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Some New Items on 8th Series Standard Cars —

Bonnet

A NEW improved type of bonnet clamp operated by a cam and lever which clamps the bonnet on the inside has been specified. It is easily operated.

The bonnet tops have been altered for a new stop moulding at the hinge.

Brakes

The brake pedal and pedal pad have been redesigned to give $\frac{5}{8}$ " more travel.

Clutch and Transmission

The clutch plate material has been changed to high carbon steel.

The clutch pedal and pad have been redesigned to give $\frac{5}{8}$ " more travel.

The change speed lever lower ball and washer has been redesigned to reduce wear.

An extra hole has been added to the clutch throwout lever so that a softer clutch action can be obtained.

The transmission has been redesigned to give a quick shift from third to high. The third speed gears are in constant mesh. A sliding sleeve is used in shifting into high or third.

Cooling

The radiator shutter thermostat and linkage has been redesigned to allow assembling the thermostat from the rear of the core.

Dash

The surface finish on the instrument bezels and other instrument board trimmings has been changed from nickel to chromium plate.

The pull handle on the chassis lubricator is eliminated due to the new style automatic lubricator.

Electrical System

The large custom-eight battery has been specified.

A rubber terminal insulator has been added to the generator cable to eliminate possibility of shorting.

Exhaust System

A new high efficiency type muffler with an expansion chamber has been added to reduce body roar.

Frame

Body holddown brackets have been added to the outside of the frame sides.

Fenders

The front and rear fenders have been changed to give one inch deeper outer skirt.

Gasoline System

The gasoline line from tank to motor has been placed on the outside of the frame for cooling purposes, and the necessary connections passing through the frame have been provided.

Seamless copper tubing has been specified for all gasoline lines.

A mechanically driven gasoline pump has been specified for all models. This is driven by an eccentric cam on the front end of the camshaft and is carried by the front gear cover.

Lubricator

The hand operated lubricator tank has been superseded by an automatic system operated by vacuum taken from the motor intake manifold. New drip plugs are specified due to automatic operation of the tank.

Motor

The cylinder block has been redesigned to provide improved intake and exhaust passages similar to those used in the Seventh Series Speedster motors.

New intake and exhaust manifolds have been specified.

A larger generator has been specified with increased output and lower cut in speed.

A new vibration damper utilizing vulcanized rubber discs has been specified.

The piston lubricator valve has been redesigned to prevent leakage.

The water pump is of new design, having two ball bearings in place of one.

A heavier flywheel has been provided to improve idling.

Rear Axle

The $4\frac{2}{3}$ to 1 gear ratio has been standardized for both 826 and 833.

The area of the splines on the inner end of the axle shafts has been increased and lubricating holes added to the gears.

Shock Absorbers

A new type of shock absorber which mounts on the frame has been specified.

The shock absorber links have been redesigned and are now lubricated by Alemite fittings.

Steering Gear

A new thin rim three-spoked steering wheel made integral with the hub has been specified.

Springs

New longer and wider front springs have been specified, measuring 42 inches long, divided 20 and 22 inches, and are $2\frac{1}{4}$ inches wide.

New longer and wider rear springs have been specified, measuring $60\frac{1}{2}$ inches long, divided equally, and are $2\frac{1}{4}$ inches wide.

All spring bolts have been provided with an automatic spring end play takeup.

Wheels

19 x $4\frac{1}{2}$ wheels have been specified.

19 x $6\frac{1}{2}$ tires and tubes have been specified.

Enlarged hub caps and black enameled shields that enhance the appearance of the disc wheels, have been specified.

Chrome Plated Dovetails

Chrome plated dovetails have been specified to improve the operation of the doors.

Remote Control Draw Bar

This has been straightened giving a more direct pull on the door lock.

Rubber Bumpers

Rubber bumpers have been added to the bottom of all doors; also to the roof header bar.

Increased Headroom

Roofs have been raised $\frac{3}{4}$ inch.

Cushion Heights

Cushions are lowered $\frac{1}{4}$ inch and with the change in roof increase the headroom one inch.

Phaeton and Roadster Tops and Windshields

Phaeton and Roadster tops are raised one inch. This, of course, affects the windshield which has been raised to agree with the top changes. This change for increased headroom.

Body Hardware

Same design as used on present 740 and 745 bodies with the exception that the Catalin inside door lever handles and regulator knobs have been changed to metal.

Locking Doorhandles

New design locking door handles are specified on all closed body models, retaining, however, the inside locking device worked out in such a manner that it will be necessary to use a key to lock the right front door.

Fore and Aft Adjustment of Driver's Seat

The driver's seat adjustment has been changed to two inches forward and two inches back of normal. The front

seats in the seven-passenger bodies have been moved to the rear one inch and on five-passenger, or bodies without folding seats, one and a half inch to the rear.

Double Windshield Cleaner

The Trico Vision-All windshield cleaner has been standardized on all closed bodies excepting the Convertible Coupe.

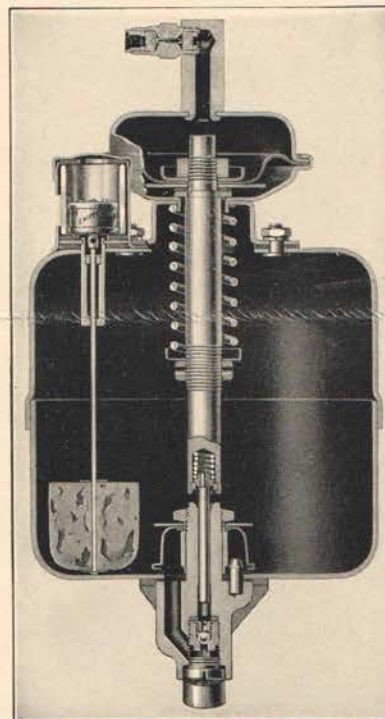
Doorhinges—Closed Bodies

All door hinges are attached with at least one thru bolt.

Adjustable Lock Striker

Adjustment plate added to allow for greater lock striker adjustment.

Packard-Bijur Chassis Lubrication System



The new Packard-Bijur automatic chassis lubrication system differs from the previous manual system mostly in the tank unit. The drip plugs are new also, although they look like the old ones externally except for the symbol stamp and an added wire ring.

The tank now entirely contains the pump, which is vertical and of much smaller bore and stroke than before, being $\frac{5}{8}$ x $\frac{1}{4}$. These dimensions give the pump a capacity of about $1\frac{1}{2}$ drops of oil per stroke, or $1/150$ th as much as the hand pump. The greatly reduced size

of the automatic pump is required by the fact that it works all of the time that the car is running and that continuous lubrication is more efficient than intermittent large shots.

The pump piston is directly connected to a diaphragm in the vacuum chamber on top of the tank and is normally held at the bottom of the stroke by a fairly stiff spring. The upper part of the vacuum chamber is connected by piping to the engine intake manifold so that the vacuum caused by running the engine tends to lift the diaphragm and piston against the spring.

With the engine idling or running steadily at any certain throttle opening the vacuum is steady and holds the piston in one position. But as soon as the throttle opening changes the vacuum also changes and moves the diaphragm and piston. In order to prevent excessive pumping, as when kicking the accelerator, a vacuum damper is formed in the vacuum line fitting on top of the vacuum

chamber. This damper slows down the sudden vacuum changes so that a good average performance is obtained over all running conditions.

The oil flow in the automatic system is very slow as compared with the flow from the hand pump and must not be expected to appear at a drip plug or bearing nearly as fast as in the manual system. Some idea of the slow flow may be obtained from the fact that the pump feed to the entire system averages only two drops of oil per mile. This means that ten or fifteen minutes driving may be required to form one drop of oil at any given drip plug. Due to this very slow flow, it is even more important now that the chassis lines be completely filled either in production or after service repairs than previously when the hand pump could be used to quickly fill a partially empty line.

As mentioned above, kicking the accelerator to speed up the engine while the car is standing still will have no pumping effect. To get quick pumping for inspection purposes there are two methods of operation. The first is to run the car at about twenty miles per hour, accelerate moderately to about thirty miles per hour, decelerate back to twenty, accelerate to thirty again, and so on. This procedure will give sufficient time for the rise and fall of intake vacuum to operate the pump. An even quicker method which may be used in the shop is to substitute an open connector for the damper and leave the tank vacuum line disconnected from the dash fitting. Then by slowly touching this pipe to the fitting and removing it, the vacuum and relief can be alternately applied to the diaphragm at a rapid rate. The pump can be heard to thump at the bottom of the stroke and movement can be readily seen by looking into the filler opening. When the pump is known to be satisfactory by observation of its discharge with the line disconnected, the line should be reconnected and pumping continued until oil appears at the particular bearing. Empty lines can be more quickly filled by temporary use of the old hand tank. When the system has been found to function properly with rapid pumping, the damper must be reinstalled to restore normal operation. The pump will not thump with the damper in place.

Line pressures in the automatic system will vary with atmospheric temperatures, being as low as two or three pounds per square inch in Summer and as high as eighty or more in Winter.

The new drip plugs are not interchangeable with the old ones, being designed to operate at lower pressures. For the same reason the drip plug rates are considerably lower than previously for the same size bearings, although oil distribution throughout the chassis remains the same.

The Gasoline Pump—

How It Operates

SUCTION STROKE

The motor cam pushes the pump lever up, the lever pivots, thereby pulling the pump diaphragm down. A vacuum or suction is thereby created. This opens the inlet valve, pressed downward by a spring, and draws gasoline from the glass reserve bowl through the screen. The glass bowl is connected to the rear tank by an inlet line. In operation the glass bowl will always be full of liquid. The outlet valve is also pressed downward by a spring. Chamber is always open to the atmosphere through breather hole. This prevents back pressure or vacuum in this chamber and ventilates it.

DELIVERY STROKE

The flow of gasoline and the relative position of the motor cam and pump parts on the delivery stroke are shown in Fig. 2. The low point on cam A is on the side nearest the pump. Pressure is exerted on lever by the lever spring. This causes the lever to follow the cam. The other end of the lever is engaged with the bronze spool that is free to slide on the diaphragm piston rod. On the end of the delivery stroke the lever is up as high as it will go, permitting the diaphragm spring to push the diaphragm up, thereby forcing the gasoline in chamber through the outlet valve. On this stroke inlet valve is held closed by its spring.

The purpose of the air dome is the same as on other hydraulic pumps. It not only relieves the diaphragm and carburetor float bowl valve of excess pressure when this valve is closed, but utilizes this pressure to increase the delivery rate about twenty-five per cent.

When the float bowl valve is closed, or partially closed, the full stroke pressure and stroke of the diaphragm is utilized to store gasoline in the air dome by compressing the gasoline vapor in it as the baffle plate is perforated. On the down stroke of the diaphragm this compressed vapor expands and maintains a pressure on the gasoline in the line to the carburetor and a constant flow, so long as the float bowl valve is open.

The maximum pressure on the gasoline to the carburetor is two and one-half pounds per square inch.

CONTROL OF DELIVERY

The maximum delivery rate of these pumps is always in excess of the requirements of the motors for which they are specified.

The actual delivery to the carburetor is controlled by the carburetor float bowl valve, as this shuts off the flow of gas when the carburetor float bowl is full. When this occurs and the air dome pressure reaches two and one-half pounds per square inch the pump diaphragm automatically stops pumping and remains in the down position. This is because the pressure in the gasoline line to the carburetor equals that of the diaphragm spring.

The lever, however, continues moving with the engine cam shaft and the spool on the piston rod with which the lever is engaged, slides up and down.

The down stroke is cushioned by the rubber washer under the bronze spool. As soon as the back pressure at the carburetor needle valve is relieved the diaphragm is forced up by spring pressure and pulled down by the lever.

Possible Troubles—

How to Locate Them, and Their Remedies

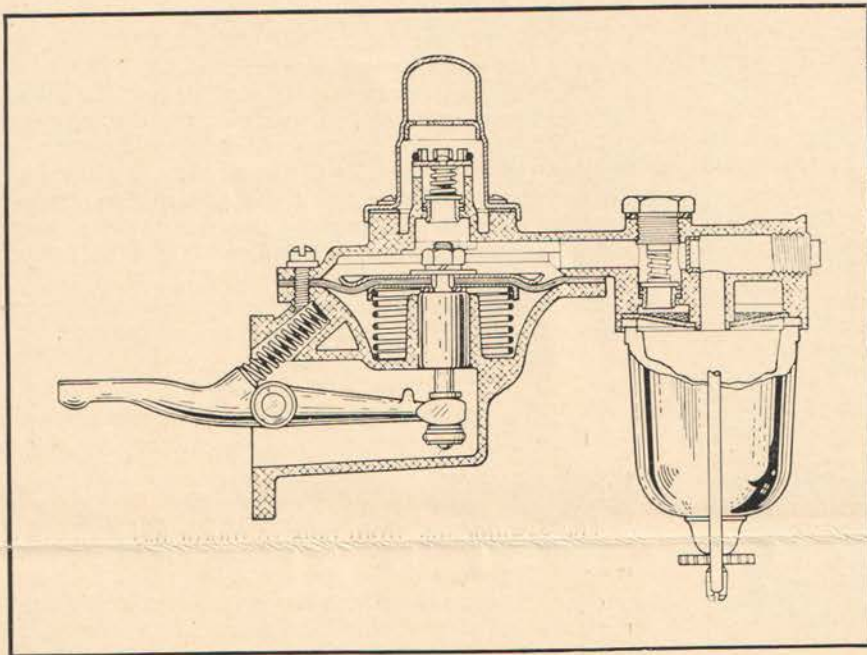
TEST ON ENGINE

When gasoline fails to reach the carburetor, do not remove the pump until you have checked up as follows:

1. Learn whether there is gasoline in the rear supply tank.
2. Note whether gasoline has been coming out of breather hole. This indicates a leak due to a fractured diaphragm or a leak at the piston.
3. Examine the sediment bowl and screen. Although this bowl may be full of gasoline, the pump will fail or not operate properly if screen is dirty or inlet valve is clogged. Clean the sediment bowl and the screen. Observe whether there are any water particles on the screen. They can be removed by blowing through it. This can happen only in extreme cases when the bowl is practically filled with water. When replacing the bowl be sure that the cork gasket is not broken and that when nut is

drawn up the bowl rests flat on its seat. A leak at the gasket will cause erratic action of the pump and retard delivery. When using a new gasket, first soak it in lubricating oil.

4. Check for loose connections or broken lines.
5. Disconnect the pump at the line to the carburetor.
6. While having someone step on the starter, observe whether the gasoline spurts out of the pump outlet. When gas spurts out and the carburetor float bowl is empty it is an indication that the line to the carburetor, or the carburetor float needle valve, is clogged.
7. Disconnect the gasoline supply line at both ends and blow through it to see whether it is clogged.



TEST OF PUMP OFF THE ENGINE

When the previous test fails to show the trouble, remove the pump and take it to the work bench for test and examination.

1. Attach two pieces of rubber hose to the inlet and outlet openings of the pump, and, while holding it down with both thumbs, move the pump lever in and out. Gasoline should spurt out of the hose attached to the outlet opening in approximately fifteen strokes of the lever. When no gas spurts out, proceed as follows:

2. Examine check valves. A gummy substance sometimes found in gasoline may cause the valves or springs to stick, or grit to stick to them, and prevent seating. Any foreign matter on valve seats will also cause failure. Clean the valve seat and the springs, and replace the disc valves, glossy side down. Be careful not to scratch or mar the valve seats while cleaning them.

Use new gaskets under the valve retaining nut, and the air dome. Be sure to draw them up tight.

3. Examine the vent hole. This must have no restriction from dirt accumulations.

4. Test the pump with two pieces of hose and a pail of gasoline, as previously described; also by holding a wet

finger alternately on the inlet and delivery openings while working the lever.

The Diaphragm

When the pump cannot be made to operate properly after the tests previously described, take it apart and examine the diaphragm, diaphragm spring and clamping nut. Make sure the nut is tight. A weak or broken diaphragm spring or a cracked or torn diaphragm will cause complete pump failure. To correct, replace the diaphragm or spring. *This must be done very carefully, and the following instructions must be adhered to to insure satisfactory operation of the new diaphragm:*

Replacing Diaphragm

1. Remove the pump cover. This will make the nut that clamps the diaphragm on the pump plunger accessible.

2. Unscrew the nut with two wrenches.

3. Clamp the body of the pump in a vise, as shown. Lay four pieces of diaphragm material on top of the spring retainer, as shown. Insert two screws through the holes in the diaphragm material to line up these holes with each other. Lay two washers on top of the diaphragm material. All these parts have two keyways in the center hole. Turn the parts so that the keyways are in line with each other and the key on the connecting plunger stud. Then press down on the retaining plate and push these parts over the stud. Make sure that the key enters the keyway. Then, while holding the diaphragm in this position, screw on the retaining nut first by hand and then tighten it with two wrenches.

Replace Cover

It is very important that this be done as explained hereafter.

1. Set the cover on top of the diaphragm and then push it down just far enough to allow entering the screws for about three threads. Then pull the diaphragm down, by pushing the lever up as far as it will go. *Hold it there until all screws are tightened securely.*

Test Pump

The pump should now be tested as previously explained and if it functions properly, should be replaced on the car.

Replacing on Car

Be sure to put gasket between the pump flange and its seat on the engine pad. Fasten the mounting screws securely. To prevent leaks, place some white lead on the threads of all fittings and tighten all the connections securely.

Starting Car

This pump will prime itself when empty in approximately twenty seconds at cranking speed.

We Welcome Suggestions and Inquiries from Packard Service Men. Address All Communications Care Editor, Packard Service Letter.
