

# MAGNETO SYSTEMS OF IGNITION

By FRANK REMY

Magneto ignition, used on but a few American cars three or four years ago, is now used on many high-priced American cars. Its absence of adjustments, sensitive parts and complicated wiring make it appeal to the user, who does not like the complication or apparent complication, often common to electrical apparatus, and the manufacturer who in his experience is after "results."

Primarily, the advantage of a source of ignition provided by the utilization of a very little of the surplus power of the engine transformed into mechanical energy, is evidently more attractive than a source of current provided from the chemical action causing rapid deterioration in a more or less sensitively constructed battery. This, together with the simple means of transforming the original magneto current to that of a high tension character, making it suitable for the jump spark ignition compared to that of the more complicated method of transforming the low voltage battery current to the high tension current by means of the common four part dash vibrator coil with its sensitive adjustments and danger of break downs in its complicated wiring, logically concludes that it is only necessary to build a high grade mechanical ignition apparatus for the most satisfactory ignition system.

There are two radically different high tension magneto ignition systems in general use. In one the magneto generates its current at a low voltage and a very high amperage and carries it to an outside coil or transformer which does not have adjustments of any kind. It is here transformed to the very high voltage current which is used at the spark plugs of the engine. After transforming this high voltage, the current is returned to the distributor of the magneto, where it is distributed to the different cylinders of the engine. The other high tension magneto apparatus consists of a magneto with a compound winding on its armature and the condenser which is placed in the coil or transformer of the other system, all inside or a part of the magneto itself. The latter magneto method of firing the motor by means of the high tension current has the advantage of being absolutely complete in itself, having no separate coil, but it must be constructed with the most extreme care and accuracy both electrically and mechanically, lest it break down its high tension insula-



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tion, which must necessarily be subject to mechanical strains, oil, etc. The length and heat of the spark are limited, for the reason that the room for the insulation of its current must be limited to the small carefully designed space inside of the magneto.

The system first considered which has the separate coil or transformer does not have the compound winding of the armature, possesses the advantage of opportunity for perfect insulation—the coil being free from adjustments and not limited to small exacting dimensions. In other words, the current insulation can be constructed with as large margins as desired to take care of the great strains of the high tension current upon it and with this system of ignition a very much longer and hotter spark can be furnished. It might be said that the magneto with coil with its margins for results and method of complication is the result of American development of the mechanical ignition system, and the more complicated magneto with its limited margins and close design is the result of the efforts of foreign manufactures of this apparatus.

So far, we have considered only the high tension ignition methods of firing the explosive motor, and by no means would it be right to consider

the subject of magneto ignition without giving very liberal time to the low tension magneto system of ignition, although on American cars it is not used nearly so extensively as the high tension ignition equipment. On cars of foreign manufacture, the low tension system has been used almost exclusively, and until recently the high tension magneto was comparatively unknown on foreign cars.

The low tension magneto, comparatively simple in design and construction to the high tension apparatus, has been perfected to a very high degree by foreign magneto manufacturers, but it remained for American builders of cars to insist on the use of the high tension magneto ignition apparatus, and American ingenuity and energy to cause the development of the high tension magneto to its present state. The low tension magneto, very simple in itself, but necessarily requiring mechanical complication in the construction of the make and break electrodes of the engine, has a greater volume in its spark at the electrodes than the jump spark, and this, together with the simple magneto construction, is considered by its advocates to more than balance the disadvantages of the make and break mechanism with its necessary cam and small, accurately constructed parts and not-to-be-forgotten movable electrode shaft extending through the wall and into the cylinder. Until recently it might probably be safely said that engineers generally, who have investigated the ignition systems most, would have advocated the low tension ignition system as the farthest development of ignition equipment, but the improved construction of the high tension magneto in the last year has changed this opinion, and if we are to judge by the rapid adoption of the high tension magneto upon 1907 American cars, then it would seem that the high tension magneto with its ample construction for taking care of its necessarily perfect insulation, is going to be, for some time at least, the more popular of the two. The writer would not presume to venture a statement as to the future outcome of the use of these two magneto systems of ignition, but is of the opinion that mechanical ignition with the magneto as source of current supply will be used almost exclusively with explosive motors, both large and small, and of all types, in the not far distant future.