

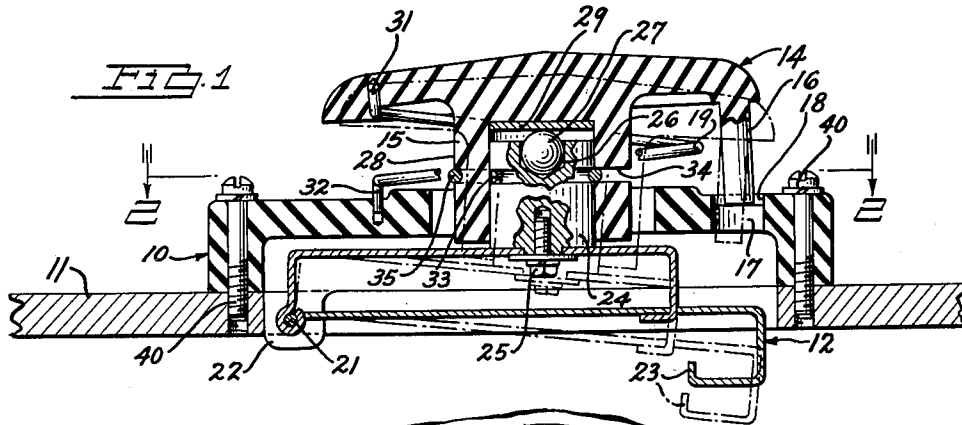
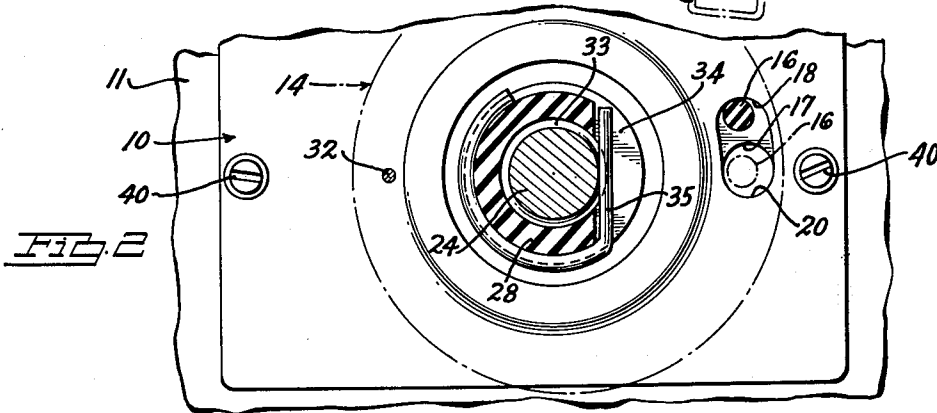
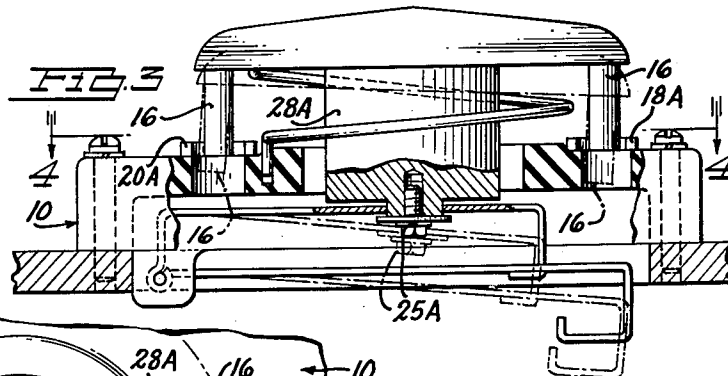
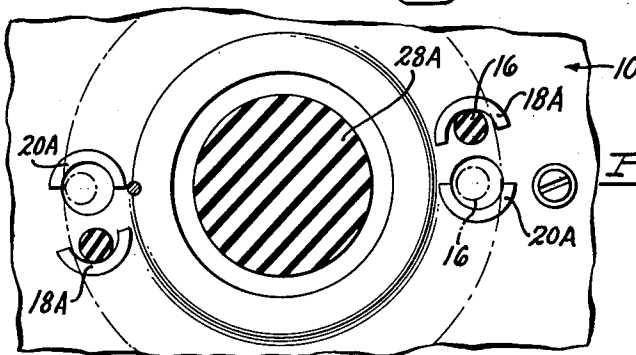
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SAFETY BUTTON

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SAFETY BUTTON

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1

This invention relates to electric switch safety buttons and in particular to improvements in electric switch buttons which are incapable of activation accidentally and which are especially suitable for use in conjunction with punch presses and other hazardous machinery.

The desirability of providing safety devices in conjunction with the operating controls of punch presses is well recognized and various safety devices are well known to those familiar with the art such as dual buttons requiring one button to be depressed by each hand of the operator; wrist cuffs and cables preventing the operator from putting his hands in the area of the press, etc.

However, in actual use, the dual buttons have been found to slow up the operator so that he locks one button down and then uses the other to operate the press despite the vigilance of management, unions, and safety officers. When one button is locked down, the press can be operated by pressing the other button which operation can be accidental such as by leaning on the open button, a tool falling on the open button, a piece of stock falling on the open button, or another workman unknowingly pressing the button in assisting the operator in some task such as cleaning the punch, etc., and numerous accidents have occurred in this manner with resulting loss of members and life.

With the foregoing in view, the primary object of the invention is to provide a switch control safety actuating button which is incapable of operation under direct pressure such as by a person accidentally leaning on or pressing the button or by a tool, piece of stock, or crane accidentally pressing or falling on the button.

An object of the invention is to provide a safety button which must first be rotated before it can be depressed to make the necessary contact to operate the press.

An object of the invention is to provide a safety button which normally maintains an inoperative position unless rotated and held in the operative position.

An object of the invention is to provide a safety button which is capable of automatically returning to an inoperative position after it has been rotated to the operative position.

An object of the invention is to provide a safety button with a strong safety mechanism capable of withstanding excessive forces tending to depress the button to make contact in the switch.

Another object of the invention is to provide a mechanism having only a few parts, simple in construction, and inexpensive to manufacture.

2

These and other objects will become apparent by reference to the following description of the switch actuating safety button embodying the invention taken in connection with the accompanying drawing, in which:

Fig. 1 is a vertical sectional view taken across the longitudinal center of the device showing the depressed contact making condition in dotted lines.

Fig. 2 is a cross-sectional view of Fig. 1 taken on the line 2—2 thereof.

Fig. 3 is a side elevational view of a modified structure, partly in cross-section, showing optional construction; and

Fig. 4 is a cross-sectional view of Fig. 3 taken on the line 4—4 thereof.

Referring now to the drawing wherein like numerals refer to like and corresponding parts throughout the several views, the safety button disclosed therein to illustrate the invention comprises a housing or face plate 10 mountable on a switch box 11 having a connector 12 capable of operating the switch, not shown, within the box 11, a button 14 disposed above or outside the housing or face plate 10 having a shank or sleeve portion 15 extending through the housing 10 and pivotally attached to the switch connector 12, a pin or dog 16 on the underside of the button 14 extending toward the housing or face plate 10 radially indexed with a pin receiving opening or interruption 17 in the housing or face plate 10 but normally out of circumferential phase with the opening 17 so as to prevent the button 12 from being depressed by the pin or dog 16 contacting the face of the housing or face plate 10, a dog or stop 18 on the housing or face plate 10 removed from the opening 17, a spring 19 anchored in the housing or face plate 10 and secured to the button 14 normally urging the pin 16 against the stop 18 out of phase with the opening 17, and a stop 20 immediately adjacent the opening 17 for circumferentially indexing the pin 16 with the opening 17 when the button 14 is manually rotated against the spring 19 to position the pin 16 so that it will enter the opening 17 thereby allowing the button 14 to be depressed to operate the switch via the connector 12.

More particularly, referring to Figs. 1 and 2, the housing or face plate 10 is provided with a small pin receiving aperture or interruption 17, a large aperture for receiving the shank or sleeve 15 of the button 14; the switch connector 12 is pivotally mounted at 21 on the housing 10 via the extensions or ears 22 while the connector 12 is provided with a hooked end 23 for attach-

3

ment to the switch, not shown, as well known in the art; a stud 24 is mounted on the connector 12 by means of a rivet or bolt 25, an axial bore 26 is provided in the top of the stud 25 to hold the ball bearing 27 so that the ball bearing 27 extends slightly above the top of the stud 24 providing a pivot point, a blind sleeve or hollow shank 15 or 28 surrounds the stud 24, and a hardened plate 29 fitted within the sleeve 28 rides on the ball bearing 27 with the cap-like portion of the button 14 supporting the pin or dog 16 and retaining the end 31 of the spring 19 with the other end 32 of the spring 19 being retained in the housing or face plate 10; the stud 24 is equipped with an annular groove 33 in its side periphery and the sleeve or shank 28 is provided with slot 34 leading to the groove 33 and with an annular groove leading to the slot 34 so that the spring clip 35 may be disposed via the slot 34 in the groove 33 securing the sleeve or shank 15 or 28 on the stud 24 with the spring clip 35 partially surrounding the shank 15 or 28 and lying in the groove thereof thereby securing itself in locked relation.

Relative to the modification shown in Figs. 3 and 4, it will be noted that the shank 28A is solid and pivotally mounted on the connector 12 via a shoulder bolt 25A, that two pins 16 are provided and that the stops 18A and 20A are positioned above the surface of the face plate 10.

While the rotational travel of the button 14 under the torsion of the spring 19 has been previously described as being limited by a stop 18 or 18A, it is obvious that the spring 19 can be so adjusted as to limit the travel of the button 14 obviating the necessity of a stop 18 or 18A. In other words, the spring 19 is so designed to rotate the button 14 a pre-determined distance so as to position a pin or dog 16 out of phase with the opening or interruption 17.

It is obvious that the button 14 can be equipped with one, two, or more pins or dogs 16 with the plate 10 being provided with an equal number of openings, interruptions, or apertures 17 for receiving the pins 16 therein and the stops 18 and 20 and 18A and 20A can be either omitted, raised above the surface of the plate 10, or recessed in the face of the plate 10 utilizing the surrounding area of the plate 10 for the stop. The button 14 may be rotatably mounted by a pivotal relation between the shank 28 and the stud 24, or by a pivoted relation between the shank 28A and the connector 12 as shown in the drawing or by pivotally mounting the head of the button 14 on the shank 28 or by allowing the connector 12 to pivot with the button 14 and shank 28. In other words the button 14 may be positioned rotatably relative to the housing or face plate 10 in other ways than illustrated in the figures and still be within the scope of the invention and the switch connector 12 can be hingedly connected as shown or freely plungably mounted as well known in the art utilizing springs and other well known devices. The inventive electrical switch safety button is preferably completely assembled and the connector 12 is then linked with the switch when the device is attached to the switch box 11 by means of the bolts 40.

In operation, the device having been assembled and mounted, the operator places the stock or form in the press and then places his hand on the button 14 and rotates the button 14 in relation to the plate or housing 10 until the dogs

4

or pins 16 contact a stop 20 or 20A which positions the pin 16 circumferentially with the pin receiving aperture 17 in the plate or housing 10 and the operator may then depress the button 14 actuating the connector 12 to operate the switch, not shown, as the pins are received in the openings 17 allowing the button to be depressed towards the face of the plate or housing 10.

It will be understood that in the operation of the device, the usual action of the pin or dog 16 relative to the housing 10 and the interruption 17 is such that the pin or dog 16 drops into the interruption 17 prior to contacting the stop 20 or 20A due to the fact that the operator is pressing the button 14 downwardly as seen in the drawings with the dog 16 riding on the housing 10 as the operator rotates the button 14 so that upon the dog 16 becoming indexed with the interruption 17, the dog 16 drops into the interruption 17 thereby obviating the stop 20 or 20A.

Upon completion of the machine operation, the operator removes his hand from the button and the spring 19 urges the button outwardly from the face of the plate or housing 10 so that the pins 16 are extracted from the opening 17 and the spring 19 then rotates the button 14 moving the pins out of circumferential indexed relation with the openings 17 which movement is limited by the stops 18 and 18A positioning the pins 16 over the face of the plate or housing 10 out of indexed relation with the opening 17 so that any direct pressure exerted on the button 14 is transmitted via the pins 16 to the face of the housing or plate 10 thereby preventing the button from being depressed towards the face of the housing 10 rendering the button mechanically inoperative to actuate the connector 12 to operate the switch, not shown.

In that the device automatically returns to an inoperative position and in that the device must be manually rotated against the spring 19 to index the pin 16 with the pin receiving opening 17, it is obvious that accidental pressure applied to the button 14 such as by the operator leaning on the button or by a piece of steel or a tool accidentally pressing on the button will not cause the button to move toward the face of the plate or housing 10 to actuate the connector 12 to operate the switch thereby eliminating the danger of accidentally operating the punch press to which the device is attached.

Although but one embodiment and one modification of the invention has been shown and described in detail and other modifications briefly described, it is obvious that many changes may be made in the size, shape, detail and arrangements of the elements of the invention within the scope of the appended claims.

I claim:

1. A switch button comprising a housing having a large aperture and a small aperture slightly removed from the large aperture, a stop on said housing face at the small aperture for circumferentially aligning a pin with the small aperture, a stop on said housing face removed from the small aperture for circumferentially positioning a pin out of alignment with the small aperture, a switch connecting and actuating member within said housing adapted to operate an electrical switch, a stud mounted on said member extending through the large aperture of said housing having a blind axial bore in the outer end thereof and an annular groove in the side

5

periphery thereof, a ball bearing disposed in the blind bore of said stud resting on the bottom thereof and extending outwardly beyond the end of said stud providing an axially disposed pivot point, a blind sleeve rotatably surrounding said stud having a slot through the side thereof leading to the annular groove in said stud and a groove in its outer peripheral surface located opposite the slot therein, a spring clip secured in groove of said sleeve and lying in the slot of said sleeve and extending into the groove of said stud rotatably securing said sleeve to said stud and anchoring said sleeve in relation to said stud against endwise movement under normal use, a hardened disc disposed between the bottom of said blind sleeve and said ball bearing providing a pivoting surface for said sleeve in relation to said stud, a palm button mounted on said sleeve, a pin extending from the back of said palm button toward said housing positioned between said stops and radially aligned with the small aperture of said housing and adapted to be received therein, and a torsion spring surrounding said sleeve anchored to said housing and anchored to said button normally exerting rotational force on said button to urge said pin against said stop removed from the small aperture of said housing positioning said pin out of circumferential alignment with the small aperture so that said pin prevents said button from being depressed by contacting the face of said housing; said button being manually rotatable with said sleeve against said spring to circumferentially align said pin with the small aperture of said housing by contacting said stop at the small aperture with said pin so that the button may be manually depressed out of contact with said housing with said pin entering the small aperture of said housing.

2. A switch button comprising a housing having a large aperture and at least one small aperture adjacent the large aperture in the face thereof, a stop on said housing next adjacent each small aperture, a stop on said housing removed from each small aperture, a switch connecting and actuating member within said housing adapted to be attached to an electrical switch, a stud secured to said member extending through the face of said housing via the large aperture therein having a blind axial bore in the outer end thereof and an annular groove in the side periphery thereof, a ball bearing disposed in the blind bore of said stud resting on the bottom thereof and extending slightly outwardly of the end of said stud providing an axially disposed pivot point, a blind sleeve surrounding said stud having a slot in the side wall thereof opposite and leading to the annular groove in said stud and adapted to rotate relative to said stud and a groove in its outer periphery opposite to said slot, a hardened annular plate disposed between the back wall of said blind sleeve and said ball bearing adapted to pivot with said sleeve on said ball bearing, a spring clip locking said sleeve on said stud disposed in said sleeve slot and said stud groove and secured in said sleeve groove, a palm button integral with said sleeve, at least one dog on said button extending toward said housing lying between said stops and radially aligned with a small aperture in said housing and adapted to enter same at a certain circumferential position of said button and a torsion spring anchored on said housing surrounding said sleeve and anchored in said button adapted to rotate said dog out of alignment with said housing small aperture and capable of allowing

6

said button to be manually rotated to align said dog with said housing small aperture so that said button may be manually depressed with said dog entering said housing small aperture.

3. A switch safety button comprising a plate having a button shank receiving opening and a safety pin receiving opening, means associated with said plate suitable to be connected to a switch to operate same, a button shank pivotally mounted on said means and extending through said face plate via the shank receiving opening thereof, a button cap on said shank, a first stop on said plate removed from the pin receiving opening, a secured stop on said plate at the pin receiving opening, a safety pin on said cap axially aligned with the pin receiving opening disposed between said stops, and a spring normally urging said pin away from said opening against said first stop so that said pin prevents said button from being depressed by contacting said plate; said button being manually rotatable against said spring to move said pin against said second stop at said pin receiving opening so that said button may be depressed to operate said switch with said pin entering the pin receiving opening.

4. A switch safety button comprising a face plate having a safety pin receiving opening, a switch actuating mechanism associated with said plate, a rotatably mounted button on said switch actuating mechanism extending through said plate a first stop on said plate removed from the opening, a second stop on said plate at the opening, a pin on said button disposed between said stops, and a spring normally rotatably urging said button so that said safety pin abuts said first stop out of phase with the opening with said pin preventing said button from being depressed to actuate the switch by contacting said plate; said button being manually rotatable against said spring to position said pin against said second stop so that said pin enters said opening thereby allowing said button to be depressed to actuate the switch.

5. A switch safety button comprising a plate having a pin receiving opening, switch actuating means associated with said plate, a rotatably mounted button adapted to operate said means, a pin on said button normally preventing depressing said button to operate same, and a spring normally torsionally positioning said button and said pin in inoperative condition; said button being manually rotatable to position said pin at the pin receiving opening in said plate so that said pin enters the opening allowing the button to be depressed.

6. In a device as set forth in claim 5, a stop normally indexing said pin out of phase with the pin receiving opening placing the device in inoperative condition.

7. In a device as set forth in claim 5, a stop for indexing said pin in place with the pin receiving opening.

8. An electrical switch actuating safety button comprising a rotatable switch actuating plunger, a housing member surrounding said plunger having a dog receiving interruption therein, a dog on said plunger adapted to be received in said housing interruption to permit said plunger being depressed to actuate a switch, and a spring normally rotating said plunger so as to dis-align said dog with said housing interruption so that said plunger cannot be depressed to actuate a switch without rotating said plunger.

9. An electrical switch actuating safety button

comprising a housing having an interruption therein, a switch actuating plunger disposed in said housing, a dog on said plunger receivable in said housing interruption, and a spring normally positioning said dog out of alignment with said housing interruption.

10. In an electrical switch actuating safety button having mechanically operative and inoperative positions, a housing having an interruption, a rotatable plunger disposed in said housing, a dog on said plunger so disposed that when aligned with said housing interruption the button is operable and when dis-aligned with said housing interruption the button is inoperable, and a spring normally disaligning said dog with said housing interruption.

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