April 19, 1932. W. E. ALBERTSON 1,854,166

MAGNETIC IGNITION SWITCH

Original Filed June 5, 1931

Fig. 1.

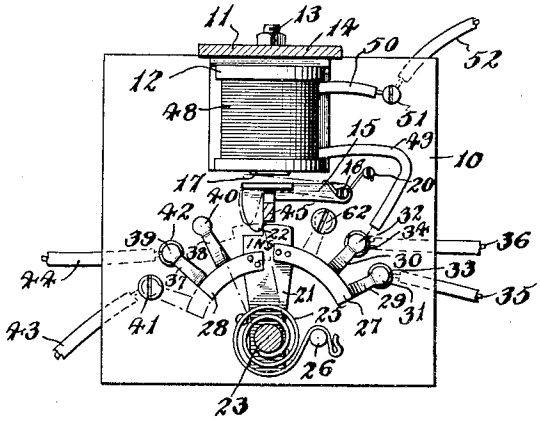


Fig. 2.

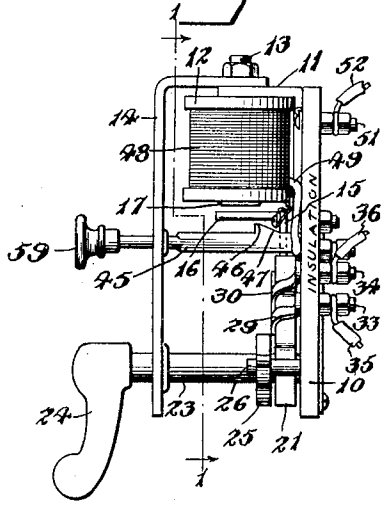


Fig. 3.

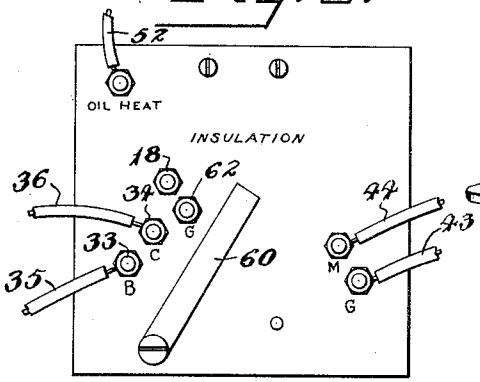


Fig. 4.

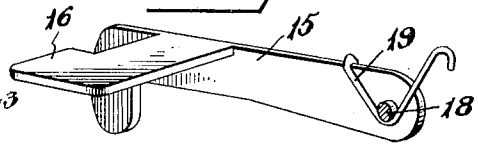


Fig. 5.

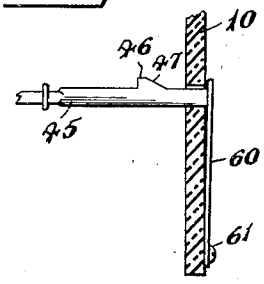
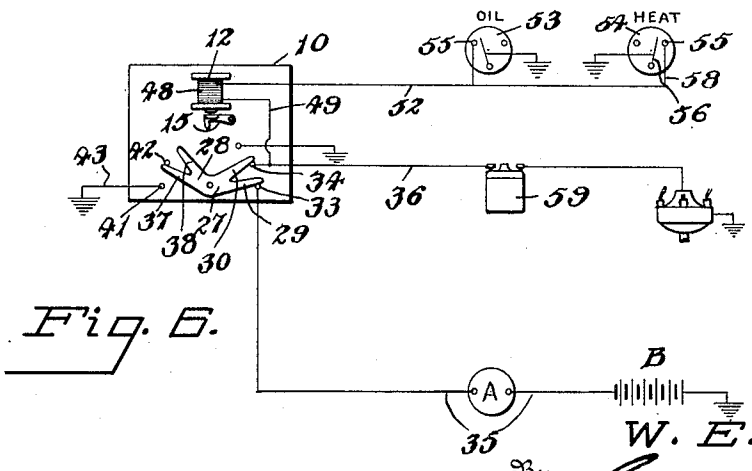


Fig. 6.



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UNITED STATES PATENT OFFICE

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MAGNETIC IGNITION SWITCH

Original application filed June 5, 1931, Serial 542,392. Divided and this application filed September 21, 1931. Serial No. 564,201.

This invention relates to oil and temperature controlled ignition switches of that general class shown and described in my copending application, filed in the United States Patent Office on the 5th day of June, 1931, bearing Serial No. 542,392, and of which the present application is a division.

The object of the invention is to provide a magnetic ignition switch for automotive engines by means of which the ignition circuit will be automatically opened in the event of the oil pressure or level becoming so low, or the temperature of the cooling system becoming so high, as to endanger the bearings, cylinder walls, and other parts of the motor.

A further object is to provide a magnetic ignition switch including a pressure and heat gage operated electro-magnet, and a spring-pressed pivoted switch segment which is released by the magnet for instantly opening the ignition circuit upon a predetermined drop in oil pressure, or predetermined rise in temperature, the device being small, compact, inexpensive to manufacture, and being adapted to be located at any convenient place on the motor or vehicle.

A further object is to provide a magnetic ignition switch which may be used as the ignition switch on standard equipment, or may be used independently of or in connection with the standard ignition switch, and may be hooked up to control dual ignition including both magneto and distributer and coil ignition apparatus, or may be used alone to control either magneto ignition apparatus or battery and coil ignition apparatus.

With the above and other objects in view the invention consists in certain novel details of construction and combinations of parts hereinafter fully described and claimed, it being understood that various modifications may be resorted to within the scope of the appended claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings forming part of this specification,

Figure 1 is a sectional view taken on the line 1—1 of Fig. 2 and showing the parts in front elevation in full lines in normal position and in dotted lines in operative position to open the ignition circuit,

Fig. 2 is an end elevation of the switch with the cover removed,

Fig. 3 is a rear elevation of the device, showing the terminals and showing the spring for controlling the push rod,

Fig. 4 is a detail perspective view of the pivoted armature and dog,

Fig. 5 is a fragmentary sectional view showing the push rod and controlling spring,

Fig. 6 is a diagrammatic view showing one application of the switch, said switch being applied to a battery, coil and distributer ignition system.

Referring now to the drawings in which like characters of reference designate similar parts in the various views, the magnetic ignition switch is shown to comprise a base 10 preferably formed of insulating material, such as bakelite or the like, upon which is mounted, near the top thereof, an angle iron bracket 11. An electro-magnet 12 is secured to the underneath face of the bracket by means of a bolt 13 which also secures an angle iron bracket 14 to the bracket 11, which bracket 14 forms a mounting for the hereinafter described push rod and shaft of the ignition switch.

A combined armature and dog, best shown in Fig. 4, is pivoted on the base 10 below the electro-magnet and comprises a dog 15 and an armature 16, which latter projects laterally from the dog to extend underneath the core 17 of the electro-magnet, as best shown in Fig. 2. The dog is provided with a depending hook or finger 16′ and is preferably pivoted to the base by means of a bolt 18. A substantially V-shaped spring 19 is looped over the bolt, one of the terminals of the spring being hooked over the dog, and the other terminal being hooked over an attaching screw 20, as best shown in Fig. 1, to normally hold the dog pressed downwardly to engage the pivoted switch segment, as will now be described.

The pivoted switch segment 21 is preferably formed of insulating material, such as bakelite or the like, and is of the general shape shown in Fig. 1. The upper edge of the seg-

ment is notched, as shown at 22, to receive the depending hook or finger 16′ of the dog 15. The lower end of the segment is keyed or otherwise rigidly secured to a rock shaft 23 which, as shown in Fig. 2, is journaled at one end in a suitable opening in the base 10 and, at the opposite end, projects through a suitable opening in the above-mentioned front angle iron bracket 14. An ignition switch handle 24 is fixed to the projecting end of the rock shaft for manually turning the shaft clockwise. For automatically turning the shaft counter-clockwise, a spiral spring 25 encircles the shaft in front of the segment 21, one end of the spring being rigidly secured to the shaft in any preferred manner, and the opposite end being hooked over a pin 26 carried by the base plate.

The switch points are mounted, as usual, on the pivoted segment 21 and, as best shown in Fig. 2, comprise a pair of arcuate copper or other metal arms 27 and 28 which are riveted or otherwise fixed at the inner ends upon the segment and extend from opposite sides of the segment. The arm 27 is provided with spaced fingers 29 and 30 which are bent obliquely toward the base 10 and terminate in disks 31 and 32 which have wiping contact with corresponding fixed switch contacts 33 and 34 on the base 10 and which are connected, as will be hereinafter more fully described, by corresponding conductor wires 35 and 36 preferably to the ammeter and to the high tension coil.

Likewise, the arm 28 is provided with fingers 37 and 38 which terminate in disks 39 and 40, respectively, which have wiping contact with respective stationary switch contacts 41 and 42, carried by the base 10, when the segment 21 is moved by the controlling spring 25 thereof counter-clockwise to ground the magneto ignition apparatus, the stationary switch contacts 41 and 42 being connected by corresponding conductor wires 43 and 44 to the ground and to the magneto, respectively.

It is now clear that when the pivoted switch segment 21 is manually turned clockwise by means of the ignition switch handle 24, the depending hook or finger of the dog 15 will lodge in the notch 22, as shown in Fig. 1, and hold the segment in this position. For the purpose of manually releasing the dog when necessary, a push rod 45, as best shown in Figs. 2 and 5, is slidably and non-rotatably fitted in openings in the base 10 and front angle iron bracket 14 and is equipped on the upper side with a tooth 46 having an inclined cam surface 47 on the rear edge which, when the push rod is moved inwardly, rides upon the underneath edge of the dog 15 and rocks the dog upwardly against the tension of its controlling spring 19 to dislodge the dog from the notch 22 and permit the spring-pressed pivoted segment 21 being instantly moved in a counter-clockwise direction by its controlling spiral spring 25. It will be noted that when the dog is in engagement with the switch segment the push rod 45 will bear against the straight inner face of the depending finger or hook 16′ and thus be guided thereby when said push rod is moved inwardly to release the dog.

It will also be noted that owing to the fact that the push rod is positioned immediately below the pivoted dog, when the switch segment is moved to off position, said rod will act as a stop to limit the downward swinging movement of said dog. The purpose of the electro-magnet 12 is to release the dog automatically and, to this end, the electro-magnet coil 48 has one terminal 49 thereof connected to the above-mentioned stationary or fixed switch contact 34 which is in the battery circuit. The other terminal 50 of the coil is connected to a binding post 51 on the base 10 from which a wire 52 leads, as best shown in Fig. 6, to the oil gage 53 and temperature gage 54.

Each gage is provided with an insulated binding post 55 in the path of movement of the indicating hand 56 which is, of course, grounded. Said wire 52 is connected to said insulated binding posts by corresponding wires 57 and 58.

It will be now clear that in the event of the oil pressure or level dropping dangerously low, for example to two or three pounds, or in the event of the temperature of the cooling system rising dangerously high, a circuit may be traced from the storage battery B, see Fig. 6, through the wire 35, finger 29, arm 27, finger 30, wire 49, coil 48 of the electro-magnet, and through the wire 52 to the grounded hand of the oil or temperature gage, so that the electro-magnet is energized.

The electro-magnet thereupon attracts the armature 16, thereby rocking the dog 15 on its pivot and dislodging the finger 16′ from the notch 22 in the segment 21. The segment is instantly rotated counter-clockwise by its controlling spring 21 to disengage the fingers 29 and 30 from the fixed contacts 33 and 34, which are in series circuit with the battery B and coil 48 through the wire 35 and the wire 36, see Fig. 6, so that the primary ignition circuit is broken by such movement of the pivoted segment 21.

The primary purpose of the push rod 43 is to manually open the ignition circuit whenever desired, and, for this purpose, the push rod is equipped, as will be observed by referring to Fig. 2, with a knob 59 on its outer end. A leaf spring 60, as best shown in Fig. 5, is secured at one end to the back of the base 10 by means of a screw 61 and bears with its free end against the inner end of the push rod, which, as will be observed, projects through an opening in the base plate. The leaf spring thus holds the push rod at

its outer limit of movement so that the cam surface 47 will be disposed normally out of engagement with the dog. It is clear, however, that, by simply pushing in on the knob 59, the cam surface will be brought into engagement with the dog, as above described, and the dog will be lifted and dislodged from the notch 22 in the pivoted switch segment 21 to permit the latter being moved by its controlling spring to open the ignition circuit, as above described.

It will be observed that when the ignition switch is initially turned to close the primary ignition circuit, when the motor is cold at starting, the grounded hands of the gages will both be in engagement with the insulated contacts, so that the electro-magnet will be energized and will automatically open the ignition circuit. In order to counteract the effect of the electro-magnet when starting, it is, therefore, necessary to manually hold the ignition switch handle 24 stationary so that the ignition circuit from the battery through the coil and distributer will be maintained closed until the motor starts, even though the parallel electric circuit through the gages and through the electro-magnet is grounded at the gages.

By referring to Figs. 1 and 3, it will be observed that an additional stationary contact 62 is provided in the path of movement of the finger 34 on the switch arm 27. This switch contact may be grounded when the switch is used in connection with electro-lock cable, so that the ignition circuit from the coil and distributer will be grounded through the fingers 29 and 34, being disposed in engagement with the fixed contact 34 and additional fixed contact 32 when the ignition switch segment 21 is in "off" position, or at its extreme limit of movement in a counter-clockwise direction.

It is thought that, from the above description, the construction and operation of my invention will be thoroughly understood without further explanation.

Having thus described the invention, I claim:

1. An electromagnetic switch including an electromagnet, a spring pressed pivoted dog having an armature extending laterally from its free end and provided at said armature with a depending finger, a spring pressed switch segment pivotally mounted in alinement with the core of the electromagnet and having switch contacts, said depending finger being adapted to engage and hold the switch segment in on position, a manually operable push rod movable beneath the free end of the dog and having a cam surface for engaging the dog to dislodge the depending finger from the switch segment, said rod forming a stop to limit the downward swinging movement of the dog when the switch segment is in off position and a plurality of stationary switch contacts coacting with the switch segment contacts.

2. An electromagnetic switch including an electromagnet, a spring pressed pivoted dog having an armature extending laterally from its free end and provided at said armature with a finger disposed at substantially right angles thereto, a spring pressed switch segment pivotally mounted in alinement with the core of the electromagnet and having switch contacts thereon, said segment having its free end provided with a notch receiving the finger of the dog when the segment is in on position, a switch handle extending from the pivoted end of the switch segment for operating said segment, a manually operable push rod between the dog and segment and having a cam surface for dislodging the dog from the said notch, said rod forming a stop to limit the downward swinging movement of the dog when the switch segment is in off position and stationary switch contacts coacting with the switch segment contacts.

3. An electromagnetic switch including an electromagnet, a pivoted spring pressed switch segment disposed in alinement with the core of the electromagnet and having its free end provided with a notch, a pivoted spring pressed dog having an armature extending laterally from its free end and provided at said armature with a finger disposed at substantially right angles thereto and adapted to engage the notch in the switch segment and hold said segment in on position at one limit of its movement, said magnet when energized attracting said armature and dislodging said finger from the notch in the segment to permit the segment to be instantly moved to off position by its controlling spring, switch contacts carried by said segment, a manually operable push rod disposed beneath the free end of the dog and engageable therewith for releasing the dog from the notch, said rod forming a stop to limit the downward swinging movement of the dog when the switch segment is in off position and stationary switch contacts adapted to coact with said segment switch contacts.

4. An electromagnetic switch including a base, an electromagnet mounted on the base, a bracket secured to the electromagnet and spaced from the base, a rock shaft journaled in the base and bracket respectively, said rock shaft being disposed in alinement with the core of the electromagnet, a switch segment carried by the rock shaft and having its free end provided with a notch, a spring operatively connected with the segment, a spring pressed pivoted dog disposed between the switch segment and electromagnet and provided at its free end with a laterally extending armature and a finger disposed at substantially right angles thereto and adapted to enter the notch in the segment and hold

said segment in on position at one limit of its movement, a manually operable push rod disposed beneath the dog and engageable therewith to release the dog from the notch, said magnet when energized attracting the armature and dislodging the finger from the notch to permit the segment to be instantly moved to off position by its controlling spring, said rod forming a stop to limit the downward swinging movement of the dog when the switch segment is in off position, switch contacts carried by said segment, and stationary switch contacts adapted to coact with said segment contacts.

5. An electromagnetic switch including a base, an electromagnet secured to the base, a bracket spaced from the base, an insulated spring pressed switch segment disposed in alinement with the core of the electromagnet and having one end thereof pivotally mounted and its other end provided with a notch, a spring pressed pivoted dog arranged between the electromagnet and notched end of the switch segment, said dog having its free end provided with a laterally extending armature and a finger disposed at substantially right angles thereto for engagement with the notch in the switch segment, said finger having a straight inner face, a manually operable push rod disposed beneath the dog and adapted to bear against the inner straight face of the finger and provided with a cam surface adapted to engage the dog and release the finger from the notch in the segment, said rod forming a stop to limit the downward swinging movement of the dog when the switch segment is in off position, switch contacts carried by said segment, stationary switch contacts adapted to coact with said segment switch contacts, and a handle operatively connected with the switch segment for manually moving the same to on position.

In testimony whereof I affix my signature.

WILLIAM E. ALBERTSON. [L. S.]