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S. H. HEMPHILL

ELECTRIC PUSH BUTTON

Filed May 2, 1922

Fig. 1.

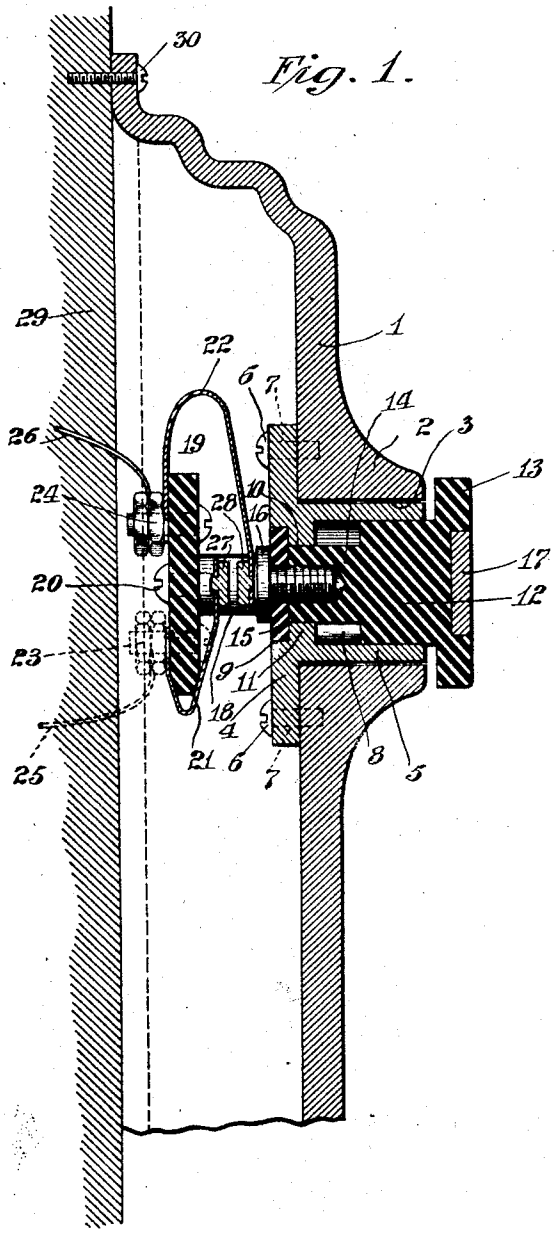
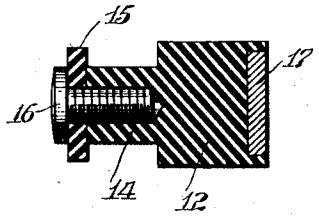


Fig. 2.



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ELECTRIC PUSH BUTTON.

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To all whom it may concern:

Be it known that I, STEWART H. HEMPHILL, a citizen of the United States, residing in the borough of Bronx, county of Bronx, city and State of New York, have invented certain new and useful Improvements in Electric Push Buttons, of which the following is a specification.

This invention relates to electric contact push buttons and more particularly to a device of this character suitable for circuits where the push button is in frequent use, such, for instance, as in elevator signal systems.

The primary object of my invention is to enable the push button to withstand frequent and long usage without appreciable wear of the parts. A further object is to completely insulate the operating parts of the push button so that short circuiting or grounding through wear of the parts or otherwise will be effectively prevented. Another object is to enable the push button to be easily and quickly attached as a unit to a signal box or enclosing casing and entirely supported by the latter. A still further object is to enable the push button to be "fool proof" by making it difficult or impossible for mischief makers to perpetrate abuses tending to disarrange or impair the usefulness of the circuit or system of which the button forms a part. Still further objects are to accomplish the above results by a device which is simple and durable in construction, positive in action and easily and quickly assembled or disassembled.

Practical embodiments of the invention are illustrated in the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a longitudinal sectional elevation of a portion of a signal box or casing with one preferred form of my invention embodied therein; and

Figure 2 is a sectional view of a modified form of push button body.

Referring to Figure 1 of the drawings, I have shown a portion of an elevator signal box or casing 1, which may be of any conventional form, and constitutes a housing and support for one or a plurality of push buttons. The front face of the box 1 has an enlarged portion 2 provided with a central bore 3 in which the push button holder is mounted. This holder is generally made of metal and in this instance consists of a flange or plate 4 which may be circular in form, and a centrally disposed integral cylindrical body portion 5 adapted to fit the bore 3, the inner face of the plate abutting against the inner face of the box 1 and being secured thereto preferably by screws 6 passing through notches or apertures 7 located in the flange 4. The length of the cylindrical body portion is preferably such that its outer end is flush with the end of the enlarged portion 3 of the casing 1.

The holder body 5 in this instance is provided with an interior bore or chamber 8 which communicates with a circular recess or chamber 9 of smaller diameter at the opposite end of the holder portion 4, there being a still smaller diameter bore 10 between the bore 8 and recess 9. The smaller diameter bore 10 is formed by an internal annular shoulder 11 extending from the interior wall of the holder. The communicating sections 8, 10 and 9 constitute a continuous differential bore.

The push button proper comprises a cylindrical body 12 adapted to slide in the bore 8. The body 12 has a head 13 of larger diameter, which head extends beyond the end of the bore 8 and is adapted to prevent access thereto. A cylindrical reduced diameter portion or neck 14 integral with the body portion 12 is adapted to fit the smaller diameter bore 10, and a separate annular disk 15 of a diameter corresponding to the recess or chamber 9 is secured to the end of the reduced diameter portion 14 of the push button proper, after the push button has been inserted in the holder, by means of a headed screw 16 which extends through the centre of the disk 15 and into the reduced diameter portion 14. The push button proper is therefore of triple diameter, the portions 12, 14 and 15 fitting the differential bore formed by the bores 8, 10 and recess 9 respectively. The flanged head 13 of the button and disk 15 retain the push button within the holder and limit its inward and outward movement.

The push button proper and the disk 15 are made of insulating material, such as fibre, rubber or the like, but may be made of other materials. In the outer face of the head 13 I insert a circular centre piece 17 of polished nickel, pearl or other desired substance.

A plurality of spacing pins or posts 18 extend from the face of the plate 4 and an in-

sulating base plate 19 is adapted to be secured on the ends of the posts 18 by screws 20. Movable flat spring contact members 21 and 22 are secured to the base plate 19 by screws, rivets or any other usual or approved manner, and binding posts 23 and 24, which may pass through the ends of the contact springs 21 and 22, serve to hold the ends of circuit wires 25 and 26 and establish connection with the contact springs. The ends of the contact springs are provided with opposing metallic contact disks or plates 27, 28 which are strongly wear-resisting. The spring 22 is under sufficient tension to return the push button to and maintain it in its outward position after each operation. The entire contact making device, including the push button proper, holder, insulating base plate and binding posts constitutes a unit and is held within the box 1 by the screws 6. The box 1 itself is fastened by screws 30 to a wall 29 from which the wires 25 and 26 lead, or the box may be secured to any other support. The push button is spaced from the wall or other support and is quickly and easily secured in place within the casing. Any form of box or casing may be employed and the device is utilizable for practically any electric contact making purpose.

In the ordinary practice it has been customary to secure the shank of the push button within its holder by means of a pin passing through the shank near its outer end, the pin abutting against a flange within the holder and the end of the shank engaging one of the contact springs to depress it and establish the circuit. The end of the shank in such a construction is apt to wear out in a short time and the contact spring comes into engagement with the pin, which, being in contact with the metal flange, thus causes grounding or short-circuiting of the system. This condition is apt to occur more frequently where a plurality of push buttons are mounted in a single casing, as in an elevator signal system.

In my device the push button proper is retained in position within the holder by an insulating and non-grounding member of large diameter, this member, in the present instance the disk 15, being secured to the shank of the push button proper by the metal contact point or screw 16 the head of which constitutes a practically non-wearing point of engagement with one of the contact springs, the shank of the screw being completely insulated within the push button. Even if the head of the screw should wear, the contact spring can not engage any metal part because of the disk 15. The disk 15 thus effectively insulates the metallic parts and insures against short-circuiting or grounding. By reason of the enlarged diameter of the recess 9 and disk 15, the contact 16 is also effectively isolated from the metal holder body, so these parts can not contact with each other while the disk 15 is capable of performing its function of retaining the push button proper within the holder.

The large diameter head 13 covering the end of the bore in which the push button is fitted protects the push button against the insertion of pins, toothpicks or other articles by mischievous persons, the effect of which is well known.

Figure 2 illustrates the push button proper without the "fool proof" protecting head. In this form, which is desired in certain cases and operates equally as well as the preferred form, the inward and outward movement of the push button is limited by engagement of the shoulder 11 with the opposing faces of the large diameter body portion 12 and disk 15.

It is to be understood that while the present showing and description disclose certain specific embodiments of my invention, other forms and modifications are included within the spirit and scope of the invention as expressed in the appended claims.

I claim:

1. An electric push button comprising, in combination, a supporting casing having an opening therein and a push button positioned within said opening and secured to the under side of said casing, said push button including a holder having a plural diameter bore, a base plate mounted on said holder in spaced relation thereto, contact members on said base plate, and a body having inner and outer enlarged portions reciprocable in said plural diameter bore to make and break contact between said contact members.

2. An electric push button comprising, in combination, a supporting casing having an opening therein, and a push button positioned within said opening and secured to the under side of said casing, said push button including a metallic holder having a plural diameter bore, a non-metallic base plate mounted on said holder in spaced relation thereto, contact springs on said base plate and a body having inner and outer enlarged portions reciprocable in said plural diameter bore to make and break contact between said contact members, one of said contact springs normally engaging said body to maintain said body in inoperative position.

3. An electric push button comprising, in combination, a supporting casing having an opening therein and a push button mounted within said opening and secured to the under side of said casing, said push button including a holder having a plural diameter bore, a base plate mounted on said holder in spaced relation thereto, contact members on said

base plate, a body having inner and outer enlarged portions reciprocable in said plural diameter bore to make and break contact between said contact members, one of said contact members comprising a spring arm normally engaging said body to maintain said body in inoperative position, said body including an enlarged end portion, and means to secure said enlarged end portion to said body, said means engaging said spring arm.

4. An electric push button comprising, in combination, a supporting casing having an opening therein, and a push button positioned within said opening and secured to the under side of said casing, said push button including a holder having a plural diameter bore, a base plate, contact members mounted on said base plate, spacing posts between said base plate and said holder, and a body having inner and outer enlarged portions reciprocable in said plural diameter bore to make and break contact between said contact members, one of said contact members comprising a spring arm to normally maintain said body in inoperative position.

5. An electric push button comprising, in combination, a supporting casing having an opening therein, and a push button positioned at the under side of said casing to extend within said opening, said push button including a holder having a plural diameter bore, a base plate, contact arms on said base plate, spacing posts between said base plate and said holder, a body reciprocable in said plural diameter bore to make and break contact between said arms, said body including an enlarged outer portion, a neck portion and an enlarged separable inner portion, all within said plural diameter bore, and means to secure said separable inner portion to said neck, said means constantly engaging one of said contact arms.

In testimony whereof, I have affixed my signature to this specification.

STEWART H. HEMPHILL.