Hudsonotes

Column of Mechanical Miscellany
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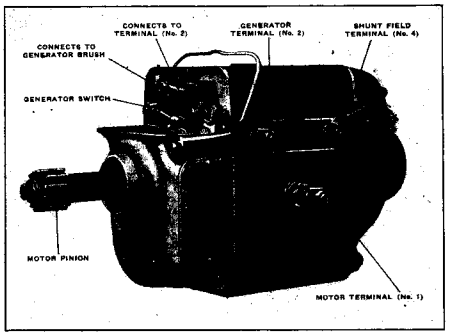
Inside The 1916 Super Six

(part 3 of a series)

ALTHOUGH THE ELECTRICAL system on early Hudson Super Sixes (as on most other 1916 cars) was far simpler than on models of the 1950's or of today, it had several unusual features that were quite different from those on more modern vehicles. Hudsons of this era used the "Delco" electric system, named for the **D**ayton **E**ngineering **L**aboratories **Co.**, a part of the General Motors organization, which also produced the system for a number of non-GM cars.

The Delco system in these years featured a single large unit containing the starter and the generator. Both of these shared one shaft, but had separate windings and brushes, with starter being placed toward rear. The unit mounted at the right side of the Hudson engine, and was normally driven from front of engine through the water-pump shaft, but it included an overrunning or "one-way" clutch so that when required (while starting engine, for example) it could spin much faster than the water pump. At back of unit was a small pinion gear which engaged the teeth on flywheel for starting. As on modern starter drives, it too had an overrunning clutch to prevent excessive motor speed as soon as the engine fired; but as on most other older cars, the pinion was shifted into mesh not by solenoid or inertia, but by pressure on starter pedal. Additional foot pressure also dropped the two starter brushes into contact with the motor commutator; thus they served as the starter switch as well. Release of pedal broke the brush contact and disengaged the pinion gear, and the unit then continued to be turned by engine at a lower ratio, generating a useful charging current at any road speed above approximately 7 or 8 MPH.

Surprisingly, there was no small black box containing a "voltage regulator" or even a pair of automatic "cut-out" contact points for generator; and of course there was no "diode" rectifier like those used to prevent backflow on most modern alternators.



Side View of Generator

The generator brushes remained in constant contact, and were connected to the battery circuit as soon as the ignition was switched on. This combined with the overrunning-clutch arrangement permitted the generator to turn or "motor" at a slow rate whenever the ignition was turned on and the engine not running. It was said that this feature wasted very little current, while allowing easier and smoother engagement of the pinion gear for starting. A switch then interrupted this generator brush circuit briefly while the starter was actually in use.

GENERATOR WAS of the "third brush" type, and the adjustable third brush was the only means provided to control the charging rate. Although the output was only about 5 amperes at 9 MPH on road (in high gear), it rose to a peak of about 17 amperes at 24 MPH and then tapered off at higher speeds (11 amperes at 42 MPH, for example). These charging rates were easily checked since Hudson at the time included an ammeter on the dashboard as standard equipment.

Most of the electrical instructions and illustrations in Hudson's 1916 manual apparently are taken directly from Delco (and Exide Battery) literature of the time. This includes directions for cleaning and resurfacing the copper commutator bars on generator when necessary, and the proper method of undercutting the insulation between them. The manual states---as is often stated today---that the commutator on starter motor does not require similar undercutting when it is serviced, because of the harder brush material (copper) used on starters. However, mechanics then and now have found that this is not invariably true. If a starter motor (antique or modern) does not develop its proper torque despite good windings, brushes, bearings, etc., the commutator should be checked, even if it is clean and smooth, to be sure there is no high insulation (or possible copper bridging) between the segments.

THE 6-VOLT BATTERY on these Hudson models was connected (as are most batteries at present) with its negative terminal grounded to car frame. Elaborate instructions for battery charging and care, and even shipment for repair, are included in the manual. It is pointed out that although a lead-acid battery can tolerate fast powerful discharges (as when starting engine) without harm, any attempt to recharge it at a similar fast rate will only cause quick destruction. The use of a low charging current for an extended time (a day or more) was especially important for best results with a battery of this era.

With direct current still available from power companies in a number of areas at the time, battery charging at home or shop was a simple matter. Batteries could be connected to the line with merely a few resistors or reducers in series (ordinary household light bulbs would do) to bring voltage and amperage down to a safe level for the purpose. With alternating current, battery charging was more of a problem since rectifiers of the time were not very practicable, and A.C. chargers were generally of either the vibrator, mercury-arc, or motor/generator (dynamotor) type. The "tungar" rectifier, which changed A.C. to D.C. by use of a bulb resembling a large radio tube, came later, as did the compact solid-state power rectifiers used in chargers today.

No fuses are shown in the 1916 Hudson circuit diagram. A protective circuit breaker was mounted as part of the main combination switch on dash. This breaker was magnetic (not thermal) in action, and it made a characteristic clicking sound when overloaded or shorted. To find a short circuit, the manual suggests turning on only one switch at a time, and then disconnecting individual wires from the switch one by one to help locate the trouble. Manual points out that Hudson used the "single wire" system (then not yet universal on cars), with return connections grounded so that the metal car frame served to complete each circuit.

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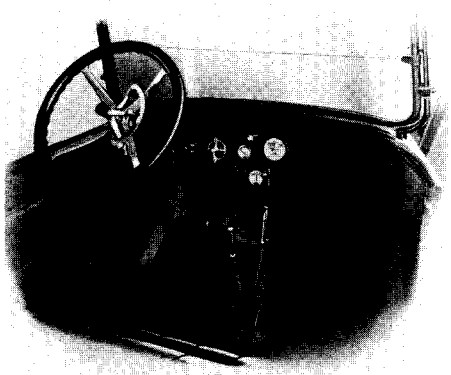
HUDSONOTES cont'd.



Driver's Section and Controls

ELECTRIC LIGHTING on the 1916 Hudson was extremely simple. There was a pair of single-filament headlamps, plus an instrument light and a tail lamp; but the wiring diagram shows no other interior lighting, nor in fact any sidelamps or cowl pr parking lights (perhaps these were available as an option or accessory, electrical or possibly even still kerosene-operated). As on many Brand X's at the time, the tail and dash lights were in series, permitting the use of 3 (or 3½)-volt bulbs, and giving a warning of any bulb failure at rear. Also typical was the headlamp "dimmer" switch---it was precisely that, and could only dim the single beam from each headlamp for town driving by switching in a series resistance located under dash. This resistance was adjustable (by tying off one or more turns). Headlight bulbs were of the normal 6-7 volt type, globular shaped; and all bulbs had what was then called the "Ediswan" base—the familar bayonet style in about ½-inch size still in use today.

In later years, oversize replacement bulbs were available which would fit the headlamps and give better illumination—almost a necessity if these cars are to be used today for any extensive night driving. If the dimmer resistance overheats or causes excessive dimming with the larger bulbs, it may be necessary to add another resistor in parallel with it.

Headlights could be adjusted for both focus and aim. Normal setting was to have both beams form 3-foot circles just touching each other, and 1½ feet from the ground, on a screen 40 feet from car; but the beams might also be aimed somewhat lower if used mostly for slow or city driving. If the silver reflectors became tarnished, a product called "Putz Pomade" (from drug store) was recommended for cleaning them, along with a soft chamois, rubbed carefully in a radial (never circular) direction.

IGNITION COIL on the 1916 Super Six was dashboard-mounted, but in most other respects the ignition system was not unlike more modern ones. The distributor was mounted at front of engine, and contained a conventional rotor and contact points, with condenser mounted at side. It of course had external linkage connecting it to the manual spark advance lever on steering wheel, but—perhaps surprisingly for 1916---it also had a pair of internal centrifugal weights which automatically advanced the ignition timing in proportion to engine RPM.

Correct ignition point gap was .018 inch. Then, with hand lever at the full-advance position, ignition timing was to be set so that cylinder #1 would fire just when the "A" mark on flywheel (placed ½ inch ahead of the top-dead-center mark) lined up with the pointer on crankcase. Hand lever could then be used to compensate for conditions such as load, altitude, fuel quality, or very high speeds.

Also at side of distributor was a protective resistor wired in series with the contact points; but unlike the resistors used with later 12-volt ignition systems, it was not shorted out during starting of engine. It was designed to have negligible effect at normal temperatures, but to increase resistance sharply when heated due to overload (as when engine was stopped with ignition turned on and points closed.)

SPARK PLUGS in 1916 were available in many brands and styles, but apparently they were not very reliably classified or numbered according to their effective heat ranges. This was evidently of concern to the Hudson factory, since the manual warns particularly against the use of what would now be called too "hot" a type of plug in the high-performance Super-Six engine:

"The Hudson motors are of the high compression, high speed type and the combustion chamber is comparatively small. On this account, it is absolutely essential that the [spark plug] electrodes be quite short and of the material or size necessary to prevent their becoming red-hot and causing pre-ignition. The same is true of plugs which have several electrodes, or one central electrode of very thick section. On this latter type of plug, the porcelain is usually hollow and generally known as the petticoat' type. On account of the great heat to which these porcelains are subjected, breakage is quite frequent, and the length of the electrode in such a plug is sure to cause pre-ignition. Another disadvantage of the long electrodes is that they distort or warp under high temperatures and vary the spark gap from the correct setting.

"The plugs which are fitted at the factory are of a type calculated to give the maximum amount of satisfaction and we are positive that they will not cause pre-ignition under any conditions. We do not insist that the particular type of plug which we use be carried by our dealers or used by owners but we recommend that they consider our judgment in the selection of a plug before purchasing. Any type of plug which has a short, solid porcelain and small, short electrodes, will be satisfactory, provided the shell does not project down into the combustion chamber farther than the standard plug we supply. Such a plug must be gas-tight, and preferably without joints or packing.

"The correct gap for the standard spark plug on the Hudson motor is from .025" to .028". The symptoms of pre-ignition are: Back firing in the carburetor and missing under a heavy pull, especially on long hills where the constant load has a tendency to heat the motor above normal temperatures....

"Plugs which have seen a season's service may become oxidized at the electrodes to such an extent as to cause the motor to miss when pulling hard. This can be eliminated by cleaning the electrodes with emery cloth."

(Next time: Early Super Six clutch, transmission, cooling, etc.)

A RED-LETTER DAY for your columnist this past autumn was the Saturday when his "new" Hudson was brought home. It is a 1954 Super Wasp coupe (short wheelbase), but with the 308" Hornet engine, along with stick shift and overdrive. Typically for a Hudson, the car is comfortable and fun to drive on long trips or short ones, and although not exactly unnoticed when on the road, it seems much more a four-wheeled friend than an antique or museum piece.