W. KLOCKE.

PRESS OR THE LIKE.

APPLICATION FILED MAR. 16, 1921.

1,433,627. Patented Oct. 31, 1922.

2 SHEETS—SHEET 1.

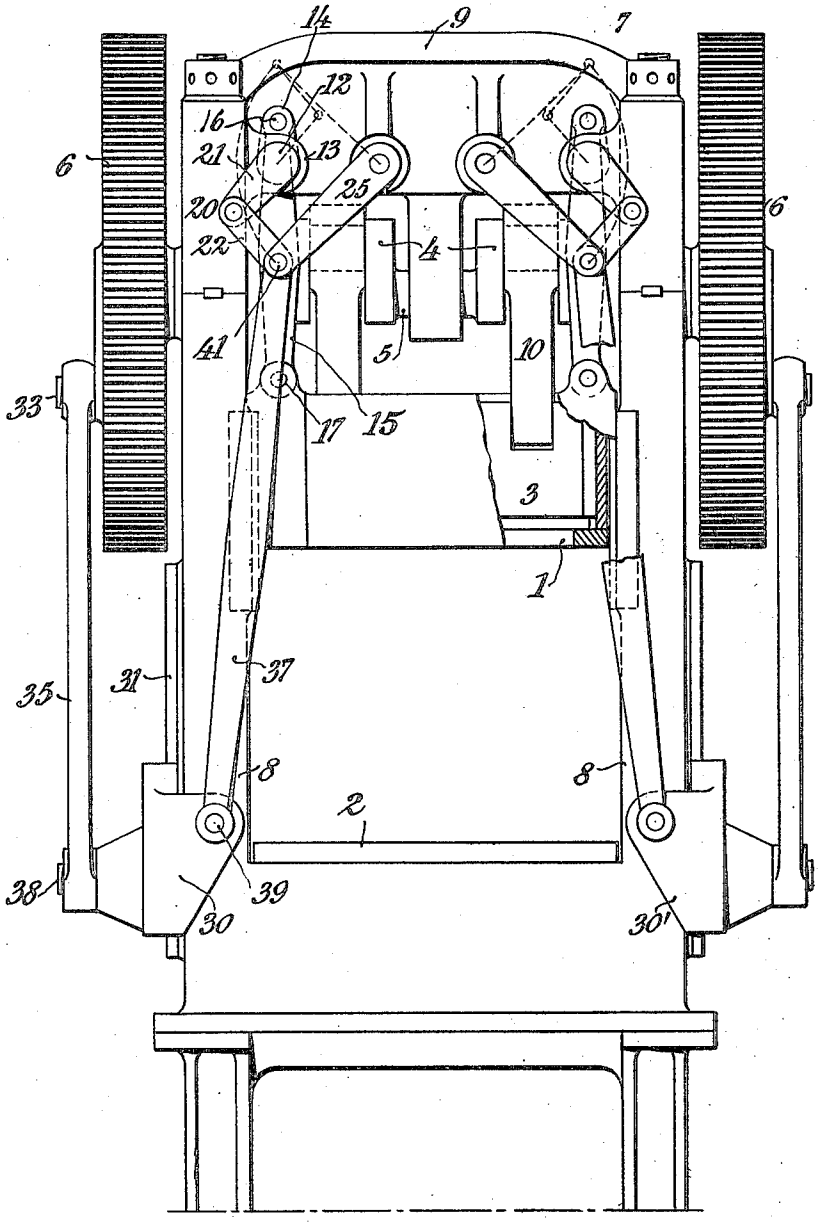


Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 2.

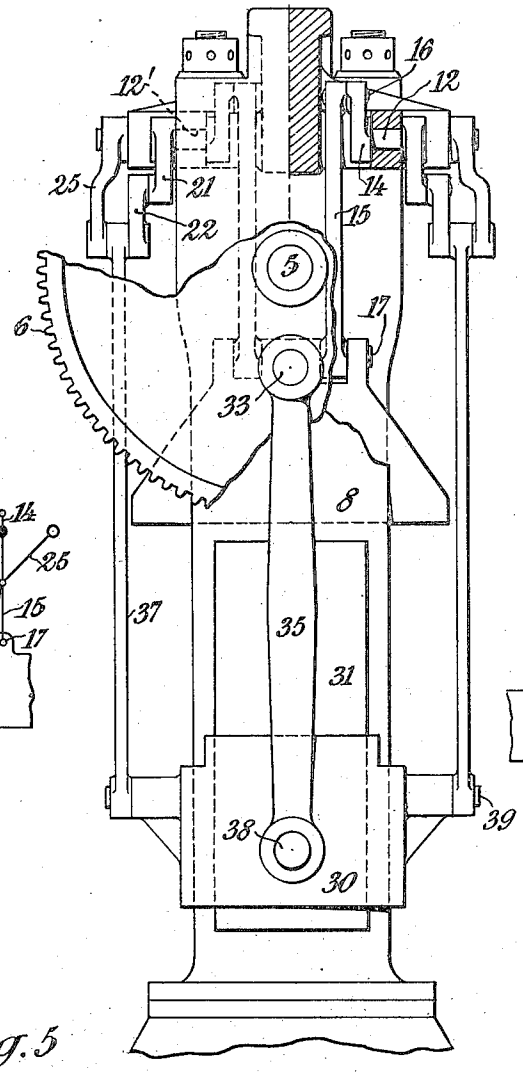


Fig. 3.

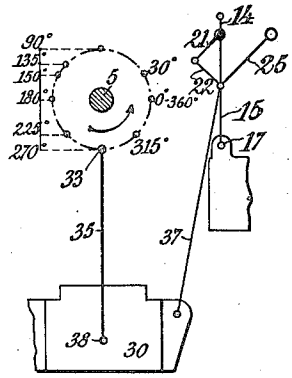


Fig. 4.

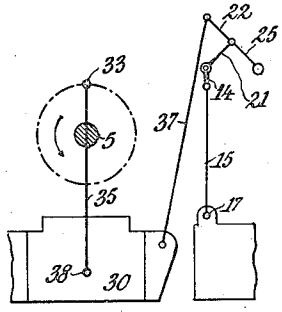
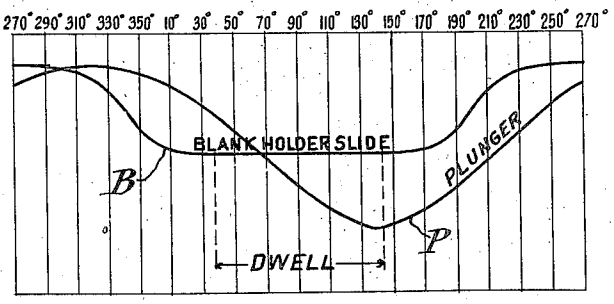


Fig. 5



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UNITED STATES PATENT OFFICE.

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

PRESS OR THE LIKE.

Application filed March 16, 1921. Serial No. 452,744.

To all whom it may concern:

Be it known that I, WILLIAM KLOCKE, a citizen of the United States of America, residing in Woodhaven, in the borough and county of Queens and State of New York, have invented certain new and useful Improvements in Presses or the like, of which the following is a specification.

This invention relates to improvements in presses or the like, and more particularly to drawing presses, and aims to provide improvements therein.

The invention provides a novel mechanism for actuating a reciprocatory part (such as a bed or blank-holder slide) with a "dwell" in its movement.

The invention further provides a construction wherein the immediate mechanism for effecting the dwell, may be located adjacent the main crank-shaft of the press, preferably, in the head frame of the press, and also wherein the force for actuating said reciprocatory dwelling part may be taken from the main crank-shaft, at the outside of the frame.

The invention further provides a mechanism whereby force may be taken from said crank-shaft, outside of the frame, and transmitted to a rock shaft (or equivalent) having an axis crossing that of said crank-shaft, (said rock shaft forming part of the mechanism actuating said reciprocatory dwelling part), by the use of joints, such as pin and cylindrical socket joints, which are firm, strong, and have broad bearing surfaces.

This invention further provides a mechanism particularly suitable for presses having considerable width between the side frames.

Broad claims comprehending the present invention, are contained in the Klocke and Dobson application, Serial No. 297,911, filed May 17, 1919.

An embodiment of the invention is illustrated in the accompanying drawings, wherein

Fig. 1 is a front view of a drawing press of a type especially adaptable for drawing long articles.

Fig. 2 is a side view (with parts in section and parts broken away), of the construction shown in Fig. 1.

Figs. 3 and 4 are diagrammatic views, illustrating the parts in two extreme positions of their movements, and

Fig. 5 is a diagrammatic view showing, by means of curves, the movement and preferred timing of the blank holder and punch slides 1 and 3.

Referring to the drawings, numeral 1 designates a reciprocatory slide adapted to carry a blank holder or die, according to the design of the press, 2, a bed (on which a die is usually mounted), and 3, a punch or plunger slide working in the blank holder or die-carrying slide (and on which a punch or male forming member is usually mounted).

The plunger slide 3 is conveniently given a reciprocatory movement by cranks 4 upon a shaft 5, driven by a gear or gears 6, at one or both ends of said shaft. Numeral 7 designates the frame of the press, which may comprise side frames 8 and a head frame 9, and the crank-shaft 5 is preferably mounted in the upper part of said frame with the gear or gears 6 thereon at the outer sides of said frames 8. The plunger slide 3 is conveniently connected to the cranks 4 by means of connecting rods 10.

Means are provided for reciprocating, with a dwell, the blank holder or die-carrying slide 1. This means preferably comprises a rock shaft or equivalent part 12, conveniently mounted at the upper part of the frame in brackets 13. Means are provided for connecting the rock shaft to the slide 1. Conveniently, the rock shaft 12 may have thereon an arm 14 connected to a link 15, as indicated at 16, which link is connected to the slide 1, as indicated at 17.

The means for rocking the rock shaft 12 conveniently comprises a swinging toggle 20, one leg of which may be an arm 21 on the rock shaft 12, and the other leg of which may be a link 22. The toggle 20 is also connected to a pivoted lever 25 (or equivalent), which lever 25 has a short angular movement and cooperates with the actuating mechanism to impart a greater angular movement to said rock shaft 12, preferably, an angular movement of 180 degress. One extreme of the movement of said lever 25 and associated parts is illustrated in full lines in Fig. 1, and its other extreme is indicated in dotted lines, Fig. 1.

The toggle 20 is swung to and from the positions shown in full and dotted lines. The means for this purpose conveniently

comprise a slide 30, conveniently mounted upon gibs, or the like, 31, on the side frame, and the slide conveniently receives its driving force and is reciprocated by suitable means upon the crank shaft 5, preferably an eccentric pin 33 on the gear 6 attached to said shaft 5, through a connecting rod 35. The toggle 20 and slide 30 are conveniently connected by means of a rod 37.

The connection 38 of the rod 35 to the slide 30, is preferably a pin or stud and a cylindrical socket. The connection 39 between the rod 37 and the slide 30 is also preferably a pin or stud and a cylindrical socket, such pin and socket connections affording a broad bearing surface between the parts, and constituting a strong and firm joint.

The connection 41 between the rod 37 and toggle 20, is likewise preferably a pin and cylindrical socket, and the pin of the connection 41 may also serve as a part of the joint between the toggle 20 and lever 25.

The rock shaft 12 is preferably arranged crosswise of the crank-shaft 5, and the pins of the connections 39 and 41 are preferably arranged parallel to the axis of the shaft 12, and the pins of the connections 33 and 38 are preferably arranged parallel to the axis of the crank-shaft 5, thereby providing a transmission avoiding a universal movement in any of the joints.

In the construction of large presses, the rock shaft 12 is preferably prolonged or duplicated on the front and rear of the press, as indicated at 12′ (Fig. 2), and the connections from the prolongation or rock shaft 12′ to the slide 1 and to the slide 30, are conveniently duplicates of those connected to the rock shaft 12.

Moreover, in presses for drawing long articles, the mechanism for actuating the slide 1 is preferably duplicated on the two sides of the press, as indicated in Fig. 1, this duplication conveniently comprising a slide 30′ on the side frame opposite the slide 30, the slides 30, 30′ being each driven from a gear 6, the driving gears of the crank-shaft 5, in this type of machine, being preferably duplicated. There are, therefore, symmetrical driving connections for the slide 1 with respect to two mid-planes of the press, one running from side to side, and the other from front to rear.

Operation.

The press is shown in Figs. 1 and 2, and in the diagrammatic view (Fig. 3), as being at the top-stroke position of the punch and blank holder slide 1. There is a negative and positive acceleration of the parts toward and from the 270° positions, in which position the slide reverses its movement.

From the 315° position to the 360° position, the movement of the slide 1 is quite rapid, inasmuch as the crank pin 33 is moving in that part of its circle which is in the general direction of the movement of the slide 30. Moreover, there is only a slight amount of lost motion in the toggle 20 owing to the closing of the legs at this part of the movement, and the toggle constituted by the crank 14 and link 15 is rapidly opening.

From the 0° or 360° position to the 30° position, there is a negative acceleration. From the 30° position to the 150° position (120° or thereabout), there is a dwell in the movement of the blank holder slide 1, this being due to the fact that the crank pin 33 is traveling generally across the line of movement of the slide 30, the toggle constituted by the parts 14 and 15 being fully extended, and the leg 22 of the toggle oscillating around a virtually fixed point corresponding to the axis of the joint between the legs 21 and 22. The position of the parts in the 90° position of the crank pin 33, is indicated in Fig. 4.

From the 150° position to the 225° position, there is a rapid movement of the slide 30, which communicates a rapid movement of the toggle 20 and hence rapidly moves the blank holder slide away from its blank holding position and toward the top of its stroke.

From the 225° position to the 270° position, there is a negative acceleration, a reversal of movement, and a positive acceleration of the blank holder slide on its downstroke, as heretofore explained. The timing and movement of the blank holder and punch slides 1 and 3 are indicated by the curves B and P in the diagram, Fig. 5.

The invention may receive other embodiments than that herein specifically illustrated and described.

What is claimed is:

1. A press or the like, comprising a reciprocatory part, and means for reciprocating said part, with a dwell in its movement, said means comprising a rock shaft, connections between said reciprocatory part and rock shaft, a swinging toggle connected to said rock shaft, and means for swinging said toggle, said means comprising a part having a short angular movement connected to said swinging toggle and cooperating to impart a greater angular movement to said rock shaft, a slide, a connection between said slide and said swinging toggle, and means for reciprocating said slide.

2. A press or the like, comprising a crank-shaft, a reciprocatory part, and means for reciprocating said part, with a dwell in its movement, said means comprising a rock shaft, connections between said reciprocatory part and rock shaft, a swinging toggle connected to said rock shaft, and means for swinging said toggle, said means comprising a part having a short angular movement connected to said swinging toggle, and cooperat-

ing to impart a greater angular movement to said rock shaft, a slide, and means for reciprocating said slide, said rock shaft being in a cross direction to said crank-shaft, and pin and rod connections between said rock shaft and slide and between said slide and swinging toggle.

3. A press or the like, comprising a crank-shaft, a reciprocatory part, and means for reciprocating said part, with a dwell in its movement, said means comprising a rock shaft, connections between said reciprocatory part and rock shaft, a swinging toggle connected to said rock shaft, and means for swinging said toggle, said means comprising a part having a short angular movement connected to said swinging toggle, and cooperating to impart a greater angular movement to said rock shaft, a slide, and means for reciprocating said slide, said rock shaft being in a cross direction to said crank-shaft, and pin and rod connections between said rock shaft and slide and between said slide and swinging toggle, said press comprising a frame, and said rock shaft being on the inside of said frame, and said connection to said crank-shaft being on the outside of said frame.

4. A press or the like, comprising a crank-shaft, a reciprocatory part, and means for reciprocating said part, with a dwell in its movement, said means comprising a rock shaft, connections between said reciprocatory part and rock shaft, a swinging toggle connected to said rock shaft, and means for swinging said toggle, said means comprising a part having a short angular movement connected to said swinging toggle and cooperating to impart a greater angular movement to said rock shaft, a slide, a connection between said slide and said swinging toggle, and means for reciprocating said slide, said press comprising a frame, and said rock shaft and crank-shaft being at the upper part of said frame.

5. A press or the like, comprising a frame, a crank-shaft, a reciprocatory part, and means for reciprocating said part, with a dwell in its movement, said means comprising a rock shaft, connections between said reciprocatory part and rock shaft, a swinging toggle connected to said rock shaft, and means for swinging said toggle, said means comprising a part having a short angular movement, connected to said swinging toggle and cooperating to impart a greater angular movement to said rock shaft, a slide, and means for reciprocating said slide, said rock shaft being in a cross direction to said crank-shaft and on the inside of said frame, said crank-shaft having a gear thereon outside of said frame, and connections between said swinging toggle and slide, and between said gear and slide.

6. A press or the like, comprising a frame, a crank-shaft, a reciprocatory part, and means for reciprocating said part, with a dwell in its movement, said means comprising a rock shaft, connections between said reciprocatory part and rock shaft, a swinging toggle connected to said rock shaft, and means for swinging said toggle, said means comprising a part having a short angular movement connected to said swinging toggle and cooperating to impart a greater angular movement to said rock shaft, a slide and means for reciprocating said slide, said rock shaft being in a cross direction to said crank-shaft and on the inside of said frame, said crank-shaft having a gear thereon outside of said frame, and connections between said swinging toggle and slide, and between said gear and slide, said connections comprising pins on said slide at an angle corresponding to the angle between said rock shaft and crank-shaft.

7. A press or the like, comprising a frame, a reciprocatory part, and means for reciprocating said part, with a dwell in its movement, said means comprising a rock shaft at the upper part of said frame, a connection between said reciprocatory part and rock shaft, a swinging toggle connected to said rock shaft, and means for swinging said toggle, said means comprising a part having a short angular movement connected to said toggle and cooperating to impart a greater angular movement to said rock shaft.

8. A press or the like comprising a frame, a reciprocatory part, and means for reciprocating said part, with a dwell in its movement, said means comprising a rock shaft at the inner part of said frame, a connection between said reciprocatory part and rock shaft, a swinging toggle connected to said rock shaft, means for swinging said toggle, said means comprising a part having a short angular movement connected to said toggle and cooperating to impart a greater angular movement to said rock shaft, an actuating part on the outside of said frame, and connections from said outside actuating part to said swinging toggle.

9. A press or the like, comprising a reciprocatory part, and means for reciprocating said part, with a dwell in its movement, said means comprising a rock shaft, a pair of connections between said reciprocatory part and rock shaft, a pair of swinging toggles connected at opposite ends to said rock shaft, and means for swinging said toggles, said means comprising a part having a short angular movement connected to each of said swinging toggles, and cooperating to impart a greater angular movement to said rock shaft, a slide, a connection between said slide and each of said swinging toggles, and means for reciprocating said slide.

10. A press or the like, comprising a frame, a reciprocatory part, and means for recipro-

cating said part, with a dwell in its movement, said means comprising a rock shaft at the upper part of said frame, a connection between said reciprocatory part and rock shaft, a pair of swinging toggles connected to said rock shaft at opposite ends, and means for swinging said toggles, said means comprising a part having a short angular movement connected to each of said toggles and cooperating to impart a greater angular movement to said rock shaft.

In witness whereof, I have hereunto signed my name.

WILLIAM KLOCKE.