Jan. 5, 1932. L. B. EHRLICH 1,839,916

STARTING MOTOR SWITCH

Filed June 11, 1925

Fig. 1.

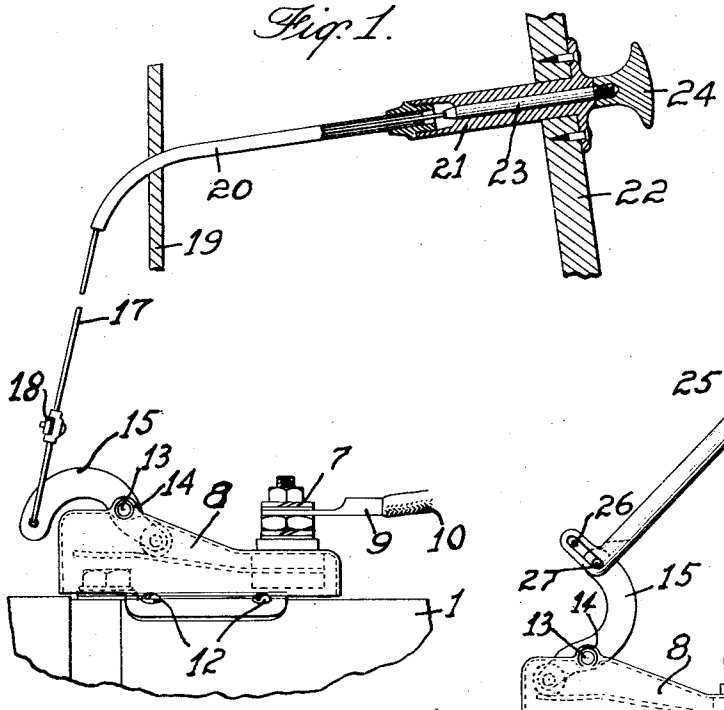


Fig. 2.

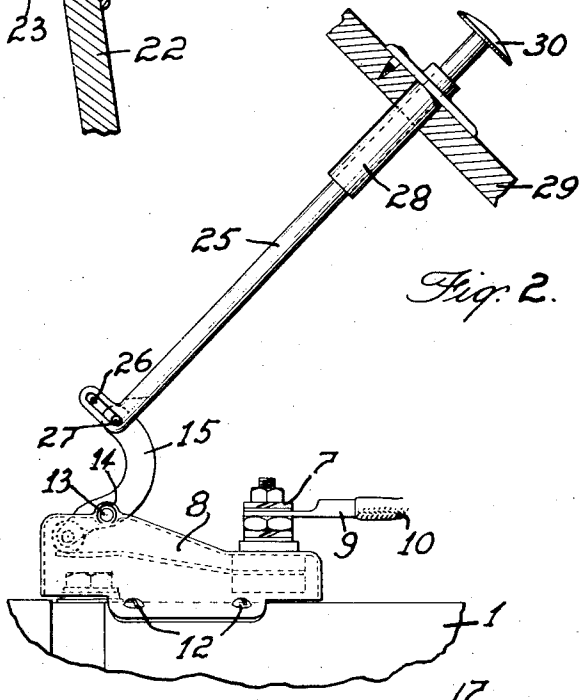


Fig. 3.

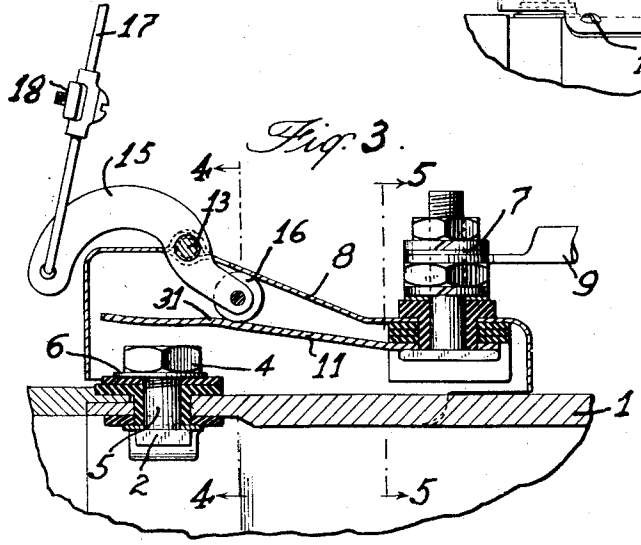


Fig. 4.

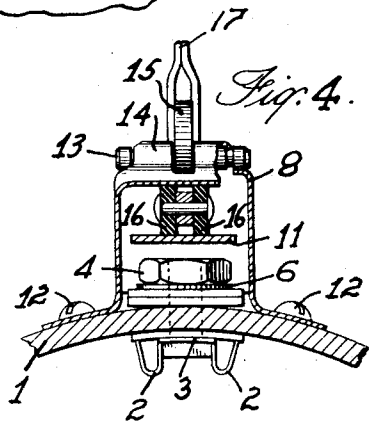
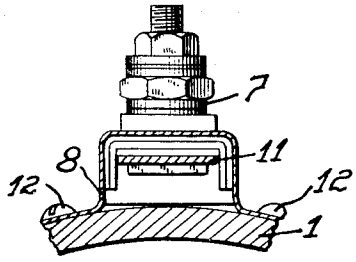


Fig. 5.



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UNITED STATES PATENT OFFICE

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STARTING MOTOR SWITCH

Application filed June 11, 1925. Serial No. 36,467.

Switches for starting motors for automobile engines are usually arranged on the floor board of the body under the foot of the driver, but where they have been mounted directly on the motor the construction was such that it was still necessary to connect the switch terminal with the motor terminal by a cable or the like. In accordance with this part of my invention, the construction of my switch and its installation on the motor are simplified by using the motor terminal as one terminal of the switch and extending that terminal insulatedly through the motor frame for connection inside the motor to the field or armature winding or both. The switch terminal forming the other terminal of the switch is carried insulatedly by the motor frame, but the switch and its installation may be further simplified by providing a switch housing which is fastened to the motor frame and not only carries the switch terminal but extends over the motor terminal. Preferably one of said terminals, usually the switch terminal, carries the conducting member or switch blade which extends into cooperative relation with the other terminal and is usually a spring metal plate adapted to be pressed into contact with that terminal by means of an operating lever pivoted on the switch housing. This operating lever may be actuated by the driver by means of a pull wire or by a push rod extending to a knob on the face of the dashboard of the automobile, and the operating lever is preferably so constructed and arranged as to be suitable for both means of operation upon being reversed in position on a pivot supported by the housing. This method of control forms the subject matter of my divisional application, Serial Number 307,191, filed September 20, 1928.

In the accompanying drawings illustrating the preferred embodiment of my switch, Fig. 1 shows, partly in elevation and partly in section, the switch operated by a pull wire; Fig. 2 is a similar view showing the switch operated by a push rod with the operating lever of the switch reversed for that purpose; Fig. 3 is a central longitudinal section on an enlarged scale of the switch of Fig. 1; and Figs. 4 and 5 are sections on lines 4—4 and 5—5, respectively, of Fig. 3.

The motor frame 1 which houses the armature and field coils (not shown), has a terminal passing through it and insulated from it, as shown in Fig. 3, a lead (not shown) to the armature or field winding, or both, being soldered or otherwise fastened inside the frame to the bottom of the terminal between the ears 2 of the clip 3. This motor terminal has a top contact formed by a copper nut 4 screwed on the shank 5 of the copper stud bolt and held from turning thereon by the lock washer 6. The switch terminal 7 extends through the pressed-up metal switch housing 8 and is insulated therefrom as shown. Outside the housing the cable connector 9 is secured to the terminal for connection of the battery lead 10 and inside the housing the conducting element or switch blade 11 of spring copper is fastened to this terminal so as to extend over the nut 4 of the motor terminal, the switch housing 8 being fastened to the motor frame at 12 and covering the motor terminal. Mounted on the pivot pin 13 which passes through ears 14 struck up from the housing, is an operating lever 15 carrying the rollers 16 of insulating material near its inner end and having a hole near its outer end.

Where a pull wire is used for operation, the operating lever is arranged as shown in Figs. 1 and 3, the pull wire consisting of a wire 17 passed through the hole in the operating lever 15 and secured by the adjustable connector 18. At the body frame member 19 the wire passes through a guide tube 20 which is held in place by the fitting 21 passing through the dashboard 22, the wire 17 being fastened to the rod 23 having a knob or handle 24 at its end for operation by the driver.

Where a push rod is used for operation, the operating lever 15 is arranged as shown in Fig. 2 in reverse position on the pivot pin 13 and the rod 25 with an elongated slot at 26 is connected thereto by a cotter pin 27 or the like. This rod passes through a tube 28 secured to the face of the dashboard 29 and has a knob 30 for operation by the driver.

It will now be obvious that to close the switch for supplying current from the battery or other source to the starting motor, the operator merely pulls the knob 24 of Fig. 1 or pushes the knob 30 of Fig. 2, to the limit of its motion, whereby the switch blade 11 is pressed by the rollers 16 into intimate contact with the top contact of the motor terminal and the circuit thereby completed from the battery or other source to the motor. As a result of the bend at 31 in the switch blade, there is a slight but sufficient wiping action of the blade on the motor terminal, particularly in the arrangement with the pull wire, sufficient to keep the contacting surfaces clean. Upon releasing the knob, the spring tension in the switch blade 11 restores the parts to their normal or open position shown in the drawings.

Having thus described my invention what I claim is:

1. In combination with an electric starting motor, having a motor frame, a motor terminal extending through the motor frame insulated therefrom, a switch terminal carried by the motor frame and insulated therefrom, a conducting element carried by said switch terminal and extending into cooperative relation with said motor terminal, and means for bringing the conducting element into electrical connection with said motor terminal to close the circuit therebetween.

2. In combination with an electric starting motor, having a motor frame, a motor terminal extending through the motor frame insulated therefrom, a switch housing carried by the motor frame, a switch terminal carried by the housing insulated therefrom, a conducting element carried by said switch terminal and extending into cooperative relation with said motor terminal, and means for bringing the conducting element into electrical connection with said motor terminal to close the circuit therebetween.

3. In combination with an electric starting motor having, a motor frame, a motor terminal extending through the motor frame insulated therefrom, a switch housing carried by the motor frame, a switch terminal carried by the housing, insulating means interposed between said terminal and said housing, a conducting element carried by said switch terminal and extending into cooperative relation with said motor terminal, and an operating lever pivoted on the housing for bringing the conducting element into electrical connection with said motor terminal to close the circuit therebetween.

4. In combination with an electric starting motor having, a motor frame, a motor terminal extending through the motor frame insulated therefrom, a switch housing fastened to the motor frame over the motor terminal, a switch terminal projecting through the housing and insulated therefrom, a conducting element carried inside the housing by the switch terminal and extending into cooperation with the motor terminal, and an operating lever pivoted on the housing and carrying a roller adapted to press the conducting element into contact with the motor terminal.

5. In combination with an electric starting motor having, a motor frame, a motor terminal extending through the motor frame and insulated therefrom, a housing fastened to the motor frame, a switch terminal carried by the housing insulated therefrom, a conducting element carried by one of the terminals and extending into cooperative relation with the other terminal, and a reversible lever pivoted on said housing for bringing the conducting element into electrical connection with said other terminal to close the circuit therebetween, said lever being constructed and arranged for operation in one position by a pull wire and for operation in the reverse position on its pivot by a push rod.

6. In a motor switch, a motor; a terminal carried by said motor; a casing supported by the motor and covering the motor terminal; a terminal on said casing; an element attached to said casing terminal and normally positioned adjacent but spaced from said motor terminal; a curved lever pivoted in said casing and rotated to either of two positions with respect to said element such that in one position the element is moved into contact with said motor terminal when the end of said lever is pulled and in the other position the element is moved into contact with said motor terminal when the end of said lever is pushed; and remote means to actuate the end of said lever.

7. In combination with an electric starting motor, a terminal on said motor, a housing supported by the motor covering the terminal of said motor; a terminal on said housing; a conducting element attached to said housing terminal and means mounted on the housing independently of said element adapted to move the same into contact with said motor terminal.

8. In combination with an electric starting motor; a terminal on said motor; a housing attached to the motor adjacent to the terminal of said motor; a terminal mounted on the housing insulated therefrom; a conducting spring element attached to the terminal mounted on said housing; a lever pivotally mounted on said housing carrying insulated rollers adapted to press against said conducting spring element and move the same into contact with said motor terminal.

In testimony whereof I affix my signature.

LOUIS B. EHRLICH.