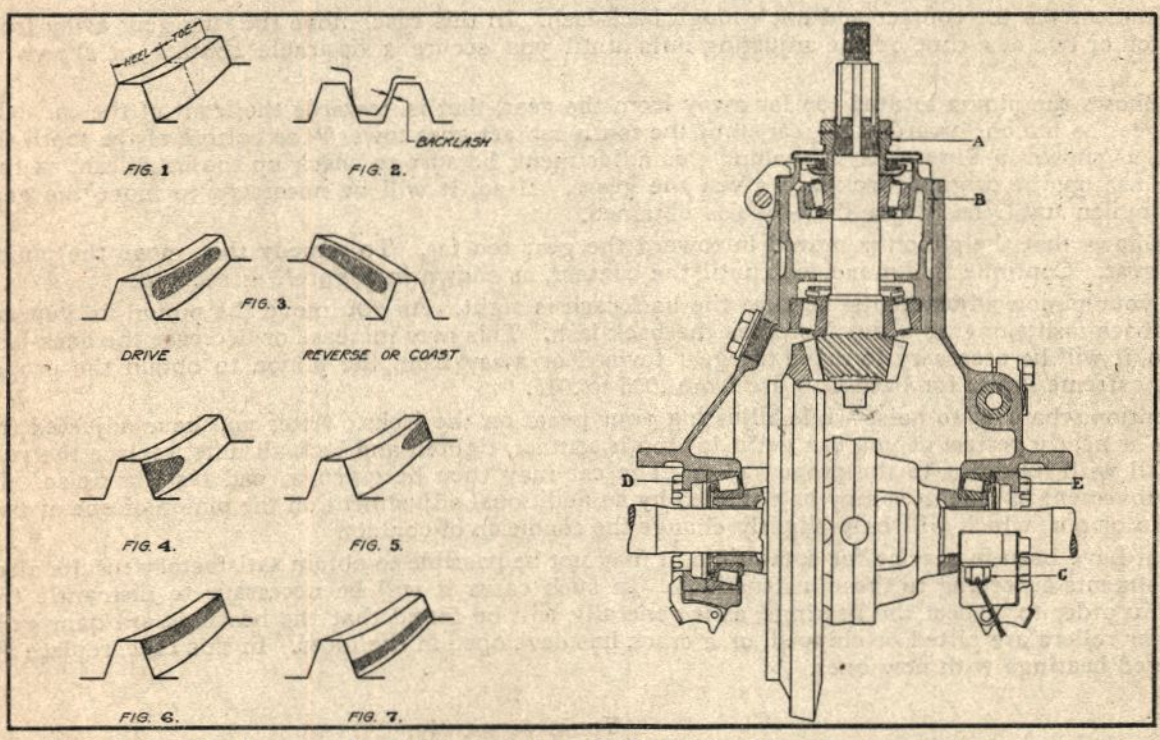
DETROIT, MICHIGAN

October 3, 1922

TO PACKARD DISTRIBUTERS

SUBJECT

REAR AXLE ADJUSTMENT—SINGLE-SIX



To obtain the best possible service with the Single-Six rear axle, it is absolutely necessary that all bearings and gears be properly mounted and adjusted. Good results cannot be expected unless these instructions are carefully followed.

It will be necessary to become familiar with terms used in naming the different parts of the tooth, referring to:

Figure 1—The large end of the tooth is called the "heel," and the small end the "toe."

Figure 2—Shows the back-lash between the teeth of the pinion and the ring gear. Normal back-lash should be from .006 to .012, but if the adjustments are made to obtain the contacts given in the following figures, the extreme limits of back-lash may be from .005 to .015.

The first step is to jack up both wheels, and after removing the rear cover plate, thoroughly clean the gears. The best way to do this is by using a stiff brush and kerosene or gasoline (be sure to keep gasoline away from an open flame). It is necessary at this point, to carefully examine the washings from the housing for dirt or grit, and if any is found, it is possible that the bearings or gears are damaged. The whole unit should then be dismantled and thoroughly cleaned and examined.

Before making any gear adjustments, make absolutely sure that the pinion bearings and mountings are assembled with no end play. After these bearings have been in service, it is probable that end play has developed in the pinion shaft. In order to remedy this, the nut "A" at the forward end of the pinion housing should be tightened until all end play is removed, taking care, however, that it is not drawn too tight to cause the bearings to bind.

Also, see that the differential bearings are properly mounted and adjusted to have no end play, and that the four bearing cap holding down nuts "C" are drawn up tightly.

The next step it to adjust the pinion and gear. To adjust the pinion, turn the sleeve "B." To adjust the gear, turn the nuts "D" and "E," loosening first the nut "E" a couple of notches, then taking up the play with nut "D" in moving the gear toward the pinion. In moving the gear away from the pinion, nut "D" should be loosened first, and the play taken up by tightening nut "E." No adjustment should be made, however, until the proper moves have been determined by the procedure following:

Paint the working faces of the gear teeth with a mixture of powdered red lead and common machine oil, the consistency being such that it will not run when painted on a vertical surface.

Start the engine, shift the transmission into high and open throttle to five miles per hour and apply the brakes until speed is reduced to four miles per hour, making the engine pull for about ten seconds, then shift into reverse and repeat, stop the engine, look at the gears. After looking at the gears, you will find a condition of tooth contact as shown by one of the figures from 3 to 7, in which case you will proceed according to instructions given for the condition you meet.

Figure 3—Illustrates an ideal condition of tooth contact in the Single-Six combination. A central and practically full length tooth contact is always good, and from that to a three-quarter length contact is satisfactory. Slight variations from such contacts may be usable.

Figure 4—Indicates that you have a heel contact, and also shows that you may have too much back-lash. In order to remedy this condition, move the ring gear toward the pinion a notch or two at a time on the adjusting nuts, painting the teeth again as before. Keep adjusting in this way until you bring your tooth contact as near as possible to that shown in Figure 3.

Figure 5—Indicates a toe contact and not enough back-lash. In this case, move the ring gear away from the pinion a notch or two at a time on the adjusting nuts until you secure a desirable contact as shown in Figure 3.

Figure 6—Shows the pinion located too far away from the gear, that is, towards the front of the car. To remedy this, move the pinion towards the gear until the tooth contact goes toward the bottom of the tooth the desired amount, as shown in Figure 3. In making this adjustment, be sure to check up the back-lash, as this movement may use up the original back-lash given the gears. If so, it will be necessary to move the gear away from the pinion until the proper back-lash is obtained.

Figure 7—Shows that the pinion is moved in toward the gear too far. To remedy this, move the pinion away from the gear. Continue this movement until the contact, as shown in Figure 3 is secured.

In making your pinion adjustments, be sure the back-lash is right. As you move the pinion in, you are eliminating the back-lash; moving it out increases the back-lash. This may increase or decrease the back-lash too much. If so, it will be necessary to move the gear toward or away from the pinion to obtain the proper back-lash. The extreme limits for back-lash are from .005 to .015.

Pay no attention whatever to noise while adjusting your gears on the jacks. After you have adjusted the gear so that it is as nearly perfect as you can get it for tooth contact, tighten and lock all nuts, replace the rear end cover and fill with lubricant to the proper level. The car may then be given a road test for noise. In some cases, improvement in quietness may be obtained by an additional adjustment on the pinion of one or two notches, either in or out, which will only slightly change the condition of contact.

For cars that have been in service for some time, it may not be possible to obtain satisfactory results after making all adjustments according to these instructions. In such cases it will be necessary to dismantle the differential unit in order to inspect the bearings, as it generally will be found that the bearings are damaged; either the races or rollers are pitted or chipped, or a crack has developed in the races. In this case, replace all worn and damaged bearings with new ones.

Yours very truly,

PACKARD MOTOR CAR COMPANY.

H. N. Davock.

H. N. Davock,
Manager Technical Service Department.

NOTE:—We have found that in spite of the caution contained in Technical Letter No. 1729, many of our distributers are still ascribing to the gears or bearings, noise which is actually caused by the tires.

Tire noise is most noticeable at the lower speeds, and is apt to be pronounced in turning a corner. It exists on both drive and coast and has the same pitch for a given car speed, whether the car is coasting or picking up.

In order to identify the noise definitely, plain tread tires may be mounted on the rear wheels.

P. M. C. CO.