Feb. 6, 1923.

1,444,336

E. DE MAECKER

PRESS GUARD

Filed Sept. 15, 1919

FIG. 1.

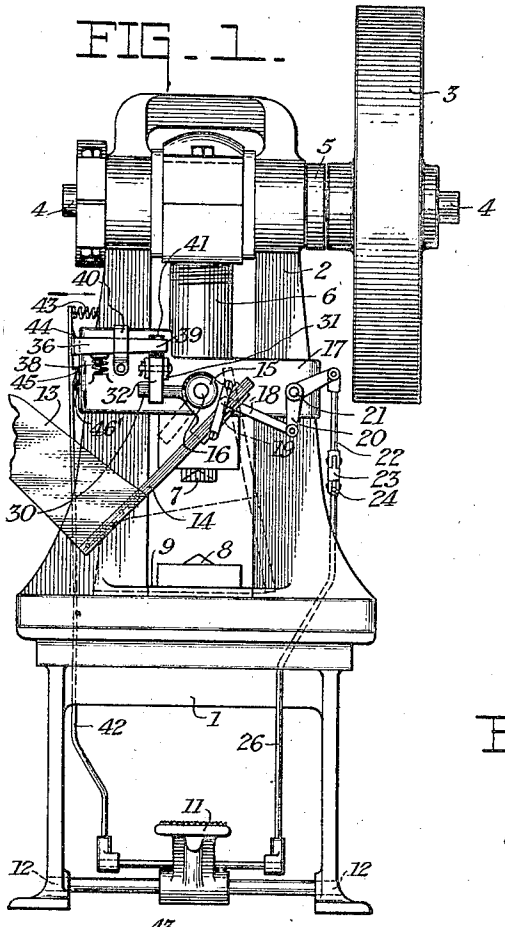


FIG. 2.

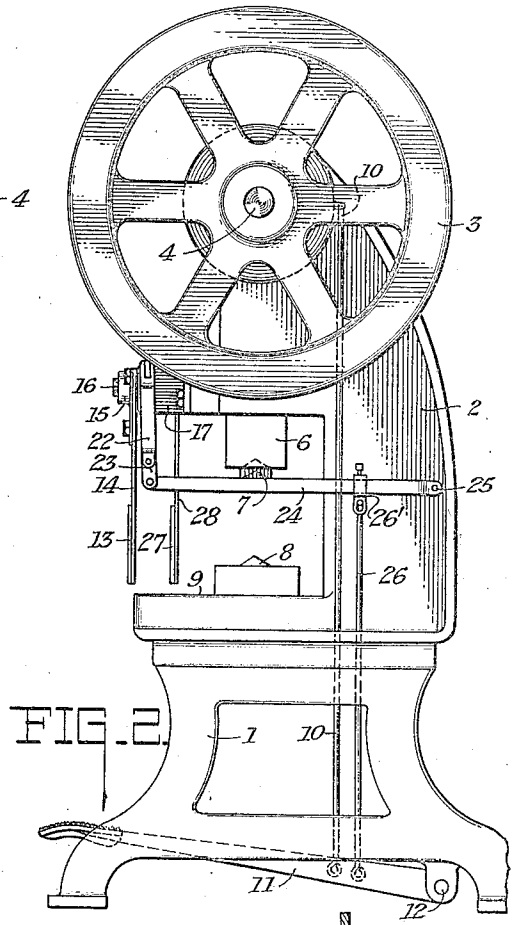


FIG. 3.

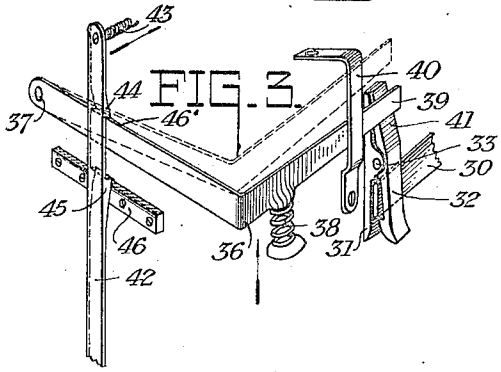


FIG. 4.

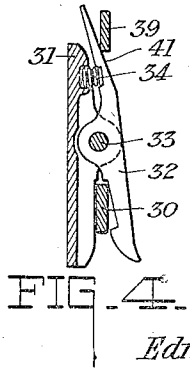
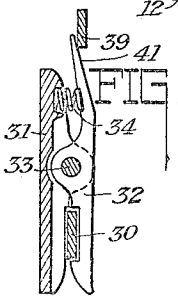


FIG. 5.



WITNESSES:

N. M. Perrin

Margaret Duignan

Edmond DeMaecker,
INVENTOR.

R. L. Stanchfield

BY Duell & Stanchfield

ATTORNEYS.

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UNITED STATES PATENT OFFICE.

EDMOND DE MAECKER, OF IRONDEQUOIT, NEW YORK, ASSIGNOR TO EASTMAN KODAK COMPANY, OF ROCHESTER, NEW YORK, A CORPORATION OF NEW YORK.

PRESS GUARD.

Application filed September 15, 1919. Serial No. 323,963.

To all whom it may concern:

Be it known that I, EDMOND DE MAECKER, a citizen of the United States of America, residing at Irondequoit, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Press Guards, of which the following is a full, clear, and exact specification.

My present invention relates to machinery, and more particularly to punch presses or other machines having reciprocating parts intermittently operated under the control of a workman in which there is danger of injury to the hands of the operator in placing the work beneath the operating parts; and it has for its object to provide a safety guard which will be automatic in its operation and which will eject the workman's hand from the danger zone before the machine functions; a further object is to provide a device of the character described which will reduce the jar and vibration due to the rapidly moving parts thereby causing less wear upon the safety guard and the clutch which operates the machine; and a still further object is to provide an automatic safety mechanism which will prevent the machine clutch from being tripped through the vibrating parts of the safety guard, thereby reducing accidents caused by machines with the usual type of safety guard. To these and other ends the invention resides in certain improvements and combination of parts such as will be hereinafter described, the novel features being pointed out in the claims following the specification.

In the drawings in which like reference characters designate like parts:

Fig. 1 is a front elevation of a punch press provided with a safety guard with a preferred form of my safety device incorporated therewith.

Fig. 2 is a side elevation of the same machine as shown in Fig. 1.

Fig. 3 is a detail showing the operating parts of my safety catch in proper relation, the punch press being omitted for clearness.

Fig. 4 is a detail section of the spring catch in open position.

Fig. 5 is a view similar to Fig. 4 only in closed position.

My invention can be applied to punch presses having safety guards of various types, and is particularly well adapted to a machine of the type shown in Patent No. 1,178,168, C. A. MacDonald and M. P. Dougherty, April 4, 1916, such a machine being illustrated in the drawings. In the drawings the press consists of a lower frame 1 on which there is mounted an upper frame 2 carrying a fly wheel 3 on a shaft 4, a clutch 5, and plunger 6 to which a male die 7 may be fastened, there being a female die 8 on the work table 9. The clutch 5 is operated through a rod 10 connected to a foot treadle 11 pivoted at 12 to the lower frame 1, and is so arranged that a single depression of the foot lever 11 causes the shaft carrying the plunger 6 to revolve once so that work carried on the table 9 will have an operation performed upon it.

In the machine illustrated a press guard or wing 13, made preferably of celluloid, is attached by rivets or otherwise to an arm 14 which is adjustably fastened to a small casting 15. This casting is bored out so as to revolve freely on a stub shaft 16, fastened to a yoke 17, which in turn is attached to the upper frame 2. In order to revolve the casting 15 upon shaft 16, a link 18 is pivoted to the casting at 19 and to the short arm of a bell crank lever 20, which in turn is pivoted to yoke 17 by a pin 21. The bell crank lever is connected to the foot lever through the following parts: links 22, and 23 attach one end of the bell crank lever 20 to a long lever 24 pivoted to the frame 2 by a pin 25. A rod 26 connects the foot lever 11 to the long lever arm 24, there being a slidable connecting member 26′ adjustable along lever 24 on the upper end of rod 26. A set screw 50 in the top of the connection member 26′ is for fastening this part in the desired position on lever 24. The bearing 51 carried by member 26′ is in the form of a slot, so as to allow a slight movement of a pin 52 carried by rod 26 before lever 24 is moved. The mechanism above described causes the wing 13 to move from the position shown in full lines to that shown in dashed lines in Fig. 1, before the die 7 descends to die 8, so that an operator's hand would be thrust to one side before the machine functions. The press also has a second wing guard 27 directly behind guard 13 so that in Fig. 1 it cannot be seen. In Fig. 2 the guard 27 is shown attached to a rod 28 which is fastened to the yoke 17 in such a manner that the ram or plunger 6 in descending causes it to move

into the same relative position as wing 13, only in a different plane. The idea of this arrangement is that normally guard 13 which moves first will remove the operator's hand from the danger zone. But if this guard fails, wing 27, which moves after guard 13 and much more rapidly, will remove the operator's hand as die 7 descends but before it reaches the female die 8. This second guard moves so rapidly that severe bruises are liable to result, so that guard 13 should be made to function as accurately as possible.

In the past guards as described have worked satisfactorily, reducing the number of press guard accidents to a very small proportion of the number occurring where guards are not employed. They occasionally fail, however, and I have discovered that the cause of failure is that excessive vibration of the wing guard causes the parts to react upon the foot lever and trip the clutch so that the workman will be caught unexpectedly. It is also much better to reduce the shock on the various parts in order that they may wear longer and operate more smoothly, but the main reason for my device is the prevention of accidents. To accomplish these ends I have provided a short arm 30 attached fast to casting 15, which revolves with the casting about stub shaft 16. This arm 30 is caught in its open position (that is when wing 13 is in position shown in full lines Fig. 1) by a spring catch consisting of a base plate 31 attached to the yoke 17, to which is pivoted a latch or jaw 32 by a pin 33, a spring 34 normally forcing cam surface 41 away from and the jaw 32 toward plate 31. When the arm 30 moves rapidly back from an actuation of the guard it strikes the jaw 32 which yields against the pressure of spring 34 serving as both a shock absorber and a definite latch. A lever 36 pivoted to frame 2 at 37 normally pressed by a spring 38 from the position shown in full lines Fig. 3 to position shown in dashed lines in the same figure, has one end 39 adapted to pass under a guide 40 and over the beveled surface 41 of jaw 32. A rod 42 connected to the foot lever 11 is held toward the frame of the machine by a spring 43 fastened to the upper frame 2. The upper end of this rod 42 has two cam surfaces, 44 and 45, the former, 44, being adapted to engage a side of one end, 46, of lever 36. until released by the downward movement of treadle 11, which causes rod 42 to descend, so that the other cam, 45, rides up on bar 46′ attached to the upper frame 2. In other words, the arm 30 is released when the foot treadle starts its movement, and before the wing 13 is actuated, and then the latch is automatically closed by the spring 34.

The operation of the complete machine is as follows:

Assuming the machine is in position shown in Fig. 1 when the operator presses down on the treadle 11, the rod 42 moving down causes cam 45 to ride up on bar 46′, releasing catch 44 from part 46 of lever 36, which under impulse of spring 38 will ride up upon the beveled surface 41 of the latch 35 so that the jaw will open, releasing arm 30. This movement of the treadle causes the pin 51 of rod 26 to move from the top to the bottom of slot 52, while lever 24 remains stationary. A further movement of treadle 11 causes the wing 13 to function, trips clutch 5, starts plunger 6 downward thereby actuating wing 27 and then the above mentioned parts all return to their normal or open position. As some of the small presses operate very rapidly the return movement of the wings, unless some provision is made to prevent it, is accompanied by a jerk or jar, causing the parts to shake and vibrate. With my attachment arm 30 upon returning is caught by latch 35 positively preventing any rebound of the wing 13, most of the force of the impact being taken up by the spring 34. As this wing is operated through the foot treadle 11, it likewise absolutely prevents this back lash from again accidentally tripping the foot lever 11. Just as the foot treadle reaches its uppermost position, and after the shock of the returning wing has subsided, the rod 42 will ride up over bar 46 so that latch 44 can engage the upper edge of one side 46 of lever 36. In this position, Fig. 5, it is ready to unlock arm 30 as another cycle of movement starts. It will thus be seen that the vibration of the guard at this end of its cycle of movement is absorbed or controlled by my device.

I have described a preferred form of my invention in which a positive lock holds the wing 13 against back lash and undue vibrations, and which prevents accidental movement of the foot lever, but it is obvious that any device which would deaden the shock of the return movement would be within the scope of my invention. The vibration and shock could be cushioned by a weight or by a pneumatic device, for either of these would prevent the rebound of the guard. I prefer, however, the machine which I have described, as it both absorbs the shock of the rapidly moving guard and positively locks it in place.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a safety guard for punch presses, the combination with a frame, a bed, a ram movable on the frame and actuating mechanism for the ram with a safety guard adapted to cross the bed thereby removing an operator's hand from beneath the ram before the same has descended, and a vibration controller mounted on the frame, which will

cooperate with the guard upon the completion of its movement.

2. In a safety device for punch presses, the combination with a press comprising a frame, a bed, a ram movable over the bed, and means for actuating the ram, with a press guard adapted to cooperate with the ram moving means to swing across the bed, and a vibration controlling mechanism mounted on the frame adapted to cooperate with the press guard when the same is at rest.

3. In a safety device for punch presses, the combination of a press comprising a frame, a bed, and a ram movable to and from the bed, with a safety guard adapted to cross the bed, mechanism for operating the ram, means for operating the guard, and a shock absorbing mechanism adapted to receive the impact of the safety guard as it comes to rest after an actuation comprising a spring jaw, a tripping device for the ram and for the guard operating mechanisms, said tripping means being adapted to render the spring jaw momentarily inoperative so that the guard and then the ram can be operated.

4. In a safety device for punch presses, the combination of a press comprising a frame, a bed, and a ram movable to and from the bed, with a safety guard adapted to cross the bed, mechanism for operating the ram, means for operating the guard, and a shock absorbing mechanism adapted to receive the impact of the safety guard as it comes to rest after an actuation comprising a yielding spring tensioned jaw having a cam surface on one end, a lever for contacting with the cam and rendering the jaw inoperative, and a tripping device for the guard and the ram operating mechanisms, this tripping mechanism also operating the cam contacting lever so that when actuated the jaw will be rendered inoperative, the safety guard actuated, and the ram clutch tripped, all in the order given.

5. In a safety device for punch presses, the combination of a punch press, comprising a frame, a ram, and a bed with means for moving the ram, a clutch for operating the ram moving mechanism, and a lever for operating the clutch, a safety guard pivoted to the frame adapted to swing across the bed and back at each actuation of the ram, moving means for the guard, actuated independently of the ram moving mechanism through the lever which trips the ram clutch, a shock absorber on the frame consisting of a spring latch, the spring jaw of the latch adapted to first receive the shock from and then restrict the movement of the guard, and means operated by the clutch operating lever for momentarily rendering the spring jaw inoperative before an actuation of the ram and guard.

6. In a safety device for punch presses, the combination with a machine having a frame, a bed and movable parts operable over the bed, of means for actuating the movable parts to cause them to perform a cycle of operations, a guard adapted to cross the bed and return at each cycle of operations, means for moving the guard, and means for definitely retaining the guard in position after a cycle of operations is complete, thus preventing the guard momentum from vibrating and accidentally actuating the movable parts which operate over the bed through the means used for moving the guard.

7. In a safety guard for punch presses, the combination with a machine having a frame, a bed and a ram mounted over the bed, of a safety guard adapted to move to and from an operative position across the bed, means for actuating the ram and means for actuating the guard, both of said means being actuated by a common controlling member, and a device for limiting the movements of the safety guard as it moves to its inoperative position after an actuation, said device thus preventing the safety guard from accidentally operating the ram through the common controlling member as the guard moves from its operative position across the bed.

8. In a press, a die, to which work is fed through a path, mechanism for moving said die, a continually rotating member, a clutch which, when tripped, connects said member to said mechanism for causing a cycle of operation of said die, tripping devices for said clutch, a guard system including connections with said tripping devices and also including a guard member normally out of said path but movable, in timed relation to said cycle, across said path and movable finally back to said normal position, and a safety element engaging with said system and inducing the reposing of said guard in its said normal position when it finally moves back to said position, whereby accidental tripping of said clutch by reaction of said guard system on said tripping devices is prevented.

Signed at Rochester, New York, this 11th day of September 1919.

EDMOND DE MAECKER.