SERVICE MANUAL

SECTION XVIII

WHEELS

Packard Motor Car Company
Detroit 32, Michigan

INDEX

SECTION XVIII
WHEELS AND TIRES

Description

The new, carefully balanced, demountable, drop center, disc-type wheels incorporate a safety feature in the form of a raised ridge, or section, between the rim flange and the drop center of the wheel rim. This ridge tends to keep the tire bead tightly against the rim flange, even in case of a sudden deflation of the tire.

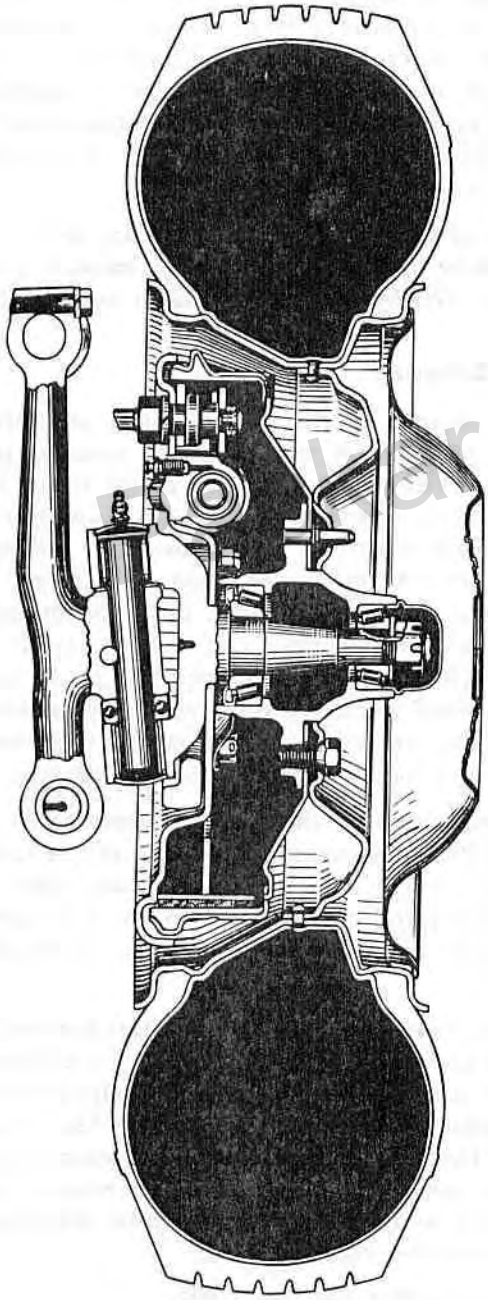

Figure 1—Cross Section of the Front Wheel

When inflating the tires, the air pressure within the tube snaps the bead over the ridge and holds it tightly against the rim flange. When removing the tire from the rim, additional force is required to push the tire bead over the ridge into the drop center. This can be accomplished by using the car jack under the bumper.

The "200" wheels have three raised lugs for attaching the hub shell cover. The spring tension of the beaded edge of the hub shell cover holds it firmly in position when it is pressed over the evenly spaced lugs. The "300" and Patrician "400" disc-type hub shell cover has eight evenly spaced flanged edges which grip the step of the wheel rim with a *"clawlike"* effect to hold it in position. All the hub shell covers can be removed by prying them off with a screwdriver, and they may be installed by bumping them into position with the palm of the hand, or by using a rubber mallet.

Tightening Wheel Attaching Cap Screws

Whenever the wheel is installed on the hub, it is important that the attaching cap screws be securely and evenly tightened before driving the car. When installing the wheel, tighten the cap screws evenly and snugly while the tire is off the ground. Lower the jack and torque tighten the cap screws to 85 to 95 foot pounds. Install the hub shell cover.

Tire Removal and Installation

With the wheel and tire removed from the car, remove the valve core (valve inside), and deflate the tube completely. Using a tire tool, force the bead of the tire down into the wheel rim drop center, all around the rim. Turn the wheel over and force the other bead into the wheel rim drop center.

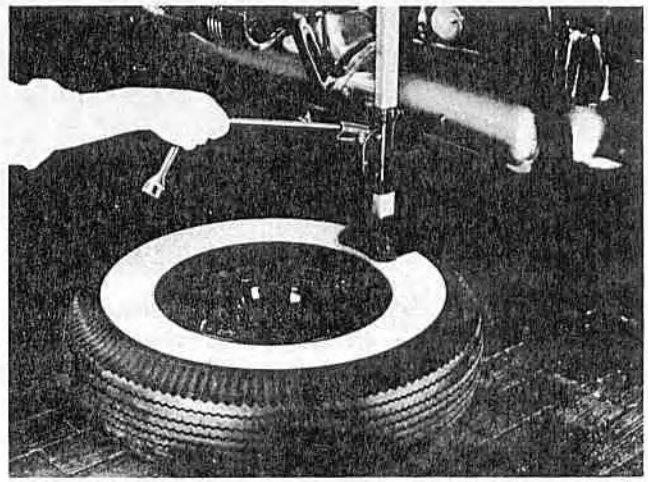

Figure 2—Using the Car Bumper Jack to Force the Tire Bead Over the Ridge

On wheels with safety rims, the bead may be forced down by placing the wheel on the floor beneath the car bumper and using the bumper jack provided in the car tool kit. Place the jack between the bumper and the tire, and operate it to force the bead over the rim ridge. Turn the wheel over and repeat the operation on the inside bead.

Holding the outer bead down in the drop center at one point, pry up the bead, approximately 180° from where the bead is held down over the rim edge, using the tire tool. Pry up the balance of the bead of the tire over the rim edge using the tire tool. Pry off the bead on the opposite side of the tire using the tire tool. Remove the tire and tube from the wheel.

To install the tire and the tube, lay the wheel flat on the floor with the valve opening up. Start to install the tire with the valve pointing toward the valve opening in the wheel rim. Install the first bead by pushing a portion of it into the drop center and working the balance of the bead over the rim flange, using a tire tool.

Spread the tire and insert the valve stem through the opening in the rim. A valve holding tool may be used to prevent the valve from slipping out of the opening. Force a portion of the outer bead (opposite the valve) down into the wheel drop center, using a tire tool, and work the remainder of the bead over the rim flange, alternating from left to right to prevent the tire from creeping on the rim.

Figure 3—Installing the Tire on the Wheel

Be sure the beads are out of the drop center in position to seat against the rim flange when the tire is inflated. Pull the valve out as far as possible, and inflate the tube until both beads are seated properly. When the tire is in place, the centering ribs will show evenly around the rim flange.

Remove the valve core and deflate completely to allow the tube to locate its position properly and to prevent pinching the tube under the beads. Install the valve core and inflate the tube to the recommended pressure.

Note: It is recommended to inflate the tube slightly to maintain its shape when installing the tire. The valve should line up with the balance mark on the tire sidewall. Liquid vegetable soap may be applied to the tire beads to facilitate installation of the tire.

Tire Care

Maintaining proper tire pressures has a great effect on tire life and the riding of the car, as well as the action of the brakes and steering. Tires are subject to wear, and because of road conditions and driving habits tend to wear unevenly. In order to maintain uniform and even tire wear, it is recommended to cross-switch the tires to reverse their rotation, at intervals of approximately 5,000 miles.

Because of the normal wear of the tire itself, it is impossible to preserve proper wheel balance; therefore, it is advisable to balance wheels every 10,000 miles.

Wheel Balance

Proper balance of the wheels, tires, and brake drums is important in providing safe steering, prolonging tire life, preventing wheel tramp, shake, and shimmy, and preventing excessive wear of the steering parts, which is caused by wheel vibrations. Although correct front suspension alignment is necessary for easy steering and long tire life, the cause of faulty steering and car vibrations can often be traced to improper wheel and tire assembly balance. In most cases, abnormal wheel vibrations can be corrected by balancing the tire and wheel as a unit, both *statically* (still balance) and *dynamically* (running balance).

Static balance in a wheel and tire assembly is the equal distribution of weight around the axis or center of rotation. A wheel that is out of balance statically has a tendency to bounce up and down. This condition is often called "*wheel tramp*" or "*high speed shimmy.*"

Dynamic balance of a wheel is the equal distribution of weight on both sides of the vertical center line of the wheel. A wheel that is dynamically out of balance has a tendency to "wobble" and causes "low speed shimmy." Dynamic unbalance can easily result in early failure of wheel bearings, excessive wear of the knuckle pins and bushings, and excessive wheel fight or shaking of the steering wheel.

Balancing a Wheel Statically

Although the use of a wheel balancing machine greatly facilitates the operation, the wheels and tires

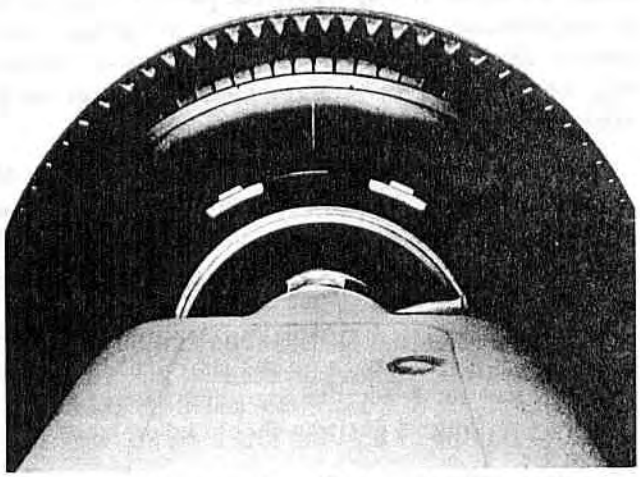

Figure 4—Weights Installed on the Wheel Rim to Balance the Wheel Statically

may be statically balanced on the steering knuckle spindle of the car. To statically balance a wheel on the spindle, remove the wheel and hub and remove the oil seal and grease from the bearings. Lubricate the bearings with engine oil and install the wheel, hub, and bearings *but omit the oil seal.* Adjust the wheel bearings so there is no drag on the bearings. Be sure the brakes are fully released and not dragging.

Rotate the wheel and allow it to stop. It will come to rest with the heavy part of the wheel and tire assembly at the bottom. Install two external balance weights directly opposite the heavy part of the wheel. Rotate the wheel again and allow it to stop. Gradually move the two balance weights apart or add additional weights, until the wheel will stop in any position without any tendency of rotating of its own accord.

The same procedure is followed when balancing the tire, wheel, and hub assembly on a balancing machine or fixture. Follow the instructions furnished by the balancing machine manufacturer.

Balancing a Wheel Dynamically

After balancing a wheel statically, special balancing equipment or a wheel balancing machine is required to determine the amount of dynamic out-of-balance, and where the correct amount of weight is to be added to the rim flange to put the wheel in dynamic balance without disturbing the static balance. Do not attempt to balance a wheel dynamically until it is *known* that the wheel is *in balance statically.*

Correct dynamic balance of a wheel and tire assembly is obtained by determining the heavy point on the wheel while the assembly is rotated rapidly. One-half of the required balancing weight is attached to the rim flange on the other side of the wheel, directly opposite the heavy point; and the remaining one-half of the required weight is attached diagonally across, *or 180° around the rim flange and on the opposite side of the rim,* from the first-one half dynamic balancing weight installed. By dividing and installing the required weight in this manner, it is possible to balance a wheel dynamically without disturbing the static balance of the wheel and tire assembly.

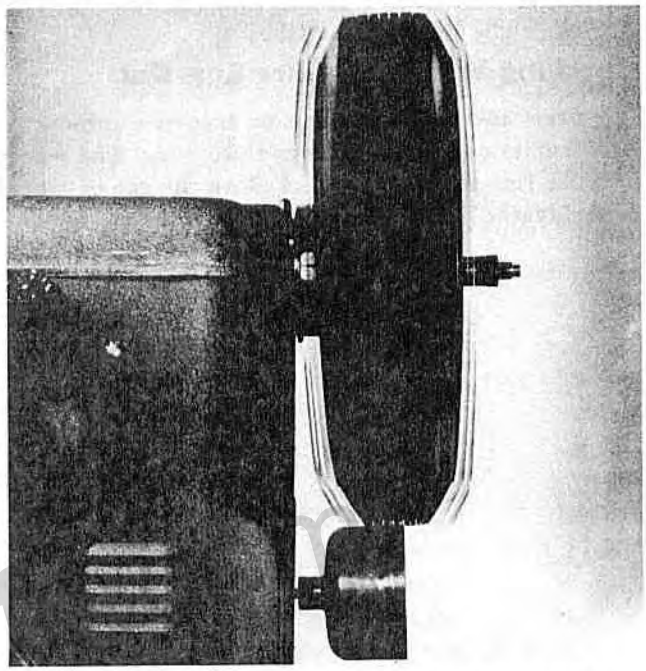

Figure 5—Rotating Wheel Rapidly to Determine Heavy Point to Correct Dynamic Balance

Remove the tire, wheel, and hub assembly from the balancing machine. Lubricate the wheel bearings, and pack the wheel hub with proper lubricant. Install the oil seal. Install the wheel and hub, and adjust the wheel bearings correctly. Install the spindle nut cotter pin, hub dust cap, and wheel hub shell cover.

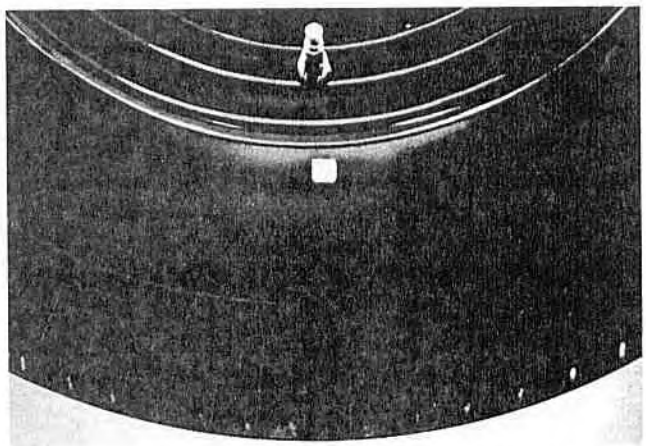

Figure 6—Proper Location of the Tire Balance Mark

Balancing the Rear Wheels

Rear wheels that are out of balance statically may

cause a tramp, shake, or vibration of the car when driving at high road speeds. Although dynamic balance affects the rear wheels less (since they rotate around a fixed axis), it is recommended that when rear wheels are balanced, that they be balanced dynamically as well as statically. The procedure for balancing rear wheels is the same as for the front wheels, using a balancing machine.

Checking Wheel and Tire Run-Out

Wheels and tires that have an excessive run-out or eccentricity will cause excessive tire wear. The wheel and tire run-out may be checked on the car or wheel straightening fixture using a pointer. Raise the car and rotate the wheel slowly. Move the pointer to the side of the rim and measure the amount of run-out. The run-out should not exceed 1/16 inch. Excessive run-out may be corrected by straightening the wheel on a straightening machine.

Measure the eccentricity of the tire at the center of the tread. Measure the run-out at the center of the tire tread. The eccentricity should not exceed 1/16 inch, and run-out should not exceed 1/8 inch. If the wheel and rim are known to be true, tire run-out and eccentricity can often be corrected by deflating the tire and working it to another position on the rim. A tire that has excessive run-out or eccentricity which cannot be corrected by shifting its position should be replaced with a new tire.