H. A. MYERS.

STARTER CONTROL FOR EXPLOSIVE ENGINES.

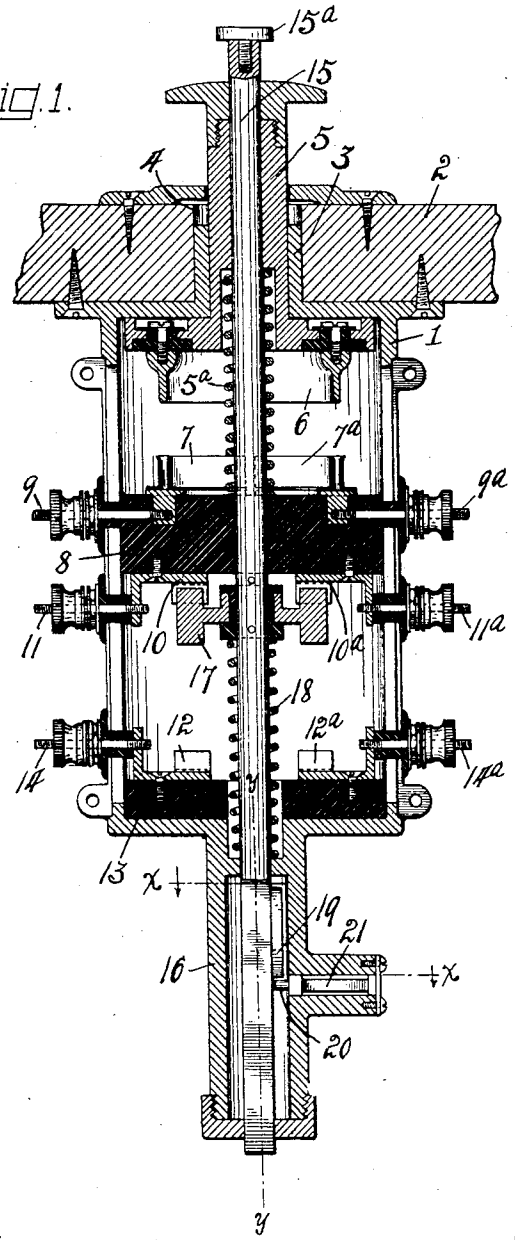
APPLICATION FILED MAY 15, 1914.

1,132,602.

Patented Mar. 23, 1915.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:-

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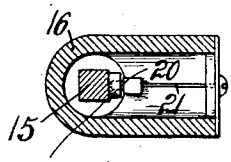


Fig. 2.

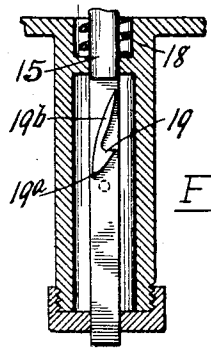
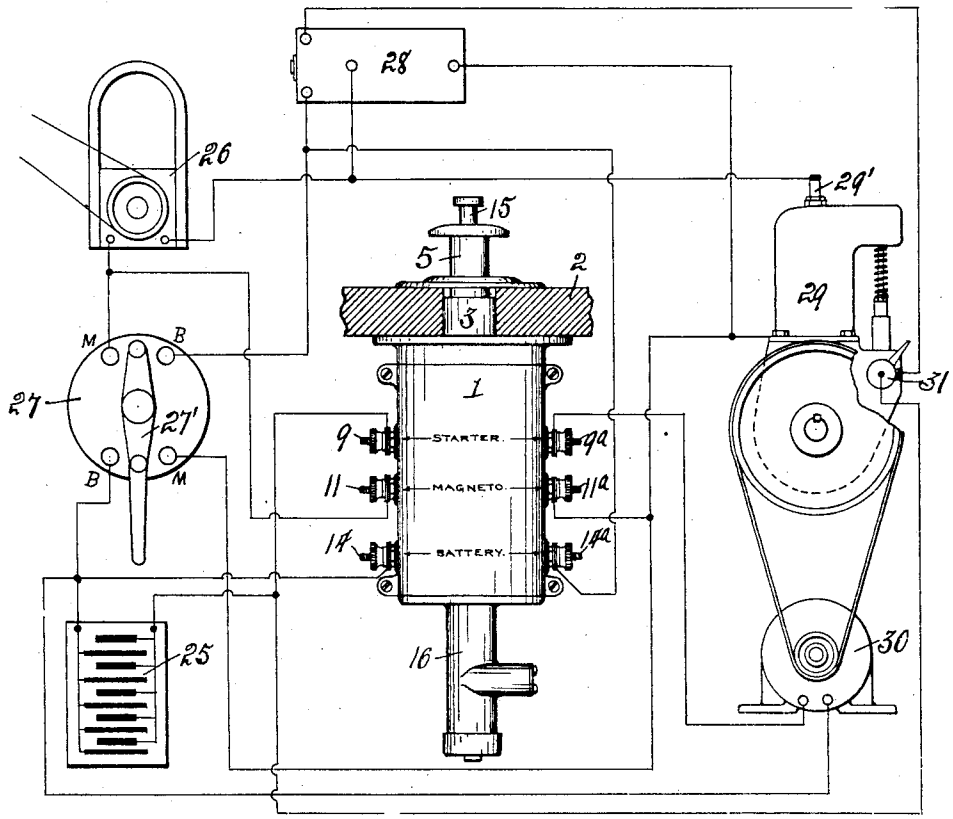


Fig. 3.

Fig. 4.



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UNITED STATES PATENT OFFICE.

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STARTER-CONTROL FOR EXPLOSIVE-ENGINES.

1,132,602. Specification of Letters Patent. Patented Mar. 23, 1915.

Application filed May 15, 1914. Serial No. 838,671.

To all whom it may concern:

Be it known that I, HUBERT A. MYERS, a citizen of the United States, and a resident of Toledo, in the county of Lucas and State of Ohio, have invented a certain new and useful Starter-Control for Explosive-Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

This invention relates particularly to control means for the electric starter and ignition circuits of internal combustion engines, such as used in automobiles, but is not restricted to such use, as it may be employed in any connection for which it may be adapted or appropriate.

The primary object of my invention is the provision, in connection with the control switches of electric starters for engines of the character described, of simple and efficient means which is automatically operable to switch the ignition circuit from the battery to the magneto when the engine has been started and the starter circuit is broken, thus preventing the liability of running on the battery for a considerable time and the consequent loss of the battery charge.

Further objects and advantages of the invention will be apparent from the following detailed description thereof.

The invention is fully described in the following specification, and while, in its broader aspect, it is capable of embodiment in numerous forms, a preferred embodiment thereof is illustrated in the accompanying drawings, in which,—

Figure 1 is a central vertical section of a starter switch embodying my invention. Figs. 2 and 3 are sections thereof on the lines x, x and y, y, respectively, in Fig. 1, and Fig. 4 is a side elevation of the invention with a wiring diagram illustrated in connection therewith.

Referring to the drawings, 1 designates a switch case of cylindrical form, in the present instance, which is carried by a supporting member 2, which may comprise the portion of the floor in advance of the driver's seat of an automobile, or be any other suitable supporting part for the switch. The end of the case 1, which is attached to the support 2, is provided, in the present instance, with an outwardly flanged opening, the flange 3 of which projects into a registering opening 4 in the support and forms a bearing for the control plunger 5, which carries the movable member 6 of the starter-switch, said plunger projecting through the support and having its outer end disposed in position to be depressed or forced inward by the operator. The movable starter-switch member 6 is insulatingly carried by the plunger 5 and, in the present instance, is of cylindrical knife edge form and adapted, when depressed, to fit into and connect the insulatingly fixed starter-switch circuit members 7 and 7^a. The members 7, 7^a are carried, in the present instance, by a block 8 of insulating material, which is mounted within the case 1 and carries binding posts 9 and 9^a without opposite sides of the case, said binding posts being electrically connected to the respective members 7, 7^a. A coiled compression spring 5^a is interposed between the block 8 and the inner end of the plunger 5 and serves to yieldingly retain the fixed and movable starter switch members in spaced relation. Nothing novel is claimed for this feature of the switch, as it is a form of switch commonly used in connection with electric starters for internal combustion engines.

Carried by the block 8 at its under side, or the side thereof which is opposed to the switch members 7, 7^a, are the spaced contacts 10 and 10^a which connect respectively with binding posts 11 and 11^a, the outer ends of which project without the case 1. Similar contacts 12 and 12^a are insulatingly carried within the bottom portion of the case 1, as by an insulating block 13, and have binding posts 14, 14^a, respectively, projecting therefrom without the case. In the present arrangement of my control mechanism the contacts 10 and 10^a are in circuit with the customary magneto, and the contacts 12 and 12^a are in circuit with the starting battery.

A stem 15 projects axially through the plunger 5 and the insulating blocks 8 and 13, and has its lower end projected through an axial extension 16 provided on the lower or outer end of the case 1. The stem 15 is mounted for limited reciprocatory movements in such parts and is provided at its

upper or control end with a head or enlargement 15^a for coacting with the outer end of the plunger 5 to limit the depressing movements of the stem relative to said plunger. A movable switch member 17 is fixedly and insulatingly carried by the stem 15 in the space between the insulating blocks 8 and 13 and is movable into contact with the set of contacts 10, 10^a to close the electrical connection therebetween, or with the set of contacts 12, 12^a to close the electrical connection therebetween, as the stem 15 may be moved into proper position therefor. A coiled compression spring 18 encircles the stem 15 with its opposite ends thrust against the lower end of the case 1 and the insulation carrying the switch member 17, and serves to normally urge the stem upward and the switch member 17 into engagement with the contacts 10 and 10^a, as shown in Fig. 1, whereby to close the magneto circuit. When the plate 5 and stem 15 have been depressed the full limit of their inward movements the starter switch member 6 will stand in contact with the members 7, 7^a, thus closing the starter circuit, and the switch member 17 will stand in contact with the contacts 12, 12^a, thus closing the battery circuit. The permissible depressing movement of the stem 15 relative to the starter switch plunger 5 is sufficient to move the switch member 17 out of contact with the magneto circuit contacts 10, 10^a and into neutral position relative to such contacts and to the contacts 12, 12^a of the battery circuit. In order to retain the stem 15 and its switch member 17 in such neutral position against the tension of the spring 18 a catch 19 is provided on one side of the lower end portion of the stem within the extension part 16 of the case and engages with a spring finger or pin 20, which is mounted in registering relation in the wall of the extension part 16 for yielding movements transversely of the stem. The pin 20 is carried, in the present instance, by a spring finger 21, which normally holds the pin in position transversely of the stem to engage over the shouldered portion of the catch 19 when such catch is lowered in proper position therefor. The catch 19 has a tapered nose portion 19^a, which, upon a lowering of the stem from its elevated or normal position, engages the pin 20 and causes a transverse swinging thereof from normal position, the pin springing back to normal position over the shouldered portion of the catch when the catch has been lowered sufficiently therefor. The catch 19 is also provided with an upstanding diagonally-disposed or inclined tail-piece 19^b, which, upon a continued lowering or depressing of the stem 15 from neutral position, acts on and forces the pin 20 from its normal position transversely of the stem, so that when the stem has lowered sufficiently to place the upper end of the tail-piece 19^b below the pin 20, the pin will move over such end to normal position on the opposite side thereof. Upon the next upward movement of the stem the pin 20 slides freely down the side of the catch member to its normal position below such member, as indicated in Fig. 3. The tail-piece 19^b of the catch member is of such length that it will permit the pin 20 to pass over its upper end when the stem has been lowered or depressed sufficiently to make contact between the switch member 17 and the contacts 12, 12^a. It is thus evident that in order to permit the switch member 17 to move into contact with the magneto contacts 10, 10^a after such switch member has been lowered to neutral position, it is necessary to completely depress the stem 15 so as to dispose the pin 20 on the opposite side of the catch member from that having the catch shoulder, as the stem is then free to return to its normal elevated position.

In the diagram shown in Fig. 4, 25 designates the starting battery, 26 the magneto, 27 the customary switch having sets of battery and magneto contacts and the movable member 27′ for bridging the contacts of the respective sets, as desired, 28 the customary exciting coil, 29 an explosive engine having a spark plug 29′, 30 the electric starting motor, and 31 the timing device. It will be noted that the battery circuit may be closed with the ignition device of the engine either through the customary control switch 27 or through the starter control battery contacts 12, 12^a, as the control switch battery contacts and the starter device battery contacts are each in series with the battery through the coil 28, timer 31 and ignition device of the engine, as will be readily apparent from the diagram, and each is operable independently of the other. The starter switch contacts 7, 7^a are in circuit with the battery 25 and motor 30, as shown in the diagram, so that the battery circuit with the motor 30 is closed when the switch member 6 is in starting-switch closing position. The magneto contacts 10, 10^a of the starter device are in circuit with the ignition parts of the engine 29 through the customary magneto 26, as shown. It will, of course, be understood that the wiring diagram shown in merely illustrative of one form of such wiring and that it may be changed, as desired, without departing from the spirit of the invention.

In the operation of my improved device, the operator, to start the engine, depresses both the plunger 5 and stem 15 to their full extent so as to place the switch member 6 into contact with the battery circuit starting contacts 7, 7^a to close such circuit and to place the switch member 17 into contact with the battery ignition circuit contacts 12, 12^a to close such circuit. When this is done both

the ignition and starting circuits are energized from the battery and if everything is in proper working condition the engine will be started. When the engine has been started in this manner the operator releases the plunger 5 and stem 15 to permit the same to return to their normal positions, the switch member 6 returning to its normal open position and the switch member 17 moving into contact with the magneto ignition circuit contacts 10, 10^a to maintain a running of the engine. If it is desired to place the switch member 17 in neutral position relative to the two sets of contacts 10, 10^a and 12, 12^a the stem 15 is depressed until the pin 20 has moved into catch engagement with the catch shoulder of the catch member 19. To return the switch member into magneto circuit closing position it is necessary to completely depress the stem 15 and then to release it to permit the catch member 19 to have its upward movement at the opposite side of the pin 20 to its lowering movement.

I wish it understood that my invention is not limited to any specific construction, arrangement or form of the parts as it is capable of numerous modifications without departing from the spirit thereof.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is,—

1. In combination, a starter circuit, a battery circuit and a magneto circuit, and single mechanism operable to simultaneously close the starter and battery circuits and to open such circuits and close the magneto circuits.

2. In combination, a starter circuit, a battery circuit and a magneto circuit, and mechanism manually operable to simultaneously close said starter and battery circuits and automatically operable to open said starter and battery circuits and to close the magneto circuit when released for such purpose.

3. In combination, a starter circuit, a battery circuit and a magneto circuit, mechanism operable to simultaneously close the starter and battery circuits, and means operating to normally move said mechanism from starter and battery circuit closing position and into magneto circuit closing position.

4. In combination, a starter circuit, a battery circuit and a magneto circuit, independent means, one movable to open and close the starter circuit and one movable to open and close either the battery or magneto circuits, and means automatically operable to move one of said means from battery circuit to magneto circuit closing position when the other means is permitted to move from starter circuit closing position.

5. In combination, a starter circuit, a battery circuit and a magneto circuit, independent means, one operable to close the starter circuit and the other operable to open and close either the battery circuit or the magneto circuit, and means manually operable to simultaneously move one of said means to starter circuit closing position and the other of said means to battery circuit closing position and then automatically operable to break the starter and battery circuits and to close the magneto circuit.

6. In combination, a starter circuit, a battery circuit and a magneto circuit, a switch member manually movable in one direction to close the starter circuit and automatically movable in the opposite direction to break such circuit, and a second switch member manually movable to break the magneto circuit and close the battery circuit and automatically operable to break the battery circuit and to close the magneto circuit, the battery circuit closing movements of said second member being dependent on starter circuit closing movements of said first switch member.

7. In combination, a starter circuit, a battery circuit and a magneto circuit, two plunger parts which are yieldingly movable in one direction, a switch member carried by one of said parts and movable from normal position into starter circuit closing position, and a second switch member carried by the other of said parts and normally standing in magneto circuit closing position and movable from such position into battery circuit closing position.

8. In combination, a starter circuit, a battery circuit and a magneto circuit each having a set of spaced contacts, a plunger having a movable switch member for closing the connection between the contacts of the starter circuit, means yieldingly retaining the plunger and its switch member out of circuit closing position, a second plunger having a switch member movable into positions to close the connection between the contacts of either said battery or magneto circuits, and means urging a movement of said plunger and its switch member into magneto circuit closing position, the movement from normal position of one of said plungers being dependent on the movement from normal position of the other of said plungers.

9. In combination, a starter circuit, a battery circuit and a magneto circuit, mechanism manually operable to simultaneously close the starter and battery circuits and then automatically operable to break both of said circuits and to close the magneto circuit, and means for retaining said mechanism in neutral position relative to the battery and magneto circuits.

10. In combination, a starter circuit, a battery circuit and a magneto circuit, a switch member yieldingly movable in one direction to close the starter circuit, a second switch member normally standing in magneto circuit closing position and yield-

ingly movable in one direction to break the magneto circuit and close the battery circuit, and means operable to retain said second switch member out of magneto circuit closing position until after said second switch member has been moved to battery circuit closing position.

11. In combination, a starter circuit, a battery circuit, and a magneto circuit, a switch operable to close the starter and battery circuits and to open the magneto circuit, and means for retaining said mechanism in a neutral position relative to the battery and magneto circuits.

12. In combination, a starter circuit, a battery circuit, and a magneto circuit, a switch operable to close the starter and battery circuits and to open the magneto circuit, and means for retaining said mechanism in a neutral position relative to the battery and magneto circuits until the switch is released by a continued closing movement of said mechanism.

In testimony whereof, I have hereunto signed my name to this specification in the presence of two subscribing witnesses.

HUBERT A. MYERS.

Witnesses:
F. E. AUL,
E. E. THOMAS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."