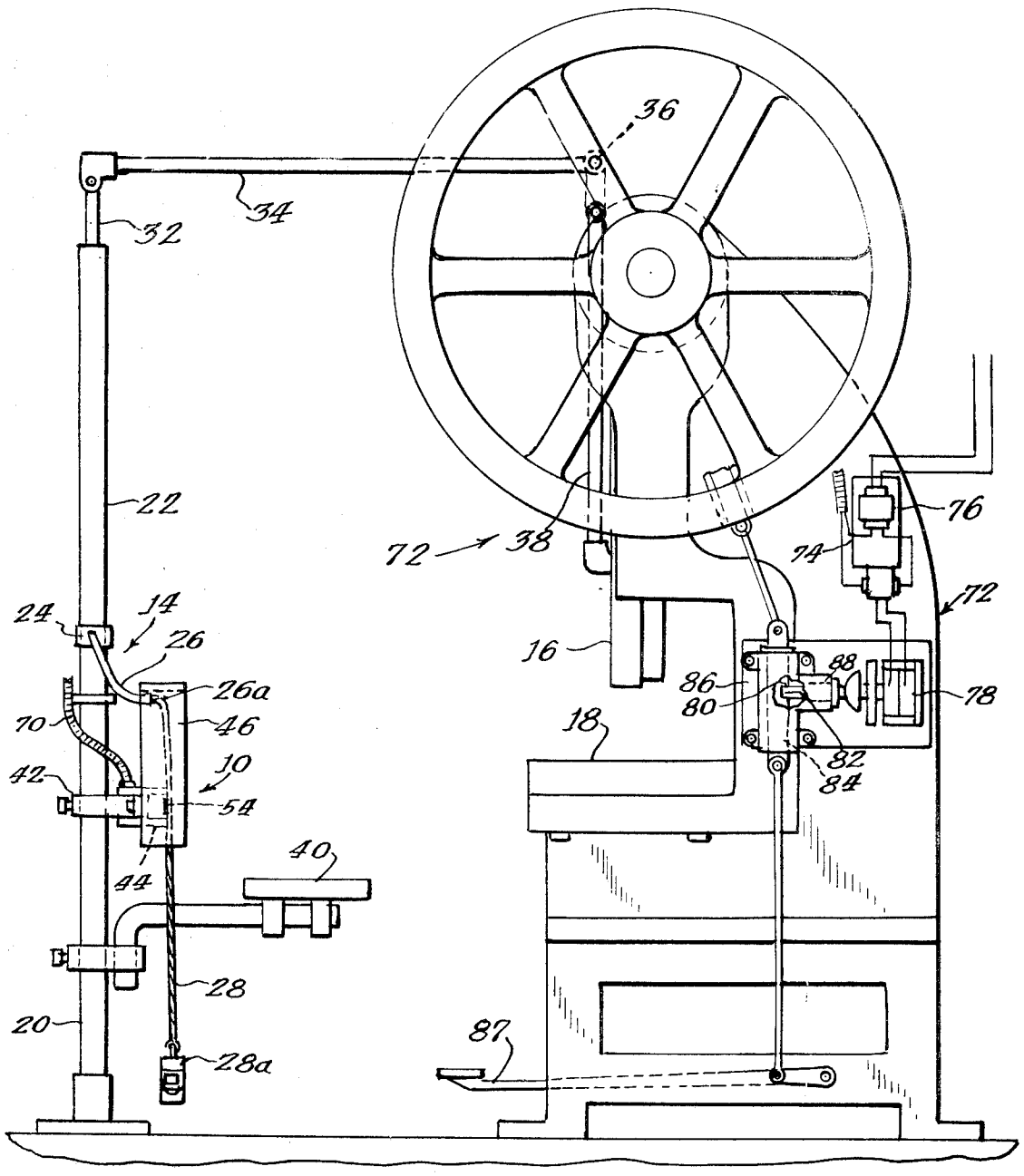
Aug. 4, 1970 H. GENGER 3,522,868

SUPPLEMENTAL SAFETY DEVICE FOR PRESS

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FIG. 1



Inventor:
Horst Genger
By: Hofgren, Wegner, Allen, Stellman & McCord
Attorneys

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SUPPLEMENTAL SAFETY DEVICE FOR PRESS

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FIG. 2

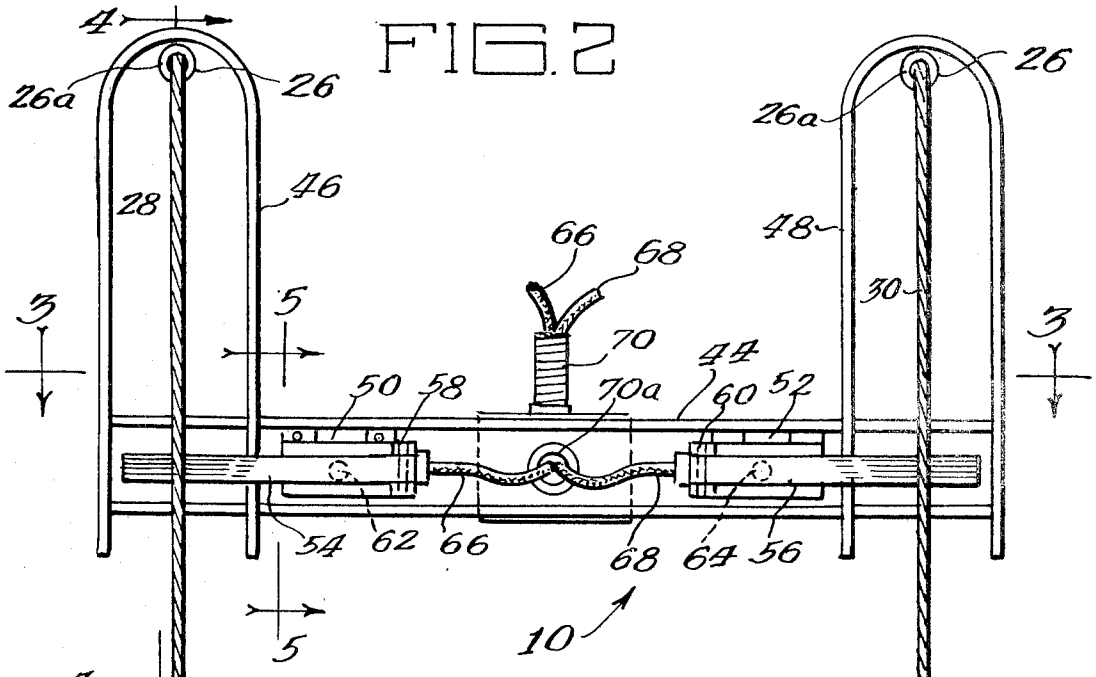


FIG. 3

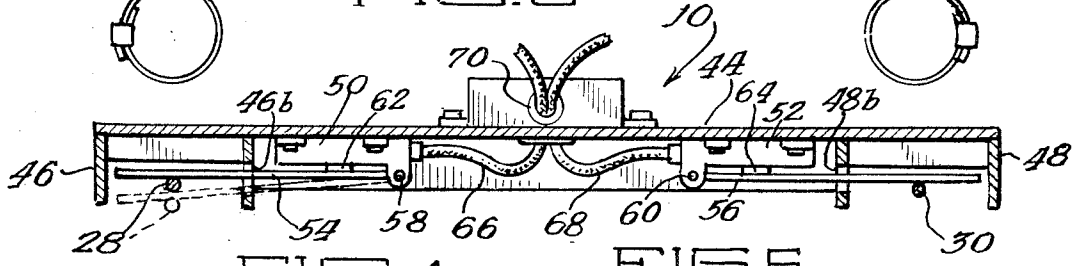


FIG. 4

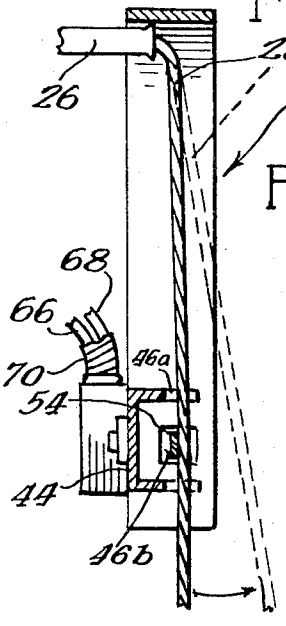


FIG. 5

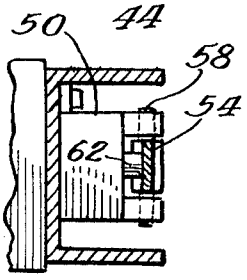
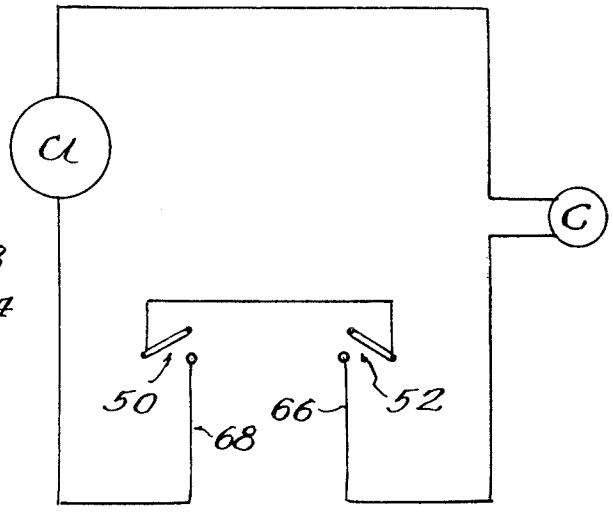


FIG. 6



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SUPPLEMENTAL SAFETY DEVICE FOR PRESS

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FIG. 7

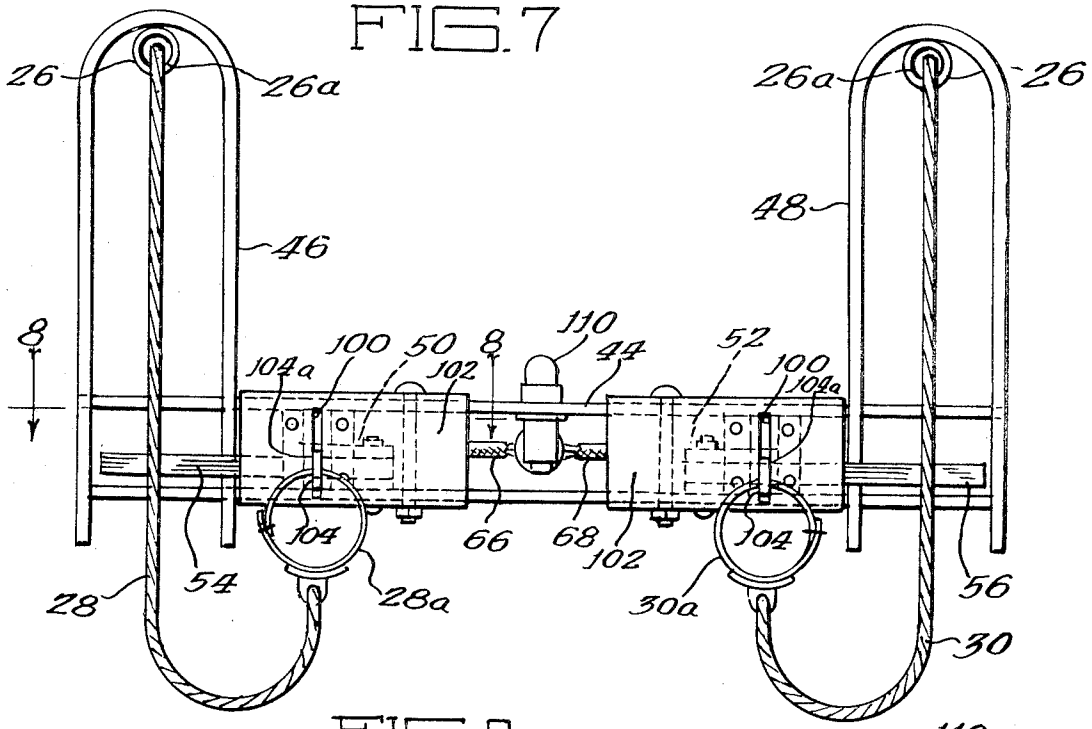
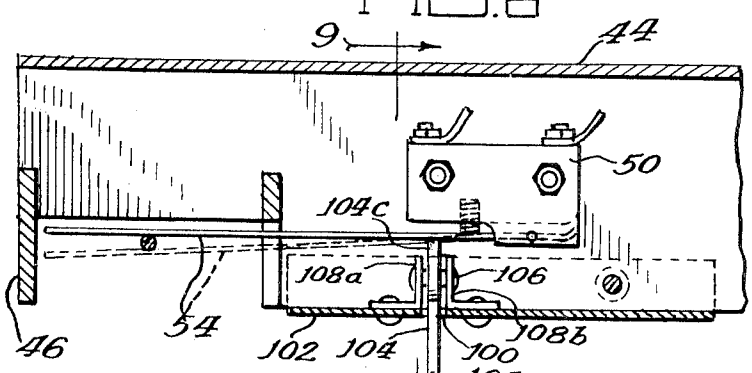


FIG. 8



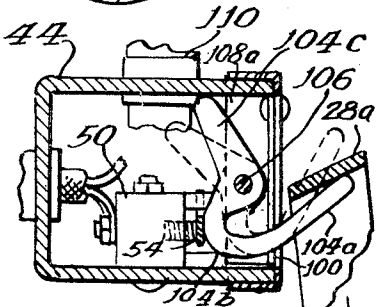


FIG. 9

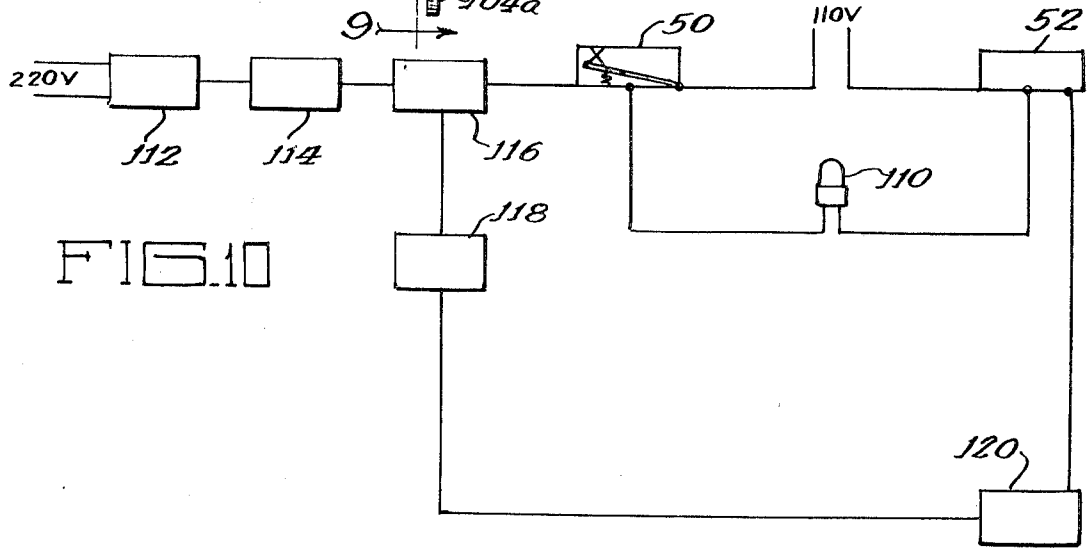


FIG. 10

United States Patent Office 3,522,868 Patented Aug. 4, 1970

3,522,868

SUPPLEMENTAL SAFETY DEVICE FOR PRESS

Horst Genger, Chicago, Ill., assignor to Bretford Manufacturing, Inc., a corporation of Illinois

Filed Jan. 31, 1969, Ser. No. 795,658
Int. Cl. B67b 3/26
U.S. Cl. 192—131 16 Claims

ABSTRACT OF THE DISCLOSURE

A supplemental safety device for use with a press mechanism of the type having cuffs for securement to the wrists of an operator, the cuffs being connected to cables which are associated with the press mechanism by means for retracting the cables and cuffs away from the press bed during operation of the press, characterized by a switch means on the cable support adapted to be moved to a press deactivated position when the wrist cuffs are removed from the wrists of an operator and hang freely at the end of the cables, the switch means being further adapted to being moved to a press operative position when the wrist cuffs are placed on the wrists of an operator.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates to reciprocal press mechanisms and, more particularly, to an improvement in a supplemental safety device for such mechanisms.

Brief description of the prior art

A well known safety device for reciprocal press mechanisms is that commonly known in the art as the "Possons" safety device. Generally speaking, the Possons safety device includes wrist cuffs intended to be secured on an operator's wrists. The wrist cuffs are connected on one end to cables that are interconnected with the press mechanism so that as the press descends, the cables are retracted, thereby pulling an operator's hands rearwardly from the area of the press bed. Over the years there have been some secondary safety devices developed for use in association with the Possons type safety device. Examples of such devices are shown in the patents to Goff 2,013,441, Korkowski 2,429,065, Vilkaitis 2,978,-084 and Stiebel 3,011,610 and 3,047,116.

In these prior art secondary safety devices, the wrist cuffs themselves form a part of the circuitry for rendering the press motor operative or inoperative. Thus, when the wrist cuffs are closed about the wrists of an operator, the circuitry is completed and the press may be operated. However, when the wrist cuffs are unfastened or removed from the wrists of an operator, the circuit is interrupted and the press is inoperative.

The need for such a secondary safety device is apparent when it is realized that it is not uncommon for operators to forget to put on wrist cuffs, particularly after a break period or the like, thus leaving them without the benefit of the basic Possons type safety appliance and exposing them to possible injury unless the operator himself voluntarily withdraws his hands from the area of the press bed on each downstroke. A shortcoming of the prior art devices is that if the cable and wrist cuffs are left hanging in the guides and the operator, after removing the wrist cuffs, re-encloses the same, the circuitry is completed so that, even though the wrist cuffs are not about the operator's wrists, the press mechanism may still be operative. Thus, a need and desire has arisen in the art for an improved secondary safety device for the Possons type safety device for reciprocal press mechanisms.

SUMMARY OF THE INVENTION

This invention is directed, in brief, to the provision of an improved secondary safety device for a Possons type safety device utilized with reciprocal presses, the secondary safety device comprising switch means responsive to the functional attitude of the cables associated with the wrist cuffs of the Possons type safety device, to render the press inoperative when the wrist cuffs hang free at the end of the cables, unattached to an operator's wrists.

The best mode currently contemplated by me for carrying out the invention includes the provision of switches in guides for the cable runs, the switches having switch arms positioned to be contacted and moved when the wrist cables hang freely downwardly in the guide during those periods when the wrist cuffs are unattached to the wrists of a press operator. The switches are further spring biased so as to automatically activate the press circuitry when both of the cables are lifted out of engagement with the switch arms during and following the attachment of the wrist cuffs to the wrists of a press operator.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a partially diagrammatic side elevational view of a press having a Possons type safety device and the supplementary safety device of this invention;

FIG. 2 is a front elevational view of the safety device of this invention;

FIG. 3 is a section view taken generally along the lines 3—3 of FIG. 2;

FIG. 4 is a section view taken generally along the lines 4—4 of FIG. 2;

FIG. 5 is a fragmentary enlarged section view of the switch portion of the safety device of this invention;

FIG. 6 is a wiring diagram of circuitry associated with the safety device of this invention;

FIG. 7 is a front elevational view of a modified form of the safety device of this invention;

FIG. 8 is a fragmentary, enlarged sectional view taken along the line 8—8 of FIG. 7;

FIG. 9 is a fragmentary sectional view taken along the line 9—9 of FIG. 8; and

FIG. 10 is a wiring diagram of the circuitry associated with the modified form of the safety device shown in FIGS. 7 through 9.

While this invention is susceptible of embodiment in many different forms, there is shown in the drawings and will herein be described in detail a specific embodiment therefor, with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiment illustrated.

BRIEF DESCRIPTION OF THE PREFERRED EMBODIMENT

The safety device 10 of this invention is intended for use with a reciprocal press mechanism or punch press 12 equipped with a primary safety device of the type known in the art as a "Possons" safety device, believed to be originally disclosed in Possons Pat. 1,417,346.

The press 12 is provided with a reciprocal slide 16 for engaging a work piece held on the work table 18. An upright pedestal or standard 20 is laterally spaced from the press 12 and includes a guide tube 22. Guide tube 22 has a lower collar 24 from which two guide branches 26 extend outwardly and downwardly. The branches 26 terminate at open ends 26*a*. Cable branches 28 and 30 extend outwardly from the open ends 26*a* of each of the guide tube branches and terminate in securement to wrist cuffs 28*a* and 30*a*, respectively. Cable branches 28 and

30 are connected to the main cable strand 32 which extends outwardly from the upper end of guide tube 22 and is connected to lever 34. Lever 34 is connected at 36 to link or lever 38 which, in turn, is connected to slide mechanism 16.

The operator of the press 12 is provided with a seat 40 connected to standard 20. In general operating procedure, the operator applies the wrist cuffs 28*a* and 30*a* to each of his wrists. During the operation of the machine, as the slide 16 descends toward the work table 18, the lever or linkage mechanism 38, 34 and cable 32 pull on the cable branches 28 and 30 and the wrist cuffs 28*a* and 30*a* to automatically pull the operator's wrists rearwardly from the work table 18 as the slide 16 descends, thereby eliminating the possibility of the operator's hands being mutilated by the descending press slide 16. In practice, it has been found that press operators seldom neglect to apply the wrist cuffs when they initiate their work at the beginning of a shift. However, it has been found that it is not uncommon for operators to neglect to put the wrist cuffs back on after a break such as a coffee break or lunch break or the like, thus leaving them without the benefit of the safety appliance and exposing them to possible injury unless the operator himself voluntarily withdraws his hands from the area of the work table 18 on each downstroke of the slide 16. This invention is directed to a means for disabling the press unless the operator has first put on the wrist cuffs of the Possons safety device.

Safety device 10 of this invention is secured to pedestal 20 near seat 40 by means of a bracket 42. Bracket 42 extends outwardly from the pedestal and is fixed to a channel 44 which extends generally transversely of the pedestal 20 in a generally horizontal orientation.

Opposite ends of the channel 44 are provided with inverted U-shaped shrouds 46 and 48 which are secured to the channel by suitable means, such as welding. The closed end of the inverted U-shaped shrouds 46 and 48 are disposed over the open ends 26*a* of the branches 26, which terminate within the confines of each of the shrouds 46 and 48. Thus, each of the cable branches 28 and 30 projects downwardly from the open ends 26*a* within the confines afforded by the shrouds 46 and 48 thereby limiting the lateral movement of the cable branches 28 and 30 in the area of the safety device 10.

Microswitches 50 and 52 are secured within channel 44 near opposite ends thereof. The microswitches preferably are of the type which are normally closed so as to create an activated circuit therethrough. Each of the switches is provided with a leaf-like switch arm 54 and 56 which extends laterally of the channel within the confines afforded thereby and through openings such as 46*b* in the shrouds, into the area defined by the lateral confines of the U-shaped shrouds. Each switch arm 54 and 56 is pivoted as at 58 and 60 in the area of its proximal end to the microswitches 50 and 52. The interior face of each switch arm 54 and 56 is closely adjacent to, or in abutment with, switch buttons 62 and 64 of each of the switches 50 and 52. Switch buttons 62 and 64 are normally biased outwardly of the switches 50 and 52 thereby normally conditioning each switch in an "on" mode. Depression of switch buttons 62 and 64 opens the press circuitry to render the press inactive thereby placing each switch in an "off" mode. Switch arms 54 and 56 are oriented so that the exterior face and distal end of the switch arms are in abutment with and moved inwardly by each of the cables 28 and 30 when these cables dangle from the open ends 26*a* of branches 26 responsive to gravity when the cables are in an inactive position as shown in FIGS. 1 and 2.

Lead wires 66 and 68 extend from microswitches 50 and 52, respectively, through conduit 70 which opens at 70*a* to the rear of channel 44. Conduit 70 carries the lead wires to the appropriate circuitry utilized for deactivating the machine when the normally closed microswitches 50 and 52 are opened by engagement of at least one of the cable branches 28 and 30 with the leaf-like switch arm 54 or 56. By this arrangement, when the cables 28 and 30 are in the dangling or inactive position as shown in FIGS. 1 and 2, the circuit for activating the machine is opened, thereby preventing operation of the machine. Thus, an operator who has neglected to apply the wrist cuffs 28*a* and 30*a* to his wrists will be unable to operate the machine and as such will not suffer injury from the reciprocating slide 16 by reason of not having the wrist cuffs applied to his wrists. Because the machine will be inoperative, the operator will most likely then be reminded that he has not hooked the wrist cuffs 28*a* and 30*a* of the Possons type safety device to his wrists, and will then do so. This will release the weight of both of the cables 28 and 30 against the switch arms 54 and 56 permitting the arms to spring outwardly and permitting the switch buttons 62 and 64 to return from the depressed position, thereby closing the circuit in which the microswitches 50 and 52 are positioned and rendering the machine operative. However, now the operator, having the wrist cuffs 28*a* and 30*a* applied to his wrists, may operate the press safely in that each descent of the reciprocating slide 16 will automatically pull his wrists away from the work table 18.

One form of disabling or deactivating the press is shown in FIG. 1. Here the lead wires 66 and 68 are interconnected with solenoid circuit 72 by connection to wires 74 which extend from transformer 76. Solenoid circuit 72 includes solenoid 78 connected with slide bolt 80 which is slidable into and out of a notch 82 in vertical slide bar 84 which extends through guide 86. Slide bar 84 is part of a trip mechanism operated by foot pedal 87. Solenoid 78 is connected with slide bolt 80 to withdraw the same from the notch 82 in slide bar 84 when the solenoid is activated by closing of the circuit. When the circuit is open, spring means 88 will urge the bolt 80 into the notch 82 of slide bar 84 preventing movement of the same. Thus, in this form of the invention, when the cable branches 28 and 30 dangle downwardly in the inactive position, the bolt 80 will occupy the notch 82 in slide bar 84 so that the application of pressure to the foot pedal 87 of the trip mechanism will not move the trip mechanism and thereby will not release the press for operation.

Another form of the invention envisions installation of the safety device 10 in the circuitry of the clutch connected to the flywheel of the motor which powers the press. Generally speaking, in presses the motor drives a flywheel, which, through a one revolution clutch activated by the trip mechanism, drives the slide through a single cycle of operation. As shown in FIG. 6, lead lines 66 and 68 are in series with the clutch control (CL) and the source of current (C). Thus when the switch is normally closed, the clutch is operable to drive the machine. However, when either one of the microswitches 50 or 52 is opened, responsive to the pressure of either one of the dangling cables 28 or 30 against either one of the switch arms 54 and 56, the series circuit with the clutch is opened and thus the press mechanism is inoperative.

A modified form of the invention is shown in FIGS. 7 through 10. Here a slot 100 is formed in a wall 102 which is positioned in front of arms 54 and 56 in the area of the microswitches 50 and 52, respectively. A hook member 104 having an upturned front finger 104*a*, an intermediate or abutment portion 104*b* and an upturned rear finger 104*c*, is pivoted at 106 to spaced rearwardly extending flanges 108*a* and 108*b* on either side of the slot 100.

In some instances, the length of the cables 28 is such, or the location of the open ends 26*a* of branches 26 is such, relative to the floor, that the cuffs 28*a* and 30*a* may drag on the floor when not in use. This causes grease and dirt and similar substances to gather on the cuffs and may also cause the cables 28 and 30 to dangle so loosely as to be incapable of contact with the switch arms 54. To this end, the hook members 104 are provided so that the

cuffs may be hung on the hooks when not in use. When this occurs, the hook members **104** pivot rearwardly with the intermediate portion **104***b* causing the switch arms **54** and **56** to swing inwardly and have the same effect on the circuitry as occurs when the cables **28** and **30** directly abut the switch arms **54** and **56** as described previously.

In the diagram shown in FIG. 10, the press motor and flywheel is represented at **112** and shown in 220 volt circuit. A clutch **114** is associated with the press motor and flywheel and is operated by a clutch control **116**. A microswitch **118** is located on a press bed and in the circuitry for the clutch control so that the clutch will not engage when a work piece on the press bed does not trip the microswitch **118**. The conventional foot pedal control **120** is also in the circuitry for causing engagement of the clutch. The normally closed microswitches **50** and **52** are shown in series in the circuitry and in series connection with light bulb **110**. The light is intended to illuminate when the microswitches move to an open position to indicate that the wrist cuffs are not on an operator's wrists and that the machine is inoperative. When the cuffs are hung on the hooks **104** dangling and abutting the switch arms **54** and **56** directly, the circuit is deactivated and the light will be activated to indicate that the press is inoperative.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, as some modifications may be obvious to those skilled in the art.

I claim:

1. A safety device for a power press of the type having motor means, a work bed, and a reciprocal slide driven by said motor means and operable in a path toward and away from the work bed, wrist cuffs adapted to be placed about the wrists of an operator, the cuffs also being connected to cables which run through guide structure, the cables normally lying in an inactive position generally dangling downwardly from the lower portion of the guide structure, the other ends of the cables being connected to the press slide by means for retracting the cables and cuffs away from the press bed during operation of the reciprocal slide, comprising: switch means adjacent the cable guide structure and operable between an on and off mode, the switch means being interposed in the press circuitry and being electrically connected with means for activating and deactivating the press and responsive to changes in the switch mode, switch elements connected to the switch means for changing the mode thereof, the switch elements being movable from an activating position to a circuit deactivating position responsive to the imposition of a portion of an inactive cable and cuff to deactivate the press and render the press inoperative, the switch elements further being movable to the circuit operating position responsive to removal of the cables and cuffs to an active position away from the switch elements to render the press operative.

2. The safety device of claim **1** including movable means adjacent the cable bed structure for receiving an inactive cable and cuff, the receiving means being operably associated with the switch elements to move the switch elements to the circuit deactivating position responsive to reception of a portion of an inactive cable and wrist cuff.

3. The safety device of claim **2** wherein the receiving means includes an abutment portion for engaging the switch elements to move the same.

4. The safety device of claim **3** wherein the receiving means includes a hook portion for receiving a portion of the cable and cuff.

5. The safety device of claim **1** wherein the switch elements are electrically connected with the press motor clutch means so that movement of the switch elements to a circuit deactivating position interrupts the motor drive.

6. The safety device of claim **1** wherein the switch elements are electrically connected with a solenoid which operates a reciprocating bolt and wherein the press includes trip mechanism having a notch positioned to be engaged by the bolt, movement of the elements to the circuit deactivating position causing movement of the solenoid to urge the bolt into the trip lever notch.

7. The safety device of claim **1** including shroud means positioned about the switch elements and about the cables adjacent the lower end of the cable guides.

8. The safety device of claim **1** wherein the switch means are positioned below the lower end of the cable guides.

9. The safety device of claim **8** wherein the switch elements include movable arm members which extend transversely across the path of the dangling cables.

10. The safety device of claim **9** wherein the cable guide means terminates in two branches with cables extending outwardly from each branch and wherein a switch means is positioned below each cable branch and the switches are interconnected in series.

11. The safety device of claim **10** including shroud means positioned about the switch elements and about the cables adjacent the lower end of the cable guides.

12. The safety device of claim **10** wherein the switch means includes a retractable element for deactivating the circuit during the retraction thereof, and a pivoted leaf arm having a proximal and distal end and an inner and outer face, the inner face of the arm being in abutment with the retractable elements, the outer face of the arm being positioned for engagement with the cable.

13. The safety device of claim **12** wherein the proximal end of the switch means is movably mounted to a means housing the retractable element and remaining switch mechanism and the distal end is positioned for engagement with the cable.

14. The safety device of claim **13** including shroud means positioned about the cables adjacent the lower end of the cable guides and about the switch elements.

15. The safety device of claim **14** wherein the switch elements are electrically connected with the press motor clutch means so that movement of the switch elements to a circuit deactivating position interrupts the motor drive.

16. The safety device of claim **14** wherein the switch elements are electrically connected with a solenoid which operates a reciprocating bolt and wherein the press includes trip mechanism having a notch positioned to be engaged by the bolt, movement of the elements to the circuit deactivating position causing movement of the solenoid to urge the bolt into the trip mechanism notch.

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ALLAN D. HERRMANN, Primary Examiner

U.S. Cl. X.R.

74—615