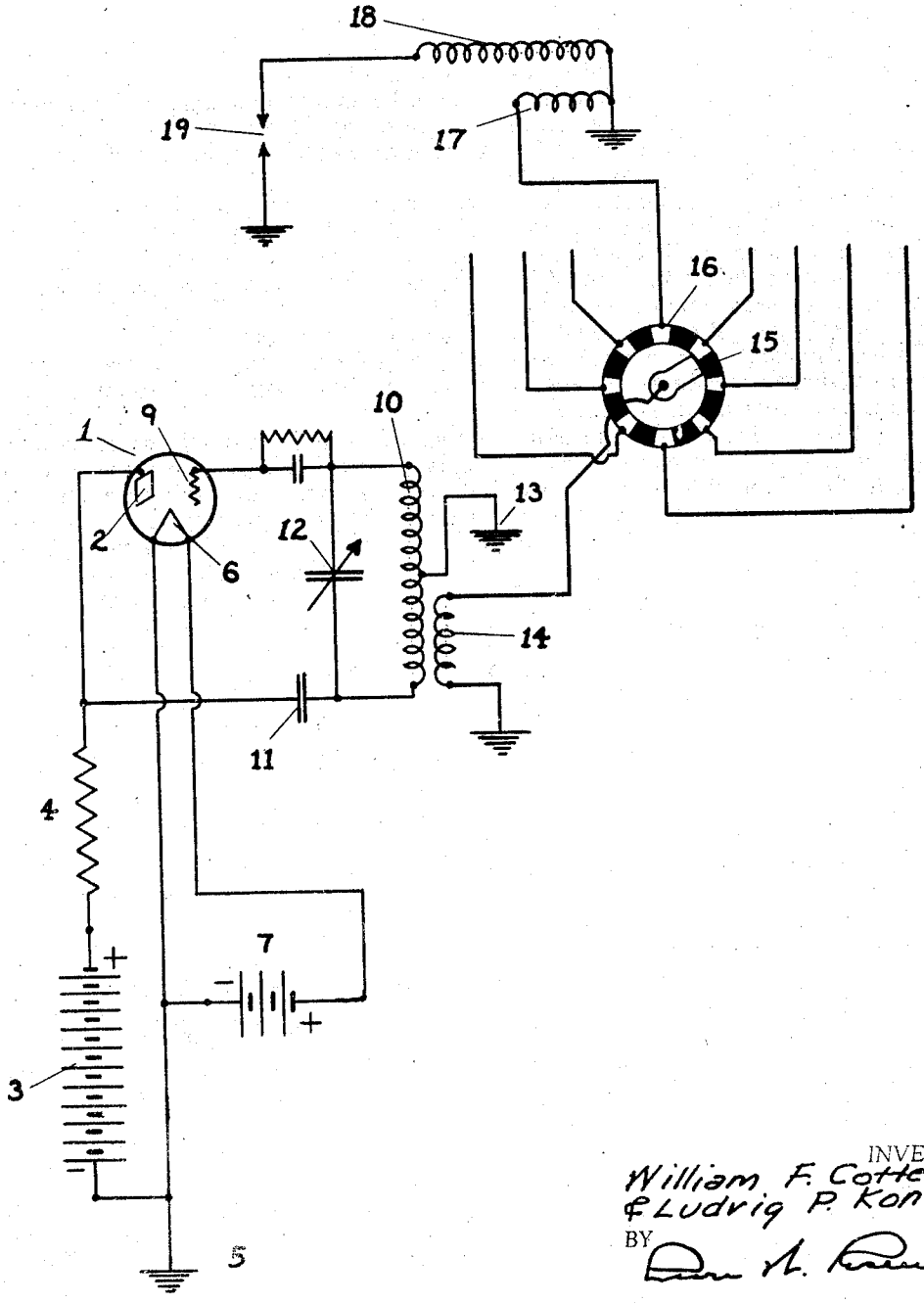
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IGNITION SYSTEM

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Fig. 1.



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IGNITION SYSTEM

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6 Claims. (Cl. 123—148)

This invention relates to improvements in electrical ignition systems; and particularly to ignition systems for internal combustion engines.

An object of the invention is to provide an ignition system containing the fewest possible number of moving parts and capable of transmitting energy to the ignition devices over relatively long distances at a comparatively low potential.

A further object of the invention is to provide an ignition system in which flow currents of high frequency, thereby insuring certainty of ignition in spite of carbon deposits and other causes of leakage on the spark points; and at the same time reducing the wear upon the spark points by reason of the relatively low amperage of the spark and the other characteristics of the alternating high frequency current.

These and other objects and advantages of the invention are clearly set forth in the following description and the novel features are pointed out in the appended claims; but of course the right is reserved to make changes which do not depart from the principle of the invention.

On the drawing.

Fig. 1 shows in outline an ignition system according to this invention.

The numeral 1 indicates a vacuum tube oscillator having an anode 2 connected to a source of current 3 through a conductor including a resistance 4. This source 3 may be either a battery, or a dynamotor, or an apparatus for producing rectified high voltage alternating current or unidirectional impulses from a spark coil. One terminal of the battery will be grounded at 5. The cathode 6 of the oscillator will be joined to the poles of a battery or low voltage transformer 7. One terminal of the cathode will also be grounded at 5. The grid of the oscillator is included in an outside circuit which contains the usual grid condenser and grid leak resistance and an autotransformer 10 joined through a condenser 11 to the anode 2. In parallel with all of the turns of the transformer 10 is a tuning condenser 12 and at a suitable point between the terminals of the windings 10 is a grounded connection 13. Obviously with the connections thus shown the tube 1 will oscillate at a frequency determined by the inductance of the coils 10 and the capacity of the condenser 12.

A portion of the coils 10 is inductively coupled to a coil 14 which forms a low voltage high frequency secondary winding grounded at one end and connected at the other to the rotor 15 of a distributor having a number of stationary spaced terminals 16. These terminals are joined by separate conductors to radio frequency transformers, each comprising a primary 17 and a secondary 18. These primaries and secondaries are disposed adjacent to the separate spark plugs, each of which has a spark gap shown at 19. These transformers adjacent the spark plugs are step-up transformers so that the high frequency currents supplied through the distributor to the spark plugs are of sufficiently high voltage to bridge the gaps 19 of the igniters.

Thus in operation the high frequency oscillations generated by the tube 1 are stepped down in voltage by the function of the coil 14 and caused to flow through the distributor to the primaries 17 by turns. The conductors joining the coil 14 to the distributor and the contacts 16 thereof to the primaries 17 constitute a low voltage transmission line. At each of the spark plugs the high frequency current is stepped up by the secondaries 18; and ignition starts at each of the plugs at the instant when the rotor 15 arrives at the stationary distributor terminal 16 connected to that plug.

With this system no circuit breaker with contact points is employed. The sparking current is transmitted at low voltage and all of the leads between the coil 14 and the spark plugs can be radio-shielded to avoid energy loss. The system is very suitable for engines with a large number of cylinders operating at high speeds, because all effort necessary for the purpose of synchronizing the contact points of the usual interrupter is eliminated. The ignition is reliable and certain even if there are carbon deposits at the spark points or other causes of electrical leakage; and there is great reduction in wear at the spark plug electrodes because while the voltage is high the amperage is low. This system is also well adapted for ignition in oil engines.

The transformer including the coil 14 and the transformers including the coils 17 and 18 are inexpensive to make because they have air cores and the problem of winding these transformers presents little difficulty.

Having described the invention what is claimed is:

1. An ignition system comprising a generator of high frequency oscillations, an igniter, a step-down transformer to which said generator is connected, a step-up transformer to which said igniter is connected and a low tension transmission conductor between said transformers.

2. An ignition system comprising a vacuum tube generator of high frequency oscillations, an igniter, a step-down transformer connected to said

generator, a step-up transformer connected to the igniter, and a low tension transmission conductor between said transformers.

3. The combination of a generator of high frequency oscillations, a step-down transformer connected to said generator, a plurality of igniters, a step-up transformer connected to each igniter, and a distributor and low tension conductors between said transformers.

4. The combination of a vacuum tube generator of high frequency oscillations, a step-down transformer connected to said generator, a plurality of igniters, and step-up transformers connected to said igniters, and a distributor and low tension conductors for connecting the step-up transformers and the igniter in succession to the step-down transformer.

5. The method of ignition which consists in generating high frequency electrical oscillations, reducing the voltage of said oscillations, transmitting said oscillations at low voltage to a point in the vicinity of an igniter and then increasing the potential of said oscillations to supply said igniter with a high tension current of relatively low amperage.

6. The method of producing electrical energy which consists in generating high frequency oscillations, reducing the voltage of said oscillations, transmitting said oscillations at low voltage to a desired point and then increasing the potential of said oscillations to supply adjacent said point a high tension current of relatively low amperage.

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