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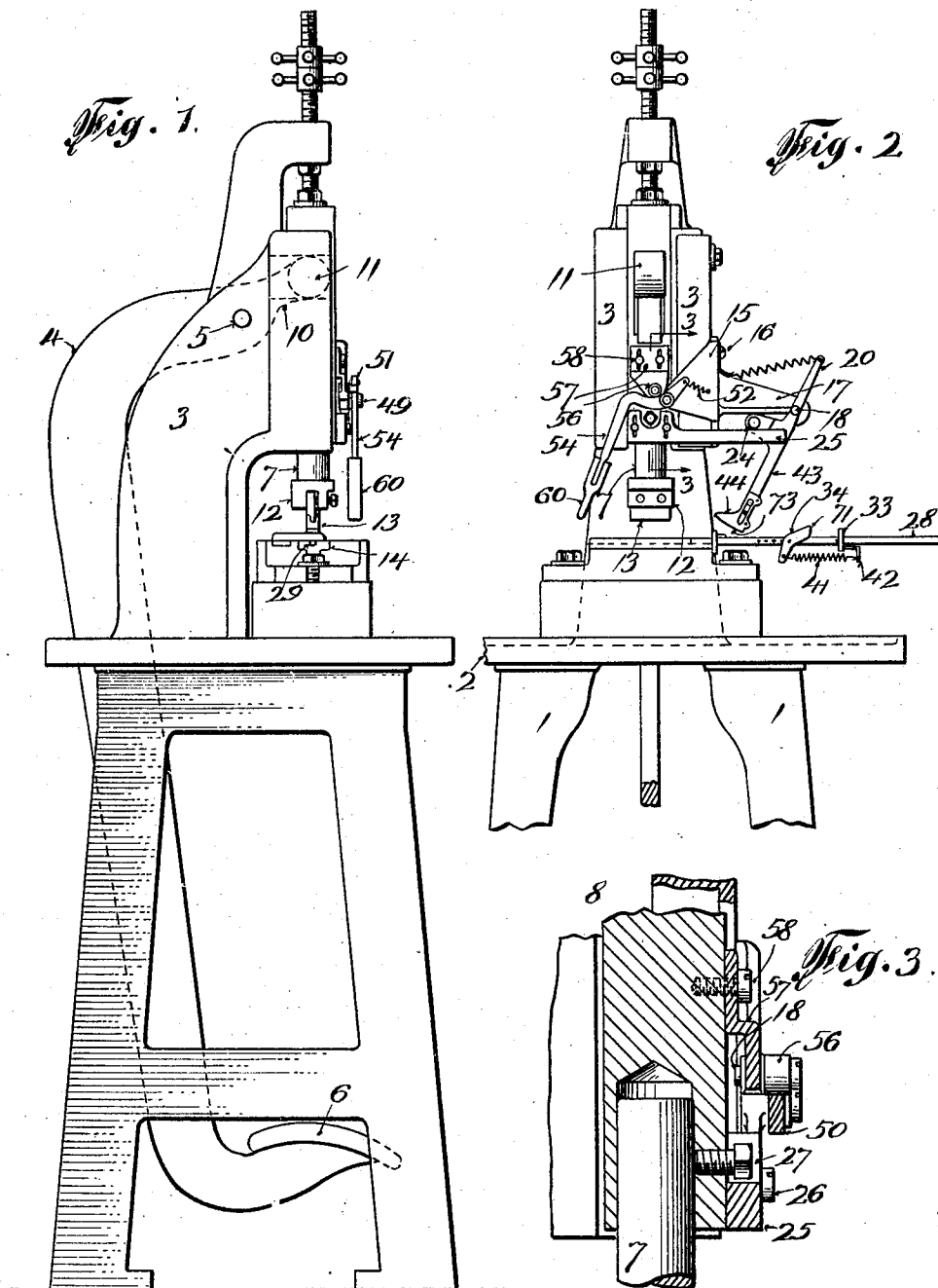
I. NEWMAN

1,797,239

PROTECTING DEVICE FOR STAMPING PRESSES

Filed June 5, 1929

3 Sheets-Sheet 1



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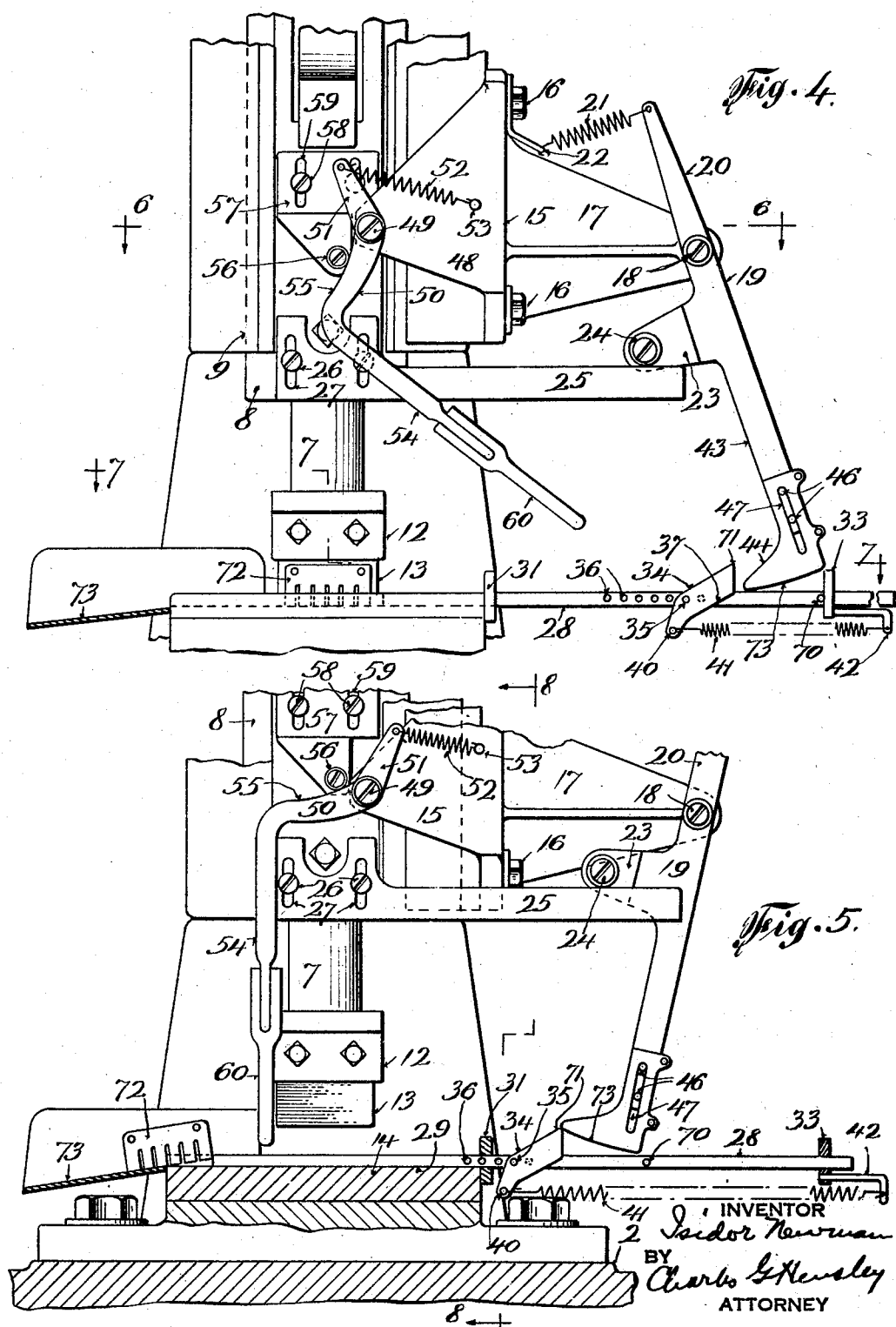
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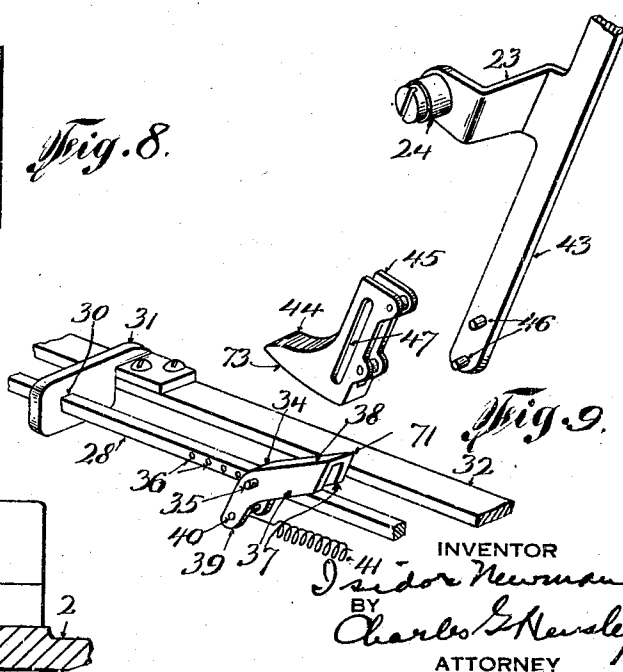
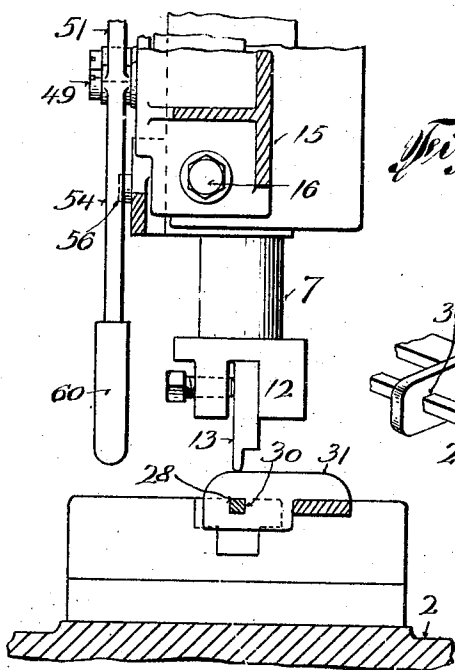
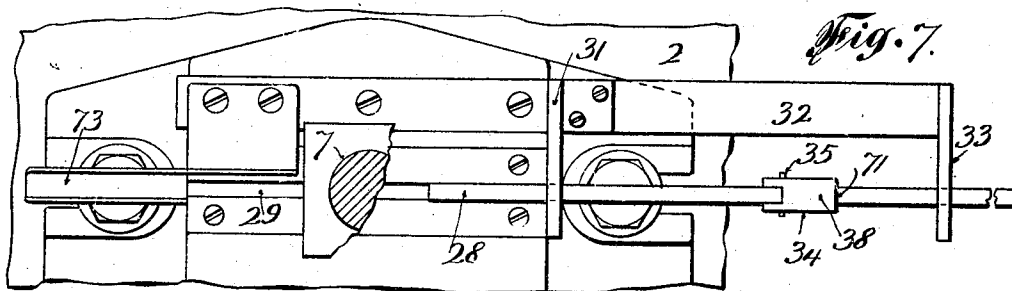
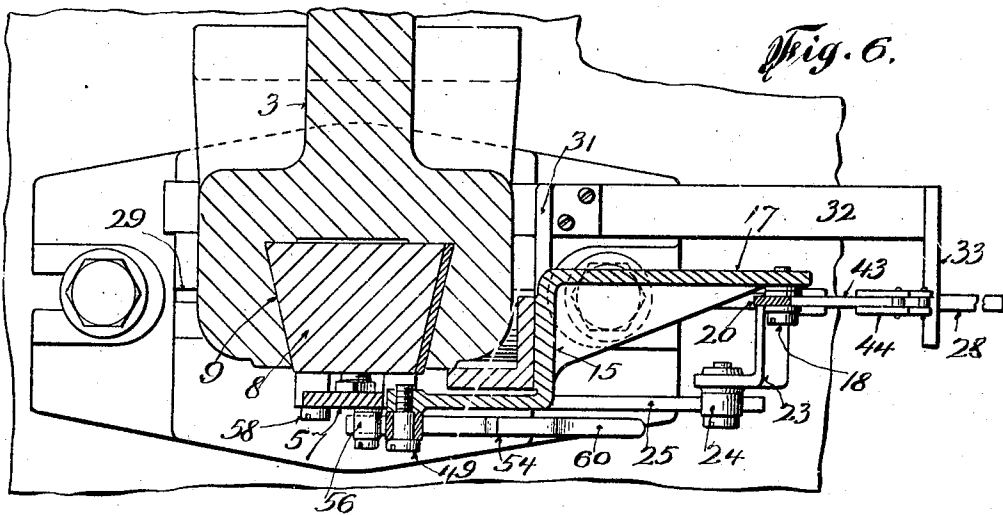
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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PROTECTING DEVICE FOR STAMPING PRESSES

Application filed June 5, 1929. Serial No. 368,710.

My invention relates to devices for protecting operators of machines such as, for instance, stamping presses, against injury. The invention embodies two principal features, one of which is a device for automatically ejecting the work from the machine after the stamping, blanking or other operation has been performed by the machine, in order that the operator will not have to insert the hand into position where it might be injured by the dies or other moving parts of the machine if the same should unintentionally be operated before the hands are withdrawn. This branch of my invention also embodies a simple and automatic means for ejecting the work so that the hand of the operator does not have to be used in removing the work from the machine after the material has been acted upon. The other branch of the invention embodies a device in the form of a movable guard which will strike the hand or hands of the operator during the active stroke of the machine if the operator fails to withdraw his or her hands from the danger point. This branch of the device, therefore, is intended to permit the operator to move the material in the feeding position on the machine and when this has been accomplished and the machine makes its active stroke, if the operator should fail to withdraw his or her hands to a safe position, the guard will come in contact with the hand or hands of the operator, thereby warning of the danger or even physically moving the hands out of danger.

The guard is a movable part, operated automatically in conjunction with the machine and it remains in position where it will not interfere with the hand feeding of the material into the die of the machine. Both branches of the invention are for the purpose of avoiding injury to the operator of the machine, such as a stamping press, where movable or movable and stationary parts co-operate to forcibly act upon stock which is fed by hand to the machine.

Another object of the invention is to provide protective devices embodying both of the features above described, which will be adaptable to the same machine and which

will not interfere in their operation one with the other, nor with the operation of the machine itself, and which will not interfere with the feeding of the stock into the machine. While the present invention may be employed in conjunction with various types of machines, such as stamping presses, in which stamping, forming, closing, riveting and other operations may be performed, the same may be used in conjunction with various other types of machines where material is fed by hand and where the operator is liable to be injured by parts of the machine if the hands are not removed a safe distance.

In the drawings forming part of this application,

Figure 1 is a side elevation of a foot power stamping press to which my invention has been applied,

Figure 2 is a front elevation of the upper portion of the same,

Figure 3 is a sectional view taken on the line 3—3 of Figure 2,

Figure 4 is an enlarged elevation of a portion of the stamping press together with the protective devices,

Figure 5 is a similar view but with some parts shown in section and showing the ejecting device at about the completion of the ejecting operation,

Figure 6 is a sectional view taken on the line 6—6 of Figure 4,

Figure 7 is a sectional view taken on the line 7—7 of Figure 4,

Figure 8 is a sectional view taken on the line 8—8 of Figure 5, and

Figure 9 is a perspective view of a group of members forming part of the ejecting device.

I have shown my invention applied to a foot power stamping press although it is to be understood that the same may be applied to a power driven machine as well as to types of machines other than stamping presses. In the drawings I have shown a machine mounted on standards 1 and comprising in part a table portion 2 from which extends upwardly the frame 3 of the machine on which the movable parts of the stamping device are mounted. There is a long, curved

lever 4 pivoted in this upper frame on the shaft 5 and the lower, curved end of this lever is provided with a treadle portion 6 on which the operator places his or her foot to operate the lever for driving the plunger of the press. The plunger 7 of the press is provided with a dovetail slide portion 8 which travels in a corresponding groove 9 in the frame 3 and in a vertical direction. One arm 10 of the operating lever 4 is provided with a roller 11 which engages the slide 8 of the plunger so that when the lever 4 is rocked, the plunger will move vertically toward and from the bed of the machine.

The lower end of the plunger, which is shown as round, is provided with a chuck or clamp 12 which holds the upper die member 13 which is to co-operate with the lower die member 14 in the bed of the machine for forming or shaping a piece of metal. The metal is fed across the die 14 by the operator to a position against a gauge in order to be acted upon by the upper and lower die members.

The object of the present invention is to eject the stock from the lower die after the stamping or other operation has been performed, as well as to move the operator's hand away from the dies. On the upright frame member 3 of the machine there is mounted a bracket 15 by means of the bolts 16 and one arm 17 of this bracket projects from one side of the machine and supports the pin 18 on which the lever 19 is pivoted. The upper arm 20 of this lever is drawn in one direction by the coiled spring 21, one end of which is attached to the lever arm 20 and the other to a fixed holder 22. There is an arm 23 extending laterally from this lever and it is provided with a roller 24 which is adapted to engage the top surface of a plate 25 which is secured to the slide block 8 of the plunger of the machine by means of the bolts 26 which screw into the slide block and pass through the vertical slots 27 of the plate. By means of these bolts and the slotted apertures 27 the vertical position of the plate 25 may be adjusted in relation to the plunger of the machine for a purpose which will be set forth hereinafter.

The ejector rod 28 is movable laterally of the lower die member 14 and in the particular instance illustrated herein this rod slides through a channel 29 in the die member, although the particular relation of this ejector to the die will depend partly on the character of the dies.

Where the die has a slot extending through it as illustrated herein, the ejector slide can move in this slot of the die but in other cases it may be necessary to slide over the face of the die 14 and it will be apparent that modifications in the ejector will be made according to the character of the die and the particular article to be handled by it. The ejector rod

28 is shown as rectangular in cross section and it is shown as sliding through a rectangular opening 30 in a guide plate 31 mounted on the frame behind the lower die 14. It will be understood that if the cross sectional shape of the ejector 28 is changed the opening 30 in the plate 31 will be correspondingly changed. There is a plate 32 fixed to the machine and projecting to the right in Figures 6 and 7 of the drawings; and this plate has a lateral projection 33 which is also provided with a guide aperture through which the rear end of the ejector rod 28 moves. There is a latch or trigger 34 which is U shaped in cross section and which is pivoted to the ejector rod by means of the pin 35 which may be placed in any one of the several apertures 36 of the ejector rod 28 for adjusting the position of the latch on the ejector rod. This latch has downwardly extending portions 37 which straddle the ejector rod, the downward movement of one end of the latch being limited by the engagement of the cross portion 38 with the top of the rod 28. The lower ends of the arms 39 are connected by a cross pin 40 to which one end of a coiled spring 41 is connected, the other end of this spring being connected to a bracket 42 attached to the lateral extension 33 of the plate 32.

The lower arm of the lever arm 43 is provided with a shoe 44 adapted to engage the end of the latch 34; and this shoe is formed with an upper extension 45 which fits slidingly on the end of the lever arm 43 where it is held and permitted to move along the arm by means of the pins 46 fixed to the arm 43 and engaging in the slots 47.

The bracket 15 attached to the frame of the machine has a plate 48 extending to the left in Figures 4 and 5 to a position adjacent the plunger of the machine; and on the pivot pin 49 attached to this arm there is pivoted a lever 50 having a short arm 51 which is connected with one end of the coiled spring 52 the other end of the spring being attached to a stationary pin 53 on the plate 48. The lower arm 54 of this lever has a curved top surface 55 which is engaged by a roller 56 mounted on a plate 57 which is attached to the slide of the plunger of the press by means of the screws 58 which engage through the elongated slots 59 of the plate 57. These screws and slots permit a limited vertical adjustment of the plate 57 on the plunger slide for the purpose of varying the time of operation of the lever 50 to correspond with the time of operation of the plunger upon the work. There is an arm 60 forming a continuation of the arm 54 but arranged at an angle thereto and the lower end of this arm forms a striking portion adapted to sweep across the front of the space between the upper and lower die members of the machine for the purpose of pushing the hand or hands

of the operator away from the danger point.

Operation

The operator of the machine will feed a
 5 piece of stock across the lower die member
 14 to a suitable gauge while the parts of the
 machine are in the position shown in Figure
 2, at which time the striking member 60 is at
 the left to leave the space in front of the
 10 dies free for the operator to feed the stock.
 Assuming the stock has been fed in the po-
 sition over the lower die member and under
 the path of the upper die member, the op-
 erator will operate the treadle 6 to force the
 15 plunger of the machine downwardly so that
 the die members will operate on the stock
 which has been fed to them. As the treadle
 is moved for this operation, and before the
 upper die member has come down to a point
 20 where the hand of the operator might be
 injured if not sufficiently withdrawn, the fol-
 lowing operations will take place. As the
 plunger of the press moves downwardly it
 carries the plate 57 on which the roller 56
 25 is mounted and this roller will act on the
 curved surface 55 to swing the lever 50 on its
 pivot 49 so that the striking member 60
 sweeps across in front of the die members to
 move the hand of the operator away from
 30 the danger point if it has not been previously
 removed. If the operator, therefore, should
 for any reason fail to withdraw the hand or
 hands a safe distance from the dies, the hand
 or hands will be forcibly moved to prevent
 35 their being injured by the descending die.
 The striker member 60 will not interfere
 with the operator's holding the front edge
 of the stock up to the time the material is
 acted upon by the dies, so that the operator
 40 may hold the stock against the gauge from
 the front edge of the stock. The striker
 member 60 makes one sweep or movement
 from left to right, as shown in Figures 4 and
 5 during one downward stroke of the plung-
 45 er of the press.

During the upward or return stroke of
 the plunger the roller 56 permits the lever
 50 to be swung back to its starting position
 by the spring 52 the parts thus returning to
 the initial or starting position ready for a
 succeeding operation.

During the downward stroke of the plung-
 er in the operation just described, the plate
 25 which is carried by the plunger, also
 55 moves downwardly and as it does so it per-
 mits the roller 24 to move downwardly under
 the action of the spring 21 which constantly
 tends to move the lever 19 in one direction.
 This causes the arm 43 to move from left to
 60 right, so that by the time the plunger has
 descended to its lowermost position, the arm
 43 will move to its extreme right hand po-
 sition, as shown in Figure 4. During this
 downward movement of the plunger the ejec-
 65 tor rod 28 is held in the right hand position

shown in Figure 4 by the spring 41 holding
 the rod with its pin 70 abutting against the
 bracket 33. This spring also tends to keep
 the end 71 of the latch elevated above the
 ejector rod. While the lever arm 43 was mak-
 70 ing its movement from left to right, as just
 described, the shoe 44 at one period of the
 movement engaged the top surface of the
 latch 34 so that as the lever arm 43 moved,
 the latch was not only rocked downwardly
 75 but the shoe 44 was also lifted upwardly or
 caused to slide along the arm 43 and these
 combined movements permitted the shoe to
 escape the latch. When the arm 43 moved the
 shoe beyond or behind the latch, as shown
 80 in Figure 4, the latch was caused to spring
 upwardly again by the spring 41 and the
 shoe 44 moved downwardly by gravity ready
 for the return or ejecting stroke. These op-
 erations will have taken place during the
 85 downward stroke of the plunger of the press.

Upon the upper or return stroke of the
 plunger the plate 25 operates on the roller
 24 to swing the lever 19 in opposition to the
 spring 21 so that the arm 43 moves from right
 90 to left, as indicated in Figure 5. During this
 return stroke the front end of the shoe 44
 first engages the back of the latch 34 and as
 the latch cannot pivot counterclockwise be-
 yond the position shown in Figure 5, the
 95 shoe pushes on the latch and causes both the
 latch and the ejector rod to slide. One end
 of the ejector rod moves through the slot 29
 of the lower die 14 and pushes the piece of
 work 72 which has been formed or otherwise
 100 acted upon by the die members, laterally out
 of the machine to discharge down the slide
 73. When the lever arm 43 moves to the left
 a point is reached, as shown in Figure 5,
 when the front end of the shoe 44 rises over
 105 the point 71 of the latch 34 and as soon as
 this occurs the latch trips from the shoe and
 the spring 41 rapidly pulls the ejector rod
 and the latch to the right, into the position
 shown in Figure 4. As soon as the point of
 110 the shoe thus passes the upper end 71 of the
 latch and the latch begins to move to the
 right under the action of the spring 41, the
 upper end of the latch will be depressed as
 it travels along the under, curved surface 73
 115 of the shoe, so that the latch is rocked on its
 pin 35. The shoe is also caused to slide up-
 wardly on the arm 43 to permit the latch to
 entirely pass the shoe to bring the parts into
 the position shown in Figure 2. This condi-
 120 tion is brought about by the time the plunger
 has repeated its upward or return stroke. At
 each complete movement of the plunger for
 a stamping or similar operation, the move-
 ments of the safety devices and ejecting de-
 125 vices above described are repeated.

The plate 25 may be adjusted vertically
 by means of the bolts 26 and slots 27 to reg-
 ulate the timing of the plate in relation to
 the roller 24 so that the device may be adapt-
 130

ed to the particular press to which it is applied. That is to say, the plate 25 will be adjusted so that the operations just described will take place in the order described. The
 5 plate 57 which carries the roller 56 may also be adjusted vertically on the plunger slide so that the operations of the arm 50 will be properly timed to remove the operator's
 10 hand before the upper die or plunger can cause injury.

The present device is very simple in construction and operation and it requires no modification of the stamping press to permit
 15 it to be applied thereto; nor does the device in any manner interfere with the normal operations of the press; nor with the ordinary methods of feeding the stock by hand to the dies.

Having described my invention, what I
 20 claim is:

1. The combination with a stamping press or other machine adapted to operate on stock fed thereto by hand, of a reciprocating member arranged to eject the article acted upon
 25 by said machine, a spring tending to retract said ejecting member, a lever and co-operating tripping means interposed between said lever and said ejecting means whereby said lever will operate said ejector means in
 30 one direction and the latter will be quickly returned by said spring in the opposite direction, and means operated automatically with the operation of said machine for periodically rocking said lever.

2. The combination with a stamping press or other machine adapted to operate on stock fed thereto, of a reciprocating member arranged to eject the article acted upon by said
 40 machine, a spring for moving said ejector in one direction, a lever operated automatically by the operation of said machine for moving said ejector in another direction to that caused by said spring, and co-operating members on said ejector and said lever including a rocking trigger and a sliding shoe
 45 co-operatively engaging with each other to effect engagement between said lever and said ejector in one direction of movement of the lever and to escape each other by rocking and sliding movements upon the reverse
 50 operation of said lever.

3. The combination with a stamping press or other machine adapted to operate the stock fed thereto by hand, of a reciprocating ejector arranged to eject the article acted
 55 upon by said machine, a spring tending to move said ejector in one direction, a lever and means for operating it automatically on said machine for moving said ejector in a reverse direction to said spring, and a pivotal trigger arranged on said ejector and a
 60 sliding shoe on said lever co-operating with said trigger to operate said ejector in one direction, said trigger and said shoe being
 65 adapted to escape in one direction by the

combined pivotal motion of said trigger, and the sliding motion of said shoe.

4. The combination with a stamping press or other machine adapted to operate on the stock fed thereto, of a reciprocating ejecting
 70 member arranged to eject the article acted upon by said machine, a lever and means for operating the same from a movable portion of said machine, a pivotal trigger on said ejector, a sliding shoe on said lever co-operating with said trigger to move said ejector in
 75 one direction, spring means tending to hold said trigger in the path of said shoe, said shoe having a curved surface with which said trigger cooperates to lift said shoe in one direction of movement whereby said shoe and
 80 said trigger escape in one direction by combined rocking and sliding movements of said trigger and said shoe.

5. The combination with a stamping press or other machine adapted to operate on stock fed thereto, a reciprocating ejector arranged to eject the article acted upon by said machine, a trigger pivoted on said ejector, a
 90 spring arranged to both retract said ejector and rock said trigger, a lever and means for operating it from a movable portion of said machine and a shoe slidable on said lever and co-operating with said trigger to move
 95 said ejector in one direction, said shoe being adapted to escape said trigger in one direction by the combined rocking movement of said trigger and the sliding movement of said shoe.

6. The combination with a stamping press or other machine adapted to operate on stock fed thereto, a reciprocating ejector arranged to eject the article acted upon by said machine, a trigger and means for pivoting the same in
 100 different positions on said ejector, a spring arranged to retract said ejector and to rock said trigger in one direction, a lever and means for operating the same from a movable portion of said machine, a shoe slidable along
 105 said lever and co-operating with said trigger to move said ejector in one direction and adapted to escape said trigger in another direction through the combined rocking movement of said trigger and the sliding movement of said shoe.
 110

7. The combination with a stamping press or a similar machine adapted to operate on stock fed thereto and having a reciprocating plunger for acting on the stock, a movable member arranged to eject the article acted
 120 upon by said machine, spring means tending to return said ejecting means, means operated automatically during the return movement of said plunger for gradually actuating said ejecting member to eject the stock and adapted to trip during the return upward movement of said plunger whereby said ejecting member will be rapidly retracted by said
 125 spring by the time the plunger completes its upward movement.
 130

8. The combination of a stamping press or similar machine adapted to operate on stock fed thereto and having a reciprocating plunger, an ejecting member for ejecting the stock from the machine on the completion of the downward stroke of the plunger, a spring for causing rapid retraction of said ejecting member, means actuated from the plunger for moving said ejecting means, said latter means and said ejector means having co-operating tripping members, said ejector operating means being adapted to be gradually operated during the downward movement of said plunger to cause said tripping members to escape each other and place the ejector operating member in operative position, said ejector operating member being operated during the upward movement of said plunger to cause a gradual movement of said ejector member in the direction necessary to eject the stock, said tripping members being adapted to automatically trip in time for said spring to retract the ejecting member by the time the plunger completes its upward, return movement.

Signed at the city, county, and State of New York the 11th day of April, 1929.

ISIDOR NEWMAN.