Dec. 18, 1923. 1,477,834

G. LEDDICK

ELECTRIC SWITCH

Filed April 25, 1921

Fig. 1.

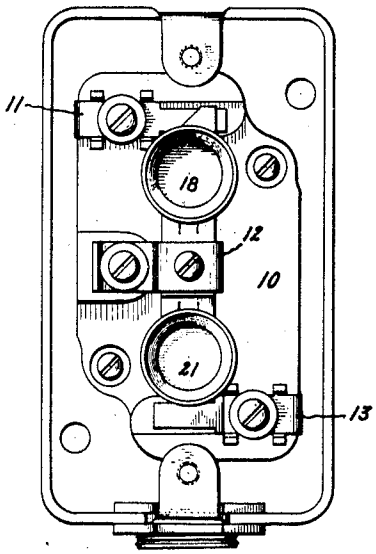


Fig. 2.

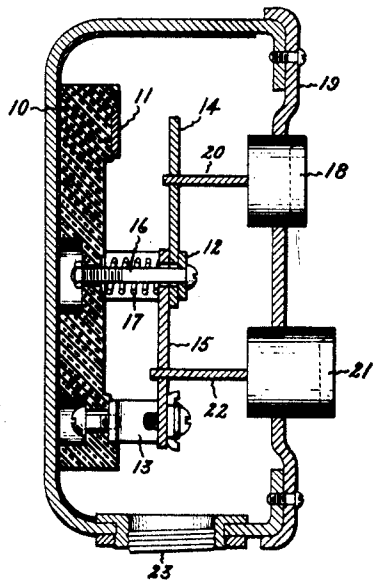


Fig. 3.

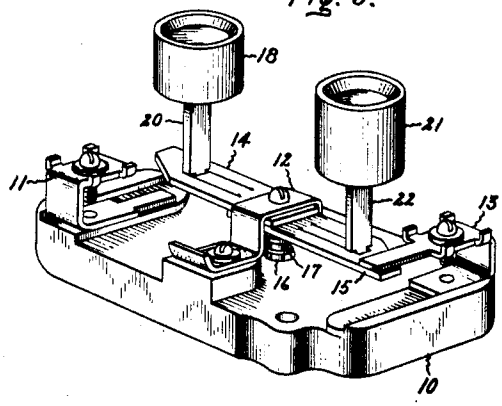
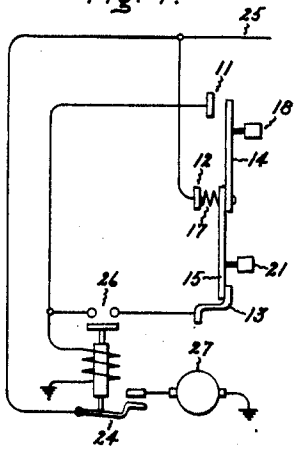


Fig. 4.



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UNITED STATES PATENT OFFICE.

GEORGE LEDDICK, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELECTRIC SWITCH.

Application filed April 25, 1921. Serial No. 464,095.

To all whom it may concern:

Be it known that I, GEORGE LEDDICK, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Electric Switches, of which the following is a specification.

One of the objects of my invention is to provide a switch which shall have comparatively few simple cheaply manufactured parts and which shall nevertheless be reliable and effective in operation.

Although not necessarily limited thereto, the invention has a particular application to combination "start" and "stop" push button switches for controlling the starting and stopping of electric motors.

In carrying the invention into effect in one form, I provide a switch having three circuit terminals and two relatively movable switch members mounted in one of the terminals. The overlapping ends of the switch members are mounted on a pin in the said terminal and a spring is disposed on the pin to provide a resilient mounting for the switch members. The spring biases the overlapping ends of the switch members into engagement with the said terminal and also biases the switch members to predetermined positions with respect to each other and the other circuit terminals. The parts of the switch are mounted within a casing and push buttons extending through the casing are provided for the purpose of operating the switch members against the bias of the spring.

The various features of construction and arrangement of my improved switch will be more particularly pointed out hereinafter, and the scope of the invention is indicated by the appended claims.

For a better understanding of the invention, reference is had to the accompanying drawing showing an embodiment of the invention for purposes of illustration.

Referring to the drawing, Fig. 1 is a plan view of a switch embodying my invention, the top cover of the casing being removed for the purpose of showing the interior arrangement of the parts within the casing; Fig. 2 is a cross-sectional view of Fig. 1 with the top cover in position; Fig. 3 is a perspective view showing the various parts of the switch mounted on an insulating base with the casing removed; and Fig. 4 is a very simplified diagram of a motor control system in which my improved switch is shown in simplified diagram.

Referring to the figures, the switch mechanism is mounted upon an insulating base 10. Three circuit terminals 11, 12 and 13 respectively are secured to the base 10 in the positions shown. The two relatively movable switch members 14 and 15 are loosely mounted on a pin 16 in the intermediate terminal 12. These switch members are oppositely disposed with respect to each other and are mounted in the intermediate terminal 12 so that their overlapping ends are in engagement with each other. These overlapping ends are biased into engagement with each other and into electric conductive relation with respect to the intermediate terminal 12 by means of the single spring 17 which surrounds the pin 16. The switch member 14 is adapted to be normally out of engagement with its corresponding circuit terminal 11, and the switch member 15 is biased by the spring 17 so as to normally make engagement with the circuit terminal 13.

The "start" push button 18 extends through the cover of the casing 19, and the post 20 connected to the push button has its end mounted in a slot in the switch member 14, thereby providing a means for operating the switch member 14 from the outside of the casing. The "stop" push button 21 also extends through the cover of the casing and has a post 22 which has its end mounted in the switch member 15 for the purpose of operating this switch member from the outside of the casing. The casing 19 has an aperture 23 through which the conductors to be connected to the circuit terminals 11, 12 and 13 are adapted to pass.

As thus constructed and arranged and with the parts in the various positions shown in the drawings, the operation of my invention is as follows:—Referring to Fig. 4, when the "start" push button 18 is depressed against the action of the spring 17 into engagement with the circuit terminal 11, the switch member 14 will pivot about

the pin 16 in the circuit terminal 12. The switch member 15 will be unaffected and will remain in its normal position. A circuit for the winding of the electromagnetic switch 24 will be completed from the supply conductor 25 through the intermediate terminal 12, the switch member 14, the circuit terminal 11, through the winding to ground, the other side of the supply circuit. The electromagnetic switch 24 will thereby be energized to close, and in closing will close the auxiliary switch 26, thereby completing a maintaining circuit for the switch winding through the switch member 15. The "start" push button 18 can thereupon be released and the electromagnetic switch 24 will remain closed to connect the motor 27 to the supply circuit. In order to deenergize the electromagnetic switch 24 and thereby stop the motor, the "stop" push button 21 will be depressed and thereby cause the switch member 15 to pivot about the pin 16 against the action of the spring 17. This will cause the switch member 15 to break engagement with the circuit terminal 13 and thereby open the maintaining circuit for the winding of the electromagnetic switch 24. This electromagnetic switch will thereupon be deenergized and will open, disconnecting the motor from the source of supply. When the push button 21 is released and the switch member 15 is caused to return to its normal position, the parts will be in their original positions, and it will be necessary to again depress the push button 18 in order to restart the motor.

It will be seen that my improved switch has a comparatively few parts, which can be very easily manufactured and that the switch can be quickly assembled. The switch members 14 and 15 can be identical parts, thereby effecting a saving in the number of different parts which need be manufactured. It will also be observed that a single spring 17 serves to bias both switch members to their normal positions, thereby also effecting a saving in the number of parts that need be manufactured. It will also be observed that by simply reversing the position of the terminal 11 on the insulating base 10, the switch member 14 will normally be in engagement with the terminals 11 and 12. The switch will then have two normally closed switch members. If instead of reversing the position of the circuit terminal 11, the position of the circuit terminal 13 be reversed, the switch will have two normally open switch members. It will also be seen that the circuit terminals 11 and 13 are interchangeable with each other if desired, so that only one form of circuit terminal need be made for these two terminals. It will also be observed that in the form shown in the drawings in case both push buttons are depressed, the spring 17 is merely put under strain but no circuit is established through the switch.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the apparatus shown is only illustrative and that the invention can be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States is:—

1. The combination in an electric switch of a circuit terminal, two relatively movable identical switch members having overlapping ends, a spring cooperating with the said ends of the switch members for holding each of the switch members in a predetermined position with respect to the other switch member and for holding the said overlapping ends in engagement with the said terminal, a circuit terminal adapted to be engaged by the other end of one switch member, and a circuit terminal adapted to be engaged by the other end of the other switch member.

2. The combination in an electric switch of a circuit terminal having a pin, two relatively movable switch members having one end of each member mounted on the said pin, a spring cooperating with the said ends of the switch members for biasing the same into engagement with the said terminal, a circuit terminal adapted to be engaged by the other end of one of said switch members, and a circuit terminal adapted to be engaged by the other end of the other of said switch members.

3. The combination in an electric switch of a circuit terminal, two relatively movable switch members having one end of each member pivotally mounted in the said terminal, a spring cooperating with the said ends of the switch members for biasing the same into engagement with the said terminal, a circuit terminal adapted to be engaged by the other end of one of the switch members, and a circuit terminal adapted to be engaged by the other end of the other switch member.

4. The combination in an electric switch of a circuit terminal, two relatively movable switch members having one end of each member pivotally mounted in the said terminal, a spring cooperating with the said ends of the switch members for biasing the same into engagement with the said terminal, a circuit terminal adapted to be engaged by the other end of one of the switch members, and a circuit terminal adapted to be engaged by the other end of the other switch member.

5. The combination in an electric switch

of a circuit terminal having a pin, two relatively movable switch members having overlapping ends pivotally mounted on the said pin, a spring surrounding the said pin, adapted to press on the said overlapping ends of the said switch members for biasing the same into engagement with the said terminal, a circuit terminal adapted to be engaged by the other end of one of said switch members, and a circuit terminal adapted to be engaged by the other end of the other switch member.

6. The combination in an electric switch of a circuit terminal, two relatively movable switch members having overlapping ends mounted in the said terminal, a spring for resiliently supporting the said switch members and for biasing the same into engagement with the said terminal, a circuit terminal adapted to be engaged by the other end of one of said switch members, a circuit terminal adapted to be engaged by the other end of the other switch member, a casing for the switch, and a push button for each switch member extending through the casing for operating its respective switch member.

7. The combination in an electric switch of a circuit terminal having a pin, two oppositely disposed relatively movable switch members having overlapping ends loosely mounted on the said pin, a spring surrounding the said pin adapted to press on the overlapping ends of the switch members to bias the same into engagement with the said terminal, a circuit terminal adapted to be normally in engagement with the other end of one of said switch members, a circuit terminal adapted to be engaged by the other end of the other switch member, and normally out of engagement therewith, a casing for the switch, and a push button for each switch member extending through the casing for operating its respective switch member against the bias of said spring.

In witness whereof, I have hereunto set my hand this 22nd day of April, 1921.

GEORGE LEDDICK.