

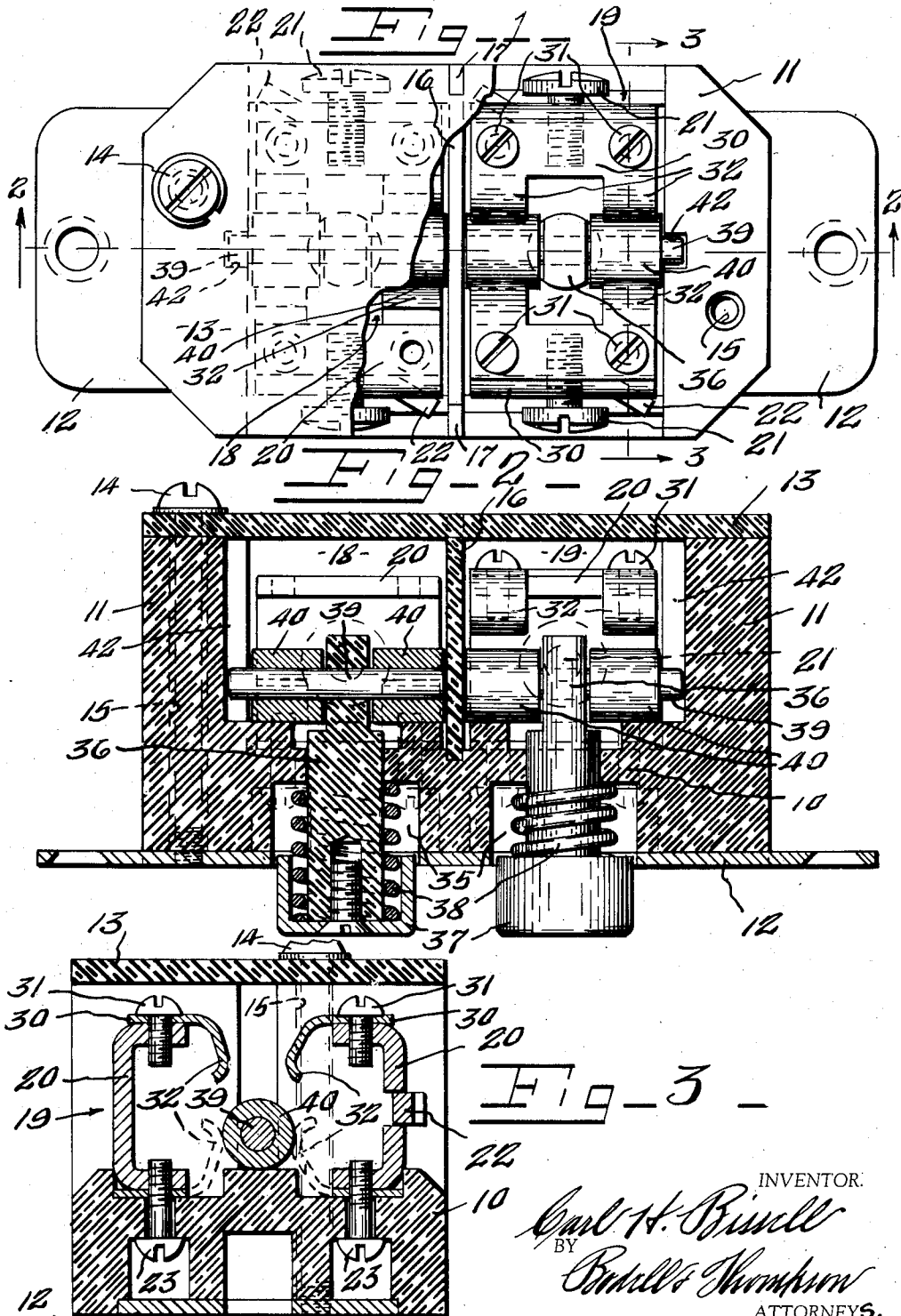
April 12, 1938.

C. H. BISSELL

2,113,756

PUSH BUTTON SWITCH

Filed Jan. 18, 1935



UNITED STATES PATENT OFFICE

2,113,756

PUSH BUTTON SWITCH

Carl H. Bissell, Syracuse, N. Y., assignor to
Crouse-Hinds Company, Syracuse, N. Y., a cor-
poration of New York

Application January 18, 1935, Serial No. 2,398

2 Claim. (Cl. 200—5)

This invention relates in general to electrical switches, and more particularly to that type of switch known as a push-button station. Push button stations are switches of the push button type used generally in connection with starting apparatus for large size electric motors. The push button station is located within convenient reach of the machine operator, and by which he controls the electric motor connected to the machine.

Push button stations, now in general use, are constructed to carry a comparatively small current, about two amperes, and are of such construction that it is often difficult to change the contacts of the station to obtain different combinations in operation.

An object of this invention is a push button station of such construction that it will carry comparatively heavy currents, ranging up to thirty amperes while, at the same time, maintaining the over-all dimensions of the present push button stations, so that the heavy current carrying station may be mounted in the standard housing now used for stations carrying small currents.

Another object of the invention is the construction of such a station in which the various elements thereof are standardized and interchangeable, and permitting the contacts of the station to be readily changed for different make or break connections and combinations by the electrician, or wireman, without the use of special tools.

Another object of the invention is a push button station incorporating novel contact construction whereby the connections may be made and broken a great number of times without any appreciable wear on the contacts.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawing in which like characters designate corresponding parts in all the views.

Figure 1 is a bottom, plan view with the detachable back or bottom plate partly broken away.

Figure 2 is a sectional view, taken on line 2—2, Figure 1.

Figure 3 is a sectional view, taken on lines 3—3, Figure 1.

The switch consists generally of a body formed of insulating material with a flat central base portion, and upstanding end portions, the body being in the form of a box having a bottom wall and end walls only, opposing contact members mounted in the recess between the end portions,

each contact member being channel shaped in general form with one flange mounted on the bottom wall of the recess, and spring contact fingers carried by the contact members and projecting inwardly, a push button having a stem slidably mounted in the base portion of the body, and being provided at its inner end with roller contacts which, upon axial movement of the stem, engage or disengage the contact fingers, the stem of the push button being operable from the outer side of the base portion of the body.

As here shown, the body of the switch is of one-piece integral construction formed of insulating material, being preferably moulded of bakelite, porcelain, or like substances. The body is formed with a central flat portion or base 10, and end portions 11. The end portions are greater in length than the thickness of the central portion 10, giving the body a substantially U shaped formation. The stationary contacts of the switch are mounted on the flat base portion 10 between the end portions 11. The outer side of the base portion 10 may be called the face of the switch, and is provided with a shallow recess extending lengthwise of the body, and in which is detachably mounted a metallic supporting plate 12.

As here shown, a back plate 13, also of insulating material, is detachably secured to the back of the body, or to the outer ends of the portions 11. The metallic supporting plate 12, and the back plate 13 are secured to the body by screws 14 which extend through apertures 15 in the back plate 13 and end portions 11, and thread into the supporting plate 12, as indicated in Figures 1 and 2. The recess between the end portions 11 may be divided into two or more compartments, and to accomplish this arrangement, the body is provided with a partition or separator 16 of insulating material. As here shown, the partition 16 is located midway between the end portions 11 with the inner edge located in a slot, or recess, extending transversely of the base portion 10, and the outer rear edge provided with projections 17 which fit into complementary notches or recesses in the side edges of the back plate 13. The partition 16 may be moulded integral with the body, but as here shown is detachably held in the slot in the base 10 by the back plate 13 which is preferable, as the removal of the partition permits greater access to the contacting mechanism of the switch. The partition 16 divides the recess of the body into two compartments 18, 19. These compartments are open on their sides to permit attachment of the conductors to the contact members of the switch. That is, as here shown,

the body is of box formation having a bottom wall and end walls only, and is divided into two compartments, each being open at their lateral sides.

A pair of contact members 20 is mounted in each of the compartments 18, 19. The contact members 20 are channel shaped in cross section, and the members of each pair are mounted with one flange on the bottom wall of the compartment, or the inner side of the base 10 with the flanges extending inwardly toward the center of the body. The central portion of the contact members 20 is provided with a threaded aperture to receive the terminal screw 21, and are also provided with struck out lugs 22 which aid in holding the loop of the conductor under the head of the screw 21.

The flanges of the contact members 20 are provided with spaced apart threaded apertures, and the members 20 are detachably mounted upon the base 10 by means of screws 23 extending through the base, and threading into the lower flange of the contact member. The heads of the screws 23 are located in counter-bores in the face of the body, and are accessible when the supporting plate 12 is removed from the body.

Resilient metallic contact fingers 30 are detachably secured to the confronting sides of the contact members 20, and are formed with extensions 32 which extend inwardly toward the center of the body, and the inner ends of which are curved slightly downwardly and outwardly, as shown in Figure 3. The contact fingers 30 may be either mounted on the upper or lower flange of the supporting members 20, and when mounted on the upper flange are secured thereto by screws 31, and when attached to the lower flanges of the member 20 are clamped between the lower flange and the base 10 by the screws 23, as shown by dotted lines Figure 3.

The contact fingers 30 are bridged, or electrically connected, by push button mechanism. Referring to Figure 2, the face of the body is formed with recesses or counterbores 35, and the supporting plate 12 is provided with complementary apertures. The central portion of the body is also provided with passages extending therethrough and arranged axially of the counterbores 35.

As here shown, a stem 36 of insulating material is slidably mounted in these passages and provided at its outer end with a detachable push button 37. The outer portion of the stem 36 is surrounded by a helical compression spring 38 abutting at its inner end against the base 10 of the body, and the outer end against the inner wall of the cap or button 37 to normally press the stem outwardly. The diameter of the cap 37 is such, relative to the recess 35, as to permit free axial movement of the cap in the recess. The inner end of the stem 36 is flattened and provided with a transverse aperture in which a pin 39 is carried. Metallic rollers 40 are mounted on each end of the pin on opposite sides of the flattened portion of the stem. The stems 36 are arranged on the longitudinal axis of the body, and the pins 39 are held in alignment during movement of the stem 36 by slots 42 formed in the inner side of the end portions 11. One end of the pins extends into this slot, and the slot acts as a guide for the pin. The diameter of the rollers 40 is greater than the distance between the opposing fingers 32 of the contacts, whereby when the stems are pushed inwardly, the rollers are moved out of contact with, or in contact with, the fingers 32, depending upon

whether the contacts 30 are mounted on the outer flanges of the supporting members 20, or adjacent the base 10. The rollers are pivoted, or rotatably mounted, upon the ends of the pins 39 so that they are free to revolve in making and breaking contact with the fingers 32. This reduces arcing and provides even wear on the rollers, whereby the switch may be operated over a considerable period of time without the necessity of either removing the contacts 30 or the rollers 40.

In push button stations generally, it is desirable that they be of such construction as to readily permit the contacts to be so arranged as to effect either make or break connections. Where two push buttons are employed in the one switch, the contacts are arranged usually so that pushing in one button breaks a circuit, and pushing in the other button makes a circuit. There are instances however, when it is desirable to have both buttons make a circuit when pushed inwardly, or both buttons break a circuit.

In the arrangement here shown, the contacts in the compartment 18 are normally closed, as they are mounted adjacent the base 10, while the contacts in compartment 19 are mounted on the outer flanges of the supporting members 20, and the circuit is made when the button is pressed inwardly. Due to the fact that the supporting members 20 and the contacts 30, stems 36, rollers 40, and all other parts of the switch, are standard and interchangeable, any one of a number of combinations can be readily obtained through the use only of a screw driver, it being necessary for the dealer to only carry one switch in stock, as the wireman or electrician can readily obtain the desired combination on the job.

The feature of interchangeability of parts, and ease of access, constitutes one of the important features of my invention.

The construction of this push button station is exceedingly simple, and while it will carry comparatively heavy currents for special application, it does not occupy any more space than the push buttons now obtainable.

What I claim is:

1. A switch of the type described comprising a body of insulating material consisting of a base portion and end portions extending rearwardly from the base, a partition strip extending rearwardly from the base portion and arranged intermediate said end portions, a back plate mounted on said end portions and extending lengthwise of the body, a face plate overlying the face side of the base portion, means for securing the back plate and face plate to the body, said back plate being cooperable with the rear edge of said partition strip to detachably secure the same to the body, and said partition strip and back plate forming separate compartments in the body, stationary contacts mounted in each compartment, a push button stem slidably mounted in the base portion in register with each of said compartments and having a push button extending through said face plate, contacts carried by the inner end of each stem and being operable to engage and disengage said first mentioned contacts upon axial movement of said stem.

2. A switch of the type described comprising a body of insulating material consisting of a base portion and end portions extending rearwardly from the base, a comparatively thin partition strip extending rearwardly from the base portion and arranged intermediate said end por-

tions, a back plate mounted on said end portions and extending lengthwise of the body, a face plate overlying the face side of the base portion, means for securing the back plate and face plate to the body, said back plate being cooperable with the rear edge of said partition strip to detachably secure the same to the body, and said partition strip and back plate forming separate compartments in the body, stationary contacts mounted in each compartment and having terminals accessible at the side of the body, a push button stem slidably mounted in the base portion in register with each of said compartments and

having a push button operable through said face plate, a pin extending transversely through the inner end of said stem, roller contacts carried by said pin and being operable to engage and disengage said stationary contacts upon axial movement of said stem, the inner side of each of said end portions being formed with a slot extending from the base portion toward said back plate, one end of said pins extending into said slot and being guided thereby during sliding movement of the stem.

CARL H. BISSELL.