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SAFETY GUARD FOR PUNCH PRESSES

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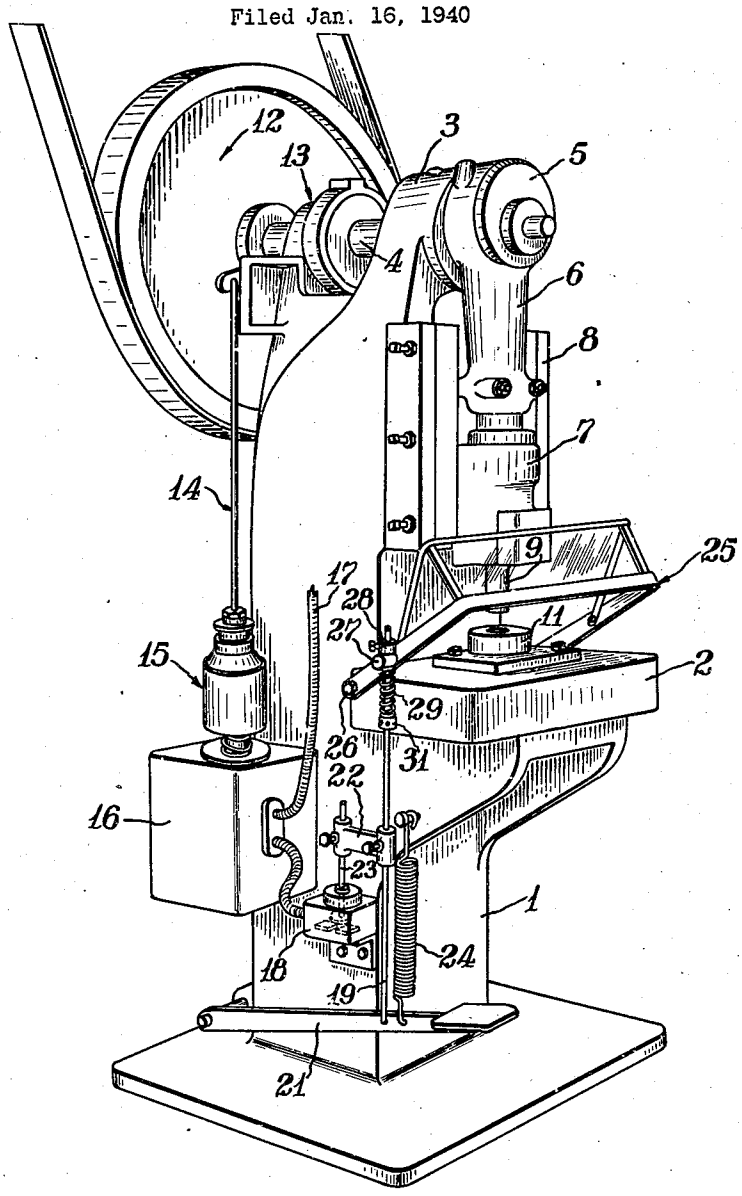

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SAFETY GUARD FOR PUNCH PRESSES

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5 Claims. (Cl. 192—134)

The present invention relates to a safety guard for punch presses and the like and more particularly to an interlocked guard and trip-actuating device for preventing injury to an operator.

It is common to use mechanically operated gates or movable guards for insuring that the hands of a punch press operator are in positions of safety when the press is operated. Such devices, however, are not usually favored by the operator since they slow down the operation of the press and, as usually constructed, they operate to forcefully and without control by the operator.

It is an object of the present invention to provide a novel control mechanism for presses and the like having a guard member interlocked therewith in such manner that obstruction of the motion of the guard prevents the tripping of the operating clutch.

It is another object to provide such a device incorporating an electrical tripping means for the operating clutch.

It is a further object to provide such a device in which a control treadle actuated by the operator first lowers the guard member and then closes a switch which causes actuation of the electrical clutch-tripping means.

It is another object to provide such a device incorporating a yielding connection between the guard member and treadle to prevent closure of the control switch by manipulation of the guard member.

Further objects and advantages will be apparent from the following description taken in connection with the accompanying drawing which illustrates in perspective a punch press incorporating a preferred embodiment of the present invention.

In the drawing a punch press of conventional type is illustrated comprising a pedestal 1 supporting an anvil block 2 and providing a bearing 3 for an operating shaft 4. Eccentric 5 on the end of shaft 4 is arranged to actuate a pitman 6 to reciprocate a ram 7 in guideways 8 mounted on the pedestal. Ram 7 carries at its lower end a punching tool 9 which is arranged to cooperate with a die 11 resting on the anvil block 2 to operate on the work.

Means for rotating the operating shaft 4 is provided in the form of a constantly rotating pulley wheel 12 adapted to be connected to the shaft 4 by means of a clutch 13 which is arranged to be tripped so as to render it effective by means of a link 14 operated by a single stroke mechanism 15.

The single stroke mechanism illustrated is preferably in the form shown in applicant's copending application Serial Number 298,284, filed October 6, 1939, and since this mechanism forms no part of the present invention, it is deemed unnecessary to describe it further than to state that a solenoid in the casing 16 is energized by current from the feed line 17 under the control of a switch 18, the arrangement being such that closure of the switch 18 causes the clutch to be tripped and released so as to cause one revolution of the operating shaft 4, after which further actuation can be secured only by opening the switch 18 and again reclosing it.

The switch 18 is adapted to be operated through a link 19 by a treadle 21, the operating connection including a crosshead 22 adjustably fixed in any suitable way to the link 19 and to a switch operating rod 23. Suitable means such as a spring 24 is provided for normally maintaining the treadle in switch-open position.

According to the present invention, a guard member 25 is pivoted as indicated at 26 to the anvil block 2, and is connected to be operated by the treadle 21 so that depression of the treadle brings the guard into such position as to prevent access by the operator to dangerous proximity to the ram 7 and the tool 9 carried thereby. For this purpose, the link 19 is extended upwardly through a pivot stud 27 mounted on the guard 25, and a collar 28 is suitably fixed on the link above the stud so as to provide a positive tractive connection between the link and guard. The downward motion of the treadle 21 is thus transmitted positively to the guard 25 to move it into operative position prior to closure of the switch 18. It will be understood that if the movement of the guard 25 to operative position is obstructed in any way as by interposition of the arm of the operator, it will be impossible for the switch to close.

Yielding means are provided for returning the guard to idle position in the form of a compression spring 29 on link 19 bearing at its upper end against the stud 27 and at its lower end against a thrust collar 31 suitably fixed to the link 19. Spring 29 is made weaker than spring 24 so that manipulation of the guard 25 to closed position is not effective to cause closure of the trip switch 18.

In operation, starting with the parts in the positions illustrated, the operator places the work on the die 11 under the tool 9 of the ram and then removes his hands and depresses treadle 21. Guard 25 is thereby moved to operative

position and then switch 18 closed to cause actuation of the clutch 13 to connect the drive wheel 12 to the operating shaft 4. As soon as this connection has been made, it is possible for the operator to release the treadle 21, causing the guard 25 to rise, but since the motion of the press has by this time caused the tool to enter the work, it is impossible for the operator to become injured even though he should thrust his hands under the guard as soon as it rose sufficiently to permit such action. The guard thus caused a minimum amount of interference with the operation.

It will be understood that the guard 25 may be made of light material, and since the pressure exerted thereon is simply the pressure exerted by the operator on the treadle 21, it will be obvious that if the operator should inadvertently leave a hand or arm under the guard, the blow of the guard thereon will not be severe, and the pressure will be immediately relieved by the operator releasing the treadle 21.

Since the force required to close the switch 18 may be made quite small, the entire mechanism may be constructed of light and economical components, and the operation may be performed easily and rapidly without fatiguing the operator.

Although but one embodiment of the invention has been shown and described in detail, it will be understood that other embodiments are possible and various changes may be made in the design and arrangement of the parts without departing from the spirit of the invention as defined in the claims appended hereto.

What is claimed is:

1. In combination with a punch press or the like having an operating clutch, trip mechanism for the clutch including a control switch, means for closing the switch including a lever and link, and a movable guard for the press connected to said link and movable thereby into operative position prior to closure of the switch, said connection being effective to prevent closure of the switch when movement of the guard to operative position is obstructed.

2. In combination with a punch press or the like having an operating clutch, electrical trip mechanism for the clutch including a control switch, means for closing the switch including a treadle and link, and a movable guard for the press connected to said link and movable thereby into operative position prior to closure of the switch, said connection including a lost motion connection and a spring take-up whereby movement of the guard to operative position is not transmitted to the link to close the trip switch.

3. In combination with a punch press or the like having an operating clutch, electrical trip mechanism for the clutch including a control switch, means for closing the switch including a treadle and link, and a pivotally mounted guard for the press connected to said link and movable thereby into operative position prior to closure of the switch, said connection including a sliding connection, a positive abutment for transmitting motion from the link to the guard, and a take-up spring permitting movement of the guard to closed position without moving the link to close the trip switch.

4. In combination with a punch press or the like having a reciprocating ram and a clutch for actuating the ram, an electrically operated single stroke control device for the clutch including a switch, means including a treadle for closing said switch, a safety guard movable into position to prevent access to the ram, and a positive connection from the treadle to the guard for moving the guard to operative position prior to closure of the switch.

5. In combination with a punch press or the like having a reciprocating ram and a clutch for actuating the ram, an electrically operated single stroke control device for the clutch including a switch, means including a treadle and link for closing said switch, a safety guard movable into position to prevent access to the ram, a positive connection from the link to the guard for moving the guard to operative position prior to closure of the switch, and a spring connection between the link and guard for returning the guard to normal position, said spring connection being adapted to yield and prevent closure of the switch by manipulation of the guard to operative position.

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