IGNITION TIMING -

Fine-tuning the electrical system.

Motor's Handbook
13th Edition
MoToR - The Automotive Business Magazine

During the 1930s, MoToR magazine was considered the premier source for professional automotive mechanics. Their in-depth repair and maintenance instructions became a very important part of the information on the many marques, models and years of vehicles on the road.

In a number of the Motor's Handbook editions, ignition timing was featured. The importance of correct and proper ignition timing was only part of the operation of the electrical system.

Before jumping into the ignition timing, there are several other areas that must be checked and repaired. All of the vehicle's wiring must be checked and repaired.

Beginning at the ammeter, the wire to the ignition coil, from the ignition coil to the starter switch and instrument panel, and the wires to the distributor must be thoroughly checked for loose connections, fraying, or other sources for an electrical short or leak. All cables, except for the secondary circuit (coil tower to distributor; distributor to spark plugs) should be 14 gauge wire. The secondary circuit cables should be fresh 7mm (or 9mm) spark plug wires. Each wire should be checked to ascertain that there is no fraying, broken wires, loose connections or other source of an electrical loss. Any questionable cables should be replaced.

In addition, the spark plugs should be cleaned and properly gaped, the ignition breaker points should be dressed and properly gaped, the rotor and the distributor cap should be checked for cracks and for carbon tracks which indicate a hidden crack or electrical leak.

Only when all components of the electrical system have been checked and verified sound should the next step, ignition timing, be performed.

Because of the variation of marques, and even models within a marque, (and variations from year to year within a model), simply connecting a strobe light and turning the distributor is not adequate. The various types of distributors described on the following pages require special attention.

Although there will be a rather lengthy article - spanning three months of *Skinned Knuckles* magazine, from May 2017 through July 2017 - the detailed instructions proposed by MoToR magazine will assist in getting the optimum ignition timing for a specific make/model/year of car from 1930 to 1936.

Only after the entire electrical system has been checked, problems corrected, necessary parts or wires/cables replaced, should the focus be turned to the fuel system.

It has been repeated regularly: most 'fuel-related' problems are actually electrical. Carburetor adjustments must be made after the electrical system is put into good working order.

We apologize for having to spread the following information out over three months. The original article (from Motor's Handbook) used a font size too small to reproduce legibly. We were forced to increase the font size by 150 percent and had to reformat the pages to make the text readable. As a result, the original article, which was twelve-and-a-half pages long, was expanded to twenty-three pages in *Skinned Knuckles* magazine. The text is complete and unedited as it appeared in the original publication. The formatting does vary, but it too is complete and follows the Motor's Handbook article.

Most 'carburetor' problems are actually electrical, not fuel related. In months past, we have discussed many of the facets of locating and correcting problems within the electrical/ignition system. One of the least understood, though, is correctly timing the spark so that combustion occurs at precisely the right moment. Ignition timing is not necessarily a simple task, nor it is the same for all makes or even models within the same make of vehicle.

The Motor's Handbook series realized the importance of correct ignition timing and devoted a lot of space to the subject. The information below, and which will continue for three months in order to cover the entire range of marques and models, is from the 13th edition (1938) of the Motor's Handbook, and covers most models for the years from 1930+/- through 1938.

IGNITION TIMING . . .

FIVE types of breaker arm and cam arrangements are used in distributors.

1 The first and simplest is the breaker cam having as many lobes as there are cylinders in the engine and a single breaker arm. One ignition coil is used. With this type, when the points break correctly for one cylinder, all other cylinders are timed.

2 The second type uses a breaker cam having as many lobes as there are cylinders, but has two breaker arms operating in parallel. One ignition coil is used. Both sets of points open at the same time.

3 The third type has a breaker cam with half as many lobes as there are cylinders in the engine and uses two breaker arms. One breaker arm fires half the cylinders and the second breaker arm fires the others. One ignition coil is used. For a straight eight cylinder engine, one set of points opens 45 degrees of cam travel after the other. On some V type engines this interval is irregular. Adjusting both sets of points in their correct relation is called synchronizing. Gauges are made to synchronize the points and flywheel marks or piston travel can also be used. If the points are synchronized with a gauge while on the bench it is only necessary to time one set of points with the engine after the distributor is installed.

4 The fourth type of distributor has a breaker cam with half as many lobes as there are cylinders in the engine and two breaker arms with separate electrical circuits. The contact points must be synchronized the same as with the third type. Two ignition coils are used, one for each set of points.

5 The fifth type of distributor is the same as the fourth except that the breaker cam has as many lobes as there are cylinders and both sets of points must open at the same time, similar to type two. Each set of points is electrically separate. Two ignition coils are used. This type is used on dual ignition engines.

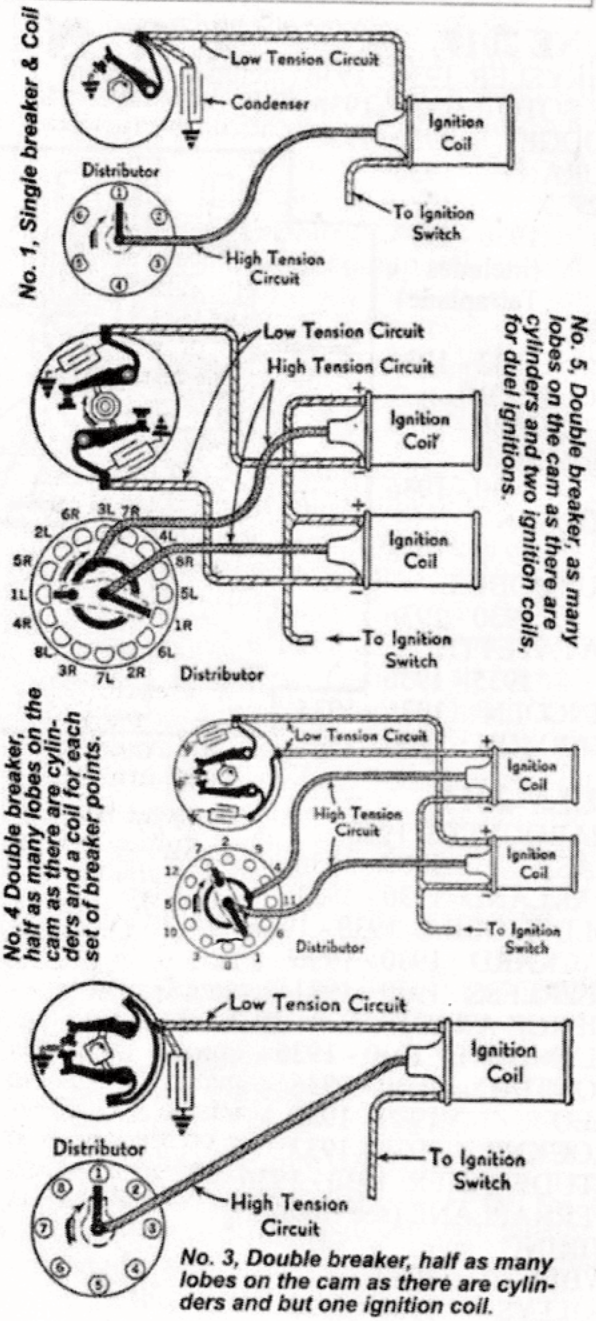
Many distributors have both automatic and manual spark advance while some have only the automatic advance. In addition to these two combinations, some cars have a vacuum spark control that is separate from the other two. Instead of depending upon the speed of the engine for its operation, it depends upon the vacuum in the intake manifold. This control consists of a flexible diaphragm connected to the distributor and the intake manifold to advance or retard the tension on the spring cannot be adjusted. If the unit does not function properly check the vacuum line and connections for leaks. It is easy to observe whether the unit is functioning or not by opening and closing the throttle with the engine running and noting the movement of the advance arm.

One type of control is installed so that it will retard the distributor when there is a high vacuum in the manifold. This application is to give improved idling performance. When the engine is idling there is a high vacuum in the manifold which acts on the diaphragm, compressing its spring and retarding the distributor. The vacuum line is connected on the engine side of the butterfly valve. As the engine is speeded up, the vacuum decreases and the spring returns the diaphragm to its normal advanced position. Further increase in engine speed brings the centrifugal automatic spark advance mechanism into operation in the regular way. Due to the retarding of the spark at idling speed, this unit is adaptable to cars having free wheeling as it retards the spark when the throttle is closed and the free wheeling unit is in operation. When connecting the unit to the distributor, move the distributor advance arm to the fully advanced position.

The vacuum spark control unit can also be attached to the distributor to retard the spark when the engine is on a hard pull or on quick acceleration. As there is very little vacuum in the manifold under such conditions, no force is exerted on the diaphragm and the spring holds the diaphragm in its normal retarded position. When the engine is idling or operating with part throttle, the vacuum in the manifold increases and the diaphragm advances the distributor. When a combination of manual, centrifugal and vacuum spark control is used and the diaphragm unit is mounted on the manual advance arm, provision is usually made for holding the arm in correct position while the distributor is timed. A method for holding the arm in the correct position for timing is to line up the holes that are drilled in each arm and insert a pin in them until the timing operations have been completed. The diaphragm will be compressed under the above conditions.

When timing the spark by watching the ammeter on a car equipped with an automatic starter, Startix, remove the small wire at the terminal of the automatic starter marked IGN and tape the loose end. With this wire removed, the automatic starter will not operate and the timing can be checked with the ignition switch turned on.

Wiring diagrams of the different ignition circuits



No. 3, Double breaker, half as many lobes on the cam as there are cylinders and but one ignition coil.