

W. KLOCKE.  
DRAWING PRESS.

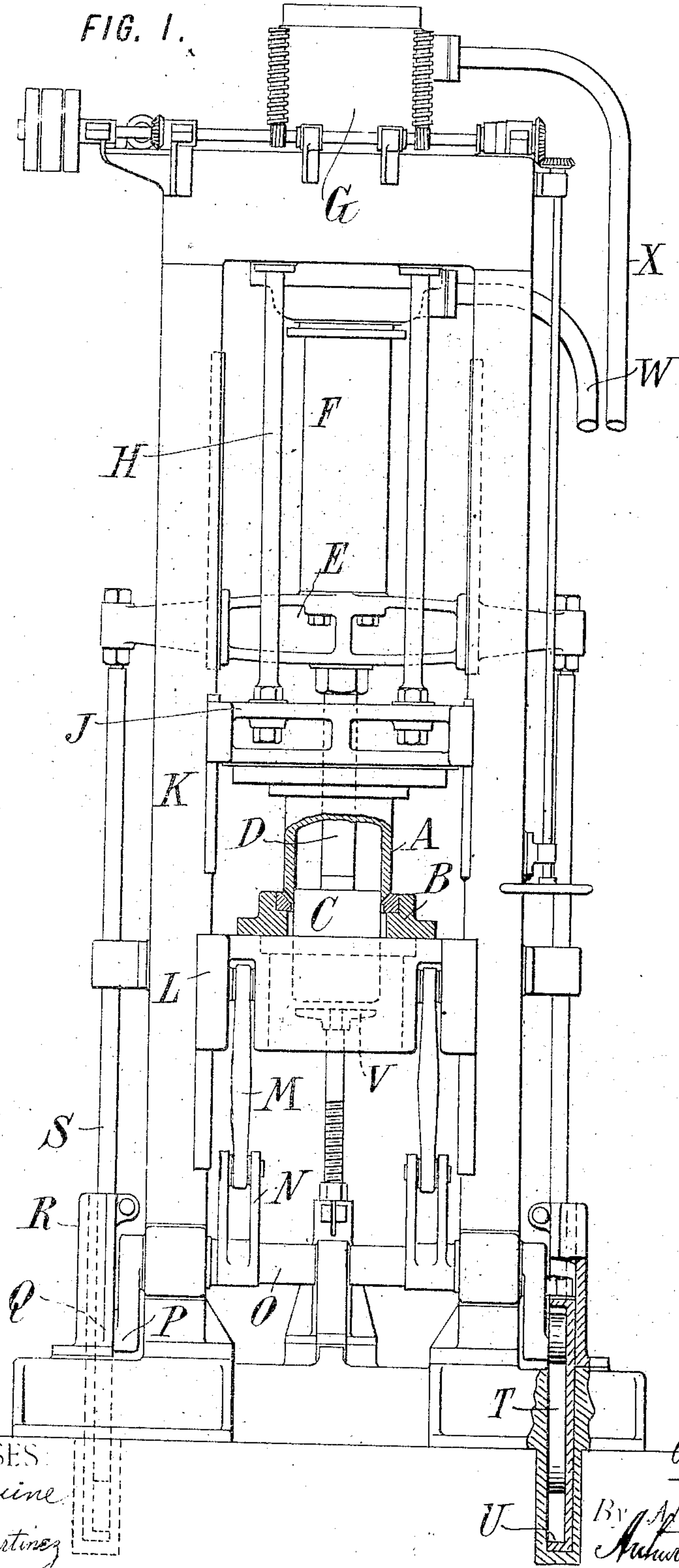
APPLICATION FILED AUG. 21, 1907.

924,672.

Patented June 15, 1909.

4 SHEETS—SHEET 1.

FIG. 1.



WITNESSES:  
*René P. Ruine*  
*William F. Martinez*

INVENTOR :  
*William Klocke*

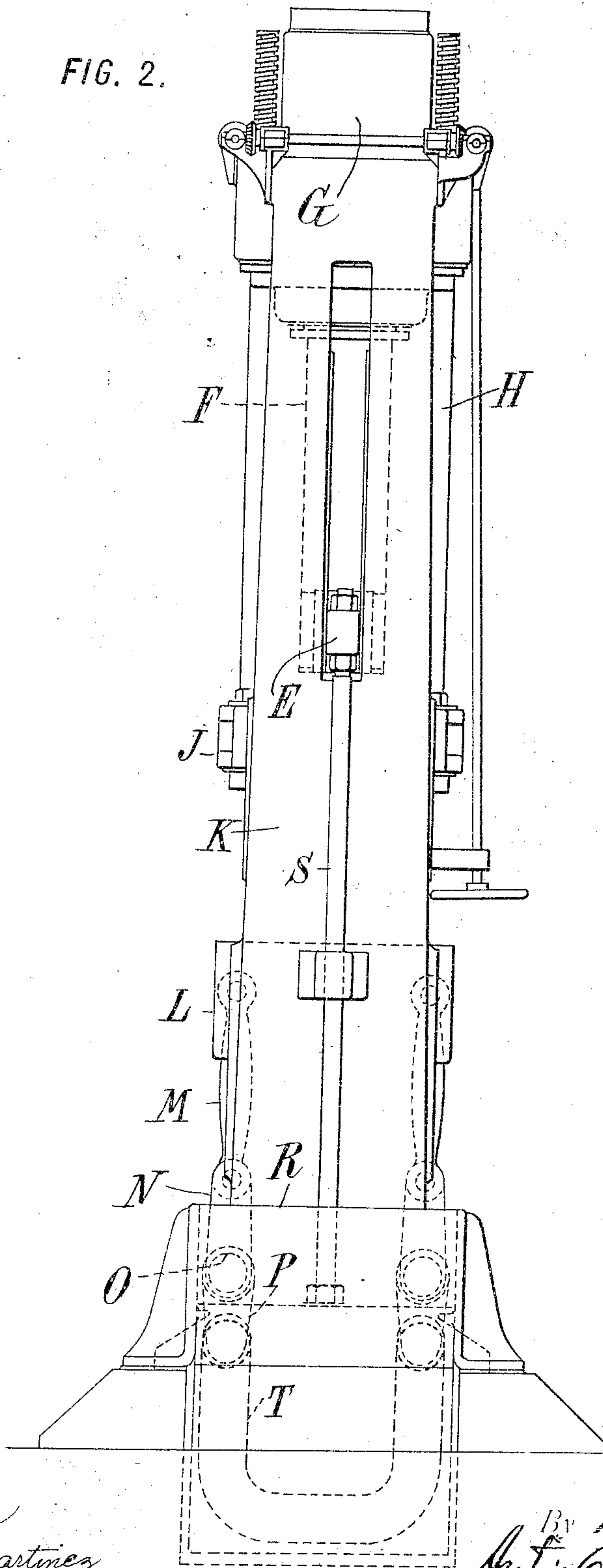
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4 SHEETS—SHEET 2.

FIG. 2.



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4 SHEETS—SHEET 3.

FIG. 3.

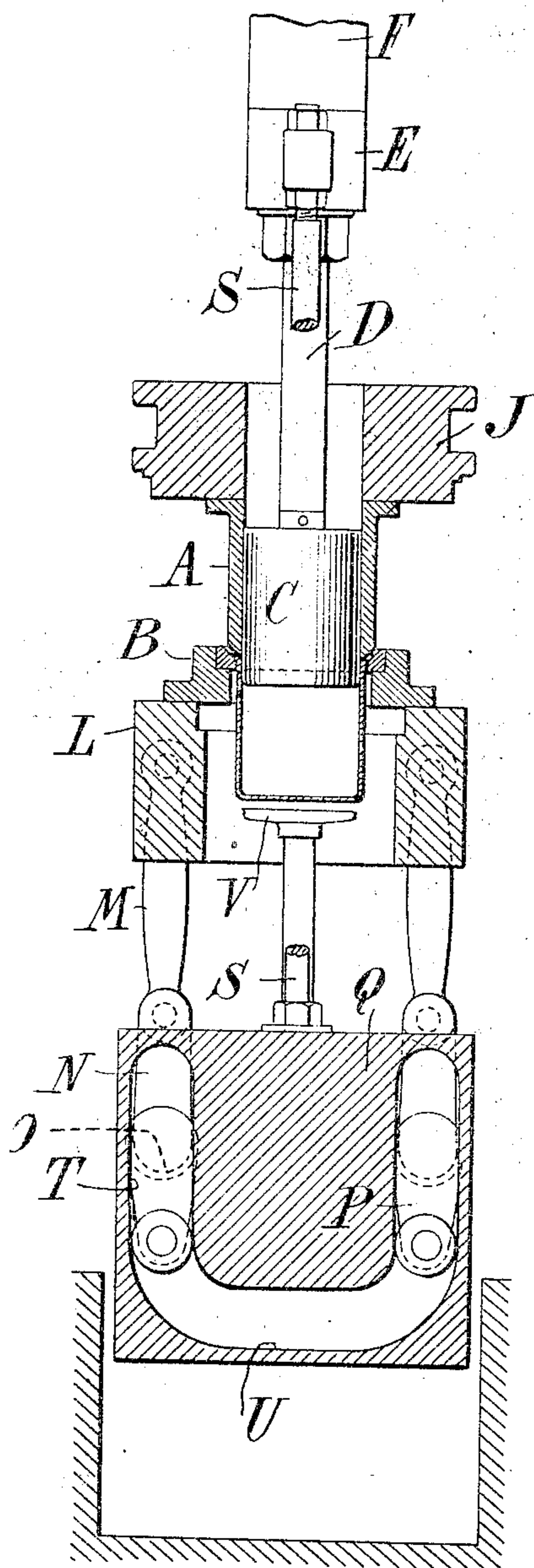
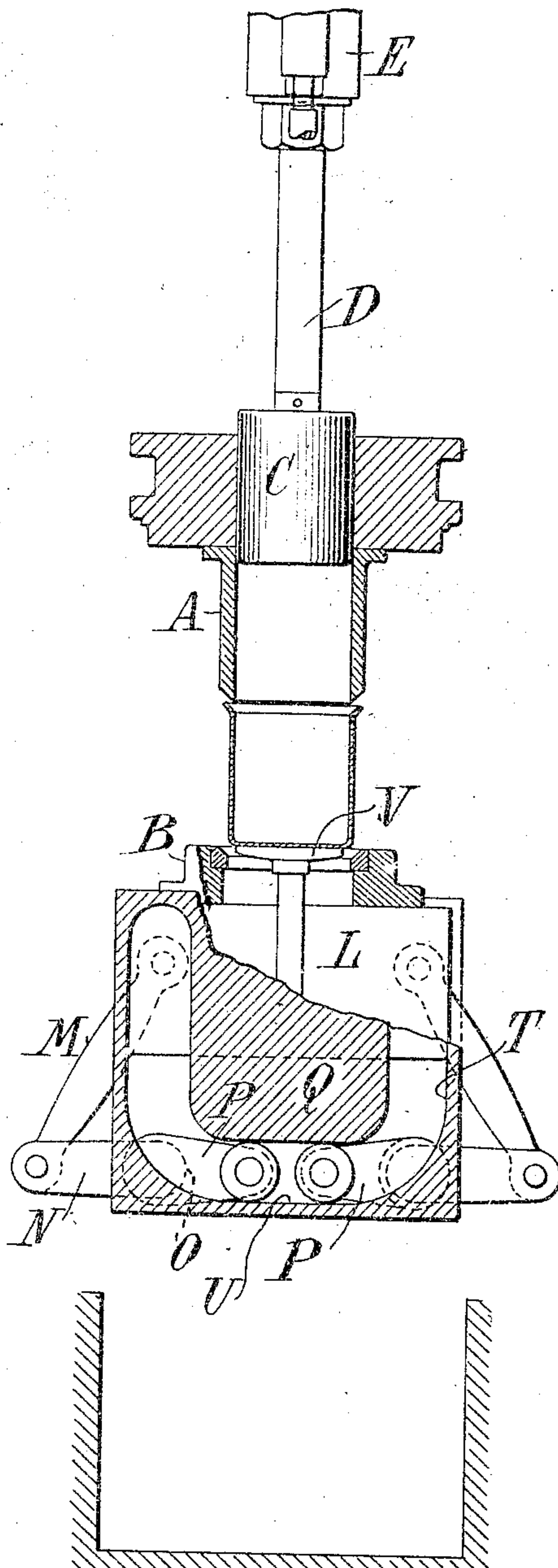


FIG. 4.



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4 SHEETS—SHEET 4.

FIG. 5.

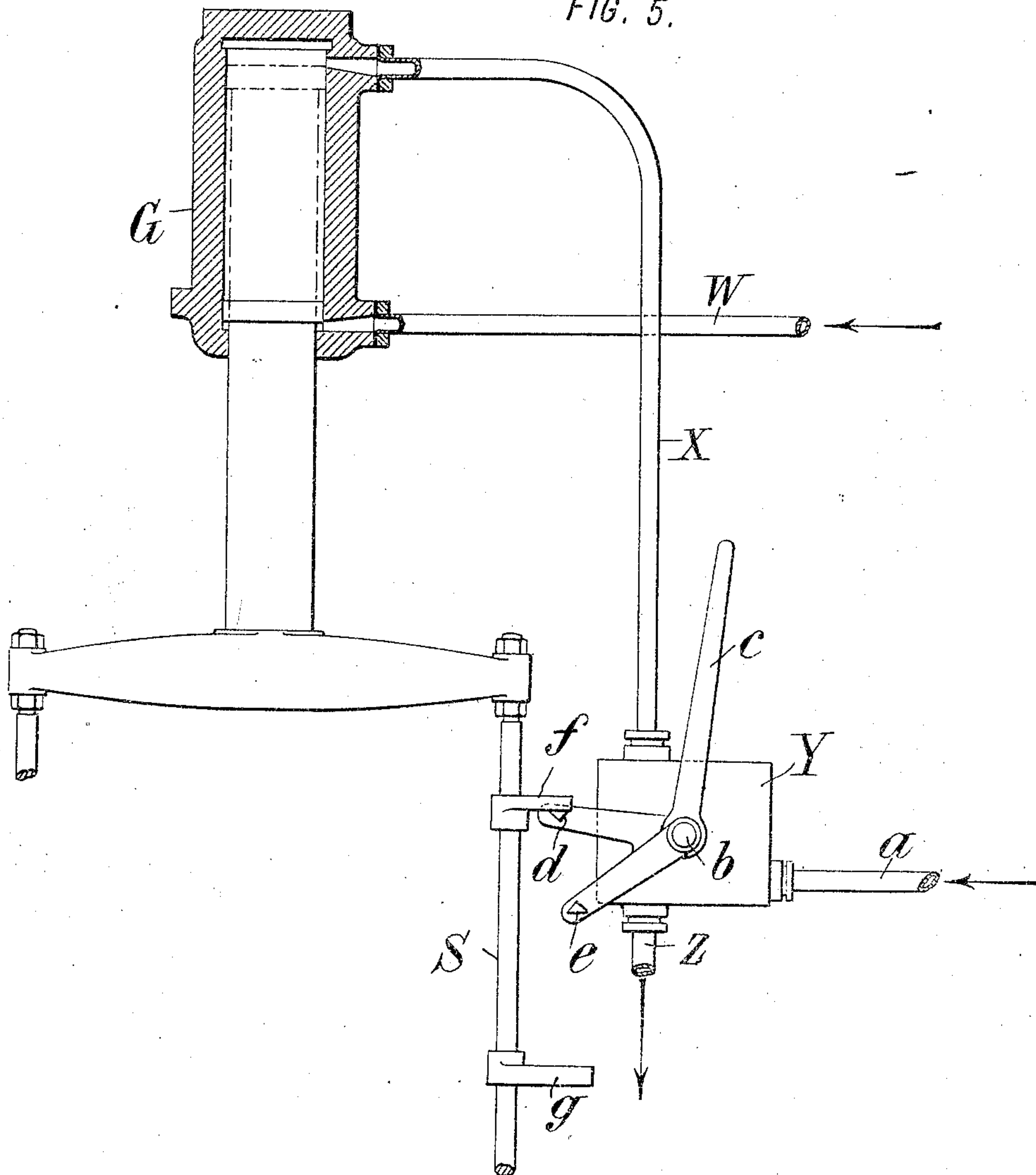
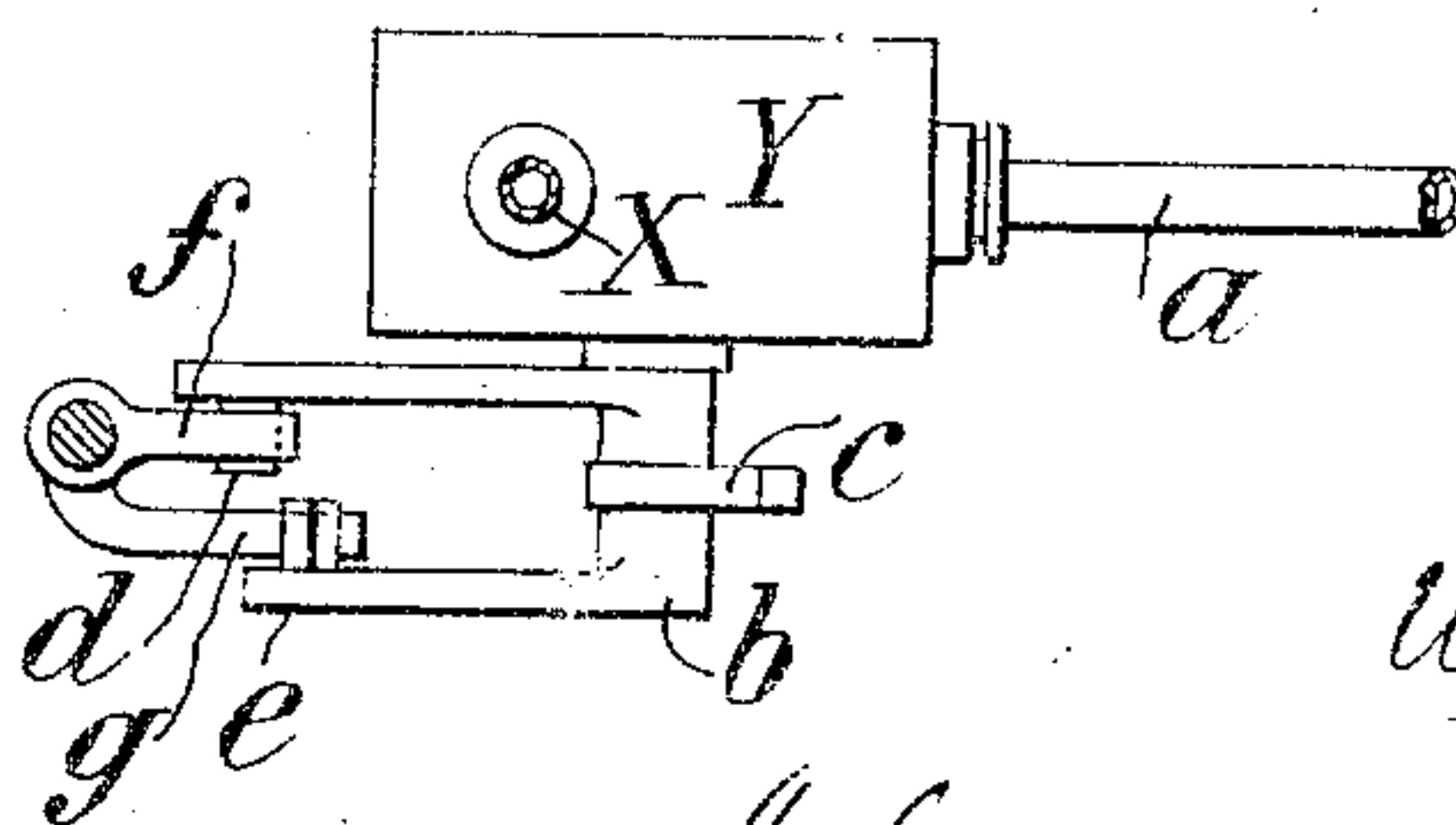


FIG. 6



WITNESSES:  
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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.

## DRAWING-PRESS.

No. 924,672.

Specification of Letters Patent.

Patented June 15, 1909.

Application filed August 21, 1907. Serial No. 389,574.

*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 Drawing-Presses, of which the following is a specification.

This invention aims to provide an improved press for drawing sheet metal into tubular shape, the improvements being especially adapted to presses for doing the largest class of work, drawing out the metal to a length of two feet or more. A long stroke is necessary in these presses, both for the blank holder and for the punch, and the usual type of machine employed has these parts of the apparatus operated by two separate hydraulic rams. The proper timing of the movements of the two rams involves a complicated valve system, and there are various other difficulties arising from the comparative complexity of the apparatus.

According to this invention I use a single ram, which is of such stroke and is so connected with the blank holder as to operate the latter to clamp the blank during a preliminary downward movement of the punch, the punch thereupon entering the blank and drawing it to its full depth while the blank holder is merely held in operative position; while on the return stroke of the plunger, during the first part of the movement, while the punch is being withdrawn from the article, the blank holder is still held in clamping position. After the punch is fully withdrawn the blank holder is opened and the drawn article ejected. This arrangement simplifies very much the construction of the machine, the plunger being preferably connected rigidly to cams which actuate a toggle mechanism for lifting the lower movable member of the blank holder, so that the cams move parallel with and synchronously with the plunger and punch. In fact the only parts which do not move all together, are the movable member of the blank holder and the toggle mechanism between it and the cams.

The accompanying drawings illustrate an embodiment of the invention.

Figure 1 is a front elevation of the machine, the work holder and adjacent parts being shown in section. Fig. 2 is a side elevation of the machine. Figs. 3 and 4 are diagrammatic views illustrating different posi-

tions of the parts. Figs. 5 and 6 are a diagrammatic elevation and plan of mechanism for controlling the operation.

Referring to the embodiment of the invention illustrated, the work is clamped between the members A and B of the work holder, and is drawn by the downward passage of the punch C, which is connected by a rod D with a cross head E on the lower end of the plunger F of the ram G. In various types of machines the work holder is made with sometimes one and sometimes the other member movable, and sometimes both members. In the present case we suppose the member A of the work holder to be fixed (at an adjustable level by screwing up the rods H carrying the cross-bar J which supports the member A and which is guided in the side frames K of the machine). The movable member B is carried upon a slide L moving up and down upon guideways upon the side frames K, and operated by a toggle mechanism consisting of four links M connected at their upper ends to the slide L, and at their lower ends to cranks N on shafts O passing from side to side and through the side frames K of the machine. The shafts O are provided at their outer ends with cranks P having rollers on their ends which travel in cam tracks in cam plates Q. One of the plates Q is arranged at each side of the machine, and is provided with a double cam track serving to operate two cranks P. Each of the cam plates Q is arranged to slide in a guide R, and is fastened rigidly upon the lower end of a rod S, the two rods S being connected at their upper ends to opposite ends of the cross-bar E which project through slots in the side frames K.

The cam tracks in the plates Q are formed with two parts, a vertical part T and a horizontal part U connected with each other by a suitable curve. The vertical part being parallel with the movement of the plate, effects a dwell of the blank holder, while the horizontal part of the track causes the ends of cranks P to swing around and so operates the blank holder. If we start with the punch in its raised position (Fig. 4) we find the ends of the cranks P lying in the horizontal portions U of the cam tracks. During the first part of the downward movement of the plunger and punch, the arm P is swung around until its end lies in the vertical portion of the cam track. The stroke of the



plunger is so arranged that during this movement the punch is brought just into the blank. This is the position of the parts in Fig. 3. As the plunger continues to move downward the article is drawn, while the vertical portions of the cam tracks merely hold the inside crank arms and links up and hold the blank holder in operative position. The completion of the drawing operation is shown in Figs. 1 and 2. Upon the return movement of the plunger, the first effect is to withdraw the punch substantially completely from the article. It is of great utility to withdraw the punch before opening the blank holder, because of the close adherence of the work to the punch. After the punch is withdrawn there is a continued upward movement of the plunger which brings the horizontal portions U of the cam tracks into play and brings down the lower member of the blank holder. This operation lowers the article upon the fixed ejector V.

The simplicity of construction and operation effected by the use of a single cylinder, makes it possible to use a very simple controlling device, such for example as the mechanism of Fig. 5 adapted from planers. The ram G is supplied with continuous lifting pressure through the pipe W, and with operating pressure through the pipe X which is connected through a valve box Y with either a waste pipe Z or the pressure pipe a. The valve shaft b has a handle c and a pair of tappets d and e which lie in the vertical planes respectively of strikers f and g carried upon any suitable reciprocating part of the machine, say for example one of the rods S. When the plunger moves down it turns the valve shaft b so as to connect the pipe X with the waste, whereupon the plunger automatically rises by reason of the pressure through the pipe W until the striker g strikes the tappet e and swings the shaft b sufficiently to cut off connection to the waste. The hand lever c will then be operated to swing the valve shaft b still farther around so as to connect the pipe X with the pipe a and repeat the operation.

What I claim is:—

1. A drawing press including in combination a single ram having a reciprocating plunger, a punch carried by said plunger and reciprocating therewith, a blank holder hav-

ing a movable member, and means for transmitting only the first part of the downward movement of said plunger to said movable member of the blank holder.

2. A drawing press including in combination a ram having a reciprocating plunger, a cam operated by said ram in a direction parallel to the movement of the plunger, a punch operated by said ram, and a blank holder operated by said cam.

3. A drawing press including in combination a ram having a reciprocating plunger, and a cam rigidly connected to said plunger so as to move parallel and synchronously therewith.

4. A drawing press including in combination a ram having a reciprocating plunger, a punch carried by said plunger and reciprocating therewith, a blank holder having a movable member, a cam rigidly connected to and operated by said plunger so as to move parallel and synchronously therewith, said cam being adapted to actuate said movable member during the first part of the downward movement of the punch to hold said member stationary until the punch is approximately withdrawn on the return stroke of the plunger.

5. A drawing press including in combination a single ram G having a plunger F reciprocating in a straight line with a long stroke, a cross-head E and a punch C carried by said plunger, a work holder including a movable member B, toggle mechanism for operating said member B, and a cam operating said toggle mechanism and connected rigidly with said cross head.

6. A drawing press including in combination two movable members, a hydraulic ram operating one of said members with a movement which is parallel and synchronous with that of the ram, and a toggle mechanism for transmitting to the other of said members the action of the first part only of the movement of the ram.

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

WILLIAM KLOCKE.

Witnesses:

DOMINGO A. USINA,  
FRED WHITE.