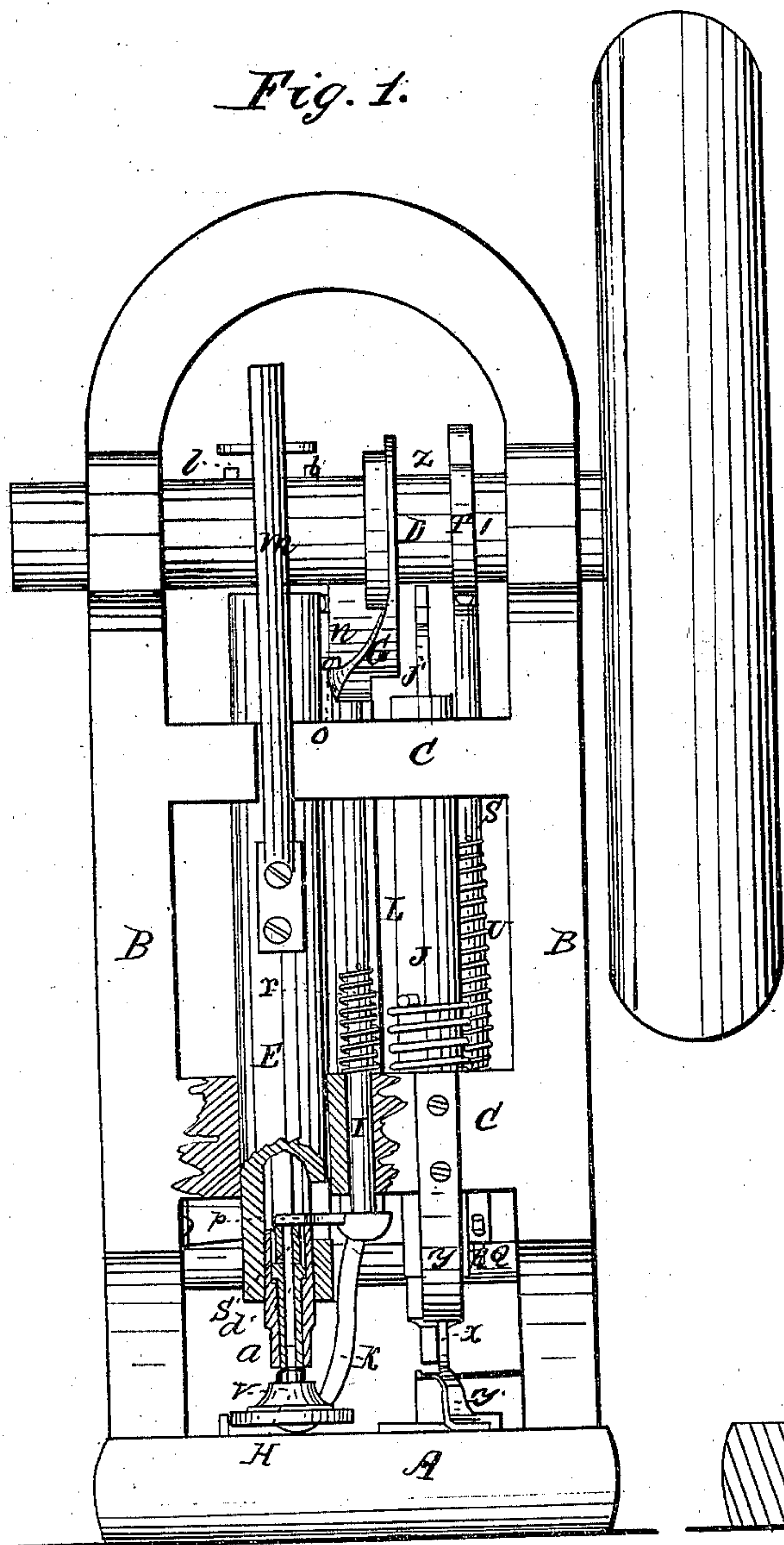
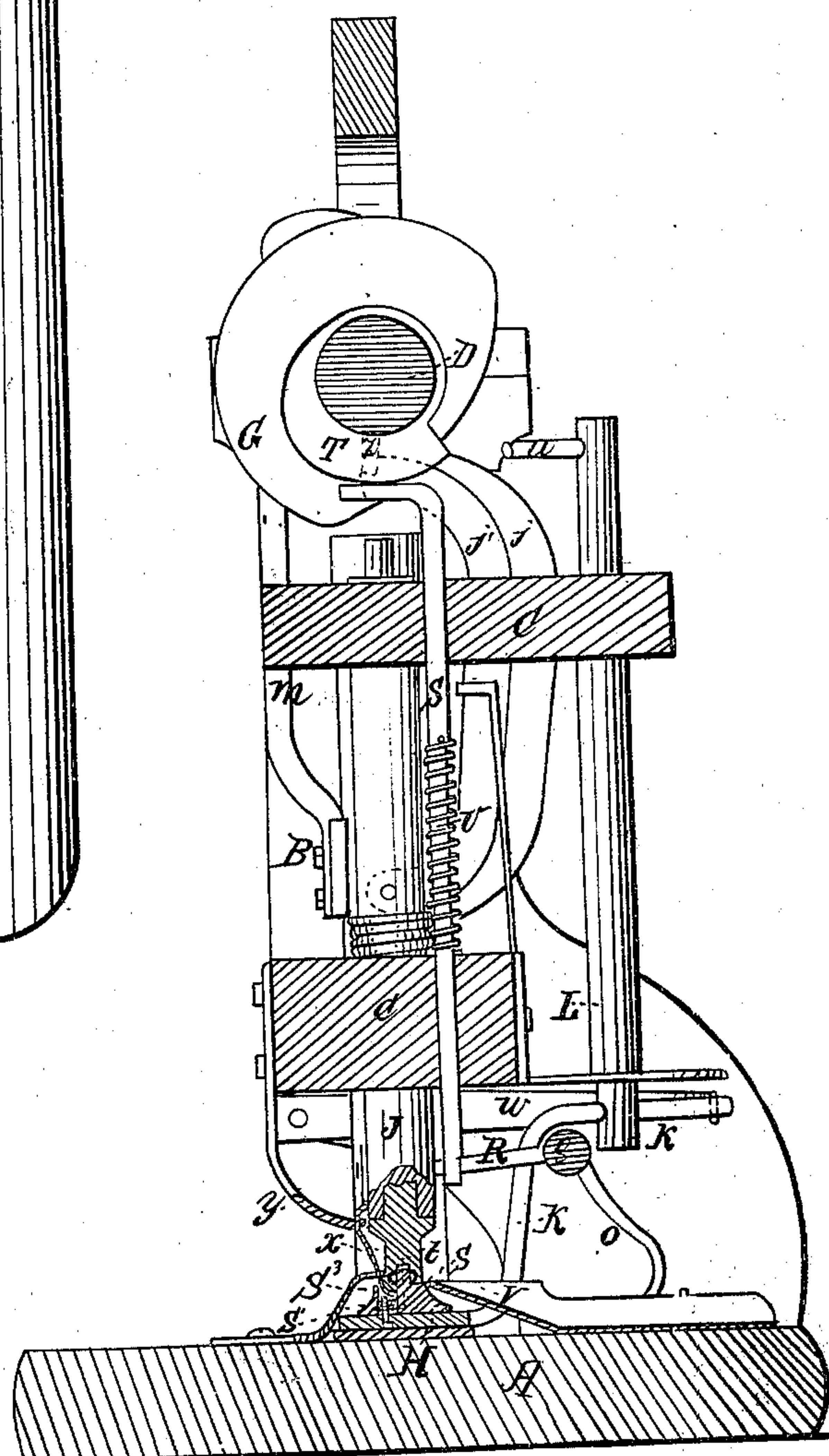


*C. W. Dickinson,*  
*Making Rings, Links &c.,*  
*No 11,363,* *Patented July 25, 1854.*

*Fig. 1.*



*Fig. 3.*



Witnesses

*S. H. Wales*  
*J. H. Hamilton.*

Inventor

*C. W. Dickinson*

C. W. Dickinson,  
Making Rings, Links &c.,  
No 11, 363,  
Patented July 25, 1854.

Fig. 2.

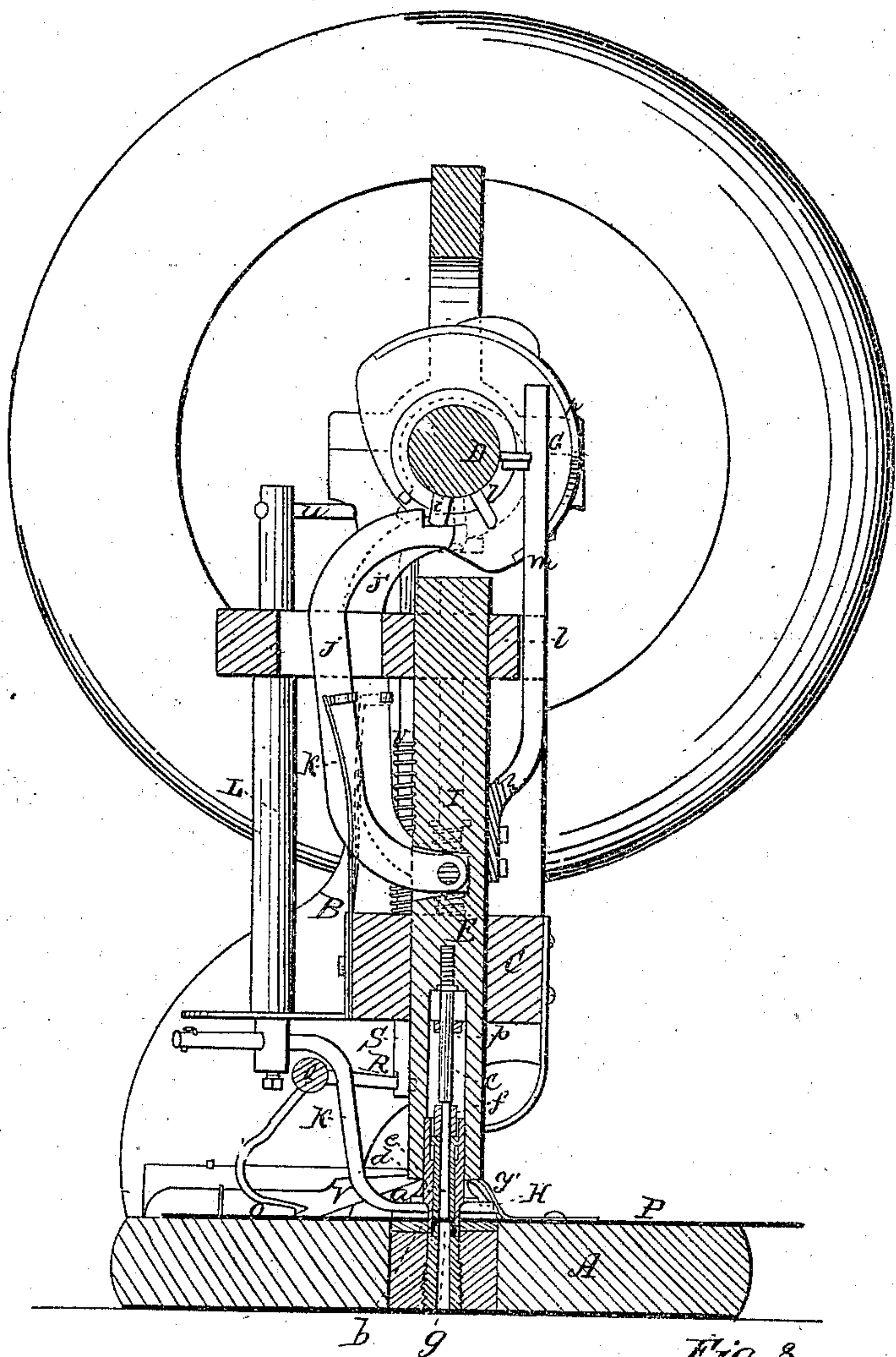
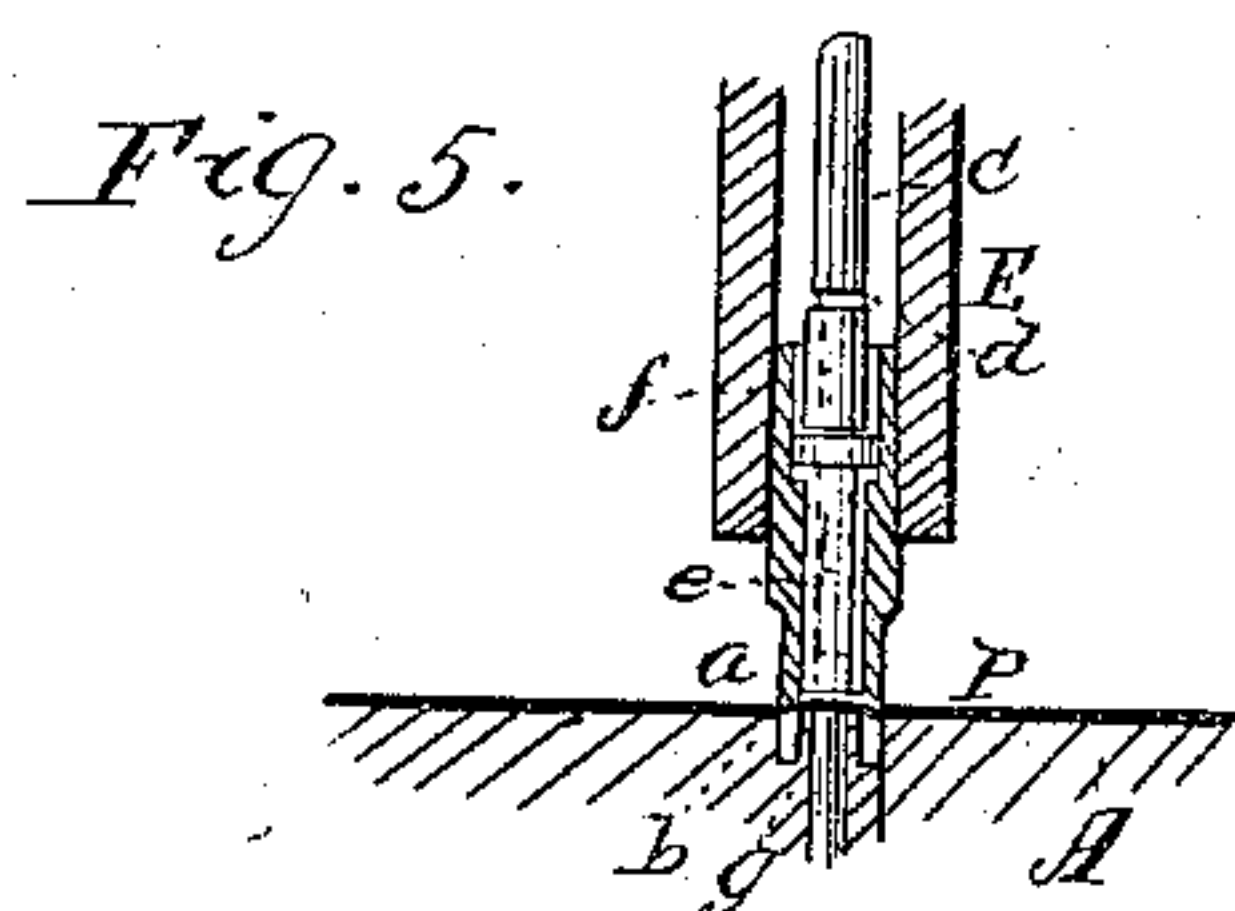


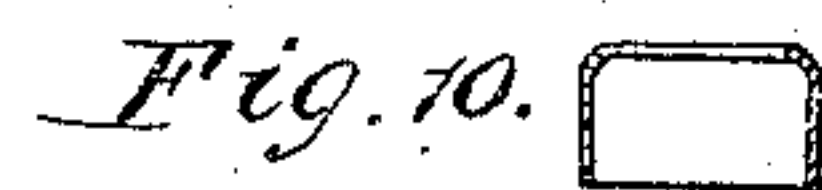
Fig. 8.



*Fig. 5.*



*Fig. 9.*



*Fig. 10.*

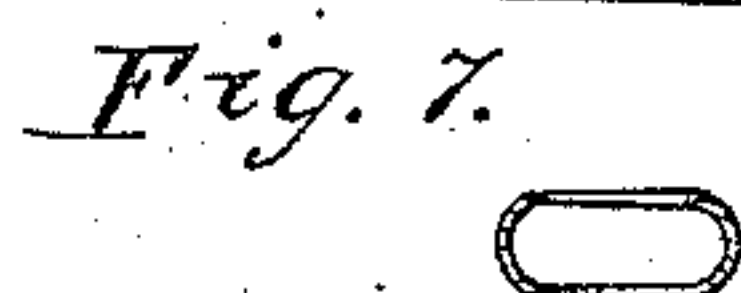


Fig. 7.

Witnesses

J. H. Wales  
J. H. Hamilton

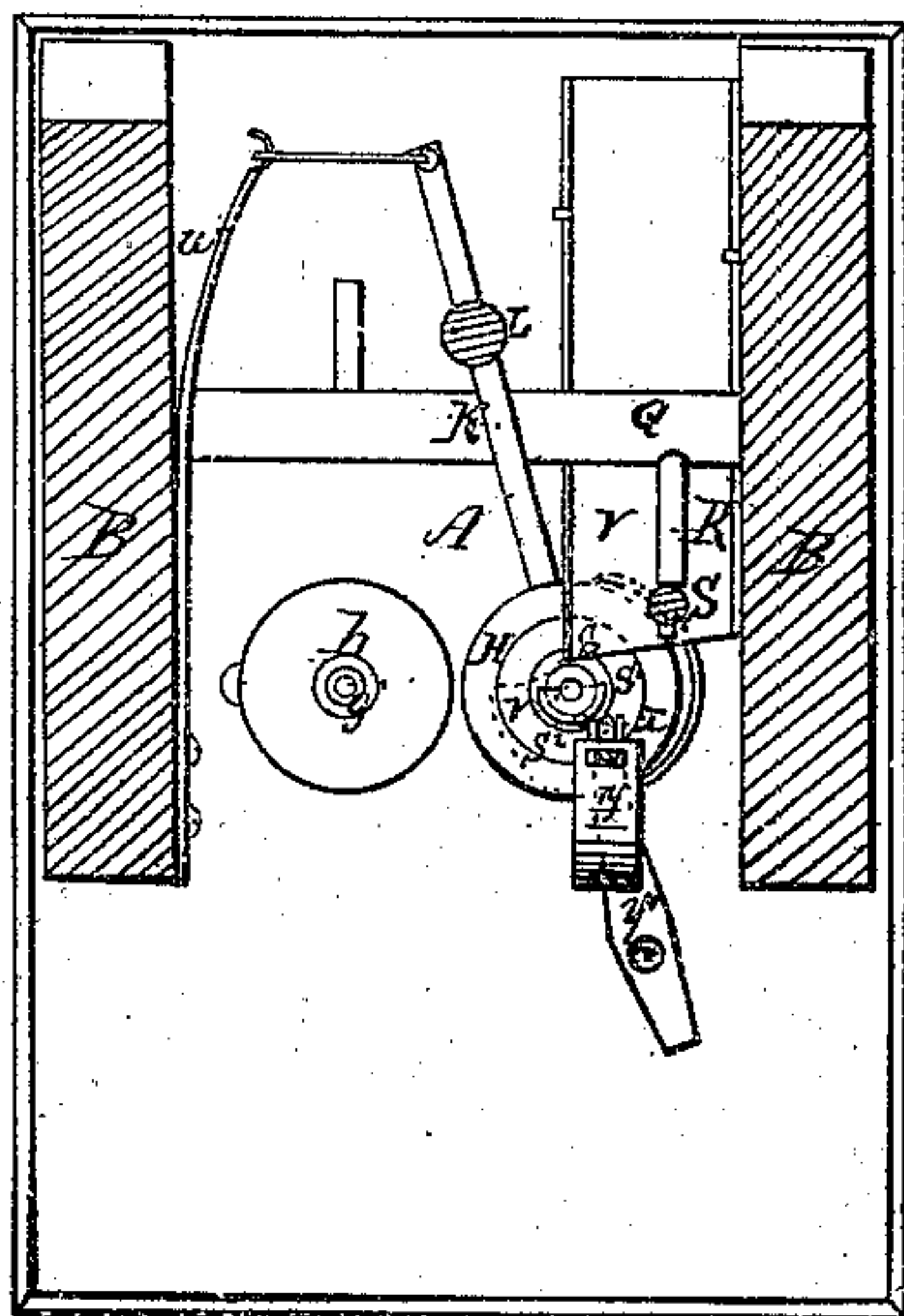


Fig. 4.

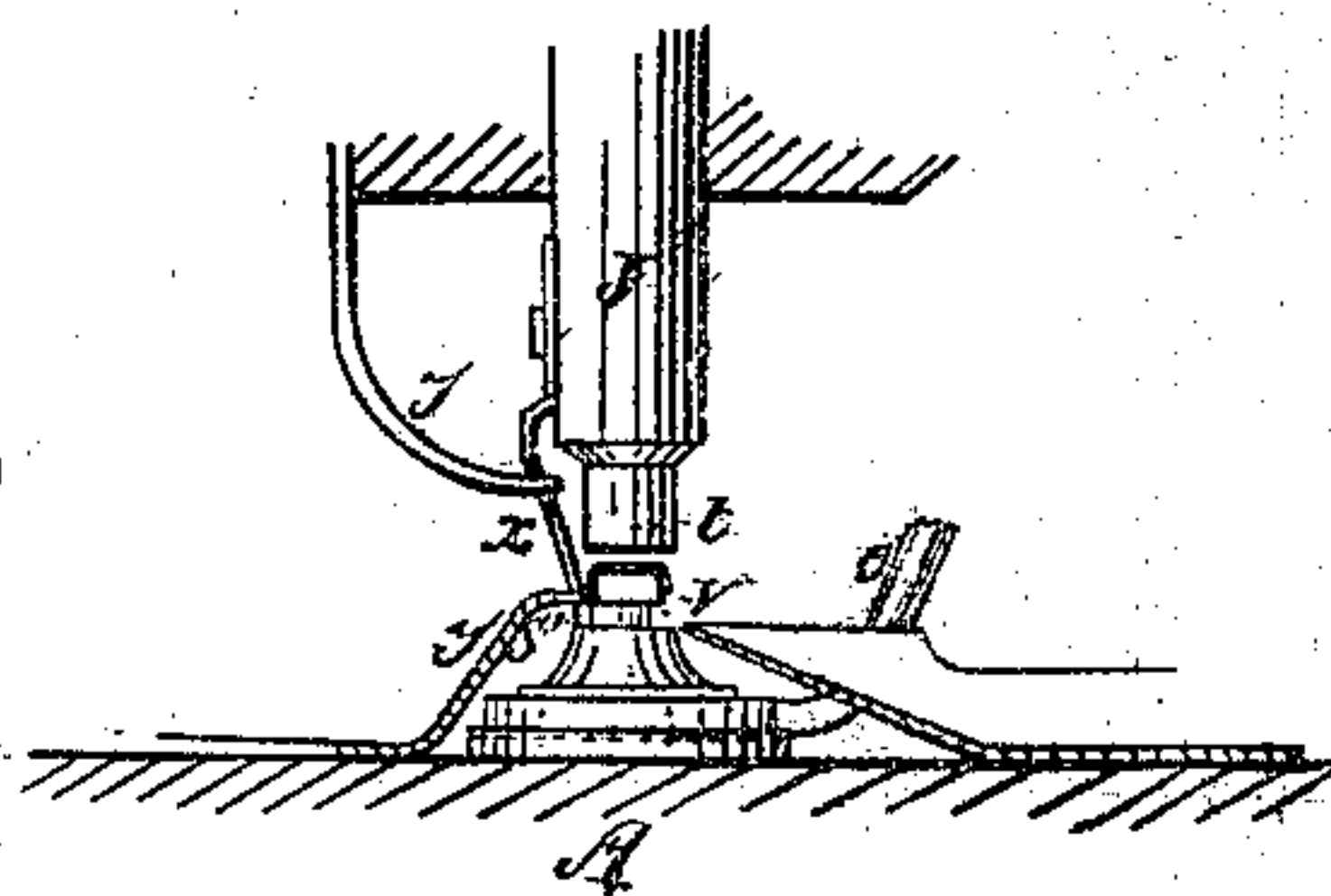


Fig. 6.

Inventor

W. Dickinson



# UNITED STATES PATENT OFFICE.

CHARLES W. DICKINSON, OF NEWARK, NEW JERSEY.

FINISHING-DIE IN MACHINES FOR MAKING RINGS FROM SHEET METAL.

Specification of Letters Patent No. 11,363, dated July 25, 1854.

*To all whom it may concern:*

Be it known that I, CHARLES W. DICKINSON, of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Machinery for Making Rings or Links from Sheet or Plate Metal; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, is a front elevation of a machine constructed according to my invention, with the punch in section. Fig. 2, is a transverse vertical section of the same in a plane passing through the center of the punch, represented as seen from the left hand of Fig. 1. Fig. 3, is another transverse vertical section taken just within the side framing, represented as seen looking from the opposite side to Fig. 1, and showing the finishing dies in section, in the act of finishing a ring. Fig. 4, is a plan of the lower dies and the discharging mechanism. Fig. 5, is a vertical section of the punch and its die. Fig. 6, is a side view of the finishing dies, and the discharging mechanism. Fig. 7, is a section of a finished ring on a scale larger than the former figures. Figs. 8, 9, 10 represent the piece of metal from which a ring is made, at the various stages of manufacture, on the same scale as Fig. 7.

Similar letters of reference indicate corresponding parts in the several figures.

The machinery which forms the subject of this invention cuts a piece of metal of a suitable form from the sheet or plate, punches a hole therein, and partly gives the desired form to the ring by means of one set of dies and punches, and then finishes it by other dies and discharges it.

My invention relates to the construction and operation of the lower finishing die for the purpose of discharging the finished ring or link.

To enable those skilled in the art to make and use my invention I will proceed to describe its construction and operation.

The working parts of the machine are all supported by a framing composed of a bedplate, A, standards, B, B, and crosspieces C, C, which may be cast separate and bolted together, or all cast together. The movements of the parts are all given by a shaft, D, resting in bearings at the top of the standards, and receiving a constant rotary

motion. The first operation to be performed, is that of cutting out a flat circular piece of plate, like that shown in Figs. 8 and 9, and the punch (a) for that purpose is attached to a vertical slide, E, working in suitable guides in the framing near the left hand side of the machine, the bottom die (b), in connection with which the punch acts, being in the bedplate. The punch (a), is fitted to the slide in any suitable manner so as to leave a cavity (c) above it within the slide, and it is bored out to the size of the largest part of the exterior of the finished ring, and counterbored at the upper or back part to a larger size to form a shoulder. In the center of the punch (a) is placed the small punch (d) for punching a hole in the center of the circular plate which is cut by the larger punch (a). The punch (d) is secured in that part of the slide, E, at the back or above the recess (c) and its upper part is slightly enlarged to form a shoulder. Its face or ends stands at some distance above the face or end of the larger punch. The annular space between the large and small punches is filled by a tubular die (e) whose face is of the necessary form to produce the finished form of the upper half of the ring.

The die (e) is free to slide up and down within the punch (a) for a certain distance, its downward motion being limited by a fixed collar on the upper part, which is arrested by the shoulder within the above named punch, and its upward motion by a loose collar (f) which fits between its upper end and the collar on the smaller punch (d). Within the lower die (b) which receives the punch (a) there is an internal die (g) whose interior receives the punch (d) and whose exterior is cylindrical and of such size as to enter the cavity in the punch (a) and leave room all around it for the thickness of the metal to form the ring. The face of the die (g) is the reverse of the die (e).

The punches (a) (d) upper die (e) and lower dies (b) (g) bring the metal to the form shown in section in Fig. 10, and the punches and upper die are caused to receive the necessary movements for that purpose by the following means: The slide is forced downward by means of a wiper (i) on the driving shaft acting upon a curved vibrating bar (j) attached to the back side of the slide. This bar which is moved forward by the action of the wiper causes the pres-



sure on the slide to increase gradually and to be very great toward the termination of its descent. The bar (*j*) after the wiper passes it is thrown back by a spring (*k*).

5 On the descent of the slide, the punch (*a*) comes first into operation on the plate and cuts out the circular piece, as shown in Fig. 5, where, as well as in Fig. 2, the plate is represented tinted yellow and indicated by

10 P. The further descent of the punch after cutting out the circular piece of plate bends and draws the sides of the said piece over the exterior of the internal bottom die (*g*) to a cup form, as shown in Fig. 2, before the

15 small punch (*d*) comes into operation to punch the hole in the center, and after the hole has been punched by the small punch (*d*) the shoulder on the upper part of the said punch, by its contact with the loose

20 collar (*f*), forces down the die (*e*) for the purpose of giving a finish to the curved upper side of the ring, between the said die and the bottom die (*g*). The ring having now received the form shown on a large

25 scale in Fig. 9, the slide, E, requires to be raised to allow it to be removed from the dies (*b*) (*g*) and deposited in the lower finishing die. The wiper (*i*) having now passed the bar (*j*) and having receded to

30 clear the shaft, two other wipers (*l*) (*l*), placed side by side on the shaft, come in contact with the underside of a broad tongue on the back side of a rod (*m*) which is secured to the front of the slide and lifts

35 the slide, which is supported by the said wipers, and afterward by the wiper (*i*) acting on the same tongue, until a stud (*o*) on the right side of the slide is caught by the projecting rim (*n*) of a cam,

40 G, on the shaft, by which the slide is held up until just before the proper time for the punches to act again. The ring remains within the punch (*d*) as the latter rises with the slide until the slide has been raised to

45 its highest position, by which time the die plate, H, containing the lower finishing die, has been moved under it to receive the ring as represented in Fig. 1. The ring is expelled from the punch by a slight downward

50 motion of the die (*e*) which is produced by a forked arm (*p*) on the lower end of a vertical rod, I, which slides in bearings at the right side of the slide. This forked arm enters through a slot in the side of the

55 slide, into the cavity (*c*) and its prongs pass one on each side of the upper part of the small punch (*d*) and when the rod, I, is forced down, as it is at the proper time, by the exterior of the cam, G, the arm forces

60 the collar (*f*) down on the die (*e*) and depresses it. The rod, I, except at the proper time for the expulsion of the ring from the punch, is held up by a spring (*r*).

The finishing dies are placed the lower

65 one (*s*, *s'*) in the plate, H, and the upper

one (*t*) in a vertical slide, J, arranged at some distance from the slide, E. The plate, H, is attached to a bent lever, K, whose fulcrum is a vertical shaft, L, supported in suitable bearings, on the framing. At the upper end of the shaft, L, there is an arm (*u*) with which the side of the cam, G, comes in contact, and upon which the said cam, assisted by a spring (*w*) attached to the lever, K, operates so as to give the lever, K, such a motion as to carry the die plate, H, and lower finishing die from a position directly under the punches (*a*) (*d*) to one directly under the upper finishing die (*t*) or vice versa.

The lower finishing die has in its center a short mandrel (*r*) which stands up just high enough to pass through the hole which has been made in the ring by the punch (*d*), as shown in Fig. 1, and around this mandrel is a concave recess, of a form exactly the reverse of the form desired to be given to the lower side of the ring. The upper finishing die is bored a short distance up to receive the end of the mandrel (*r*) and around this bore its form is exactly the reverse of the finished upper side of the ring. Its slide, J, receives a downward motion at the proper time, to finish the ring, from a wiper (*z*) on the driving shaft, which acts upon a vibrating bar (*j'*) attached to the slide, and acting in a similar manner to the bar (*j*) on the slide, E, and as the ring is finished and the pressure removed from the slide the latter is raised by a spring, M. The movement of the die plate, H, to the upper finishing die (*t*) under which the bed is raised to support it, takes place immediately after the lower finishing die has received the partly finished ring, and as soon as the ring is brought under the die (*t*) the latter descends, and its pressure causes the lower edges to be crowded into the concavity of the die (*s*, *s'*) and to be so contracted as to fit closely around the mandrel (*r*) like the upper part of the ring.

In order to allow the finished ring to be easily expelled from the lower finishing die, the latter die is made in two parts, the back part (*s*) being firmly secured in the die plate, and the front part (*s'*), (see Fig. 4,) whose external form is that of half a cylinder, fitting easily in a recess of similar form in the die plate and having a recess at its center to allow it to move up and down in its place, independently of the mandrel (*r*). When the die (*s*, *s'*) is in operative condition, the front part (*s'*) rests on the bottom of the aforesaid recess, as shown in Fig. 3, but every time the upper die (*t*) rises after having finished a ring the front part (*s'*) of the lower die is raised by a small hook at the end of a spring (*x*) which is attached to the slide, J. The spring (*x*) passes through a guide piece (*y*) attached to



the framing, and it has a tendency to spring toward the center of the die, but it is to a certain extent prevented by the guide piece, though, as it occupies an oblique position, this tendency is allowed to exert itself as the slide, J, and top die descend. During the descent of the slide and top die to finish a ring the hook enters a small hole ( $s^2$ ) (see Fig. 4) which is made in the top of the piece ( $s'$ ) and has a recess ( $s^3$ ) extending backward at the bottom, (see Fig. 3,) and by the time the die has finished its operation the point of the hook has passed into the recess, and as the slide and top die rise, the hook pulls up the front part ( $s'$ ) of the lower die, which lifts the finished ring high enough to clear the top of the mandrel ( $r$ ), when, being unsupported on the back side, it falls over on an inclined plane, V, which is placed immediately behind the dies, and by the inclined plane is conducted to any suitable receptacle. The part ( $s'$ ) of the die is prevented rising too high by a guard piece ( $y'$ ) and is forced down again to its place by the act of depositing the next partly finished ring upon it.

The metal from which the rings are made is introduced to the machine in strips of a width a trifle greater than the diameter of the circular pieces to be cut out, as in coining presses, and in order to move the strip exactly the proper distance, I employ a

feeding hook, O, which catches the edges of the holes which have been already made by punching the strip. This hook is attached to a horizontal shaft Q, which receives a rocking motion by being connected by an arm R, with a vertical rod, S, which is alternately depressed by a cam, T, on the main shaft and raised by a spring, U.

The use to which this machine is particularly applicable is the manufacture of links for watch chains, and their manufacture is not limited to the form represented, as by varying the shape of the dies and punches the form of the links may be varied.

Two rings or links are always under operation at the same time, one being punched and partly formed by the punches ( $a$ ) ( $d$ ), top die ( $e$ ) and bottom dies ( $b$ ) ( $g$ ) simultaneously with the finishing of that cut out and partly formed by the preceding movement of the said punches, &c.

What I claim as my invention, and desire to secure by Letters Patent, is—

Forming the lower finishing die in two parts, of which the part ( $s'$ ) is capable of being raised substantially as herein described, to expel the finished ring or link.

CHARLES W. DICKINSON.

Witnesses:

S. H. WALES,  
O. D. MUNN.