

Aug. 28, 1928.

E. H. FREEMAN

1,682,007

SWITCH

Filed July 10, 1926

2 Sheets-Sheet 1

Fig. 1.

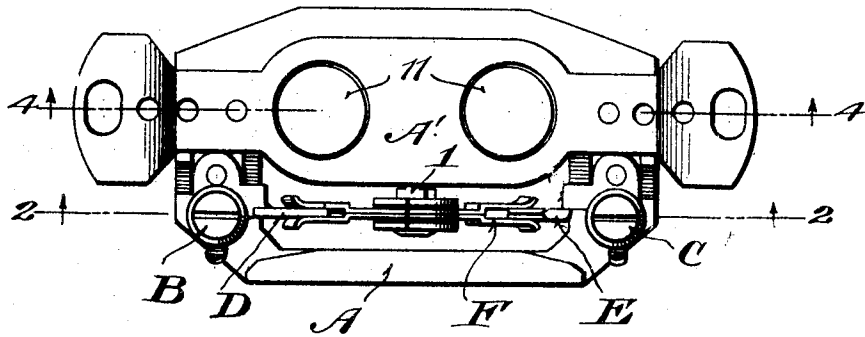


Fig. 2.

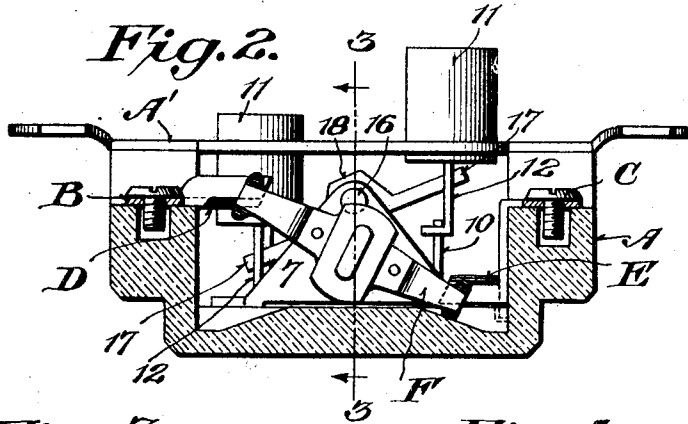


Fig. 3.

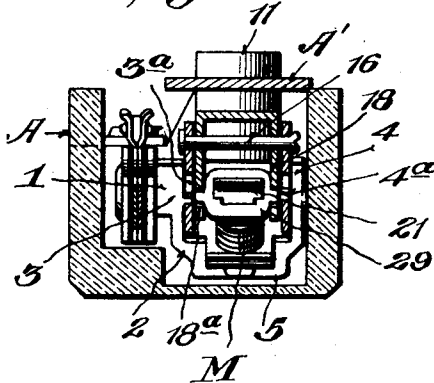
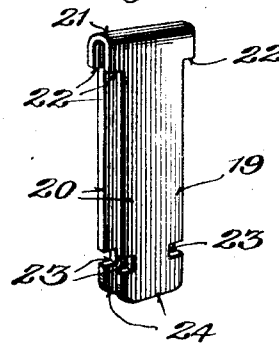


Fig. 5.



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2 Sheets-Sheet 2

Fig. 4.

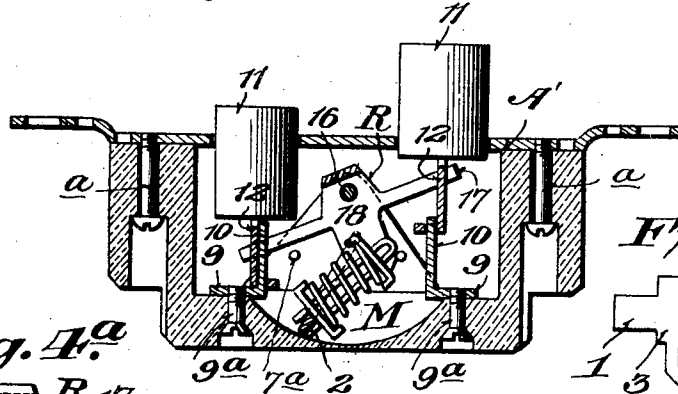


Fig. 4a.

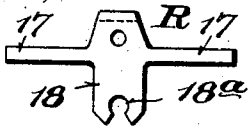


Fig. 6a.

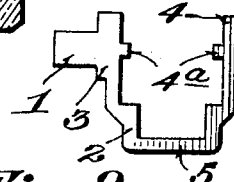


Fig. 6.

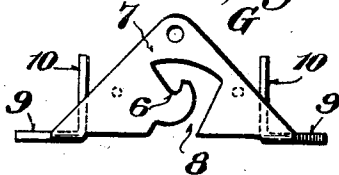


Fig. 7.

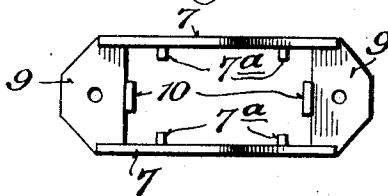


Fig. 8.

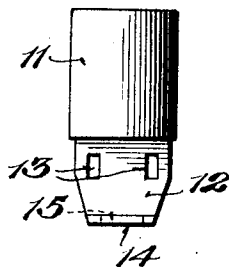


Fig. 9.

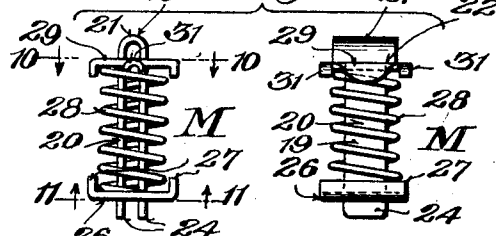


Fig. 10.

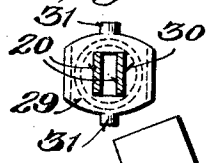


Fig. 11.

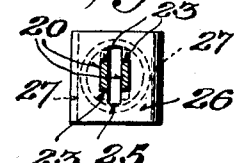
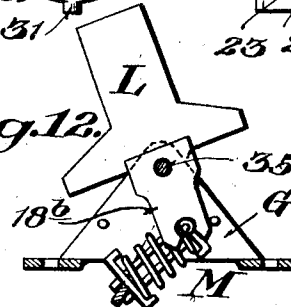


Fig. 12.



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UNITED STATES PATENT OFFICE.

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SWITCH.

Application filed July 10, 1926. Serial No. 121,670.

This invention relates to electrical switches, and more particularly to switches of the "flush" or wall type.

A primary object of the invention is to provide a simple, practical and reliable switch device having novel features of construction and whose several parts are made in such a way as to facilitate manufacture and assembly. In that connection the invention contemplates a construction which involves a novel plunger unit which is particularly easy to make and assemble as well as install in the switch assembly before it is placed in the porcelain receptacle.

A further object of the invention is to provide a novel plunger unit which is adaptable to either the push button type of switch or the oscillating lever type. That is to say, the novel plunger unit above referred to is made in such a way that the push button type of rocker or actuator may be used or an oscillating lever type may be substituted thereby providing a switch construction which may be made to meet the requirements of either one of the type of switches referred to.

A still further object of the invention is to provide a novel switch frame particularly adapted for use in connection with the push button type, the said frame having means for guiding the push buttons in their movement through the guide plate so that undue canting and consequent binding of the push button in the guide plate is avoided.

With the above and other objects in view which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated and claimed.

A preferred and practical embodiment of the invention is shown in the accompanying drawings in which—

Fig. 1 is a top plan view of the complete switch device.

Fig. 2 is a vertical sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is a vertical sectional view taken on the line 3—3 of Fig. 2.

Fig. 4 is a view similar to Fig. 2 but taken on the line 4—4 of Fig. 1.

Fig. 4^a is a detail view of the rocker frame.

Fig. 5 is a detail perspective view of the plunger core.

Figs. 6 and 7 are respectively side eleva-

tions and top plan views of the switch frame. 55

Fig. 6^a is a detail elevation of the yoke.

Fig. 8 is a side elevation of one of the push buttons.

Fig. 9 is a composite view showing in elevation respectively front and side of the plunger device. 60

Fig. 10 is a horizontal section taken on the line 10—10 of Fig. 9.

Fig. 11 is a horizontal section taken on the line 11—11 of Fig. 9. 65

Fig. 12 is a detail view illustrating the use of the plunger device in connection with an oscillating lever type of actuator.

Similar reference character designate corresponding parts throughout the several figures of the drawings. 70

Switches of the wall of the "flush receptacle" type may be of a single pole, double pole, three-way or four-way type, and one of the essential features of such a switch is to provide accurate and reliable means for quickly throwing the switch member so as to effect a quick make and break. 75

As previously indicated, one of the features of the invention resides in the provision of a novel plunger unit which includes a spring adapted to be placed under tension so that when the actuator for the switch blade is thrown past center, the yoke which carries the switch blades will be quickly shifted to opposite position. Before proceeding to a description of the plunger unit however, reference will be made to the general features of construction shown in the drawings. 80

As will be observed from Figs. 1 and 2 the invention is shown as applied to a single pole type of switch which includes in its organization a porcelain receptacle designated generally as A and having secured thereto the line wire terminal plates B and C respectively. 85

The line wire terminal plates are in turn connected with the switch terminals D and E which are adapted to be engaged and disengaged by the switch member or blade designated generally as F. This blade is preferably carried by the offset portion 1 of a yoke member designated generally as 2 and having the upstanding arm portions 3 and 4 connected by the transverse web portion 5. (See Fig. 3.) 90

The arms 3 and 4 are provided with offset bearing projections 3^a and 4^a adapted to rest in the keeper notches 6 of the upstanding 105

spaced wing 7—7 of the switch frame designated generally as G.

The switch frame G is preferably formed of stamped metal and the upstanding sides 5 7—7 thereof are provided with the entrance slots 8 for permitting access to the notches or seats 6. That is to say, for purposes of assembly the side wings of the frame are slotted as shown in Fig. 6 to permit the projections 10 3^a and 4^a to reach the seats 6 so that the yoke may be pivotally mounted on the frame to swing or rock and thereby give the necessary movement to the switch member F.

It will also be observed that the frame G is 15 provided with the end web-portions 9 adapted to rest on the floor of the porcelain receptacle to receive the fastening screws 9^a which hold the frame in the receptacle when the switch device is assembled. The ends of the web 9 20 are also provided with the upstanding guide members 10 which cooperate with the push buttons 11 to assist in guiding said buttons in their movement. As will be observed from Fig. 8 the push buttons 11 are provided with 25 the shank members 12 which are slotted as at 13 to receive the ends of the arms of rocker frame designated generally as R, (hereinafter referred to more in detail), while the ends of said members 12 are offset as indicated at 14 30 and provided with slots 15 for receiving the upstanding guide members 10 of the frame.

The rocker member R is preferably of substantially U-shaped formation and is mounted on the transverse pin 16 which is supported at 35 the tops or apices of the wings 7. The intermediate portion of the rocker member R is provided with the oppositely extending paired arms 17 which fit in the slots 13 of the button shanks 12 while the opposite sides of 40 the body below the pin 16 are provided with the actuating arms 18 adapted to engage with the plunger unit designated generally as M, as will presently appear.

The plunger unit M preferably includes in 45 its organization a core or body 19 (Fig. 5) which is preferably of substantially U-shaped formation and includes the spring arms 20 which are of less width than the body portion at the bend 21 to provide shoulders 22. The 50 lower ends of the arms 20 are notched as indicated at 23 while the lower extremities 24 are made in such a way as to be readily insertible in the substantially cruciform slot 25 of an abutment washer 26. This washer, 55 as shown in Figs. 9 and 11, preferably has the upturned flange portions 27 which cooperate to provide a seat for one end of a spring 28. This spring is adapted to be confined between an upper washer 29 which is substantially 60 similar in formation to the washer 26 except that the central opening 30 is of rectangular formation to fit over and receive the spring arm 20, and to also abut against the shoulder 22. Also, the washer 29 is provided with the

offset rocker engaging projections 31 as will 65 be clearly apparent from Fig. 10.

The construction above described makes a 70 plunger unit that is very easy to assemble because the spring core 16 may readily have placed thereon the upper washer 29, and then 75 the spring 28 may be fitted over the arms 20 and abut against the washer 29. The ends 24 of the spring arms 20 may then be squeezed or pressed together so as to enter the central 80 portion of the cruciform slot 25 of the lower washer 26. After they have been placed in the central portion of the slot 25 they may be released to expand so that the notches 23 slide 85 over the corners of the slot 25 and thereby cause the washer 26 to be interlocked with the end of the arm 20, and hold the spring 28 90 partly compressed between the two washers. When the ends 24 of the arm 20 are released in the slot 25 it will be apparent that they are spaced apart sufficiently to receive and 85 straddle the web portion 5 of the yoke 2, as clearly shown in Fig. 4. In that way it will be impossible for the end 24 of the plunger arm to become disengaged from the washer 26 90 when the device is assembled and in operation. In other words the construction described permits of locking the ends 24 of the arms 20 so that they cannot be released accidentally when the switch device is actuated.

As will be apparent from Fig. 4 the plunger 95 device M may be assembled on the yoke and then the rocker member R may be put in position so that the projections 31 on the upper slidable washer plate 29 enter the notches 18^a 100 of the actuating arm 18 of the rocker member. The pin 16 may be then placed in position to mount the rocker R in the frame so that each time the rocker is actuated the arms 18 thereof will compress the spring 28 by 105 pushing down on the upper slidable washer 29. When the rocker has moved sufficiently past center, energy stored up by the compressed spring will come into play to effect a quick snap movement of the yoke and a correspondingly quick snap movement of the 110 switch member F thereby causing the so-called "snap" action of the switch. For the purpose of limiting the movement of the rocker R switch frame G may be provided at the inside of the wings 7 with the stop 115 members 7^a as shown in Fig. 7.

Fig. 12 of the drawings illustrates the application of the present plunger unit to a 120 lever type of actuator. As will be observed from that figure the lever is designated generally as L and is pivotally supported as at 35 in the frame G'. The lever L carries therewith the actuating arms 18^b for receiving the projections 31 of the upper washer of the plunger unit. It will be apparent that upon 125 the rocking of the lever L to move the arms 18^b the plunger unit will be shifted in the same manner as when the push buttons 11

are used. This arrangement however is only illustrative of range of application and utility of the invention, the distinctive features thereof residing in the novel construction of the plunger unit and the manner for guiding the push buttons 11—11 through the guide plate A' which may be secured to the receptacle A by means of the screw *a* as shown in Fig. 4 for example.

The plunger unit M may be readily made from easily assembled parts as will be readily apparent, and can be expeditiously assembled by a comparatively inexperienced person, thereby greatly facilitating and enhancing the value of the same both from a commercial and practical standpoint.

Without further description it is thought that the features and advantages of the invention will be readily apparent to those skilled in the art, and it will of course be understood that changes in the form, proportion and minor details of construction may be resorted to, without departing from the spirit of the invention and scope of the appended claims.

I claim:—

1. A switch of the class described including in combination with a yoke and an actuator, a plunger device arranged between the actuator and the yoke and including a core member doubled upon itself to provide spaced spring arms at its lower end adapted to engage over and straddle a portion of the yoke, and a spring carried by the core and adapted to be compressed by the actuator.

2. A switch of the class described including in combination with a yoke and an actuator, a plunger device arranged between the actuator, and the yoke, and including a core member formed of spring metal and doubled upon itself to provide opposite spring arms, abutment means formed adjacent the bend of the core member, a washer element adapted to engage said abutment means, another washer element adapted to be interlocked with the free ends of the core member and the said

free ends receiving therebetween a portion of the yoke, a spring confined between the said washer elements, and projections carried by one of said washer elements adapted to be engaged by the actuator to permit compression of the spring.

3. An electrical switch of the class described including a plunger device comprising a core member formed of spring metal and doubled upon itself to provide spring arms, abutment means formed adjacent the bend of the core member, spaced spring confining members associated with said core, means for interlocking one of said members with the free ends of the core, a spring for normally maintaining the other of said members against the abutment means on the core, and means engaging between the ends of said core member for preventing disengagement of the arms of the core from the spring confining member which is interlocked therewith.

4. A switch of the class described including in combination with a yoke and an actuator, a plunger device arranged between the actuator and the yoke, and including a core member of spring metal bent into substantially U-shaped formation and provided with offset abutment portions adjacent the bend thereof and also provided with notches adjacent the free ends of the arms, a washer element adapted to engage with said abutment means on the spring core and having projections adapted to be engaged by the actuator, a washer member having a central opening adapted to receive the free end of the spring arms of the core member, said opening being of such a form as to permit the notches in the arms to receive portions of the washer, a spring confined between the washer elements, and the said yoke lying between the free ends of the spring arms at the side of the washer opposite the spring.

In testimony whereof I hereunto affix my signature.

EDGAR H. FREEMAN.