# Hudsonotes

Column of Mechanical Miscellany
by George Schmidt
Mishicot, Wisc.

**On Time**

WHEN TIMING IGNITION on a Hudson Six or Eight, how many degrees static advance (before top dead center) are best? Somehow the factory traditionally was unwilling to list a specific figure, as most Brand X's did, but insisted that timing first be set at exactly TDC (0 deg.), and advanced further only after a road test showed how much additional spark advance was possible without causing excessive "ping" or preignition. Engine, after warmup, was to be accelerated at low speed in high gear with wide-open throttle; and the correct final setting was the one which produced just a slight ping under these conditions at 15 MPH.

This of course was the classic method, and in the hands of an experienced mecanic with time and road space, it could produce superior results, duly allowing for gasoline quality, engine condition, and other variables in a way that no arbitrary figure in a book could do. But under other circumstances it was not as practicable — and for most later models and fuels, the O deg. initial advance (unchanged since 1930's) was distinctly archconservative.

Hudson for decades placed its engine timing marks on the flywheel, evidently considering this more accurate than the smaller-diameter "vibration dampener" or pulley at front of engine. A radial line marks "upper dead center" (UDC or TDC) for the engine's two end cylinders, and this is preceded by four shorter lines, all spaced ¼ inch apart. No degree equivalents were given, but since these marks are on about an 11½-inch circle, each one represents approximately 2½ degrees, or 10 deg. for all four. Maximum permissible static advance was given as 4 marks or 1" (3 marks or ¾" for older models) before TDG. On most cars these marks are readily visible through hole in rear engine plate; if they are not, check for dirt or slight leakage at flywheel, and if necessary use steel wool and a sharp colored marker to make them visible. If flywheel is off engine, clean front surface, deepen the marks slightly, and paint with light-gray flat primer for best visibility, before reinstalling it.

To avoid parallax error, timing marks and index edge of hole must be viewed head-on (not easy on some models when Drive-Master, oil filter, etc. are in place). Late engines usually have an auxiliary bolt-on pointer which lines up with edge of hole and improves accuracy (this piece will also fit the earlier models). Another important help is a bright modern strobe timing light — one which can still be operated on 6 volts. It connects to battery and to #1 (front) spark plug wire, and as a double-check can also be used with the rearmost plug wire. If the two readings differ (or if they will not hold steady at idle), look for wear at distributor shaft bushing, breaker cam, or advance mechanisms.

When timing by the road-test method, using good high-octane fuel, it may be found that many older low-compression engines will not "ping" noticeably at all; nevertheless they will lose power if advanced too far, often mostly at high speeds; hence this will need to be checked in addition to low-speed acceleration. When the optimum setting has been found on road, it can be identified using timing light, and a note made of it to help simplify future tuneups. Barring an encounter with some of today's more wretched gasolines, this setting should remain the proper one for the engine. My '49 Eight appeared quite content with about any setting between the third and fourth marks (thus 7½-10 deg. BTDC, not unlike many Brand X's); and my later 262" Six is currently set on about an imaginary "fifth mark" ¼ inch past the last short one, or approximately 12½ deg. BTDC. Whether these are the ideal settings for all similar models I cannot say, but it would be extremely interesting to know how other Hudson owners usually time their cars, and what settings they have found to work best. If you will please send me a postcard listing year, model, engine, and ignition setting (in marks or degrees), we'll report on this in a future column.

LESS THAN HALF of an engine's total ignition advance, however, is provided by the static adjustment (made by turning entire distributor manually on its base). The rest is supplied as needed by a set of centrifugal advance weights, and by a vacuum diaphragm, both built into the distributor on most models. When checking static advance using a timing light, the engine must be idled at less than 600 RPM (or 300 RPM at distributor, which is driven only at camshaft speed) to prevent these weights from coming into action. Afterward, engine can be speeded up, and the light should show spark being advanced still further in proportion to speed, to points well beyond the last mark on flywheel.

Sometimes, however, the timing will not budge (except perhaps in response to the vacuum control). When this happens, the loss in engine power is sizable, and distributor must be carefully taken apart to check the two weights underneath breaker plate and contact points. Weights are linked so that as they fly outward, the breaker cam will be turned as much as 10 degrees (more on some models) ahead of its normal position, thus giving up to 20 or more degrees extra advance at crankshaft when engine is running fast enough. But it is not uncommon on an old distributor to find both weights thoroughly stuck, or possibly even with their springs broken. Free and clean them up if necessary; perhaps also the cam on its center pin; and in any case give each a few drops of motor oil before reassembling. Springs are selected especially for each model engine (often an unequal pair for the two weights). Every tuneup should at least include a check that cam and weights are movable; but for a more precise check, distributor can be placed on a test machine, and the performance compared with table of advance figures given in manual. Often full advance should be reached at about 3500 engine RPM (1750 at distributor), but this varies with model.

IN THE DAYS of the manual spark control lever on steering column, many drivers became fairly skilled at advancing the lever more or less in proportion to engine speed, this giving generally best results. Soon this action was being duplicted automatically by the centrifugal weights and springs. However, as some early drivers also realized, when engine was running at a lighter load with only part throttle, the spark could safely be pushed even farther ahead, thus improving efficiency, saving a bit of fuel, and not causing any ping or knock until load and throttle opening were again increased, as for climbing a hill. This was possible because the flame front inside cylinder spreads more slowly at reduced pressures, and there is far less chance of preignition.

The next step was to duplicate this extra advance automatically as well. It was unimportant on luxury vehicles, since neither smoothness nor maximum engine output were affected, but it would have some value for the smaller models, where fuel economy was often a selling point. Since the relationship between throttle opening, engine load, and vacuum level was well-known, a device was arranged to advance ignition slightly whenever engine vacuum was high. to avoid excessive advance due to the very high vacuum at idle, the vacuum tap for distributor control was placed neatly inside carburetor to be just above throttle butterfly (and thus inactive) while throttle was nearly closed, but just below edge of throttle as soon as the latter was opened.

At distributor, Auto-Lite added a vacuum diaphragm with appropriate spring-loading chosen for each model; and in-

stead of attempting to shift the breaker cam still farther ahead, achieved the same effect by making entire contact point assembly movable slightly backwards on an annular ball bearing, linked to the vacuum diaphragm and spring.

Hudson, which had been offering centrifugal advance on all models since the early 1930's, added the vacuum feature to all Sizes for 1940, and in 1948 and up fitted it to all Eights as well. Maximum vacuum advance varied with engine and year (plus some midyear changes) from 8½ down to only 3½ degrees (17 to 7 deg. at crankshaft). Spring pressure also varied somewhat, typically requiring a vacuum level of about 12-14 inches Hg for full advance.

For a rough-and-ready check of vacuum-advance parts, remove distributor cap; then disconnect vacuum line and attach a clean spare piece of tubing in its place. Suck vigorously on tubing. Breaker plate should move perceptibly, and there should be no air leakage at distributor. For a more accurate check, place distributor on test machine and connect the vacuum supply; then compare results with appropriate specs from manual.

It is important with any tuneup to check at least for a possibly stuck annular ball bearing) nearly as common as stuck weights), and for a broken or leaking vacuum diaphragm. The bearing, which is a light press fit in breaker plate, can be removed and soaked with penetrating oil or solvents; then worked free, blown dry, and lightly re-oiled.

A broken diaphragm occasionally announces itself with a minor explosion which blows distributor cap loose, caused by fuel seeping in from carburetor through vacuum line. Since vacuum unit cannot be taken apart except to change springs and spacers, a new unit will be required.

FOR THE 1951 HUDSONS (and Chrysler products), Auto-Lite introduced a revised distributor with movable breaker plate pivoted simply at one side rather than on a centered ball bearing. Although the new design tended to alter point dwell slightly on full vacuum advance, it was simpler, and had little tendency to stick unless screw for ground wire (on early versions) was too long. On these distributors the stops limiting the maximum amount of vacuum advance were built not into the breaker plate but into the arm of vacuum control unit instead, with appropriate number of degrees stamped on arm. A recent check indicated these vacuum units are still available from C. E. Niehoff & Co. if not elsewhere, and contact point sets from this and several other suppliers.

When setting the static advance on Hudson and other older cars, using timing light, it is not really necessary to disconnect and plug the vacuum line, as is done on some current models. If the rigid metal line used on many Hudsons is inconvenient when adjusting distributor, a short piece of flex tubing can be added, either at one end, or by cutting line in two. Tubing or hose must be small (⅛" I.D. to slip over line), but heavy enough to be non-collapsible.

Most of these distributors had an external oil hole for shaft bushing, to be used every 1000 miles. As with generator, starter, etc., oil can be heavier when bearings are old — perhaps the SAE #50 used for aircleaners — although normal-weight oil is better for internal distributor parts, such as the small felt circle underneath rotor, which serves as an oil wick. Auto-Lite insisted that this wick be replaced with each tuneup, not merely re-oiled, but did not say why; conceivably the high-voltage discharges helped to deteriorate it. For cam and rubbing block themselves, a drop of oil may be used as originally recommended, but one of the modern distributor cam greases (from Niehoff or others) is preferable. Keep all lubricants scrupulously off contact point surfaces.

If all three ignition-advance figures for a typical Hudson engine were added — say 8½ deg. static, 35 deg. centrifugal, and 7½ deg. vacuum — the total would be about 51 degrees, or ⅛ crankshaft turn, under maximum-advance conditions. At 3500 RPM this represents less than $\frac{1}{400}$ second of time; but this tiny interval is necessary to spread the flame front properly inside combustion chamber so that piston will receive the most effective possible push (but never a sharp blow) from the exploding fuel mixture. For any engine, the correct "ignition advance curve" is merely the complete set of ignition timings required to produce maximum power and smoothness at every possible combination of load, speed, and throttle opening. Any deviation from this curve, whether caused by inefficient operation of the advance mechanisms, the "emissions" witch hunt, or the need to compensate for inferior fuel, simply reduces power and wastes gasoline — or in extreme cases can damage engine due either to preignition or to overheating.

WHILE FEW DRIVERS perhaps mourned the demise of the hand spark control, it did have occasional uses, so that now and then an accessory manufacturer has tried to bring it back — not to take the place of centrifugal and vacuum advances, but as a supplement to them under special conditions — a drastic change of fuels, for example; or perhaps exteme changes of altitude during mountain trips.

One such device, marketed during the early '50's and hence an acceptable add-on for cars of that era, included a streamlined chromed case with knurled thumbwheel around its middle, for underdash mounting, along with control cable to distributor, arranged to rotate distributor housing slightly (at octane selector) when control wheel was turned. It was tested by one or two car magazines, who reported that it was not a toy, but did permit very precise adjustment of timing from the driver's seat while engine was running under load. Another version of the control featured a small dial with pointer-type knob for underdash mounting. Although these devices were intended for permanent installation, they could also be used temporarily to fine-tune ignition timing on road; then removed and the distributor locked carefully in position.