Feb. 28, 1928. 1,660,674

W. HEMINGWAY, JR

IGNITION SYSTEM AND SWITCH THEREFOR

Filed April 28, 1924 2 Sheets-Sheet 1

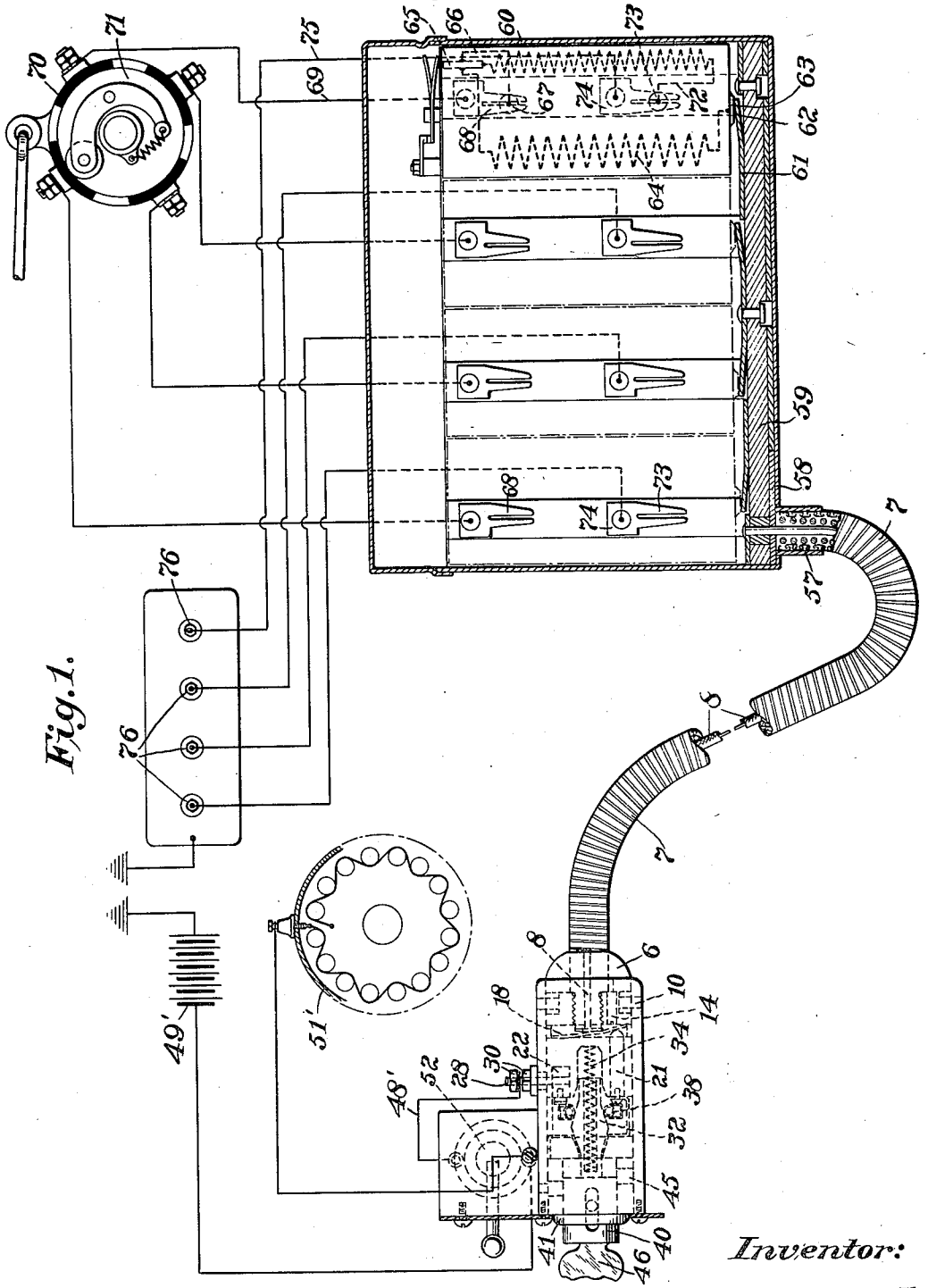


Fig. 1.

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Fig. 2.

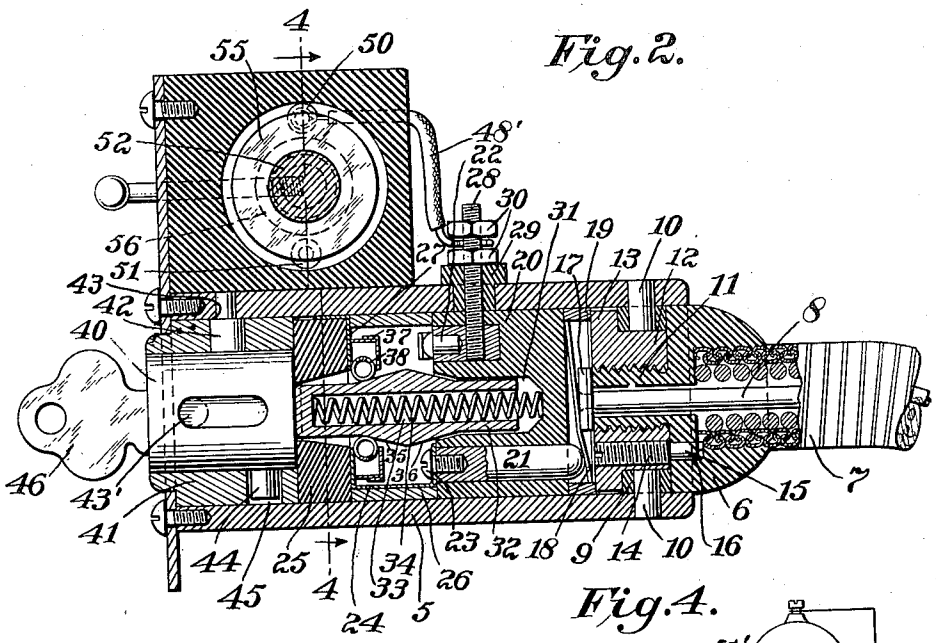


Fig. 3.

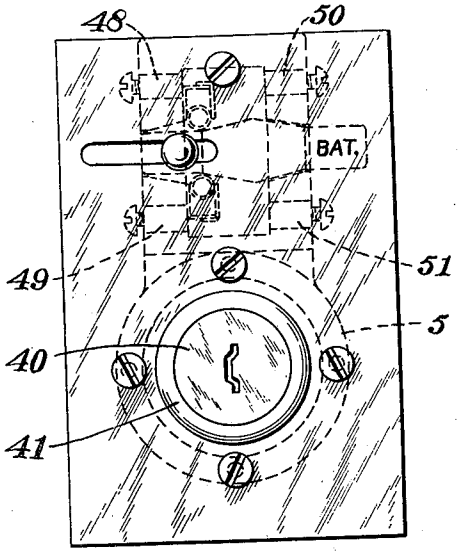
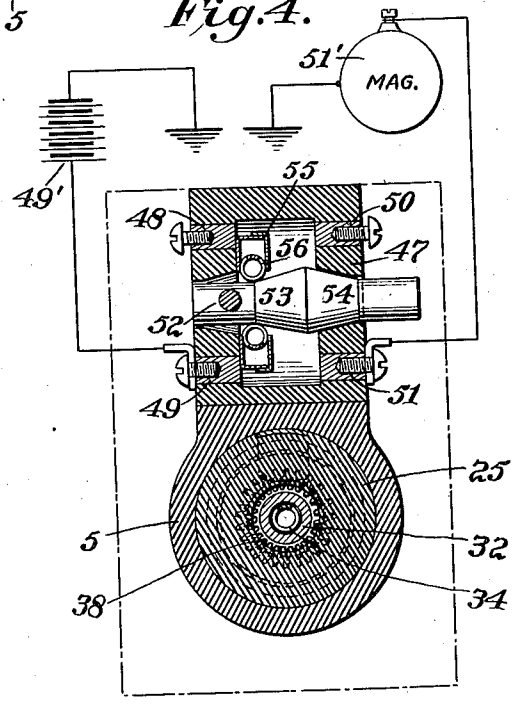


Fig. 4.



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UNITED STATES PATENT OFFICE.

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IGNITION SYSTEM AND SWITCH THEREFOR.

Application filed April 28, 1924. Serial No. 709,695.

The principal purpose of this invention is to provide more efficient and dependable theft protection for automobiles by making it practically a physical impossibility for the owner or operator to switch off the ignition system in stopping the motor without first actuating an automatic lock mechanism associated with the switch and functioning, in locked position, to prevent reestablishment and use of the ignition system except by a person having a proper key. The actuation of said lock mechanism takes place at a time not later than the interruption of the current through the ignition system to stop the motor.

To this end the invention consists essentially in the provision of a main switch included in the ignition system in such manner as to afford the sole means of connection and disconnection between the source of current supply and the remaining components of the system such as the coils, spark plugs, etc. When, as in the present instance, the invention is applied to ignition systems of the Ford automobile type, there is provided, in addition to the main switch, an auxiliary or selective switch which is operable to positions including either the battery or the magneto in the system as the effective source of current supply but which has no intermediate or off position. This selective switch merely serves, therefore, as a means for substituting the battery and the magneto for one another as the effective source of current supply for the ignition system, and includes no provision for breaking or disrupting the ignition system in view of the fact that the switch has no open or intermediate position.

Other purposes, advantages and characteristic features of the invention will be more readily understood from the following detailed description and accompanying drawings; wherein,

Fig. 1 is a diagrammatic view of an ignition system including my improved switch mechanism;

Fig. 2 is a longitudinal sectional view of the switch mechanism;

Fig. 3 is a front elevation of the structure disclosed in Fig. 2; and

Fig. 4 is a transverse vertical section on the line 4—4 of Fig. 2.

Referring more particularly to the switch structure illustrated in Figs. 2 to 4, inclusive, reference character 5 designates a casing which is preferably composed of hardened steel or other metal difficult to cut or drill through in an effort to obtain access to the interior of the casing. This casing is closed at one end by an inserted metal knob 6 which is securely anchored to one extremity of a cable 7 which affords a housing for the conductor 8. The knob 6 is in abutting engagement with one side of a ring 9 fastened to the inner wall of the casing by suitable pins 10. Fitting the opening in the ring 9 and threaded on to a neck 11 formed integral with the knob 6, is a clamping nut 12 equipped with a flange 13 bearing against the inner side of the ring. It is thus evident that the threaded engagement of the nut 12 with the neck 11 serves to clamp the flange 13 and knob 6 against the opposite sides of ring 9 whereby said knob and cable 7 are securely fastened to the casing. A screw 14 threaded through the nut 12 and terminating in a smooth tip or stem 15 entering a suitable socket 16 formed in a knob 6 serves to lock the knob and nut against relative rotation necessary to separation thereof.

The end of the conductor 8, shown in Fig. 2, extends through the neck 11 and terminates in an enlarged flat head 17 resting against the inner end of the neck and contacting with a copper disc 18. The disc 18 is contained within an insulating ring 19 which serves as a spacer between the nut 12 and an insulating block 20 carrying a pair of contacts 21 and 22. The contact 21 is made sufficiently long to extend entirely through the block 20 and to project beyond one face of the block into contact with the disc 18. At the opposite face of the block 20, the contact 21 is secured by a screw 23 to one end of a contact strip 24. The opposite end of the contact strip 24 is secured to a second insulating block 25 spaced from the insulating block 20 by an interposed tubular insulating shell 26. Secured to the insulating block 25 at a point opposite the attached end of the contact strip 24 is a second contact strip 27 having one end grounded to the metal casing 5. The remaining contact 22 of the insulating block 20 is threadedly secured to the inner end of a binding post 28. This post extends laterally through a portion of

the block 20 and through an insulating bushing 29 in the wall of the casing 5 and is equipped at its outer end with binding nuts 30.

Between the contacts 21 and 22, the insulating block 20 is hollowed out to provide a socket 31 in which is slidably received one end of a tubular reciprocating stem 32 composed of suitable insulating material and hollowed out to provide a bore 33 housing a coiled spring 34 having one extremity bearing against the inner closed wall of the bore and the other extremity bearing against the opposing or bottom wall of the socket 31 so that the spring, when under compression as shown in Fig. 2, has a normal tendency to shift the stem 32 to the left from the position shown. At an intermediate point the stem 32 is widened to provide surfaces 35 and 36 sloping downwardly in opposite directions from the widened central portion of the stem to points located between the central portion and the extremities of the stem. This stem, as hereinafter disclosed, serves as an actuator for a movable contact comprising a ring shaped casing 37 to open at its inner periphery and containing a coil spring 38 surrounding and closely embracing the stem.

In the position shown in Fig. 2 the movable contact 37 is in a position bridging the contacts 24 and 27 so that the conductor 8 is grounded through the disk 18 and contacts 21, 24, 37 and 27 to the metallic wall of the casing 5 for a purpose to be hereinafter set forth. In order to shift the contact 37 to the right to bridge the stationary contacts 21 and 22 it is necessary that the stem 36 be permitted to move to the left under the influence of the spring 34 until the central or widest portion of the stem has passed through the coil spring 38 at which time the gripping or squeezing action of the spring, acting in conjunction with the inclined surface 36 will serve to cause the movable contact 37 to snap or travel to the right relatively to the stem so as to engage the contacts 21 and 22. In this second position of the movable contact 37 it will be understood that the conductor 8 is connected through disk 18, contacts 21, 37 and 22 to the binding post 28.

In the position of parts shown in Fig. 2 the stem 32 is held against movement to the left by engagement with the inner end of a lock barrel 40. This barrel fits slidably within an annular metal shell 41 secured in the casing 5 by means of a transverse pin 42 having its outer end flush with the outer surface of the casing and its inner end flush with the inner surface of the shell 41. This pin is widened intermediate its length to provide a shoulder 43 bearing against the inner wall of the casing 5 and serving to prevent the pin from being drawn outwardly through the opening formed in the casing. The pin is prevented from being driven inwardly through its opening by reason of the fact that the inner end of the pin engages the barrel 40. Sliding movement of the barrel 40 within the shell 41 is limited by a stop pin 43′ carried by the shell 41 and casing 5 and having its inner end entering an elongated recess formed in the outer surface of the barrel. The barrel 40 contains a suitable locking mechanism including a retractable spring pressed bolt 44 adapted to automatically enter an opening 45 in the shell 41 when the lock barrel is in inner position disclosed in Fig. 2. When, by means of the key 46, the bolt 44 is retracted from the opening 45, the spring 34 will act to move both the stem 32 and the lock barrel to the left until the latter reaches the limit of movement permitted by the stop pin 43′.

Carried by the casing 5 is a second switch including a casing 47 having contacts 48 and 49 secured to one side wall thereof and contacts 50 and 51 secured to the opposite side wall in line with the first mentioned contacts. The contact 49 is connected by a suitable lead to one terminal of a battery 49′, the remaining terminal of which is grounded. The opposite contact 51 is, in like manner, connected to the insulated post of the magneto 51′, the remaining terminal of the magneto being grounded. 52 designates an actuating stem having cylindrical end portions slidably mounted in suitable openings formed in opposite walls of the casing 47, the intermediate portion of the stem being widened to provide oppositely sloping surfaces 53 and 54. The movable contact of this switch is of the same type as that disclosed in connection with the first switch and comprises a ring shaped casing 55 open at its inner periphery and housing a coiled spring 56 closely embracing the stem 52, as shown. In the arrangement of parts disclosed in Figs. 3 and 4, the movable contact is in engagement with the left hand wall of the casing 47 and serves to bridge the contacts 49 and 48. Movement of the stem 52 to the left from the position shown will cause the inclined portion 53 of the stem to travel through the spring 56 until the central portion of the stem has passed to the left of the spring at which time the gripping action of the spring on the oppositely inclined surface 54 will cause the movable contact to snap or travel to the right into engagement with the right hand wall of the casing 47 so as to bridge the contacts 51 and 50. The contacts 48 and 50 are connected by suitable leads 48′ to the aforementioned binding post 28, being clamped to the binding post through the medium of the nuts 30. In practice, the switch mechanism of my invention is embodied in a system of distribution as shown

to advantage in Fig. 1. In this figure, it will be noted that the end of the cable 7 opposite that secured to casing 5 is anchored within the neck 57 of a metal plate 58 which is secured to the underside of a wooden strip 59 mounted within and on the bottom wall of the coil casing 60. The conductor 8 is carried through the strip 59 and is suitably secured to a contact plate 61 fastened to the upper surface of the wooden strip. The plate 61 is provided with a plurality of contact tongues 62 struck therefrom and engaging the contacts 63 of the induction coils contained within the casing 60. The contact 63 of each induction coil is connected to one extremity of the primary winding 64. The other terminal of this winding is connected through the vibrator 65, lead 66, contacts 67 and 68 and lead 69 to one of the stationary contacts 70 of the timer 71. One terminal of the secondary winding of each coil is connected by lead 72, contacts 73 and 74 and lead 75 to one of the spark plugs 76. When the movable contacts of the selective switch 47 and the main switch 5 are in the positions shown in Figs. 4 and 1, respectively, the battery 49′ is included in the system as the effective source of supply for the induction coils. Current from the battery passes through the contacts 49, 55, and 48, to the binding post 28 of the main switch. From the binding post 28 the current passes through the contacts 22, 37, and 21 and copper disk 18 to the conductor 8 through which it flows into the primary winding of the coil. When it is desired to shift from the battery to the magneto this is accomplished by forcing the stem 52 to the left from the position shown in Fig. 4 so as to cause the movable contact 55 to travel to the right to a position bridging the contacts 50 and 51. In this second position of the selective switch, current is supplied from the magneto 51′ through contacts 51, 55 and 50 to the binding post 28 of the main switch through which the current is delivered to the coils as previously set forth. When it is desired to disrupt the ignition system the lock barrel 40 is pushed inwardly from the position shown in Fig. 1 to the position shown in Fig. 2 thus causing the stem 32 to travel to the right until the inclined surface 36 of the stem has passed through or to the right of spring 38 at which time the pressure of the spring on the stem, acting in conjunction with the inclined surface 35 will cause the spring to travel or snap to the left, thus breaking the connection between the contacts 21 and 22 and interrupting the supply of current to the coils. When the movable contact 37 of the switch is in the position shown in Fig. 2 it will be noted, as previously set forth, that the conductor 8 is grounded to the metal casing 5. The purpose of grounding the conductor 8 and the coils in this manner in the open position of the switch 5 is to prevent any possibility of current being supplied to the contact plate 61 for the purpose of energizing the coils.

The switch 5 is constructed in such manner that when the lock barrel 40 is moved inwardly from the position shown in Fig. 1 to the position shown in Fig. 2 the bolt 44 will automatically enter the opening 45 at a moment not later than that at which the spring 38 acts to cause movement of the contact 37 to break the connection between the contacts 22 and 23 to thereby interrupt the ignition circuit. The locking action of the lock may be effected either simultaneously with or immediately before the movement of the contact 37 to interrupt the ignition circuit. In this way the switch is locked against retrograde movement at a time such that there is no possibility of disrupting the circuit of the ignition system without setting in operation the lock mechanism to effect locking thereof. Re-establishment of the circuit and use of the system cannot be effected except by persons having the proper key.

While in the foregoing I have described what I now consider to be the preferred embodiment of my invention it is to be understood that various changes in the construction, combination and arrangement of parts may be resorted to within the scope of the appended claims.

What I claim as my invention:

1. An ignition system for automobiles including a battery and magneto as alternate sources of current supply, the usual complement of ignition devices, a selective switch operable only to positions connecting either the battery or the magneto in circuit with said devices but having no intermediate position of rest, a master switch included in the system in such manner as to constitute the sole means for disconnecting both sources of current supply to render the ignition devices inoperative and a lock for the master switch arranged to function automatically at an intermediate point in the actuation of the master switch from closed to open position.

2. A system as recited in claim 1 including a transformer as one unit of the aforesaid ignition devices and contacts carried by the master switch and arranged to automatically ground the transformer when the switch is moved to and locked in the open position.

3. An ignition system for automobiles including a battery and a magneto as alternate sources of supply, a transformer in circuit with said sources of supply, a selective switch connected between the transformer and the aforesaid sources of current supply, said switch being selectively operable to positions connecting either source

of supply in circuit with the transformer but having no intermediate position of rest, a master switch connected between the selective switch and the transformer and affording the sole switch means for opening the circuit in such manner as to disconnect both sources of supply and a lock for the master switch arranged to function automatically in the actuation of the said switch from the open to the closed position and at a time not later than the actual opening of the circuit.

4. An ignition system for automobiles, including alternate sources of electric current supply, the usual complement of ignition devices, a selective switch operable only to positions connecting one or the other of said sources of current supply in circuit with said devices, the said switch having no intermediate position of rest, means included in the system adapted to occupy a position closing said circuit and to be moved from closed position into position to open said circuit to disconnect both sources of current supply from the ignition devices to render the latter inoperative, and a lock for locking the said means in disconnected position, the said lock becoming effective at a time not later than the opening of said circuit.

In testimony whereof I hereunto affix my signature.

WILSON HEMINGWAY, JR.