Technical Letter No. 1838

REFER TO THIS LETTER BY NUMBER

TO BE NOTED AND INITIALED BY	

PACKARD MOTOR CAR COMPANY

DETROIT MICHIGAN

January 29, 1927.

To: Packard Distributers and Dealers.

Subject: Steering Adjustments.

Gentlemen:

There are several conditions which may develop in the steering which will affect its operation and these conditions will first be defined so there may be no uncertainity as to what is meant.

Whip: This is the jerking movement in the steering wheel set up by inequalities in the road. It is irregular and occurs only when the wheels travel over an uneven surface.

Shimmy: This refers to the violent side to side movement of the front wheels, which causes a corresponding movement in the steering wheel. It may occur on a level road.

Tramp: This is the alternate up and down movement of the front wheels. It does not immediately affect the steering wheel and usually is first noticed by a shaking of the radiator.

Wander: The steering normally tends to travel in a straight line, and the term "wander" is used when the steering veers to one side or the other and must continually be corrected in order to keep the car straight.

Regardless of which of the above conditions is experienced, the first step to take is to see that all adjustments are made as accurately as possible, because if sufficient care is exercised in making the adjustments the steering will be satisfactory. Particular attention should in all cases be paid to making sure that there is no undue looseness either in the steering connections, the wheel bearings, spring clips, spring shackle mountings or shock absorber mountings. The tires of course, must be fully inflated, because all steering disturbance will be found to be more severe if the tires are soft.

The items listed above have been repeated so often that we hesitate to mention them again, and yet failure to correct a steering trouble is almost always due to the fact that the mechanic doing the work fails to give the proper attention to one or more of these adjustments.

It is not possible to eliminate all the whip or road shock in the steering wheel and still have a smooth acting mechanism. If an endeavor were made to eliminate all whip the result would be that the steering would either be so stiff that it would be objectionable or else the ratio of the gear would have to be increased to a point where it would be too slow for safety. Many customers refer to whip as shimmy, and in case of any steering complaint the first step should always be to determine exactly the condition which the customer has in mind. If a Packard steering is in standard condition the amount of whip will not be unpleasant and it should be made clear to the owner that we do not intend to attempt its entire elimination. Excessive whip is usually caused simply by loose connections.

Shimmy is usually due almost entirely to loose connections or low tire pressures, but it will be aggravated if the caster effect of the steering knuckle pins has been changed. In some cases the amount of caster has been altered by uninformed mechanics using wedges under the front springs, which seriously disturb the result. It is very dangerous to tamper with the caster of the knuckle pins, and, if the front springs are standard, the caster will be correct unless the front axle has been bent in an accident.

Steering tramp is usually a high speed disturbance and is caused by an unbalanced condition in the front wheels. In many cases the driver does not realize that the wheels are tramping until the tramp has developed into a shimmy, but close observation will usually indicate the condition, particularly on the Six, by the movement of the radiator. The obvious remedy is to eliminate the out-of-balance condition as nearly as possible.

There are two rotating masses to balance, one consisting of the hub and brake drum and the other consisting of the wheel and tire. Each will be out of balance to a certain extent, and the remedy lies in mounting the wheel on the hub in such a way that the heavy side of one offsets the heavy side of the other.

The first thing to do is to locate the heavy side of the brake drum. This can best be done by mounting a dummy steering knuckle spindle in a vise and mounting the hub on this spindle, lubricating the roller bearings with light cylinder oil in order that they shall be perfectly free. It is not possible to balance the drum on the front axle because of the resistance of the brakes and of the heavy grease in the bearings.

After you have mounted the brake drum on the dummy spindle so that it turns freely, use putty in order to locate the heavy side of the drum. After the drum has been temporarily balanced with putty you are then ready to locate the heavy side of the wheel and tire assembly.

Mount the wheel and tire on the balanced drum and determine the heavy side by the use of putty. You have now found the heavy side of the drum and the heavy side of the tire. These points should be marked and all putty should then be removed and the parts mounted on the front axle so that the two heavy sides offset each other.

Tires are now being balanced by the manufacturers and a red mark is placed on the side of the casing at its lightest point. Where casings are marked in this way the inner tube should be installed with the valve located at the red mark.

When the above procedure has been followed the out-of-balance condition will be reduced to such an extent that it can easily be controlled. The spring mountings must be tight, the stabilators must be properly adjusted and the tires must be inflated to a minimum of forty pounds. In the case of the Six the installation of the crankcase brace, described in Technical Letter # 1832, will be found to be of material assistance, because the crankcase then tends to stiffen the frame, and the stiffer frame, acting through the springs and shock absorbers, reduces the tramping action.

Steering wander will exist if the caster of the steering knuckle pins is changed. Wander may also be caused by unequal tire pressures, unequal wheel bearing adjustments or shock absorber adjustments, or by the fact that one of the front springs is stronger than the other. It may also be due to a damaged condition of the steering knuckle bearings. In some cases a slight amount of wheel tramp may develop an uncertainty in the steering which will cause it to be harder to control.

In closing, we wish to emphasize that in most cases steering disturbances are simply a matter of proper adjustment and that special non-standard corrective measures are not only unnecessary but are often very dangerous.

Yours very truly,

PACKARD MOTOR CAR COMPANY

H. N. Davock.

H. N. DAVOCK,
General Service Manager.

HND:CN