June 14, 1932. F. D. FOWLER 1,863,199

PRESS

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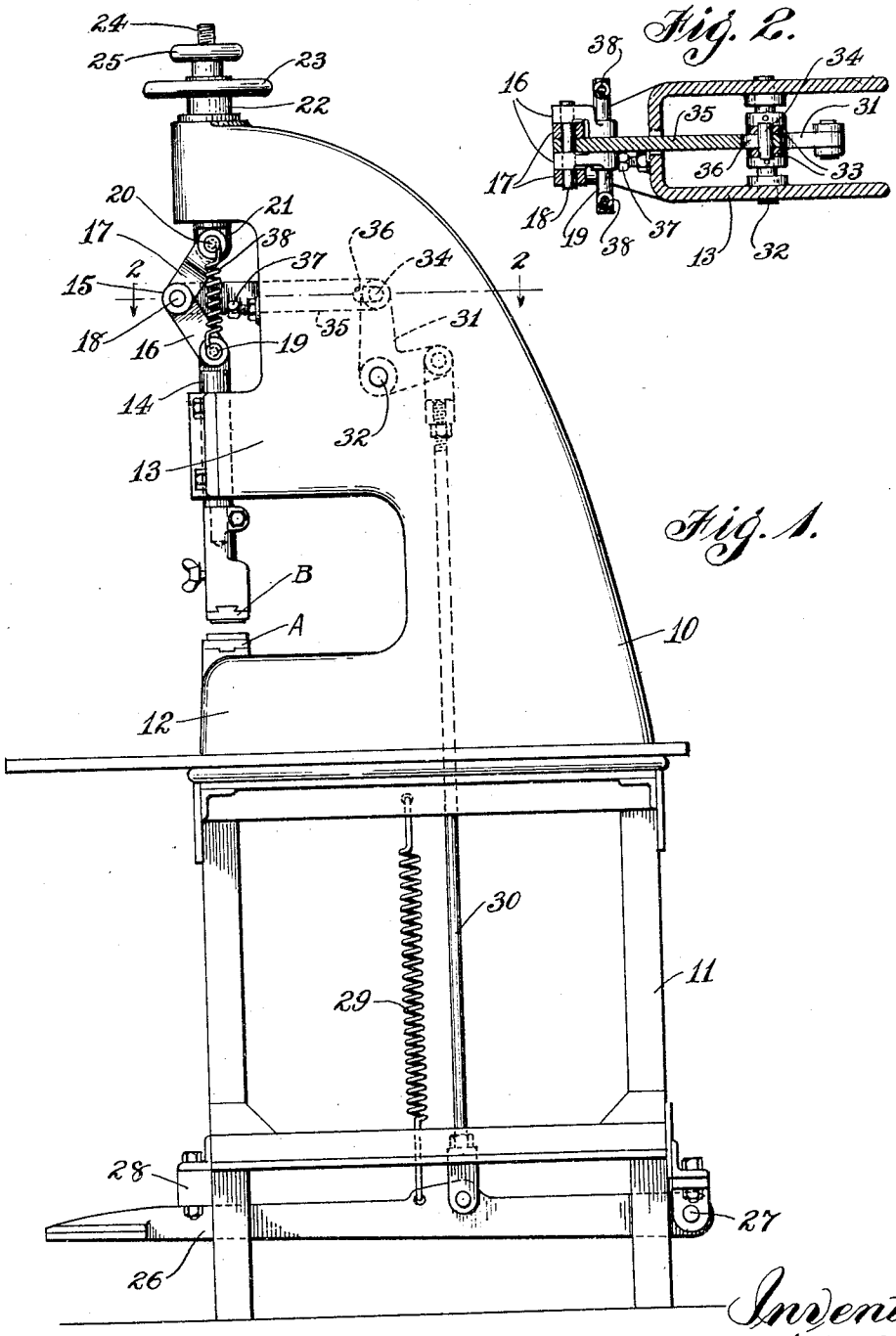


Fig. 1.

Fig. 2.

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PRESS

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This invention relates to presses, more particularly presses used in the embossing of rubber, and has for its special object the provision of improved means for operating the embossing dies of such presses to produce uniformly high quality embossing.

A further object resides in providing the improved die operating means in a press of light and simple construction, which may be operated manually, but without requiring a high degree of skill for successful operation, and which avoids the necessity for more cumbersome, spacious and costly power apparatus.

In the embossing of rubber articles, such for example as ankle patches for tennis shoes, and outsole medallions for rubber soled shoes, where the rubber is placed betwen embossing die members which are brought into pressing relation with the work to effect the embossing, it has been found that a more uniformly high quality product is obtained when the die is permitted to pause or "dwell" in the embossing position in intimate contact with the rubber for a short interval of time before separating the rubber therefrom. Apparently, such delay of the die in the embossing position permits the somewhat sluggish rubber to flow into all portions of the die crevices, some of which, due to their deep and complex character, require an increased interval of time for the rubber to be pressed into a settled position in all portions thereof.

The present invention contemplates the provision of apparatus for delaying or causing the die members to "dwell" in the embossing position without dependence upon the will of the operator for effecting this delay in the embossing operation.

These and further objects will appear from a reading of the following specification, of which the accompanying drawing forms a part.

In the drawing:

Fig. 1 is a view in side elevation of a press embodying the present invention.

Fig. 2 is view in section, taken along the line 2—2 of Fig. 1.

The invention is illustrated as embodied in a treadle operated toggle press. The press, designated generally by the numeral 10, is supported by a base 11, and comprises a bed 12 and a head 13 in which head is mounted a die-holding ram 14 for vertically reciprocable movement. Die members A and B, mounted on the bed 12 and ram 14 respectively, cooperate to effect embossing of material placed between these die members on operation of the press as will be explained more fully hereinafter.

Movement of the ram 14 is effected through a toggle linkage indicated generally at 15, accommodated within a recess in the head 13, as shown, and comprising links 16 and 17 connected together by a transverse pivot pin 18. Link 16 at its lower end is connected to ram 14 by means of a pivot pin 19 and link 17 at its upper end is connected by means of a pivot pin 20 to a member 21 which is normally in fixed position relative to the head 13, but is preferably adjustable vertically, to vary the extent of downward movement of the ram 14, by any suitable means such as a sleeve 22 rotatable in the head 13 but restrained against vertical movement relative to the head and having a threaded engagement with a shaft portion 24 of the member 21. For rotating the sleeve 22 to make an adjustment a hand wheel 23, integral with the sleeve may be provided, and locking of the hand wheel 23 and sleeve 22 in adjusted position relative to the shaft 24 and press head may be effected by means of a lock nut 25.

Each of the links 16 and 17 is preferably bifurcated at both of its ends in order that the pivot pins 18, 19 and 20 may be engaged by the links at spaced points for lateral stability of the linkage. The mounting of the bifurcated portions of the links 16 and 17 on pin 18 is shown in Fig. 2, from an examination of which the mounting of links 16 and 17 on pins 19 and 20 respectively will be understood.

For operating the toggle linkage 15 to effect vertical movement of the ram 14 a system of levers is provided, the system of levers being connected to a foot treadle 26 which is pivoted at 27 to the base 11 and is normally urged to its upward position against a stop

28 by a tension spring 29 interposed between the treadle and a fixed part of the press. A vertically disposed rod 30 is pivoted at its lower end to the treadle and at its upper end to one arm of a bell crank lever 31 which is pivotally mounted at 32 in the frame of the press. The frame of the press is preferably hollow, being shown to be substantially U-shaped in cross section in Fig. 2, in order to accommodate the bell crank lever 31 and other parts of the operating mechanism. The second arm of the bell crank lever is bifurcated, as shown at 33 in Fig. 2 and in this bifurcated portion is mounted a transverse pin 34. A link 35, connecting the bell crank lever 31 with the toggle linkage 15, is formed adjacent one of its ends with an elongated slot 36 in which rides the pin 34 of the bell crank, the other end of the link 35 being apertured to accommodate pin 18 of the toggle linkage.

The toggle linkage 15 is provided with a pair of tension springs 38 connecting the outer ends of pins 19 and 20 and tending to fold the toggle to the position of Fig. 1, further folding of the toggle being prevented by the operating links and levers which are held against further backward movement by engagement of the treadle 26 with the stop 28. The toggle linkage 15 is adapted to be straightened from the position of Fig. 1 to a position where the pins 18, 19 and 20 are in substantial vertical alignment, thus effecting a dead center position of the links, whereby the ram 14 will be temporarily locked in its lowermost position. An adjustable stop 37 is positioned in the path of link 16 of the toggle to prevent movement of the linkage past the dead center position to any undesirable extent.

In operation, assuming the parts to be in the position of Fig. 1, depression of the treadle 29 will cause downward movement of rod 30, clockwise rotation of bell crank 31 and approximately horizontal movement of the link 35 to the right. This will cause the central pin 18 of the toggle to be drawn to the right, effecting a straightening of the toggle linkage to its dead center position whereby the ram 14 will be locked in its lowermost position for embossing of work placed between the die members.

On release of the treadle 26, permitting it to rise under the influence of spring 29, to its normal position against stop 28, the rod 30 will be caused to rise and the bell crank lever 31 to turn counterclockwise. Breaking of the dead center lock of the toggle with folding of the toggle to the position of Fig. 1, and consequent rise of the ram 14 and separation of the die member B from the work will occur, but not before the pin 34 of the bell crank lever has first traversed the length of elongated slot 36, causing a delay or "dwell" of the die in the embossing position. On engagement of pin 34 with the left hand end of slot 36, link 35 will be moved to the left to move pin 18 out of its dead center alignment with pins 19 and 20, and assisted by the force of springs 38, the toggle linkage will be folded and the ram 14 raised to the position of Fig. 1. After removing work which has just been embossed, new work may now be placed beteween the die members, and the press is then ready for another similar operation.

By the mechanism above described it will be seen that, regardless of how short a period of time the operator holds down the foot treadle, the die carried by the ram will be held in embossing engagement with the work for at least as long as it takes for the pin 34 to traverse the elongated slot 36, which interval of time has a determinate minimum duration and that during this space of time the die is exerting a constant and maximum pressure on the work, all of which conditions contribute to the production of uniformly high quality embossing, especially where the material worked upon is of rubber composition.

What I claim is:

1. In a press, in combination, a ram, operating means, mechanism for moving said ram to and from a work-engaging position, means included in said mechanism under control of said operating means for retaining the ram in said position and for releasing the same, and means for delaying the releasing action of said ram retaining means after release by said operating means for a time interval having a determinate minimum duration.

2. In a press, in combination, a ram, manually operable mechanism for moving the ram to and from a work-engaging position, means included in said mechanism for retaining the ram in said position, and means operable independently of the will of the operator for delaying the releasing action of said first mentioned means after manual releasing operation of said mechanism for a time interval having a determinate minimum duration.

3. In a press, in combination, a ram, mechanism including a toggle linkage for moving said ram to and from a work-engaging position the links of said toggle being placed in dead center relation when the ram is moved to said position, and a delay action linkage included in said mechanism for moving the links of the toggle to release them from their dead center relation.

4. In a press, in combination, a ram, a treadle, mechanism interposed between said ram and said treadle for moving said ram to a work-engaging position on depression of the treadle and for returning the ram on release of the treadle, and means included in said mechanism for causing a delay of the

ram in said work-engaging position when said treadle is released.

5. In a press, in combination, a ram, a treadle, mechanism interposed between said ram and said treadle for moving said ram to a work-engaging position on depression of the treadle and for returning the ram on release of the treadle, a toggle linkage included in said mechanism adapted to be set in dead center to retain the ram in said work-engaging position on depression of the treadle and to be released from dead center to permit return of the ram after release of the treadle, and means for causing a delay in the release of said toggle from dead center when the treadle is released.

In witness whereof I have hereunto set my hand this 27th day of August, 1930.

FRED D. FOWLER.