Feb. 27, 1934. R. G. KLINGLER 1,948,925

AUXILIARY IGNITION SYSTEM

Filed Dec. 1, 1931. 2 Sheets-Sheet 1

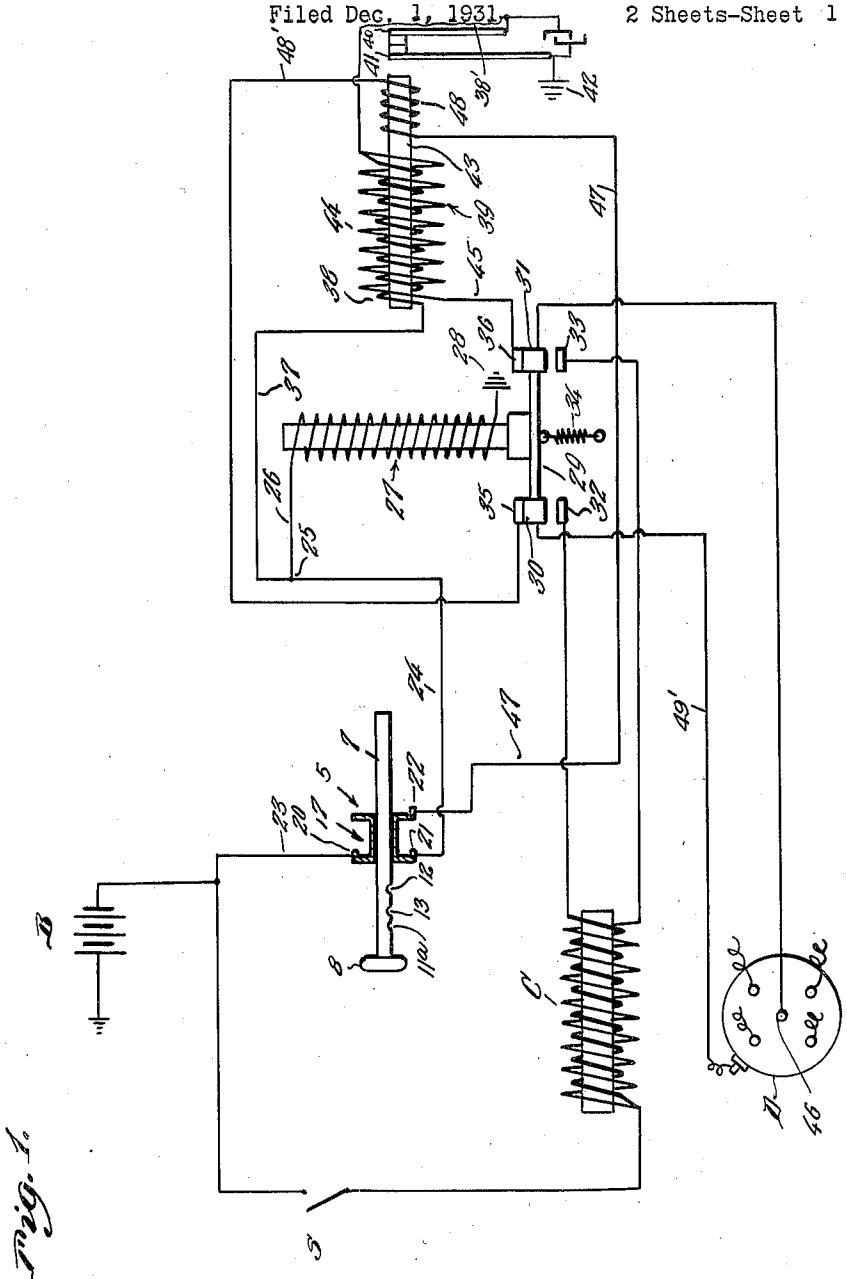


Fig. 1.

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Fig. 5.

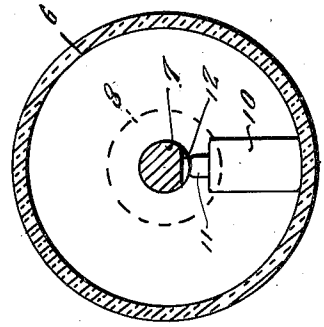
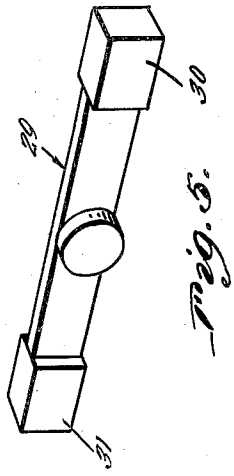


Fig. 3.



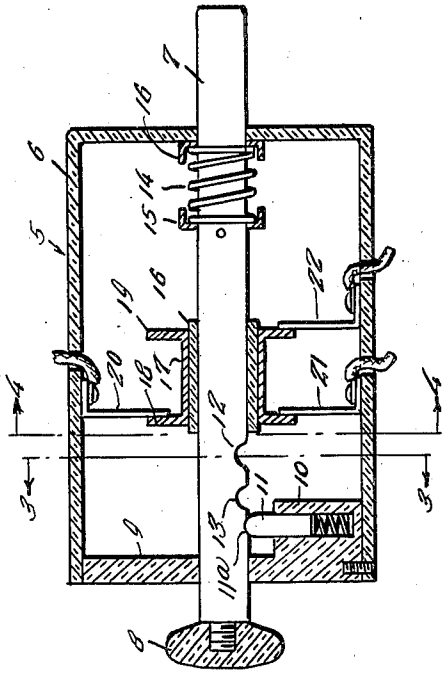


Fig. 4.

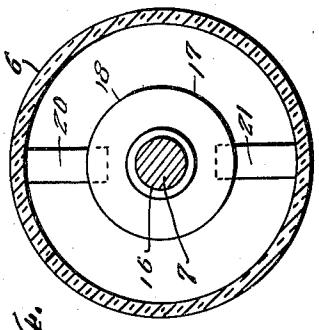


Fig. 2.

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1,948,925

UNITED STATES PATENT OFFICE

1,948,925

AUXILIARY IGNITION SYSTEM

Rayfield George Klingler, Shelby, Mont.

Application December 1, 1931. Serial No. 578,389

2 Claims. (Cl. 123—148)

This invention relates to an improved auxiliary ignition system for internal combustion engines which is designed to operate in conjunction with the existent ignition system or to act as a substitute therefor.

It is an important object of my invention to provide an auxiliary ignition system of the type described which is designed to operate in conjunction with the regular or existent ignition system, for instance, in an automobile, and to be set into action to assist and improve the operation of starting the engine, and adapted for use as an emergency ignition system when the regular or existent system is disabled.

It is also an important object of my invention to provide an auxiliary ignition system of the type described which may be manually connected with the existent ignition system, which may be manually disconnected therefrom, or manually arranged so as to substitute for the existent ignition system, cutting out of operation the said existing ignition system.

It is also an important object of this invention to provide means incorporated in an auxiliary ignition system of the type described which operates to synchronize the action of the said auxiliary ignition system whereby the effective power impulses generated by the said auxiliary ignition system are confined and limited to such periods in the operation of the engine as will bring about the most perfect coordination, for instance, between ignition spark and piston position, thereby eliminating the defective and imperfectly synchronized relationship of ignition spark and piston position which very frequently obtains in a regular ignition system, particularly if any of the elements thereof are not functioning at their highest efficiency.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this application and in which like numerals are employed to designate like parts throughout the same:

Figure 1 is a general diagrammatic view of the device of the invention.

Figure 2 is a longitudinal vertical section taken through the switch control means.

Figure 3 is a transverse vertical section taken approximately on the line 3—3 of Figure 2 looking in the direction of the arrows.

Figure 4 is a view similar to Figure 3 taken approximately on the line 4—4 of Figure 2 also looking in the direction of the arrows.

Figure 5 is a perspective view of an armature of one of the coils of the device of the invention.

In the drawings wherein for purposes of illustration is shown a preferred embodiment of my invention, the numeral 5 designates generally the manual switch control of the device of the invention which may be mounted upon the instrument board or the like convenient location adjacent the position of the operator of the automobile or the like. It consists of a casing 6 receiving slidably therethrough a rod 7 provided at one end with the suitable dielectric handle 8.

The end of the casing 6 adjacent the handle 8 is provided with a dielectric closure plate 9 having an inward extension 10 vertically bored to receive an outwardly spring pressed detent 11 adapted to engage with either of a pair of notches 12, 13 in the adjacent side of the bar 7. The bar 7 is normally projected in the direction of its handle by a spring 14 thereon which operates with and is extended between a sleeve 15 anchored on the bar and with a similar spring holder 16 secured to the back of the casing or not as desired. The handle is maintained in the full inward position shown in Figure 2 by the detent 11 seating in the small notch 11a in the underside of the bar 7 outward of the large notch 13.

Intermediate the ends of the bar 7 and rigidly connected thereto is an insulating bushing 16 carrying a spool-shaped conductive member 17 having the flanges 18 and 19, which act as contacts. From one side of the wall of the casing 5 there is supported an inwardly projecting L-shaped contact 20, and at an opposite position and aligned with the contact 20 is another similar contact 21. On the same side of the casing as the contact 21 there is another similar contact 22 spaced from the contact 21 at such a distance that when the contacts 20 and 21 are engaged by the flange 18, the flange 19 will engage the said contact 22 shown in Figure 2 of the drawings. It will be obvious that the handle 8 serves as a means for drawing the shaft 7 outwardly and pushing the same inwardly to the position shown in Figure 2. It will be obvious that the shaft 7 may be locked in two outward positions through the cooperation of the detent 11 with either notch 12, 13. When the detent 11 is positioned in the notch 13, the spool is out of contact with the contacts 20, 21 and 22, but when the detent 11 is positioned in the notch 12 the flange 19 contacts the contacts 20, 21, in this position being out of engagement with the contact 22. The utility of the structure just described will be evident as the description proceeds. The casing 6

is preferably formed of dielectric material, though, of course, it may be formed of any suitable material, the contacts 20, 21 and 22 and the shaft 7 being suitably insulated. Although it is an advantage to have the shaft 7 insulated, it is necessary to have the spool contact member 17 insulated from the shaft 7. The formation of the casing completely of dielectric material provides a device which meets all of the safety requirements.

My invention being designed to be used in conjunction with the regular high tension battery ignition system used on most types of internal combustion engines is installed by cutting the primary and secondary wires on the regular high tension coil C and connecting the auxiliary coil unit therewith.

The description of parts and the operation of my invention is as follows:—

The regular ignition switch S is first turned on, as is ordinarily done in starting the engine. Then, to put into operation my invention the switch button 8 is pushed in to bring the flange 18 of the spool 17 into contact with the points 20 and 21. The current from the battery B then flows through the wire 23, to point 20, through spool flange 18, to point 21, and through the wire 24, to the connection 25. Part of this current flows through the wire 26 into the winding of the electro-magnet 27 to the ground 28 and causes the electro-magnet 27 to attract the armature 29 carrying the points 30, 31, insulated from each other, which are normally held in contact with the fixed contacts 32, 33 by the coil spring 34, so that the points move into contact with the fixed contacts 35, 36. Consequent upon engagement of the points 30, 31 with the contacts 35, 36 the balance of the current in wire 24 flows from the connection 25 through the wire 37 and into the primary winding 38 of the auxiliary high tension coil 39 and through wire 38' to the stationary point 40 and the spring mounted vibrator point 41 and to the ground as indicated at 42. This sets up a magnetic flux in the core 43 of the auxiliary coil 39 causing the vibrator point 41 to vibrate, thereby building up a high frequency, high tension current in the secondary winding 44 of the auxiliary coil 39. This high tension current then flows from the secondary winding 44 through the wire 45 and the engaged points 36, 31 to the center of the distributor cap 46 and is distributed to the proper spark plug of the engine by the rotor in the distributor, causing a high frequency, high tension sparking between the points of the spark plug as long as the breaker points in the distributor are open or in cylinder firing position. A condenser is placed across the breaker points to reduce sparking at the points and induce a stronger spark in the secondary winding 44 of the auxiliary high tension coil 39.

When the engine has been turned over by the starter motor thereof or by hand cranking sufficiently so that the breaker points in the distributor have closed, current from the battery B will flow through the point 20 in the hand switch 5 through the flange 18 and the body of the spool 17 and through the flange 19 to the point 22, then through the wire 47 into the small winding 48 on the core 43 of auxiliary coil 39. The small winding 48 is wound accumulative magnetically to increase core flux around the core 43 of the auxiliary coil. The opposite end of the small winding 48 has wire 48' leading to point 35 engaged with point 30 and the breaker points which are grounded. This arrangement provides for building up sufficient magnetic force in the core 43 of the auxiliary coil to draw the spring mounted vibrator point 41 away from the stationary vibrator point 40 to hold the point 41 in this non-operative position and disengaged from the point 40 until a piston of the engine has reached the proper firing position in the cylinder and the breaker points in the distributor again open and break this circuit, which will allow the vibrator point 41 to again vibrate and create a high frequency, high tension spark in the spark plug.

When the engine has started the switch button 8 may be pulled out or released so as to disengage the detent 11 from the small notch 11*a*. The coil spring 14 will then push the switch rod 7 outwardly until the catch 11 drops into the notch 13 in the rod 7. This will move the flanges 18 and 19 of the spool 17 away from the points 20, 21 and 22 and hold the spool 17 in this neutral position. This cuts the battery current off from the electro-magnet 27 so that it immediately permits the armature 29 to be returned by the spring 34 with its points into contact with the fixed contacts 32, 33, which action disconnects the auxiliary coil 39 from the regular ignition system and permits the engine to operate on its regular ignition system.

An important benefit derived from my invention is that, in starting the engine, with the switch button 8 in the full inward position, a strong vibrating spark is delivered to the spark plugs continuously from the moment the breaker points in the distributor open until they close again, which will ignite the charge of gas in the cylinder much more readily than can an ordinary spark, even though the mixture may not be correct, the spark resulting at the plugs being much more intense and of much longer duration than the spark produced by the regular ignition system. It is obvious that in this arrangement it is the circuit breaker which controls the incidence and duration of the spark.

This important feature of my invention is achieved by the provision of the small winding 48 around the core 43 of the auxiliary coil 39, which is energized each time the breaker points in the distributor close so as to pull the vibrator point 41 away from the stationary vibrator point 40 and hold it in this non-operative position until the distributor breaker points again open. This arrangement provides a well timed spark at the spark plug for starting as current is not permitted to flow to the spark plugs until the piston is in the proper firing position in the cylinder and the distributor breaker points are open, which is the proper time for the spark to occur.

Another advantage of my invention is that, should the regular ignition system of the engine become disabled due to failure of the distributor breaker points to open or to close or to operate in synchronism, burning out of the regular ignition coil or grounding or open circuiting of a condenser, the motor may be kept running merely by pulling the switch button 8 outwardly until the catch 11 drops into the second notch 12 in the rod 7 of the switch 5 in which position the flange 19 of the spool 17 is in contact with the fixed contacts 20 and 21. This will let the battery current flow into the wire 24, and energize the electro-magnet 27 so that it pulls the points of the armature 29 into contact with the fixed contacts 35, 36 so that the regular ignition coil C is cut out and the auxiliary coil is

cut into the circuit as explained above. With the switch rod 7 in the position stated, the fixed contact 22 will not be in contact with the spool 17 in the switch 5 so that no current flows through the wire 47 to the small coil 48 and to the distributor breaker points and this part of the system remains inoperative. The point 41 now vibrates uninterruptedly and the auxiliary coil 39 functions continuously, the high frequency, high tension current being distributed to the spark plugs entirely by the rotor in the distributor. While the motor may be run on the auxiliary coil in this manner indefinitely, it should only be done as an emergency measure until the regular ignition system can be repaired.

Another advantage of my invention in starting the engine is the fact that it will operate efficiently even when the voltage and amperage of the battery current is much below normal due to heavy drain imposed upon it by the starting motor in attempting to start a cold motor or by high resistances likely to occur in the numerous connections in the ordinary ignition system, while the regular ignition system requires a fully charged battery in order to operate efficiently and develop a strong spark.

My invention will function perfectly in starting, even though the breaker points in the distributor are so badly burned or pitted that it would be practically impossible to start the motor with the regular ignition coil C. The reason for this is that the ordinary coil as commonly used requires approximately a six ampere current flow through the breaker points in order to work properly, while my auxiliary coil requires only one-half ampere current through the breaker points of the distributor to operate efficiently.

It is to be understood that the form of my invention herewith shown and described is to be taken as a preferred embodiment of the same, and that various changes in the shape, size, and arrangement of parts may be resorted to without departing from the spirit of my invention or the scope of the subjoined claims.

What is claimed as new is:—

1. In combination with a conventional internal combustion engine ignition system which includes a battery, a high tension transformer, a switch for connecting and disconnecting the battery to the transformer, a distributor unit including breaker points fed by the transformer, and a spark plug fed by the distributor; an auxiliary high tension transformer having a vibrator, switch means for connecting the auxiliary transformer to be fed by the battery and for simultaneously disconnecting the first transformer from the battery, and for disconnecting the secondary of the first transformer and simultaneously connecting the secondary of the auxiliary transformer in feeding relation to the distributor unit, coil means on the core of the auxiliary transformer and connectible by the switch means to be energized by the battery for increasing the magnetic flux of the core and thereby hold the vibrating arm of the auxiliary transformer vibrator inoperative and out of engagement with the stationary arm of the vibrator to prevent incidence of a spark at the spark plug, the breaker points of the distributor unit being interpolated in the circuit of the said coil means whereby the opening and closing of the distributor breaker points control the later incidence and longer duration at the spark plug of the spark produced by the auxiliary transformer.

2. A starting device for connection to a conventional internal combustion engine ignition system including a grounded battery, a transformer fed by the battery, a distributor unit fed by the transformer, and a spark plug fed by the distributor, said distributor unit having breaker points, said starting device comprising an auxiliary transformer provided with vibrator points, an auxiliary winding on the auxiliary transformer energizable to increase the magnetic flux of the core to hold open the vibrator points of the auxiliary transformer, and switch means operable for simultaneously disconnecting the battery from the first transformer and connecting it to the auxiliary transformer, while disconnecting the secondary of the first transformer from the distributor unit and connecting the secondary of the auxiliary transformer to the distributor unit, and for connecting and disconnecting one side of the auxiliary winding with one side of the distributor breaker points and the remaining side of the auxiliary winding with the battery, the remaining side of the breaker points being grounded, the opening and closing of the distributor breaker points thereby controlling the later incidence and longed duration of the spark produced by the auxiliary transformer at the spark plug.

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