

W. KLOCKE.

PRESS.

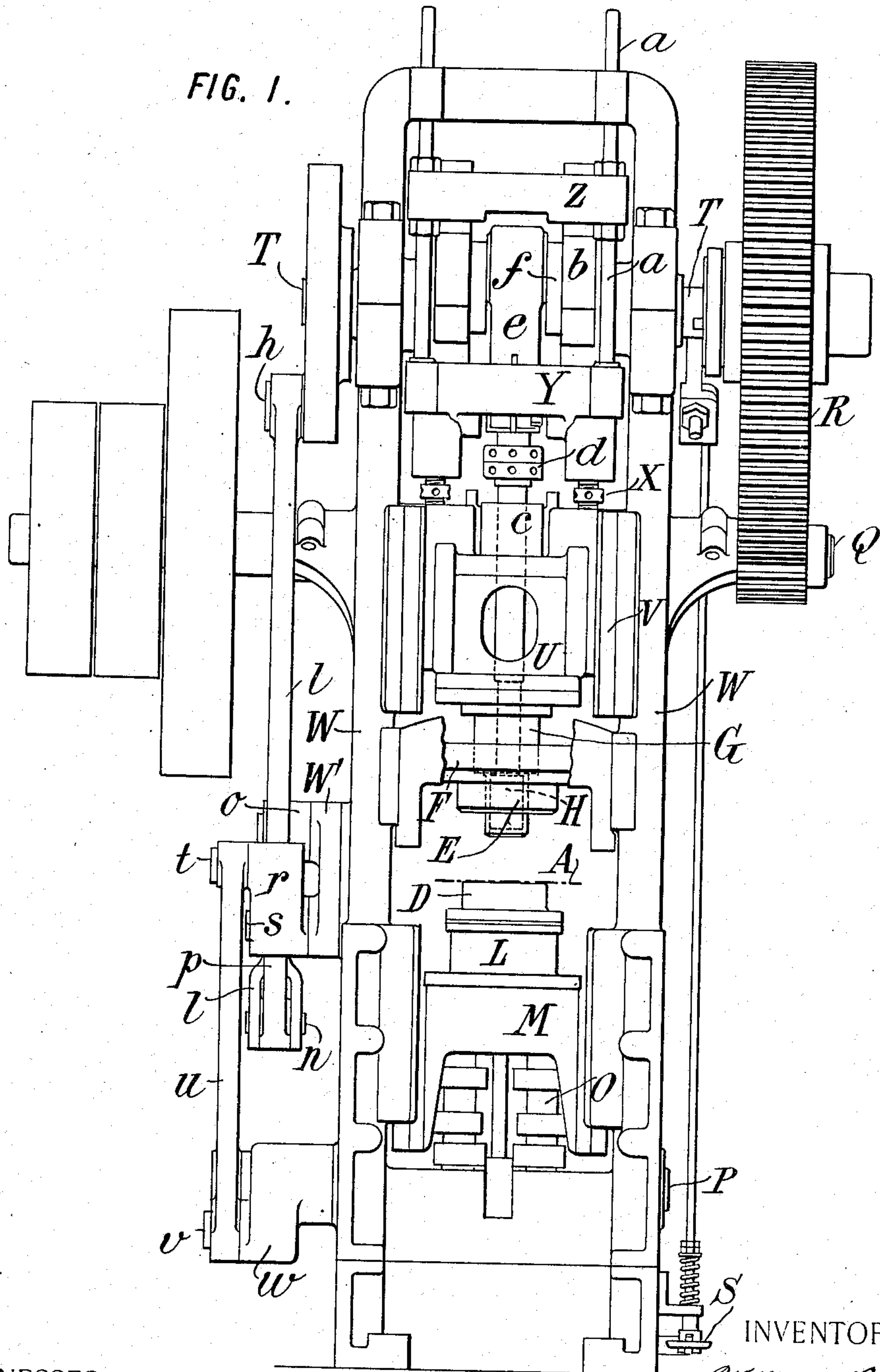
APPLICATION FILED MAR. 31, 1908.

930,602.

Patented Aug. 10, 1909.

4 SHEETS—SHEET 1.

FIG. 1.



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4 SHEETS—SHEET 2.

FIG. 2.

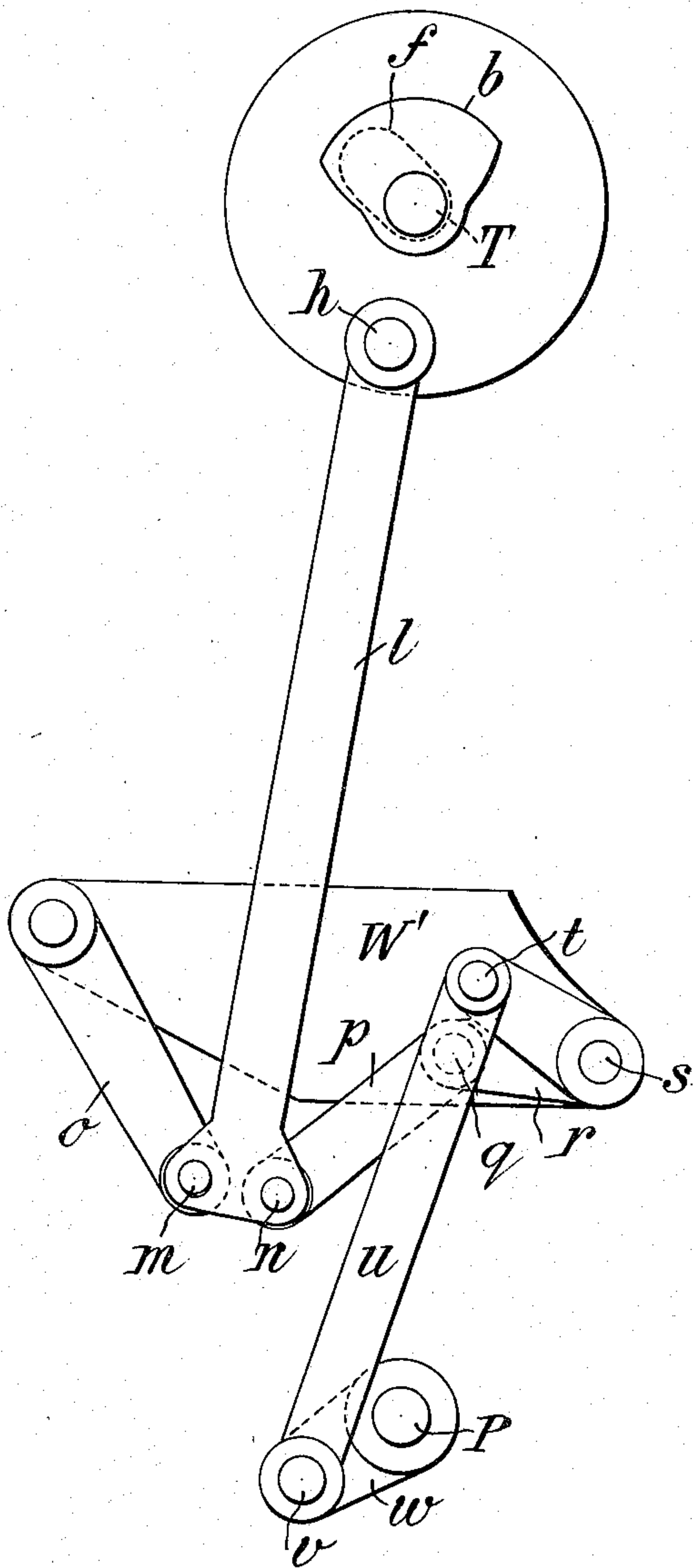
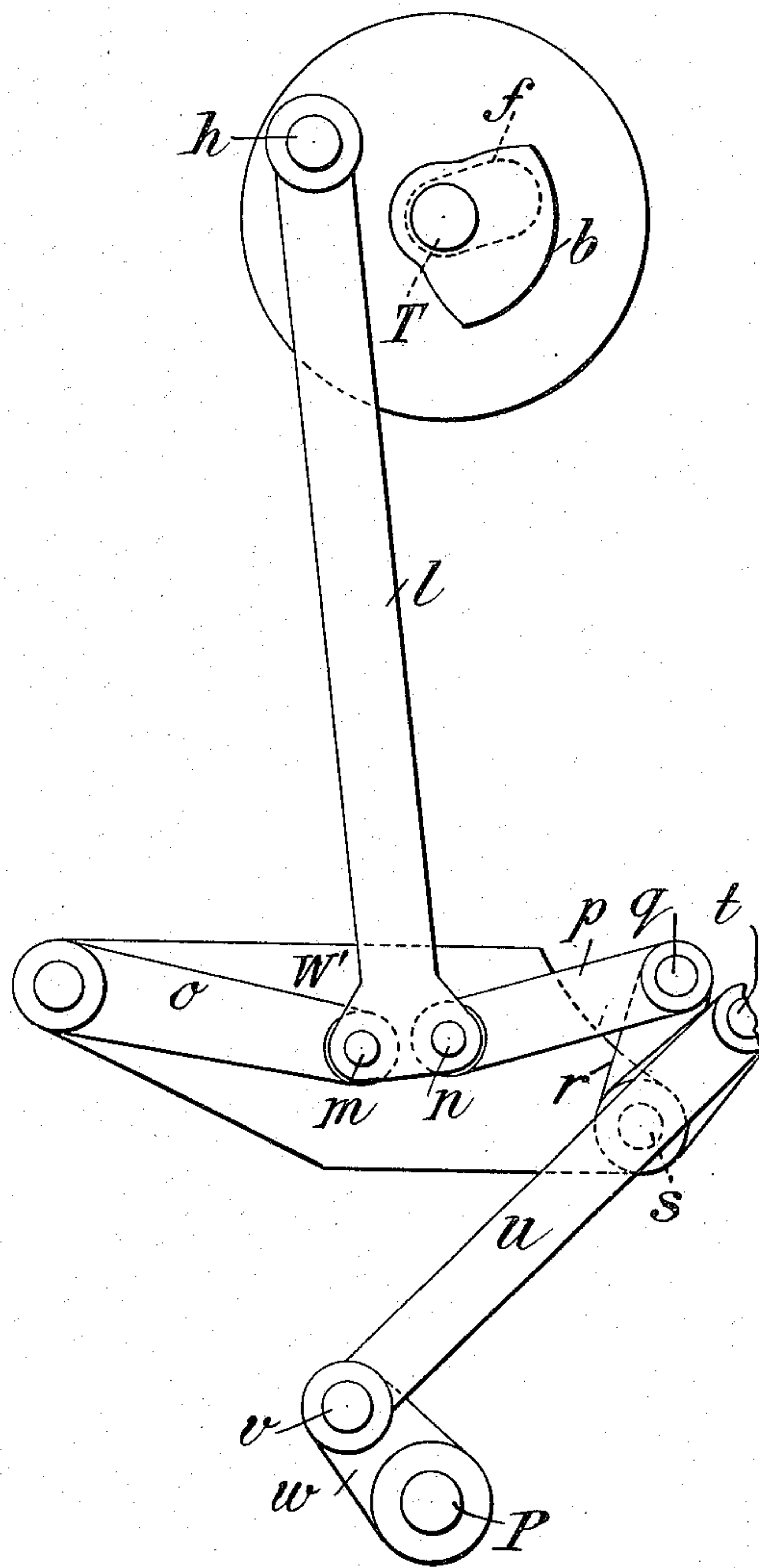


FIG. 3.



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4 SHEETS—SHEET 3.

FIG. 5.

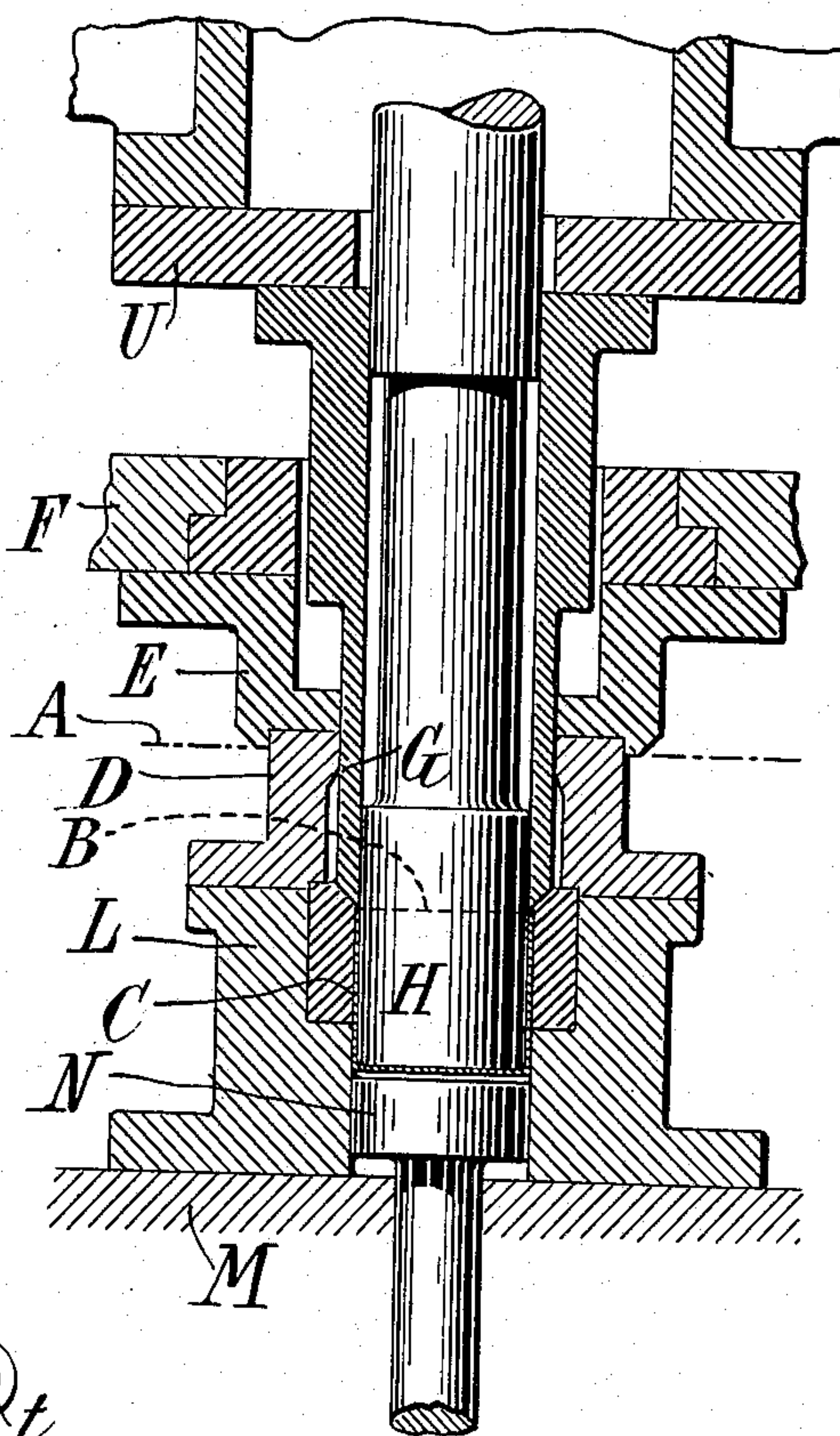
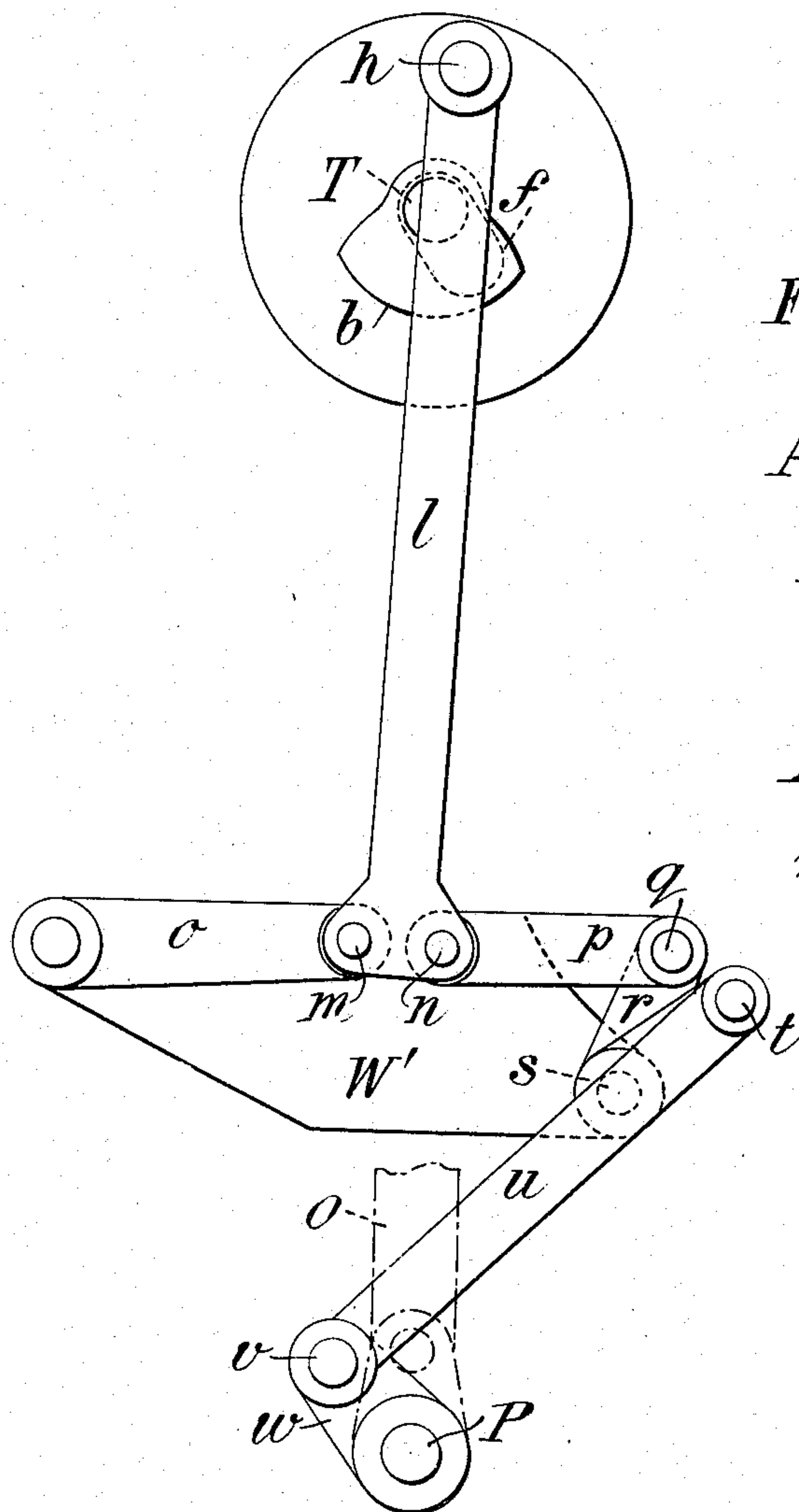


FIG. 4.



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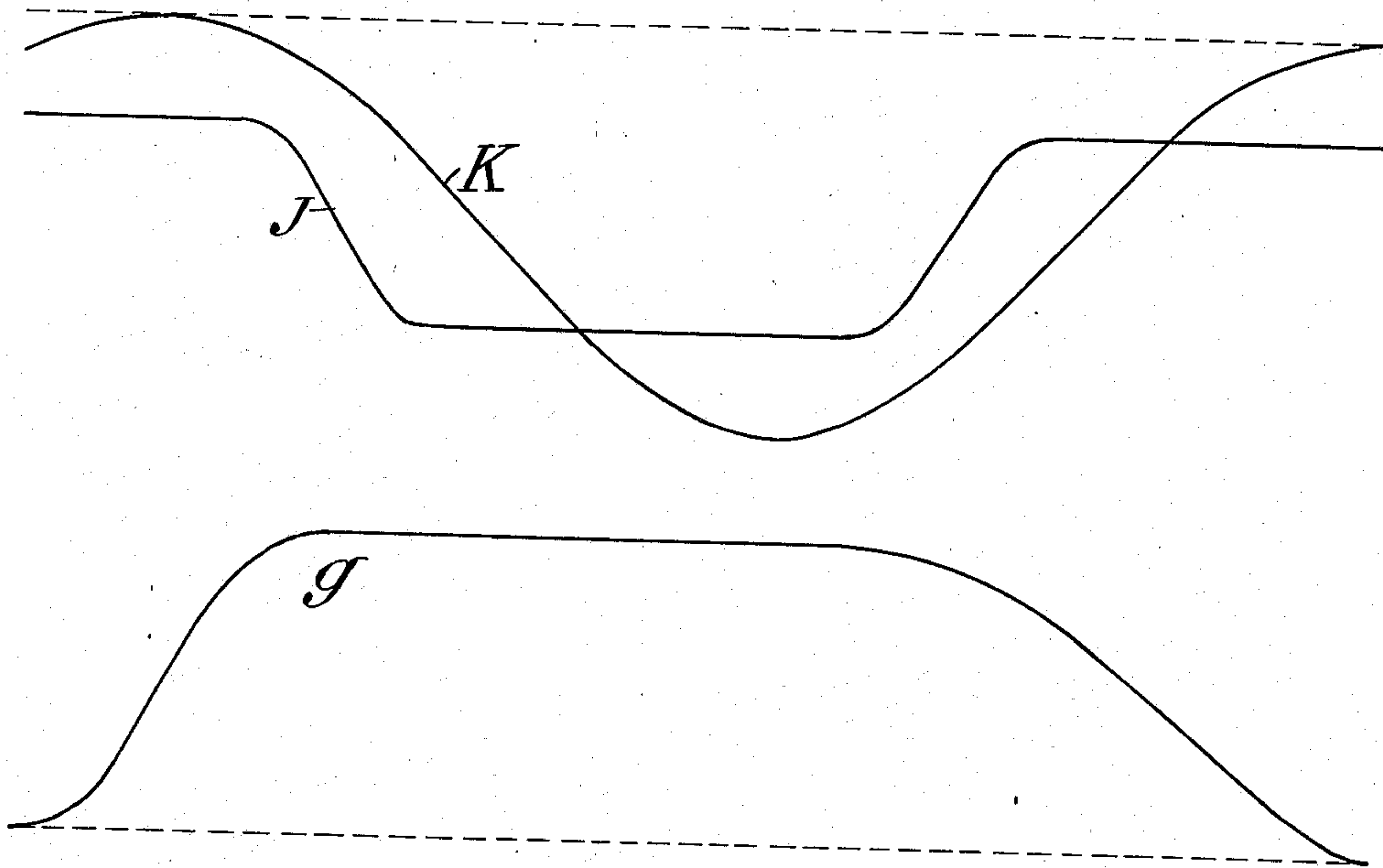
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4 SHEETS—SHEET 4.

FIG. 6.



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UNITED STATES PATENT OFFICE.

WILLIAM KLOCKE, OF NEW YORK, N. Y., ASSIGNOR TO E. W. BLISS COMPANY, OF BROOKLYN, NEW YORK, A CORPORATION OF WEST VIRGINIA.

PRESS.

No. 930,602.

Specification of Letters Patent.

Patented Aug. 10, 1909.

Application filed March 31, 1908. Serial No. 424,316.

To all whom it may concern:

Be it known that I, WILLIAM KLOCKE, 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 Presses, of which the following is a specification.

This invention aims to provide certain improvements in presses, and which are especially applicable to drawing presses which first cut and then in two successive steps draw a sheet of metal to a desired tubular form.

The accompanying drawings illustrate an embodiment of the invention.

Figure 1 is a face elevation of a press embodying the invention. Figs. 2, 3 and 4 are side elevations of certain transmitting mechanism in successive positions. Fig. 5 is a central section through the cutting and punching tools. Fig. 6 is a diagram of the successive positions of the several tools or movable parts of the machine.

Referring to the embodiment of the invention illustrated, the broken and dotted line A, Fig. 5, indicates the original sheet, the dotted line B the position of the sheet after the cutting and the first punching operations, and C the final shape of the work. In operation the sheet A is first laid upon the lower (in this case the movable) cutter D which constitutes also the first drawing die and is moved upward until the cutting is effected by means of the upper or fixed die E which is supported from a cross-brace F of the main frame of the machine. The cut-out portion of the sheet-metal is held between the cutting dies D and E until engaged by the descending punches, respectively an outer hollow punch G and an inner punch H, the former being the first punch and the latter the second. These two punches pass through the hollow die E, both punches partaking of the first movement substantially or nearly synchronously as indicated by the curves J and K, Fig. 6, corresponding to the movements of the punches G and H respectively. The descending punches thus draw the metal down to the position shown at B. The outer or first punch G comes to a stop in a position to press the metal down upon the second drawing die L, and the second punch continues its movement to draw the metal down to the position C. Thereafter the punches

are raised clear of the work and the movable bed M supporting the cutting and drawing dies is lowered, the knock-out N remaining stationary or being lifted as far as is necessary to hold the finished work clear and to permit its ready removal from the machine. The lifting and lowering of the movable bed M is effected by means of links O, Fig. 1, connected to crank arms on a shaft P, as is common in other machines of this type, and the knock-out may be controlled in any of the various known ways or in any other suitable way.

The machine is driven from a shaft Q which drives a gear R, which by means of a one-revolution clutch controlled from a pedal S is connected to the main shaft T of the machine so as to give this one complete rotation, and is then automatically disconnected until the work is removed and a new sheet placed in the machine, whereupon the operator again presses the pedal S. The three principal movements of the machine,—the movement of the cutter and blank holders, the first punching movement, and the second punching movement,—are all obtained from the main shaft T. For this purpose the outer punch G is carried upon a hollow slide U guided in ways V carried by the side frames W of the machine, the slide U being adjustably connected by means of screws X with a cross-head Y which in turn is adjustably connected to an upper cross-head Z, the rods *a* which connect the cross-heads Y and Z to each other being extended upward through the top of the machine frame and guided therethrough. Cams *b* are mounted close to the bearings of the shaft T, and engage the cross-heads Y and Z to raise and lower the outer punch.

The inner punch H is guided in the outer punch, being carried upon a rod the upper end of which constitutes a slide *c* which is connected adjustably by means of a nut *d* to a link *e* the upper end of which is carried by cranks *f* on the shaft T. The angular position of the cams *b* and cranks *f* relatively to each other is indicated in Figs. 2, 3 and 4, and results in the operation of the two punches according to the curves J and K previously referred to.

For transmitting the movement from the main shaft T to the lower shaft P which actuates the movable bed, I have devised a

mechanism for securing a very quick initial movement until the lower bed is brought up nearly to the cutting and clamping position, and a very slow and powerful movement thereafter; and this transmitting mechanism is applicable whether the member moved be a cutting and clamping die as in the present case, or whether it be some other movable member of the press. This mechanism includes preferably a toggle, a crank arm which is actuated by said toggle at a diminishing speed, and a second crank arm linked to the first and actuated thereby at a diminishing speed. Preferably also the toggle is substantially straight at the end of an actuating movement, and the link between the two crank arms extends approximately across the axis of the first arm. This mechanism results in a movement of the bed which is indicated by the curve *g* (Fig. 6).

The starting position of the machine is shown in Fig. 2, the position after the shaft has been rotated 108 degrees in Fig. 3, and after the shaft has been rotated 180 degrees in Fig. 4. Fig. 3 represents the point at which the movable bed has risen to the limit of its upward movement. The shaft *T* is provided with a crank pin *h* connected to the upper end of a link *l* the lower end of which is provided with a pair of pins *m n* whose centers are in a line transverse to the length of the link. The pin *m* connects the operating link *l* with a toggle link *o* fastened at its opposite end to a fixed point upon plate *W'* fastened upon the side frame of the machine. The pin *n* connects the operating link with a second toggle link *p* the opposite end of which is connected by a pin *q* with an arm *r* upon a shaft *s* fixed to the plate *W'*. The arm *r* is in effect a double arm carrying a second pin *t* which is connected to the upper end of a link *u* the lower end of which is fastened by a pin *v* to an arm *w* on the bed-operating shaft *P* previously referred to.

As shown by Fig. 3, the crank pin *h* on the main shaft *T* moves through an arc of 108 degrees in order to bring the link *u* in line with the shaft *s*, this being the position in which the bed-operating shaft *P* is farthest advanced and the bed lifted to its clamping position, the cam-operated outer punch being about to begin its punching operation. A very long movement of the movable part may be effected by this mechanism, since the movement comes to a gradual stop regardless of the original velocity. In the beginning the line from the shaft *s* to the pin *t* is nearly at right-angles to the link *u*, and the toggle *o p* is in its most bent position, so that from each of these there results a high speed. In the position of Fig. 3 the pin *t* has a minimum speed efficiency, and the same is approximately true for the toggles.

The further movement of the toggles to the position of Fig. 4 and back again to that

of Fig. 3 (with the link *l* on the opposite side of the axis of the shaft *T*) merely swings the toggles to the position in which they are slightly beyond their straight-line relation and swings the pin *t* so slightly beyond its position of rest or "center" as to effect no longitudinal movement of the link *u* or of the bed of the machine. During this stand-still of the lower bed the cam *b* bears with its concentric portion upon the outer punch so that the latter also stands still; while the crank *f* moves the inner punch downward through its full stroke and commences its lifting movement.

What I claim is:—

1. A press including a movable member and mechanism for moving the same, said mechanism including a toggle and a crank arm actuated by said toggle at a diminishing speed.

2. A press including a movable member and mechanism for moving the same, said mechanism including a toggle and a crank arm actuated by said toggle at a diminishing speed, and a second crank arm linked to the first and actuated thereby at a diminishing speed.

3. A press including a movable member and mechanism for moving the same, said mechanism including a toggle and a crank arm actuated by said toggle, said toggle being substantially straight at the end of an actuating movement.

4. A press including a movable member and mechanism for moving the same, said mechanism including a toggle and a crank arm actuated by said toggle, said toggle being substantially straight at the end of an actuating movement, and a second crank arm linked to the first and actuated thereby, the link being adapted to extend approximately across the axis of the first arm at the end of an actuating movement.

5. A press including a movable member and a toggle mechanism for moving the same, said mechanism including toggle links *o* and *p*, an operating link *l* connected thereto, a crank pin *h* connected to said link *l*, and means including a crank arranged to transmit the motion of said toggle mechanism at a diminishing speed to said movable member.

6. A press including a movable member and a toggle mechanism for moving the same, said mechanism including a crank pin *t*, toggles for swinging said pin *t*, a link *u* connected to said pin *t*, and a second arm operated by said link *u* and operating the movable member.

7. A press including a pair of movable members, a shaft, means for transmitting the action of said shaft to one of said members, and toggle mechanism for transmitting the action of said shaft to the other member, said mechanism including a toggle and a

crank arm actuated by said toggle at a diminishing speed.

8. A press including a pair of movable members, a shaft, means for transmitting the action of said shaft to one of said members, and toggle mechanism for transmitting the action of said shaft to the other member, said mechanism including a toggle and a crank arm actuated by said toggle at a diminishing speed, and a second crank arm linked to the first and actuated thereby at a diminishing speed.

9. A press including a pair of movable members, a shaft, means for transmitting the action of said shaft to one of said members, and toggle mechanism for transmitting the action of said shaft to the other member, said mechanism including a toggle and a crank arm actuated by said toggle at a diminishing speed, and an operating link for said toggle connected to a crank pin rotated by said shaft and at such an angle as to secure a minimum movement of said link as the toggle stands approximately straight.

10. A press including a pair of movable members, a shaft, means for transmitting the action of said shaft to one of said members, and toggle mechanism for transmitting the action of said shaft to the other member, said mechanism including a toggle and a crank arm actuated by said toggle at a diminishing speed, a second crank arm linked to the first and actuated thereby at a diminishing speed, and an operating link for said toggle connected to a crank pin rotated by said shaft and at such an angle as to secure a minimum movement of said link as the toggle stands approximately straight.

11. A press including, in combination, an outer punch, an inner punch, a shaft carrying a crank operating said inner punch and a cam operating said outer punch, a blank-holder and cutter having a movable member, and a toggle mechanism for operating said member with a quick initial movement and a slow final cutting and clamping movement.

12. A press including, in combination, an outer punch, an inner punch, a shaft carrying a crank operating said inner punch and a cam operating said outer punch, a blank-holder and cutter having a movable member, and a toggle mechanism for operating said member with a quick initial movement and a slow final cutting and clamping movement, said toggle mechanism including a toggle and a

crank arm actuated by said toggle at a diminishing speed.

13. A press including, in combination, an outer punch, an inner punch, a shaft carrying a crank operating said inner punch and a cam operating said outer punch, a blank-holder and cutter having a movable member, and a toggle mechanism for operating said member with a quick initial movement and a slow final cutting and clamping movement, said toggle mechanism including a toggle and a crank arm actuated by said toggle at a diminishing speed, and a second crank arm linked to the first and actuated thereby at a diminishing speed.

14. A press including, in combination, an outer punch, an inner punch, a shaft carrying a crank operating said inner punch and a cam operating said outer punch, a blank-holder and cutter having a movable member, a toggle mechanism for operating said member with a quick initial movement and a slow final cutting and clamping movement, said toggle mechanism including a toggle and a crank arm actuated by said toggle at a diminishing speed, and an operating link for said toggle connected to a crank pin rotated by said shaft and at such an angle as to secure a minimum movement of said link as the toggle stands approximately straight.

15. A press including, in combination, an outer punch, an inner punch, a shaft carrying a crank operating said inner punch and a cam operating said outer punch, a blank-holder and cutter having a movable member, a toggle mechanism for operating said member with a quick initial movement and a slow final cutting and clamping movement, said toggle mechanism including a toggle and a crank pin actuated by said toggle at a diminishing speed, a second crank arm linked to the first and actuated thereby at a diminishing speed, and an operating link for said toggle connected to a crank pin rotated by said shaft and at such an angle as to secure a minimum movement of said link as the toggle stands approximately straight.

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

WILLIAM KLOCKE.

Witnesses:

DOMINGO A. USIN,
THEODORE T. SNELL.