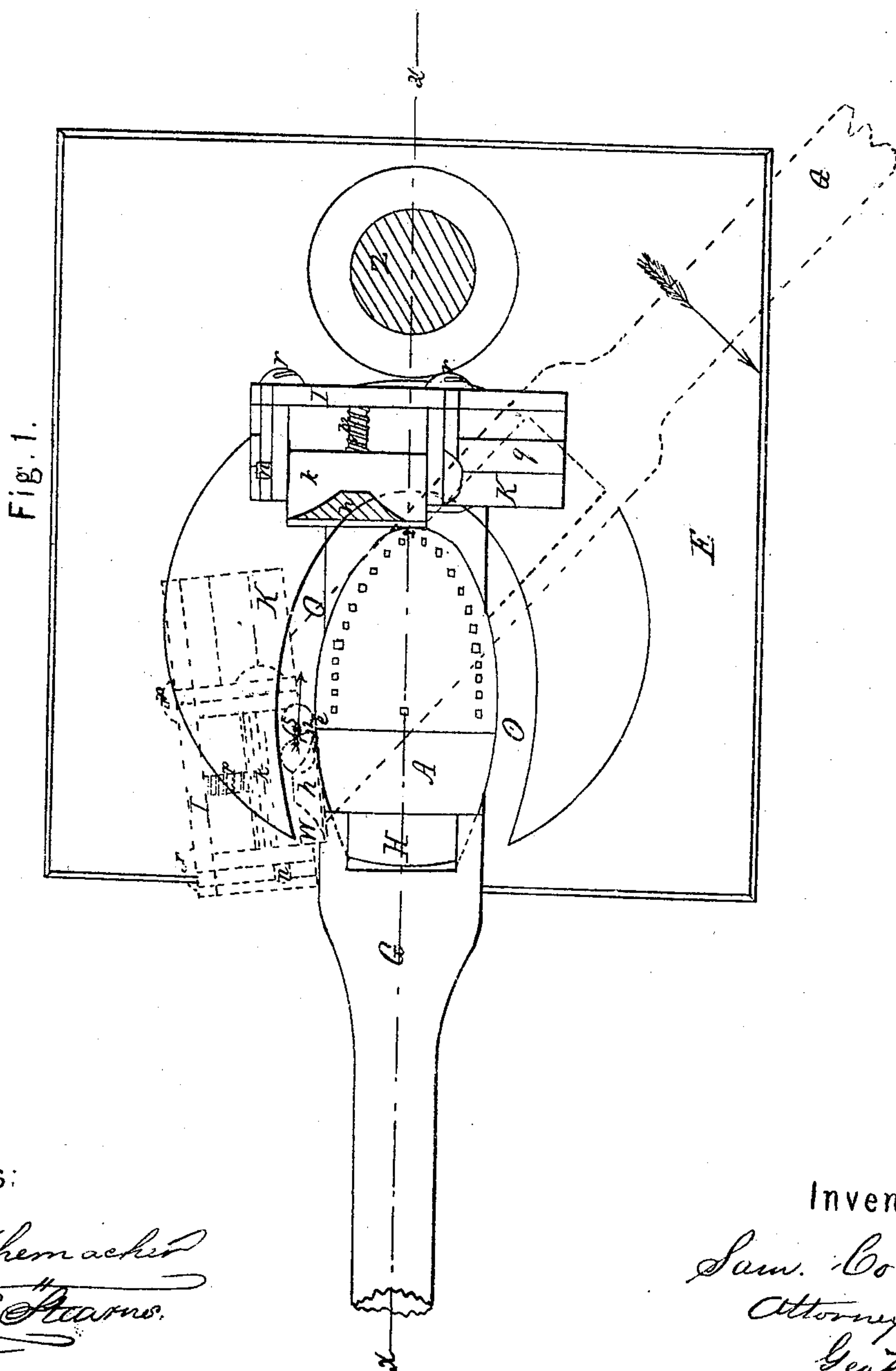


No. 41,038.

PATENTED DEC. 22, 1863.

G. W. ELLIS.
MACHINE FOR NAILING HEELS TO BOOTS OR SHOES.

3 SHEETS—SHEET 1.



Witnesses:

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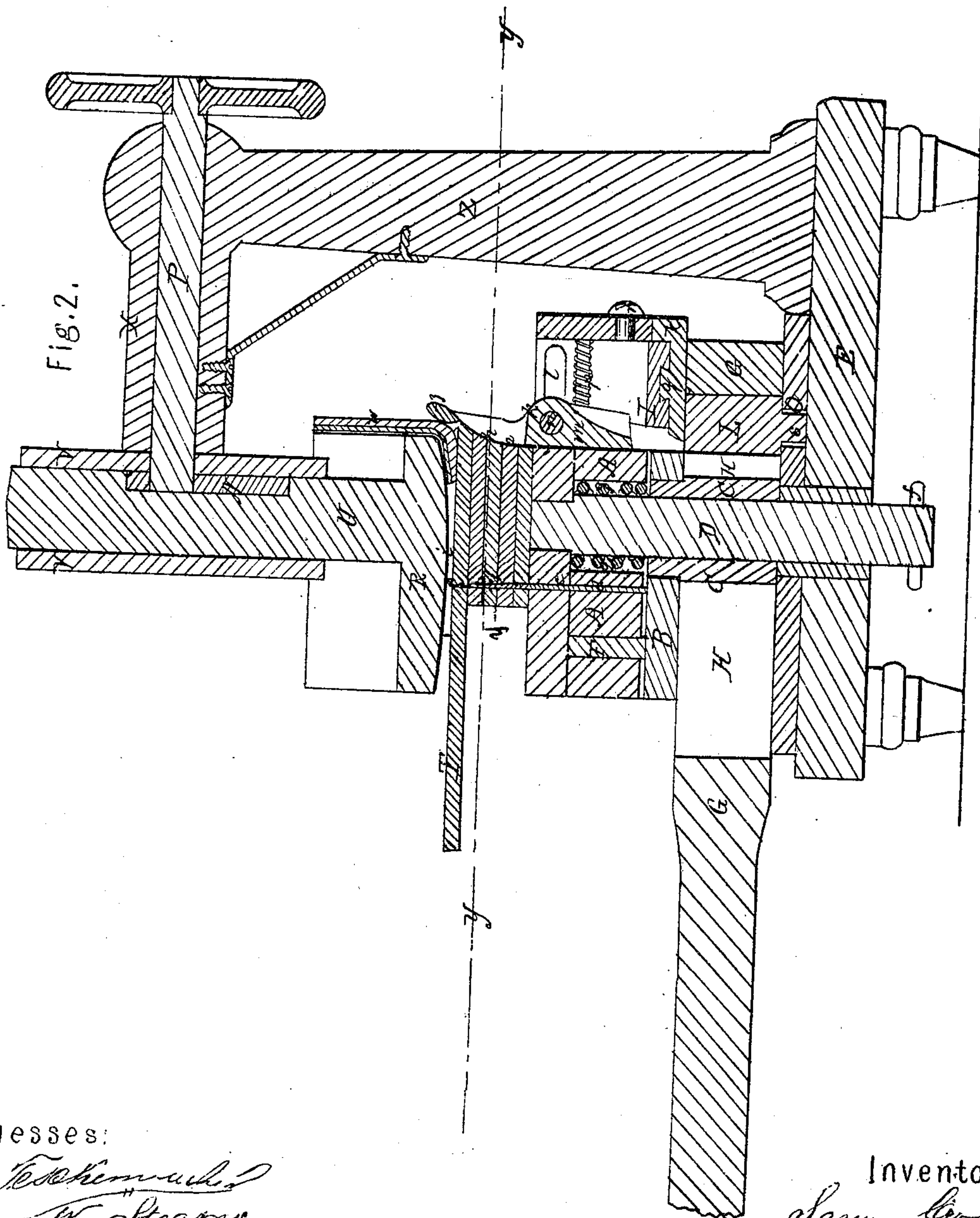
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MACHINE FOR NAILING HEELS TO BOOTS OR SHOES.

3 SHEETS—SHEET 2.



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MACHINE FOR NAILING HEELS TO BOOTS OR SHOES.

3 SHEETS—SHEET 3.

Fig. 4.

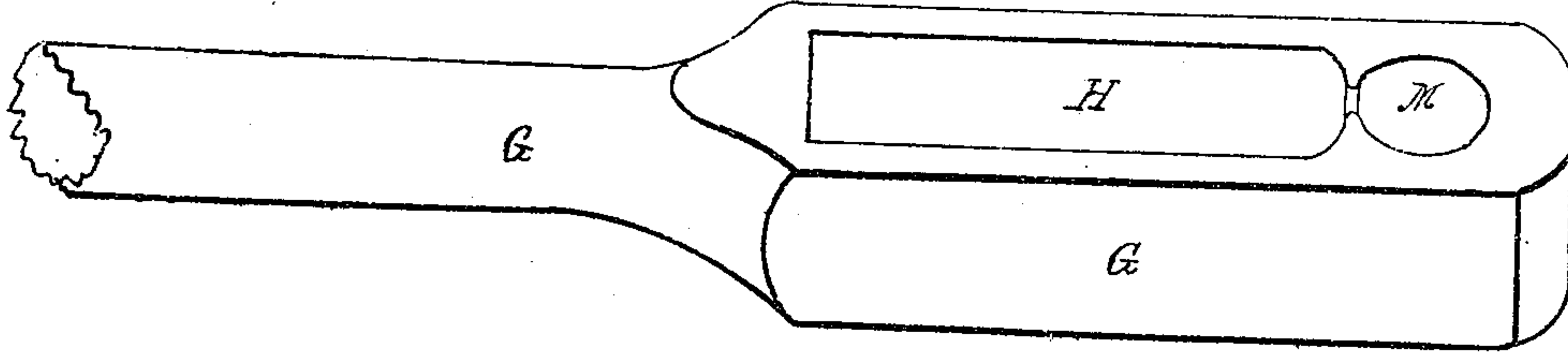


Fig. 3.

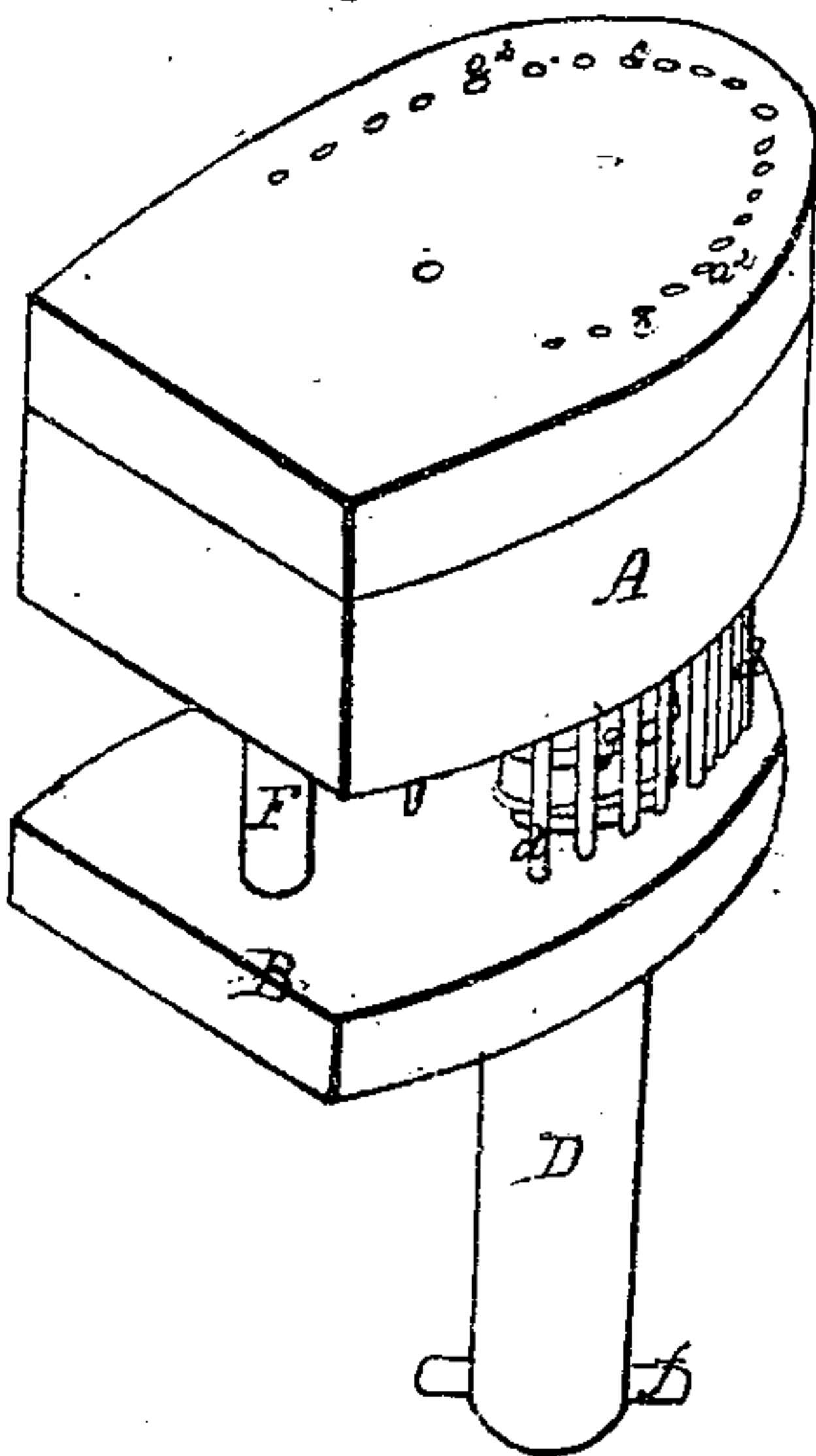


Fig. 5.

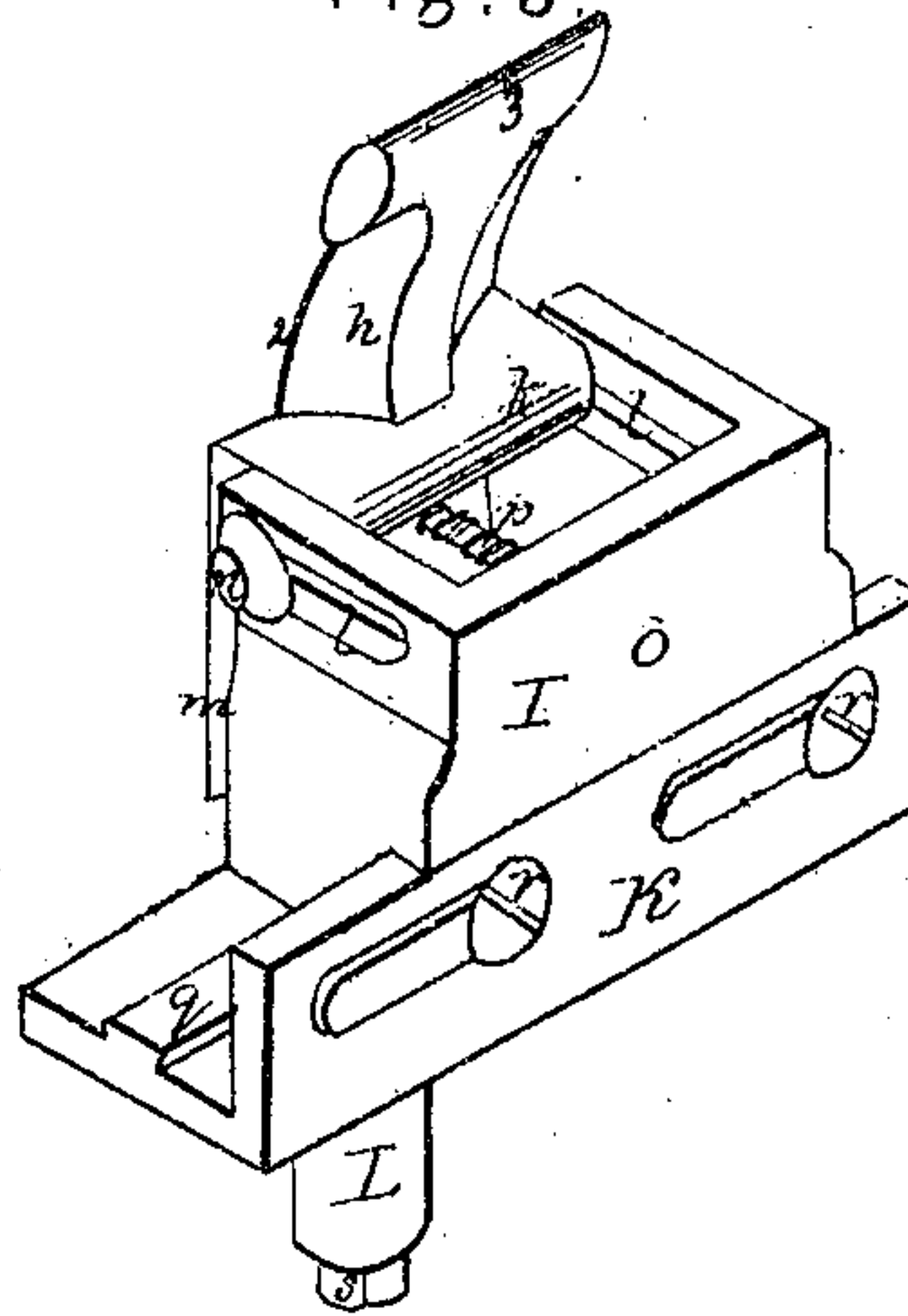
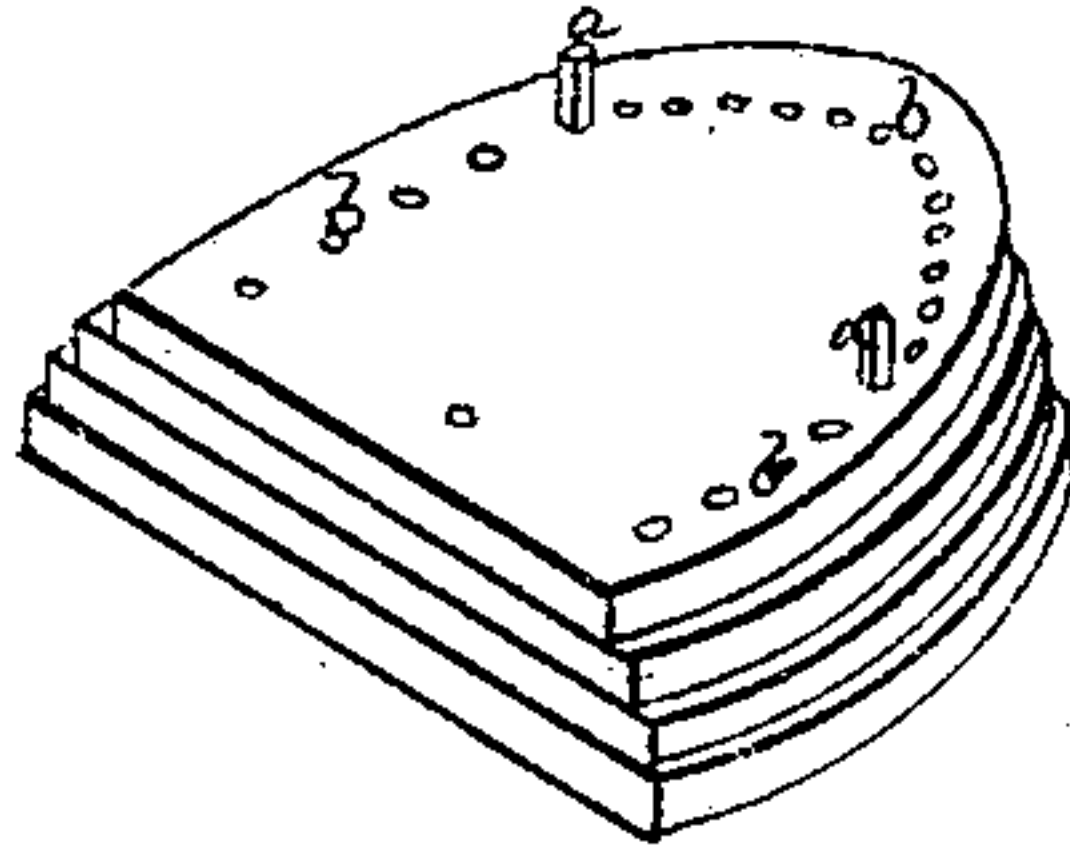


Fig. 6.



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UNITED STATES PATENT OFFICE.

GEORGE W. ELLIS, OF LYNN, MASSACHUSETTS, ASSIGNOR TO HIMSELF
AND LUTHER HILL.

IMPROVEMENT IN MACHINES FOR NAILING HEELS TO BOOTS AND SHOES.

Specification forming part of Letters Patent No. 41,038, dated December 22, 1863.

To all whom it may concern:

Be it known that I, GEORGE W. ELLIS, of Lynn, in the county of Essex and State of Massachusetts, have invented certain Improvements in Machines for Nailing Heels to Boots and Shoes and Trimming them, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a plan of my machine; Fig. 2, a vertical section upon the line *xx* of Fig. 1, the shoe being inserted; Fig. 3, a view of the nailing-block detached; Fig. 4, a view of the knife-lever detached; Fig. 5, a view of the shaving-knife and the parts immediately connected therewith; Fig. 6, a view of a heel-blank, as prepared for nailing on.

The heels, before they are applied to the boots by my machine, are built up of lifts cut into a form approximating that which they are to have in the heel by dies, and temporarily secured together in a machine which I have invented for the purpose, and for which I have applied for Letters Patent simultaneously with this. In the same machine the holes for the tacks are made and two or more nails are partly driven into and through the heel. These nails are left projecting from the top lift, and serve not only to hold the lifts together temporarily, but also as guides by which the heels are properly placed in my present machine, where they are secured to the soles of the boots or shoes.

To enable others skilled in the art to build and use my machine, I will proceed to describe its construction and operation.

The heel-blank which is to be applied to the shoe is represented in Fig. 6. The holes *b* for the nails having been punched and the guide-nails *a* inserted upon the machine before referred to, the nailing-block *A* is perforated with a series of holes, *c*, exactly conforming in position with the awl-holes *b* in the heel-blank, and in each of these holes *c* works a driver, *d*, the lower end of which rests upon the stationary driver-bed *B* upon the top of a hollow post, *C*, rising from the bench *E*. The nailing-block *A* is secured to a round rod or bar, *D*, which passes down through the post *C*, and between the bed and the block there is a spring, *g*, which raises the block *A* to the

proper height, where it is arrested by the pin *f* in its lower end coming in contact with the underneath surface of the bench *E*. A pin-guide, *F*, rising from the bed *B*, enters a corresponding hole in the block *A* and prevents the latter from turning. When pressure is applied to the nailing-block, it is forced down upon the bed, Fig. 2, the spring *g* yielding and the drivers rising through the holes in the block *A* so as just to reach the upper surface of the block.

The knife lever *G*, which is seen in plan in Fig. 1, in section in Fig. 2, and in perspective in Fig. 4, has a long slot, *H*, in its center, of a width that will just accommodate the post *C* within it, so that the lever may turn freely round this post and at the same time have a considerable range of motion in the direction of its length.

The motions of the knife lever are governed as follows: The knife *h* (seen in Fig. 2 in the act of shaving the heel) is formed so as to give the proper curve to the heel, and is secured to the knife-head *k*, and has a prolongation, or tail-piece, *m*, which rests against the nailing-block *A*. The head *k* has two bearings or pivots, *n*, which slide in slots *l* in the knife-block *I*, and is forced up toward the heel, Figs. 1, 2, and 5, by the spring *p*. The knife is thus allowed to vibrate on its pivots *n* and to move longitudinally in the slots *l*.

Above the knife is a fender, *z*, which rests against the upper leather *w* and protects it from being cut by the operation of shaving the heel.

The knife-block *I* slides upon dovetailed ways *q* on the knife-carriage *K*, and is secured in position thereon by screws *r*. Down from this carriage projects a post, *L*, which fits closely, but turns freely, in the hole *M*, Fig. 4. The post terminates in an elongated or double pin *s*, which fits snugly, but slides freely, in a curved groove, *O*, upon the upper surface of the bench *E*. The curve of the groove *O* corresponds, generally, with that of the nailing-block *A*, but will allow this block to be varied sufficiently for all the different sizes of heels that may be required.

The knife *h* is adjusted by means of the screws *r*, so that its edge *2* shall be in a vertical plane, passing through the center of the post *L* and pin *s*.

The post *L* is passed down through the hole *M*, and the knife-lever *G* is turned so that the elongated pin *s* will enter the slot *O* at the point *W*, Fig. 1, and as the lever is carried around the pin moves in the direction of its arrow, and as it moves it turns the carriage *K* and knife-block, so as to cause the knife blade constantly to make a tangent to the bed *B* and block *A*. The knife *h* is adjusted by means of the screws *r*, so that its edge 2 shall be in a vertical plane passing through the center of the post *L*, and thus the edge of the knife is always kept in the proper cutting position.

In operating the machine, the boot or shoe, after having been soled, and while it is yet upon the last, has its heel secured to it by nails and shaved, as will be presently explained. In the machine represented in the accompanying drawings only the rear portion of the shoe is shown, Fig. 2, and the follower *R* takes the place of the last. In the great majority of cases, however, the shoe will be heeled before the last is withdrawn.

In Fig. 2, *T* is the sole, which may be secured to the insole *i* and upper leather *w* by pegs, or in any ordinary way. The follower *R* is attached to the lower end of a rod or bar, *U*, which slides up and down in bearings *V*, attached to an arm, *X*, projecting from the standard *Z*, rising from the bench *E*. The bar *U* is operated by the eccentric *N* upon the end of the shaft *P*, which runs through the center of the arm *X*.

Operation: When not in operation the nailing-block is elevated a short distance above the bed *B*, as seen in Fig. 3, and the drivers *d* are then sufficiently far below the mouths of the holes *c* to permit a nail to be dropped into each of the holes, except those which come opposite to the guide-nails *a*, Fig. 6. The nails being thus dropped into the holes with their points uppermost, the heel-blank is placed upon the nailing-block, the guide-nails *a* being placed in their proper holes *a*², into which, as before stated, no nails were placed. These guide-nails thus serve the purpose of instantly placing the heel-blank in the proper position, so that each hole in the block shall correspond with a hole in the heel. The shoe is now placed upon the heel, Fig. 2, a proper guide or gage, projecting from some stationary part of the machine, arresting the shoe in the right position with respect to the nailing-block *A*. This gage is not shown upon the drawings, as such instruments are common in a great variety of machines and need no further description. The shaft *P* is turned, and the follower *R*, (or the last if the latter has not been withdrawn from the shoes,) together with the shoe, heel, and the nailing-block *A*, is forced down until the latter bears upon the stationary bed *B*. While this is taking place the drivers have forced the nails up into the holes in the heel-blank, or a portion of them, through the sole and insole and against the bottom of the follower *R*, (or of the last,) which

is iron plated, to rivet them and secure the heel firmly, the guide-nails *a*, Fig. 6, being at the same time driven. One of the nails is seen at *y*, Fig. 2, riveted against the follower. The descent of the follower (or of the last) is graduated with reference to the thickness of the heel, so that the latter may be submitted to a great pressure, not only that it may be thus nailed and retained in a solid and compressed state, but also that it may be shaved while under pressure, which operation is performed as follows:

Starting with the knife-lever in the position represented in red in Fig. 1, and moving this lever in the direction of its arrow, the knife commences to cut upon the corner *c* of the heel, and is carried round until it has shaved the entire heel, the tail *m* of the knife resting against the nailing-block *A*, and the fender *z* against the upper leather of the shoe, as already described, and thus the block *A* and the upper leather serve as guides for the knife, while the fender prevents the knife-edge from coming in contact with the upper leather.

For certain work I propose to secure the sole and heel temporarily together in the machine before mentioned, which makes the holes for the nails, the guide-nails being of sufficient length to penetrate partly into the sole. The sole and heel are then shaved and secured together in my present machine, and before being secured to the shoe.

The heel and the portion of the sole to which it is attached are then secured to the shoe by six or more nails driven into holes left vacant for the purpose, and clinched upon an iron-plated last. In such case the nailing-block and the follower *R* will serve as guide for the knife, the fender resting against the edge of the follower. This method of shaving the heel and sole before they are secured to the shoe gives a much better opportunity of finishing the "rand" than where the heel is shaved after it is secured to the shoe. Any other method or machinery other than that described above may be employed for the purpose of depressing the follower *R* or the last at the proper time.

These details, however, form no part of my present invention, and need not be further particularized. It is necessary, however, that the machine be of sufficient strength and the power sufficiently great to compress the heel with great force before it is shaved.

In a machine for operating with heels of different heights a different knife will be required for each height of heel in order that the fender may bear upon the extreme bottom of the upper leather, which is technically called the "top edge," as seen in Fig. 2. Or the same knife may be used for heels of different heights; but in such case the fender must be made adjustable upon the knife and be secured by screws thereto.

In order that the inside of the boots may be concave to correspond with the convexity of the foot at the heel, it is customary in building up heels to employ what is called a "split lift,"

by which the top of the heel is made concave. By the use of my machine this concave form is given to the heel without the necessity of resorting to the split lift, as follows: The follower, R, or the last, is made convex to correspond to the shape of the foot, and the heel is subjected to sufficient pressure in the machine to produce the requisite concavity of the sole by the compression of the leather. It would, however, be manifestly of no avail thus to shape the heel if it were again to be released from pressure before being permanently secured in shape. This is accomplished by driving the nails while the heel is under pressure. It is thus held by the nails in the shape in which it is compressed by the machine. It is evident, however, that heels built up with a split lift may equally well be nailed and shaved upon this machine. By shaving the heel while under pressure a much cleaner and better cut can be made.

It will be perceived that by the employment of the spring *p* behind the shaving-knife I am enabled to operate upon heels of different sizes with the single stationary groove O by simply

changing the nailing-block A. By this means the machine is greatly simplified.

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

1. In combination with the follower R, placed inside of the shoe, the nailing-blocks A B, so arranged with regard thereto and to the shoe as that the nails shall be driven from the exterior of the heel toward the interior of the shoe in the manner and for the purpose set forth, thus making one set of nails hold the lifts tightly together, and the whole to the shoe, as described.

2. In combination with a knife carriage or block, I, that traverses through or is guided in or by a curved slot, and moved by a slotted lever, the hanging of the knife therein by pins or trunnions working in slots *l* and guided by the tail-piece *m* and fender *z*, substantially in the manner and for the purpose set forth.

GEO. W. ELLIS.

Witnesses:

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