July 4, 1944. J. BIERENFELD ET AL 2,352,765

ELECTRIC SWITCH

Original Filed Aug. 24, 1936 2 Sheets-Sheet 1

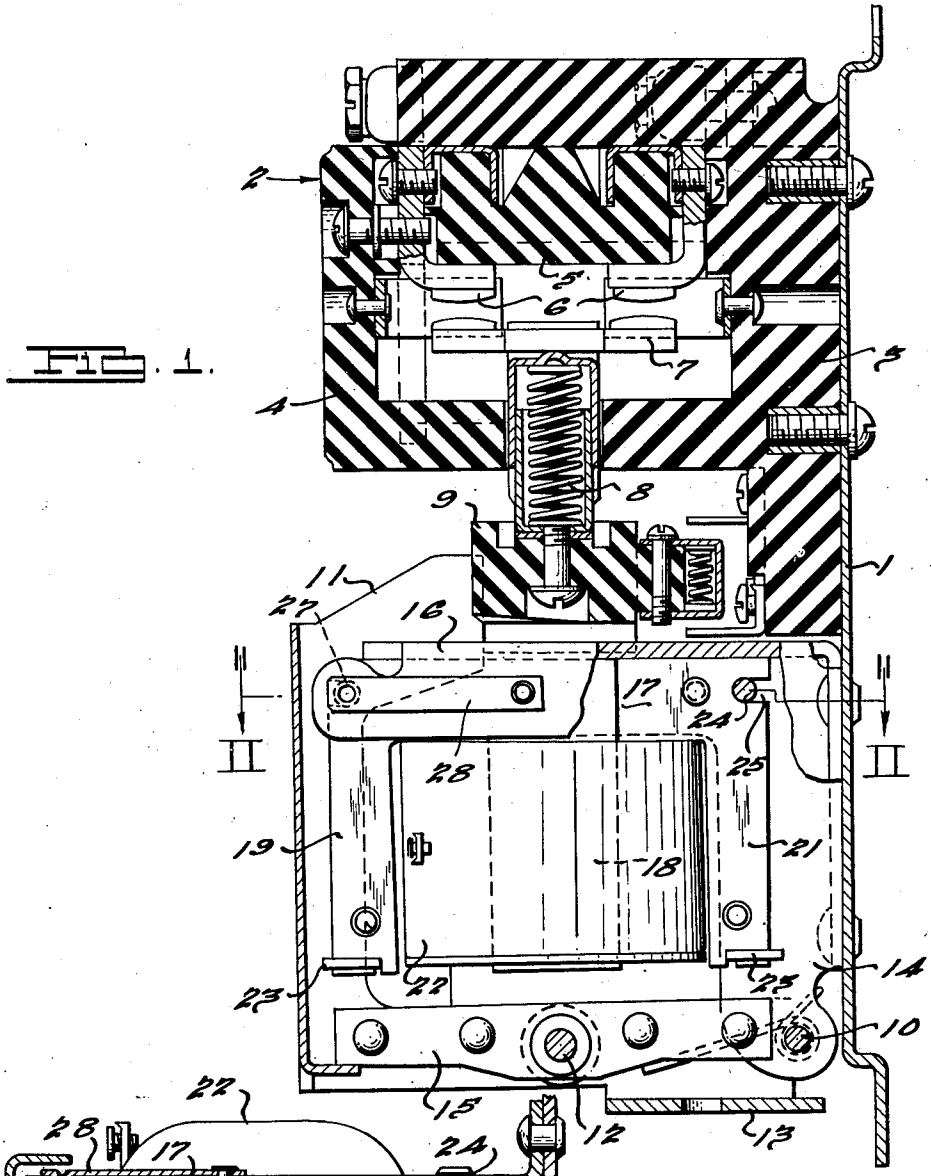


Fig. 1.

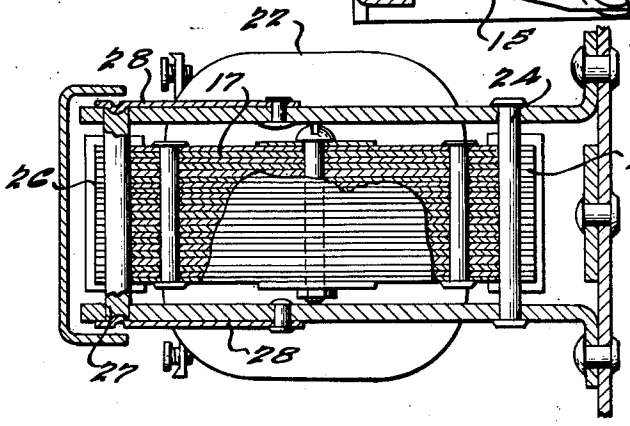


Fig. 2.

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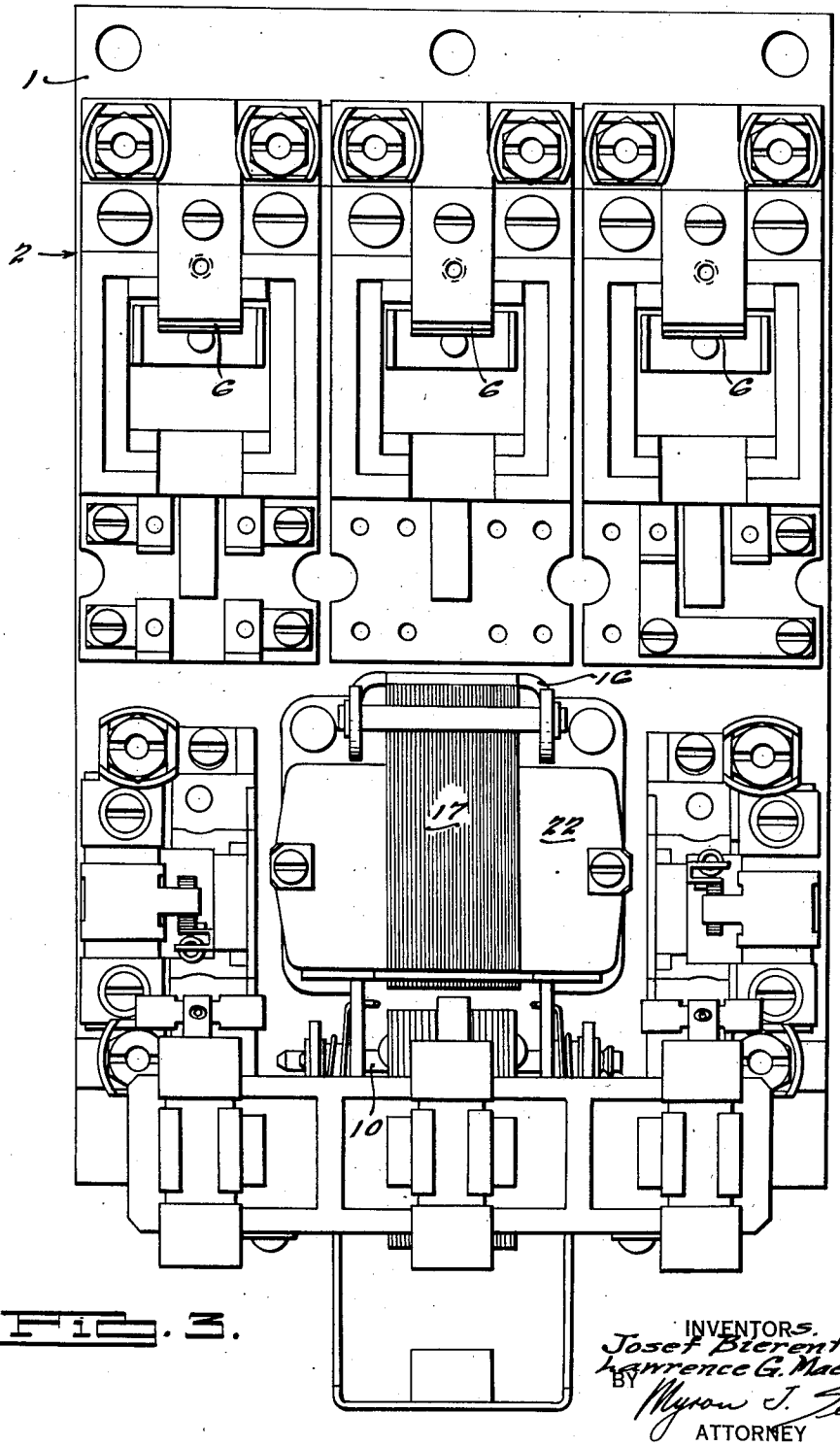


Fig. 3.

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UNITED STATES PATENT OFFICE

2,352,765

ELECTRIC SWITCH

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Original application August 24, 1936, Serial No. 97,532. Divided and this application May 29, 1940, Serial No. 337,782

3 Claims. (Cl. 175—336)

This invention relates to electromagnetically operated electric switches, and more particularly to the mounting of the electromagnetic operator for such switches, and is a division of application, Serial No. 97,532, filed August 24, 1936, for Electric switches, now Patent No. 2,239,031, issued April 22, 1941.

The object of this invention is to provide, in an electric switch, an improved mounting for the stationary magnet structure which shall securely support the field magnet and coil in its operating position and in which the magnet assembly may be readily detached from the switching structure, and without special tools.

Another object of the invention is to provide an electric switch having an electromagnetic operator in which the connection between the armature of the electromagnetic operator and the movable contacts may be readily swung forwardly to provide free access to the field magnet assembly and in which the field magnet assembly is readily removable for replacement or repair.

Other objects and features of the invention will be readily apparent to those skilled in the art from the specification and appended drawings illustrating certain preferred embodiments in which:

Figure 1 is a vertical sectional view through an electric switch according to the present invention.

Figure 2 is a horizontal sectional view on the line II—II of Figure 1.

Figure 3 is a front elevational view with certain parts removed and the movable contact swung outwardly to render the magnet structure accessible.

The electric switch comprises a rear supporting plate 1 upon which are mounted a plurality of insulating contact chambers 2 comprised of a back portion 3 rigidly secured to plate 1 and a front cover 4 cooperating therewith to complete the chamber. Within the chamber is mounted a stationary contact assembly comprising an insulating spacer portion 5 and spaced stationary contacts 6. Also, within each chamber is disposed a movable bridging contact 7 resiliently mounted through spring 8 and this chamber upon a common insulating member 9. To the member 9 is secured a generally U-shaped member 11 which is also U-shaped in cross-section and which extends from the member 9 at the front of the switch to a pivoted pin 12 which pivotally secures it to a link 13 connected to a stationary bracket 14. Also pivotally mounted upon the pin 12 is an operating armature 15.

The stationary or field magnet structure, according to the present invention, is mounted upon the bracket 14 which is of general L shape in side elevation and whose generally horizontal top leg 16 is substantially U shaped in cross section. The vertical legs of the bracket and the top surface of the leg 16 are provided with flanges shown more particularly in Figure 2, which are securely riveted to the supporting plate 1. The field magnet 17 is of E shape and comprises a central core 18 and two outer leg portions 19 and 21. About the core 18 is disposed the operating coil 22 and upon each of the pole faces of the legs 19 and 21 are disposed conventional shading coils 23. The armature 15 and the field magnet 17 are composed of thin plate-like magnetic laminations securely riveted together.

At the rear upper portion of the bracket 14 is rigidly secured a transverse pin 24 securely mounted in the opposite legs of the inverted U shaped portion 16 of the bracket and spaced downwardly from the under surface of the top of the bight of the U. The upper rear corner of the stationary magnet structure 17 is provided with a slot 25 which is adapted to receive the pin 24 therein when the magnet is in operating position. The front upper portion of the stationary magnet 17 is provided with a similar slot 26, and at the front of the opposite legs of the portion 16 of the bracket 14 there are provided opposite openings in which is received a removable pin 27 received within the slot 26 to support the forward part of the magnet. A pair of swinging resilient arms 28 are mounted on the outside faces of the legs of portions 16 and these arms interengage with the pin 27 to maintain it in position supporting the magnet.

Figure 3 illustrates the position of the switching parts to give access to the magnet structure for removal thereof. In this view the front covers 4 for the contact chambers have been removed and the movable contacts swung outwardly from the chambers on the pivots 10 and 12. In the outward position of the movable contacts the magnet 17 is readily accessible for manipulation. To remove the magnet the arms 28 are swung out of engagement with the pin 27 and this pin 27 is readily removed by pushing it through the openings in the portion 16. With the pin 27 removed, the entire stationary magnet structure, including the magnet 17 and a coil 22 may be readily withdrawn by pulling it forwardly whereupon the slot

25 is disengaged from the pin 24 which held the rear portion of the magnet. To replace the magnet, it is pushed rearwardly into a position where the slot 25 again engages the pin 24, whereupon the pin 27 is reinserted through the openings in the portions 16 and the slot 26 in the magnet and the spring arms 28 return to the position where they maintain the pin in place. By this construction it is seen that the stationary magnet assembly is securely maintained in its operating position, but may readily be removed without the use of tools and by the removal of a single retaining pin. The construction renders the replacement or repair of the stationary magnet structure a matter of great ease which may be carried out with a minimum of time and manipulation.

While certain preferred embodiments of this invention have been specifically disclosed, it is understood that the invention is not limited thereto, as many variations will be readily apparent to those skilled in the art and the invention is to be given its broadest possible interpretation within the terms of the following claims.

We claim:

1. An electromagnetic operator comprising an armature member being adapted to be connected to motion transmitting means, a stationary magnet structure for attracting said armature member, said magnet structure being generally E-shape and having an operating coil disposed around the central leg of the E, a stationary supporting bracket, a pin rigidly supported on said bracket, a groove in one extreme leg of the E interfitting with said pin to support one side of said magnet structure, and means connecting the other extreme leg of the E to the bracket to support the same and to prevent removal of the magnet structure, said last mentioned means being readily releasable to provide for ready removability of the magnet structure from its supporting bracket.

2. An electromagnetic operator comprising an armature member adapted to be connected to motion transmitting means, a stationary magnet structure for attracting said armature member, said magnet structure being generally E-shaped and having an operating coil disposed around the central leg of the E, a stationary supporting bracket, a pin rigidly supported on said bracket, a groove in one extreme leg of the E interfitting with said pin to support one side of said magnet structure, an opening in the other extreme leg of the E and a second and removable pin mounted on said bracket and passing through said opening to complete the support of the magnet structure, removal of said second pin providing for the ready removability of the magnet structure from its supporting bracket.

3. An electromagnetic operator comprising an armature member adapted to be connected to motion transmitting means, a stationary magnet structure for attracting said armature member, said magnet structure being substantially E-shaped and having an operating coil disposed around the central leg of the E, the E being disposed facing downwardly with its extreme legs at the front and rear of the structure, a stationary supporting bracket, a part rigidly supported on said bracket, means on the rear leg of said E closely and slidably interfitting with said part to support the rear end of the magnet structure, and means connecting the front leg of the E to the bracket to rigidly support the magnet structure and prevent removal thereof, said last mentioned means being releasable to provide for ready removability of the magnet structure from the supporting bracket by a longitudinal frontwise movement.

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