

No. 819,872.

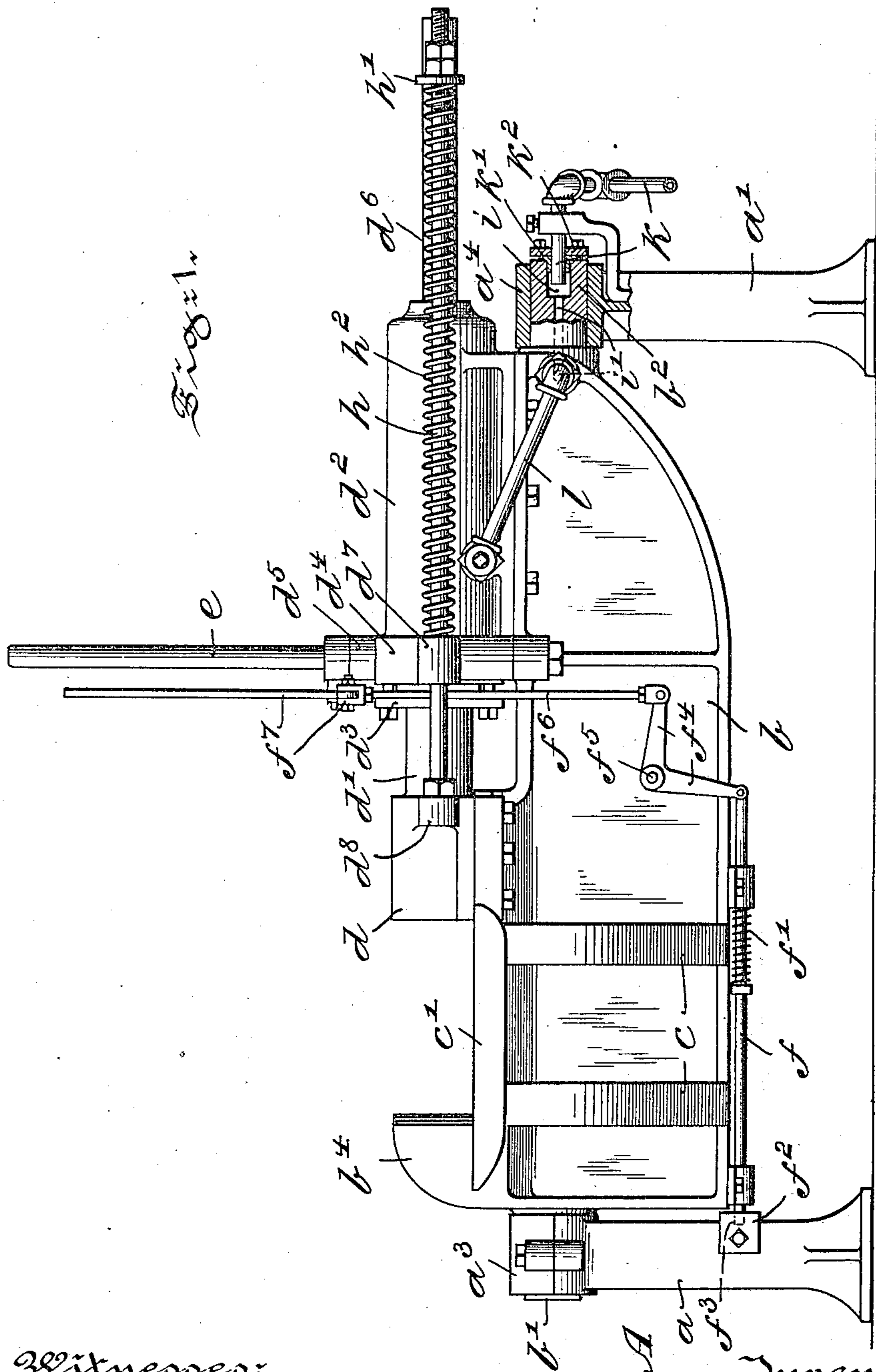
PATENTED MAY 8, 1906.

W. EVANS.

HYDRAULIC MACHINE FOR CLAMPING PLATES IN THE MANUFACTURE  
OF SPRINGS.

APPLICATION FILED OCT. 4, 1905.

3 SHEETS—SHEET 1.



Witnesses:  
Wilhelm Voigt  
Thomas M. Smith.

Inventor:  
William Evans

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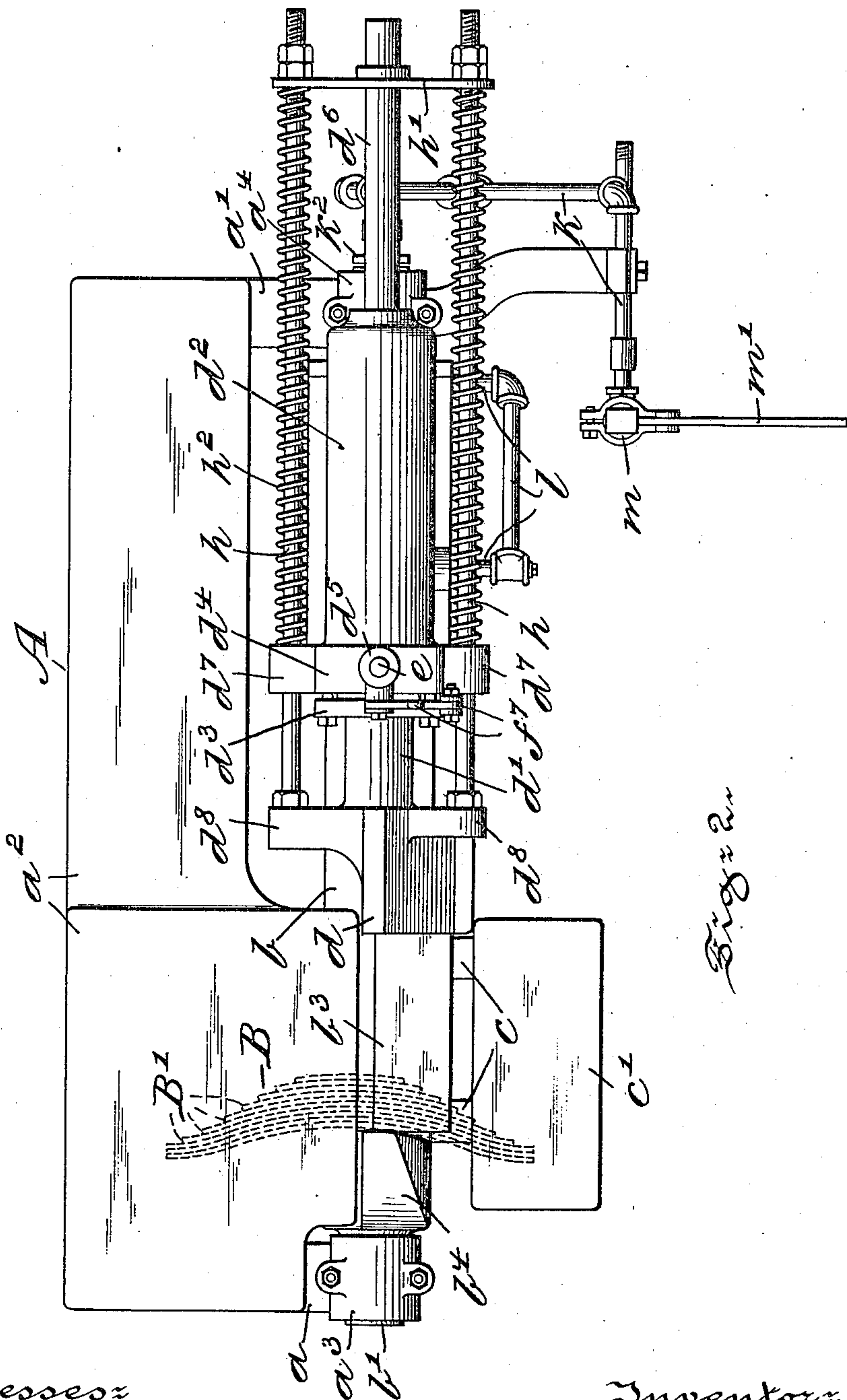
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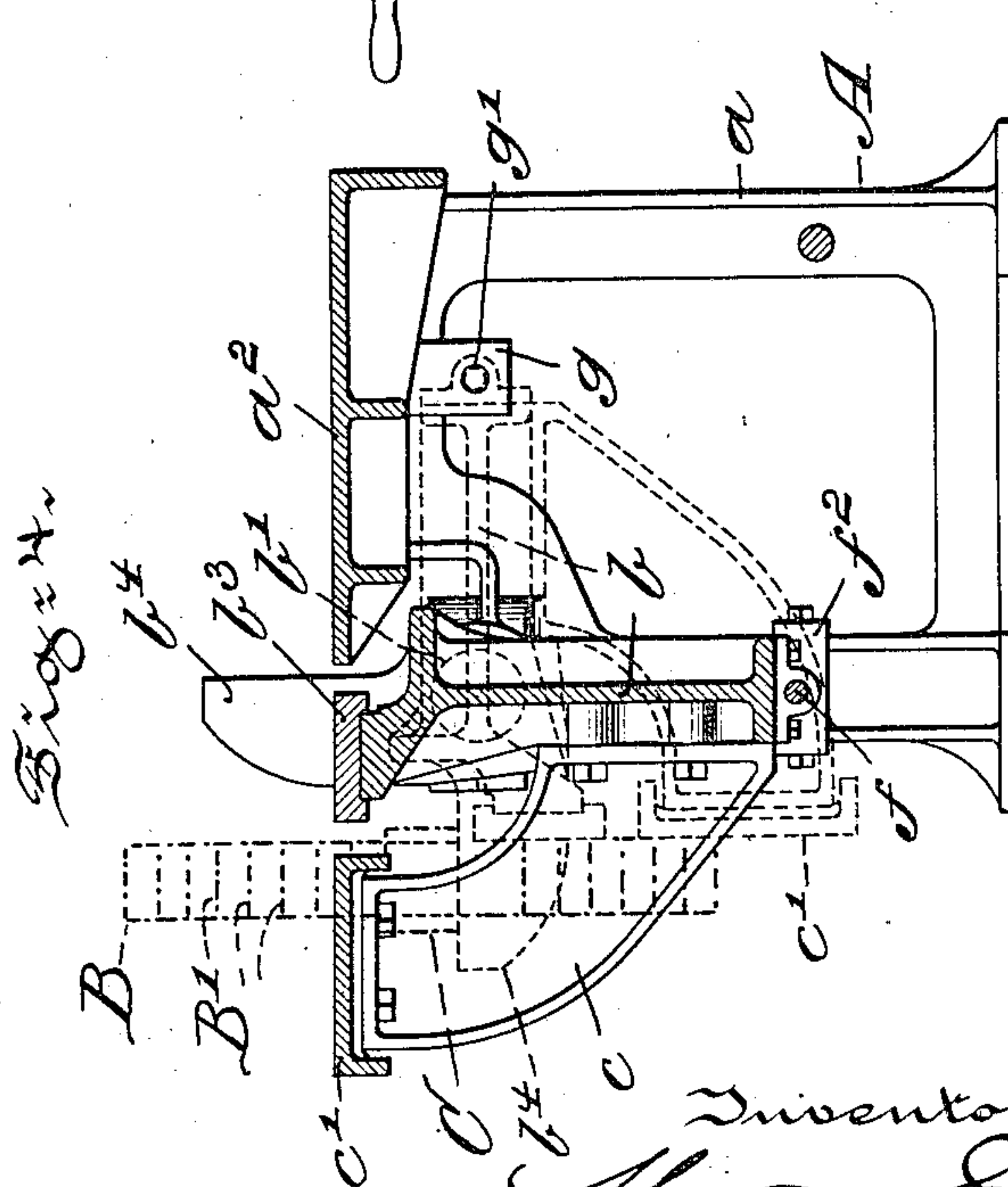
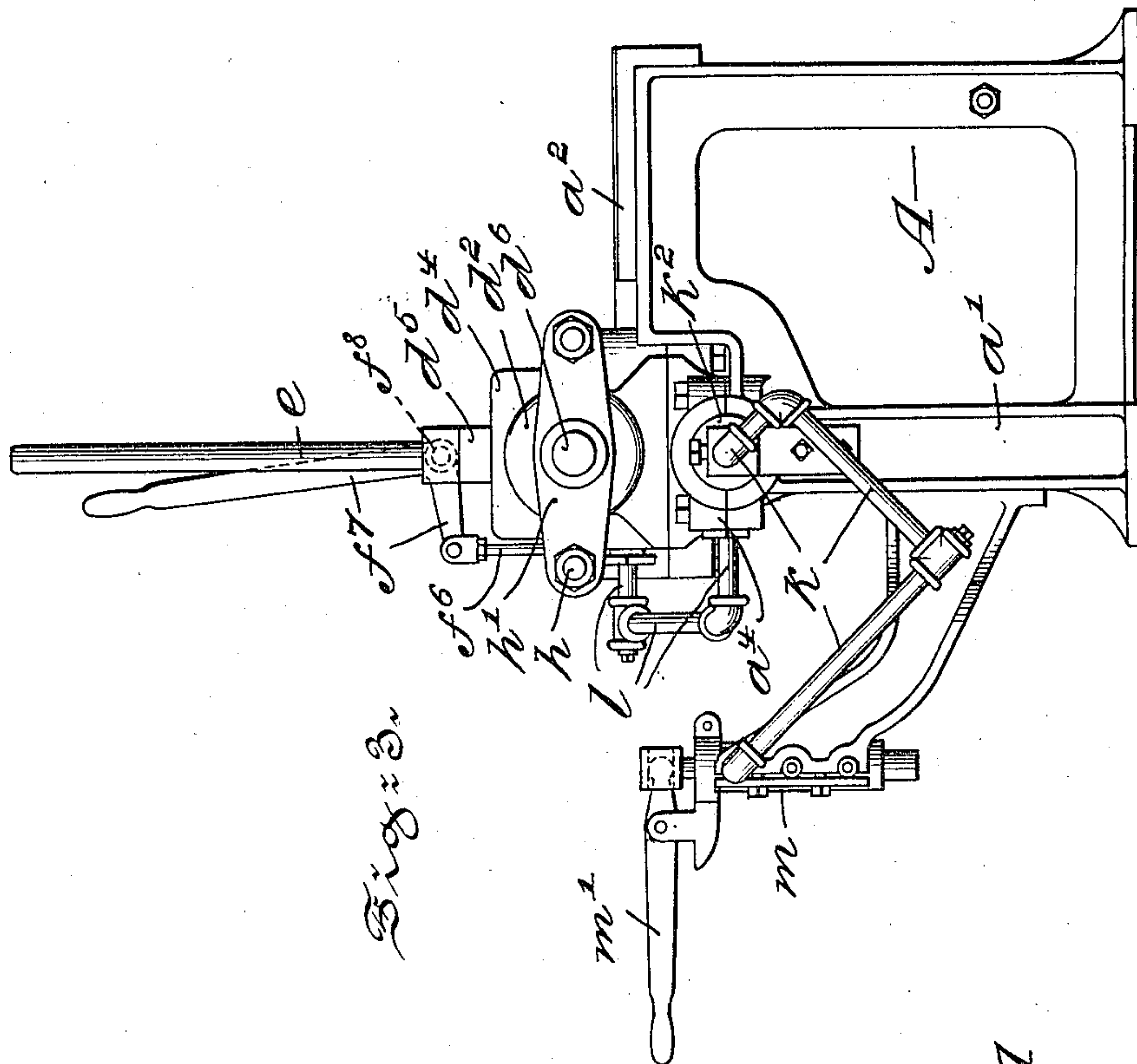
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# UNITED STATES PATENT OFFICE.

WILLIAM EVANS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO  
WILLIAM EVANS, ROBERT EVANS, AND JOHN H. EVANS, OF PHILA-  
DELPHIA, PENNSYLVANIA, A FIRM.

HYDRAULIC MACHINE FOR CLAMPING PLATES IN THE MANUFACTURE OF SPRINGS.

No. 819,872.

Specification of Letters Patent.

Patented May 8, 1906.

Application filed October 4, 1905. Serial No. 281,240.

*To all whom it may concern:*

Be it known that I, WILLIAM EVANS, a citizen of the United States, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Hydraulic Machines for Clamping Plates in the Manufacture of Springs, of which the following is a specification.

My invention has relation to a hydraulic machine for clamping plates in the manufacture of springs, and in such connection it relates more particularly to the constructive arrangement of such a machine to so clamp and hold assembled plates as to permit of ready application of bands thereto.

The principal objects of my invention are, first, to provide a machine with means actuated by hydraulic pressure to force, in the manufacture of springs, the plates properly shaped and assembled against each other to securely clamp and hold the same together; second, to provide the machine with movable means adapted to support the hydraulic means and the clamped spring held by the same to permit of the moving of the clamped spring-plates into a position so that a band can be readily applied thereto; third, to provide a trunnion with movable means provided with a chamber to form a passage-way for water and a flexible joint, for feed-pipes, engaging the same to permit of swinging the movable means into various angular positions and the feeding of the water under pressure into the hydraulic means, irrespective of the position occupied by the swinging means, and, fourth to provide a machine with a combined locking and releasing mechanism, adapted to lock the swinging frame in various angular positions in the same.

The nature and scope of my invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming part hereof, in which—

Figure 1 is a view illustrating in side elevation the hydraulic spring-plate-clamping machine, a swinging frame supported by trunnions engaging the standard of the machine, a hydraulic ram carried by the frame, a hollow trunnion adapted to form a connection between feed-pipes conducting water to and from the hydraulic cylinder actuating the

ram, spring-controlled means to automatically return the ram to its normal inoperative position, and locking means adapted to hold the frame in various angular positions in the machine, all embodying the main features of my said invention. Fig. 2 is a top or plan view of the machine shown in Fig. 1 and illustrating in dotted lines, a spring formed of plates assembled in a position so as to be clamped by the hydraulic ram. Fig. 3 is a view illustrating in elevation the right-hand end of the machine shown in Fig. 1; and Fig. 4 is a cross-sectional view of the machine, illustrating in full and dotted lines the various positions of the swinging frame in the machine and the manner of holding the clamped spring-plates in a vertical position for the attachment of a band thereto.

Referring to the drawings, A represents the standard of the machine, consisting of frames  $a$  and  $a'$ , united with each other by a plate  $a^2$ , forming a table for a purpose to be presently described. In the frames  $a$  and  $a'$  are arranged bearings  $a^3$  and  $a^4$ , adapted to receive trunnions  $b'$  and  $b^2$ , preferably formed integral with a frame  $b$ , which by extending downward beyond the trunnions  $b'$  and  $b^2$  is overbalanced and thus normally held in a substantially vertical position in the standard A, as shown in Figs. 1 and 4. The frame  $b$ , pivotally supported in the standard A by the trunnions  $b'$  and  $b^2$ , can be swung therein, to assume various angular positions with respect to the standard A, and for this reason will hereinafter be called the "swinging frame"  $b$ . This swinging frame  $b$  is provided with brackets  $c$ , laterally projecting therefrom, to support and hold a plate  $c'$  in alignment with the table  $a^2$ .

As shown in Fig. 4, between the plate  $c'$ , forming an auxiliary table, and the table  $a^2$  of the standard A, is arranged a plate or table  $b^3$ , directly carried by the swinging frame  $b$  and held in alignment with the tables  $a^2$  and  $c'$  by the same. These tables  $a^2$ ,  $b^3$ , and  $c'$  serve to receive and permit of the assembling of plates  $B'$ , properly shaped into a spring B. The assembled spring B by resting on these tables is placed with one side against a projection  $b^4$ , preferably formed integral with the swinging frame  $b$ , as shown in Figs. 1 and 2. Opposite the projection  $b^4$ , forming a jaw and sliding on the table  $b^3$ , is arranged



a hydraulic ram  $d$ , preferably formed integral with a piston  $d'$  of a hydraulic cylinder  $d^2$ , which by means of bolts is rigidly secured to the swinging frame  $b$ , as shown in Fig. 1. In addition to a gland  $d^3$ , rendering the piston  $d'$  water-tight in the cylinder  $d^2$ , the same is provided with a flange  $d^4$ , to the extension  $d^5$  of which is secured a rod  $e$ , serving as a handle, which when engaged by the operator permits of a ready turning of the swinging frame  $b$  on its trunnions  $b'$  and  $b^2$  in the standard  $A$ , for which purpose, however, the same must first be unlocked therefrom.

One mode of locking the swinging frame  $b$  to the standard  $A$  and holding the same in vertical and horizontal positions therein is as follows: As shown in Fig. 1, to the under side of the swinging frame  $b$  is secured a rod  $f$ , which by means of a spring  $f'$  is normally held in engagement with an opening  $f^3$ , arranged in a plate  $f^2$ , secured to the frame  $a$ . The rod  $f$  is connected with a bell-crank lever  $f^4$ , pivotally secured in the point  $f^5$  to the swinging frame  $b$ , and by means of a link  $f^6$  is connected with the lower arm of a bell-crank lever  $f^7$ , pivotally secured in the point  $f^8$  to the handle  $e$ , as shown in Fig. 3. When the upper arm of the lever  $f^7$  is swung toward the handle  $e$  and held in alignment with the same, the movement imparted to the lever  $f^7$  by means of the bell-crank lever  $f^4$  and link  $f^6$  is transmitted to the rod  $f$ , which is withdrawn from the opening  $f^3$  in the plate  $f^2$ . The swinging frame  $b$  thus unlocked from the plate  $f^2$  may now be swung into a horizontal position, as shown by dotted lines in Fig. 4, and locked in this position by permitting the rod  $f$ , through the release of the lever  $f^7$ , to engage the opening  $g'$ , arranged in a plate  $g$ , secured to the frame  $a$ , as shown in Fig. 4. Before, however, the swinging frame  $b$  and the hydraulic cylinder-ram and accessories carried by the same are swung into this horizontal position the hydraulic ram  $d$ , actuated by the piston  $d'$ , must first be brought into engagement with the assembled spring-plates  $B'$ . The ram  $d$  is held in its normally inoperative position preferably by rods  $h$ , carried by a yoke  $h'$ , secured to an extension  $d^6$  of the piston  $d'$  projecting beyond the rear end of the cylinder  $d^2$ . The rods  $h$  are guided in ears  $d^7$ , formed integral with the flange  $d^4$  of the cylinder  $d^2$ , and are secured to extensions  $d^8$ , formed integral with the ram  $d$ . Springs  $h^2$ , arranged on the rods  $h$  and bearing against the ears  $d^7$  and yoke  $h'$ , force the ram  $d$  backward into its inoperative position. (Shown in Figs. 1 and 2.) As shown in Fig. 1, the trunnion  $b^2$  of the swinging frame  $b$  is provided with a chamber  $i$ , into which projects one end of a pipe  $k$ , held in engagement with the trunnion  $b^2$  by a stuffing-box  $k'$  and a gland  $k^2$ . The chamber  $i$ , by means of a duct  $i'$ , forming the continuation thereof, communicates with a pipe  $l$ ,

which at one end is secured to the swinging frame  $b$  and at its other end to the hydraulic cylinder  $d^2$ . The pipe  $k$ , terminating in the chamber  $i$  of the trunnion  $b^2$  and forming the continuation of pipe  $l$ , is connected to a valve  $m$  of suitable construction actuated by a handle  $m'$ , which communicates with a source of water-supply held under pressure. (Not shown.) The pipe  $k$  by terminating in the trunnion  $b^2$  of the swinging frame  $b$  permits the same to freely turn in the standard  $A$  without in the least interfering with the proper conduct of the water into and from the hydraulic cylinder  $d^2$ . As soon as water under pressure is permitted to enter the cylinder  $d^2$  the ram  $d$ , actuated by the piston  $d'$ , is shifted forward until the same reaches the spring  $B$  and forces the same against the jaw  $b^4$  of the frame  $b$ . The plates  $B'$ , forming the spring  $B$ , are thus forced against each other and are then immovably clamped in position between the jaw  $b^4$  and ram  $d$ . The movable frame  $b$  is now unlocked by the actuation of the lever  $f^7$  and by means of the handle  $e$  is swung into the horizontal position, (shown by dotted lines in Fig. 4,) in which the same is relocked by the release of the lever  $f^7$ . As shown in Fig. 4, the spring  $B$  is thus moved from a horizontal position into a vertical position and by extending with its greater portion beyond the jaw  $b^4$  and ram  $d$  a band  $C$ , previously brought to white heat, and thus slightly increased in size, is now slipped over the upper end of the spring, after which it will drop by gravity and with slight assistance, if necessary, be brought to proper position by abutting against the jaw  $b^4$  and ram  $d$ . By the actuation of the valve  $m$  and the exit of the water from the cylinder  $d^2$  the ram  $d$ , by means of the rods  $h$  and springs  $h^2$ , will be automatically returned to its normally inoperative position, thus freeing the now completed spring  $B$  and permitting the same to drop onto the floor or onto any transporting means, which may be placed beneath the spring  $B$ . On the other hand, the spring  $B$  may be returned to a horizontal position by first returning the swinging frame  $b$  to its normal vertical position, in which the same, when released by the jaw  $b^4$  and ram  $d$ , will again be placed on the tables  $a^2$  and  $c'$  of the standard  $A$ .

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a machine of the character described, a standard, movable means arranged in said standard and adapted to support a clamping means, hydraulic means carried by said movable means, said clamping means adapted when actuated by said hydraulic means to force spring-plates against each other so as to clamp the same.

2. In a machine of the character described,



a standard, means arranged in said standard having a projection, hydraulic means carried by said means, said hydraulic means when actuated adapted to force spring-plates against said projection and in conjunction with said projection to then clamp the same, and means to permit said hydraulic means and the clamped spring to assume certain angular positions in said standard.

3. In a machine of the character described, a standard, means movably arranged in said standard having a projection, hydraulic means carried by said movable means, said hydraulic means when actuated adapted to force spring-plates against said projection and in conjunction with said projection to then clamp the same, means adapted to permit said movable means and by the same, said hydraulic means and the clamped spring to assume various angular positions in said standard, and means adapted to lock said swinging frame in positions given.

4. In a machine of the character described, a standard, a swinging frame arranged in said standard having a projection, a hydraulic ram carried by said swinging frame, said hydraulic ram adapted when actuated to force spring-plates against each other and said projection and in conjunction therewith to clamp and hold the same in position on said standard, and means adapted to return said ram to its normally inoperative position.

5. In a machine of the character described, a standard, a swinging frame arranged in said standard having a projection, a hydraulic ram carried by said swinging frame, said hydraulic ram adapted when actuated to force the spring-plates against each other and the projection of said frame and in conjunction therewith to clamp and hold the same in position on said standard, and means for turning and clamping said swinging frame in said standard in the position given.

6. In a machine of the character described, a standard, a frame having a projection and trunnions engaging said standard, a hydraulic cylinder carried by said frame, a piston having a head sliding on said frame, said cylinder, piston and head forming a hydraulic ram adapted when actuated to force spring-plates against each other and the projection of said frame and in conjunction therewith to clamp and hold the same in position on said standard, and means adapted to automatically return said head and piston to its normally inoperative position.

7. In a machine of the character described, a standard, a frame having a projection and trunnions engaging said standard, one of said trunnions having a chamber, a hydraulic cylinder carried by said frame, a piston having a head slidable on said cylinder, said cylinder, piston and head forming a hydraulic ram adapted when actuated to force spring-plates against each other and said projection and in

conjunction therewith to clamp and hold the same in position on said standard, and pipes adapted respectively, to connect said cylinder with said chambered trunnion and the same with a source of water-supply under pressure.

8. In a machine of the character described, a standard, a frame having a projection and trunnions engaging said standard, one of said trunnions having a chamber, a hydraulic cylinder carried by said frame, a piston having a head slidable on said frame, said cylinder, piston and head forming a hydraulic ram adapted when actuated to force the spring-plates against each other and said projection and in conjunction therewith to clamp and hold the same in position, and pipes adapted to connect respectively said cylinder with said chambered trunnion and the same with a source of water-supply under pressure, and said chambered trunnion arranged to permit of the passage of water through said pipes irrespective of their position to each other.

9. In a machine of the character described, a standard, a frame having a projection and trunnions engaging said standard, one of said trunnions having a chamber forming a passage-way, a hydraulic cylinder carried by said frame, a piston having a head slidable on said frame, said cylinder, piston and head forming a hydraulic ram adapted when actuated to force spring-plates against each other and said projection and in conjunction therewith to clamp and hold the same in position on said standard, pipes adapted to connect respectively said cylinder with said chambered trunnion and with a source of water-supply under pressure and to conduct water into and from said cylinder by the passage of the same through said chambered trunnion irrespective of the position of said frame in said standard, a spring-controlled rod connected with said frame and adapted to lock the same to said standard, and means adapted to permit of the disengagement of the rod therefrom.

10. In a machine of the character described, a standard, having a table, a frame having a projection and trunnions engaging said standard, one of said trunnions having a chamber forming a passage-way, a bracket carried by said frame adapted to support a plate forming an auxiliary table, said tables adapted to support and permit of the assembling of spring-plates thereon, a hydraulic cylinder carried by said frame, a piston having a head slidable on said frame, said cylinder, piston and head forming a hydraulic ram adapted when actuated to force the spring-plates against each other and said projection and in conjunction therewith to clamp and hold the same in position on said standard, pipes adapted to connect respectively said cylinder with said chambered trunnion and with a source of water-supply



under pressure and to conduct water into  
and from said cylinder by the passage of the  
same through said chambered trunnion irre-  
spective of the position of said frame in said  
5 standard, and a spring-controlled rod con-  
nected with said frame adapted to lock the  
same to said standard, and means to permit  
of the disengagement of the rod therefrom.

In testimony whereof I have hereunto set  
my signature in the presence of two subscrib- 10  
ing witnesses.

WILLIAM EVANS.

Witnesses:

WILHELM VOGT,  
THOMAS M. SMITH.