

Dec. 15, 1953

E. R. MCKITRICK

2,662,389

SAFETY LOCK FOR SWITCHES

Filed Aug. 7, 1951

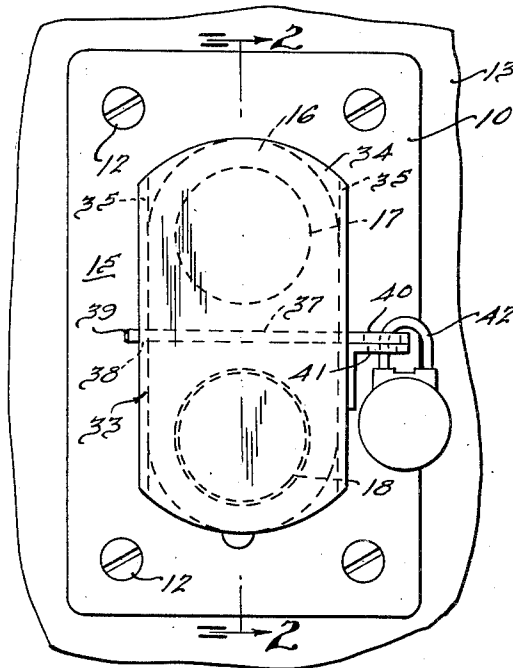


FIG. 1.

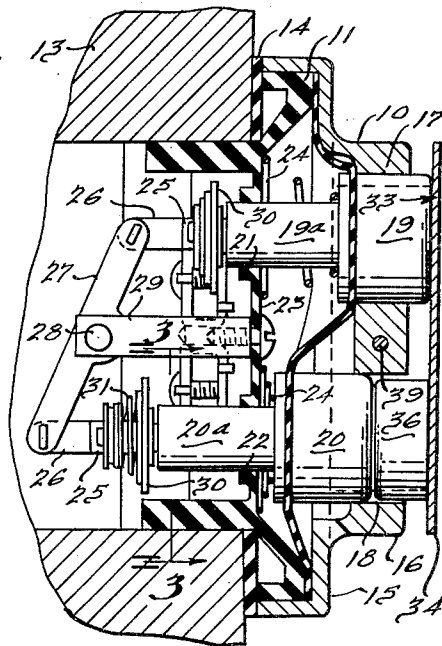


FIG. 2.

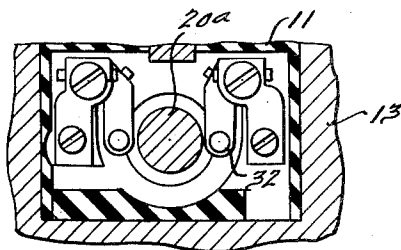


FIG. 3.

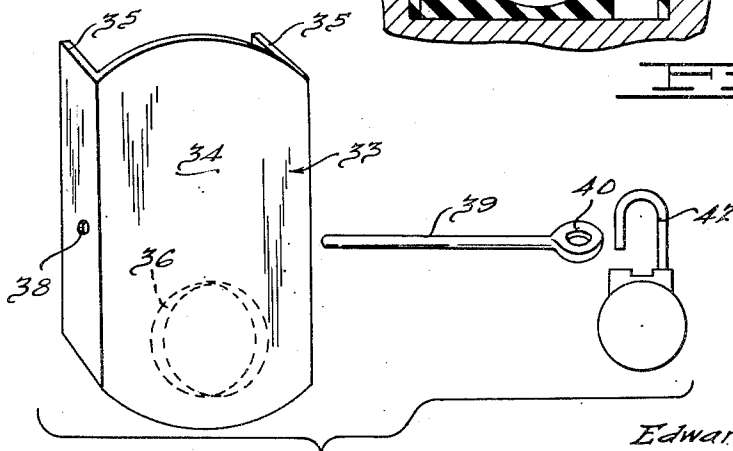


FIG. 4.

INVENTOR.
Edward R. McKittrick.

BY

Elmer Jamison Gray
ATTORNEY.

UNITED STATES PATENT OFFICE

2,662,389

SAFETY LOCK FOR SWITCHES

Edward R. McKittrick, Detroit, Mich., assignor to
Briggs Manufacturing Co., Detroit, Mich., a
corporation of Michigan

Application August 7, 1951, Serial No. 240,668

10 Claims. (Cl. 70-174)

1

This invention relates to a safety lock for electrical switches and more particularly to a safety lock for electrical switches used to control the starting and stopping of the operation of metal stamping presses or other machines and apparatus.

One type of electrical switch commonly used to control the operation of metal stamping presses and other machines or apparatus comprises a housing which encloses the electrical contact elements of the switch and which provides a mounting for at least two actuators or push button elements for shifting the contact elements to open and close the necessary electrical circuits for starting or stopping the drive means of the press or machine. In this type of switch, at least one of the buttons must be pressed to start the operation of the press or machine and another of the buttons must be pressed to stop the operation thereof. The start and stop buttons are interlocked, preferably by mechanical means, in such a manner that movement of one button inwardly into a recessed position within the housing automatically results in the other button being moved outwardly to project beyond the surface of the housing in accessible position to be actuated by the machine operator to start or stop the machine, as the case may be. For example, when the press or machine is in operation the start button will be in a depressed position within the housing and a portion of the stop button will project beyond the surface of the housing in position to be moved inwardly to stop the operation of the press or machine. When the stop button is pressed by the machine operator, it will move inwardly to a recessed position within the housing and the start button will be automatically moved outwardly into a position of readiness to be actuated to restart the press or machine.

It is an object of the present invention to provide a simple and inexpensive safety device which may be readily attached to the housing of the electrical switch to prevent the movement of the switch push buttons necessary to start the operation of the press or machine. The present invention comprises a means for preventing or blocking outward movement of the stop button when it is recessed within the switch housing, the stop button being in a recessed position when the machine is not operating. Because of the means interlocking the two buttons for correlated movement, when outward movement of the stop button is prevented or blocked the start button cannot be moved inwardly to close the electrical circuit necessary to put the machine or press in operation. In its illustrated embodiment, the present invention comprises a cover plate adapted to be fastened to the front face of the switch housing and having a plug portion fastened to the inner side thereof, which plug portion may be inserted into the cavity in the front face of the

2

housing resulting when the stop button is placed in its recessed or machine inoperative position, and means being provided to lock the cover plate to the switch housing to prevent unauthorized removal of the safety device, the cover plate when locked to the housing effectively blocking any outward movement of the stop button and thereby blocking the inward movement of the start button. As long as the safety device is in blocking position the machine cannot be operated. Thus, a repair man after having inserted the safety device in blocking position on the switch and put the key thereto in his pocket may crawl into the machine or apparatus to make any necessary repairs without the danger of someone inadvertently putting the machine or apparatus into operation while he is in a position to be injured by any of its moving parts.

Other features, objects and advantages of this invention herein illustrated will appear in the following description, reference being had to the accompanying drawings forming a part of the specification wherein like reference numerals designate corresponding parts in the several views.

Fig. 1 is a front elevation of a start-stop switch and illustrating the present invention mounted thereon.

Fig. 2 is a section taken substantially through line 2-2 of Fig. 1 looking in the direction of the arrows.

Fig. 3 is a section taken substantially through line 3-3 of Fig. 2 looking in the direction of the arrow.

Fig. 4 is an exploded view showing the component parts of the safety device comprising the present invention.

Before explaining in detail the present invention it is to be understood that the invention is not limited in its application to the details of construction and arrangements of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

Referring more particularly to the drawings, the electrical switch to which the present invention is applied comprises, for illustrative purposes, a metal casing or housing 10 which fits over an inner casing 11 made of a dielectric material. The outer and inner casings 10 and 11, respectively, are adapted to be fastened by means of screws 12 as a unit to the frame structure 13 of a stamping press, machine or other apparatus, a suitable rubber insulating gasket 14 being provided to insulate the metal casing 10 from the press or machine frame 13. The front face 15 of the casing 10 is provided with a raised boss 16 having two spaced bores 17 and 18 therein.

3

Two push buttons 19 and 20 are slidably mounted within the bores 17 and 18 respectively. The push buttons 19 and 20 are provided with stems or extensions 19a and 20a respectively, which project through apertures 21 and 22 in the base plate 23 of the inner casing 11, the apertures 21 and 22 being in alignment with the bores 17 and 18 in the outer casing 10. A compression spring 24 is seated over each stem 19a and 20a, each spring being adapted to be compressed between one surface of the base plate 23 and the inner surface of the corresponding push button 19 or 20.

Mounted on the end of each push button stem 19a and 20a is a cylindrical brass member 25. Pivotaly connected to one end of each link 25 is a dielectric link 26. Each link 26 is pivotally connected to one end of a cross bar 27 which is pivoted intermediate its ends on a pin 28 carried on one end of a yoke member 29 mounted at its other end to the base plate 23 of the inner casing 11.

The foregoing construction and arrangement is such that when one push button is in a depressed position relative to the outer casing 10, as for example the push button 20 as shown in Fig. 2, the other push button will have a portion thereof projecting beyond the outer surface of the boss 16 of the outer casing 10. Movement of the outwardly projecting button in an inward direction automatically results in the cross bar 27 urging the recessed button outwardly into a position of readiness to be actuated when desired by the machine operator.

Suitable contact means in the form of metallic washers 30 are carried on each cylindrical brass member 25. The contact means are urged by compression springs 31 into contact with suitable contact elements 32 carried within the inner casing 11.

It is believed that the foregoing description of the illustrative type of electric switch with which the present invention is adapted to be utilized is of sufficient detail for an understanding of the invention.

The embodiment of the invention herein illustrated comprises a cover plate generally designated 33 which comprises a flat section 34 substantially equal in area and similar in shape to the upper surface of the switch housing boss 16 and having a flange 35 extending from each longitudinal edge thereof, the depth of the flanges being substantially equal to the height of the housing boss 16 plus the distance that the push buttons project beyond the upper surface of the boss when in position to be actuated. A plug member 36 is welded or fastened to the inner side of the plate section 34. The plug 36 is located on the plate section in position to enter the cavity in the surface of the housing resulting from the stop button being in a recessed or machine inoperative position, as shown in Fig. 2. Thus, with the cover plate in place as shown in Figs. 1 and 2, it is impossible for any one to push the start button inwardly to close the electrical circuit necessary to place the press or machine in operation. Further, even if a tool were deliberately inserted between the cover plate 33 and the outwardly projecting button 19 to actuate the start button despite the fact that the safety device was in place, the plug member 36 would block the outward movement of the button 20 necessary to permit the inward movement of the button 19.

The cover plate 33 may be held in place on

4

the switch housing 10 in any suitable manner. As illustrated, the boss 16 of the switch housing 10 and the flanges 35 are provided with aligned holes 37 and 38 respectively through which a pin 39 is inserted to hold the cover plate 33 to the switch housing. The pin 39 is provided with an eye 40 and the cover plate 33 is provided with an apertured bracket 41 to which a small padlock 42 may be attached to lock the pin 39 to the cover plate 33 thereby to prevent unauthorized withdrawal of the pin 39.

When for any reason it is desired to prevent the operation of a press or machine, the safety device embodying the present invention is readily fastened to the switch housing with the plug member 36 inserted into the bore 16. With the padlock 42 in place the switch cannot be actuated to start the drive means for the press or machine. When it is desired to place the machine back in service, it is only necessary to open the padlock 42, pull the pin 39, and remove the cover plate 33. The present invention therefore provides an effective and efficient as well as inexpensive means of preventing unauthorized or inadvertent operation of a press or machine as when undergoing repairs.

I claim:

1. A safety device for use in conjunction with an electrical switch having push button actuating elements slidably mounted within recesses in an embossed portion of the switch housing, said push button elements being interlocked for correlated movements so that when one button is shifted inwardly into depressed position within one of said recesses another button is shifted outwardly into operative position, comprising a cover plate adapted to fit over the face of said embossed portion, a plug portion fastened to said cover plate and insertable into said one recess in position to block said one button when said plate is at the cover position, and means for releasably holding said cover plate sufficiently immovably at the cover position to block actuation of said buttons.

2. A safety device for use in conjunction with an electrical switch having push button actuating elements slidably mounted within recesses in an embossed portion of the switch housing, said push button elements being interlocked for correlated movements so that when one button is shifted inwardly into depressed position within one of said recesses another button is shifted outwardly into operative position, comprising a cover plate adapted to fit at a cover position over the face of said embossed portion, said cover plate having flanges extending from two opposite edges thereof, a plug portion fastened to said cover plate and insertable into said one recess in position to block said one button when said plate is at the cover position, and means cooperable with said embossed portion and said flanges to hold said cover plate sufficiently immovably at said cover position to block actuation of said buttons.

3. A safety device for use in conjunction with an electrical switch having push button actuating elements slidably mounted within recesses in an embossed portion of the switch housing, said push button elements being interlocked for correlated movements so that when one button is shifted inwardly into depressed position within one of said recesses another button is shifted outwardly into operative position, comprising a cover plate adapted to fit at a cover position over the face of said embossed portion, said cover plate having substantially parallel flanges ex-

5

tending from two opposite edges thereof, a plug portion fastened to said cover plate and insertable into said one recess in position to block said one button when said plate is at the cover position, said flanges and said embossed portion intermediate said buttons having holes therein aligned when said plate is at the cover position, and pin means inserted through said holes to hold said cover plate on said housing thereby to hold said plug portion in said one recess and block outward movement of said one button thereby preventing actuation of the other button.

4. A safety device for an electrical switch comprising a support, start and stop push buttons interconnected for shiftable movement in unison and in opposite directions, the stop button being shiftable inwardly within a recess in the support whereby the start button will be shifted outwardly into operative position, said device comprising a cover plate adapted to fit at a cover position over the face of the support, a blocking means fastened to said cover plate and insertable into said recess into blocking position with respect to said stop push button when said plate is at the cover position, and locking means for holding said cover plate sufficiently immobile to block actuation of said buttons.

5. A safety device for an electrical switch comprising a support, start and stop push buttons interconnected for shiftable movement in unison and in opposite directions, the stop button being shiftable inwardly within a recess in the support whereby the start button will be shifted outwardly into operative position, said device comprising a cover plate adapted to fit at a cover position over the face of the support, a blocking means fastened to said cover plate and insertable into said recess into blocking position with respect to said stop push button when said plate is at the cover position, said support having keeper means intermediate said buttons, said cover plate having apertures therein adapted to be placed in alignment with said keeper means when said plate is at the cover position, and pin means insertable through the apertures in said cover plate cooperable with said keeper means to fasten said cover plate to said support to hold said blocking member in position within said recess.

6. In a safety device for use in conjunction with an electrical switch having push button actuating elements slidably mounted within recesses in a housing and interlocked for correlated movements so that when one button is shifted inwardly into depressed position within one of said recesses another button is shifted outwardly into operative position, means to block outward movement of one of said buttons from its depressed position within its recess comprising a cover plate adapted to fit over said buttons at a blocking position and having a plug portion insertable into the latter recess at the blocking position, and means for releasably holding the cover plate at the blocking position.

7. In a safety device for an electrical switch mounted in a housing and having start and stop push buttons coupled to move in unison and in opposite directions so that when either button is moved inward to a depressed position with respect to said housing the other button is moved outward to an extended position, the combination of fixed supporting means having recesses into which said buttons are shiftable, means to block outward movement of one of said buttons depressed within its recess comprising a cover member having a plug portion insertable into the latter recess in blocking position with respect to

6

the button depressed therein, and means for releasably locking said cover member at the blocking position.

8. In a safety device for an electrical switch mounted in a housing and having start and stop push buttons coupled to move in unison and in opposite directions so that when either button is moved inward to a depressed position with respect to said housing the other button is moved outward to an extended position, the combination of fixed supporting means having recesses into which said buttons are shiftable, means to block outward movement of one of said buttons depressed within its recess comprising a cover member having a plug portion insertable into the latter recess in blocking position with respect to the button depressed therein, said cover member at the blocking position also having portions adapted to fit over said buttons, and means for releasably locking said cover member at the blocking position.

9. In a safety device for an electrical switch mounted in a housing and having start and stop push buttons coupled to move in unison and in opposite directions so that when either button is moved inward to a depressed position with respect to said housing the other button is moved outward to an extended position, the combination of fixed supporting means having recesses into which said buttons are shiftable, means to block outward movement of the stop button from its depressed position within its recess comprising a cover plate having a plug portion insertable into the latter recess in blocking position with respect to the stop button, said plate at the blocking position being adapted to cover said buttons, and means for securing said plate at the blocking position.

10. In a safety device for an electrical switch mounted in a housing and having start and stop push buttons coupled to move in unison and in opposite directions so that when either button is moved inward to a depressed position with respect to said housing the other button is moved outward to an extended position, the combination of fixed supporting means having recesses into which said buttons are shiftable, means to block outward movement of the stop button from its depressed position within its recess comprising a cover plate having a plug portion insertable into the latter recess in blocking position with respect to the stop button, said plate at the blocking position being adapted to cover said buttons, said supporting means having a portion intermediate said buttons, a pinhole extending in said latter portion transversely of the axes of shifting of said buttons, said cover plate having lateral flanges at opposite edges thereof, said flanges having pinholes therein adapted to align with the pinholes in said supporting means when the cover is at the blocking position, and pin means extending through said holes to hold said plate at the blocking position, said flanges abutting said supporting means to block pivoting of said cover plate about the axis of said pin means.

EDWARD R. McKITRICK.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,706,518	Blough	Mar. 26, 1929
1,762,371	Wilhelm	June 10, 1930
2,484,424	Rosing	Oct. 11, 1949