

March 6, 1945.

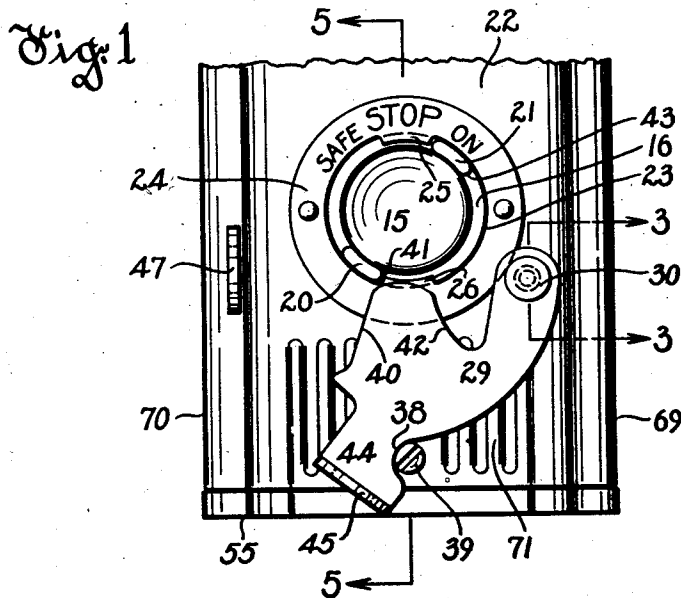
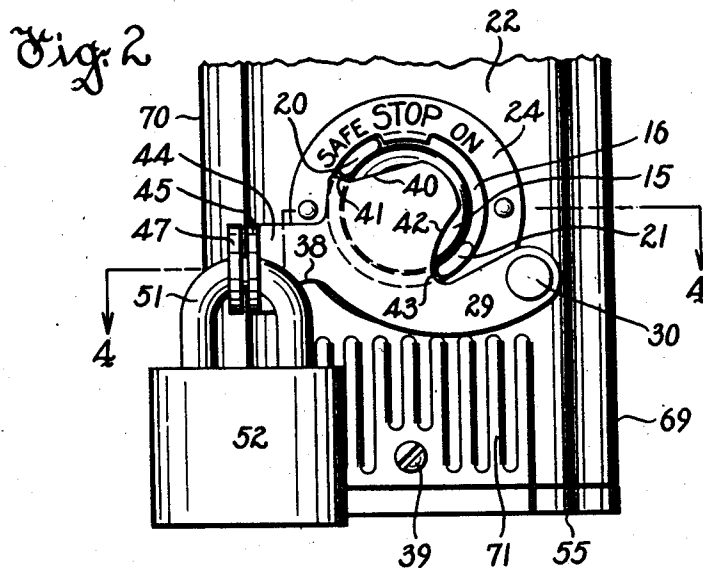
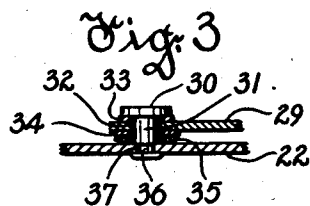
C. F. ROBBINS

2,370,877

PUSHBUTTON SWITCH CONTROL STATION

Filed Feb. 17, 1944

2 Sheets-Sheet 1



Inventor
Clyde D. Robbins
By Mark A. Hubbard
Attorney

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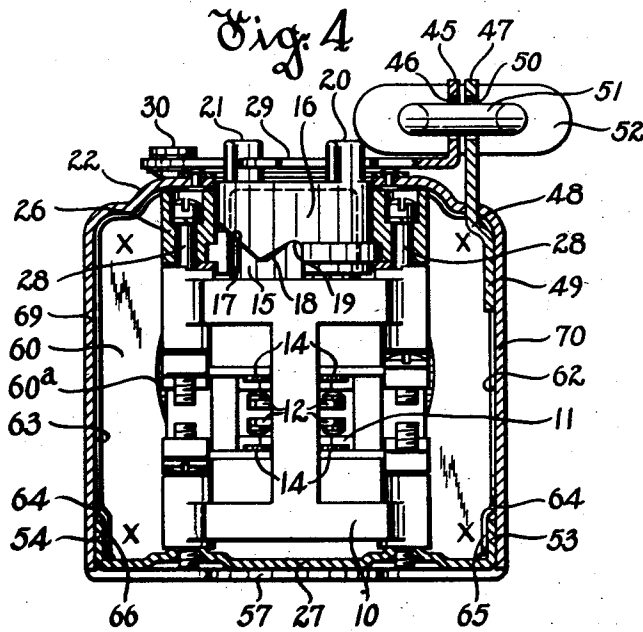
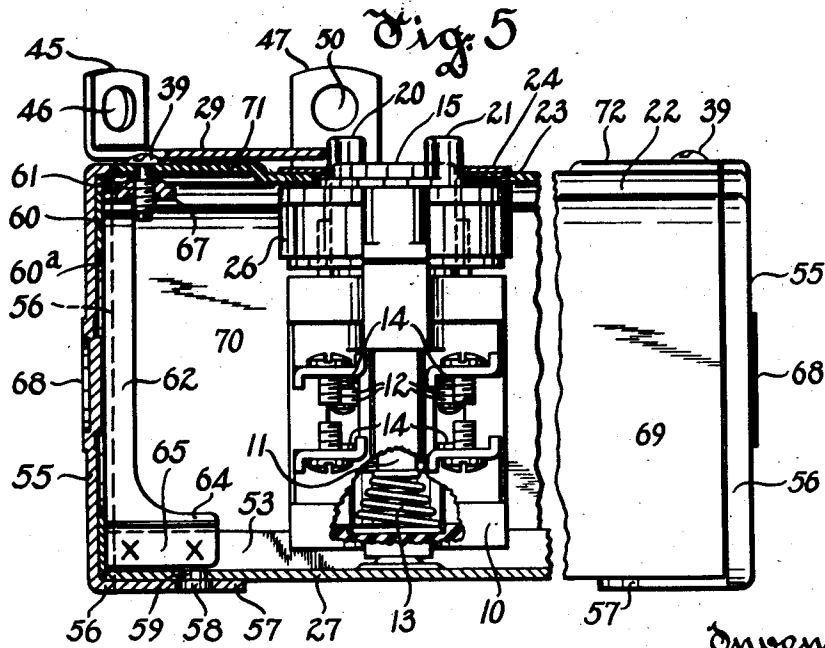
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Inventor
Clyde F. Robbins
By Frank H. Hubbard
Attorney

UNITED STATES PATENT OFFICE

2,370,877

PUSH-BUTTON SWITCH CONTROL
STATIONClyde F. Robbins, Milwaukee, Wis., assignor to
Cutler-Hammer, Inc., Milwaukee, Wis., a cor-
poration of Delaware

Application February 17, 1944, Serial No. 522,724

13 Claims. (Cl. 200—50)

This invention relates to improvements in pushbutton switch control stations.

A primary object of the invention is to provide novel and simple means for enabling locking of the pushbutton switch in a position to interrupt a circuit controlled thereby.

Another object is to provide means of the aforementioned character which insures movement of the pushbutton, automatically if necessary, to such circuit interrupting position as an incident to the locking operation.

Another object is to provide for such locking by means of a padlock of any well known form.

Another object is to improve and simplify the construction and assembly of the parts of sheet metal enclosing casings for pushbutton switches.

Another object is to minimize the number of different parts required to form such sheet metal casings, and to utilize one part thereof for support of the locking elements.

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

The accompanying drawings illustrate a preferred form of the invention which will now be described; it being understood that the embodiment illustrated is susceptible of modification in respect of certain structural details thereof within the scope of the appended claims.

In the drawings,

Figure 1 is a front elevational view of a fragment of a sheet metal enclosing casing within which the pushbutton switch mechanism is housed; the pushbutton being in its outer extreme position, to which it is normally spring-biased, a portion of the operating cam ring co-operating with a suitable legend to indicate a circuit completing position of the switch, and the pushbutton locking means being shown in its normal inoperative position.

Fig. 2 is a view similar to Fig. 1, but showing the cam ring rotated to its "safe" or circuit interrupting position, and with the locking device in a position to prevent reverse rotation of the cam ring upon proper association of a padlock hasp with respect thereto.

Fig. 3 is a fragmentary section, on the line 3—3 of Fig. 1.

Fig. 4 is a sectional view, on the line 4—4 of Fig. 2, and

Fig. 5 is a fragmentary sectional view, on the line 5—5 of Fig. 1, and showing in elevation the other end portion of the casing.

The pushbutton switch herein disclosed is of the plural position, rotary selector type disclosed in my prior application, Serial No. 451,417, filed

July 18, 1942; with particular reference to Figs. 6, 7, and 8 of the drawings of said application. Thus the switch as shown comprises a one-piece molded insulating base 10 which is recessed to slidably accommodate a one-piece molded insulating plunger 11. Plunger 11 is shown as provided with two pairs of bridging contactors 12 (Figs. 4 and 5); the contactors of each pair being normally spring-biased apart, as shown in Fig. 4; and the space between the contactors of each pair being taken up when plunger 11 is in its upper extreme position, to which it is biased by a coiled compression spring, as shown at 13 in Fig. 5, or when the plunger 11 is depressed to its lower extreme position, as hereinafter described.

The contact tips upon the upper bridging contactors are adapted to engage pairs of contact tips 14 upon upper sets of stationary contacts 20 when plunger 11 is free to move upwardly under its spring bias, as shown in Fig. 5; and the contact tips upon the lower bridging contactors are adapted to engage corresponding pairs of contact tips 14 upon lower sets of stationary contacts, in the event that plunger 11 is depressed to its lower extreme position. As illustrated in Fig. 4, plunger 11 is adapted to be depressed to and retained in an intermediate position thereof wherein all of the bridging contactors 12 are disengaged from the associated sets of stationary contacts, this being the so-called "safe" or circuit interrupting position of the switch mechanism.

More specifically, the plunger 11 has removably fitted to the upper end or extension thereof a molded insulating pushbutton 15 which is shown in its upper extreme position to which it is normally biased by the action of spring 13 upon plunger 11; thus providing for engagement of the upper bridging contactors with their associated sets of upper stationary contacts, as shown in Fig. 5. In Fig. 4, pushbutton 15 is shown in an intermediate, or partially depressed position wherein all of the bridging contactors are disengaged from their associated stationary contacts. Such normal and/or intermediate positioning of pushbutton 15 is preferably effected by employment of a ring-type rotary cam member 16 (Fig. 4) which surrounds said pushbutton.

Member 16 is provided with two diametrically opposite sets of downwardly facing cam surfaces, one set of which surfaces is shown at 17 and 18. The corresponding cam surfaces of said sets are adapted for simultaneous cooperative engagement with diametrically opposite integral later-

ally or radially projecting lugs upon pushbutton 15; one of said lugs being shown at 19 in Fig. 4. Thus when lugs 19 are engaged with the upper end portions of cam surfaces 18 the pushbutton 15 will be restrained against upward movement from the intermediate position thereof shown in Fig. 4. Manual rotation of ring 16 from each extreme position thereof to the other is facilitated by providing thereon integral upstanding lugs 20 and 21, which are preferably arranged in diametrically opposite relationship to each other.

As shown in Fig. 1 the sheet metal enclosing casing for the pushbutton switch mechanism is provided in its cover member 22 with a circular opening 23 which affords clearance for ring 16 and its lugs 20 and 21 during rotation thereof from each extreme position to the other. Cover member 22 also preferably has rigidly attached to the outer surface thereof a substantially annular flat plate 24 upon which suitable legends may be applied, which legends may be "Safe," "Stop," and "On," arranged as shown in Figs. 1 and 2. Thus with the switch parts in the relative positions thereof shown in Fig. 4, the lug 20 will be radially aligned with the legend "Safe" (Fig. 2) to indicate interruption of all of the circuits to be controlled by the switch.

On the other hand, upon counterclockwise rotation of ring 16 from the extreme position thereof shown in Fig. 2 to the extreme position thereof shown in Fig. 1, the lug 21 thereon will be radially aligned with the legend "On" to indicate the normal circuit completing relationship of the switch parts shown in Fig. 5. In such position of the switch parts the lugs 19 (see Fig. 4) are freed to move under the aforementioned bias of spring 13 to the upper ends of the pair of cam surfaces, one of which is shown at 17. The plate 24 is preferably provided with a diametrically opposed pair of inwardly extending integral radial lugs 25 and 26 which lie in the rotary path of lugs 20 and 21 to positively limit the degree of rotary movement of ring 16 in each direction. In practice, however, such rotary movement of ring 16 in each direction is positively limited by cooperation of elements carried thereby with parts carried by the adapter member 26; said adapter member 26 and insulating base 10 being rigidly attached to each other and to the bottom wall 27 of the sheet metal enclosing casing, as by means of a pair of bolts 28, 28 (Fig. 4). Plate 24 therefore serves primarily as an indicator, and to lend a more finished appearance to the enclosing casing.

As will be apparent from consideration of Fig. 4, the upper end of pushbutton 15 will be accessible for depression thereof toward or to its lower extreme position, by a thumb or finger of an operator, whether ring 16 is in one extreme position or the other. With the particular multiple circuit controlling switch mechanism herein illustrated such depression of pushbutton 15 to its lower extreme position is adapted to provide for completion of an alternative circuit for effecting stopping of a translating device controlled by the switch. However, in those cases in which it is desirable to lock the switch mechanism in its "Safe" position it is undesirable to permit the operator to complete the "Stop" circuit pending unlocking of the switch mechanism. On the other hand, if the switch mechanism is unlocked in its "Safe" position, or if it is in its "On" position, the ability to effect completion of the "Stop" circuit by manually depressing pushbutton 15 to its lower extreme position is desired. In accord-

ance with my invention all of the aforementioned desirable results are attained by the employment of a simple form of combined operating, locking and protecting device, which will now be described.

Said device comprises a punched and stamped sheet metal member having a flat portion 29 pivotally supported in upwardly spaced parallel relationship to the front face of the cover member 22, as by means of a pin 30. Thus, as best illustrated in Fig. 3, pin 30 is provided with a cylindrical shank portion 31 against which the circular wall of an opening 32 in said flat portion 29 is adapted to bear. A pair of flat washers 33 and 34 are positioned upon opposite sides of portion 29, and a resilient dish washer 35 is interposed between washer 34 and the outer face of cover member 22. Pin 30 is provided with a reduced cylindrical shank portion 36 which penetrates an opening 37 in cover member 22, the lower end of said shank portion 36 being upset over the inner face of cover member 22 to retain said parts in assembled relation.

Assuming vertical mounting of the enclosing casing, as shown in Fig. 1, said sheet metal member will be biased by gravity to a position wherein an edge 38 of the flat portion 29 abuts against the hemispherical head of one of a pair of screws 39 which are employed to hold the cover and base portions of the casing in assembled relation, as hereinafter more fully described. In such position of portion 29 ring 16 may be moved from each extreme position thereof to the other without interference. However, with ring 16 in the rotary position thereof shown in Fig. 1, upon pivotal movement of flat portion 29 in a clockwise direction a cam-like edge portion 40 thereof is adapted to engage the adjacent edge portion 41 of lug 20 of ring 16 to effect corresponding clockwise rotation of the latter to provide for "Safe" positioning of the switch parts, as afordescribed, and as illustrated in Figs. 2 and 4.

When said flat portion 29 is in the position thereof shown in Fig. 2 the material thereof between said edge 40 and an edge 42 is adapted to fairly completely overlie the upper end of pushbutton 15, whereby access to the latter by a thumb or finger of the operator is positively prevented. As best illustrated in Fig. 2 the edge 42 is so shaped as to avoid interference thereof with the side edge 43 of lug 21.

Said flat portion 29 is provided with an extension 44, and extending upwardly at substantially a right angle to the latter is an arm or lug 45 having a substantially circular opening 46 formed therein (Figs. 4 and 5). Lug 45 thus serves as a handle to facilitate manual pivotal movement of flat portion 29 in a clockwise direction from the position thereof shown in Fig. 1.

A punched and stamped sheet metal lug member has a flat portion 47 extending upwardly through an opening of substantially corresponding cross sectional shape in the forward wall of cover member 22, said lug member having an intermediate bend or offset 48 below said forward wall, and a second flat portion 49 (Fig. 4) spot welded or otherwise rigidly and permanently secured to the inner surface of one of the two side walls of the casing which are formed integrally with cover member 22. Flat portion 47 is so arranged as to be closely adjacent to and parallel with the aforementioned lug 45 upon clockwise movement of flat portion 29 to the extreme position thereof shown in Fig. 2. Said flat portion 47 is also provided with an opening 50

of a size corresponding to and aligned with the opening 46 in lug 45. The hasp 51 (Figs. 2 and 4) of a padlock 52 may be inserted through said openings 46 and 50 and then locked in the usual manner to insure the relative positioning of the various parts as shown in Fig. 2, pending unlocking and removal of the padlock hasp.

With further reference to Fig. 2, it will be apparent that the ring 16 may be rotated to the position thereof illustrated by direct manual engagement with one or both of the lugs 20 and 21; the flat portion 29 being thereafter moved to the position illustrated in Fig. 2 to permit locking of the parts in the manner aforescribed.

It will also be noted with respect to Fig. 2 that upon unlocking of lug 45 with respect to lug 47 and counterclockwise movement of flat portion 29 to the normal position thereof shown in Fig. 1, the switch mechanism will remain in its "Safe" position, with the electrical circuit open. The added operation of requiring the ring 16 to be manually rotated in a counterclockwise direction to effect "On" positioning of the switch parts is an intended safety feature to compel the operator to perform two operations, thus insuring consideration by the operator of the question of whether or not the equipment can safely again be put into service.

As aforestated the base portion of the sheet metal casing includes a member of the desired length which forms the bottom wall 27 (Figs. 4 and 5); said member being of relatively shallow channel-shape in transverse cross section, the substantially parallel upstanding side flanges thereof being designated by numerals 53 and 54, and said flanges extending throughout the length of bottom wall 27. In practice said casings are made in different lengths, to accommodate from one (as shown) to eight pushbutton switch mechanisms. When two or more pushbutton switch mechanisms are housed within a casing, the lower or end unit will have my improved locking device applied thereto, as shown, whereas the other units will ordinarily not be of the locking type. Upon selection of the desired length of the member forming bottom plate 27, the same will have associated with opposite ends thereof a pair of like end walls 55, 55 formed of sheet metal of approximately the same thickness as bottom wall 27.

End walls 55 are provided with relatively short peripheral flanges 56 extending inwardly at substantially right angles thereto, the bottom portion of each such flange having an inward extension located in the plane thereof, as shown at 57; said bottom portion of flange 56 and extension 57 underlying bottom plate 27 as shown in Figs. 4 and 5. Extensions 57 have openings 58 formed therein, as shown in Fig. 5, and bottom plate 27 has relatively smaller openings aligned therewith as shown at 59, the openings 59 being adapted to accommodate the shanks of bolts or screws or other suitable elements whereby the base portion of the casing may be attached to a wall, panel or the like.

Each end wall 55 has nested therewithin a member 60 of substantially thinner sheet metal; said members 60 having top and side flange portions 61, 62 and 63, respectively, of substantially greater width than the peripheral flanges 56 of end walls 55, as best illustrated at the left hand side of Fig. 5. Moreover, the lower portions of said side flanges 62 and 63 are extended inwardly a substantial distance, as shown at 64 in Fig. 5, and said lower portions are offset as shown at 65 and

66, to respectively accommodate the flanges 53 and 54 of bottom plate 27. Said offsets 65 and 66 are spot-welded to the respective flanges 53 and 54 at a plurality of points, as indicated at x in Fig. 5. Also as indicated at four points marked x in Fig. 4, each inner member 60 is spot-welded to the inner surface of the end wall 55 associated therewith. In this manner the end walls 55 are rigidly and permanently attached to the bottom plate 27.

Each inner sheet metal member 60 has spot-welded at a plurality of points to its top flange 61, at the midpoint thereof, a relatively thick sheet metal member 67 having a tapped opening formed therein, whereby such member 67 acts as a nut for cooperation with the shank of one of the aforementioned cover-securing bolts 39. The end walls 55 are provided with suitable multiple knockouts 68 (Fig. 5), the respective inner sheet metal members 60 having openings or cut away portions 69, as shown at the left hand side of Fig. 5, of greater dimensions than said knockouts.

The cover member 22 has a specially formed top wall, as best illustrated in Figs. 1, 2, and 4, and the top flanges of end walls 55 are shaped to conform thereto (see Figs. 1 and 2). Cover member 22 has side walls 69 and 70 formed integrally therewith and extending downwardly in parallel relationship to each other throughout substantially the entire depth of the casing, as best illustrated in Fig. 4.

The cover member 22 is assembled by a straight-line sliding movement downwardly over the base portion of the casing to a position flush with the end wall flanges 55, as shown in Figs. 1, 2 and 5, whereupon the cover may be secured in position by the screws or bolts 39 aforementioned. As will be understood, the cover member 22 will have one or more openings formed therein to accommodate the pushbuttons of the particular number of switch units housed by the casing. Also as shown at 71 in Figs. 1, 2, and 5, and at 72 in Fig. 5, the front wall of the cover member 22 may be suitably ornamented to improve the appearance thereof, in conjunction with the aforementioned special form thereof in transverse cross section.

I claim:

1. In an electric switch device, in combination, a sheet metal casing adapted for vertical mounting, a switch mechanism housed thereby, said mechanism including an operating member in the form of a pushbutton, said casing having an opening formed in the front wall thereof to afford clearance for said pushbutton, said pushbutton being spring biased to a forward extreme position thereof to provide for completion of a controlled circuit, a ring type rotary cam surrounding said pushbutton and adapted in one extreme position of the former to permit forward movement of said pushbutton to the biased position thereof, said cam ring in its other extreme position being adapted to effect depression of said pushbutton to effect interruption of said controlled circuit, a pair of outwardly extending lugs formed integrally with said ring in predetermined relationship to the cam surfaces thereon to facilitate manual rotation of said ring from each extreme position thereof to the other, a sheet metal member pivotally supported upon the outer surface of said casing adjacent said pushbutton opening in the latter but normally biased to a position out of alignment with said opening, said sheet metal member including a flat portion one edge of which is adapted upon pivotal movement

thereof to act as a cam for cooperation with one of said lugs to insure movement of said ring to its second mentioned extreme position whereby interruption of the circuit controlled by said pushbutton is effected, said sheet metal member having a perforated lug portion upstanding therefrom to facilitate manual movement thereof, and a second perforated lug upstanding from said casing, the perforations in said last mentioned lugs being closely adjacent and alined with each other upon completion of such pivotal movement of said sheet metal member to provide for insertion of a padlock hasp whereby said parts may be locked in their last mentioned positions.

2. In an electric switch device, in combination, a sheet metal casing adapted for vertical mounting, a switch mechanism housed thereby, said mechanism including an operating member in the form of a pushbutton, said casing having an opening formed in the front wall thereof to afford clearance for said pushbutton, said pushbutton being spring biased to a forward extreme position thereof to provide for completion of a controlled circuit, a ring type rotary cam surrounding said pushbutton and adapted in one extreme position of the former to permit forward movement of said pushbutton to the biased position thereof, said cam ring in its other extreme position being adapted to effect depression of said pushbutton to effect interruption of said controlled circuit, a pair of outwardly extending lugs formed integrally with said ring in predetermined relationship to the cam surfaces thereon to facilitate manual rotation of said ring from each extreme position thereof to the other, a sheet metal member pivotally supported upon the outer surface of said casing adjacent said pushbutton opening in the latter but normally biased to a position out of alinement with said opening, said sheet metal member including a flat portion one edge of which is adapted upon pivotal movement thereof to act as a cam for cooperation with one of said lugs to insure movement of said ring to its second mentioned extreme position whereby interruption of the circuit controlled by said pushbutton is effected, said sheet metal member having a perforated lug portion upstanding therefrom to facilitate manual movement thereof, a second perforated lug upstanding from said casing, the perforations in said last mentioned lugs being closely adjacent and alined with each other upon completion of such pivotal movement of said sheet metal member to provide for insertion of a padlock hasp whereby said parts may be locked in their last mentioned positions, and the cam edge of said flat portion of said sheet metal member having an adjacent part shaped to directly overlie the pushbutton opening in said casing under said conditions whereby direct manual engagement of said pushbutton for further depression thereof is positively prevented.

3. In an electric switch device, in combination, a sheet metal casing adapted for vertical mounting, a switch mechanism housed thereby, said mechanism including an operating member in the form of a pushbutton, said casing having an opening formed in the front wall thereof to afford clearance for said pushbutton, said pushbutton being spring biased to a forward extreme position thereof to provide for completion of a controlled circuit, a ring type rotary cam surrounding said pushbutton and adapted in one extreme position of the former to permit forward movement of said pushbutton to the biased position thereof, said cam ring in its other extreme posi-

tion being adapted to effect depression of said pushbutton to effect interruption of said controlled circuit, a pair of outwardly extending lugs formed integrally with said ring in predetermined relationship to the cam surfaces thereon to facilitate manual rotation of said ring from each extreme position thereof to the other, a sheet metal member pivotally supported upon the outer surface of said casing adjacent said pushbutton opening in the latter but normally biased to a position out of alinement with said opening, said sheet metal member including a flat portion one edge of which is adapted upon pivotal movement thereof to act as a cam for cooperation with one of said lugs to insure movement of said ring to its second mentioned extreme position whereby interruption of the circuit controlled by said pushbutton is effected, said sheet metal member having a perforated lug portion upstanding therefrom to facilitate manual movement thereof, a second perforated lug upstanding from said casing, the perforations in said last mentioned lugs being closely adjacent and alined with each other upon completion of such pivotal movement of said sheet metal member to provide for insertion of a padlock hasp whereby said parts may be locked in their last mentioned positions, the cam edge of said flat portion of said sheet metal member having an adjacent part shaped to directly overlie the pushbutton opening in said casing under said conditions whereby direct manual engagement of said pushbutton for further depression thereof is positively prevented, and said sheet metal member when in its normally biased position affording direct manual access to said pushbutton for depression of the latter to its inner extreme position whereby an alternative electric circuit may be completed.

4. In an electric pushbutton switch station, in combination, a metal casing including a base portion forming the bottom and end walls thereof and an inverted U-shaped cover portion forming the top and side walls thereof, said cover portion being adapted for straight-line sliding movement into engagement with flanges upon the bottom and end walls of said base portion, a pushbutton switch mechanism including an insulating base member secured to said bottom wall of the casing, said cover portion having an opening formed in the top wall thereof, said mechanism including a pushbutton normally biased outwardly to a circuit-completing position and movable by direct manual engagement out of said position, a cam ring associated with said pushbutton and having limited rotary movement between opposite extreme positions, said ring having peripherally spaced lugs upstanding therefrom to facilitate manual movement thereof, said ring in one extreme position thereof permitting movement of said pushbutton to its normally biased circuit-completing position, said ring when moved to its other extreme position being adapted to effect movement of said pushbutton out of said circuit-completing position, a punched and stamped sheet metal cam member pivotally supported upon the top wall of said cover portion, said cam member being manually movable toward one extreme position thereof whereby it is adapted to cooperate with one of said lugs to insure movement of said pushbutton from said circuit-completing position thereof, and said cam member in said extreme position thereof being adapted to overlie said pushbutton to effectively prevent direct manual engagement with the latter, for the purpose set forth.

5. In an electric pushbutton switch station, in combination, a metal casing including a base portion forming the bottom and end walls thereof and an inverted U-shaped cover portion forming the top and side walls thereof, said cover portion being adapted for straight-line sliding movement into engagement with flanges upon the bottom and end walls of said base portion, a pushbutton switch mechanism including an insulating base member secured to said bottom wall of the casing, said cover portion having an opening formed in the top wall thereof, said mechanism including a pushbutton normally biased outwardly to a circuit-completing position and movable by direct manual engagement out of said position, a cam ring associated with said pushbutton and having limited rotary movement between opposite extreme positions, said ring having peripherally spaced lugs upstanding therefrom to facilitate manual movement thereof, said ring in one extreme position thereof permitting movement of said pushbutton to its normally biased circuit-completing position, said ring when moved to its other extreme position being adapted to effect movement of said pushbutton out of said circuit-completing position, a punched and stamped sheet metal cam member pivotally supported upon the top wall of said cover portion, said cam member being manually movable toward one extreme position thereof whereby it is adapted to cooperate with one of said lugs to insure movement of said pushbutton from said circuit-completing position thereof, said cam member in said extreme position thereof being adapted to overlie said pushbutton to effectively prevent direct manual engagement with the latter, for the purpose set forth, a pair of perforated lugs upstanding respectively from the top wall of said cover portion and from said cam member, and said lugs being positioned closely adjacent each other with their perforations in alignment in said extreme position of the cam member, whereby a padlock hasp may penetrate said perforations to provide for locking of said cam member in said extreme position.

6. In combination, a switch including a pushbutton normally biased outwardly to an "on" position to provide for completion of a controlled circuit, a rotatable ring type cam surrounding the upper end portion of said pushbutton, said cam having a pair of diametrically opposed upstanding lugs to facilitate manual rotation thereof, means associated with said lugs to limit rotation of said cam between extreme positions, said cam in one of its extreme positions permitting movement of said pushbutton to its biased position, said cam when moved to its other extreme position being adapted to simultaneously effect movement of said pushbutton to a position wherein the controlled circuit is interrupted, said pushbutton in the last mentioned position thereof being normally depressible by direct manual engagement to a third position to provide for completion of an alternative circuit, a cam member pivotally supported adjacent said first mentioned cam and normally biased to an inoperative position, said cam member having an edge portion adapted for driving engagement with one of said lugs upon pivotal movement of the former to an extreme position thereof to effect movement of said first mentioned cam to its second mentioned extreme position, and said cam member having a portion adjacent said edge portion thereof adapted to overlie said pushbutton to insure against direct manual engagement with the

latter in the aforementioned extreme position of the former.

7. In combination, a switch including a pushbutton normally biased outwardly to an "on" position to provide for completion of a controlled circuit, a rotatable ring type cam surrounding the upper end portion of said pushbutton, said cam having a pair of diametrically opposed upstanding lugs to facilitate manual rotation thereof, means associated with said lugs to limit rotation of said cam between extreme positions, said cam in one of its extreme positions permitting movement of said pushbutton to its biased position, said cam when moved to its other extreme position being adapted to simultaneously effect movement of said pushbutton to a position wherein the controlled circuit is interrupted, said pushbutton in the last mentioned position thereof being normally depressible by direct manual engagement to a third position to provide for completion of an alternative circuit, a cam member pivotally supported adjacent said first mentioned cam and normally biased to an inoperative position, said cam member having an edge portion adapted for driving engagement with one of said lugs upon pivotal movement of the former to an extreme position thereof to effect movement of said first mentioned cam to its second mentioned extreme position, said cam member having a portion adjacent said edge portion thereof adapted to overlie said pushbutton to insure against direct manual engagement with the latter in the aforementioned extreme position of the former, said cam member having a lug upstanding therefrom to facilitate manual pivotal movement thereof, a relatively fixed lug with respect to which said last mentioned lug is adapted to move, and said last mentioned lugs having openings formed therein to provide for insertion of a locking element jointly therethrough when aligned in said extreme position of said member.

8. In a pushbutton switch station, in combination, a sheet metal housing comprising a base portion and a cover portion, said base portion including a bottom plate of relatively shallow channel form in transverse cross section, a pair of end members of like form rigidly and permanently secured to said bottom plate, each of said end members comprising an outer plate of relatively heavy sheet metal having an inwardly extending peripheral flange and an inner plate of relatively thin sheet metal, said inner plate being arranged in nested relation to said outer plate and having flanges formed at the top and sides thereof extending inwardly to a greater extent than said flange first mentioned, the bottom portions of the side flanges of said inner plate being spot-welded at a plurality of points to the respective inner surfaces of the bottom plate flanges, each of said outer plates being also spot-welded at a plurality of points to the inner plate associated therewith, a punched and stamped sheet metal cover member of substantially inverted U-shape in transverse cross section, said cover member being adapted for positioning by a straight-line sliding movement into a substantially flush relation to the top and side portions of the peripheral flanges of said outer plates, and means associated with the top flange portions of said inner plates and with said cover member to accommodate securing screws whereby said cover member is retained in proper position.

9. In a pushbutton switch station, in combination, a sheet metal housing comprising a base portion and a cover portion, said base portion in-

cluding a bottom plate of relatively shallow channel form in transverse cross section, a pair of end members of like form rigidly and permanently secured to said bottom plate, each of said end members comprising an outer plate of relatively heavy sheet metal having an inwardly extending peripheral flange and an inner plate of relatively thin sheet metal, said inner plate being arranged in nested relation to said outer plate and having flanges formed at the top and sides thereof extending inwardly to a greater extent than said flange first mentioned, the bottom portions of the side flanges of said inner plate being spot-welded at a plurality of points to the respective inner surfaces of the bottom plate flanges, each of said outer plates being also spot-welded at a plurality of points to the inner plate associated therewith, a punched and stamped sheet metal cover member of substantially inverted U-shape in transverse cross section, said cover member being adapted for positioning by a straight-line sliding movement into a substantially flush relation to the top and side portions of the peripheral flanges of said outer plates, means associated with the top flange portions of said inner plates and with said cover member to accommodate securing screws whereby said cover member is retained in proper position, at least one switch mechanism including an insulating base rigidly secured to said bottom plate, said mechanism including a pushbutton, and said cover member having an opening formed in the forward wall thereof to provide reciprocating clearance for said pushbutton.

10. In a pushbutton switch station, in combination, a sheet metal housing comprising a base portion and a cover portion, said base portion including a bottom plate of relatively shallow channel form in transverse cross section, a pair of end members of like form rigidly and permanently secured to said bottom plate, each of said end members comprising an outer plate of relatively heavy sheet metal having an inwardly extending peripheral flange and an inner plate of relatively thin sheet metal, said inner plate being arranged in nested relation to said outer plate and having flanges formed at the top and sides thereof extending inwardly to a greater extent than said flange first mentioned, the bottom portions of the side flanges of said inner plate being spot-welded at a plurality of points to the respective inner surfaces of the bottom plate flanges, each of said outer plates being also spot-welded at a plurality of points to the inner plate associated therewith, a punched and stamped sheet metal cover member of substantially inverted U-shape in transverse cross section, said cover member being adapted for positioning by a straight-line sliding movement into a substantially flush relation to the top and side portions of the peripheral flanges of said outer plates, means associated with the top flange portions of said inner plates and with said cover member to accommodate securing screws whereby said cover member is retained in proper position, at least one switch mechanism including an insulating base rigidly secured to said bottom plate, said mechanism including a pushbutton, said cover member having an opening formed in the forward wall thereof to provide reciprocating clearance for said pushbutton, a ring-type rotary cam member carried by said switch mechanism, said cam member having peripherally spaced lugs upstanding therefrom to facilitate manipulation thereof, and said cover opening being shaped to afford clear-

ance for said lugs and to limit the range of rotary movement thereof.

11. In a pushbutton switch station, in combination, a sheet metal housing comprising a base portion and a cover portion, said base portion including a bottom plate of relatively shallow channel form in transverse cross section, a pair of end members of like form rigidly and permanently secured to said bottom plate, each of said end members comprising an outer plate of relatively heavy sheet metal having an inwardly extending peripheral flange and an inner plate of relatively thin sheet metal, said inner plate being arranged in nested relation to said outer plate and having flanges formed at the top and sides thereof extending inwardly to a greater extent than said flange first mentioned, the bottom portions of the side flanges of said inner plate being spot-welded at a plurality of points to the respective inner surfaces of the bottom plate flanges, each of said outer plates being also spot-welded at a plurality of points to the inner plate associated therewith, a punched and stamped sheet metal cover member of substantially inverted U-shape in transverse cross section, said cover member being adapted for positioning by a straight-line sliding movement into a substantially flush relation to the top and side portions of the peripheral flanges of said outer plates, means associated with the top flange portions of said inner plates and with said cover member to accommodate securing screws whereby said cover member is retained in proper position, at least one switch mechanism including an insulating base rigidly secured to said bottom plate, said mechanism including a pushbutton, said cover member having an opening formed in the forward wall thereof to provide reciprocating clearance for said pushbutton, a ring-type rotary cam member carried by said switch mechanism, said cam member having peripherally spaced lugs upstanding therefrom to facilitate manipulation thereof, said cover opening being shaped to afford clearance for said lugs and to limit the range of rotary movement thereof, a perforated sheet metal lug secured to said cover member and upstanding therefrom, a punched and stamped sheet metal member having a flat portion pivotally supported upon the exterior of the forward wall of said cover member, said flat portion having a cam edge for cooperation with one of said first mentioned lugs to effect rotation of said first mentioned cam upon pivotal movement of said cam member to a given position, said cam member having a perforated lug upstanding from said flat portion thereof, and the perforations in said last mentioned lug and said cover lug being aligned and closely adjacent each other in said given position of said cam member, whereby a padlock hasp may be inserted therethrough jointly for locking of the parts in their respective positions.

12. In combination, an electric switch comprising a recessed molded insulating base having an insulating plunger slidable within the recess, at least one set of stationary contacts carried by said base and a bridging contactor carried by said plunger, said plunger being biased outwardly from said recess to normally provide for engagement of said contactor with said contacts, a pushbutton carried by said plunger at the outer end thereof, a ring-type cam surrounding said pushbutton, said cam in one rotary position thereof providing for outward movement of said plunger to its normally biased position to

provide for engagement of said contactor with said contacts, said cam in another rotary position thereof being adapted to effect and maintain disengagement of said contactor from said contacts, the upper end of said pushbutton being accessible for direct manual engagement in either of said rotary positions of said cam, a casing in which said switch is mounted, said casing having an opening formed therein to provide operating clearance for said pushbutton and said cam, said cam having a plurality of peripherally spaced lugs upstanding therefrom substantially beyond said casing to facilitate manual rotation thereof, said casing having a perforated lug member attached thereto and upstanding therefrom at one side of said opening, a relatively thin cam member pivotally supported by the upper surface of said casing in parallel relationship thereto, said cam member having an edge portion adapted to cooperatively engage one of said first mentioned lugs upon pivotal movement of the former in one direction to effect a predetermined degree of rotary movement of said first mentioned cam, and said cam member having a perforated lug upstanding therefrom for parallel alinement with said first mentioned perforated lug under such conditions, whereby a padlock hasp may be passed through said perforated lugs jointly for locking the switch and cam parts in their respective positions.

13. In combination, an electric switch comprising a recessed molded insulating base having an insulating plunger slidable within the recess, at least one set of stationary contacts carried by said base and a bridging contactor carried by said plunger, said plunger being biased outwardly from said recess to normally provide for engagement of said contactor with said contacts, a pushbutton carried by said plunger at the outer

end thereof, a ring-type cam surrounding said pushbutton, said cam in one rotary position thereof providing for outward movement of said plunger to its normally biased position to provide for engagement of said contactor with said contacts, said cam in another rotary position thereof being adapted to effect and maintain disengagement of said contactor from said contacts, the upper end of said pushbutton being accessible for direct manual engagement in either of said rotary positions of said cam, said casing having an opening formed therein to provide operating clearance for said pushbutton and said cam, said cam having a plurality of peripherally spaced lugs upstanding therefrom substantially beyond said casing to facilitate manual rotation thereof, said casing having a perforated lug member attached thereto and upstanding therefrom at one side of said opening, a relatively thin cam member pivotally supported by the upper surface of said casing in parallel relationship thereto, said cam member having an edge portion adapted to cooperatively engage one of said first mentioned lugs upon pivotal movement of the former in one direction to effect a predetermined degree of rotary movement of said first mentioned cam, said cam member having a perforated lug upstanding therefrom for parallel alinement with said first mentioned perforated lug under such conditions, whereby a padlock hasp may be passed through said perforated lugs jointly for locking the switch and cam parts in their respective positions, and said cam member having a portion adjacent said edge thereof adapted to overlie the upper end of said pushbutton under such conditions, to thereby positively prevent direct engagement of said pushbutton manually.

CLYDE F. ROBBINS.