July 24, 1923. 1,462,559

E. LESCHHORN

PAPER PUNCHING PRESS

Filed May 5, 1921 3 Sheets-Sheet 1

Fig. 1

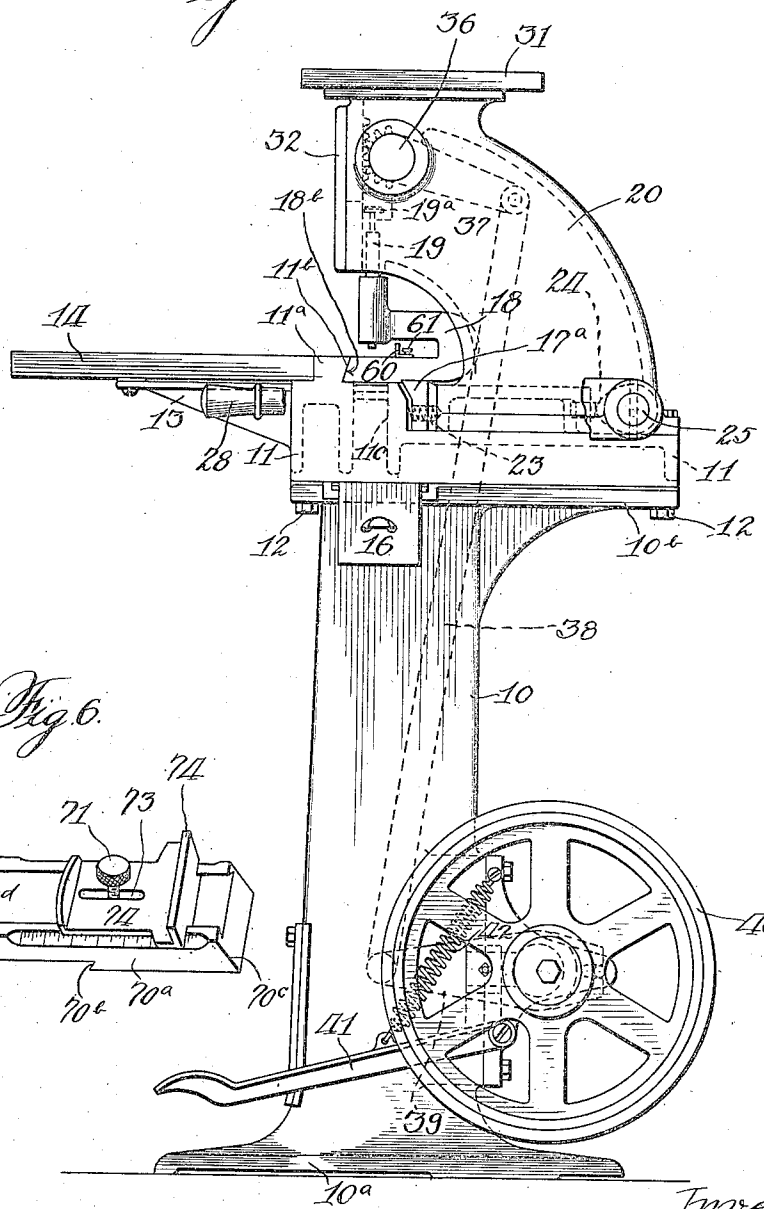


Fig. 6.

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By Arthur E. Sprinkle
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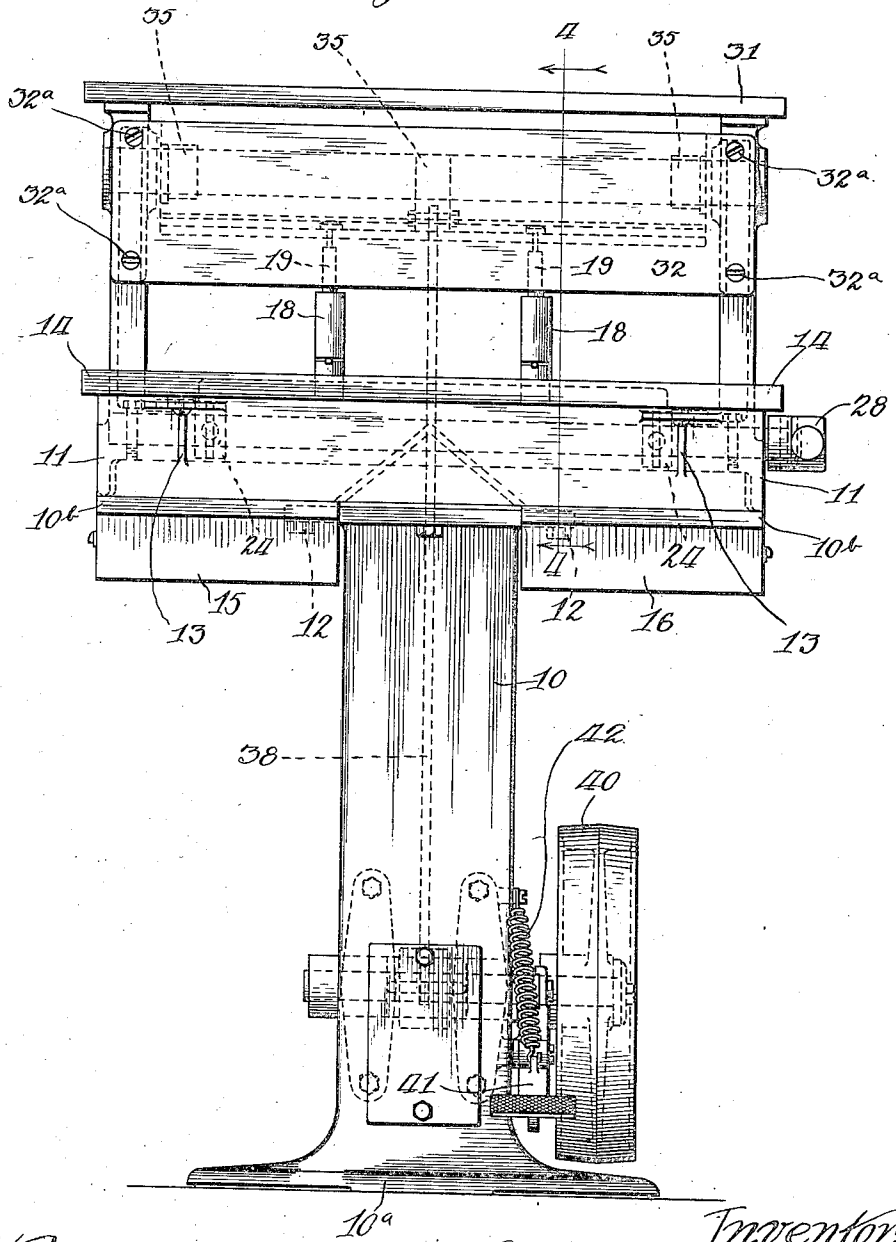
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Fig. 2.



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1,462,559

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PAPER PUNCHING PRESS

Filed May 5, 1921

3 Sheets-Sheet 3

Fig 3.

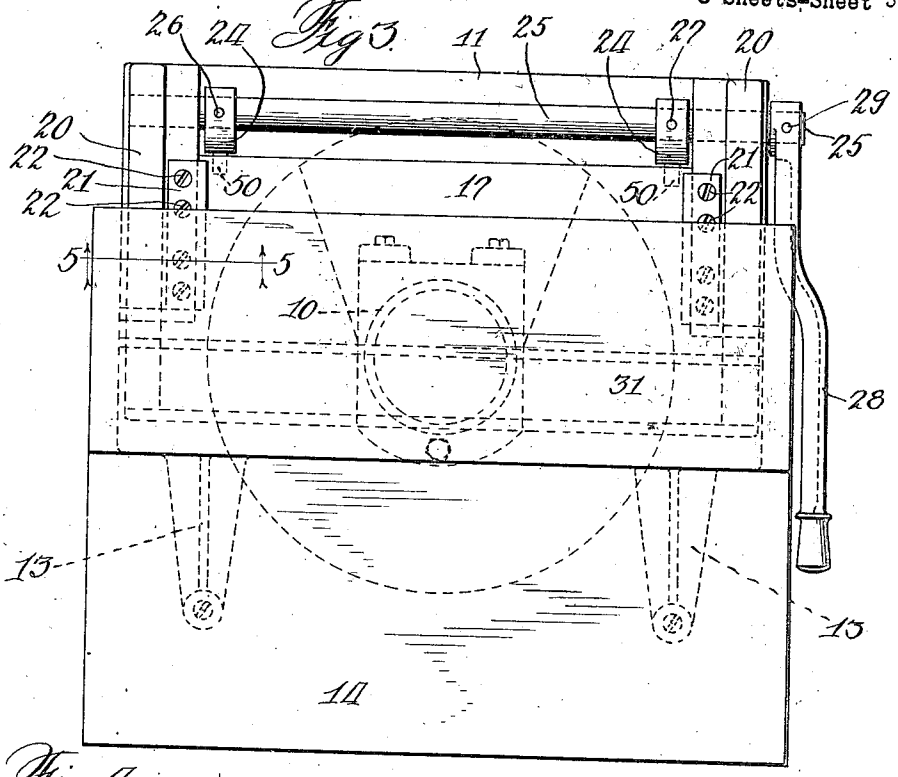


Fig 4.

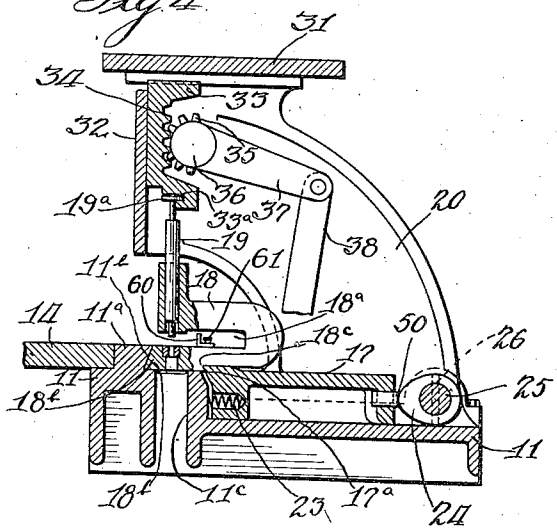
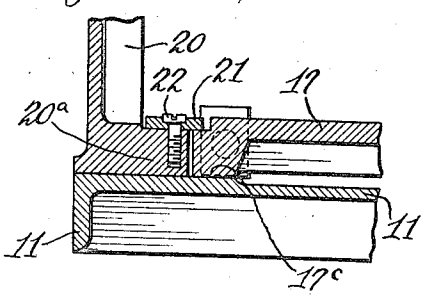


Fig 5.



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UNITED STATES PATENT OFFICE.

ERNEST LESCHHORN, OF CHICAGO, ILLINOIS, ASSIGNOR TO LATHAM MACHINERY COMPANY, A CORPORATION OF ILLINOIS.

PAPER-PUNCHING PRESS.

Application filed May 5, 1921. Serial No. 466,916.

To all whom it may concern:

Be it known that I, ERNEST LESCHHORN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Paper-Punching Presses, of which the following is a specification.

The invention relates to presses embodying tools for punching, perforating or otherwise cutting sheets of paper and analogous materials.

In paper multiple presses it has heretofore been common to provide punch blocks carrying one or more punches with co-operating dies together with means for locking or securing a plurality of said punch blocks in the press, and it is one of the chief objects of my invention to provide improved punch block locking means which shall be rapid and efficient.

It is a further object of the invention to provide an improved punch and punch block construction together with improved means for operating the same.

A further object of the invention is to provide an improved gauge block adapted to be used in conjunction with punch blocks in a press of the described character.

Other objects of the invention will appear from the following description, which is directed to the preferred embodiment of the invention, as shown in the drawings forming a part of the specification, the novel features being set forth in the appended claims.

In the said drawings, Fig. 1 is a side elevation of a punch press embodying the invention, and Fig. 2 is a front elevation of the same with dotted outlines for indicating certain of the hidden parts of the mechanism.

Fig. 3 is a top plan view of the press with certain hidden parts in dotted outline.

Fig. 4 is a vertical sectional view taken near line 4—4 of Fig. 2, looking in the direction indicated by the arrows.

Fig. 5 is a detail section on line 5—5 of Fig. 3, and Fig. 6 is a perspective view of an improved back gauge.

The operative parts of the press are supported in the embodiment shown upon a pedestal 10 widened at the lower end to form a suitable base 10^a adapted to retain the press in an upright position. The upper end of the pedestal 10 is provided with a widened or table-like portion 10^b to the upper side of which is secured the press bed plate or frame 11 by bolts or screws 12. The plate 11 has one or more brackets 13 protruding horizontally at the front of the press for supporting the work table 14. The plate 11 is formed with a narrow flat top portion 11^a adapted to form a continuation of the work table 14 and at 11^b is formed with an undercut jaw comprising the fixed member of a vise or clamp for locking the punch blocks and gauges in the machine. Near the jaw 11^b there is a slot at 11^c extending vertically through the plate 11 through which the punchings may fall by gravity from the machine, or preferably into the receptacles 15, 16 secured or carried by suitable means on the under side of the plate. The co-operating and movable jaw of the vise or clamp for locking the punch blocks and gauges in the press and under the ram is designated by reference character 17^a and is preferably formed integrally upon one longitudinal edge of a rectangular plate 17 mounted to reciprocate upon the upper surface of the plate 11, the upper surface of plate 17 being depressed below the level of the work table 14 so as to bring the working jaw of the vise or clamp to the proper level to co-operate with the fixed member of the same.

The punch blocks are given the form most clearly shown in Figs. 1 and 4 consisting of a U-shaped casting 18 having the extremities thickened and bored to carry the working parts of the punches, the slot 18^a therein obviously being intended to extend horizontally and parallel with the upper surface of the work table when clamped in working position in the press to accommodate the edges of the sheets of paper or other material to be punched. One leg of the punch block is designed to be engaged by the locking or clamping device and is preferably somewhat longer than the other and at its outer extremity is bevelled, as indicated at 18^b, to co-operate with the bevelled jaw 11^b of the locking device, while the other leg or branch is bored to furnish a bearing for the shanks of the reciprocating punches 19. Opposite the bevelled extremity 18^b is an offset surface forming an angular ledge 18^c in the lower edge of the punch blocks so that the surfaces of the

punch blocks designed to be gripped by the vise or clamp will diverge downwardly just as do the corresponding jaws 11^b and 17^a of the vise or clamp whereby when these locking surfaces of the punch blocks are gripped between the jaws of the clamp the punch blocks will be firmly held in operative position while the punches are being operated.

Heretofore it has been proposed to lock multiple punch blocks in presses by means of a vise or clamping mechanism, but such clamping devices have been operated by means requiring much time on the part of the operator to manipulate the clamping mechanism in locking or releasing the punch blocks and it is one of the chief objects of my invention to provide clamp operating means that shall be most rapid and effective. The movable jaw carrying plate 17 (see Fig. 5) is provided on its lateral edges with bearing surfaces 17^c by means of which it is slidably mounted on the top of plate 11 and is retained thereon by guides 20^a, the latter being the bases of upright supports 20 secured on the top of plate 11 having the guide strips 21 secured thereto by machine screws 22 overlying offset machined surfaces at each side of said plate. Plate 17 is thickened near the jaw portion 17^a and provided with a plurality of separated housings opening toward the clamping edge of the plate, each being adapted to support a cushion spring 23 bearing at its exposed end against an offset in bed plate 11 and tending normally to separate the jaw 17^a from the jaw 11^b and to hold the plate 17 against the working surfaces of a plurality of separated cams 24 secured by pins 26, 27, or other suitable means to the shaft 25. Shaft 25 is journalled in the two upright supports 20 and is operated by a lever 28 secured thereto by a pin 29.

From the described construction, it will be seen that the operator may by means of lever 28 operate shaft 25 and cams 24 thereon to cause any desired number of interposed punch blocks to be locked in operative position between the fixed jaw 11^b and the movable jaw 17^a. When the cams 24 are properly formed, as illustrated, the plate 17 will be given its maximum movement by a very quick movement of the lever 28 making the press more rapid and efficient than similar devices heretofore used for locking punch blocks in presses. For the purpose of providing against wear hardened pins 50 are mounted in the plate 17 in position to receive the thrust of the working faces of cams 24.

The upright supports 20 may be connected across the top of the machine with a plate 31 and at their front sides a vertical plate 32 is secured thereto by bolts or screws 32^a (Fig. 2) forming in conjunction with slots on the supports 20 a suitable guide for a ram designed to have movement imparted thereto in a substantially vertical plane by means of a series of teeth 34 forming separated racks thereon adapted to be engaged by mutilated gears 35 on a rock shaft 36 rotatably mounted in the supports 20. The ram operating means may be actuated by foot, belt or motor power and in the machine in which the invention is embodied, as shown in the present drawings, an arm 37 fixed to shaft 36 is connected by link 38 with an actuating lever 39 operatively connected by suitable clutch mechanism not shown in detail, since same forms no part of the present invention, with a power wheel 40 preferably mounted near the base of the pedestal 10. 41 is a pivoted foot lever that may be used to shift clutch mechanism against the action of the tension return spring 42 so that as desired by the operator he may operatively connect the power wheel with the ram operating mechanism described, so that as link 38 is raised the ram will be caused to descend. The lower edge of the ram 33 is undercut to form a longitudinal groove 33^a opening toward the front of the machine and designed to receive an edge of the button-like tops of the punches 19 as designated by 19^a so that as the ram 33 descends and rises the punches will be operated in the ordinary manner, being positively lowered to the punching operation and then being positively withdrawn.

To protect the plate 17 against wear from the cams 24 I provide the hardened pins 50, there being one of such pins set in the plate for each of the cams 24.

The invention particularly applies to what is known as the multiple punch type of press, the press being adapted to receive a plurality of punch blocks 18. Each block 18 may contain one, two, or more punches, so that punch blocks for punching simultaneously any desired number of holes may be locked in the press.

On the punch block 18 (Figs. 1 and 4) is shown a sheet spacing or margin stop device designated by reference character 60 and being adjustably connected by screw 61 to the block. By adjusting same in a well known manner the position of the forward edge of the sheets to be punched will be determined before the ram and punches are operated to fix the relative position of the holes to be punched from the edge of the sheet.

Instead of paper guides or margin stops 60 as shown attached to the punch block frames 18, which is a common form of guide in this type of press, I may employ one or more special guide or gauge blocks, sometimes called back gauges, of the form shown in the perspective Fig. 6. This block is designated generally by reference character 70 and is

provided at one end with a specially formed base 70^a corresponding with the base portions of the punch blocks 18 having the downwardly diverging surfaces for co-operating with the clamping members of the press, these being designated by reference characters 70^b and 70^c. 71 is a thumb screw co-operating with the slot 73 in the adjustable gauge member 74, the top of the main supporting block 70 of the gauge being grooved, as designated at 70^d to slidingly receive the slotted gauge member 74. Two or more of these gauges may be locked or clamped in the press in the same manner as the punch blocks 18 with the adjustable gauge members thereon arranged as desired to secure whatever margins may be sought between the lines of the punch holes and the edges of the sheets to be punched. An adjustable gauge block of this construction secures more accurate gauging and also more rapid adjustment than gauging means connected directly to the punch blocks, as described in connection with the showing in Figs. 1 and 4.

I claim:

1. In a press for punching sheets of paper and the like, the combination with a movable ram, a punch block clamp comprising a fixed clamping jaw and a movably mounted plate, a clamping jaw carried by said plate for co-operating with the first said clamping jaw, a rotatable shaft adjacent said movably mounted plate, and an eccentric cam rotatable with said shaft and bearing directly on said plate.

2. In a press for punching sheets of paper and the like, the combination with a movable ram, of an integral detachable punch and die block, a punch and die block clamp comprising a fixed clamping jaw, a movably mounted plate, a clamping jaw carried by said plate for co-operating with the first said clamping jaw, a rotatable shaft adjacent said movably mounted plate, and a plurality of eccentric cams rotatable with said shaft and bearing directly on said plate.

3. In a press for punching sheets of paper and the like, the combination with a movable ram, a punch and die block clamp comprising a fixed clamping jaw, a movably mounted plate, a clamping jaw carried by said plate for co-operating with the first said clamping jaw, a rotatable shaft adjacent said movably mounted plate, and a plurality of eccentric cams spaced apart on and rotatable with said shaft and bearing directly on said plate.

4. In a press for punching sheets of paper and the like, the combination with a movable ram, of a detachable punch block, a punch movably mounted in said block, a punch block clamp comprising a fixed clamping jaw, a movably mounted plate, a clamping jaw carried by said plate for co-operating with the first said clamping jaw, a rotatable shaft adjacent said movably mounted plate, a hardened bearing member carried by the plate, and an eccentric cam rotatable with said shaft and having operative connection with the hardened member on said plate.

5. In a press for punching sheets of paper and the like, the combination with a movable ram of a supporting frame, a detachable punch and die block, a punch and die block clamp comprising a fixed clamping jaw, a movably mounted plate, a clamping jaw carried by said plate for co-operating with the first said clamping jaw, a rotatable shaft adjacent said movably mounted plate, an eccentric cam rotatable with said shaft and bearing directly on said plate, and a hand lever for rotating said shaft.

6. In a press for punching sheets of paper and the like, the combination with a movable ram, of a supporting frame, a punch and die block clamp carried by the said frame and comprising a fixed clamping jaw, a movably mounted plate, a clamping jaw carried by said plate for co-operating with the first said clamping jaw, a rotatable shaft adjacent said movably mounted plate, an eccentric cam rotatable with said shaft and bearing directly on said plate, means interposed between the support and said plate for operating the same against the action of said cam thereon, and means for rotating said shaft.

7. In a press for punching sheets of paper and the like, the combination with a movable ram, of a detachable punch block and a punch and die carried by said block, a supporting frame, a punch and die block clamp carried by said frame and comprising a fixed clamping jaw, there being an offset portion in said supporting frame forming a ledge adjacent said fixed clamping jaw, a movably mounted plate in said offset portion of said supporting frame, a clamping jaw carried by said plate for co-operating with the first said clamping jaw, a rotatable shaft adjacent said movably mounted plate, an eccentric cam rotatable with said shaft and bearing directly on said plate, means for rotating said shaft, and spring means interposed between said plate and said ledge on the supporting frame for resisting the action of said cam on said plate and returning said plate toward the cam during the retraction of the operative surface thereof during the rotation of the cam.

8. In a press for punching sheets of paper and the like, the combination with a movable ram, of a punch and die block clamp adapted to co-operate with punch and die carrying blocks, said punch and die carrying blocks having undercut clamping surfaces, said clamp comprising a fixed member having an undercut clamping jaw, a movably

mounted plate, a clamping member carried by said plate and comprising an undercut jaw for co-operating with the first said clamping jaw and the punch and die carrying blocks, a rotatable shaft adjacent said movably mounted plate, and a plurality of eccentric cams spaced apart and rotatable with said shaft and bearing directly on said plate and being adapted to permit movement of said movable plate to allow direct insertion or removal of the punch and die carrying blocks at any point between the jaws of the said punch and die block clamp.

9. In a press for punching sheets of paper and the like, the combination with a movable ram, of a detachable punch block provided with converging spaced locking surfaces, a punch block clamp comprising a fixed member having an undercut clamping jaw for co-operating with one of said locking surfaces on the punch block, a movably mounted plate, a clamping member having an undercut jaw for co-operating with the other locking surface of said punch block and being carried by said plate for co-operating with the first said clamping jaw to lock the said detachable punch block in operative position in the press, a rotatable shaft adjacent said movably mounted plate, an eccentric cam rotatable with said shaft and bearing directly on said plate, and means for operating said shaft.

10. In a press for punching sheets of paper and the like, the combination with a movable ram, of a detachable punch block provided with converging spaced locking surfaces, a punch block clamp comprising a fixed member having an undercut clamping jaw for co-operating with one of said locking surfaces on the punch block, a movably mounted plate, a clamping member having an undercut jaw for co-operating with the other locking surface of said punch block and being carried by said plate and being adapted to permit movement of said movable plate to allow direct insertion or removal of the punch and die carrying blocks at any point between the jaws of the said punch and die block clamp for co-operating with the first said clamping jaw to lock the said detachable punch block in operative position in the press, a rotatable shaft adjacent said movably mounted plate, an eccentric cam rotatable with said shaft and bearing directly on said plate, and a hand lever for operating said shaft.

In testimony whereof I have signed my name to this specification on this 7th day of April A. D. 1921.

ERNEST LESCHHORN.