WHEELS & TIRES • • • • • SECTION 12

CONTENTS

GENERAL DESCRIPTION

The low pressure tires used on Henry J vehicles are mounted on fifteen inch diameter drop center rims which attach to the wheel hubs with five wheel bolts. The front hubs are mounted on two opposed tapered roller bearings on each steering knuckle. Rear hubs are keyed directly onto the rear axle shafts and supported by tapered roller bearings in the ends of the axle housing. The wheel discs have four slots for individual tire chains.

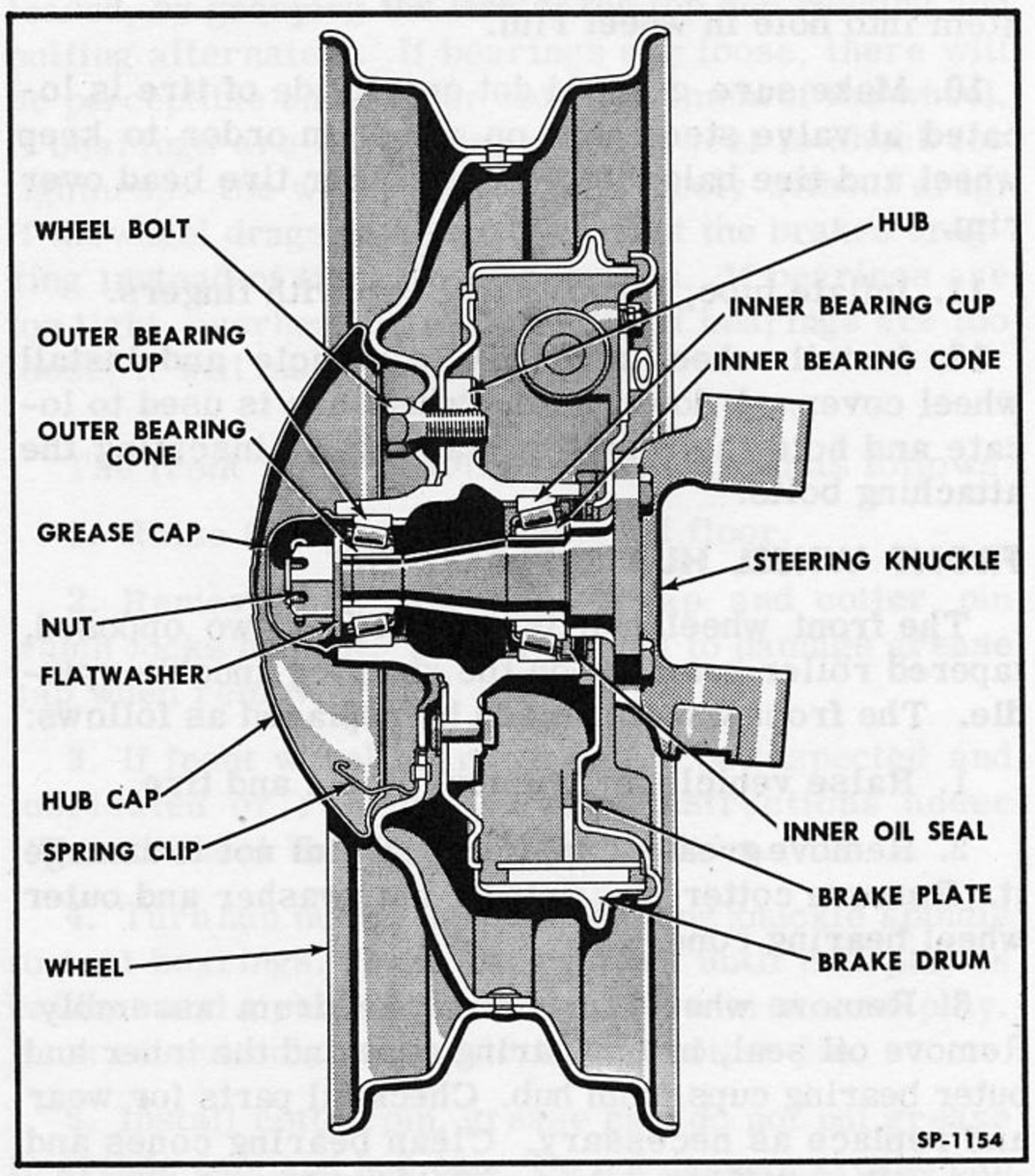

Fig. 212—Sectional View of Front Wheel and Hub—Installed

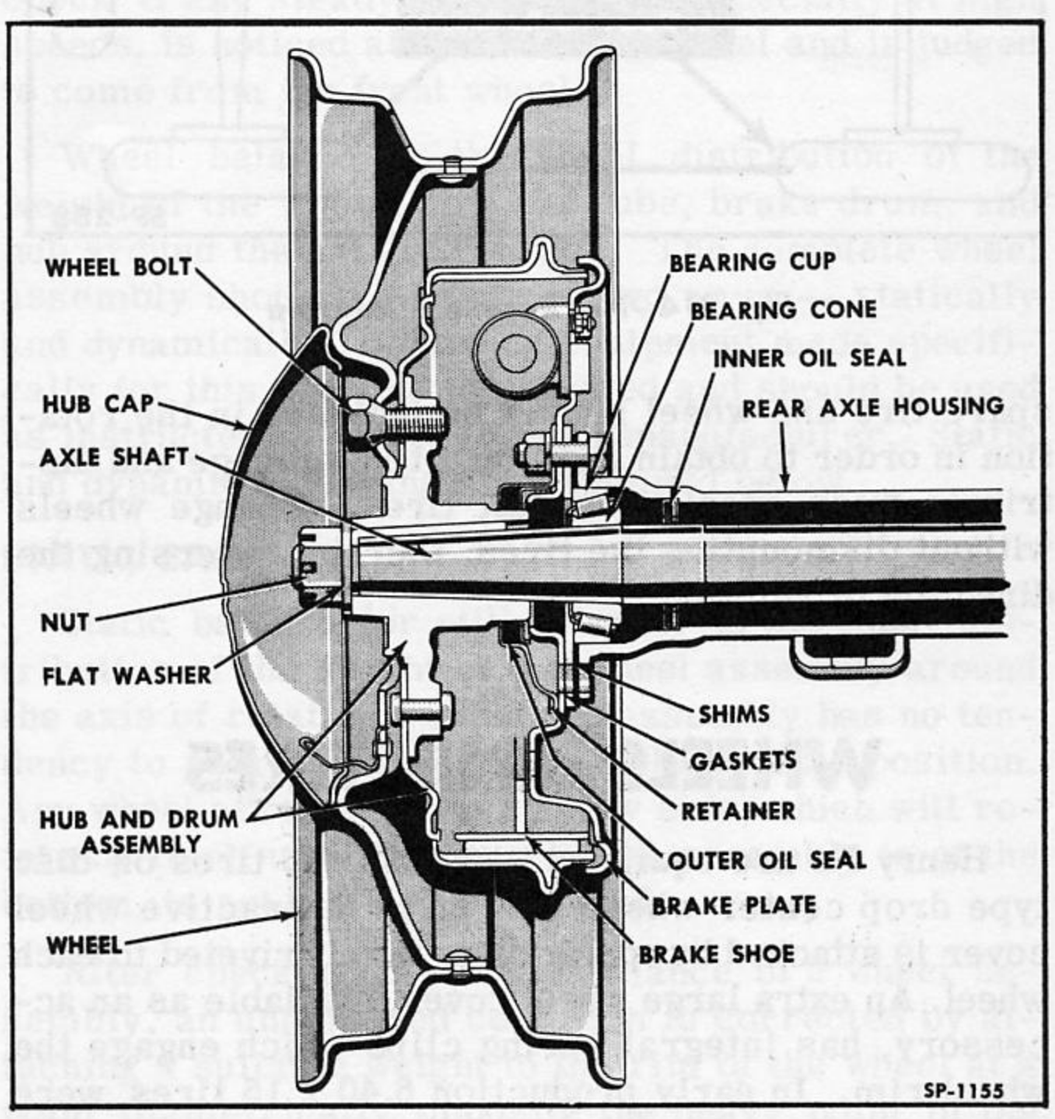

Fig. 213—Sectional View of Rear Wheel and Hub—Installed

TIRE MAINTENANCE

Tires should be inspected regularly to prevent abnormal tire wear and to assure economical and safe operation. Tire inflation should be checked once a week. The proper inflation with cold tires is 24 pounds in front wheels and 20 pounds in rear wheels. Tire pressure increases when the tires are hot, therefore always check pressure before the vehicle is driven any length of time.

Valve caps should always be installed finger tight on all valve stems to prevent possible air leakage through the valves. The valve core should be replaced when air leakage is noted.

Tires should also be inspected periodically for abnormal wear, cuts, bruises, etc. Refer to "Tire Wear" in this section for causes and remedies of abnormal wear. Normal wear of the tires is different for each wheel. This wear can be reduced to a minimum by periodic rotation or switching of wheels at 5,000 mile intervals as indicated in Fig. 214. The

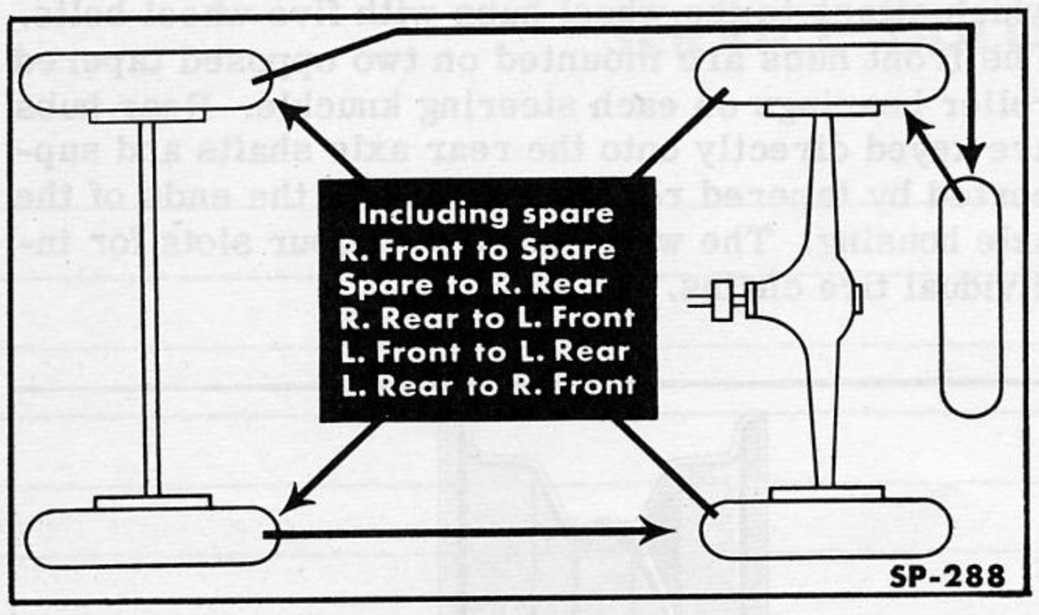

Fig. 214—Tire Rotation Diagram

spare tire and wheel should be included in the rotation in order to obtain additional tire mileage and distribute wear evenly over all tires. Change wheels without dismounting the tires, thereby reversing the direction of rotation.

WHEELS AND TIRES

Henry J's are equipped with 5.90 x 15 tires on disc type drop center wheels. A large, attractive wheel cover is attached by spring clips firmly riveted to each wheel. An extra large wheel cover, available as an accessory, has integral spring clips which engage the wheel rim. In early production 6.40 x 15 tires were installed on a few vehicles. The wheels and tires are mounted to wheel hubs with five bolts.

WHEEL AND TIRE REPAIR

When it is necessary to repair the wheel, tire or tube, the complete wheel and tire must be removed from the vehicle first. Proceed as follows:

1. Raise vehicle on hoist or set hand brake and jack up wheel to be removed.

2. Remove wheel cover.

3. Remove wheel bolts attaching wheel to hub and remove wheel and tire. NOTE: ALL WHEEL BOLTS HAVE RIGHT HAND THREADS.

4. Completely deflate tire. Valve core can be removed from valve stem to deflate tire quickly.

5. Loosen tire beads from wheel rim and place wheel flat on floor, outside up.

6. Work outer tire bead over edge of wheel rim, using suitable tire irons or a universal tire changer.

7. Remove tube from inside tire and work inner bead of tire over edge of wheel rim. Make necessary repairs to tube, tire or wheel.

8. To aid in installation, apply a small amount of liquid vegetable oil soap on outside of tube and on tire beads.

9. Install inner tire bead over wheel rim, place tube inside tire, inflate tube slightly and insert valve stem into hole in wheel rim.

10. Make sure colored dot on outside of tire is located at valve stem hole on wheel in order to keep wheel and tire balanced. Press outer tire bead over rim.

11. Inflate tube, install valve cap with fingers.

12. Install wheel and tire to vehicle and install wheel cover. A dowel on the wheel hub is used to locate and hold the wheel in place while inserting the attaching bolts.

FRONT WHEEL HUB REPLACEMENT

The front wheel hub is mounted on two opposed, tapered roller bearings on the steering knuckle spindle. The front wheel hub can be replaced as follows:

1. Raise vehicle and remove wheel and tire.

2. Remove grease cap, being careful not to damage it. Remove cotter pin, spindle nut, washer and outer wheel bearing cone.

3. Remove wheel hub and brake drum assembly. Remove oil seal, inner bearing cone and the inner and outer bearing cups from hub. Check all parts for wear and replace as necessary. Clean bearing cones and cups with a stiff brush in a suitable solvent to remove all old lubricant.

4. Pack bearings with lubricant as specified in Section 17, "Lubrication."

5. Press bearing cups in wheel hub so they bottom securely against shoulder in hub. Install inner bearing cone and new oil seal (if old seal was damaged) to wheel hub. Make sure oil seal is installed with lip toward the bearing.

6. Install wheel hub assembly to steering knuckle spindle, being careful not to damage oil seal.

7. Place outer bearing cone, washer and nut on end of spindle. Leave cotter pin and grease cap off until bearing is adjusted. Do not damage grease cap when installing.

8. Install wheel and tire to wheel hub.

9. Check and adjust front wheel bearings as described below.

FRONT WHEEL BEARING ADJUSTMENT

The front wheel bearings are adjustable and should be checked periodically. Every 10,000 miles, when wheel bearings are lubricated, the adjustment will also be made.

Check for end-play of the wheel on the steering knuckle with front wheels jacked up and brakes released, by grasping the tire at the top and pushing and pulling alternately. If bearings are loose, there will be perceptible end-play or side movement of the wheel. If bearings are not loose, rotate wheel to check for tightness—the wheel should turn freely without drag. If the wheel drags make sure it is not the brakes dragging instead of tight wheel bearings. If bearings are too tight, overheating will result. If bearings are too loose, it will cause pounding.

The front wheel bearings are adjusted as follows:

1. Raise front end of vehicle off floor.

2. Remove hub cap, grease cap and cotter pin which locks hub nut. Be careful not to damage grease cap when removing it.

3. If front wheel bearings are to be inspected and lubricated or replaced, follow instructions under "Front Wheel Hub Replacement" above.

4. Turn hub nut up tight on steering knuckle spindle to seat bearings. Then back off nut until end-play is evident and tighten again until there is no end-play. Back off nut only enough to install cotter pin.

5. Install cotter pin, grease cap (do not put grease in grease cap) and hub cap. Do not damage grease cap when installing.

REAR WHEEL HUB REPLACEMENT

The rear wheel hub is keyed to the end of the axle shaft which is supported by tapered roller bearings in the end of the axle housing. These bearings require periodic lubrication as specified in Section 17, "Lubrication."

The rear wheel hub can be replaced as follows:

1. Raise vehicle off floor, remove hub cap and remove wheel and tire.

2. Remove cotter pin, nut and washer from rear axle shaft.

3. Remove wheel hub and brake drum assembly using Rear Wheel Hub Puller C-319. Remove wheel hub to axle shaft key.

4. To install, reverse this procedure.

WHEEL AND TIRE BALANCING

New tires and tubes are marked for assembly so the heavy part of the tube at the valve stem will be partially counterbalanced by a light portion of the tire. The tire and tube should be balanced, together with the wheel, brake drum and hub after mounting the tire. A wheel assembly can lose its original balance due to uneven tread wear, tube and tire repairs, etc. It is desirable, therefore, to check the balance of any wheel assembly before installing the assembly in service. Wheel balance should be one of the first items to check if any steady disturbance, especially at high speeds, is noticed at the steering wheel and is judged to come from the front wheels.

Wheel balance is the equal distribution of the weight of the wheel, tire and tube, brake drum, and hub around the axis of rotation. The complete wheel assembly should be balanced two ways — statically and dynamically. Balancing equipment made specifically for this purpose is required and should be used as instructed by the equipment manufacturer. Static and dynamic balancing are explained below.

STATIC BALANCE

Static balance (or still balance) is the equal distribution of the weight of the wheel assembly around the axis of rotation so that the assembly has no tendency to rotate by itself, regardless of its position. Any wheel assembly with a heavy side, which will rotate by itself until this part of the assembly is at the bottom, is not statically balanced.

After checking the static balance of a wheel assembly, an unbalanced condition is corrected by attaching a suitable weight to the rim of the wheel at a point diametrically opposite the heavy point of the wheel assembly.

A wheel which is not statically balanced causes an up and down hopping or pounding action. The greater the unbalanced weight or the greater the speed the more pronounced the condition becomes and steering stability is affected accordingly.

DYNAMIC BALANCE

Dynamic balance (or running balance) is the even distribution of the total weight of the wheel assembly both around the axis of rotation (static balance) and in relation to the centerline of the wheel. A wheel can be in static balance and not be balanced dynamically but a wheel in dynamic balance has to be in static balance.

If the weight of the wheel is unevenly distributed in relation to the centerline of the wheel, centrifugal force will throw the wheel out of line first in one direction and then in the opposite as the wheel rotates 180 degrees, causing wheel shimmy or wobble. Such a wheel is not dynamically bala ced.

To correct the condition, weight must be added so the total weight is evenly distributed in relation to both the axis of rotation and the centerline of the wheel.

The principles of wheel balance are illustrated in Fig. 215. The wheel in view A is in static balance. The sections indicated by numerals 1 and 4 are equal in weight. Sections 2 and 3 are also equal in weight but heavier than sections 1 and 4. This wheel is not dynamically balanced. As the wheel rotates, the centerline of weight mass, indicated in view B, is pulled by centrifugal force toward a right angle to the axis of rotation, the force being directed as shown by the arrows. The force tends to move the wheel, distorting the centerline of the wheel and, at the same time, the axis of rotation.

When the wheel rotates 180 degrees, the forces caused by heavy sections 2 and 3 reverse and tend to move the centerline of the wheel in the opposite direction. In other words, the wheel wobbles or shimmies as shown in view C. To correct this condition weight must be added to sections 1 and 4 so they will be equal to the weights of sections 2 and 3. This addition of weight distributes the total weight evenly about the axis of rotation and the centerline of the wheel as shown in view D. Now the wheel is both statically and dynamically balanced.

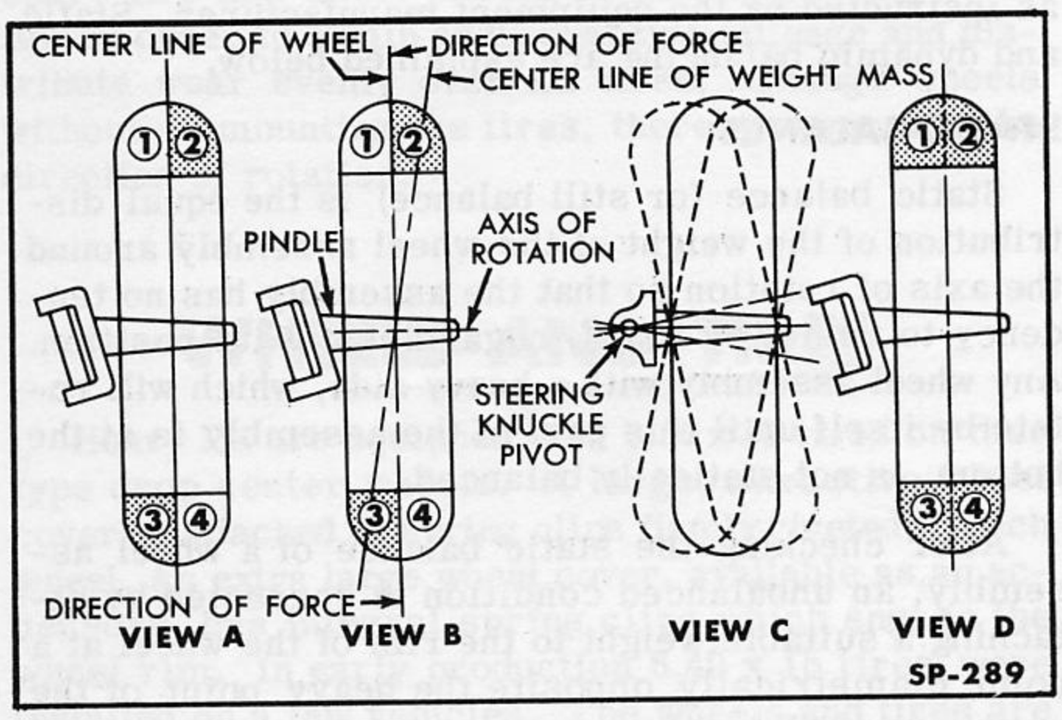

Fig. 215—Wheel Balance Diagram

TIRE WEAR

Tire wear can be held to a minimum by careful driving, proper adjustment of the front suspension, proper tire inflation and periodic wheel rotation.

Driving habits have a very important bearing on tire wear. A careful driver will obtain much more service from tires than a careless driver. Fast acceleration, sudden severe brake application, turning corners and rounding curves too fast or sharply, and straight high speed driving will all contribute to increased and uneven tire wear. The type of roads, the prevailing temperatures, the number of hills, the number of traffic lights, the amount of rain and snow, etc. all have an effect on tire wear.

When abnormal tire wear is evident, the way the tire tread is worn will, in many cases, give a clue as to the cause of the wear. The following paragraphs describe several types of wear, the possible causes and the remedies.

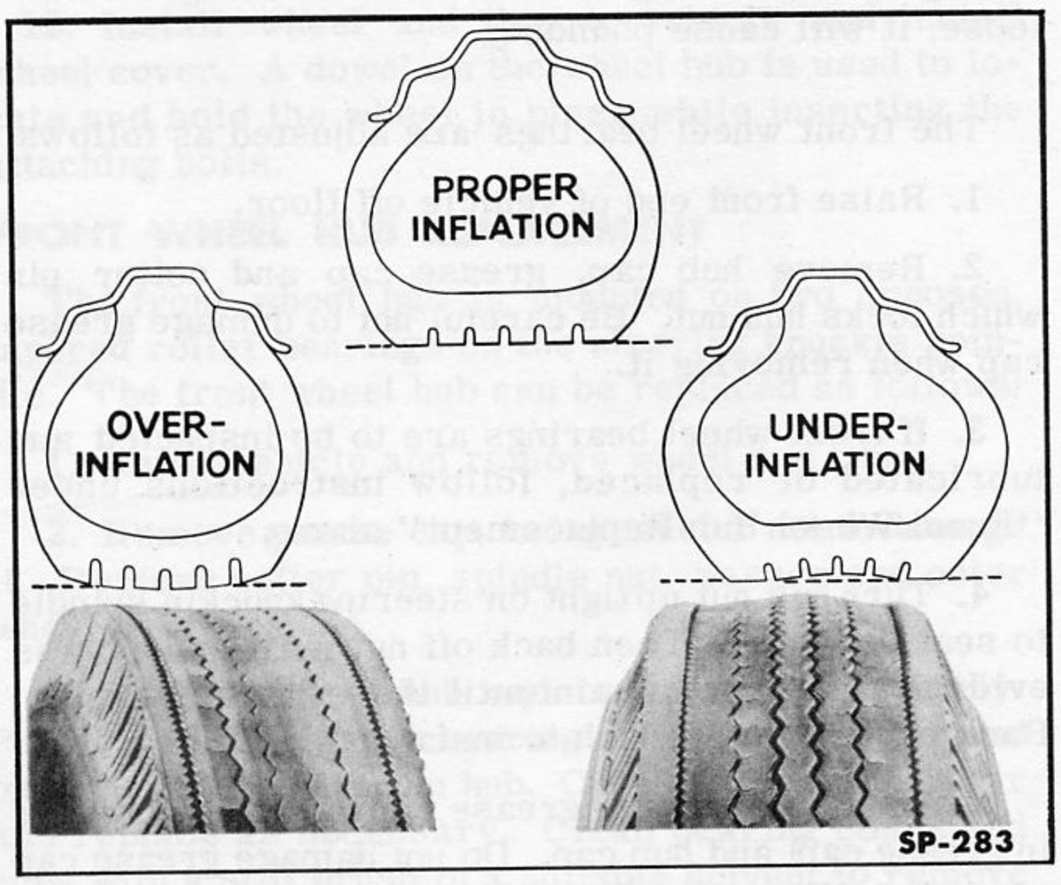

Fig. 216—Effect of Inflation on Tire Tread Wear

IMPROPER TIRE INFLATION

Over-inflation or under-inflation of tire will cause premature tread wear. Wear occurs at the point of contact, under-inflation causing wear at the sides of the tread, over-inflation causing wear at the center of the tread (Fig. 216). Proper inflation will assure uniform wear of the full tread. Under-inflation also results in damage to the sidewalls of the tire, caused by increased flexing and resultant heat. Over-inflation strains the fabric structure in the tire so it cannot absorb road shock and makes the tire susceptible to bruises and breaks.

SIDE OR CAMBER WEAR

There are several causes for tires wearing more rapidly on one side of the tread than on the other. Wheel camber, either positive or negative, makes the tire run at a slight angle to the road surface and, if camber is excessive due to improper adjustment, it will cause faster wear on one side of the tread (Fig. 217). If the wheel has excessive negative camber, tread on the inside of the tire will be worn, if camber is excessively positive the outside will be worn.

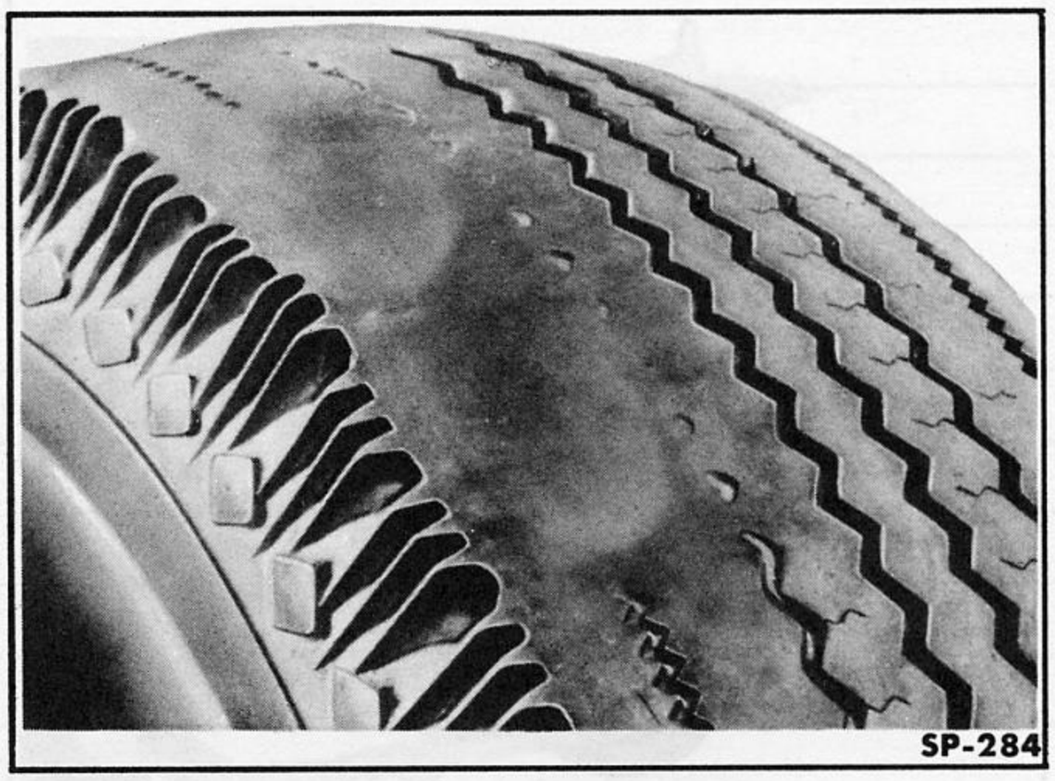

Fig. 217—Side or Camber Wear of Tire Tread

Continual driving on high crowned roads will cause side wear on one side of the right front tire. Side thrust when turning also causes side wear.

Where side wear occurs the front wheel camber should be checked as described in Section 8, "Chassis Suspension."

HEEL AND TOE WEAR

Heel and toe wear results in a saw-tooth effect with one end of each tread block worn more than the other. The end which first grips the road when the brakes are applied wears the most (Fig. 218). High

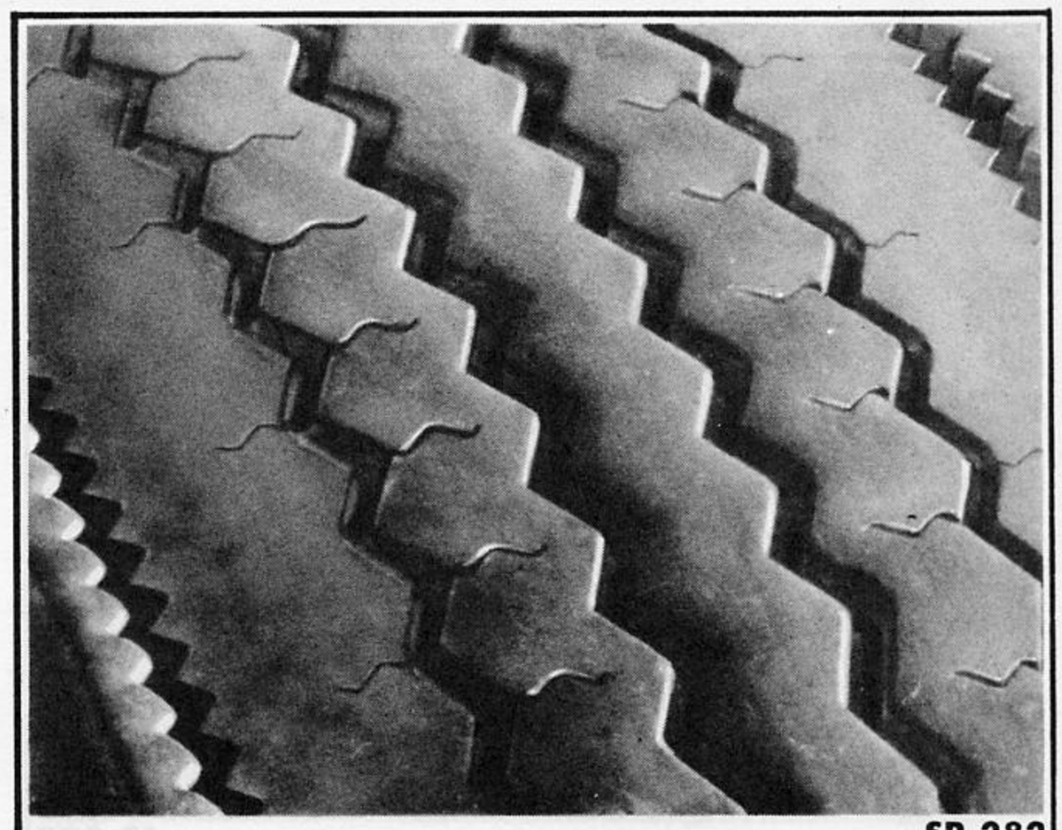

Fig. 218—Heel and Toe Wear of Tire Tread

speed driving and excessive use of the brakes will cause this type of irregular tire wear and it occurs on any type of tread design.

Heel and toe wear is not so prevalent on rear tires because the driving action of the rear wheels produce a counter-action, wearing the opposite end of the tread block. This results in wear which is more even than on the front tires.

In addition to correcting driving habits, wheels should be rotated periodically to counteract heel and toe wear.

TOE-IN AND TOE-OUT WEAR

When front wheels toe-in or toe-out excessively, the tires drag at an angle to the direction of vehicle movement as they rotate, causing cross wear of the tire. This wear is usually distinguished by a feather edge of rubber on one side of the tread blocks (Fig. 219).

If the feather edge is toward the inside of the tread on both tires, too much toe-in is indicated. Toe-out is indicated when the feather edge is toward the outside of the tread on both tires.

If only one front tire shows toe-in wear and the other tire is worn to indicate toe-out, the toe-out on turns adjustment is off. In either case, correct as necessary by making adjustments according to procedure in Section 8, "Chassis Suspension."

CORNERING WEAR

This is a diagonal cross type wear caused by high speed driving on curves and turning corners where the tire slips or skips on the road (Fig. 220). Independent suspension of present day automobiles per-

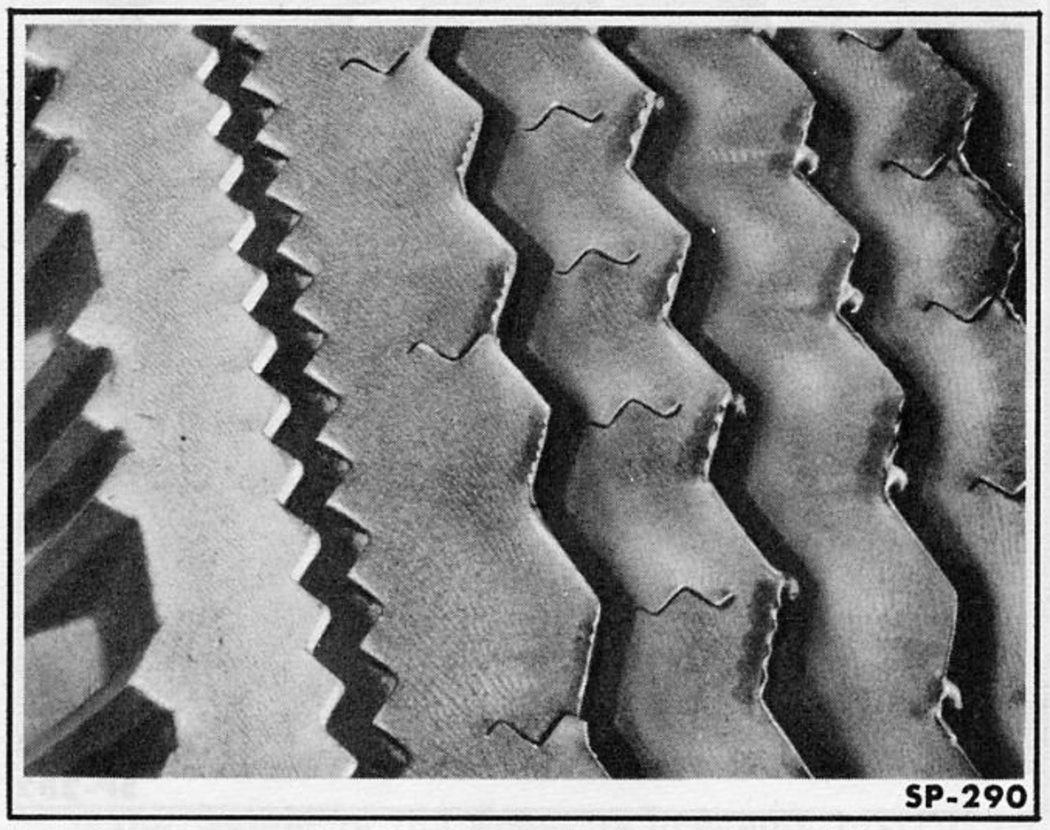

Fig. 219—Toe-In and Toe-Out Wear of Tire Tread

mits turning curves at a high rate of speed with safety and this has been responsible for an increase in this type of wear.

Cornering wear may be easily mistaken for side or camber wear but can be corrected only by reducing speeds on curves and turns. Rounding and roughening of the tread at the outside shoulder of the tire caused by severe abrasion usually indicates cornering wear.

MISCELLANEOUS WEAR

Flat spots, cups, gouges and waves in the tire tread may be caused by one or more of numerous factors, many of which are difficult to isolate. For example, a single flat spot may be worn in the tire tread and may be caused by an unbalanced wheel due either to wheel and tire static unbalance or an out-of-round brake drum. Looseness of front suspension parts (king pins and bushings, upper and lower suspension arm mountings, shock absorbers and steering linkage for example) will permit erratic and irregular wheel movement and cause uneven tire wear.

A complete mechanical inspection, repair and alignment, together with wheel and tire balancing will usually correct the causes of uneven tire wear. At the time of correction, rotate wheels and tires to take advantage of the fact that the unevenly worn tire will, to some extent, true itself up when changed to the rear or the opposite side of the vehicle.

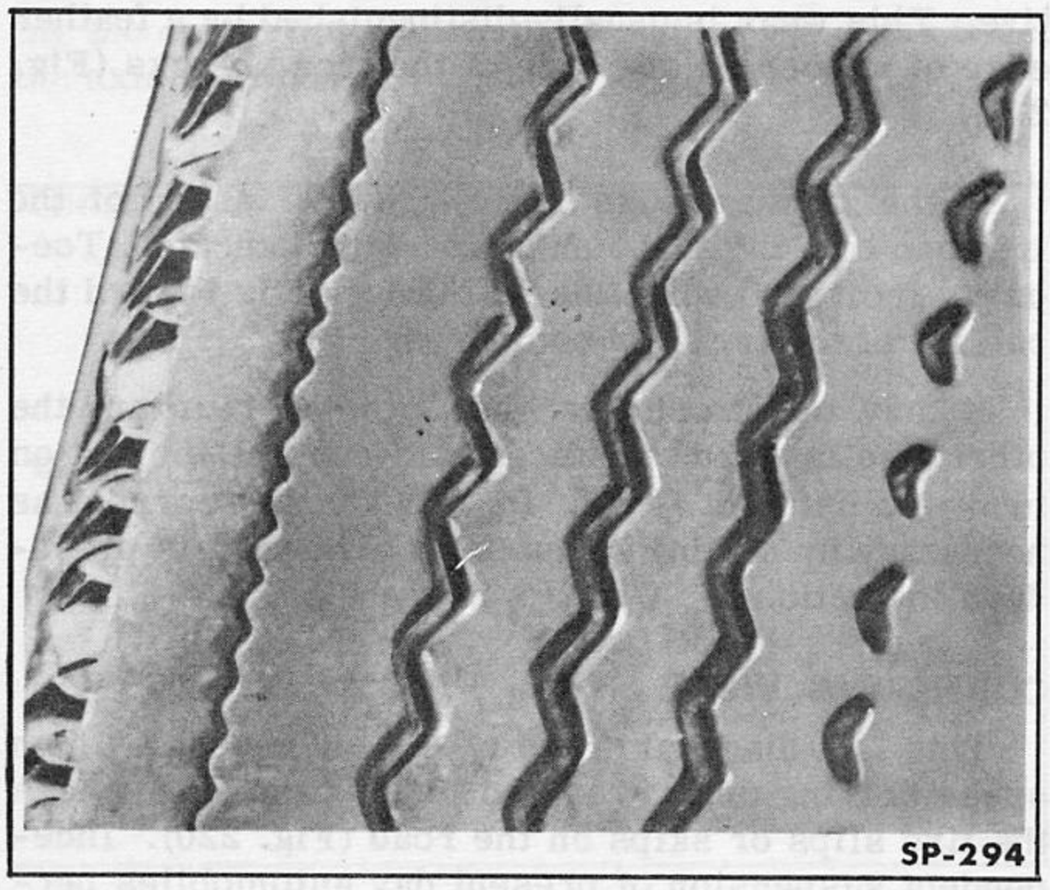

Fig. 220—Cornering Wear of Tire Tread

SPARE TIRE MOUNTING

The spare tire is mounted in an upright position in the luggage compartment against the left quarter panel (Fig. 221) and bolted firmly in place against a support bracket. Some early models with special equipment 6.40 x 15 tires have the spare tire mounted in a horizontal position on the rear compartment floor pan.

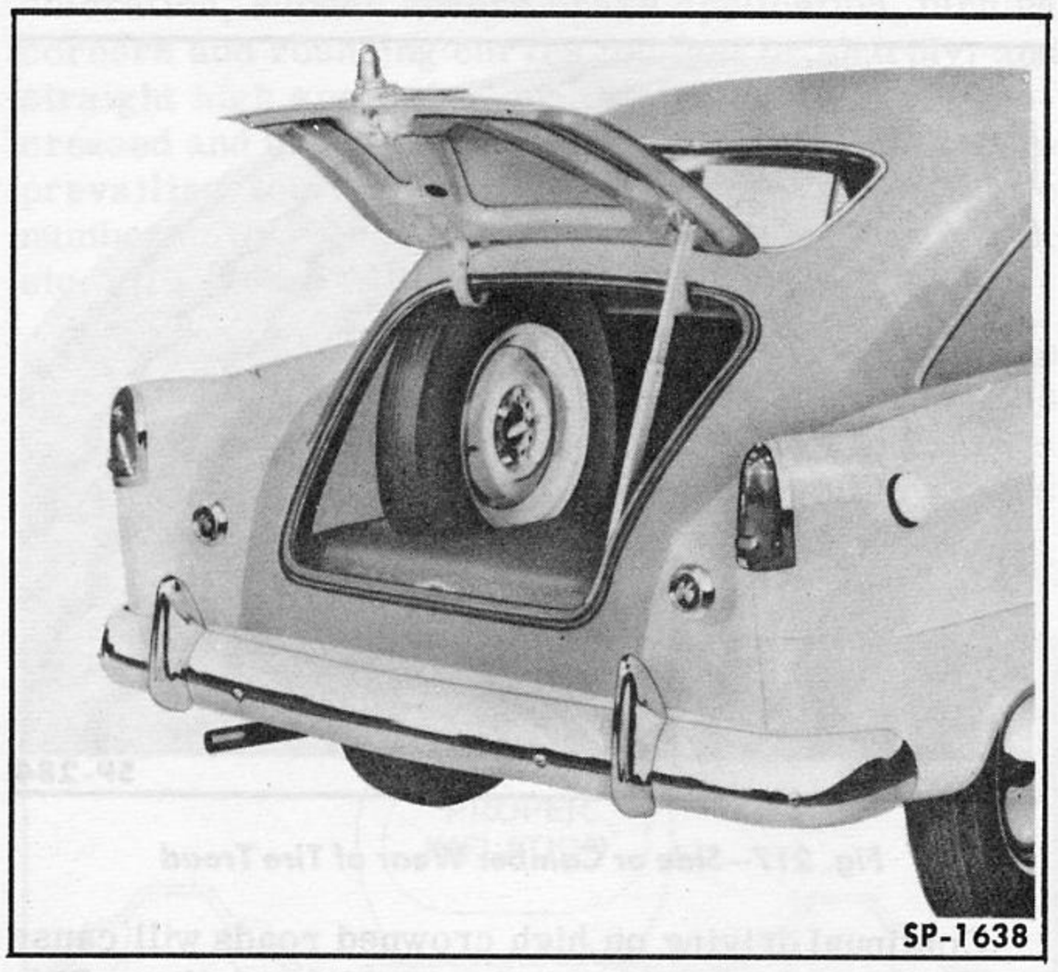

Fig. 221—Spare Tire Mounting

On some models, the spare tire was mounted outside the body, just forward of the rear bumper. This is an accessory type mounting and is described further in Section 16, "Instruments and Accessories".

When stowing the spare wheel in the rear compartment, place it in position so the valve stem is accessible for checking air pressure when tires on the vehicle are checked. Always include the spare wheel and tire when rotating wheels to obtain maximum life for the complete set of tires.

SERVICE DIAGNOSIS

The diagnosis of causes for irregular tread wear are given in detail under "Tire Wear" in this section.

WHEEL NOISES

The following are causes of various wheel noises.

1. Loose wheel bolts.
2. Wheel bearings not lubricated.
3. Loose, tight or damaged wheel bearings.
4. Brake drum, backing plate or hub cap loose.
5. Tires under-inflated.
6. Type of tread on tires.
7. Stones or foreign object imbedded in tread.
8. Rear wheel hub loose on axle shaft.
9. Brakes dragging.

UNUSUAL HEATING OF FRONT WHEEL HUBS

Front hubs are normally warm after vehicle has been operating for some time but may be hot due to the following causes:

1. Insufficient or improper wheel lubrication.
2. Bearings adjusted too tight or damaged.
3. Heat transfer from brake drums due to brakes dragging.
4. Bent steering knuckle spindle.
5. Hub oil seal cocked or too tight.

SERVICE BULLETIN REFERENCE

HENRY J SHOP MANUAL

SERVICE BULLETIN REFERENCE