July 8, 1924. 1,500,960

E. C. REGAN

POWER PRESS GUARD

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Fig. 1.

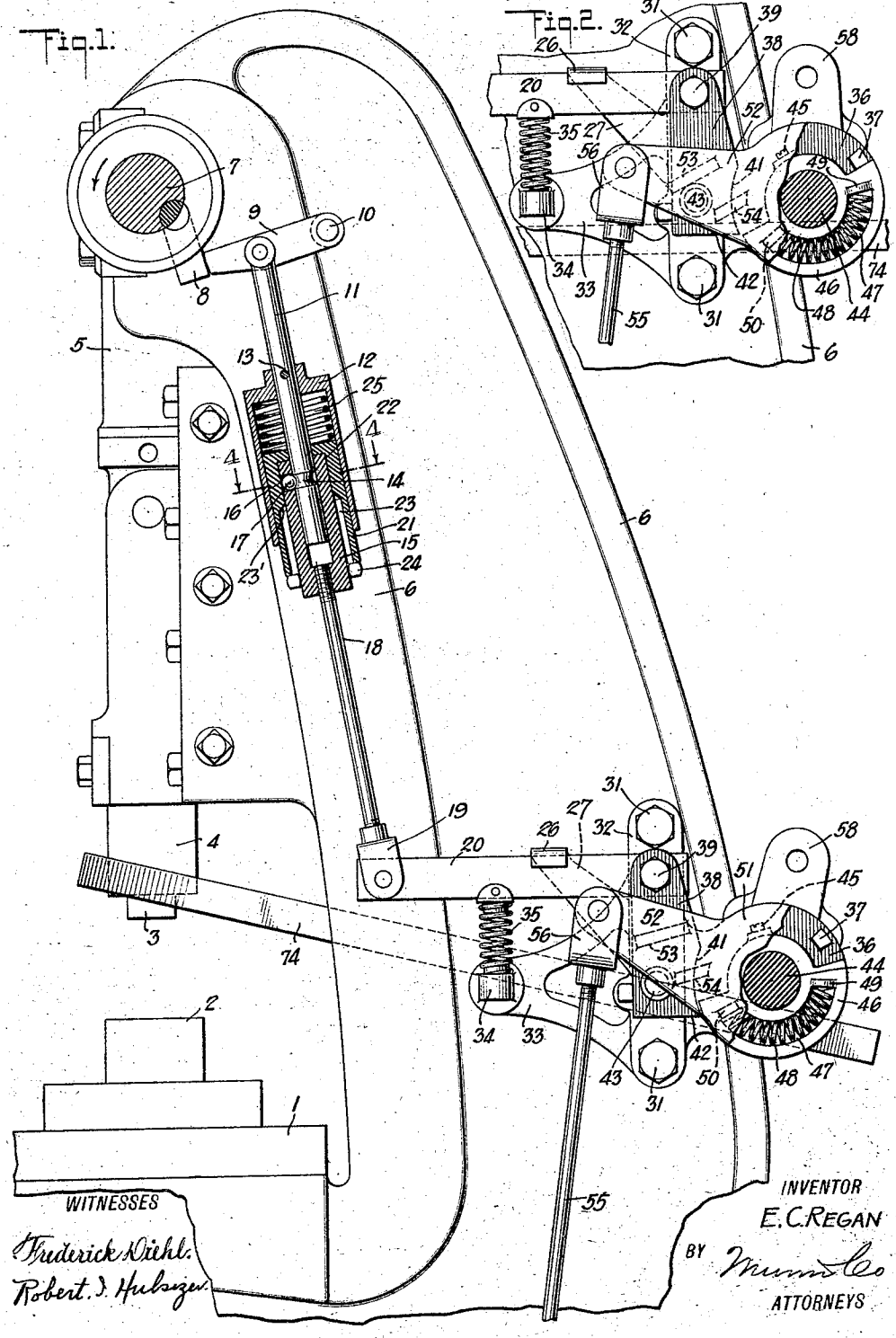


Fig. 2.

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Fig. 3.

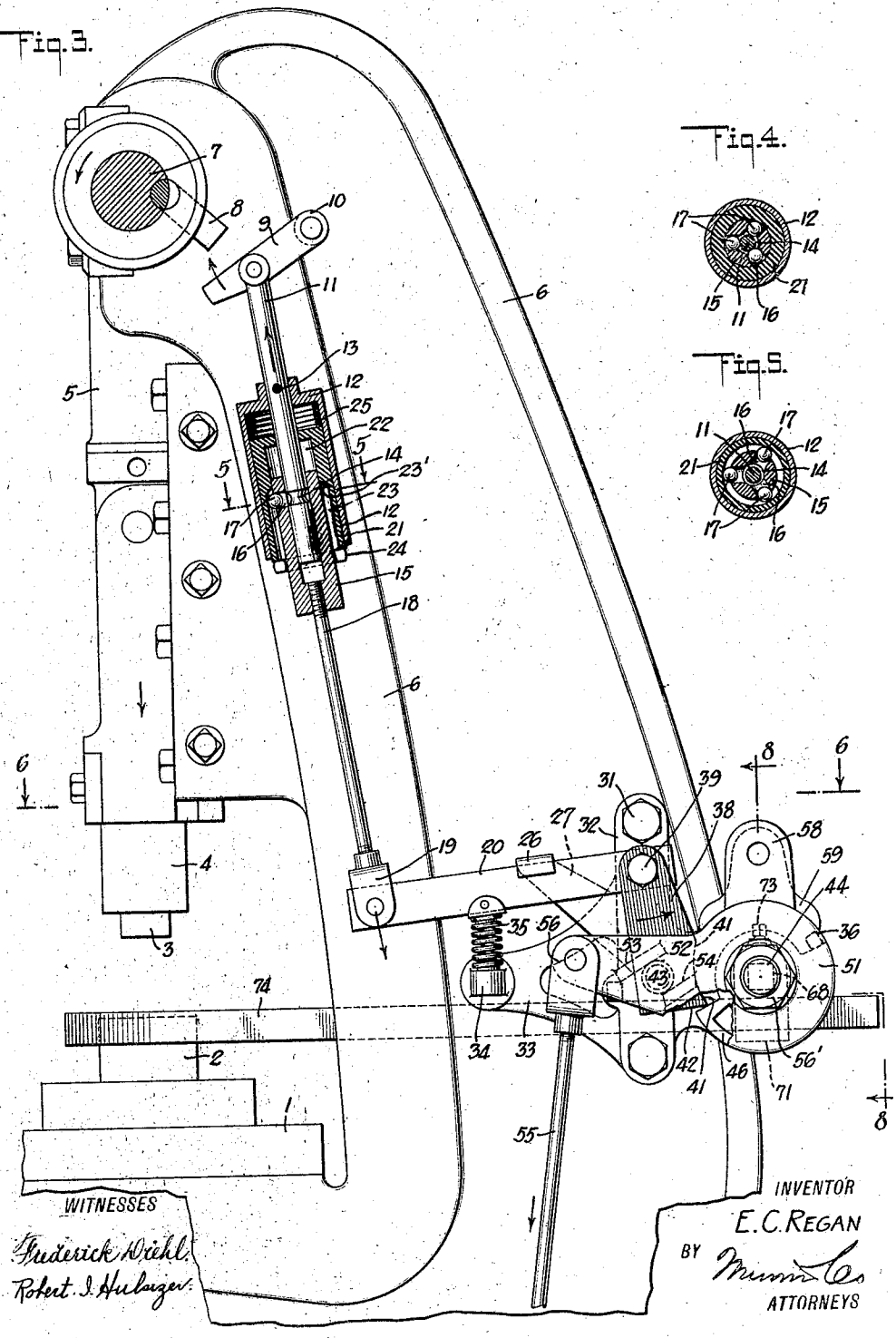


Fig. 4.

Fig. 5.

WITNESSES

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Fig.6.

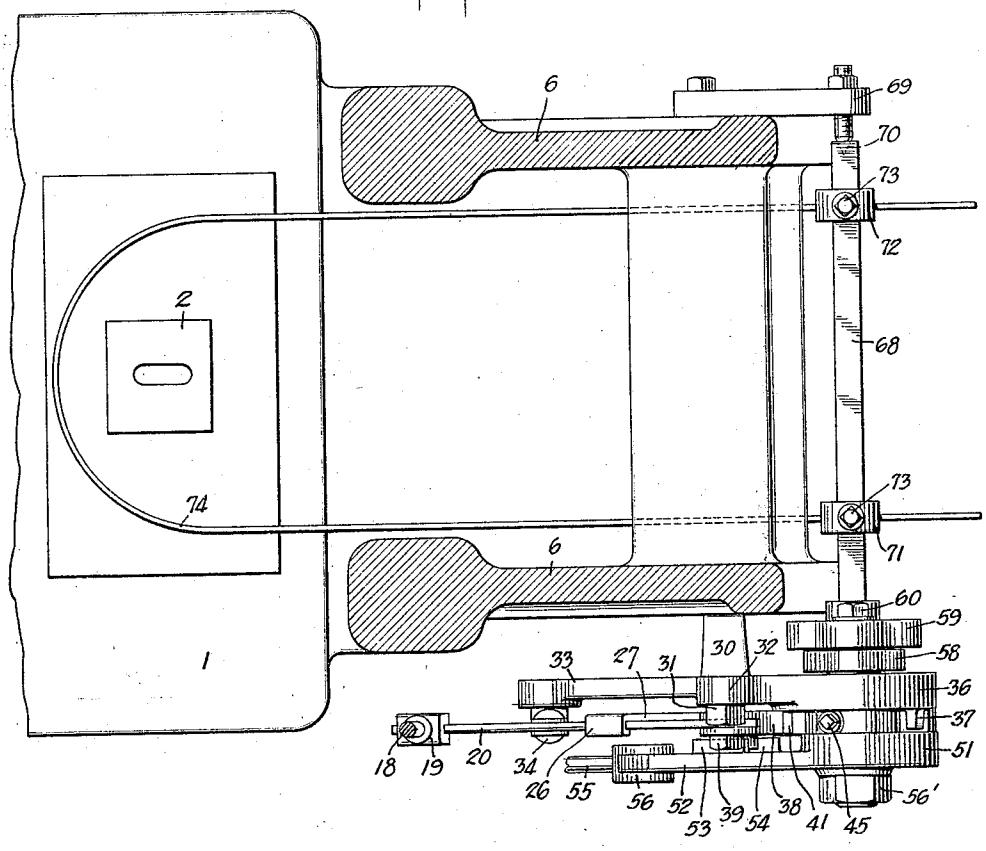
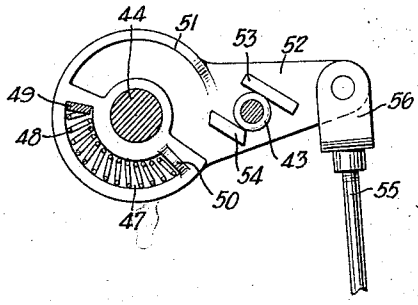


Fig.7.



WITNESSES

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Fig. 8.

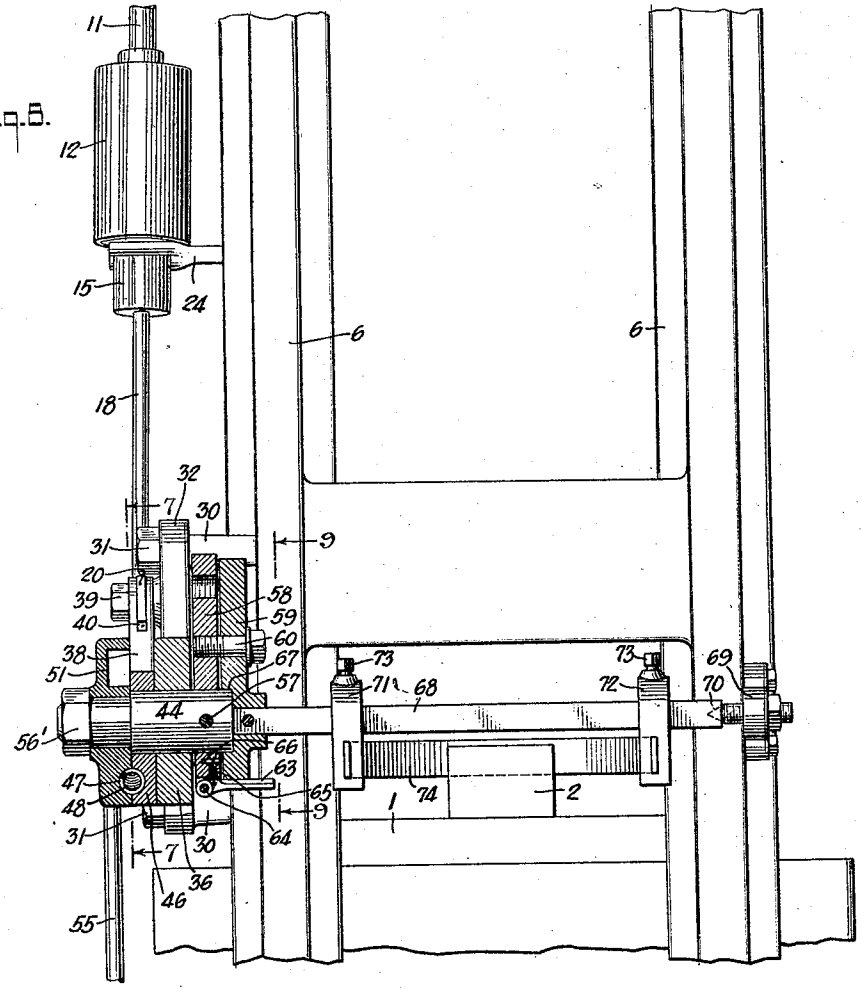
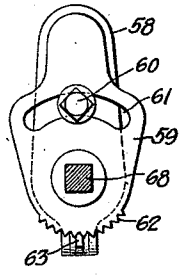


Fig. 9.



WITNESSES

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Patented July 8, 1924. 1,500,960

UNITED STATES PATENT OFFICE.

EDWARD C. REGAN, OF NEW HAVEN, CONNECTICUT.

POWER-PRESS GUARD.

Application filed November 11, 1920. Serial No. 423,406.

To all whom it may concern:

Be it known that I, EDWARD C. REGAN, a citizen of the United States, and a resident of New Haven, in the county of New Haven and State of Connecticut, have invented a new and Improved Power-Press Guard, of which the following is a full, clear, and exact description.

This invention relates to a power press guard and operating device therefor. It has for an object to provide a mechanism whereby a power press safety guard is moved into position and the power press shaft released by the simple unidirectional operation of a single element, such as an operating pedal.

Another object is to provide mechanism whereby the power shaft is released during the stroke of the operating pedal for only one revolution, regardless of how long the operating pedal may be held down.

A further object resides in the provision of mechanism whereby the power shaft is not released until after the guard ring is in its full operative position.

A still further object is to provide mechanism whereby the guard ring, when it has attained its operative position, is locked in this position before the mechanism is actuated to release the power press shaft.

Another object resides in the provision of a simple, compact mechanism which may be attached to any type of power press and connected for operation therewith with a minimum alteration in the structure of the elements of the power press, and which can be operated in a very simple and efficient manner by the actuation of one element on the part of the operator, all the other actions being automatic.

A further object resides in the provision of the particular construction and arrangement of the parts hereinafter described and claimed and shown in the accompanying drawings.

In general my invention comprises a single operator's pedal which is depressed by the operator and during the early operation of its stroke operates suitable mechanism to move the guard ring into its guarding position. When this position is reached, automatic mechanism is brought into play to lock the ring in this position. Further movement of the pedal beyond this point results in the actuation of additional mechanism whereby the power press shaft is released for action. This releasing mechanism is so constructed that after it has passed through a certain operation of its cycle of operation it automatically returns to normal latching position in time to stop the shaft before it has made more than one revolution.

Further features of my invention reside in the provision of the above-mentioned mechanisms, which are of such simple structure and so compactly arranged with respect to each other that they can be readily mounted on any type of press without any material alteration therein.

It will be apparent from a consideration of the following description, when taken in connection with the drawings, that many modifications can be made in the detail structure of the apparatus without departing in any sense from the spirit of the invention.

The invention is illustrated in the drawings, of which—

Figure 1 is a partial side elevation of the power press, showing certain parts of the apparatus in which my invention is embodied in section;

Figure 2 is a detail elevation of the part of the operating apparatus relating to the means for moving the guard ring into position to lock it;

Figure 3 is a view similar to Figure 1, showing the parts in the position attained when the power shaft has been released and the latching mechanism is about to return to normal position;

Figure 4 is a section taken on the line 4—4 of Figure 1;

Figure 5 is a section taken on the line 5—5 of Figure 3;

Figure 6 is a section taken on the line 6—6 of Figure 3;

Figure 7 is a detail view showing the operating cover plate with its co-operating parts;

Figure 8 is a section taken on the line 8—8 of Figure 3 showing the section through the mechanism particularly adapted to operate the guard ring shaft; and

Figure 9 is a detail section taken on the line 9—9 of Figure 8.

As shown in the drawings, the invention is applicable to any type of press, preferably a power press having a bed plate 1 on which is suitably disposed a lower die 2 with which an upper die 3 is adapted to cooperate. This upper die is mounted on a reciprocating head portion 4 suitably sup-

ported in the upper part of the frame 5. The upper head of the frame 5 is supported on a plurality of vertical standards 6 and suitably connected to the pedestal (not shown) on which the bedplate 1 is mounted.

In the head frame 5 a power shaft 7 is disposed in any suitable and well-known manner. The shaft is provided with a pin 8 adapted to co-operate with a latch lever 9 pivoted as shown at 10. This latch and pin co-operate in a well-known manner to prevent the movement of the reciprocating head 4 until the pin 8 is released by the removal of the latch 9 from engagement therewith. The latch 9 is operated by reason of its connection with the latch rod 11 which, in the manner hereinafter described, is operated through the depression of a pedal (not shown) by the operator.

Intermediate the length of the latch rod 11, a sleeve 12 is connected thereto by a pin 13. This sleeve is hollow within and open at one end. Along a portion of the latch rod 11, disposed within the sleeve 12, is a peripheral groove 14. The lower end of the latch rod 11 is adapted to extend into a suitable bore in a hollow plug portion 15. This plug portion 15 is provided intermediate its length with a plurality of grooves 16 disposed around the periphery and extending from the outer surface to the inner bores thereof. In these grooves a plurality of balls 17 are adapted to be disposed. A rod 18 is suitably threaded into the lower end of the plug portion 15 and connected at its other end to a yoke portion 19, whereby it is associated with a lever 20, the operation and connection of which with the rest of the apparatus is hereinafter to be described.

Disposed within the hollow portion of the sleeve 12 and around one portion of the plug 15 is an inner sleeve 21 having a reduced bore portion 22, an enlarged bore portion 23 and a beveled surface connecting these two bore portions, designated by the numeral 23'. The lower open end of the inner sleeve 21 is disposed to abut a fixed stop 24 which can be fastened in any suitable manner to one of the vertical standards 6 of the frame of the machine. A spring 25 is disposed within the sleeve 12 between the inner face thereof and the upper outer face of the inner sleeve 21. A strap is disposed in connection with the lever 20 intermediate its length and connects thereto by a hooked portion 26 integrally attached to the body portion 27 of the strap. This strap is connected to the locking plate 38, the operation and construction of which will be hereinafter described.

Attached to the rear of the pedestal 6, about on a level with the die 2, are a pair of brackets 30 to which, by means of bolts 31, a fixed stationary plate 32 is fastened. This plate 32 is provided at one end with an extension portion 33 on which a lug 34 is mounted. A spring 35 is disposed between this lug 34 and the under face of the lever 20, tending normally to force the lever upwardly. The plate 32 is provided at its opposite end portion with an extension 36 provided with a stop lug 37 thereon.

A locking plate 38 is pivoted on a stub shaft 39 connected to the fixed plate 32. The upper end of this locking plate is provided with a slot 40 into which and around the stub shaft 39 one end of the lever 20 extends. The lower operating surface of the locking plate 38 is provided with a curved portion 41 and a forward lower point portion 42. A cam engaging roller 43 is disposed on the lower end of the locking plate 38 on one side thereof.

A shaft 44 is suitably journaled in the fixed plate 32, and by means of a set screw 45 an operating plate 46 is rigidly fixed on the shaft 44. This operating plate is in the form of a sector having a curved groove 47 therein. Partly within this groove a spring 48 is disposed and extends between an outwardly projecting lug 49 on the operating plate 46 and an inwardly projecting lug 50 disposed on the inner face of a cover plate 51 adapted to be rotatably mounted on the shaft 44 adjacent and covering the operating plate 46 and the fixed plate 32. This cover plate is provided on its inner surface with half of the groove 47 in which the spring 48 is disposed, as shown in Figure 8. This cover plate 51 has a laterally extending arm portion 52 on the inner face of which cams 53 and 54 are disposed and adapted to co-operate with the cam roller 43 above mentioned when suitably actuated. An actuating rod 55 is connected to the outer end of the extension 52 by means of a yoke member 56. This actuating rod may be connected at its lower end to any suitable operating means, such as a pedal (not shown).

On the rear portion of shaft 44, back of the fixed plate 32 and fastened thereto by means of a pin 57, is a plate 58 of the form shown in Figure 9. This plate is disposed adjacent another similarly shaped plate 59 and adjustably connected thereto by means of a bolt 60 extending through a slot 61 in the plate 59 and threaded into the plate 58. The lower end of the plate 59 is provided with a plurality of ratchet teeth 62 adapted to be engaged in an adjustable manner by a pawl 63 suitably pivoted as at 64 on the lower end of the plate 58. The pawl 63 is held in an operative position by means of a spring 65, the other end of which is attached to a pin 66 on the plate 58. The inner face of the plate 59 adjacent the plate 58 is provided with a recess 67, in the form of a bearing portion, on which the plate 59 is adapted to rotate around the shaft 44. Rigidly

pinned to the plate 59 is a shaft 68. The other end of this shaft is connected to a fixed plate 69, attached to the side of one of the vertical standards 6, by a pivot pin 70. Along the length of this shaft 68 a plurality of guard yokes 71 and 72 are adjustably mounted by means of set screws 73. These lugs are adapted to receive a guard ring 74 which is adapted to extend forwardly through the frame and when in operative position to surround the lower die 2 to protect the hands of the operator from the upper die 3.

To operate this machine, the operator presses on the foot pedal or other device (not shown). This pressure actuates the rod 55 connected to the extension 52 of the cover plate 51. This starts to rotate the cover plate 51 around the shaft 44 on which it is loosely mounted. As soon as the cover plate starts to rotate, the inwardly projecting lug 50 thereon presses against the spring 48 in the groove 47 and thus resiliently presses against the outwardly projecting lug 49 on the operating plate 46. This plate 46 being keyed to the shaft 44, the plate and shaft commence to rotate. As seen in Figure 8 particularly, the rotation of shaft 44 will carry the plate 58 around, and by reason of the connection through bolt 60 with the plate 59 as well as the connection between these plates through the latch 63 and the ratchet teeth 62, the plate 59 will also move with the plate 58. Since the shaft 68 is keyed to the plate 59, the shaft will rotate around its end and carry with it the members 71 and 72 which support the guard ring 74. This causes the guard ring 74 to be moved down into place, as shown in Figure 3, around the lower die block 2. It will be noticed that this action is the first action taking place at the beginning of the movement of the operating pedal.

As soon as the operating plate 46 has moved far enough to contact with the lug 37 on the extension 36 of the fixed plate 32, the movement of the operating plate 46 is stopped, thereby stopping the movement of the other parts, including the guard ring 74. By adjusting the relative angular position of the plate 59 with respect to the plate 58 by means of the bolt 60 and the latch 63, the ultimate position of the guard ring can be varied.

Further movement of the rod 55 under the action of the pedal will compress the spring 48 within the groove 47. At this point in the period of the stroke of the rod 55, which is shown in Figure 2, the cam 53 on the inside of the cover plate 51 is about to contact with the cam roller 43 on the locking plate 38. Further movement of this cover plate causes the cam lug 53 to press against the roller 43 and move the locking plate 38 around its pivot pin 39 into the position shown in Figure 3, where the lower forward end 42 of the locking plate has moved in back of the rear edge of the operating plate 46 and holds the same in this position until the locking plate 38 is removed.

As soon as the engagement of cam 53 with the cam roller 43 has started the movement of the locking plate 38, the strap 27, which is rigidly connected to the locking plate 38, has caused the depression of the lever 20 against the action of spring 35. This causes the depression of rod 18. The initial position of rod 18 is shown in Figure 1. It will be noticed that when this rod commences to be depressed, the plug 15 is pulled downwardly and carries with it the latch rod 11 by reason of the locking engagement between the ball 17 and the groove 14 in the rod 11. It will be noticed that the inner sleeve 21 does not move, since it is firmly positioned against the stop 24. As soon as the rod 18 is moved down to the position shown in Figure 3, the balls 17 encounter the edges of the larger bore 23 in the sleeve 21 and are allowed to move outwardly and away from the groove 14. This release of the groove 14 on the part of the ball 17 permits the latch rod 11 to move upwardly. This upward movement is caused by the action of spring 25 pressing against the end face of the sleeve 12 which is pinned to the latch rod 11. This spring is backed by the upper face of the sleeve 21 which is solidly positioned against the stop 24. The movement downward of the rod 18 and the latch rod 11 has withdrawn the latch 9 from the pin 8 on the shaft 7 to permit a movement of shaft 7 whereby the upper die 3 may be moved down against the lower die 2. However, the parts are so designed that the latch rod 11 is released in the manner above described to restore the latch 9 to normal position before the pin 8 has made a complete revolution with the shaft 7, so that the shaft 7 cannot make more than one revolution without a separate and distinct operation of the pedal on the part of the operator. As soon as the operator removes his foot from the pedal, the spring 35 forces the lever 20 upward and with it the rod 18 and the plug 15. As the plug 15 moves upward, the balls 17 encounter the beveled edge 23′ on the inner face of the sleeve 21, whereby they are forced into the groove 16 and in engagement with the groove 14. A further upward movement restores them to the position shown in Figure 1.

It will be observed, therefore, that I have provided a simple, compact apparatus which can be attached to any type of press and which operates substantially automatically as a result of the action by the operator on a single element, which has a unidirectional movement, to accomplish all the functions of the apparatus. It will be observed that

the initial stroke of the pedal will move the guard ring to its ultimate position and lock it in this position, after which the shaft is automatically released and the latching means automatically returned to normal position before the complete stroke of the pedal has been accomplished, whereby the shaft cannot make more than one revolution. The pedal may be maintained in a downward position indefinitely without causing the shaft to make more than one revolution. A spring may be placed underneath the pedal, although this is not shown, to restore it to normal, although the action of spring 48 would tend to function in this manner. As the rod 55 is released, the cam lug 54 engages the lower surface of the roller 43 to move the locking plate 38 back into its normal position, shown in Figure 1.

It will also be apparent that minor modifications can be made in this apparatus to suit the convenience of application to any particular machine without departing from the spirit of the invention.

What I claim is:

1. A guard mechanism for power presses, comprising a guard ring, means for actuating said guard ring, resilient connections between the actuating means and the guard ring, means for locking the actuating means at a predetermined point in its movement, and power-releasing means operative during the movement of the locking means.

2. A power press guard mechanism comprising a guard ring shaft, means for actuating said shaft to move the guard ring to an operative position, means actuated at a predetermined point in the movement of the actuating means to lock the guard ring shaft in its operative position, means connected with said locking device to release the power shaft of the press, and means automatically to restore the power releasing means to normal at a predetermined point in the stroke of the power-releasing means.

3. A power press guard and actuating mechanism comprising a guard ring shaft, an operating plate rigidly connected to said shaft, a cover plate adapted to actuate said operating plate, a resilient connection between the cover plate and the operating plate, a stationary plate forming a bearing for said shaft, a stop lug on said stationary plate adapted to contact with one edge of the operating plate to limit its movement, means for actuating said cover plate, cams on one face of said cover plate, a locking plate, a cam roller on said locking plate adapted to be actuated by engagement with the cams on the cover plate to move the locking plate into position to lock the operating plate, a power shaft, a latch adapted to hold the power shaft in normal position, connections between said latch and said locking plate whereby the latch is removed when the locking plate is actuated, and means for automatically restoring the latch to normal position at a predetermined point in the movement of said connections.

4. A power press guard and actuating mechanism comprising a guard ring shaft, an operating plate connected thereto, an actuating member adapted to co-operate with said plate and move the shaft, a resilient connection between the operating plate and the actuating member, stationary means for limiting the movement of the operating plate, and means for locking the operating plate in an ultimate position upon further movement of the actuating member.

5. A power press guard ring and actuating mechanism comprising a guard ring shaft, an operating plate connected thereto, stationary means on the frame of the press to limit the movement of the operating plate, a power shaft, a latching mechanism to retain the power shaft in a normal position, and a single means for actuating the operating plate during the first portion of its stroke for locking the operating plate during a later portion of its stroke and for releasing the latch from the power shaft after the operating plate has been locked.

6. A power press guard ring and actuating mechanism comprising a guard ring shaft, an operating plate connected thereto, stationary means on the frame of the press to limit the movement of the operating plate, a power shaft, a latching mechanism to retain the power shaft in a normal position, a single means for actuating the operating plate during the first portion of its stroke for locking the operating plate during a later portion of its stroke and for releasing the latch from the power shaft after the operating plate has been locked, and means automatically to restore the latch mechanism to normal position independent of further movement of the single actuating means.

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