No. 655,074. Patented July 31, 1900.

E. GRAVES.

PUNCHING MACHINE.

(Application filed June 12, 1900.)

(No Model.) 3 Sheets—Sheet 1.

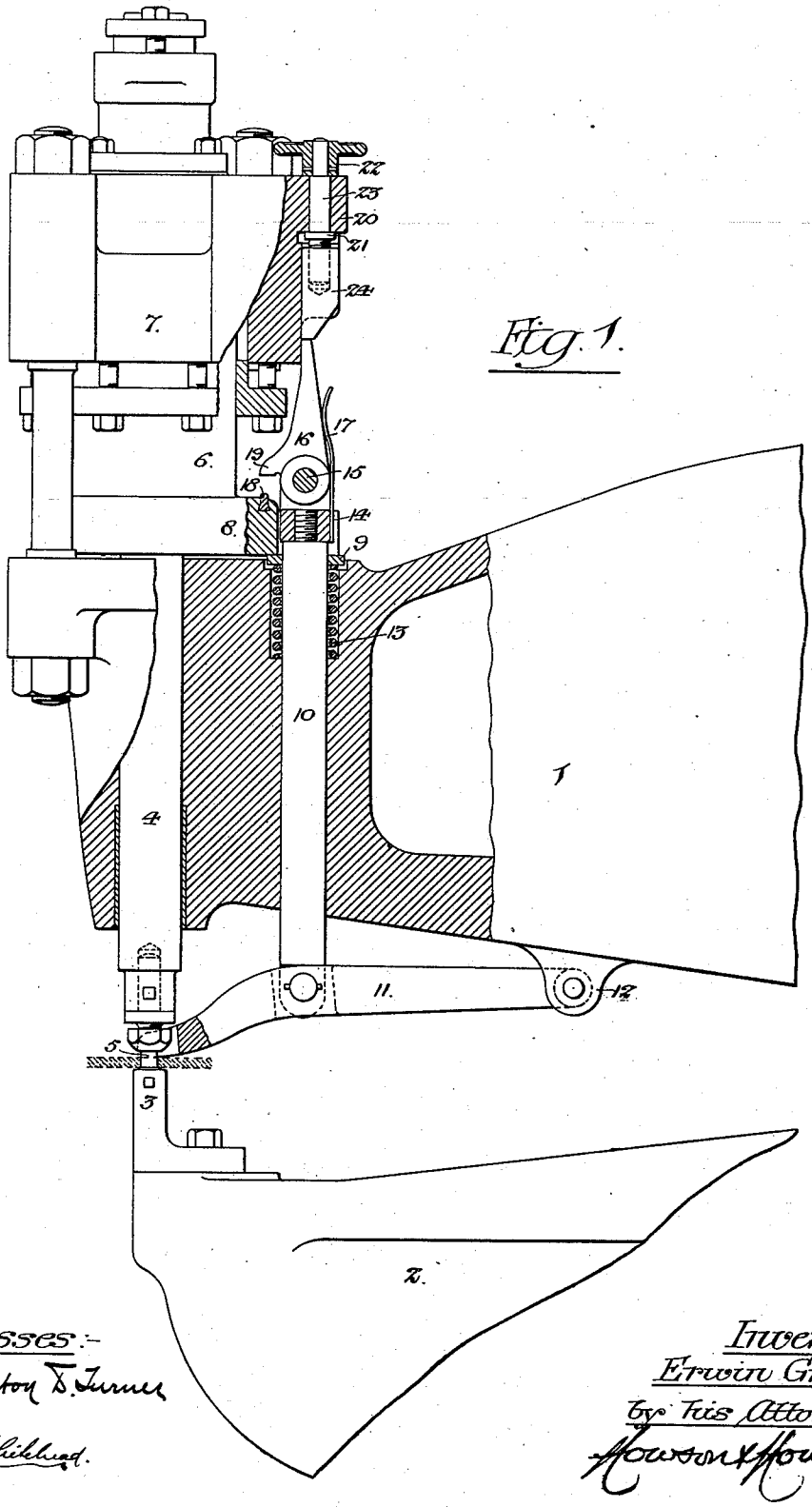


Fig. 1.

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Inventor:
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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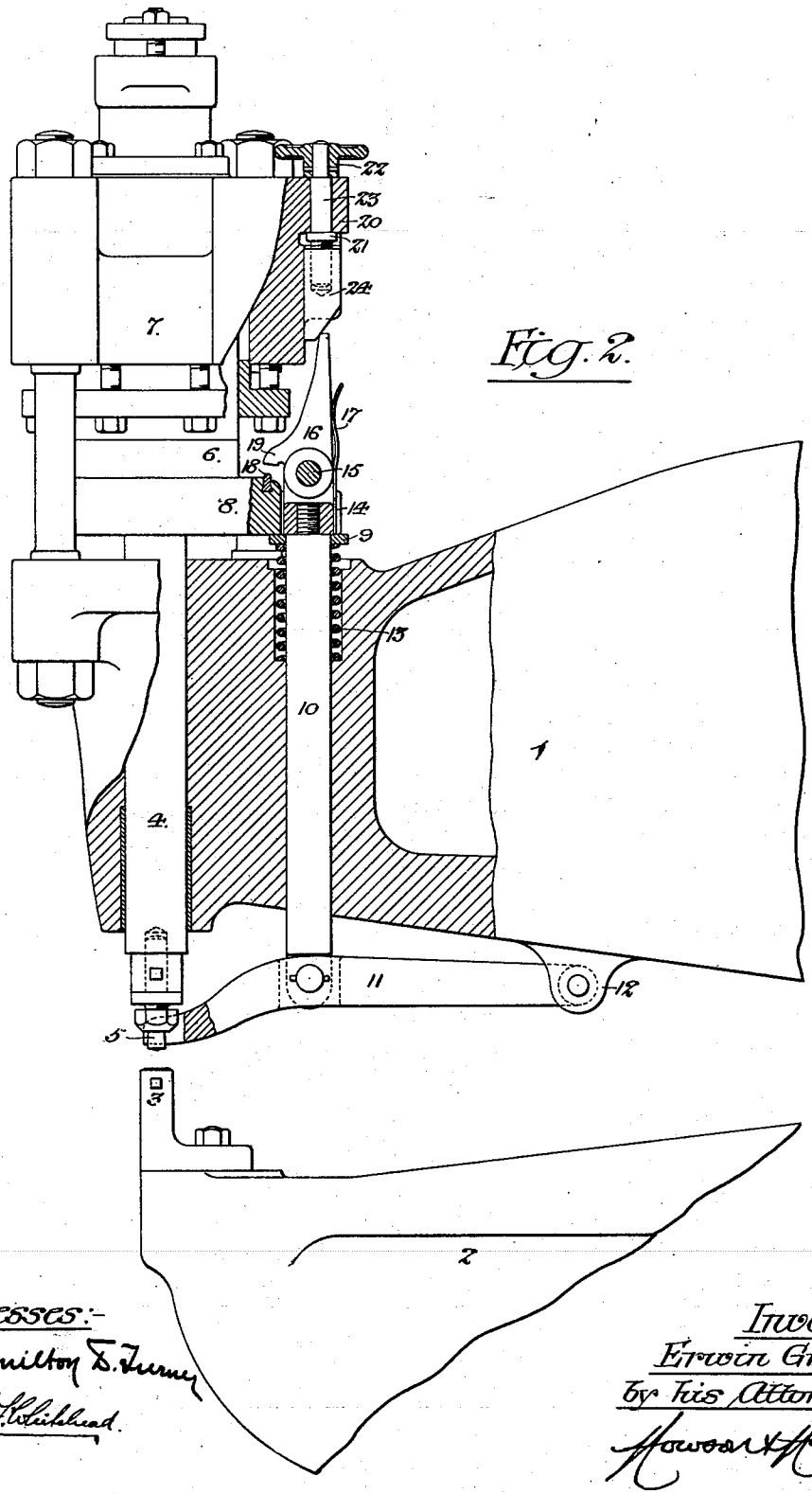


Fig. 2.

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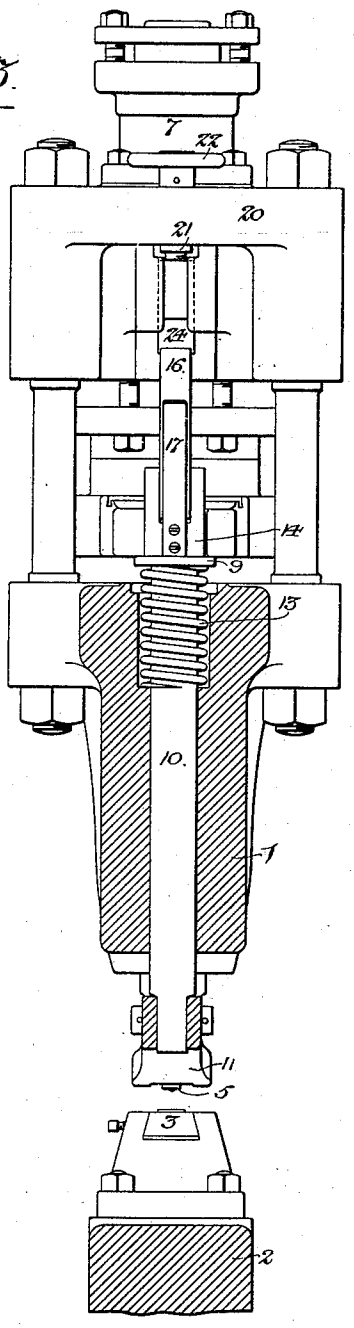
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(Application filed June 12, 1900.)

(No Model.) 3 Sheets—Sheet 3.

Fig. 3.



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UNITED STATES PATENT OFFICE.

ERWIN GRAVES, OF CAMDEN, NEW JERSEY, ASSIGNOR TO THE CAMDEN IRON WORKS, OF SAME PLACE.

PUNCHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 655,074, dated July 31, 1900.

Application filed June 12, 1900. Serial No. 20,085. (No model.)

To all whom it may concern:

Be it known that I, ERWIN GRAVES, a citizen of the United States, and a resident of Camden, New Jersey, have invented certain Improvements in Punching-Machines, of which the following is a specification.

The object of my invention is to provide a hydraulic or other punching-machine with a stripping device operated by the machine and following the punch in its downward movement until arrested by contact with the plate, in which position it is locked while the punch passes through the plate and is withdrawn from the punched hole, the stripper then rising quickly to a point above the point of the punch when the latter has reached the top of its stroke, whereby the end of the punch with its projecting center can be utilized as a guide for correctly placing the plate in position for the punching of the next hole. This object I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a view, partly in side elevation and partly in section, of sufficient of a hydraulic punching-machine to illustrate the application of my invention thereto, the parts being shown as in their lowermost position—that is to say, with the punch just completing the punching of the hole and the stripper in its lowermost position and resting upon the plate. Fig. 2 is a similar view showing the parts in their highest position; and Fig. 3 is a view mainly in elevation, but with the jaws of the machine and the stripper-bar in transverse section.

In the operation of metal-punching machines it is usual to have the lay-out of the holes to be punched stamped on the plate with a center punch and to provide a projecting point in the center of the punch to be used as a guide or gage with which the punch-marks on the plate are successively brought into line in order to adjust the plate into proper position for punching. After the punch has been forced through the plate and during its withdrawal from the hole so punched a device termed a "stripper" is necessary to prevent the plate from being lifted with the punch as the latter rises. These strippers have heretofore been practically stationary—that is to say, adjustable merely for accommodating them to varying thicknesses of plate—and in order to render available the before-mentioned projection in the center of the punch as a guide for the successive adjustments of the plate it has been necessary to cause the punch after the completion of its stroke to descend a short distance, so that the end of the same might be below the line of the stripper, and then to arrest its downward movement until the plate to be punched has been adjusted to its correct position. My invention renders this preliminary and partial downward movement of the punch unnecessary.

In Figs. 1 and 2 of the drawings parts of the upper and lower jaws of a hydraulic punching-machine are represented at 1 and 2, respectively, the lower jaw carrying the hollow lower die 3, and the upper jaw having guides for the stem 4, which carries the upper die or punch 5, said stem being connected to the plunger 6 of a hydraulic cylinder 7, mounted upon the upper jaw. Said plunger 6 has a projecting flange 8, which is adapted to act in its downward movement upon a washer 9, surrounding a rod 10, which is vertically guided in the jaw 1 and is pivotally connected at its lower end to the swinging stripper-lever 11, the latter being hung to a depending lug 12 on the jaw 1 and being forked at its front end, so as to project forwardly on opposite sides of the punch 5, as shown in Figs. 1 and 2. The washer 9 rests upon a spring 13, which is seated in the countersunk upper end of the opening formed in the jaw 1 for the reception of the rod 10, upward movement of the washer under the action of said spring 13 being restricted by a cap 14, applied to the reduced and threaded upper end of the rod 10. The cap 14 has projecting lugs carrying a pin 15, to which is pivoted a trigger 16, acted upon by a spring 17 on the cap, so that the upper end of said trigger has a constant tendency to move inward or toward the cylinder 7.

The flange 8 of the plunger 6 has a rib 18,

which on the upward movement of the plunger is adapted to act upon a toe 19 of the trigger 16, so as to throw the upper end of said trigger outwardly against the action of the spring 17.

The cylinder 7 has a projecting flange 20, to which is vertically confined, by means of a collar 21 and a hand-wheel 22, a vertical stem 23, with threaded portion adapted to a threaded opening in a sliding block 24, which is adapted to suitable guides on the cylinder 7, so that it can be adjusted vertically by manipulation of the screw-stem 23 through the medium of its hand-wheel 22.

When the parts are in the raised position, as shown in Fig. 1, the lower face of the forked forward end of the stripper 11 is considerably above the punch 5, and hence does not obstruct the view of the workmen or interfere with the proper adjustment of the plate accurately beneath the projecting central point of the punch. As the punch descends, however, the flange 8 depresses the washer 9, compresses the spring 13, and permits the stripper-lever 11 and its rod 10 and trigger 16 likewise to descend, this movement being due to the weight of the stripper-lever and its attached parts, and being, if desired, assisted by means of a spring or other suitable pressure device. This descent of the stripper continues until its forked forward end finally rests upon the plate, as shown in Fig. 1, at which time the upper end of the trigger has been pressed beneath the end of the block 24, as also shown in said figure. The punch continues to descend and after punching the hole in the plate rises, the stripper during the first part of this rising movement being held in the depressed position by the locking action of the block 24, so as to properly strip the plate from the punch. As the plunger 6 approaches the limit of its upward movement, however, the bar 18 strikes the toe 19 of the trigger 16 and moves the same, so as to release it from the controlling influence of the locking-block 24, whereupon under the action of the spring 13 the rod 10 is forced upwardly, thereby quickly lifting the stripper-lever from the plate and into position above the lower end of the punch 5, as shown in Fig. 2.

Other pressure devices than the spring 13 may be employed for raising the stripper, the spring, however, being preferred.

By adjusting the block 24 the stripper can be locked in position at different points in its descent, and the machine is thus adapted for acting upon plates of different thicknesses.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. The combination of the punch-operating plunger of a punching-machine with a stripper depressed by the action of said plunger, means for raising said stripper, and a locking device for retaining the stripper in its depressed position, one of the elements of said locking device being a trigger which is struck and released on the upward movement of the plunger, substantially as specified.

2. The combination of the punch-operating plunger of a punching-machine, with a stripper depressed by the action of said plunger, means for raising said stripper, and a locking device for retaining the stripper in its depressed position, elements of said locking device being a trigger to be struck and released on the rise of the plunger, and a vertically-adjustable locking-block for engaging with and retaining said trigger when the stripper is depressed, substantially as specified.

3. The combination, in a punching-machine, of the punch-operating plunger, the stripper having a rod with trigger thereon, a locking-block for said trigger, a spring-supported washer free to move vertically on said rod, means for arresting the upward movement of the washer on the rod, and provision on the punch-operating plunger for engaging said washer and trigger, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ERWIN GRAVES.

Witnesses:
WM. J. HAMLIN,
WESLEY C. JOHNSON.