

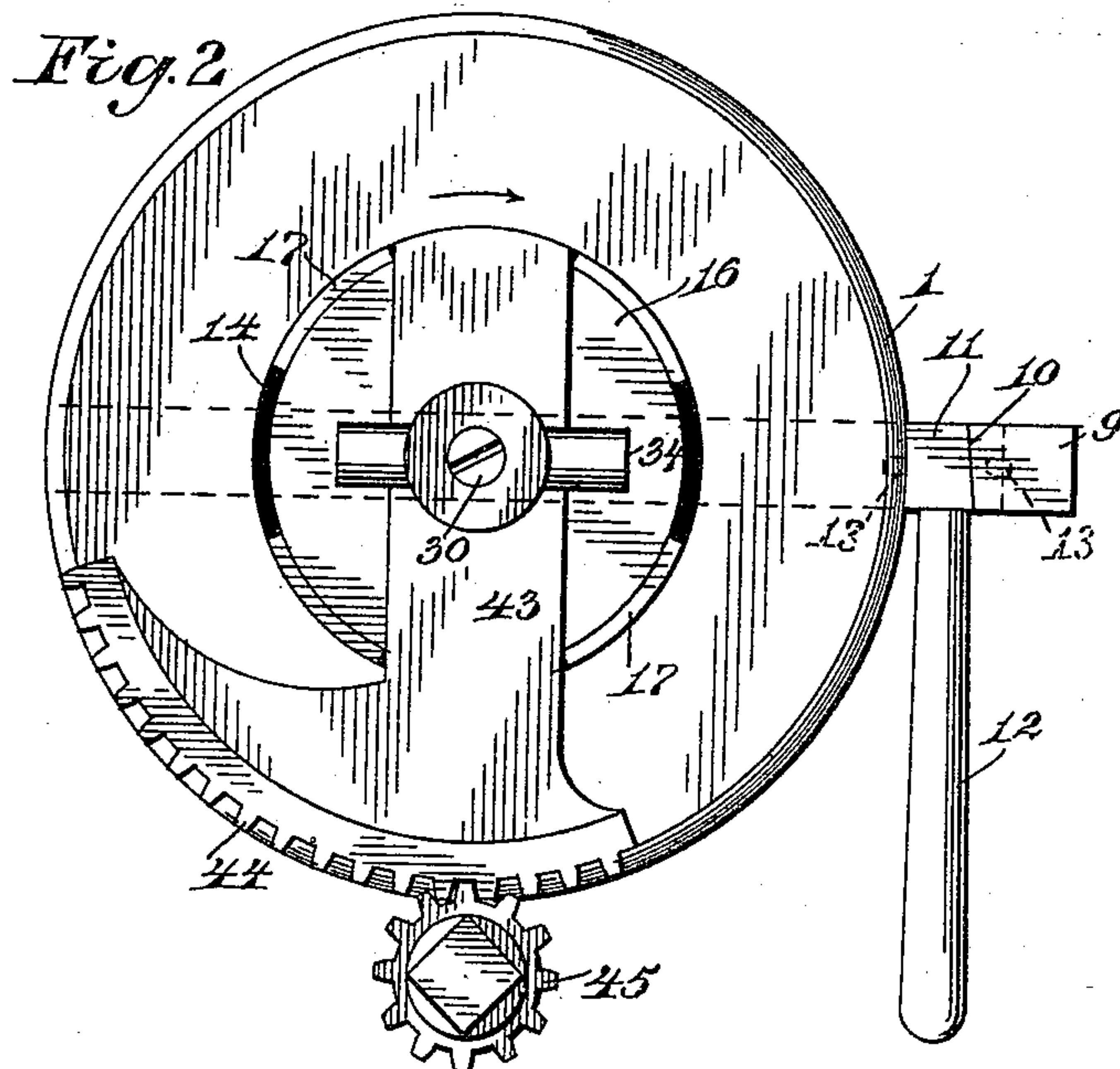
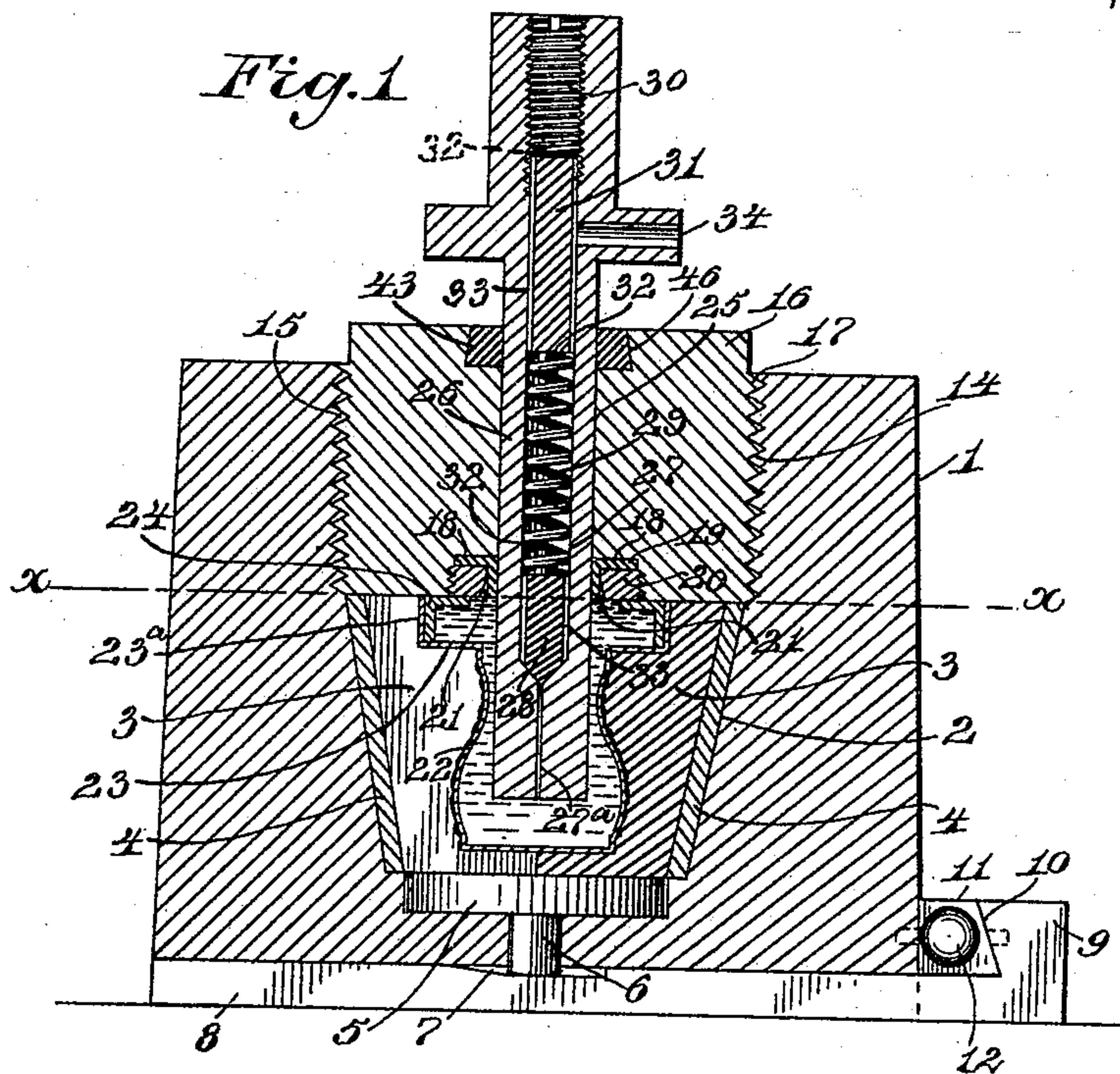
(No Model.)

3 Sheets—Sheet 1.

W. S. STAPLEY.
SHAPING PRESS.

No. 464,736.

Patented Dec. 8, 1891.



WITNESSES

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Fig. 3

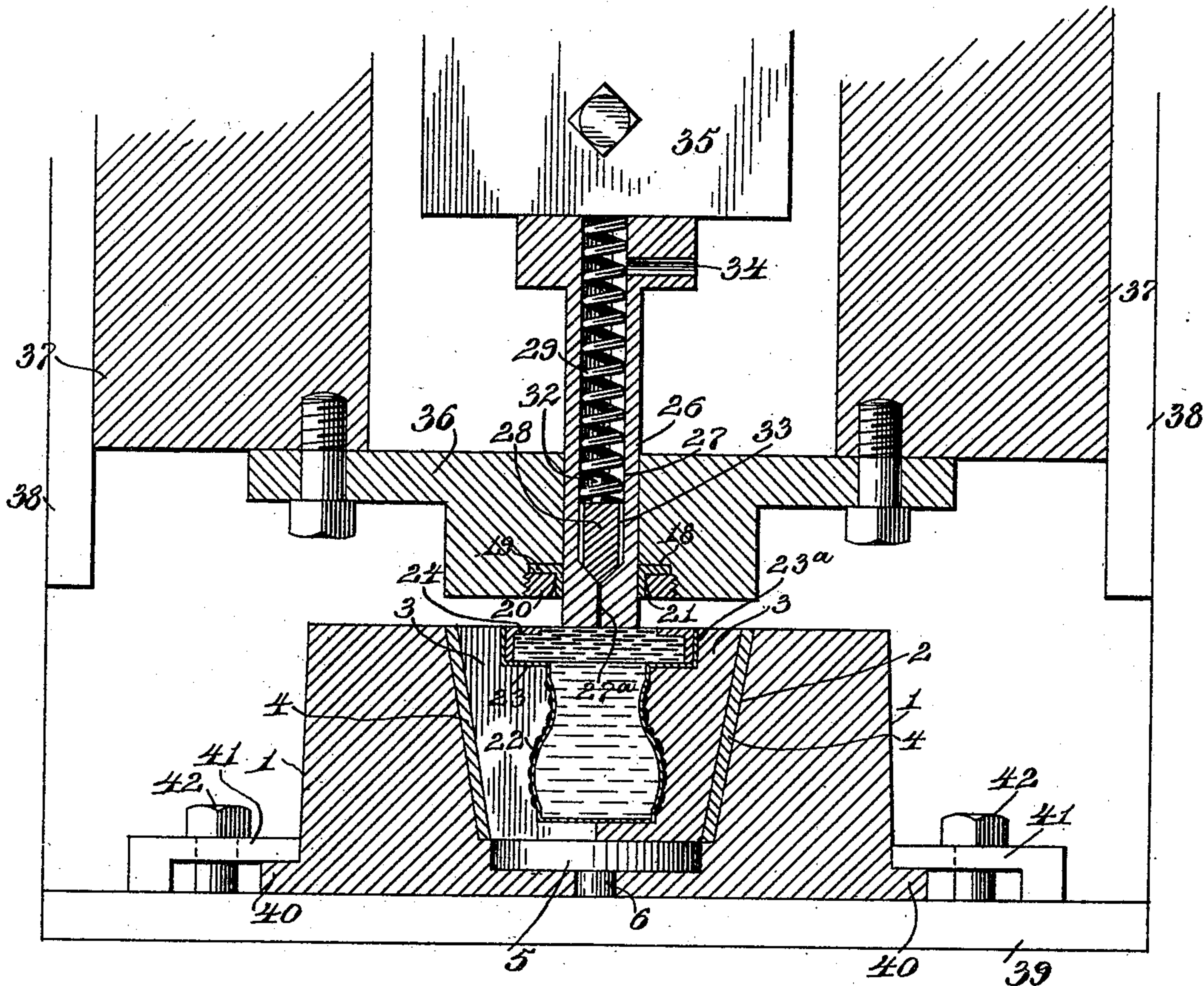
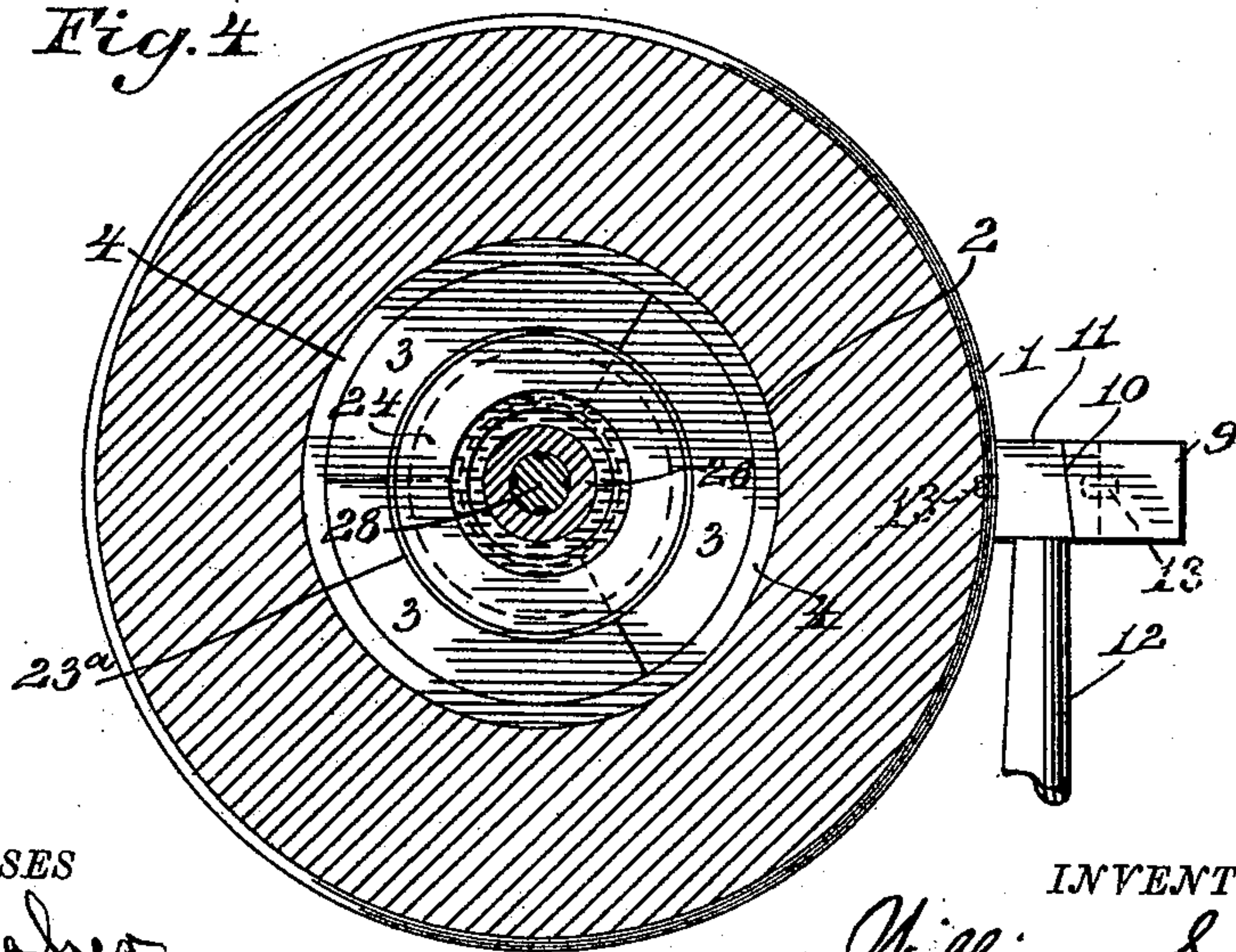


Fig. 4



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Fig. 5

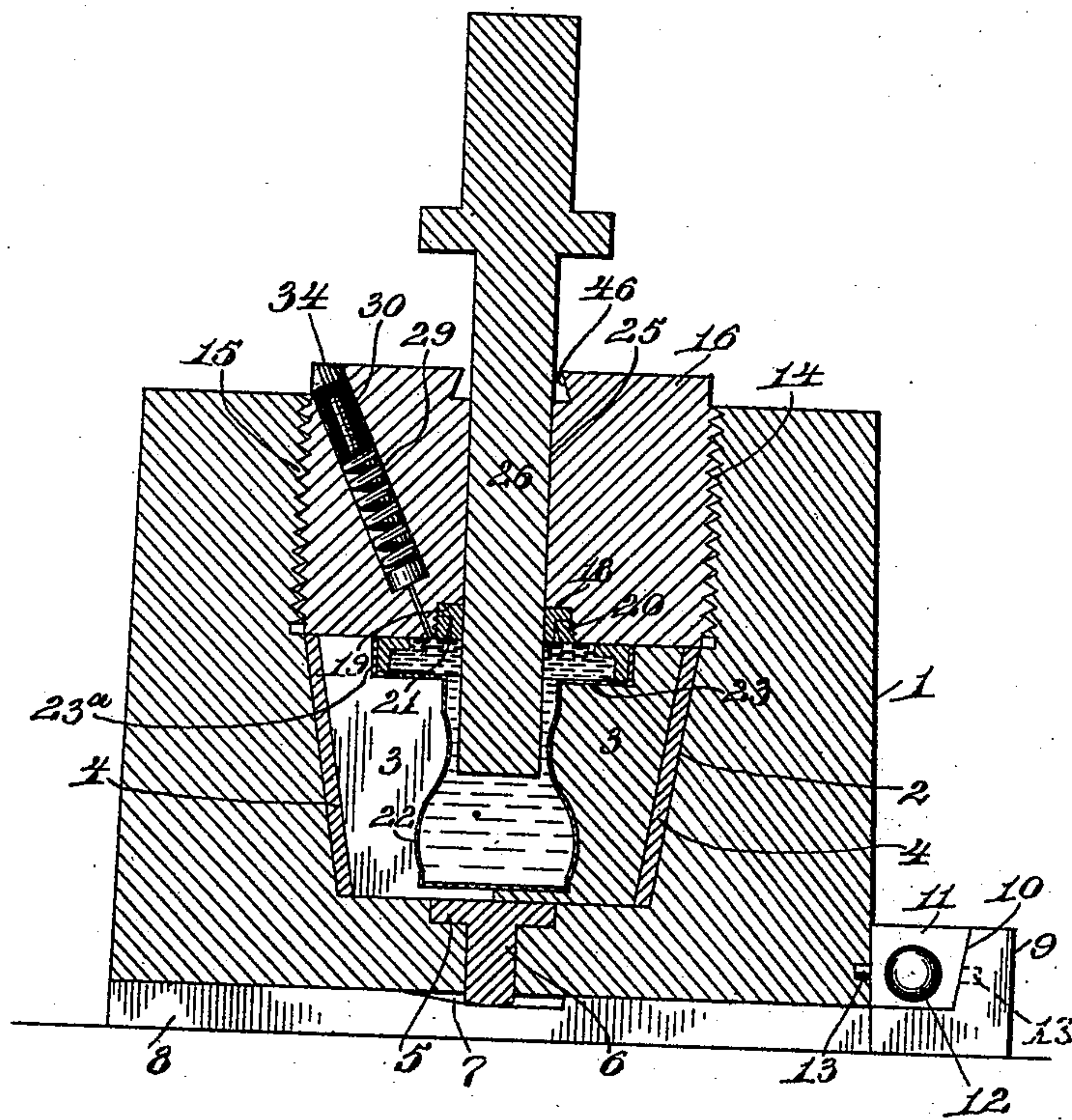
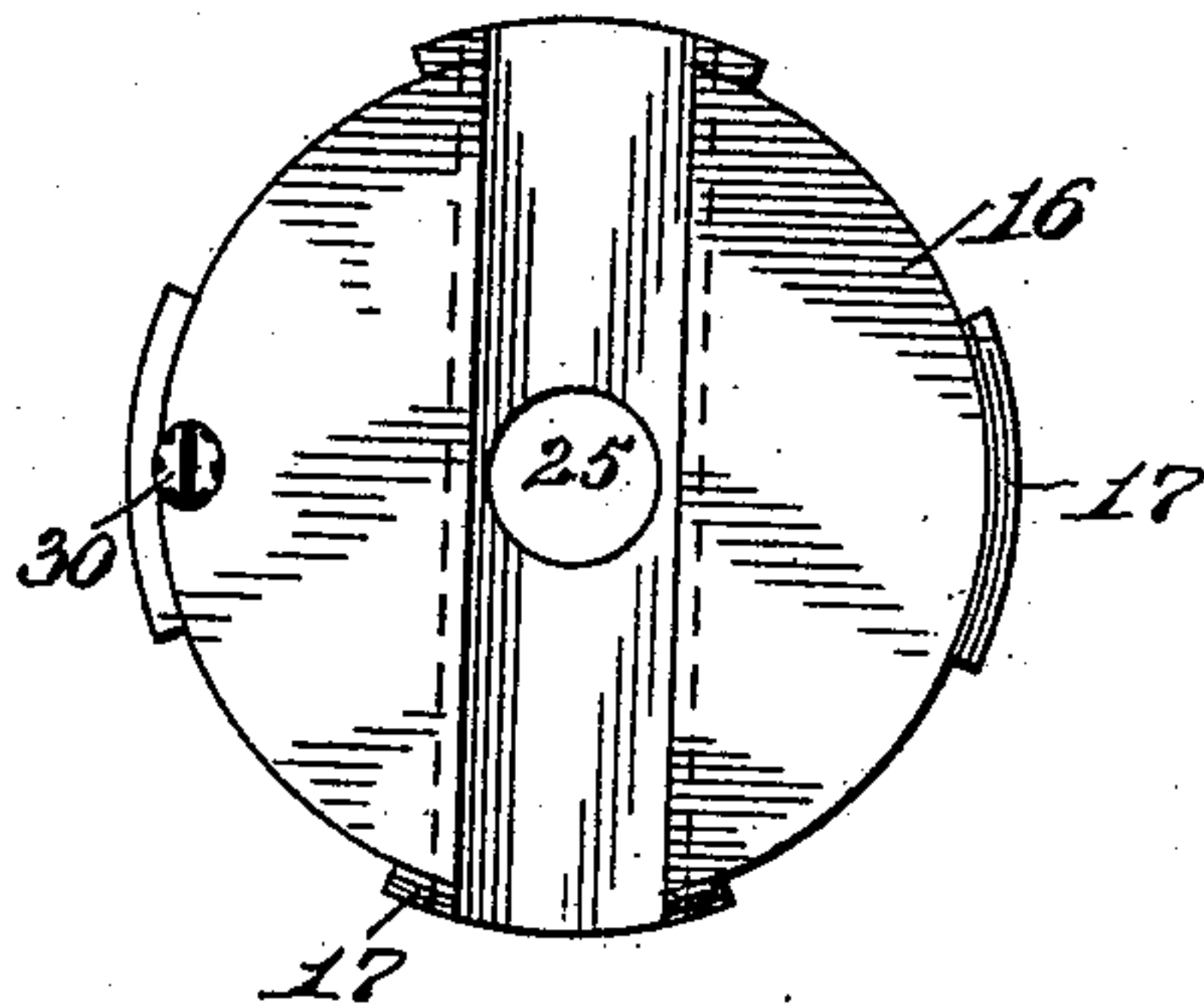


Fig. 6



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UNITED STATES PATENT OFFICE.

WILLIAM S. STAPLEY, OF MERIDEN, CONNECTICUT, ASSIGNOR TO THE
MERIDEN SILVER PLATE COMPANY, OF SAME PLACE.

SHAPING-PRESS.

SPECIFICATION forming part of Letters Patent No. 464,736, dated December 8, 1891.

Application filed July 8, 1891. Serial No. 398,762. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. STAPLEY, a citizen of the United States, residing at Meriden, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Shaping-Presses; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to the class of shaping-presses by which hollow metallic table-ware, cane-heads, and similar articles are embossed and otherwise ornamented by water-pressure from within while the blanks are inclosed in suitable dies, and has for its object to simplify and cheapen the construction and operation of the press—to produce, in brief, a construction which shall be easily operated, practically impossible to get out of repair, and always ready for use, it being immaterial, so far as my present invention is concerned, whether the pressure upon the water in the blank is produced by hydraulic means or by an ordinary rotary or cam press.

In order to accomplish the desired result, I have devised the simple and novel press of which the following description, in connection with the accompanying drawings, is a specification, numbers being used to denote the several parts.

Figure 1 is a vertical section of one form of my improved press, showing a blank within the dies and the plunger at its lowered position, as at the moment the pressure is greatest and is about to be relieved; Fig. 2, a plan view corresponding with Fig. 1; Fig. 3, a vertical sectional view showing the principle of my invention applied in connection with an ordinary double-acting press; Fig. 4, a transverse section on the line *x x* in Fig. 1, looking down; Fig. 5, a view corresponding with Fig. 1, except that the relief-valve is placed in the mutilated nut instead of in the plunger; and Fig. 6 is a plan view of the mutilated nut detached.

1 denotes the die-block, which in use is clamped down upon a bed or bolster plate (not shown) in any ordinary or preferred manner.

2 denotes a downwardly and inwardly taper-

ing recess in the die-block to receive the dies 3. Three, four, or any suitable number of dies may be used, three being shown in the present instance. These dies of course are suitably engraved to produce the raised or-
55 namental figures desired upon the blank. The dies may be placed in contact with the die-block itself, but are preferably placed within a tapering sleeve 4 and rest upon a plate 5, having a shank 6, which extends downward
60 through an opening in the bottom of the die-block and rests upon a wedge 7 on a bar 8, which lies in a recess in the under side of the die-block. At one end of bar 8 is a block 9, the inner face of which is a cam-incline 10,
65 adapted to be engaged by a corresponding incline on a block 11 at the lower end of an operating-lever 12 when it is desired to lift the dies. The block is provided with trunnions 13, which engage recesses in block 9 and
70 the die-block, as clearly indicated in Figs. 1 and 2. In the upper portion of the die-block is a recess 14 of greater diameter than recess 2, so as to permit the sleeve to be readily inserted in place. Upon the wall of this recess
75 are sections 15 of screw-threads.

16 is a mutilated nut having sections 17 of screw-threads, which are adapted to engage the corresponding sections 15 in recess 14. In the under side of nut 16 is a recess 18,
80 which is adapted to receive a hydraulic washer 19. This washer may be of any preferred construction, but I preferably use an angle-washer, as shown in the drawings, said washer being held in place by a nut 20 engaging a
85 corresponding thread in recess 18, the nut being provided with a central opening to receive the tubular portion of the washer. The diameter of the lower portion of the opening in the nut is greater than the upper portion,
90 so as to form a recess 21 between the tubular portion of the washer and the nut, the purpose of which will presently be fully explained.

22 denotes the blank from which the arti-
95 cle is formed. This blank is drawn or spun as nearly as practicable to the general outline of the article that is to be formed and is provided at its upper end with a flange 23, which lies in a suitable recess formed to re-
100

ceive it in the upper ends of the dies. This flange may or may not be provided with an angle-piece 23^a, as shown in the drawings.

24 denotes a hydraulic angle-washer, which in use lies between the flange of the blank and the angle-piece, if used, and the mutilated nut, as will be more fully explained. The mutilated nut is provided with a central opening 25, which registers with the opening in nut 20 and the opening in the dies.

26 denotes a plunger, which in use passes downwardly through the openings in the mutilated nut and nut 20 and into the opening in the dies, as is clearly shown in Figs. 1 and 5. This plunger may either be solid, as in Fig. 5, or provided with a minute opening 27^a, leading into a larger opening 27, as in Figs. 1 and 3.

An essential principle of my invention is an escape or safety valve 28, which is set to relieve the pressure upon the interior of the blank when a certain predetermined pressure per square inch has been placed upon said blank to expand it into the figure of the dies, and thereby form the pattern thereon. This construction renders it wholly immaterial whether the pressure placed upon the water in the dies is produced by a rotary press, a cam-press, or by a hydraulic press. The recess 27, in which the escape or safety valve lies, may be either in the plunger, as shown in Figs. 1 and 3, or in the mutilated nut, as shown in Fig. 5. The valve may be flat on the under side, as shown in Fig. 5, or tapering, as shown in Figs. 1 and 3, the lower end of recess 27 being, of course, shaped to correspond exactly with the operative face of the valve. The valve is held in operative position by a spring 29, which is held in place by a screw-plug 30. It will be seen in the several figures that the minute opening 27^a registers with opening 27, the exact size of this opening depending, of course, upon the requirements of use. In the press from which these drawings were made opening 27^a is about one thirty-second of an inch in diameter, and the pressure that has been used in forming the hollow metallic article is estimated at approximately one hundred and fifty tons per square inch. In the form shown in Fig. 1 a block 31 is placed between the screw-plug and the spring, said block being provided at both ends with reduced hubs 32, one of which engages a recess in the screw-plug, the other passing into the spring. The upper end of the valve is also provided with a similar reduced hub, which passes into the spring, said hubs acting to hold the spring in place and prevent doubling or buckling. In use the spring is adjusted by means of the screw-plug or in any suitable manner to permit just the required pressure to be placed upon the blank within the dies and then to yield, the pressure being brought to bear upon the valve by the passage of water through opening 27^a. In Fig. 1 the sides of the valve are shown as provided with grooves 33, through which the

water passes freely when the valve is once lifted from its seat against the power of the spring. In Fig. 1 the block is also shown as provided with similar grooves. These permit the water after having once passed the valve to pass upward freely and out at the escape-orifice 34. In Fig. 3 the construction is the same, except that block 31 is omitted. In Fig. 5 the plunger is made solid, and openings 27 and 27^a and the valve, spring, and screw-plug are placed in the mutilated nut instead of in the plunger. In this form the screw-plug is provided with grooves 33, which permit the free escape of water when the valve has once been lifted. In Fig. 3 the operation is precisely the same as in the other forms, except that the power is produced by an ordinary double-acting press. In this form 35 denotes the gate, 36 the clamp, 37 the clamp-holder, and 38 the ways. The die-block in this form rests upon a bolster-plate 39, and the latter rests upon the bed of the press. The die-block in Fig. 3 is shown as provided with lugs 40, which are engaged by clamps 41, the die-block being locked to the bolster-plate by bolts 42, passing through the clamps.

The operation is as follows: The blank to be formed is placed within the dies, which are then set down to place in tapering sleeve 4, their lower ends resting upon plate 5. After hydraulic washer 24 has been placed in position, mutilated nut 16 is then set down to place upon the top of the dies and is locked in place by turning the nut until the sections of thread upon the nut engage sections 15 of thread upon the die-block. In order to lock the parts firmly in position, I provide a cross-piece 43, adapted to engage undercut groove 46 in the top of the mutilated nut, as clearly shown in Fig. 2, and provided at its outer end with a toothed segment 44, which in use is engaged by an operating-pinion 45 to oscillate the segment, and with it the mutilated nut, thereby locking the parts firmly in position. It will be seen in Figs. 1 and 2 that the cross-piece is provided with an opening registering with the opening through the mutilated nut to receive the plunger. Having locked the parts firmly in position in the manner described, water is poured in at the top of the mutilated nut to fill the blank. It makes no particular difference just how much water is poured in, it being of course necessary to fill the blank full. As soon as the plunger is passed down through the central opening in the mutilated nut the water above washer 19 will escape between the plunger and the wall of the recess. As soon as the plunger passes into washer 19, however, the pressure will cause water to pass into recess 21 and will expand the washer absolutely tightly against the plunger, thus preventing any escape of water through the opening in the mutilated nut. After the plunger has passed into washer 19 washer 24 is expanded outward by the pressure and

prevents the possibility of any water getting back of the blank—that is, between the blank and the dies. As soon as the required pressure has been produced upon the interior of the blank, forcing it downward into the figure of the dies and forming the pattern upon the blank, the pressure upon the valve will lift the latter against the power of the spring and will permit water to pass out in the manner already described. This is a very important feature in rotary and cam presses, as it avoids all danger of setting or breaking the press. As soon as the plunger has passed to its extreme lowered position it is raised again, and the mutilated nut is removed by giving it a partial rotation by means of the pinion and toothed segment and then lifting it out. Having removed the mutilated nut, the operator takes hold of lever 12 and swings it toward the vertical position. This movement through the engagement of the cam-incline on block 11 with the corresponding incline on block 9 will draw bar A outward, causing wedge 7 to lift the die-plate and dies through the engagement of shank 6 with the wedge. As soon as the dies have once been started they may be readily lifted out with the finished blank.

Having thus described my invention, I claim—

1. In a press of the class described, the combination, with a die-block and dies adapted to inclose a blank, of a nut adapted to engage the die-block to retain the dies in position, a plunger adapted to pass through the nut and into the dies, and an automatic valve which yields to relieve the pressure when a predetermined pressure has been exerted by the plunger, substantially as described.

2. The die-block and dies, in combination with a nut by which the dies are held in position, a plunger adapted to pass through the nut and into the recess in the dies, one of said parts having a minute opening leading from the recess in the dies into a larger opening, a spring-actuated valve in said larger opening acting to close the minute opening, and a screw-plug acting to retain the valve in operative position, substantially as described.

3. The die-block, dies, and a nut for holding the dies in position, in combination with a plunger adapted to pass through the nut and into the recess in the dies, said plunger having a minute opening leading into a larger opening and an escape-orifice, and a spring-actuated valve in said larger opening acting to close the minute opening, so that when a predetermined pressure has been exerted by the plunger the valve will be lifted by the pressure of water passing through the minute opening and the pressure will be relieved by the escape of water through the orifice.

4. The die-block and dies adapted to inclose a blank and having a recess at their upper ends to receive a flange and angle-piece formed upon the upper end of the blank, in

combination with a nut adapted to engage the die-block to retain the dies in position, a plunger adapted to pass through the nut and into the dies, and a hydraulic angle-washer 24, which is expanded outward by the pressure against the angle-piece upon the blank and against the nut to prevent the entrance of water between the blank and the dies.

5. The die-block and dies adapted to inclose a blank, in combination with a nut 16, adapted to engage the die-block to retain the dies in position, said nut having a threaded recess 18 in its under side, a hydraulic angle-washer 19, lying in said recess, a nut 20, having a central opening and engaging the thread of nut 16, the diameter of said opening being greatest at the bottom, so as to form a recess 21 between the nut and the washer, and a plunger adapted to pass through nuts 16 and 20 and the washer and into the recess in the dies.

6. In a press of the class described, the combination, with the die-block and dies adapted to inclose a blank, of a plate 5, upon which the dies rest and which is provided with a shank extending through the die-block, a bar having a wedge 7, upon which the lower end of the shank rests, and a block having a cam-incline, and an operative lever having a corresponding cam-incline, whereby when said lever is oscillated the bar will be moved longitudinally and the plate and dies be lifted by the wedge.

7. In a press of the class described, the combination, with the die-block and the dies adapted to inclose a blank, of a plate 5, upon which the dies rest and which is provided with a shank extending through the die-block, a bar having a wedge 7, upon which the lower end of the shank rests, and a block having a cam-incline, and an operating-lever having a corresponding cam-incline, and trunnions engaging the die-block and the block on the bar, substantially as described.

8. In a press of the class described, the combination, with a die-block having a tapering opening to receive the dies, of a tapering sleeve adapted to lie between the die-block and the dies, a plate upon which the lower ends of the dies rest and which is provided with a shank extending through the die-block, and a longitudinally-movable bar having a wedge upon which the lower end of the shank rests, whereby the dies may be lifted.

9. The combination, with the die-block and dies adapted to inclose a blank, said die-block having in its upper side a recess provided with sections 15 of threads, of a nut 16, having corresponding sections of thread and a groove in its upper side, and a cross-piece engaging said groove and having a toothed segment by which the nut is turned to lock the threads together and hold the dies in position.

10. The combination, with the die-block and a nut adapted to hold the dies in position, of a plunger adapted to pass through the nut and into the dies, said plunger having a mi-

nute opening leading into a larger opening
and an escape-orifice, a valve in said opening
adapted to close the minute orifice and hav-
ing a hub at its upper end, a block 31, having
5 similar hubs, a spring between the block and
the valve, which is held in place by said hubs,
and a screw-plug by which the parts are held
in place, said block and valve being provided
with grooves 33 to permit the water to pass

freely to the escape-orifice when the valve is
has been lifted.

In testimony whereof I affix my signature in
presence of two witnesses.

WILLIAM S. STAPLEY.

Witnesses:

FRANK H. CUSHING,
E. S. THOMPSON.