

H. H. WARREN.

MECHANISM FOR FORGING HAMMERS.

No. 359,113.

Patented Mar. 8, 1887.

Fig. 1.

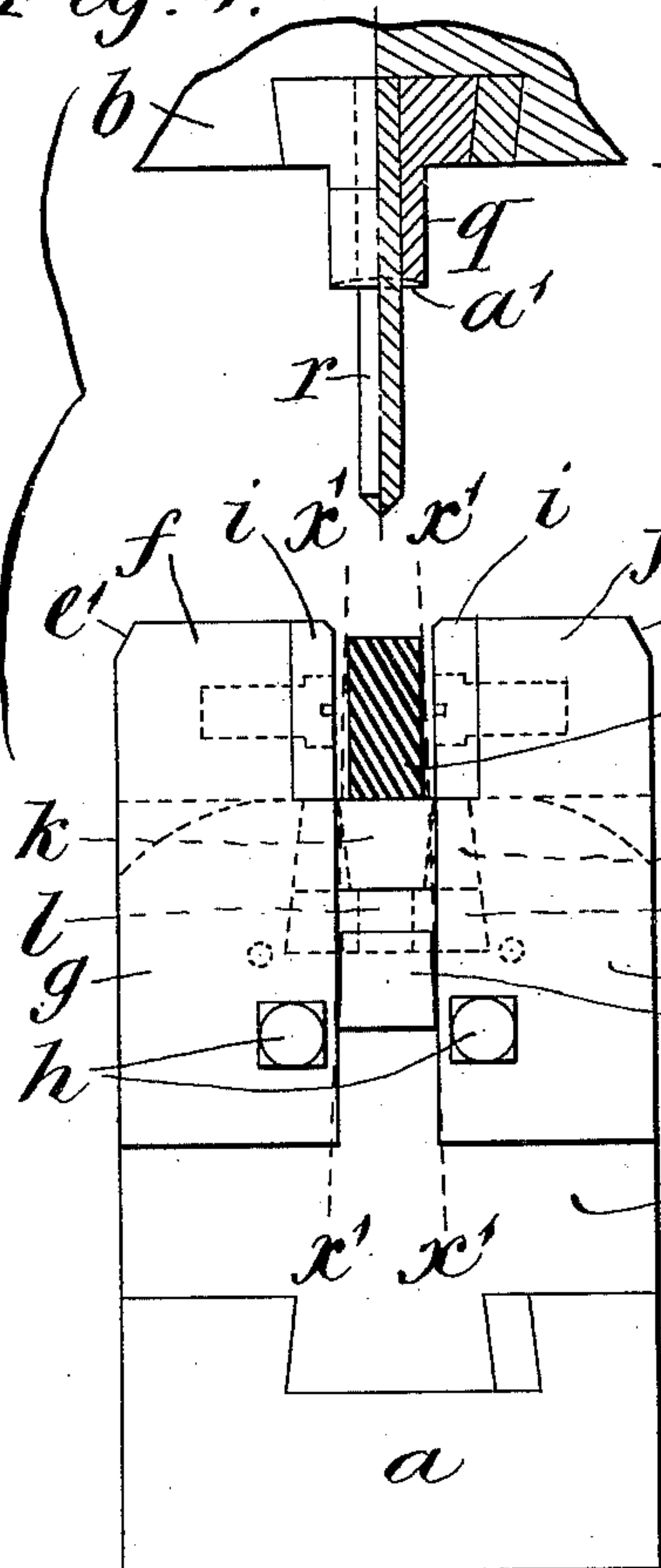


Fig. 5.

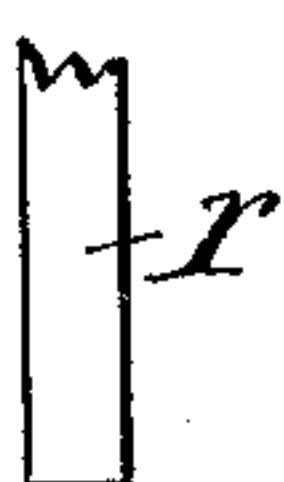


Fig. 2.

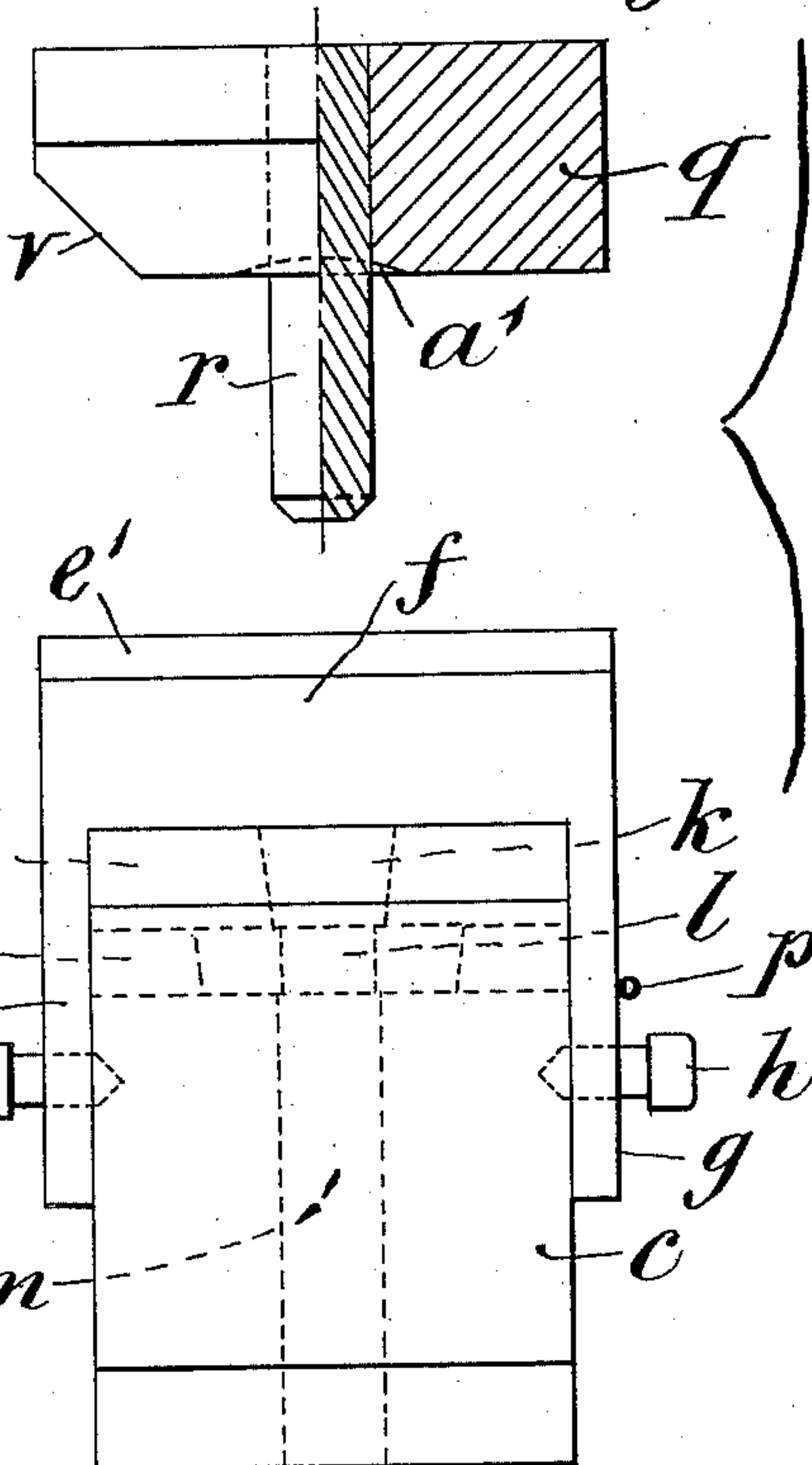


Fig. 3.

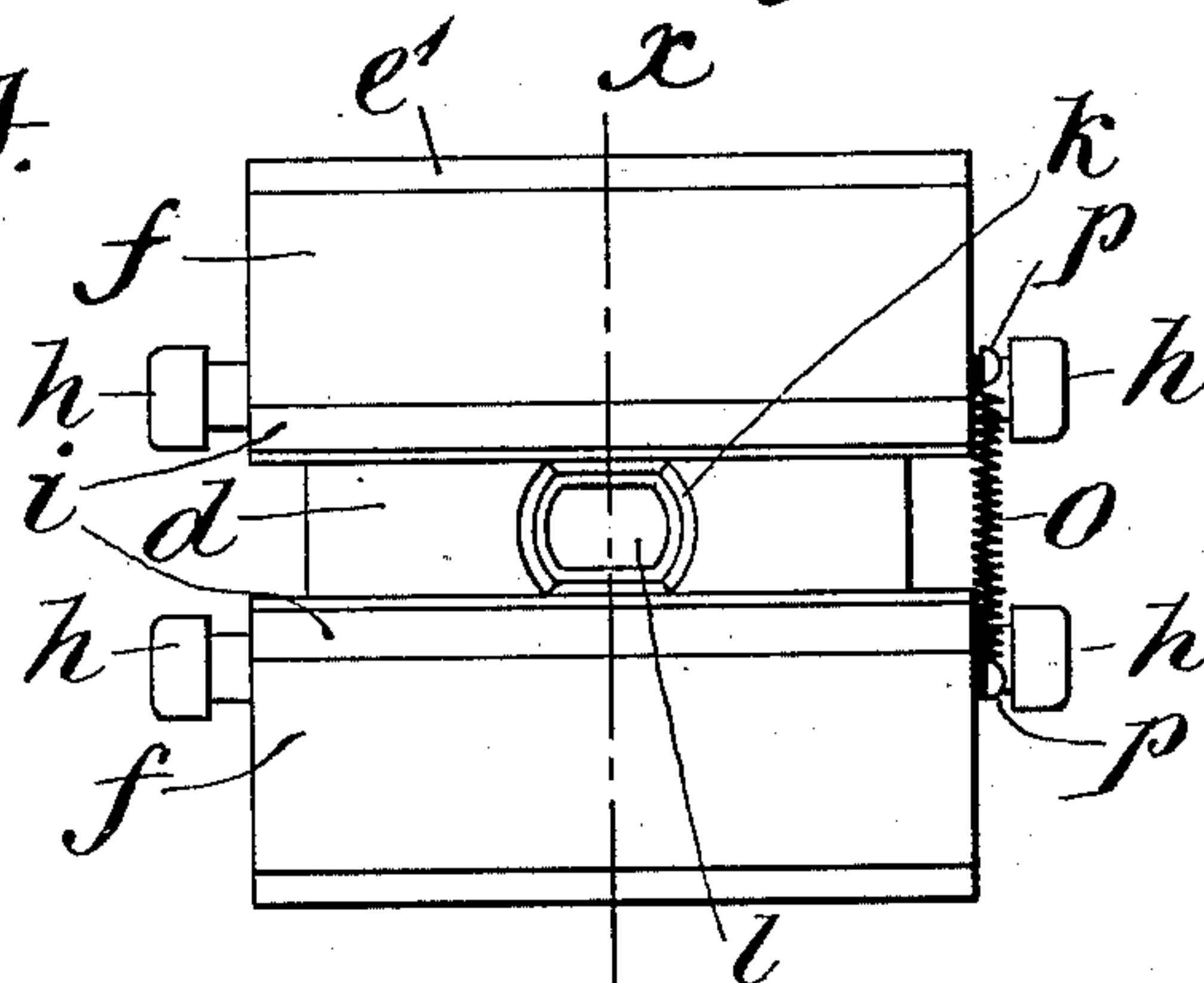
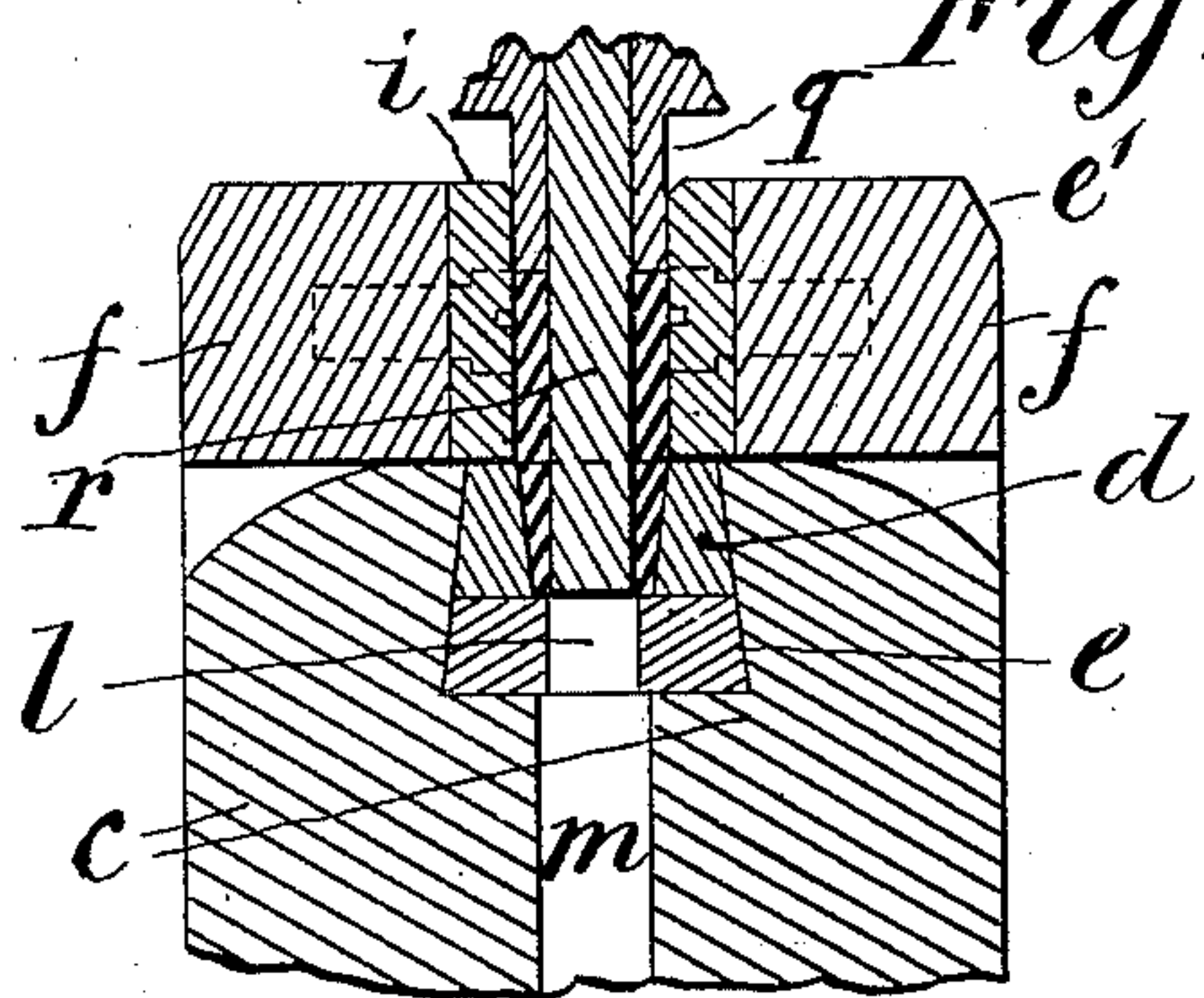


Fig. 4.



Witnesses.

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Fig. 6.

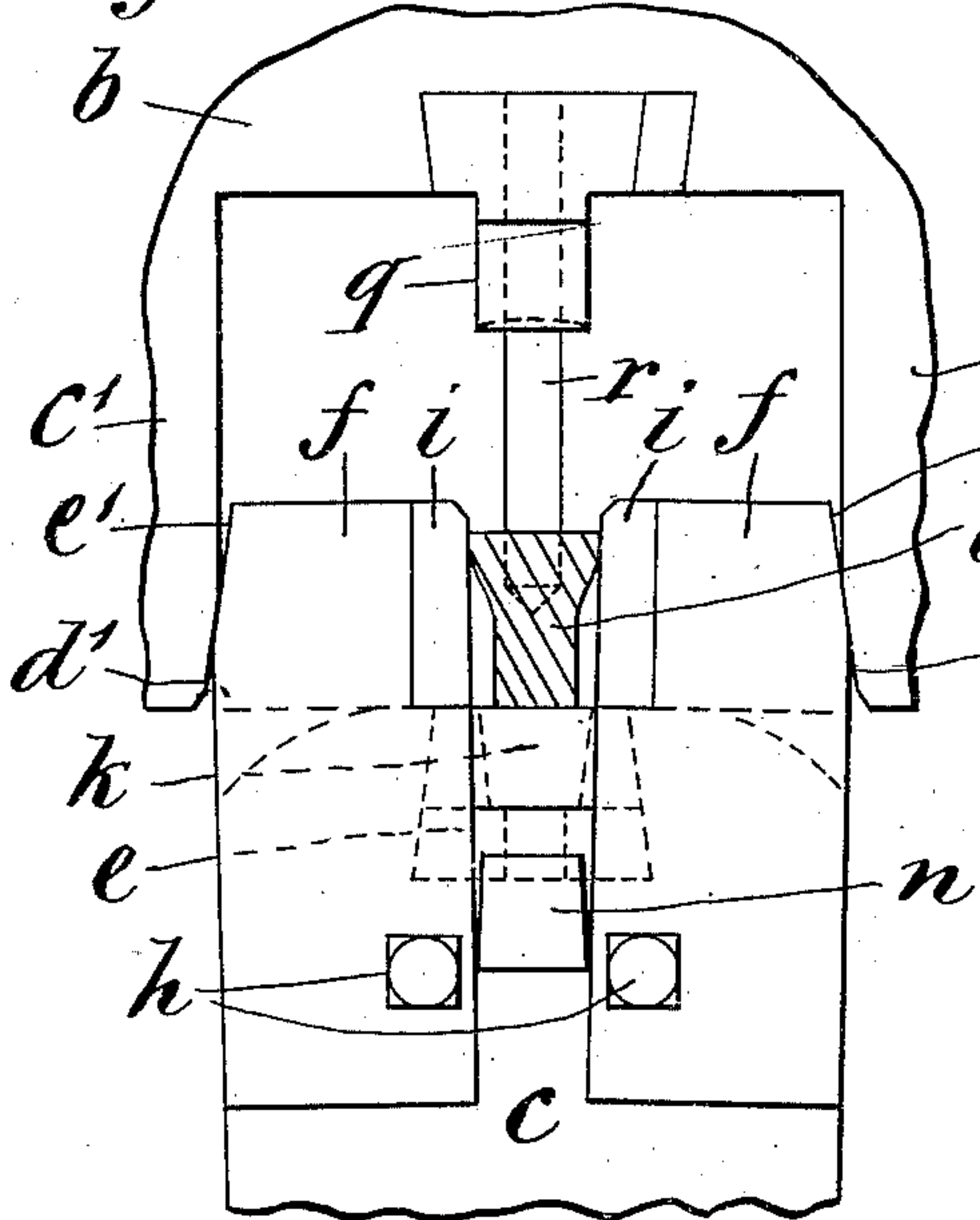


Fig. 7.

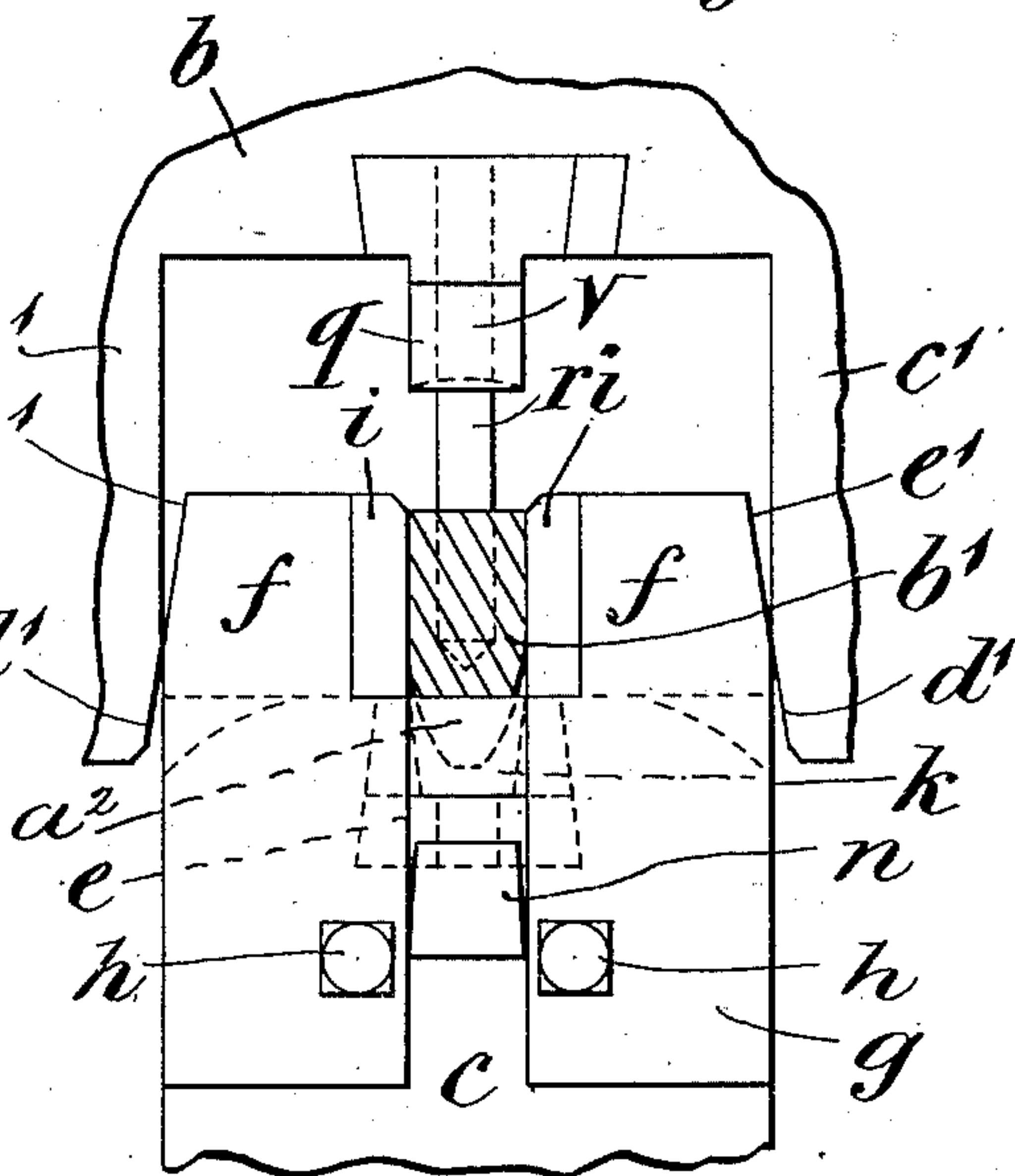


Fig. 8.

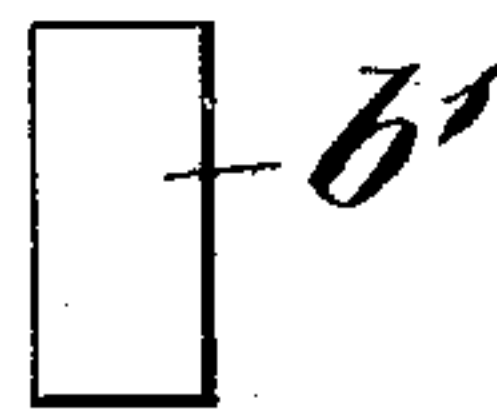
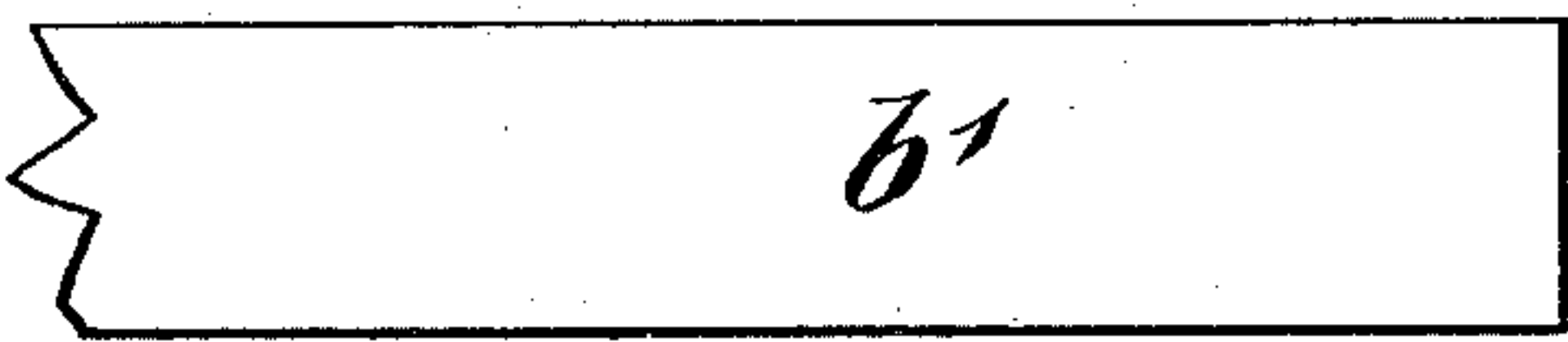
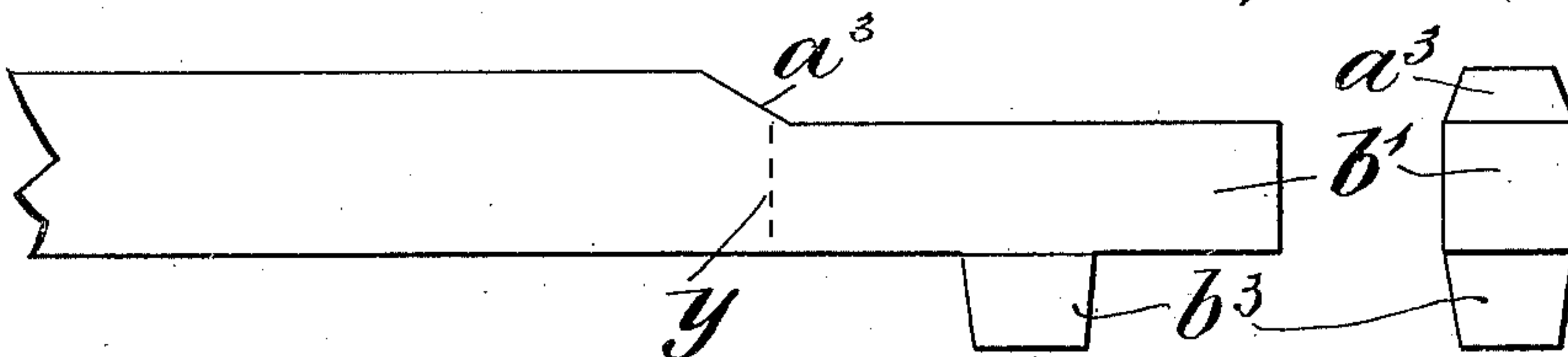


Fig. 9.



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UNITED STATES PATENT OFFICE.

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MECHANISM FOR FORGING HAMMERS.

SPECIFICATION forming part of Letters Patent No. 359,113, dated March 8, 1887.

Application filed November 15, 1886. Serial No. 218,929. (No model.)

To all whom it may concern:

Be it known that I, HENRY HARRISON WARREN, of Coté St. Paul, in the district of Montreal, Province of Quebec, Canada, have invented new and useful Improvements in Mechanism for Forging Hammers; and I do hereby declare that the following is a full, clear, and exact description of the same.

This invention has reference to an improved construction, arrangement, and operation of a punch, dies, and swages for forming hammers, the particular novelties or combinations of parts forming which will be hereinafter set forth and claimed.

In the drawings hereunto annexed, similar letters of reference indicate like parts.

Figure 1 is a front elevation of such portion of a mechanism as embodies my invention, illustrating also the parts of the mechanism in the relative proper positions to begin forging a piece of stock into a hammer. Fig. 2 is a side elevation of part of the mechanism shown in Fig. 1. Fig. 3 is a plan of the block *c*, jaws *f*, and swages *i*, &c., shown in Figs. 1 and 2. Fig. 4 is a vertical section on line *x*, Fig. 3, of upper part of the block *c*, jaws *f*, swages *i*, swage *q*, and punch *r* in the position they will assume when the punching and swaging actions are completed ready for their return-stroke. Fig. 5 is a modification of the punch. Fig. 6 is a front elevation showing the parts of said mechanism after they have begun their stroke in the operation of partly forming a hammer. Fig. 7 is a front elevation, the same as Fig. 6, but with the operation in a further advanced state. Fig. 8 shows a side and end view of the bar of stock to be formed into hammers. Fig. 9 shows a side and end view of the bar of stock after it has been acted upon by my invention.

Letter *a* is a portion of the bed of a press.

b is a portion of the follower of the press, which may be operated by any suitable pitman or other contrivance for the purpose in an ordinary manner. Such pitman or other contrivance, forming no part of the present invention, is not shown.

To the bed *a* is secured a block, *c*. In this is formed a dovetail groove having secured in it two dies, *d* and *e*.

f are two jaws, each having two arms, *g*, ex-

tending down and embracing the block *c*, being pivoted thereto by the center-pointed set-screws *h*, which form pivots for the jaws *f* to swing about upon. The jaws *f* are provided with supplementary pieces *i*, of hard material, (or steel,) attached thereto by screws, as shown, or in any other ordinary manner. These pieces *i* act as swages. Therefore, hereinafter they will be called the "swages *i*." Their swaging-surfaces may be flat, as shown, or they may be made to a desired contour to agree with that desired to be imparted to the sides of the hammer.

The die *d* is provided with an opening or recess, *k*, the die *e* is provided with an opening or recess, *l*, and the block *c* is provided with a passage or opening, *m*, all of which, when the parts are in their proper places, will be in the relative positions shown.

The passage *m* may be extended through the bed *a*, or otherwise arranged to allow of the escape of surplus material, as will be hereinafter described.

On either side, or both sides, if desired, a tap-bolt is screwed into the block *c*, having a large flat head, *n*, serving as a stop to govern the distance that the jaws *f* can close in toward one another. It is fitted to limit their motion equally, as will be hereinafter more particularly described.

The jaws *f* are closed toward each other in the first place by a spring, *o*, attached to pins *p*, secured in the arms *g*. In the follower *b* is secured a swage, *q*, in which is inserted and secured a punch, *r*, the whole being situated so that the punch will be central and in line with the center line of the openings *k l m* and the space between the swages *i*.

The punch *r* will be made to agree in size and shape (in cross-section) to the size and shape of the eye-opening to be formed in the hammer.

In the lower swaging-surface of the swage *q* a concavity, *a'*, is formed, which imparts a corresponding convexity in that part of the upper surface of the hammer-head immediately surrounding the eye, enabling the hammer to be finished up and any small amount of countersinking caused by the punch around the top of the eye to be removed with less labor.

v is a bevel formed on the swage q , the object of which will be hereinafter described.

The punch r may be made flat-ended, as shown in Figs. 4 and 5, or with a beveled end, as shown in Figs. 1, 2, 6, and 7. When made with a flat end, its length will be such as to cause the end to come to the relative position shown in Fig. 4, and when made with a beveled end it will be the same length, only that the beveled part will be in addition to its length.

The bar of stock b' to be formed into a hammer will preferably consist of a bar of steel of greater width and less thickness than the hammer to be formed, (see Figs. 8 and 9,) so that such bar may be said to be, by the operation I am about to describe, decreased in width and increased in thickness by the operation of forming it, or, rather, a portion of it, into a hammer. The bar b' to be thus formed is heated to the required temperature for easy working, and is introduced between the swages i , as shown in Fig. 1. Therefore the swages i close upon the bar b' to the position indicated by the dotted lines a' by the action of the spring o , and for the purpose of bringing the bar b' to the proper position over the recess k the head n is provided and fitted to stop each of the jaws f at the proper exact position for this purpose.

When the punch r is in the position shown in Fig. 1, the spring o brings the swages i to bear upon the two sides of the bar b' . As soon as the point of the punch r enters the bar b' it spreads out the upper part of it, as shown in Fig. 6. This is done by the spring o allowing the jaws f and swages i to swing upon the pivots h and open farther apart. This removal of the swages i farther apart must be controlled within limits by some suitable contrivance. The particular means of accomplishing this object may be various; and, further, they do not form a part of the present invention. I have, however, shown in Figs. 6 and 7 the follower b provided with horns c' , so arranged that inclined surfaces d' on the horns acting on inclined surfaces e' on the jaws will prevent the swages i from opening too wide apart. The said inclines d' and e' are further arranged so that while the punch r is being thrust into the stock-bar b' the said inclines are causing the swages (after the first entry of the punch) to close upon the sides of the bar b' , and this double action of punching and swaging is carried on until the punch has arrived at about the position shown in Fig. 7, where, the inclines d' and e' having passed one another, the closing movement of the swages i ends. This closing movement of the swages i causes an upward forcing of the material of the bar b' , and thereby prevents the countersinking action of the punch which would take place in the first part of the entry of the punch r into the bar b' . The said closing in of the swages i while the punch is being thrust into the bar is an important feature of this my in-

vention, because it gives not only the advantage of preventing the said countersink round the edge of the eye, but it also causes the punch to do its work much more easily than when the swages i are held or formed so that they will be immovable. As the punching action goes on, the swaging action continues until the point of the punch is entered about two-thirds or three-fourths of the width of the bar b' , and will then have pushed before it a quantity of the material of the bar b' into the recess k , as illustrated at a^2 in Fig. 7. The punch r and swage q descend until they have reached the relative positions with the other parts as shown in Fig. 4. It will be observed that here the under surface of the swage q , with the swages i and die d , forms a complete inclosure around the sides of the bar b' , thus partly forming it to the shape of a hammer; further, that the material is compelled to completely fill that portion of the recess k which is not occupied by the punch r , the only escape for surplus material being through the opening l and by the elongation of the material. The said surplus, passing into the opening l , is cut off by the end of the punch coming down to the position shown in Fig. 4, and the part so severed falls down through the passage m and escapes.

With regard to the bevel v of the swage q , this causes a somewhat corresponding bevel, a^3 , on the bar, and by properly situating this bevel the cutting off of the hammer from the stock-bar b' will fall a little to one side of the lower end of the bevel a^3 , or at the line y , leaving the bar of full size for the end of the next hammer to be formed out of it. If the swage q' were made without this bevel, it would crush down the upper portion of the bar b' and leave it in a ragged condition, so that, as found by practical operation, it would cause a "cant corner" on the next hammer formed from the bar; also, that what are called "cold-shuts" would be formed at the end of the hammer. After the punch r and swage q have been brought to the position shown in Fig. 4 they are returned to the position shown in Fig. 1, the bar b' is removed from the mechanism, and the part of it formed or partly formed into a hammer is by any desired means cut off at the line y , and the bar after being reheated is ready for forming another hammer.

Attention is called to the arrangement of the swaging-surfaces of the swages i in relation to the width of the swage q . These will be so arranged that when the inclines e' and d' (or whatever other means may be employed for the purpose) have passed each other the swaging-surfaces of the swages i will be the exact proper distance apart to receive the swage q between them, and no more or less, thus preventing the formation of fins or seams on the hammer, which are always troublesome and costly to remove.

The jaws f and swages i may be made integral, if but one size of hammer is to be made

by them. By making the swages *i* separate they may be changed for thicker or thinner ones, as desired; but in so changing them the swage *q* and punch *r* will also be changed for
5 others to agree with the change of size of hammer.

If the invention is to be used in the construction of hammers not having the elongated eye or socket *b*³, (see Figs. 8 and 9,) the die
10 *d* will be omitted and a die, *e*, having its upper surface at the same height as the upper surface of the die *d*, put in its place. The punch in this case will be made to agree in
15 length with what is required for punching in the ordinary manner from both sides of the bar *b'*, the die *e* being in this case a solid plate, or not having the opening *l*. Therefore it is an anvil.

What I claim, and wish to secure by Letters
20 Patent, is as follows:

1. The combination of the swage *q* and punch *r* with swinging jaws *f*, having swages *i*, (actuated by,) and with a spring, *o*, and inclines *e'*, inclines *d'* of the horns *c'*, and with lower die,
25 *d*, the whole substantially as described.

2. The combination, in a hammer-forging mechanism, substantially as described, of the swinging jaws *f*, having swages *i*, spring *o*, and head *n*, whereby the swages *i* are enabled to automatically bring the bar *b'* to the proper
30 relative position required, as described.

3. The combination, in a hammer-forging mechanism, of a reciprocating punch arranged to punch the eye of the hammer with a pair of swages arranged to open farther apart as the
35 punch first enters the material and it is extended by the said punch, as described and shown, and said swages being, furthermore, arranged to close and swage the sides of the material after the punch has entered the ma-
40 terial and as the further process of punching is being carried on, substantially as described.

4. The combination of the swage *q*, having incline *v*, punch *r*, swages *i*, and lower supporting die or anvil, the whole substantially
45 as described.

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Witnesses:

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HENRI C. DOWAL.