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LOCKABLE PUSH BUTTON DEVICE

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Fig. 1

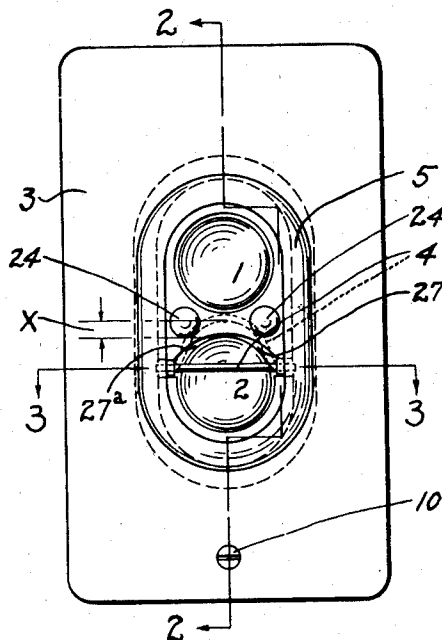


Fig. 2

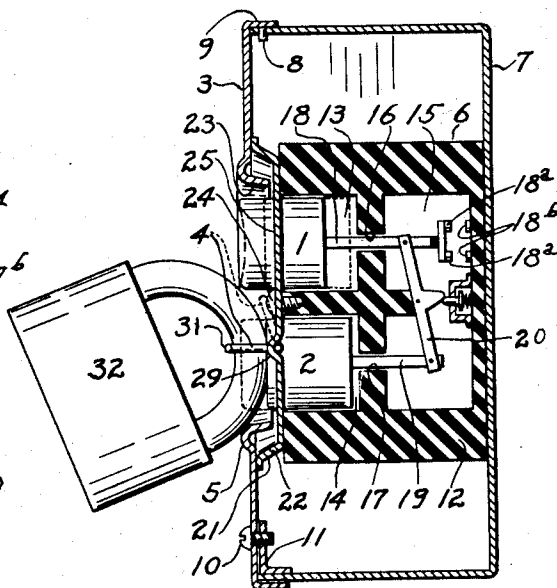


Fig. 4

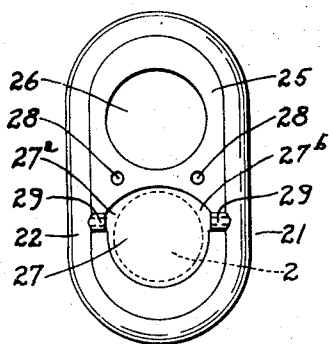


Fig. 3

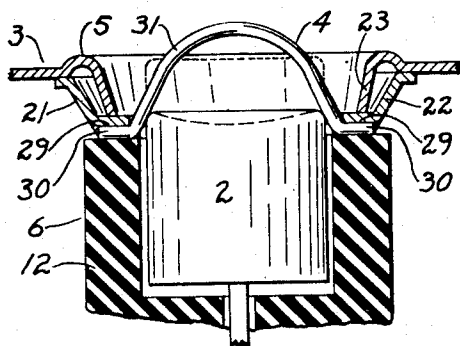
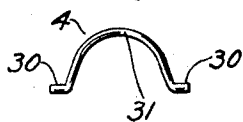


Fig. 5



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LOCKABLE PUSH-BUTTON DEVICE

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10 Claims. (Cl. 200—42)

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This invention relates to improvements in push button devices.

An object of the invention is to provide a push button switch with novel and simple latching means for optionally latching a push button thereof in a given position.

Another object is to provide means of the aforementioned character adapted to use of a padlock in conjunction therewith to afford locking of its push button in a given position.

Another object is to provide means of the aforementioned character having a minimum of parts that are simple and inexpensive to manufacture and which may be readily applied to standard types of push button switch units.

Various other objects and advantages of the invention will hereinafter appear.

The accompanying drawings illustrate the invention in detail and a preferred embodiment of the same which will now be described, it being understood that the details and the embodiment illustrated are susceptible of modification within the scope of the appended claims.

In the drawings,

Figure 1 is a front elevational view of a switch having two interlocked push buttons with latching and/or locking means for one push button.

Fig. 2 is a sectional view taken along the broken line 2—2 of Fig. 1.

Fig. 3 is a fragmentary sectional view taken along the line 3—3 of Fig. 1, and

Figs. 4 and 5 are detailed elevational views of parts shown in Figs. 1, 2 and 3.

Referring to Figs. 1 and 2, they show an enclosed push button station having interlocked operating push buttons 1 and 2 extending through a substantially elliptical opening in a cover 3. Locking of the push buttons is accomplished through the medium of latching member 4 in the form of a ball which has pivotal support behind the cover 3 and which as shown in full lines is adapted to be positioned to extend across the front of push button 2 when the latter has been depressed. On the other hand, as shown by broken lines, member 4 may be positioned in a non-latching position clearing push button 2 for its normal operation. The cover 3 is shown as provided with an integral ridge 5 surrounding the opening therein to afford protection against accidental operation of the push buttons. The switch unit 6 to be operated by the push buttons is mounted in a box shaped enclosing casing 7 having one side open; the cover 3 being provided for the open side of said casing. Cover 3 is provided with one or more lugs 8 suitably fastened to the inside of a

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flange 9 and adapted to be received in openings formed in the casing 7. A screw 10 is adapted to be received through an opening in the cover 3 to engage with a bracket 11 carried by casing 7. When the lugs 8 are engaged in the cooperating openings in casing 7 and when screw 10 is engaged with the bracket 11, the cover 3 will be securely fastened to the casing 7 and the push button latching member 4 may be utilized as hereinafter set forth to prevent removal of the cover 3.

Switch unit 6, which is shown more or less schematically, comprises an insulating block 12 having a pair of annular recesses 13 and 14 to respectively receive push buttons 1 and 2. Push buttons 1 and 2 are respectively carried by stems 18 and 19 which extend through passages 16 and 17 in block 12 and which are pivotally connected to the opposite ends of a centrally pivoted member 20. An insulated contact bar having contact tips 18^a is suitably fastened to stem 18 to be moved into engagement with a pair of cooperating stationary contacts 18^b when push button 1 is depressed and to be disengaged when push button 2 is depressed. Thus as the push buttons are interlocked by member 20 locking of push button 2 in depressed position locks the switch contacts in disengaged relation.

As shown in Figs. 2 and 3, switch unit 6 is provided with a guard plate 21 which is mounted on the outer side of the block 6 to provide a dust shield in conjunction with cover 3. Plate 21 is provided with an angular upward flaring peripheral flange 22 which provides a semi-dusttight joint in cooperation with a downward flaring peripheral flange 23 formed about the aforementioned opening in cover 3; the last mentioned flange being formed integrally with the ridge 5. Plate 21 is preferably mounted rigidly on block 12 as by drive screws 24 and said plate provides pivotal bearing support for the latching member 4.

Referring to Fig. 4, it shows the guard plate 21 in detail. The plate is preferably so formed that a flat portion 25 thereof will completely close the opening in cover 3 when the latter is mounted on the casing 7, such flat portion having openings 26 and 27 to permit the push buttons 1 and 2 to extend therethrough. Also the flat portion of plate 21 is provided with a pair of rearwardly opening, open pivotal bearing surfaces 29 for the latching member 4. These bearing surfaces 29 are preferably aligned with respect to one another and extend from opposed edges of the opening 27 to the flange 22. Said bearing surfaces are also preferably formed off center with respect to the opening 27 and said opening 27 is preferably

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formed so that the arc of its edge between the bearing surfaces 29 and adjacent to the openings 28 is of a greater radius than the radius of the major portion of said opening. The circumferential extent of push button 2 is shown by broken lines to depict the clearances 27^a and 27^b which are thus provided to accommodate portions of the latching member 4.

Referring to Fig. 5, it shows the latching member 4 in detail. In a preferred form, member 4 comprises a resilient wire having two axially aligned end portions 30 integral with an intermediate portion 31 of arcuate form. All portions of the member 4 are formed to lie in a common plane. The intermediate portion 31 is preferably formed so that it will span the opening 27 of plate 21 and provide for engagement of the end portions 30 with the bearing surfaces 29 of plate 21.

Referring particularly to Figs. 2 and 3, they afford an understanding of the assembled relation of latching member 4, plate 21 and switch unit 6. With push button 2 depressed, latching member 4 is positioned so that the end portions 30 lie on block 12 and the intermediate portion 31 is substantially perpendicular to the block 12. The plate 21 is then placed over the member 4 so that the end portions 30 of member 4 engage with the bearing surfaces 29 thereof and so that the push buttons 1 and 2 are respectively received through the openings 26 and 27; the portion 31 of member 4 being simultaneously received through opening 27 with push button 2. Plate 21 is then securely fastened to block 12 by the screws 24 and this secures the member 4 in its bearings, the push button 2 preventing contraction of member 4 for withdrawal of its ends from their bearings. As assembled, member 4 will be in its latching position. To place it in the non-latching position it is merely necessary to push the portion 31 toward push button 1 and then toward the flat portion 25 until it freely clears push button 2. The aforementioned clearance openings 27^a and 27^b in the plate 21 accommodate parts of the portion 31 so that it may be moved substantially parallel with respect to the flat portion 25 of the plate 21. When the member 4 is placed in this position it remains there and push buttons 1 and 2 may be selectively operated. If the member 4 is moved to the latching position, when push button 2 has been placed in the depressed position, the intermediate portion 31 affords wedging or binding cam action on the periphery of said push button as depicted in Figs. 2 and 3, and prevents operation of either of said push buttons.

Latching member 4 as will be understood, only provides for latching push button 2 in the depressed position and simultaneously retaining push button 1 in the extended position. However, by passing the shackle or hasp of a padlock 32 as shown in Fig. 2 about the portion 31 of member 4, said member can be rendered incapable of movement such as to free the push buttons. Necessarily, the shackle of the padlock must have dimensions suitable to locking purposes. For example the shackle preferably will have a cross sectional diameter greater than the clearance distance between push button 2 and the center of the portion 31 of latching member 4 as depicted by the distance X in Fig. 1, when member 4 is moved toward release position. If a shackle of the aforementioned size is fastened about the portion 31 when member 4 is in the locking position, an effective locking action will result.

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It has also been found in connection with the preferred enclosing casing and cover shown, that if a padlock having a shackle of the above size and having a body portion of proportionate size is locked about portion 31 of member 4 when the latter is in the latching position, it will not be possible to remove the cover 3 from casing 7. The push button 1 prevents the positioning of the padlock centrally with respect to the opening in the cover 3 so that it cannot clear the latter if an attempt is made to remove the cover. As will be understood, the size of the padlock body and shackle with respect to the size of the opening in the cover will determine whether the added feature of cover locking may be obtained.

What I claim as new and desire to secure by Letters Patent is:

1. The combination with a device having an operating push button, of a bail-like member, and fixed bearings for the ends of said member affording it pivotal movements into and out of the path of said push button, said bearings being so positioned and said member being so proportioned with respect to said push button that when said push button is depressed said member is engageable with the outer end portion of said push button to inherently restrain said push button in depressed position, and said member having between it and the end of said push button clearance for a padlock hasp of such proportions that when the hasp is engaged with said member to occupy such clearance disengagement of said member from said push button will be blocked.

2. The combination with a device having an operating push button rectilinearly movable, of a bail-like wire having its ends bent outwardly to substantially align with one another and means affording for the ends of said wire pivotal bearings which support said bail-like wire in straddling relation to said push button and for pivotal movement of said wire into engagement with the outer end of said push button when depressed or alternatively into a position affording said push button clearance therefrom.

3. The combination with a device having an operating push button rectilinearly movable, of a bail-like wire having its ends bent outwardly to substantially align with one another and means affording for the ends of said wire pivotal bearings which support said bail-like wire in straddling relation to said push button and for pivotal movement of said wire into engagement with the outer end of said push button when depressed or alternatively into a position affording said push button clearance therefrom, the bearings for said bail-like wire being in a plane offset from the longitudinal axis of said push button and being close to said push button whereby said wire is blocked from withdrawal from its bearings.

4. The combination with a device having an operating push button movable rectilinearly, of a bail-like member of arcuate form having outwardly extending end portions aligned with one another and means affording said end portions of said bail-like member pivotal bearings for support of said member in a straddling relation to said push button and for movement of said member into a position to afford said push button clearance therefrom or alternatively into a position wherein it extends across the front of said push button in depressed position of the latter, said member being so proportioned and being pivoted in such a plane that its engagement with said push button is characterized by a wedging

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action and that its disengagement requires a reverse movement thereof.

5. In combination, an electric switch having an operating push button movable rectilinearly, a supporting base for said switch, an enclosing casing for said switch and its base, said casing comprising a section to which said base is secured and a removable cover section through which said push button extends, and a bail-like member having its major portion external of said casing and having its ends extending through said cover section and pivotally attached to said switch base for pivotal movements of said member into and out of restraining relation with said push button in the depressed position of the latter, said member when in restraining relation to said push button having cross wise of said push button an intermediate portion which in part has clearance from said push button and a padlock attachable by its hasp to the part of said bail-like member having clearance with said push button, said padlock providing for retention of said member in restraining position and preventing removal of said cover section.

6. The combination with a switch having operating push buttons interlocked to move relatively in opposite directions, of a member to be set to restrain one of said push buttons in depressed position, said member being bail shaped and having for its ends fixed pivotal bearings supporting it in a straddling relation to said one push button and affording it pivotal movement to restraining position or alternatively pivotal movement to a position intermediate said push button in which it affords both of said push buttons clearance therefrom.

7. In combination, a switch unit comprising a supporting base and a switch having a plurality of push buttons disposed in a parallel and adjacent relation and interlocked for relatively reverse movements, a bail like latching member for one of said push buttons having its ends pivotally attached to said switch supporting base, said member having an intermediate portion to extend across the end of said one push button when the latter is depressed and to have in part clearance from the end of the push button, a casing for said switch unit comprising a section to which said switch unit is attached and also a removable cover section having an opening to accommodate said push buttons and said bail-like latching member and a padlock attachable by its hasp to said intermediate portion of said member at its point of clearance from the latched push button, said padlock providing for retention of said member in latching position and preventing removal of said cover section of said casing.

8. The combination with a device having an operating push button, of a bail-like member having all of its portions lying in a common plane, and fixed bearings for the ends of said

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member affording pivotal movements of the latter, said bearings being so positioned and said member so proportioned with respect to said push button that said member must and may be manually moved alternatively to a given position to engage and inherently restrain said push button in depressed position or to another given position to free said push button.

9. The combination with a device having an operating push button, of a bail-like member having all of its portions lying in a common plane, and fixed bearings for the ends of said member affording it pivotal movement into and out of the path of the outer end of said push button, said bearings being so positioned and said member being so proportioned with respect to said push button that when said push button is depressed said member must and may be moved manually to engage said outer end of said push button to inherently restrain said push button in depressed position.

10. In combination, an electric switch having an operating push button movable rectilinearly, a supporting base for said switch, an enclosing casing for said switch and its base, said casing comprising a section to which said base is secured and a removable cover section through which said push button extends, and a bail-like member having all of its portions lying in a common plane, its major portion external of said casing, and its ends extending through said cover section and pivotally attached to said switch base to permit movement of said member into and out of the path of said push button in depressed position of the latter, said member having its major portion so proportioned and its pivotal attachment with said base so positioned with respect to said push button that said member must and may be manually moved into the path of said push button to inherently restrain the latter in depressed position.

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