March 5, 1957 P. E. HINES 2,784,244

IGNITION UNIT

Filed Feb. 29, 1952

Fig. 1

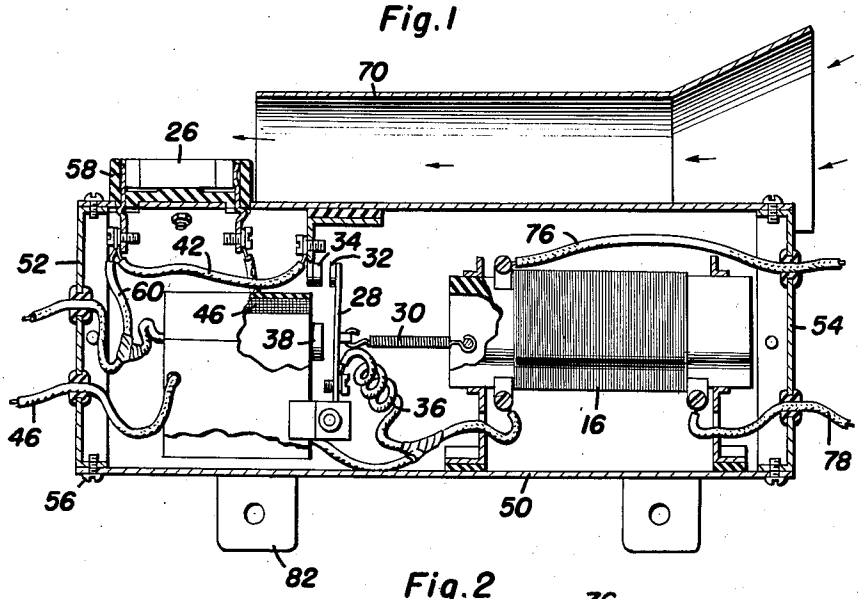


Fig. 2

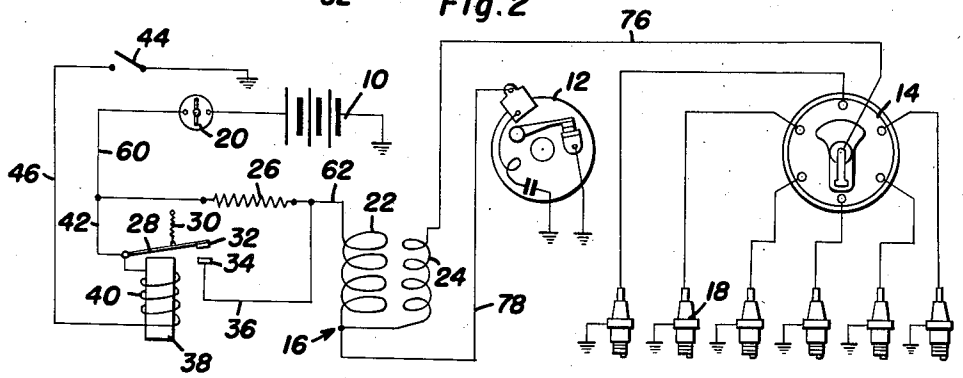
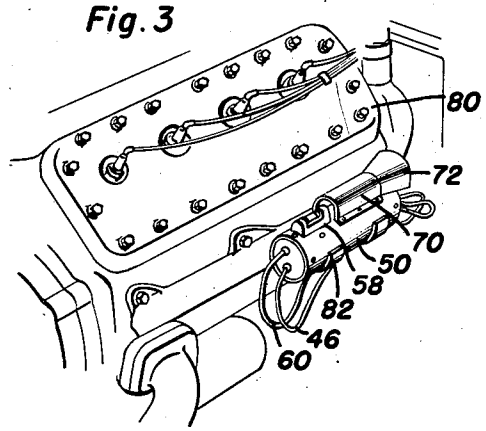


Fig. 3



Philip E. Hines
INVENTOR.

BY Clarence A. O'Brien and Harvey B. Jacobson
Attorneys

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IGNITION UNIT

Philip E. Hines, Nepton, Ky.

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2 Claims. (Cl. 123—148)

This invention relates to an ignition unit and particularly to a unit for starting under adverse voltage conditions.

In the operation of motor vehicles, it is customary to find that in very cold weather the battery voltage is low and the stiffness of the motor makes an extra drag on the starter, so there is not enough voltage available to give a good hot spark to secure starting.

The present invention relates to an ignition unit for eliminating this trouble and providing a hot spark for starting under adverse voltage conditions.

The ignition unit according to the present invention comprises an induction coil having a low voltage starting unit and a means connected in series therewith to reduce the normal voltage to the lower voltage which is essential for the coil. Under the conditions when the voltage would normally be low, it is possible to remove the impedance in series with the coil and impress all of the voltage that is available across the low voltage primary to secure the hot live spark to the necessary ignition. The unit is combined in a container in such a manner that the entire container may be cooled without any dirt or moisture being admitted to the ignition unit.

It is accordingly an object of this invention to provide an improved ignition unit.

It is a further object of this invention to provide an ignition unit for producing a hot spark under adverse voltage conditions.

It is a still further object of this invention to provide a circuit in which a portion of the impedance may be reduced when the voltage is naturally low.

It is another object of this invention to provide an ignition unit in which the strength of the spark is under the control of the operator.

Other objects and many of the attendant advantages of this invention will be apprised from the following detailed description taken in conjunction with the accompanying drawings in which:

Figure 1 is a sectional elevation through the ignition unit according to this invention;

Figure 2 is a schematic wiring diagram showing the method of utilizing the invention; and,

Figure 3 is a perspective view of a motor showing the ignition unit mounted thereon.

According to the exemplary embodiment of the invention a source of electric energy such as a battery **10** is connected to the ignition system including a breaker **12** and a distributor **14** for applying high voltage potential of the coil **16** through a plurality of spark plugs **18**. Current application to the ignition system is controlled by the usual off and on switch **20**. The heretofore described parts are customary in an ignition system and are not part of the present invention.

The present invention includes a coil **16** having a primary winding **22** which is wound to operate at a relatively low voltage and a secondary winding **24** producing the usual high potential voltage to be delivered to the distributor **14**. Since the source of potential **10** is

at the usual voltage of the normal vehicle battery, the impedance **26** is connected in series circuit relation between the battery **10** and the primary winding **22** to reduce the potential applied to the primary winding **22** to the voltage to which it is wound. During normal voltage condition of the battery **10**, the impedance **26** which is usually in the form of a wound resistor, as seen in Figure 1, is maintained in circuit relation between the battery **10** and the coil **22**. However, when there is an abnormally low voltage in the battery **10**, or for some other reason, the terminal voltage is reduced, a switch **28** normally biased to open position by spring **30** is provided with contacts **32** and **34** to close a shunt circuit **36** around the impedance **26**. The switch member **28** is controlled by a magnetic member **38** on which is wound a coil **40** connected to the ignition circuit by a conductor **42**. The other terminal of winding **40** is connected to an auxiliary switch **44** by means of a conductor **46**.

The unit is mounted in a substantially cylindrical container **50** having ends **52** and **54** which are connected in any conventional manner and maintained in position by the fasteners such as screws **56**. The ends **52** and **54** close the container in substantially gas tight relation so that the ignition unit will remain clean and in operative condition. The switch including the coil **40** on the magnet **38** as well as the inductance coil **16** is mounted within this container. The impedance **26** is mounted in a bracket **58** which is secured on the exterior of the container **50** and is connected across the switch **28** by means of a conductor **42** and **46**. The conductors **42** and **46** are connected to the conductor **60** which connects the switch **20** to the terminal of the impedance **26** while the conductor **46** connects the terminal **34** to the conductor **62** which connects the impedance to the input terminal of the coil **22**.

In order to maintain the ignition unit in properly cooled condition an air duct **70** is secured on the exterior surface of the container **50** and is provided with a wind scoop **72** for producing an air stream through the duct **70** to cool the container **50**. The bracket **58** containing the impedance **26** is mounted at the rear of the duct **70** so that the air stream flows all over.

The high potential terminal of the induction coil **16** is connected by a conductor **76** through the distributor **14** while the ground terminal of the coil **16** is connected to the breaker **12** by means of a conductor **78**. The container **50** is mounted on any convenient device, such as the motor **80** by means of brackets **82**.

In the operation of the device with normal voltage the switch **28** is maintained in open condition so the impedance **26** reduces the battery voltage to the necessary voltage to operate the coil **22**. In the event of lower voltage for any reason such as cold or heavy draft by the starting motor, the switch **44** may be closed which will close the switch **28** and remove impedance **26** from the circuit by means of shunt valve **42** and **36** and the total voltage of the battery will be applied to the coil **22** to produce a hot spark at the plugs **18**.

For purposes of exemplification a particular embodiment of this invention has been shown and described to the best present understanding thereof. It will be apparent to those skilled in the arts that minor changes in modification can be made thereon without departing from the true spirit of the invention.

Having described the invention, what is claimed as new is:

1. In an ignition circuit having an inductance coil and an impedance connected in series circuit relation, a switch connected in shunt with said impedance, resilient means biasing said switch to open position, a magnetic means for closing said switch, auxiliary circuit means in-

cluding a control switch for selectively energizing said magnetic means, a sealed container enclosing said inductance coil, said switch and said magnetic means, said impedance being mounted on the exterior of said container, an air duct secured to said container and a wind scoop directing an air stream through said air duct and over said impedance.

2. For use in an ignition circuit having an impedance and an inductance coil connected in series circuit relation, a switch connected in shunt with said impedance, resilient means biasing said switch to open position, a magnetic means for closing said switch, auxiliary circuit means including a control switch for selectively energizing said magnetic means, a sealed container enclosing said inductance coil, said switch and said magnetic means, an air duct secured to said container and a wind scoop directing an air stream through said air duct, said impedance being mounted exterior of said container and in the air stream flowing through said air duct.

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