

Jan. 21, 1930.

B. E. GETCHELL

1,744,626

ELECTRIC SWITCH

Filed March 15, 1928

2 Sheets-Sheet 1

Fig. 2.

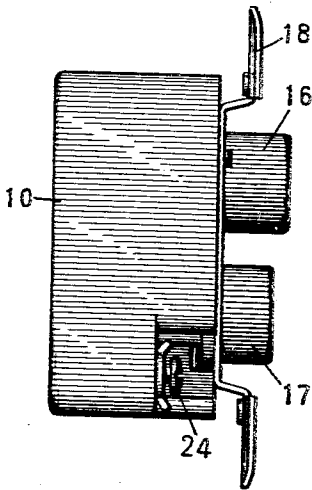


Fig. 1.

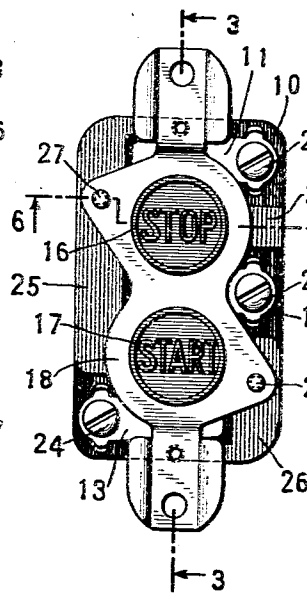


Fig. 3.

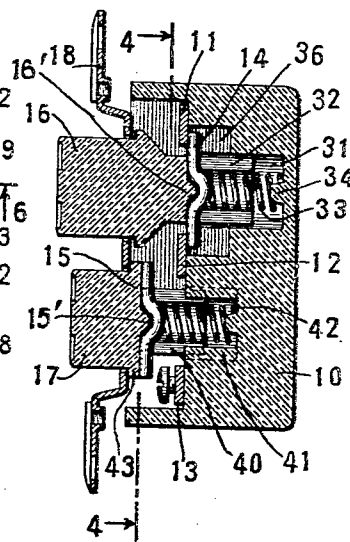


Fig. 4.

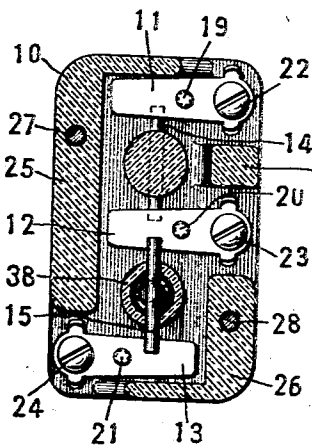


Fig. 5.

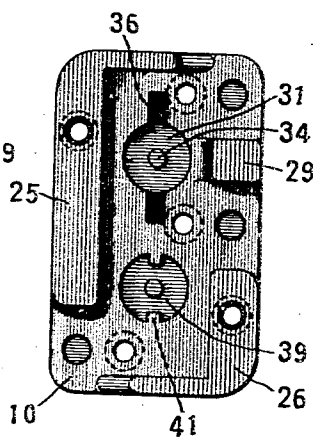
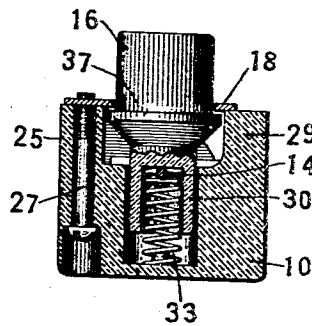
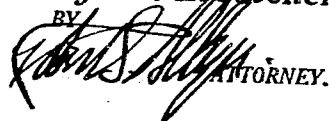


Fig. 6.



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Fig. 7.

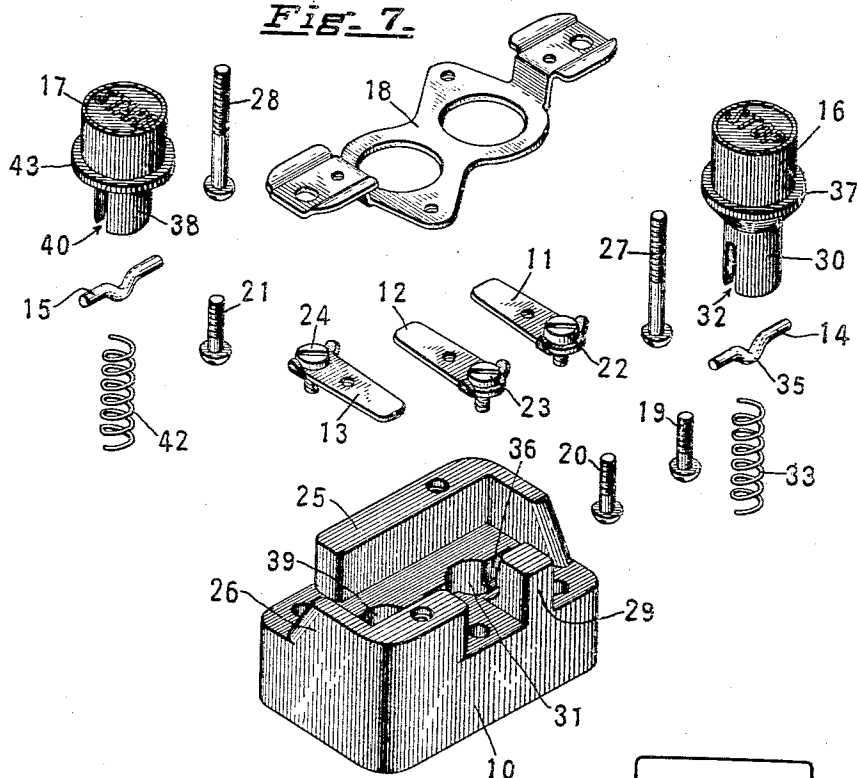
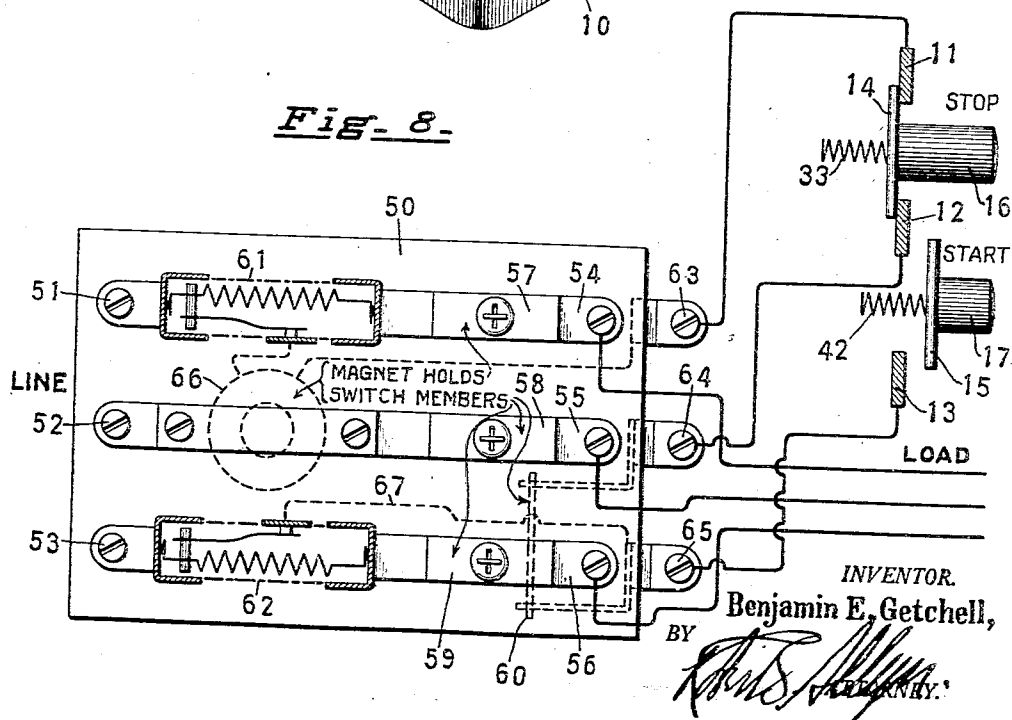


Fig. 8.



UNITED STATES PATENT OFFICE

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ELECTRIC SWITCH

Application filed March 15, 1928. Serial No. 261,893.

This invention is primarily intended for use in connection with a magnetically operated main switch of the remote control type and the specific purpose is to provide a means for momentarily interrupting one circuit or for closing another circuit so as to control the main switch from a point at any desired distance from the main switch or from any one of a number of points by means of push buttons which preferably bear the respective legends, "Start" and "Stop".

The particular object of my invention is to provide a dependable switch of substantial construction but which will have but comparatively few parts.

Another object is to provide a switch in which the movable contacts are self-adjusting with respect to the stationary contacts.

Another object is to provide a switch in which each push button is forced into its normal position by means of the straight line movement of a separate coiled spring of the compression type.

Another object is to provide a switch in which the base and movable parts are provided with integral co-acting tongues, grooves, etc. so that they are correctly positioned by the assembling of the separate parts and are maintained in operable but non-turning position by means of the yoke or supporting bridge.

Another object is to provide a switch in which all of the parts may be molded or formed separately and may be operably assembled by simply mounting the parts on the base and then securing the yoke in position, no other assembling operation or adjustments being required.

In the preferred form the invention contemplates a base or supporting body of insulating material to which are attached three conducting plates arranged in line and serving as circuit terminals as well as stationary switch contacts. Between the center plate and one of the end plates is mounted a push button or plunger carrying a contact for engaging or bridging the plates on either side of the push button when the push button is pressed inwardly to start the remote mechanism. Between the center plate and the

other end plate is mounted another push button which carries a contact for normally bridging the plates on opposite sides of it and adapted to be pushed inwardly to open the circuit to stop the mechanism. These push buttons and their contacts are interlocked with the base so as to prevent their rotation. The push buttons and the contacts carried by them are pressed outwardly by springs seated in the body and the outer ends of the push buttons are positioned by a yoke which serves as an abutment as well as a means of securing the mechanism to a receptacle face plate or the like.

Fig. 1 is a front view of a switch embodying the preferred form of the improvements of my invention.

Fig. 2 is a side view taken from the left thereof.

Fig. 3 is a vertical sectional view on the plane of the line 3—3 of Fig. 1.

Fig. 4 is a cross sectional view on the plane of the line 4—4 of Fig. 3.

Fig. 5 is a front view of the insulating base with the conducting parts all removed.

Fig. 6 is a transverse sectional view on the plane of the line 6—6 of Fig. 1.

Fig. 7 is an exploded perspective view showing the various parts of the device.

Fig. 8 is a diagrammatic view showing the invention and the associated circuit of an electromagnetic switch with which it may be used.

The base or body 10 may be formed of any suitable insulating material and has secured to it three metal plates 11, 12 and 13 which serve as stationary switch contacts as well as circuit terminals. The movable contact members 14 and 15 serve to bridge respectively the plates 11 and 12 and 12 and 13 and are provided with push buttons or plungers 16 and 17 respectively which preferably bear the word "Stop" and "Start". A skeleton face plate or yoke 18 has guiding holes or passages for the buttons 16 and 17. The contact plates 11, 12 and 13 are anchored to the base by means of screws 19, 20 and 21 and provided with binding screws 22, 23 and 24 respectively.

The base is preferably provided with

flanges 25 and 26 which serve as lateral guards for the conducting parts and also to support the yoke, plate or frame 18, which in turn is anchored by means of the screws 27 and 28 which extend through the base and screw into threaded holes in the face plate. Preferably an insulating lug or flange 29 is extended between the binding posts 22 and 23.

The push button 16 is provided on its inner or rear end with a tubular sleeve or projection 30 which is guided in the recess 31 in the base. This projection 30 is preferably slotted at 32 in its opposite walls to receive the cross contact 14. The spring 33 is inserted in the tubular extension 30 and presses against the bottom of the base where it is centered on the projection 34 and presses against the contact 14 where it may be centered by the bent portion or elbow 35.

Push buttons 16 and 17 are each provided with a preferably integral bearing or rocking point 16', 17' for engaging the center of the inner side of the bent portions 35 of the contact members 14 and 15 so as to prevent endwise movement of the contact members and to provide a bearing point on which the contact members may rock freely and thus adjust themselves to the cooperating stationary contacts. The base is also provided with extension slots 36 from the recess 31 to accommodate the opposite ends of the contact member 14 and thus guide the contact member and the push button 16 and prevent relative rotation or displacement. When the parts are properly adjusted the pressure of the spring 33 holds the contact 14 against the back of the contact plates 11 and 12 to maintain a normally closed circuit thru these contacts and, in this position the flange 37 prevents the push button 16 from coming out.

The other push button 17 is likewise provided with a tubular extension 38 which reciprocates within the recess 39. This extension 38 is slotted at 40 to receive the inward projections or lugs 41 in the base, and thus prevent the push button from turning. The contact member 15 is positioned in slots 40 and is normally pressed away from the base by the spring 42. This push button 17 is provided with an outwardly projecting flange 43 which is normally pressed against the back of the face plate 18 with the contact member 15 in open circuit position.

The yoke 18 cooperates with springs 33 and 42 to maintain the push buttons and the movable contacts 14 and 15 in assembled and operable position with respect to the base and stationary contacts 11, 12 and 13.

For the purpose of understanding the operation and use of the device, reference may be had to Fig. 8 where the electro-magnetic switch mechanism is shown diagrammatically mounted upon a base 50. The line terminals 51, 52 and 53 are mounted near one end of the base and the contact terminals 54, 55

and 56 are mounted near the other end and connected to the load. Movable switch members 57, 58, 59 and 60 are normally pressed to open circuit position by spring means, as for instance shown in my application No. 221,215. Thermostatic relays 61 and 62 are included in the opposite branches of the circuit and the switch is also provided with supplementary terminals 63, 64 and 65 which are connected respectively with the contact plates 11, 12 and 13, which have been above described. An electro-magnet 66 connected between the relay 61 and the terminal 63 serves to normally hold the switch members 57, 58, 59 and 60 in closed circuit position. The conductor 67 connects the thermostatic relay 62 with the terminal 65.

When the parts are in running condition circuit may be traced from the terminal 51 through the relay 61, movable switch member 57, terminal 54 to the load. The other side of the circuit may be traced from the terminal 53 through the relay 62, movable switch member 59, terminal 56 and the load. The neutral line extends from terminal 52 through movable switch member 58 to terminal 55 and the load. Magnet 66 is in circuit all the time except when the thermostatic relay opens on an overload and releases the movable switch members 57, 58, 59 and 60. Normally the circuit through the magnet 66 includes the switch plates 11 and 12, viz: from terminal 51, through relay 61, magnet 66, terminal 63, contact plate 11, switch member 14, contact plate 12, terminal 64, movable switch member 60, terminal 65, conductor 67, relay 62 and terminal 53.

When the parts are in running position and it is desired to open the main circuit it is merely necessary to press the push button 16 inwardly so as to break the circuit between the plates 11 and 12, which thus opens the magnetic circuit above described and releases the spring pressed movable switch members.

If we consider the circuit through the main switch to be open, and, it is desired to start the mechanism controlled by the main switch, it is simply necessary to press the push button 17 inwardly and bridge the contact plates 12 and 13 by the switch member 15. This closes the circuit through the magnet 66 independently of the movable switch member 60 as follows: from terminal 51, through the relay 61, magnet 66, terminal 63, contact plate 11, switch member 14, contact plate 12, switch member 15, contact plate 13, terminal 65, conductor 67, relay 62, terminal 53. The magnet then closes the three branches of the switch through the movable contact members 57, 58 and 59 and the cross connecting contact 60, which thus provides a circuit in shunt to the switch member 15 which may then be released.

It will be seen that the mechanism embodying my present invention is of a simple and

rugged character and that the parts are so constructed and arranged that they may be readily assembled, and require a minimum number of attaching screws or assembling operations.

I claim:

1. A switch comprising an insulating base having two guiding recesses opening toward the front, three contact plates secured to the front of said base, one of said plates being located between said recesses and the other two plates being located on the opposite sides of said recesses respectively, two push buttons having slotted extensions guided in said respective recesses, a contact bar in the slotted extension of one push button behind the adjacent contact plates, a spring normally holding said bar in engagement with both of said plates, a contact bar in the slotted extension of the other push button in front of the adjacent contact plates, a spring normally holding said bar away from engagement with both of said latter contact plates, and a yoke detachably secured to said base and holding said push buttons in place.

2. An electric switch, comprising an insulating base, three plates each constituting a contact and a circuit terminal at the front of the base, a single screw for securing each plate to said base, spring pressed push buttons, contact members carried by said push buttons and adapted to coact with said plates, a yoke having passages for said push buttons to position the same, and screws detachably securing said yoke to said base, said spring pressed push buttons being removable with said yoke, one of said contact members being held in place by two of said contact plates and the other contact member being removable with its push button.

3. An electric switch, comprising an insulating base having recesses spaced apart from each other, contact plates secured to said base, one of said plates being between said recesses and the other plates being on opposite sides of said recesses, spring pressed push buttons, reciprocable in said recesses and carrying contact members, said push buttons and the walls of said recesses having coacting projections and grooves for preventing rotation of said push buttons with respect to said base, and a yoke for holding said members in place.

4. An electric switch, comprising an insulating base, two stationary contacts mounted on said base, a recess between said plates having lateral slots, a tubular push button reciprocable in said recess, a contact member extending laterally through said push button with its end in said slots, a spring within said push button and co-acting with said base to hold said contact normally in engagement with said plates, and a yoke for holding said push button in place.

5. An electric switch, comprising an insulating base, two contact plates mounted on

said base, said base having a recess between said plates with projecting lugs at the sides thereof, a push button having a tubular extension reciprocable in said recess, said extension having slots in its sides coacting with said lugs, a contact member extending through said slots with its ends adapted to be brought into contact with said plates when said push button is pressed toward said plates, a spring within said extension and pressing against said base for normally holding the parts in open circuit position, and a yoke secured to said base for holding said push button in position.

6. An electric switch, including an insulating base having integral flanges extending from the corners thereof, contact and terminal plate members secured to said base at opposite ends thereof, a central contact and terminal plate secured to said base between the first two mentioned plates, a spring-pressed push button between two of said plates having a contact member behind and normally bridging said plates, and a spring-pressed push button mounted between the central plate and the other end plate and having a contact member in front of and adapted to bridge the adjacent plates when said push button is pushed inwardly and a yoke secured to said flanges for positioning and guiding said push buttons.

7. An electric switch including an insulating base having a plurality of guiding recesses, a corresponding number of push buttons each having a tubular extension for engagement in one of the respective guiding recesses, a spring in the tubular extension of each push button and bearing at one of its ends against the said base, a movable contact carried by each push button, appurtenant stationary contacts secured on said base and a yoke secured to said base for guiding the exterior ends of said push buttons.

8. An electric switch including an insulating base having guiding recesses, push buttons, each having a tubular extension for engagement, in one of the respective guiding recesses, a spring in the tubular extension of each push button and bearing, at one of its ends, against the said base, each of said push buttons having a slot, a movable contact in each slot, appurtenant stationary contacts mounted on said base and a yoke secured to said base for guiding the exterior ends of said push buttons.

9. An electric switch including an insulating base having guiding recesses, push buttons each having a tubular extension for engagement in one of the respective guiding recesses, the tubular extension of each push button having a slot, a movable contact in the slot of each push button, a spring in the tubular extension of each push button bearing at one end, against the said base and, at the other end, against its complementary mov-

able contact to thereby secure the said movable contact in operable positions, appurtenant stationary contacts mounted on said base and a yoke secured to the said base for guiding the exterior ends of the said push buttons.

10. An electric switch, including an insulating base having a guiding recess, a push button having a tubular extension for engagement with said recess, said tubular extension having slots and a rocking point bearing, a movable contact in said slots and engaged with said bearing to permit a tilting movement of said contact and to prevent lateral displacement of said contact, a spring in said tubular extension having one of its ends bearing against said base and its other end bearing against said movable contact to maintain said contact in operable position, appurtenant stationary contacts secured to said base and a member secured to said base to provide a bearing for the exterior end of said push button and to secure said push button, said movable contact and said spring in assembled and operable position.

11. An electric switch including an insulating base having a guiding recess, a push button having a tubular extension for engagement with said guiding recess, and having a slot and a rocking point bearing, a movable contact member in said slot and bearing against said rocking point bearing, appurtenant stationary contacts, a spring in said tubular extension to secure said movable contact member in position on its bearing and a yoke secured to said base to guide one end of the said push button and to secure all of the said parts in assembled and operable position.

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