Jan. 9, 1923. 1,441,451

W. W. RIEDEL.
IGNITION SYSTEM.
FILED JAN. 8, 1921.

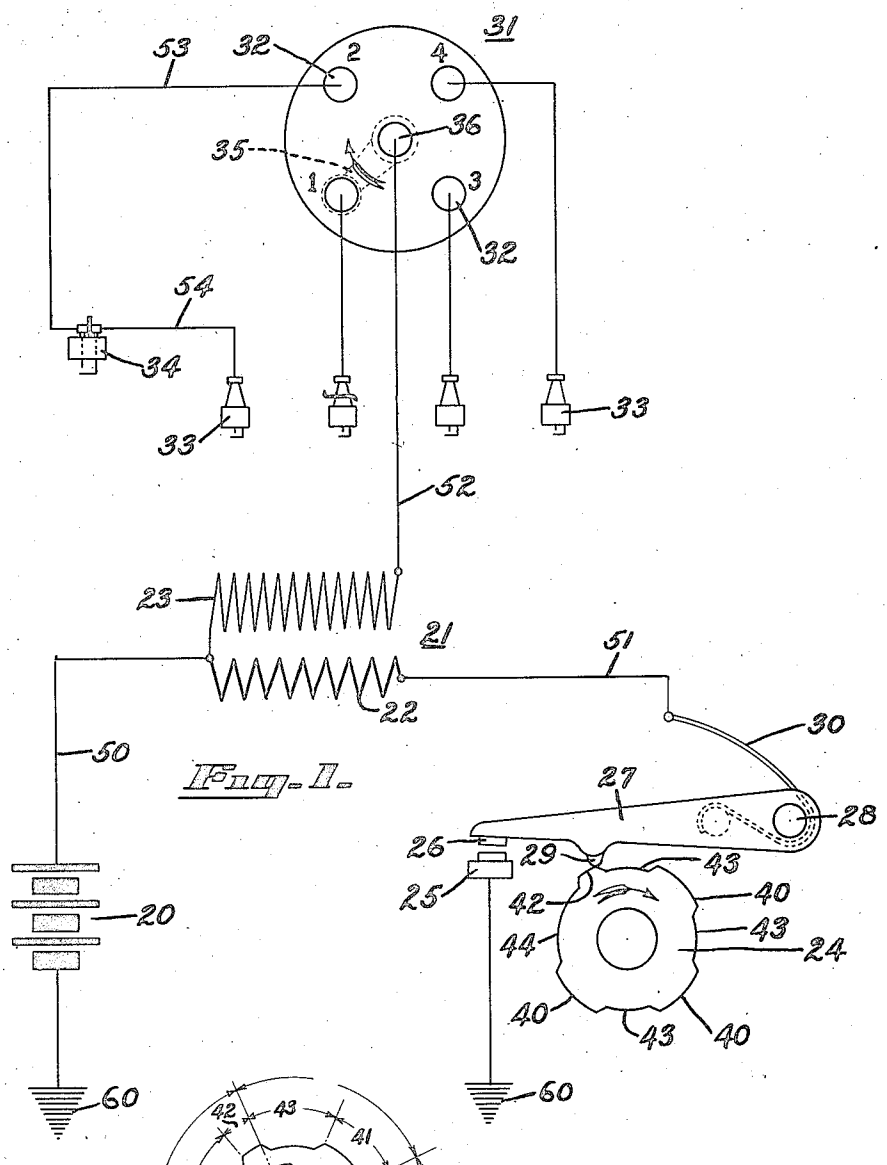


Fig. 1.

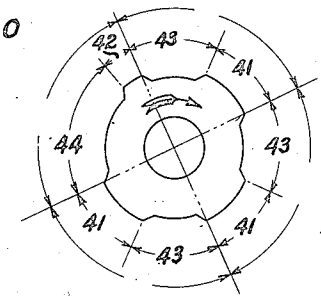


Fig. 2.

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Patented Jan. 9, 1923. 1,441,451

UNITED STATES PATENT OFFICE.

WALTER W. RIEDEL, OF DAYTON, OHIO, ASSIGNOR TO THE DAYTON ENGINEERING LABORATORIES COMPANY, OF DAYTON, OHIO, A CORPORATION OF OHIO.

IGNITION SYSTEM.

Application filed January 8, 1921. Serial No. 435,863.

To all whom it may concern:

Be it known that I, WALTER W. RIEDEL, a citizen of the United States of America, residing at Dayton, county of Montgomery, State of Ohio, have invented certain new and useful Improvements in Ignition Systems, of which the following is a full, clear, and exact description.

This invention relates to an ignition system for an internal-combustion engine provided with an electrically ignited fuel burner.

It is among the objects of the present invention to provide ignition for a fuel burner, from the regular engine ignition system without affecting the efficiency of same.

Another object is to provide a new element capable of replacing a certain similar element of the regular engine ignition unit, whereby the first mentioned object is attained.

Other and further objects of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred embodiment of the present invention is clearly shown.

In the drawings:

Fig. 1 is a diagrammatic view showing the electrical connections between the various elements of the system; and

Fig. 2 is a detailed view of the cam element shown in Fig. 1.

Referring to the drawings, the numeral 20 designates a storage battery connected to an ignition coil 21 provided with primary winding 22, secondary winding 23. An engine operated cam 24 is adapted to operate or control the circuit interrupter comprising a stationary contact 25 adapted to cooperate with the movable contact 26 secured to one end of the lever arm 27 pivoted at the point 28. This arm 27 has a cam riding block 29 held in engagement with the cam 24 by means of a spring element 30 which is also adapted to act as a conductor for current passing from the primary winding to the contact arm 27. A distributor device 31 is provided having stationary terminals 32 which are adapted to be in electrical connection with the various spark plugs 33 of any suitable type of internal-combustion engine, not shown in the drawings. In the circuit between one of these terminals 32 and the spark plug 33 there is connected in series a plug 34 of a burner, said burner being associated with the internal-combustion engine for auxiliary heating purposes and being of a type illustrated and described in the copending application of William A. Chryst, Serial No. 367,630, filed March 22, 1920. The distributor unit 31 also comprises an engine operated rotor element 35 which is adapted to conduct the sparking impulses from a central terminal 36, connected to the secondary winding 23 of ignition coil 21, to all of the stationary terminals 32 in regular sequence.

As has been mentioned before, one of the objects of the present invention is to provide ignition for electrically ignited fuel burners from a regular engine ignition system without affecting the efficient operation thereof. As is shown in Fig. 1 the burner spark plug 34 is connected in series with one of the engine plugs 33, thereby tending to provide a sparking impulse for plug 34 by the same agency that provides sparking impulses for one of the engine plugs 33. It may readily be seen that if no special provisions were made, the sparking impulse intended for the engine spark plug having the burner plug in series, would tend to be very weak in this engine cylinder due to the fact that this impulse is required to jump an additional gap provided in this circuit.

In order that the sparking impulses to the engine cylinder having the plug connected in series with the burner plug 34 may be substantially equal in intensity to the impulses to the other plugs, arrangements have been made so that when producing a sparking impulse to this plug, the current flowing into the ignition coil for energizing the same is permitted to flow therein for a longer period than during energization of said coil for producing sparking impulses to the remaining engine spark plugs. This is done by providing a cam 24 having lobes 40 which are so constructed and arranged as to permit the contact points 25 and 26 to remain in circuit closing position for a longer period of time during the building up process of the coil 21 previous to the provision of a sparking impulse to the engine spark plug having the burner plug connected in series. As shown in the drawings, the engine includes four spark plugs 33 connected to four stationary

terminals 32 of a distributor unit 31. These terminals 32 are located at equal distances from each other. By referring to Fig. 2 it may be seen that the opening points of the cam having the center lines running therethrough, are equidistant from each other to correspond with the equidistant arrangement of the terminals 32. Three of the lobes 40 are of the same width shown in spaces 41. The fourth lobe has a narrower face as shown in the space 42. Due to this construction of the lobes, three of the spaces between said lobes will be equal as is shown at 43, while the space 44, which is between one of the large lobes and the small lobe, is of much greater length than the other three equal spaces. By referring to Fig. 1 and especially to the cam element 24, it may be seen that when the cam element is rotating in the direction of the arrow, the arm 27 will be held in circuit opening position until the cam rider 29 rides off of this cam or over the face 42 into the space 44. During this time, that is while said rider is riding in the space 44 of cam 24, the contacts 25 and 26 will be closed and current will be permitted to flow from the battery 20 through the wire 50, primary winding 22, wire 51, spring 30 to the arm 27 across the contacts 26 and 25, back to the battery via the ground 60. Upon continued rotation of the cam 24 the cam riding block 29 will mount upon one of the three equal lobes and across the face 40, thereby tending to produce a sparking impulse in the ignition coil which will be directed from the secondary winding 23 through wire 52, to the central terminal 36 and thence through the rotor 35 to the stationary terminal 32, wire 53, across the spark plug 34, wire 54 to the plug 33 furnishing a spark at both plugs 34 and 33. Then upon continued rotation the cam riding block will ride into the space 43 permitting the contacts 25 and 26 to again engage, which permits the battery 20 to build up energy in the ignition coil 21. It can be seen that for the next three sparks the building up of the ignition coil 21 will be equal and of less value than the building up of the ignition coil for the sparking impulse to be provided for the burner and engine plug in series, due to the fact that the spaces 43 are of shorter length than the space 44, and consequently the building up period of said coil will be of lesser duration during these three periods than the period during which the cam riding block 29 rides in the space 44. It will, of course, be understood that any variation of the length of the space 44 will tend to vary the energization of the ignition coil 21 and thereby vary the intensity of the sparking impulse during this portion of the cycle of operation of the ignition apparatus.

While the form of mechanism herein shown and described constitutes a preferred form of embodiment of the invention, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What I claim is as follows:—

1. In an ignition system, the combination with an internal-combustion engine provided with an electrically ignited fuel burner; of a source of current; ignition apparatus including a circuit interrupter; means controlling said interrupter for producing in recurrent sequence a series of sparking impulses certain of which are of greater intensity than the others; and means for distributing the sparking impulses, said means being constructed so that the impulse of greater intensity will be conducted to the burner plug and one engine plug connected in series.

2. In an ignition system, the combination with an internal-combustion engine provided with an electrically ignited fuel burner; of a source of current; ignition apparatus including a circuit interrupter; a cam controlling said interrupter for producing in recurrent sequence a series of sparking impulses certain of which are of greater intensity than the others; and means for distributing the sparking impulses, said means being constructed so that the impulse of greater intensity will be conducted to the burner plug and one engine plug connected in series.

3. In an ignition system, the combination with an internal-combustion engine provided with an electrically ignited fuel burner; of a source of current; ignition apparatus including an ignition coil and a circuit interrupter; a cam adapted to operate said interrupter and having one lobe of different construction than the remaining lobes whereby the interrupter will be operated to provide a sparking impulse of greater intensity than other impulses; and a distributor for distributing the greater intensity impulse to the burner and one engine plug in series and other impulses to other spark plugs of the engine, all in proper sequence.

4. In an ignition system, the combination with an internal-combustion engine provided with a fuel burner; of a source of current; ignition apparatus including an ignition coil and a circuit interrupter; a cam adapted to operate said interrupter and having a plurality of lobes with spaces therebetween one of which is of greater length than the others, for providing a sparking impulse of greater intensity; and a distributor for distributing the impulse of greater intensity to the burner and one engine plug in series and the other impulses to the other engine plugs, all in proper sequence.

5. In an ignition system, the combination

with an internal-combustion engine provided with a fuel burner; of a source of current; ignition apparatus including an ignition coil and a circuit interrupter; a cam provided with a plurality of lobes so constructed and arranged that during one cycle of its operation said cam will operate the interrupter for intermittently connecting the ignition coil with the current source during varying time intervals, whereby said coil will be permitted to become more greatly energized at certain periods during the cycle of cam operation than at others to provide certain sparking impulses of greater intensity than others; and distributing means for directing the sparking impulse of greater intensity to the burner and an engine plug in series, and the impulses of lesser intensity to the other engine plugs, all in proper sequence.

In testimony whereof I hereto affix my signature.

WALTER W. RIEDEL.

Witnesses:

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IRVIN A. GREENWALD.