

No. 736,433.

PATENTED AUG. 18, 1903.

F. C. B. PAGE.
DRAWING PRESS.
APPLICATION FILED JULY 3, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

FIG. 1.

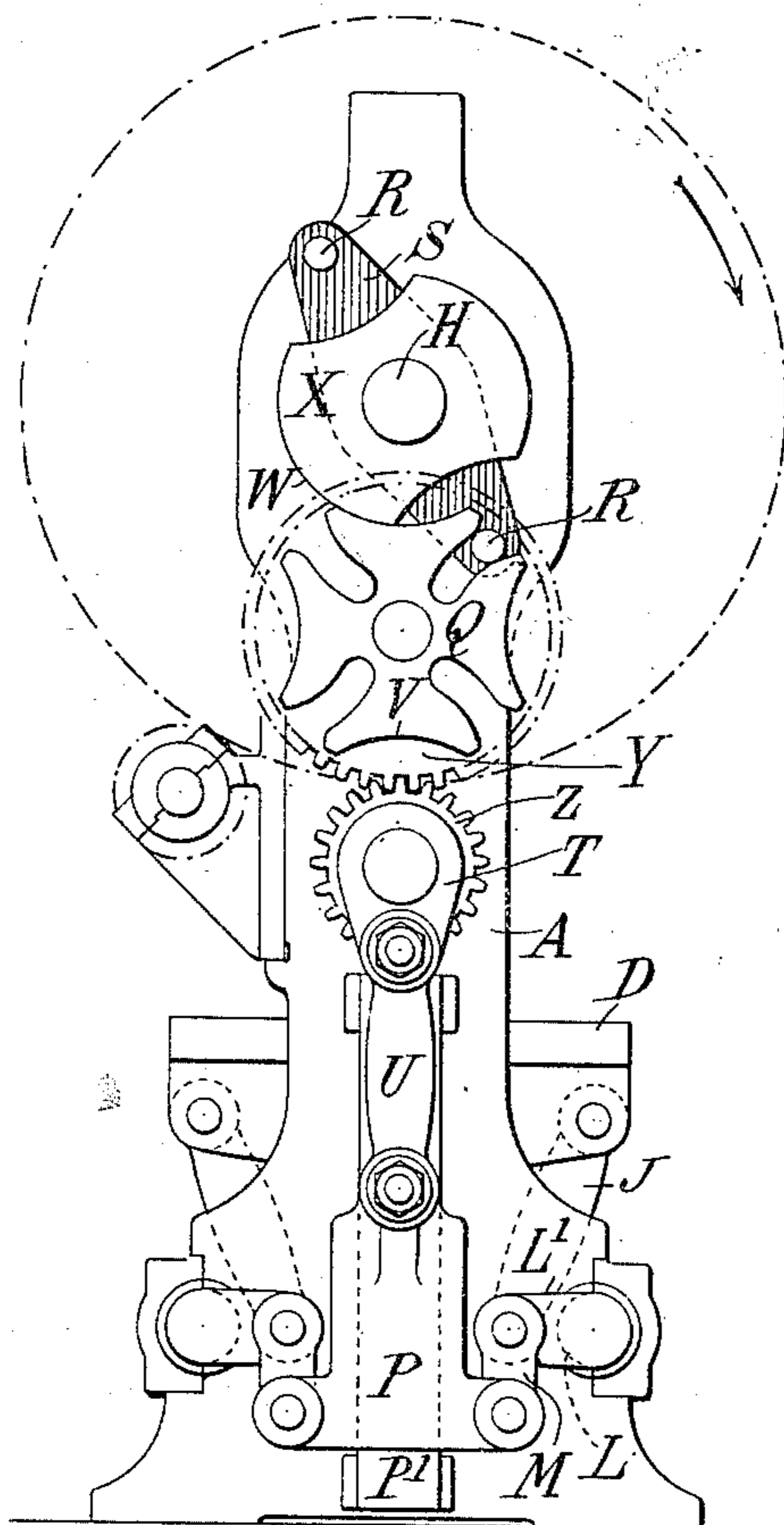
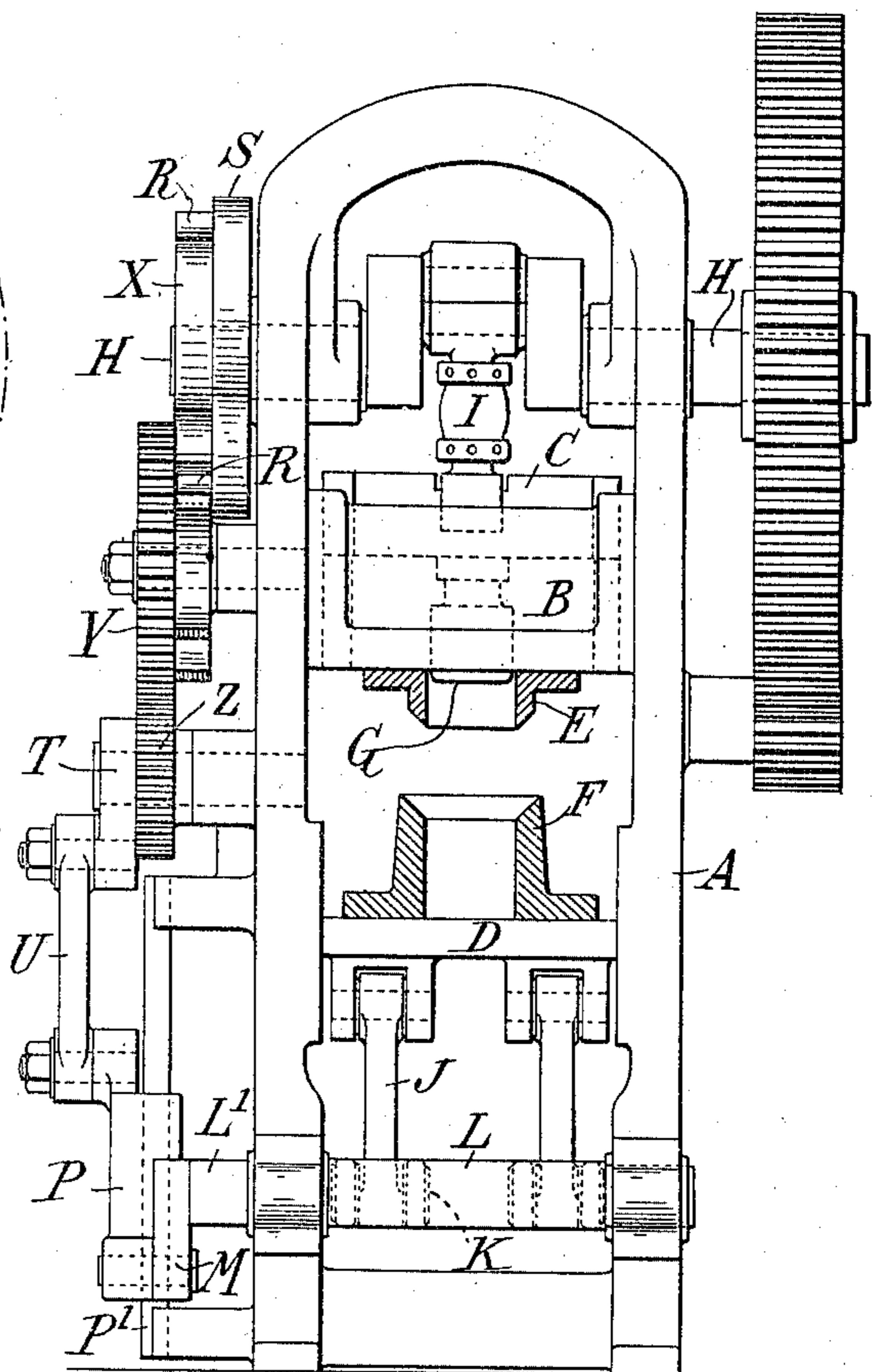


FIG. 2.



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2 SHEETS—SHEET 2.

FIG. 3.

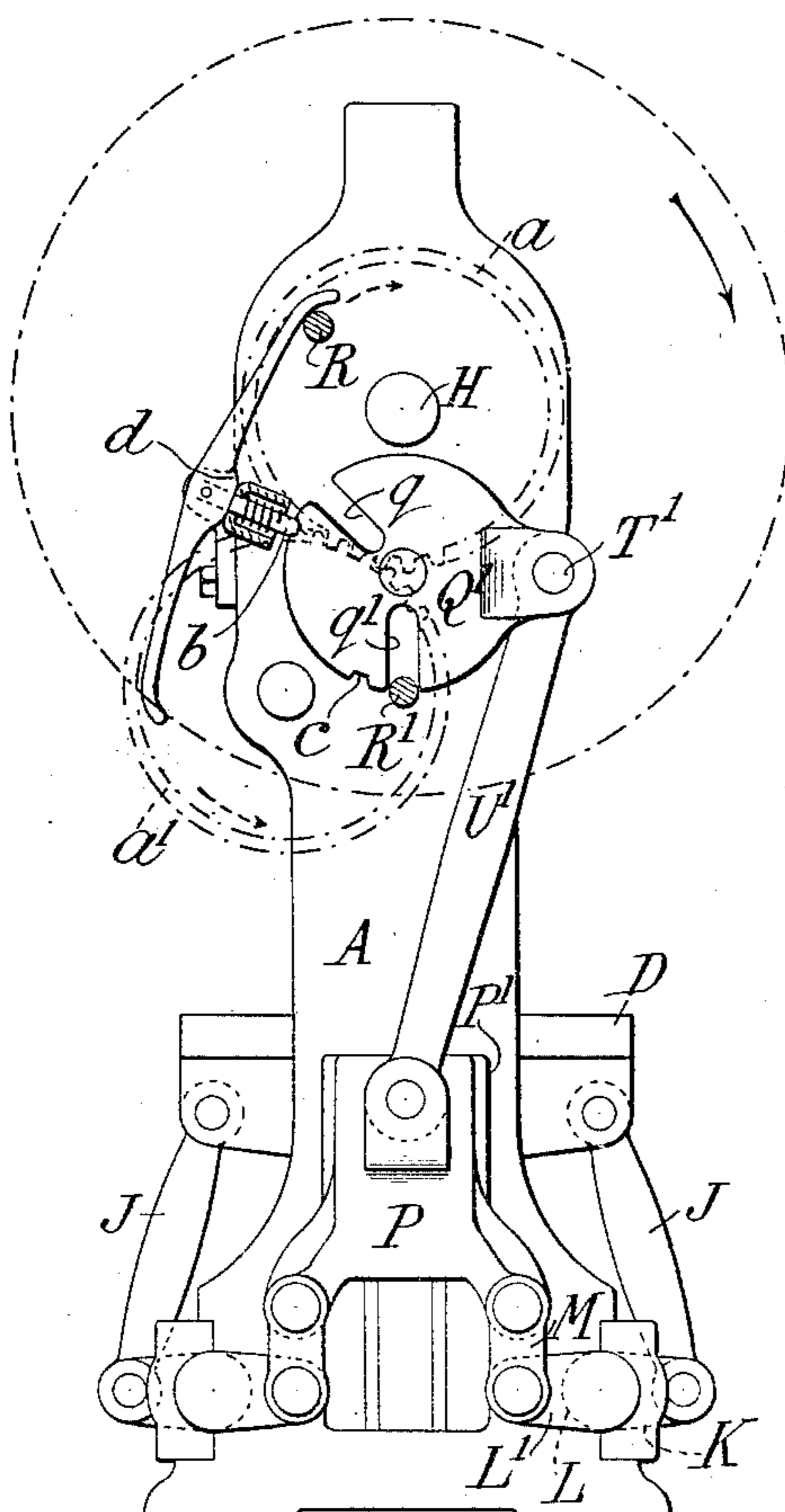
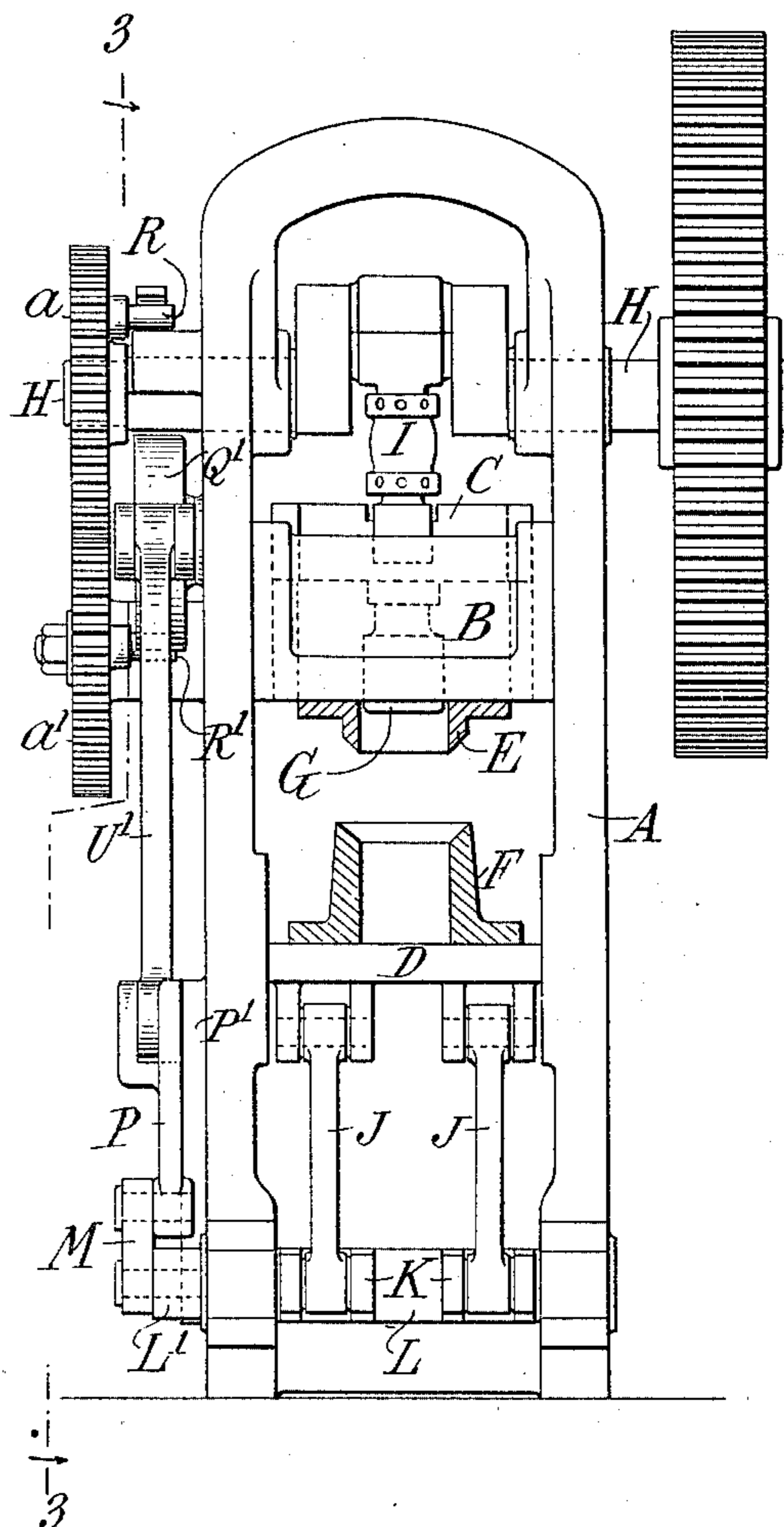


FIG. 4.



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UNITED STATES PATENT OFFICE.

FRANK C. B. PAGE, OF BROOKLYN, NEW YORK, ASSIGNOR TO E. W. BLISS COMPANY, OF BROOKLYN, NEW YORK, A CORPORATION OF WEST VIRGINIA.

DRAWING-PRESS.

SPECIFICATION forming part of Letters Patent No. 736,433, dated August 18, 1903.

Application filed July 3, 1902. Serial No. 114,304. (No model.)

To all whom it may concern:

Be it known that I, FRANK C. B. PAGE, a citizen of the United States, residing in the borough of Brooklyn, county of Kings, city and State of New York, have invented certain new and useful Improvements in Drawing-Presses, of which the following is a specification.

This invention relates to drawing-presses for drawing sheet metal or metal plates into cup-shaped articles. Such presses require an annular blank-holder for pinching the rim portion of the blank with a suitable graduated pressure and a punch or male die movable through the blank-holder for forcing the central portion of the blank into cup shape and drawing the metal between the blank-holding surfaces. In the American type of such presses the bed or lower die is stationary and the upper blank-holding member descends from above it, the punch also descending from above through the blank-holder and the female die. In the German type of such presses the upper blank-holding member is stationary and the lower blank-holding member or die is mounted upon a bed which moves up from beneath to clamp the blank, the punch moving down from above through the blank-holder and into the die to draw the blank. Ordinarily toggles are used for operating the movable blank-holding member, and the punch is driven from a crank so as to perform one drawing operation at each revolution, the blank being clamped in the blank-holder at about the beginning of the downstroke of the punch and being released immediately after the crank passes its lower dead-center, whereupon the movable blank-holding member separates from the stationary member to enable a new blank to be placed in position to be drawn. In the American type of press the die being stationary it is easy to place a blank thereon. In the German type of press the die being the movable member it is requisite that it be held stationary, or substantially so, for a sufficient time to enable the blank to be properly placed in position. In the German type of press, therefore, it is usual to move the die intermittently, holding

it stationary in its extreme upper and lower positions during about one hundred and twenty degrees of the crank movement and moving it up or down during about sixty degrees of such movement.

This invention provides an improved mechanism for obtaining such an intermittent movement of the die or other movable blank-holding member from the continuously-rotating crank-shaft, which mechanism is simple and compact and secures the necessary long stroke by means of devices which are not seriously affected by the ordinary wear which they sustain. The movable bed may receive its up-and-down movements immediately from the usual compound toggle-joint mechanism or from any other suitable mechanism. For driving such mechanism from the continuously-rotating main shaft I interpose a rotatable member operatively connected to the bed—as, for example, through the intermediation of such compound toggle-joint mechanism—and I employ means for transmitting the movement of the shaft intermittently to such rotatable member where by the bed is moved and is caused to dwell in its extreme positions. The means for transmitting the movement of the shaft intermittently to the rotatable member may, for example, be almost any one of the many pin-and-slot transmitting devices known or any variation of the known forms.

Referring to the accompanying drawings, illustrating embodiments of the invention, Figure 1 is a side elevation of a complete press. Fig. 2 is a front elevation thereof, the blank-holding dies being shown in section. Fig. 3 is a section on the line 3 3, Fig. 4, of another press embodying the invention. Fig. 4 is a front elevation thereof similar to Fig. 2.

The frame A of my improved press may consist, as shown, of two upright side frames connected together at top and bottom and having a stationary cross-head B fixed in place between them. A vertically-movable slide or plunger C is mounted to move through the open or hollow central portion of the cross-head B. A lower cross-piece D, constituting a movable bed or platen, is mounted to move vertically between the side frames,

being guided by any suitable slideways. The cross-pieces B and D carry, respectively, the clamping members E and F, which together constitute the blank-holder. A punch G is fastened beneath the plunger C and works through the blank-holding members E and F, the latter of which constitutes, as usual, the female die. The plunger C, with its punch G, may be moved by any mechanism known in the art or applicable to this purpose, being shown as operated by a crank on a main shaft H, the plunger being connected to the crank by a suitable connecting-rod or pitman I, which is adjustable in length, as usual, to adjust the punch up or down. This crank-driving mechanism imparts a regular rising-and-falling movement to the punch. Ordinarily the press will be driven continuously, although my invention does not exclude the provision of means for stopping the machine at the end of each complete revolution, so that it shall remain inactive until again started by the operator.

As shown in the drawings, the bed D is caused to ascend and descend by a well-known compound toggle consisting of links J J, jointed at their upper ends to the bed and at their lower ends to toggle-arms K K, projecting from shafts L L, which shafts have bearings in the side frames, and at one side of the machine these shafts extend through the side frames and have toggle-arms L', which arms are jointed to toggle-links M M, which in turn are jointed to a vertically-moving slide P, which is guided on slideways P'. In the positions shown in the drawings the bed is in its lowest position, the links M M being approximately vertical and the toggle-joints J K folded together or collapsed. As the slide P is pushed upwardly in Fig. 1 or downwardly in Fig. 3 it communicates a vertical thrust through the links M M to the arms L' and through the shafts L to the arms K K to swing the latter upward until they reach an approximately vertical position, an upward thrust being communicated from them through the toggle-links J J to the bed D.

For imparting motion to the slide P or other bed-operating mechanism I provide a suitable device between the crank H and the slide P, which shall be intermittently operated by the rotation of the crank-shaft and shall intermittently raise and lower the slide P. The construction shown in Fig. 1 for this purpose comprises a slotted disk Q, operated by means of pins R, carried on a double crank S on the shaft H, which disk Q in turn operates a crank T, which is connected by a pitman U to the slide P. The disk Q is provided with concave locking-faces V, which engage with convex locking-faces W on a suitable disk X, carried on the shaft H, the disk X being recessed at suitable points to permit the rotation of the disk Q when the pin R is in engagement with a slot of the latter disk. Rotating with the disk Q on the same stud is a toothed gear Y, which engages a pinion Z,

which is mounted on the same stud with and connected to rotate with the crank T. There being two pins R carried by the shaft H and four slots in the disk Q, the latter is given only one-half a rotation for each complete rotation of the main shaft and each complete operation of the punch. The pinion Z, however, is one-half the size of the gear Y, so as to make a complete rotation for each half-rotation of the gear Y, and therefore for each complete movement of the punch.

The operation is as follows: Starting from the position shown and in which the punch is at its highest point, the movement of the main shaft first transmits to the disk Q a quarter of a revolution, which brings the crank T and the slide P and bed D to their highest position. At about the end of this movement the punch has moved down sufficiently to engage the blank and commence the drawing operation. The convex edge W of the disk X then enters the concave edge V of the disk Q and holds the latter and the bed D stationary in its extreme upper position to cause a long dwell in this position. The opposite pin R then engages the next slot in the disk Q and produces another quarter-revolution, which depresses the crank T to its lowest position and also the slide P and bed D. Then follows a dwell, while the opposite convex edge W of the disk X locks the disk Q. At about the moment of beginning the downward movement of the bed D the punch G commences to rise, and when the bed D is in its lowest position it is clear of the punch, so as to permit of the feeding of a new blank.

Instead of using a completely rotative disk Q, as in Fig. 1, I may use a partially rotative or oscillating disk Q', Fig. 3, and I may attach a crank-pin T' directly to this disk, which connects, by means of a pitman U', with the slide P. The disk Q' in this case is shown as provided with a pair of slots q q', adapted for engagement with pins R R', carried, respectively, upon gears a a' in mesh with each other and driven from the main shaft H, as by mounting the gear a directly upon the shaft H. With this mechanism, starting from the position shown, the pin R' engages the slot q' and turns the disk a quarter of a revolution, throwing the slide P downward and the bed D upward. The punch simultaneously commences its downward movement and engages the blank at about the completion of the upward movement of the bed, caused by the disengagement of the pin R' from the slot q', which permits the disk Q' to remain at rest. There is then a dwell of the bed, while the punch continues its downward movement to draw the blank. At the end of the dwell the pin R engages the slot q (which was turned to proper position for such engagement by the previous movement) and turns the disk back to its original position, lifting the slide P and lowering the bed D to its extreme lower posi-

tion. Upon disengagement of the pin R from the slot *q* the disk Q' again has a period of rest, and another dwell follows, during which the punch completes its upward movement, and the cycle of operations commences again.

For holding the disk Q' in the positions to which it is moved any suitable locking means may be used—such, for example, as the spring-bolt *b*, suitably mounted on the frame of the machine and entering notches *c* in the disk. The disk is released at the moment when one of the pins R R' enters its slot by the engagement of the other of said pins with an arm of the double cam *d*, so as to withdraw the bolt from the notch of the disk.

Though I have described with great particularity of detail apparatus embodying my invention, yet it is to be understood that the invention is not limited to the particular apparatus disclosed. Various modifications thereof in detail and in the combination and arrangement of the parts are possible to those skilled in the art without departure from the invention.

What I claim, therefore, is—

1. In a drawing-press, the combination with a fixed upper and a moving lower blank-holding member, and a bed carrying the latter, of a continuously-rotating shaft, a rotatable member, means for transmitting the movements of said shaft intermittently to said rotatable member, a toggle mechanism for raising and lowering said bed, and an operative connection between said mechanism and said intermittently-moving member, whereby the intermittent movements thereof cause the bed to dwell in its lower or inactive position after each stroke.

2. In a drawing-press, the combination with a fixed upper and a moving lower blank-holding member, and a bed carrying the latter, of a continuously-rotating shaft, a rotatable member, means for transmitting the move-

ments of said shaft intermittently to said rotatable member, a reciprocating slide connected to said rotatable member, and a toggle mechanism connected to said slide and adapted to raise and lower said bed, whereby the intermittent movements of said rotatable member cause the bed to dwell in its lower or inactive position after each stroke.

3. In a drawing-press, the combination with a fixed upper and a moving lower blank-holding member, and a bed carrying the latter, of a continuously-rotating shaft, a rotatable member, a pin-and-slot mechanism for transmitting the movements of said shaft intermittently to said rotatable member, a reciprocating slide connected to said rotatable member, and a toggle mechanism connected to said slide and adapted to raise and lower said bed, whereby the intermittent movements of said rotatable member cause the bed to dwell in its lower or inactive position after each stroke.

4. In a drawing-press, the combination with a fixed upper and a moving lower blank-holding member, and a bed carrying the latter, of a continuously-rotating shaft, a rotatable member, means for transmitting the movements of said shaft intermittently to said rotatable member, a crank driven by said member, a reciprocating slide operated by said crank, and a toggle connected between said slide and bed whereby the intermittent movements of said rotatable member cause the bed to dwell in its lower or inactive position after each stroke.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

FRANK C. B. PAGE.

Witnesses:

OTTO S. BEYER,
FRED. H. MCGABIE.