Jan. 16, 1923.

1,442,489

M. MALLORY.
IGNITION SYSTEM.
FILED NOV. 9, 1920.

2 SHEETS-SHEET 1

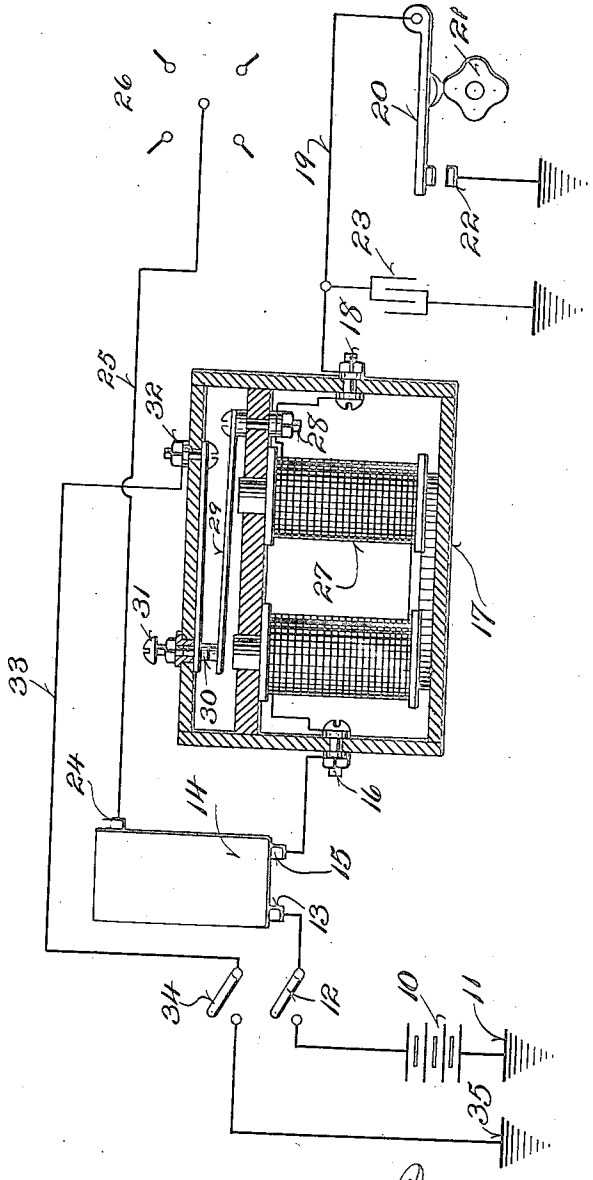

Fig. 1.

Witness:
T. T. Pratt

Inventor
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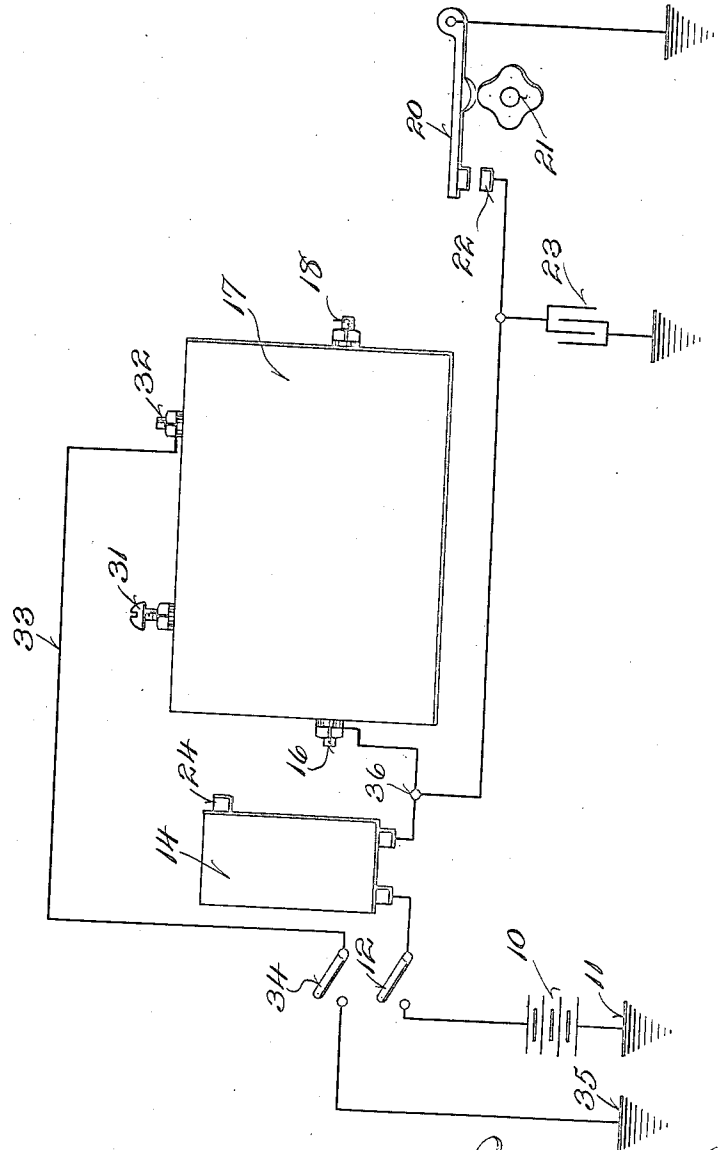
2 SHEETS-SHEET 2

Fig. 2.



Witness:
T. P. Britt

Inventor
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By Young & Young
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Patented Jan. 16, 1923. 1,442,489

UNITED STATES PATENT OFFICE.

MARION MALLORY, OF MILWAUKEE, WISCONSIN, ASSIGNOR OF ONE-FIFTH TO THOMAS WALKER, OF MILWAUKEE, WISCONSIN, AND TWO-FIFTHS TO WILBER ROMAINE, OF MILWAUKEE, WISCONSIN.

IGNITION SYSTEM.

Application filed November 9, 1920. Serial No. 422,810.

To all whom it may concern:

Be it known that I, MARION MALLORY, a citizen of the United States, and resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Ignition Systems; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to new and useful improvements in ignition systems for internal combustion engines.

It is well known that with the low grade fuel now commonly in use and especially in cold weather, great difficulty is often experienced in starting the engine, owing to the fact that the single spark usually furnished at each compression fails to come in contact with or ignite the fuel mixture. It has been proposed, therefore, to provide a high frequency spark system which will furnish a shower of sparks at each compression, but after the engine is warmed up only a single spark is wanted. To meet this condition two separate systems have been provided, the shower spark system to be used in starting and the single spark system to be used after the engine has become warmed up.

An object of my invention is to provide an ignition system including both a single spark and a shower spark circuit, both using the same source of energy, and which will be simpler and less cumbersome, as well as less expensive than those hitherto known.

A further object of the invention is to provide a combined single spark and shower spark system wherein the single spark alone may be used, or both may be used together, the shower of sparks occurring immediately after the single spark.

Other objects and advantages will appear from the detailed description which follows, in which:

Figure 1 is a diagrammatic view of one form of my invention, and

Figure 2 is a similar view of a modified form.

The energy for producing the sparks in the device as illustrated, is furnished by the battery 10, one terminal of which is connected with the ground 11 the other terminal being connected through the switch 12 with one terminal 13 of the induction coil which is located in the box 14. The current passes from the opposite terminal 15 of the induction coil through the terminals 16 and 18, wire 19 and blade 20, which is operated by the rotary cam 21 to make and break contact at 22 with the ground. This primary circuit is also provided with the condenser 23.

The structure thus far described, is the usual type of primary circuit for the single spark ignition. The secondary circuit leaves the secondary coil at 24, passes through wire 25 to the distributor 26 and thence to the spark plugs.

In carrying out my invention I have introduced between the binding posts 16 and 18, the magnetic coils 27. A branch conductor is connected with the circuit at 28 passing through the vibrating blade 29, contact points 30 which are adjustable by means of a screw 31, through the binding post 32, wire 33, switch 34 to the ground at 35.

In the usual operation of the engine with the ignition switch closed, a single spark is produced, the contact at 22 being broken by the cam 21. If the switch 34 is closed at the same time, the operation will be the same as long as the contact at 22 is closed since the current passing through the electro-magnetic coil 27 will hold the blade 29 down with the contact points 30 open. Just as soon, however, as the contact at 22 is broken producing a spark at the spark plug, the current will pass through the vibrator 29, causing the contacts at 30 to be rapidly made and broken, resulting in a shower of sparks in the engine cylinder.

Figure 2, which illustrates a modified form of the present invention, is identical to the preferred form shown in Figure 1, with the exception of the primary circuit for the single spark ignition. In this form of the invention, the wire leading to the ground through the make and break is connected at the point 36 before the electro-magnets 27. It is obvious that this arrangement will in no way alter the action of the vibrator in the shunt circuit.

I claim as my invention:

1. An ignition system comprising an electric circuit, an interrupter therefor, an induction coil, an electro-magnet in said circuit between said induction coil and said interrupter, a branch conductor the ends of which are connected into said circuit one on

each side of said interrupter, and means operated by said electro-magnet when energized to break the circuit through said branch conductor.

2. An ignition system comprising an electric circuit, a timer therefor, an induction coil, an electro-magnet in said circuit between said induction coil and said timer, a branch conductor the ends of which are connected into said circuit one on each side of said interrupter, means operated by said electro-magnet when energized to break the circuit through said branch conductor and a secondary circuit, including a distributor, through which current is induced by said induction coil.

3. An ignition system comprising a main electric circuit, an interrupter therefor, a shunt around said interrupter, an electro-magnet common to the main circuit and shunt, a vibrator blade in said shunt and in cooperative relation to said magnet, whereby a vibratory current will be produced through the shunt when the interrupter is opened and the shunt circuit through the vibrator will be held open when the interrupter is closed.

In testimony that I claim the foregoing I have hereunto set my hand at Milwaukee, in the county of Milwaukee and State of Wisconsin.

MARION MALLORY.