

July 25, 1944.

A. H. GROVER

2,354,291

PRESS

Filed Oct. 19, 1942

2 Sheets-Sheet 1

Fig. 1.

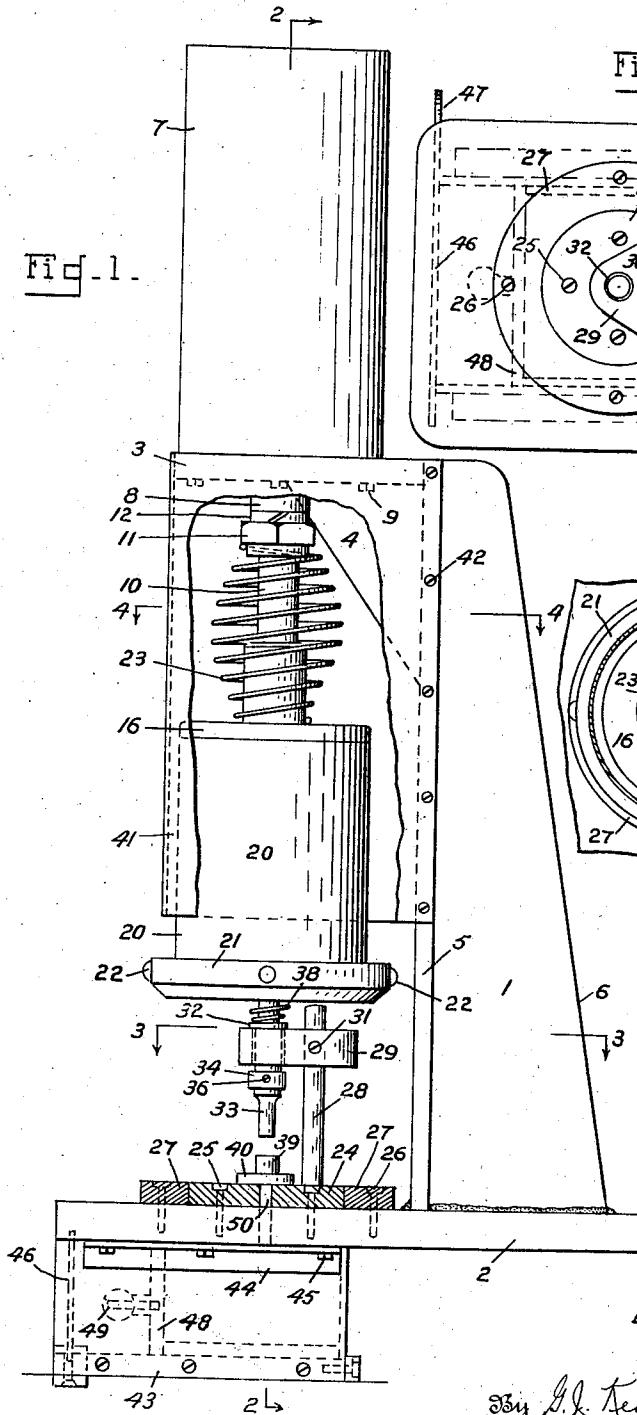


Fig. 3.

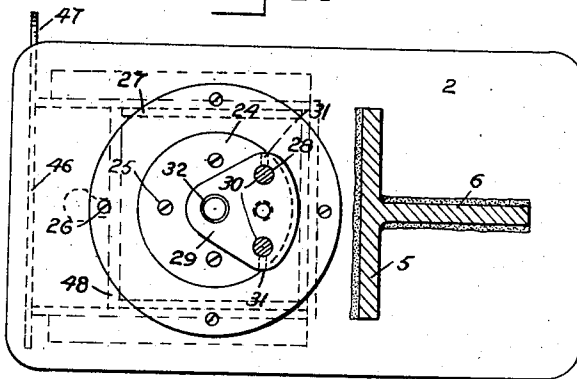
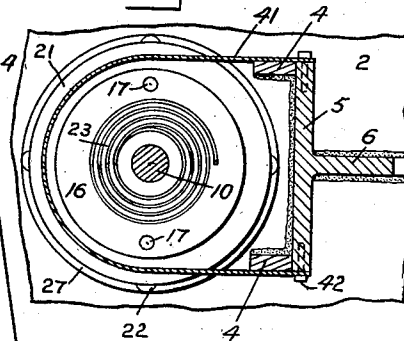


Fig. 4.



Inventor
Atwood H. Grover

By *G. J. Kessenich & W. E. Thibodeau*

Attorneys

July 25, 1944.

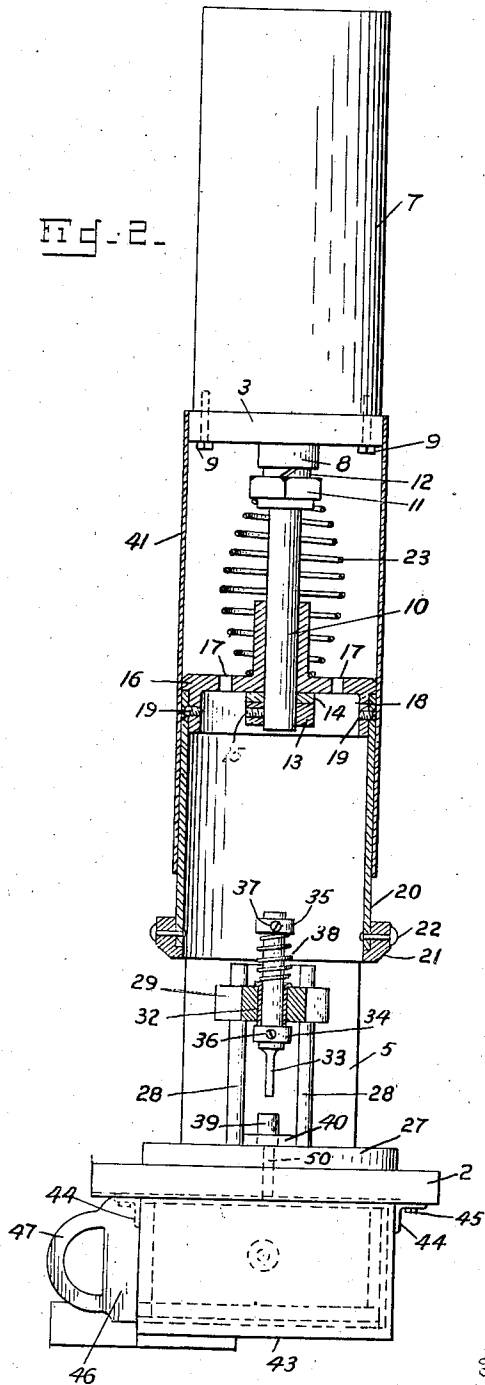
A. H. GROVER

2,354,291

PRESS

Filed Oct. 19, 1942

2 Sheets-Sheet 2



Inventor
Atwood H. Grover

By *J. J. Kessenich & W. E. Thibodeau*

Attorneys

UNITED STATES PATENT OFFICE

2,354,291

PRESS

Atwood H. Grover, Rockaway, N. J.

Application October 19, 1942, Serial No. 462,531

5 Claims. (Cl. 74—615)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

The present invention relates to presses particularly useful in the loading and processing of high explosive increments in ammunition parts.

A principal object of the present invention is to provide means to safeguard the operator of punch presses in loading and processing of high explosive parts used in ammunition and also to safeguard other personnel near or about said punch presses.

A further object of this invention is to provide, while accomplishing the above mentioned object, freedom of action for an operator in placing a loading fixture into an indexed point.

A still further object of the invention is to provide a barricade for a punch press which automatically comes into safeguarding position between the work and the operator or personnel before the work is acted upon and removed from safeguarding position only after the work has been operated upon.

Another object of the present invention is to provide a barricade for a subpress as a safeguarding means for personnel, which enables easy access to said subpress, which comes into safeguarding position before the work is operated on by said press, and which is removed from said safeguarding position only after the work is operated upon. In this manner full protection is obtained.

Other objects of the invention will be apparent from or particularly pointed out in the detailed description of an embodiment of the invention, which is hereinafter given.

Machines embodying the invention are especially useful for crimping and extracting detonators.

In the accompanying drawings which illustrate an embodiment of the invention, and in which the same reference numeral indicates the same part,

Figure 1 is a side elevation partly in section and a part broken away for purposes of clearer illustration.

Figure 2 is a section on the line 2—2 of Figure 1 in which certain parts are shown in elevation.

Figure 3 is a section on the line 3—3 of Figure 1, looking in the direction of the arrows.

Figure 4 is a section on the line 4—4 of Figure 1, looking in the direction of the arrows.

Referring to the drawings, the numeral 1 indicates a press frame having a base 2 and an

overhanging head 3 which is braced by two brackets 4 positioned in the angle between the overhanging head and the plane front surface of the vertical portion 5 of the frame. The vertical portion 5 of the frame is provided, at its rear, with a bracing member 6 which is attached at its base to base 2 of the frame.

On the upper surface of the overhanging head 3 is mounted an air cylinder 7 having a piston and piston rod which are reciprocated by air under pressure. Cylinders of this type are well known articles of commerce and their details of construction form no part of this invention. In the present invention this cylinder serves as a source of power for operating the vertically reciprocating ram hereinafter referred to more in detail. As will be understood, this cylinder may be replaced by any suitable power means for the said ram. The piston rod of the cylinder 7 is indicated by the numeral 8 in Figures 1 and 2. Screws 9 hold the cylinder 7 in position.

The ram 10 of the press forms an extension of the piston rod 8 of the air cylinder 7. The upper end of the ram is threaded and screws within the piston rod. The upper end of the ram carries a hexagon nut 11 and a lock washer 12, as shown in Figures 1 and 2. At the lower end of the ram 10 are positioned the collar 13 and the washer 14, the latter being advantageously of neoprene. The collar 13 is secured in the position shown by a set screw 15.

A circular head 16, having relief openings 17, is located on ram 10 with a sliding fit. A circular flange 18 depends from this circular head. Secured to this flange by means of screws 19, and depending therefrom, is piece of seamless steel tubing 20. This tubing alone or in connection with the circular head constitutes a barricade, the action of which is more fully explained hereinafter. At the lower end of the tubing 20, and fitting around and below the lower end of the same, is a rubber ring 21. The rubber ring is secured to the tubing by means of rivets 22. This rubber ring seals the bottom of the barricade when in lowered position. A coil spring 23, of the form illustrated, surrounds the ram 10 and is positioned between the head 16 and the nut 11, the latter also acting as a stop for the spring. This spring acts to resiliently hold the head 16 on the washer 14, which in connection with the collar 13 acts as a stop.

Vertically below the ram 10, the press base 2 supports circular die base plate 24 of steel. This plate is secured to base 2 by means of screws 25. On the base 2, and secured thereto by means

of screws 25, is a ring 27 which closely fits around circular plate 24. This ring is advantageously made of laminated phenolic condensation material. When the barricade 20 is lowered into safeguarding position, the rubber ring 20 seats on and presses against ring 27, whereby the bottom of the tube 20, or the barricade, becomes closed.

Two posts or pillars 28 are rigidly attached to plate 24 and rise vertically from it. A guide plate 29, provided with two holes 30, fits on the posts, so that it may be adjusted to various levels. Set screws 31 are provided to hold the guide plate at a selected level. This guide plate is provided with a bushing 32 within which slides the shank or plunger of punch 33 or other metal working tool. The bushing and guide plate serve as a guide for the tool 33 that is used. The shank of the tool fits in the bushing and extends above and below the guide plate and bushing. A collar 34 fits on the shank of the tool 33 below the guide plate 29 and another collar 35 fits on the shank above the guide plate. These collars are respectively held in position by set screws 36 and 37. A coil spring 38, of the form shown in the drawings, is placed on the shank of the tool 33 between the top of the guide plate 29 and the collar 35. The tool 33 may therefore be depressed against the action of the spring 38, and when the depressing force is removed, the spring causes the tool to rise again, the collar 34 limiting this upward motion. Plate 24 together with parts 28 to 38, inclusive constitute a type of subpress and are so referred to herein for purposes of general reference.

The tool 33 cooperates with a die 39 carried on base or shoe 40 on plate 24. These may be a crimping and extracting punch and base to suit job requirements.

A shield or guard 41 extends from the overhanging head 3 down to a point near the upper limit of travel of the barricade 20. This guard consists of a rectangular sheet of steel bent in the form of a U, and which is attached at its top to the rounded free end of the overhanging head 3. The longitudinal edges of the guard are attached, by means of screws 42, to the two edges of the vertical portion 5 of the press frame. Barricade 20 with its head 16 move freely within the guard 41.

Below the base 2 of the press frame 1 is secured a drawer housing 43, advantageously made of heavy metal. This housing is attached to the under side of the base 2 of the press frame by means of two angle irons 44, welded to the sides of the housing, and screws 45 which pass through the angle irons and engage the base 2. The drawer housing has a sliding door 46 at its front, and this door is formed with a handle 47. A drawer 48 with knob 49 is shown, in dotted lines in Figure 1, in the drawer housing 43. The drawer and its housing are so positioned as to permit the drawer to receive parts passing from the die through the passageway 50.

The barricade is preferably of sufficient size to provide space therein for a fixture, for example a loading fixture, so that the barricade may freely pass over and rise above the fixture.

The operation of the machine is as follows. The ram 10 descends and carries the barricade 20 downwardly with it until the rubber ring 21 at the bottom of the barricade comes into contact with and presses against the ring 27 on the base 2 of the press frame. Owing to the sliding relationship between the ram 10 and the head 16 on

the barricade, the ram 10 can continue its downward motion after the barricade 20 and ring 21 have seated on ring 27. During this further motion of the ram 10, the spring 23 is compressed and the bottom end of the ram comes into contact with the shank or plunger of the tool 33 in the subpress, whereby this tool is moved downwardly for operation on the work or metal in cooperation with a die. During this further motion of the ram 10, the collar 13 and washer 14 are carried downwardly away from the head 16 by the ram. When the ram 10 starts to ascend, the barricade 20 remains seated or in its down position, and is held there under the influence of the compression in the spring 23 until the collar 13 and its washer 14, in the upward travel of the ram 10, meet the under surface of the head 16 and carry it and the barricade upwardly with the ram. The barricade is timed, or so positioned with relation to the other parts of the machine that the barricade and its rubber ring 21 are seated on the ring 27 on the base 2, i. e., in safeguarding position between the operator or personnel and the work, before the press or subpress begins to operate on the work or metal to be operated upon, and the barricade remains in the safeguarding position during the time the work is being operated upon and starts its ascent or removal from the safeguarding position only after the work has been completely operated upon. In like manner, by proper timing or relative positioning of the parts, the barricade can be moved into the safeguarding position before the tool 33 enters a fixture used within the barricade and held in this position all the time the tool is in the fixture, and only elevated or removed from the safeguarding position after the tool 33, in its upward motion, clears or is removed from the fixture. In this latter instance, therefore, the tool or punch 33 has left the fixture before the barricade starts its upward travel from the fully closed condition, the said closed condition having been produced before the punch entered the fixture.

Rubber ring 21, besides sealing the bottom of the barricade when in lowered position, serves as an additional safety feature, in that if the operator of the machine fails to withdraw his fingers at the proper time, it will absorb any and all compression force that may result when the barricade descends.

I claim:

1. In a press, a ram, a work-tool actuated by the ram, a vertically movable barricade adapted to completely envelop the work and work-tool in one position of the barricade and interposed between the work to be operated upon by the press and an operator thereof, and serving as a safeguard, connections between the barricade and the ram for lowering said barricade to work and work-tool enveloping position before the work is operated upon and for removing the barricade from such position after the work has been operated upon.

2. In a press, a ram, a work-tool actuated by said ram, a barricade serving as a safeguard between the work to be operated upon and the operator, said barricade being carried by the ram and moving forwardly with the ram until it envelops the work and work-tool in safeguarding position, said barricade reaching its safeguarding position before the work is operated upon by the press, and means carried by the ram for removing the barricade from safeguarding position only after the work has been operated upon.

3. In a press, a vertically reciprocable ram, a work-tool actuated by said ram, a barricade carried by said ram and having a head and a portion extending downwardly therefrom constructed and arranged to envelop the work and the work-tool in one of the positions of the barricade, said ram and head being in sliding engagement and the lower part of said portion being above the work position when said ram is in raised position, a stop on the ram below said head, another stop on the ram above the head, the stops being spaced apart to permit said ram to move with respect to said head, a spring between the head and the stop above the head, a work supporting base below the downwardly extending portion of the barricade and supporting the work-tool and engaged by the lower end of the downwardly extending portion in its lowermost position, to envelop the work and work-tool.

4. In combination with a press having a vertically reciprocable ram, a subpress operated by

5 said ram, a barricade carried by said ram, for safeguarding personnel, operative connections between the press and the barricade for moving said barricade to subpress-enveloping and safeguarding position before said subpress operates upon the work and for removing the barricade from said position after the subpress has operated upon the work.

10 5. In a press, a ram, a work-tool actuated by said ram, a barricade serving as a safeguard between the work to be operated upon and the operator, said barricade being slidably carried on the ram and moving forwardly with the ram until it envelops the work and work-tool in safeguarding position, said barricade reaching its safeguarding position before the work is operated upon by the press, and means carried by the ram for removing the barricade from safeguarding position only after the work has been operated upon.

ATWOOD H. GROVER.