Feb. 13, 1940. H. L. VAN VALKENBURG 2,190,299

ELECTRIC SWITCH

Filed Feb. 19, 1936 2 Sheets-Sheet 1

Fig. 1.

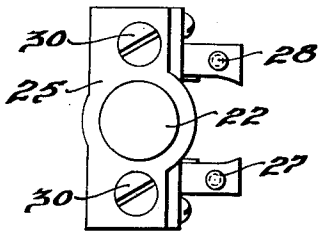


Fig. 2.

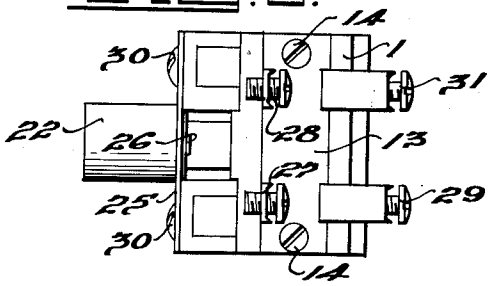


Fig. 3.

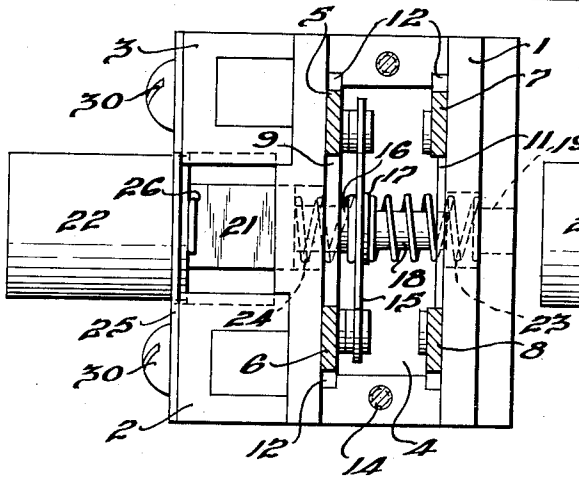


Fig. 4.

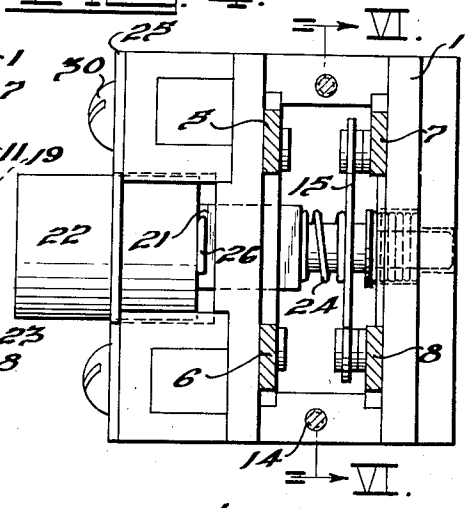


Fig. 5.

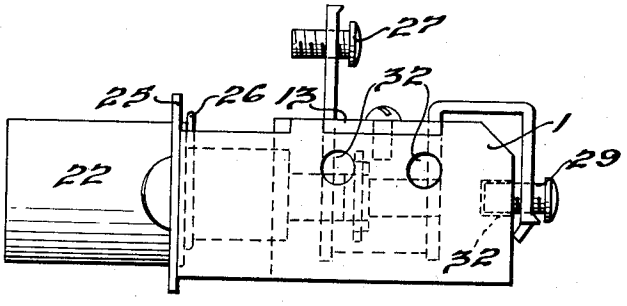
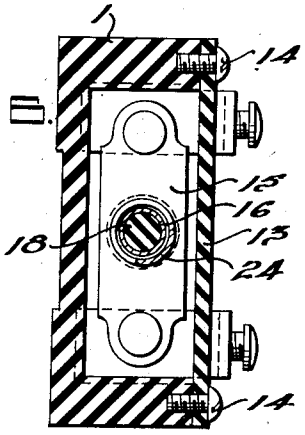


Fig. 6.



INVENTOR
Hermon L. Van Valkenburg
BY Wynn J. Seibold
ATTORNEY

Feb. 13, 1940. H. L. VAN VALKENBURG 2,190,299

ELECTRIC SWITCH

Filed Feb. 19, 1936 2 Sheets-Sheet 2

Fig. 7.

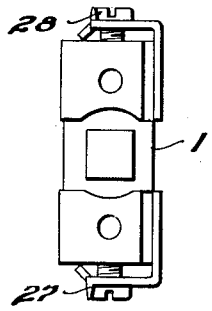


Fig. 8.

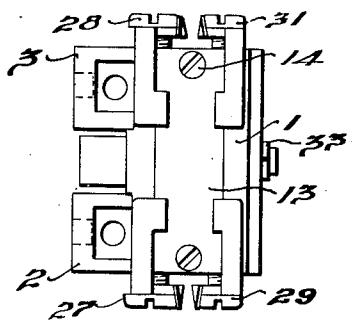


Fig. 9.

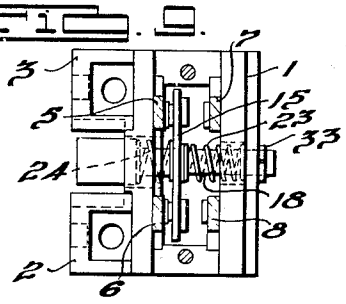


Fig. 11.

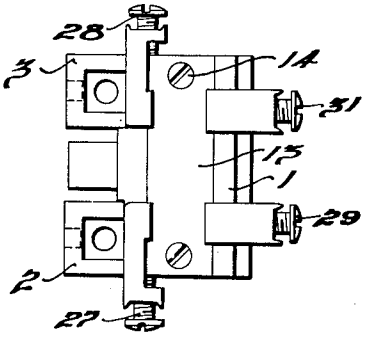


Fig. 10.

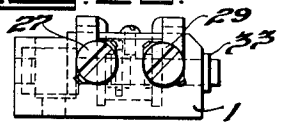


Fig. 12.

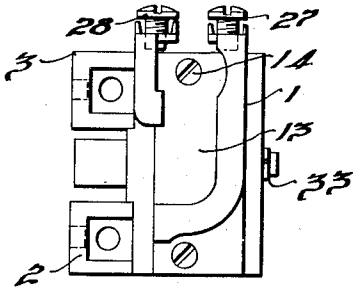
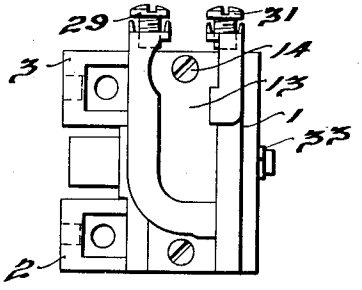


Fig. 13.



INVENTOR.
Hermon L. Van Valkenburg.
BY Myron J. Seibold
ATTORNEY.

Patented Feb. 13, 1940 2,190,299

UNITED STATES PATENT OFFICE

2,190,299

ELECTRIC SWITCH

Hermon L. Van Valkenburg, Wauwatosa, Wis., assignor to Square D Company, Detroit, Mich., a corporation of Michigan

Application February 19, 1936, Serial No. 64,627

2 Claims. (Cl. 200—16)

This invention relates to devices for making and breaking electric circuits and more particularly to electric switches of the push-button type.

One object of this invention is to provide an electric switch of the push-button type of simple form in which the operating push-button or plunger is resiliently connected to the movable contact to be movable relative thereto and to maintain a resilient contact pressure in the pressed position of the push-button.

Another object of this invention is to provide an electric switch of the push-button type which shall be substantially enclosed and in which the stationary contacts shall have portions inside and outside of the enclosure and have surfaces slidably interlocked with surfaces within the interior of the switch and maintained in position by a cover plate permitting ready sliding removal of the stationary contacts upon removal of the plate.

A further object of this invention is to provide a standardized form of electric switch of the push-button type providing a plurality of terminal connector positions and utilizing stationary contacts carrying terminal connections which are interchangeable and in which all parts except the stationary contacts are standard to all the forms of the switch and with the body portion of the switch provided with means cooperating with the terminal connectors in their various positions.

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

Figure 1 is a front elevational view of an electric switch according to the present invention.

Figure 2 is a side elevational view of the electric switch shown in Figure 1.

Figure 3 is an enlarged view similar to Figure 2 but with the parts broken away to show internal mechanism.

Figure 4 is a view similar to Figure 3 but showing the parts in position with the push-button depressed.

Figure 5 is an enlarged bottom plan view of the switch.

Figure 6 is a sectional view taken on the line VI—VI of Figure 4.

Figure 7 is a front elevational view of a slightly modified form of switch particularly adapted for use as an interlocking switch and showing a modified terminal arrangement.

Figure 8 is a side elevational view of the switch shown in Figure 9.

Figure 9 is a view similar to Figure 8 but with parts broken away to show internal parts.

Figure 10 is a bottom plan view of the modified switch.

Figure 11 is a side elevational view similar to Figure 8 but showing a modified terminal arrangement.

Figure 12 is a view similar to Figure 11 but showing a further modified terminal arrangement.

Figure 13 is a view similar to Figure 12 but showing a still further modified terminal arrangement.

The switch shown in Figures 1 to 6, inclusive, comprises a body portion 1 which may be comprised of molded insulating material and provided with a pair of hollow extensions 2 and 3 at its front corners. A chamber 4 is provided substantially centrally of the body portion and is provided with an open side as shown. Upon the front and back surfaces of the chamber are disposed stationary contacts 5, 6, 7 and 8. These surfaces of the chamber are provided with ridges 9 and 11 and with notches 12 slidably interlocking the surfaces on the stationary contact and preventing movement thereof in any direction other than toward the open side of the chamber. A cover plate 13, attached by studs 14, closes the chamber 4 and engages with notched surfaces on the stationary contacts to maintain them in position within the chamber. Within the chamber 4 and between the opposed pairs of stationary contacts is mounted a contact plate 15 having opposite contact faces at its ends adapted to bridge the respective pairs of stationary contacts. The central portion of the contact plate is provided with an opening which loosely receives a hollow cylindrical member 16 having a flange 17 disposed at one end thereof. Through the cylindrical member 16 extends a cylindrical portion 18 on the operating plunger or push-button.

The back face of the back wall of the body portion 1 is provided with an opening 19 adapted to receive the end of the plunger portion 18 in its depressed position. The cylindrical portion of the member 18 is integrally connected to an enlarged square intermediate portion 21 which terminates at its front end in the cylindrical push-button 22.

A main biasing spring 23 is interposed between the back wall of the body portion 1 and the flange 17 on the cylindrical member 16. A second spring 24 is disposed between the front face

of the contact plate 15 and the abutment formed by the enlargement 21. The front face of the body portion is apertured to slidably receive the portion 21 on the plunger.

The projections 2 and 3 at the front of the body portion have large openings at one side and apertures for attaching screws at their front and opposite side. The attaching screws may be threaded directly into these apertures or may be threaded into metallic inserts or nuts placed in the hollow portion of the extensions and there waxed in place. In the form shown in the drawings, the attaching studs 30 have been placed at the front of the projections and a cover plate 25 is shown in place surrounding and guiding the portion 22 on the push-button plunger. A cotter pin or other limiting means 26 extending beyond the push-button 22 may be provided to prevent outward removal thereof. When the push button is installed in an enclosing box, the cover plate 25 may be omitted and its place taken by the wall of the box against which the push-button switch is mounted.

As shown in Figures 1 to 6, inclusive, the stationary contacts 5 and 6 have straight extensions terminating in terminal connectors 27 and 28 and the stationary contacts 7 and 8 have angle extensions terminating in terminal connectors 29 and 31.

The operation of the push-button as shown and described should be readily apparent. The normal position of the push-button is shown more particularly in Figure 3 in which the contact plate 15 is held in position bridging the contacts 5 and 6 by spring 23. As the push-button is depressed the enlargement 21 positively engages the cylindrical member 16 and pushes it toward the rear wall of the body portion, thus compressing the spring 23. After the contact plate 15 engages the bridging contacts 7 and 8, further movement of the push-button will move the flange 17 on the member 16 away from the contact plate 15 and the spring 24 will be compressed to exert contact pressure between the contacts on plate 15 and the stationary contacts 7 and 8 in the position shown in Figure 4. Upon release of the push-button the parts will resume the position shown in Figure 3.

It is understood, of course, that should a single throw switch be desired either pair of cooperating stationary contacts may be omitted to secure single throw normally "on" or normally "off" operation.

One feature of the present invention resides in the provision of a standardized switch providing multiplicity of terminal connector positions by utilizing a large number of common or standard parts. As it is desired to maintain terminal connectors close to the body portion, provision must be made for the reception of the retaining screws on the terminal connectors in their various positions. To do this with a standard body portion the back and top and bottom exterior walls of the body portion are provided with recesses 32 more particularly shown in Figure 5 of the drawings. In the switch of applicant's invention all parts except the stationary contact and terminal connector elements are standard to the various forms and only these stationary contacts need be interchanged to provide desirable variations in terminal connector positions. Various arrangements of alternate terminal connector positions are shown in Figures 8, 11, 12 and 13. In all of these figures the shape of the interior portion of the stationary contact remains the same as it is only the exterior portions which are varied to place the terminal connectors at various positions with respect to the body portion of the switch.

While certain positions are illustrated, it is obvious that the exterior portions of the contact elements may take various other shapes and that various combinations may be used to produce any desired terminal arrangement.

The switch structure illustrated in Figures 7 to 13, inclusive, is in all respects the same as that specifically described heretofore except that the portion 22 of the push-button plunger and the plate 25 are omitted and the cylindrical portion 18 is extended through the back wall and is there provided with a split washer or other retaining means 33 preventing withdrawal of the plunger. This switch while also of the push-button type, is especially adapted for use as an auxiliary switch which may be attached to a contactor or automatic starter or similar electrical device and mechanically operated by an arm or bar movable with the main switch and may be used to provide electrical interlocking for the main switch.

While certain preferred embodiments of the 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.

What is claimed is:

1. An electric switch of the push-button type comprising spaced stationary contacts, a contact plate adapted to bridge said stationary contacts, an element slidably projecting through said plate and having a flange at one end engageable therewith, a spring biasing said flange against said plate and said plate to one operating position, an operating plunger having an abutment engaging said member for movement against said bias, and a second spring disposed between said plunger abutment and said contact plate and providing resilient pressure on said plate in a second operating position under the influence of said plunger.

2. An electric switch of the push-button type comprising opposed pairs of spaced stationary contacts, a movable contact plate adapted to bridge said pairs of contacts in its extreme positions, a hollow cylindrical element slidably projecting through said plate and having a flange at one end engageable therewith, a spring biasing said flange against said plate and said plate against one pair of stationary contacts, an operating plunger having a cylindrical portion disposed in said element and an abutment positively engageable with the end of said element remote from its flange, and a second spring disposed between said abutment and said contact plate and exerting a resilient pressure between said plate and the other pair of stationary contacts in the depressed position of said plunger.

HERMON L. VAN VALKENBURG.