

# J. Christie.

## Horse Shoe Mach.

N<sup>o</sup> 89,734.

Patented May 4, 1869.

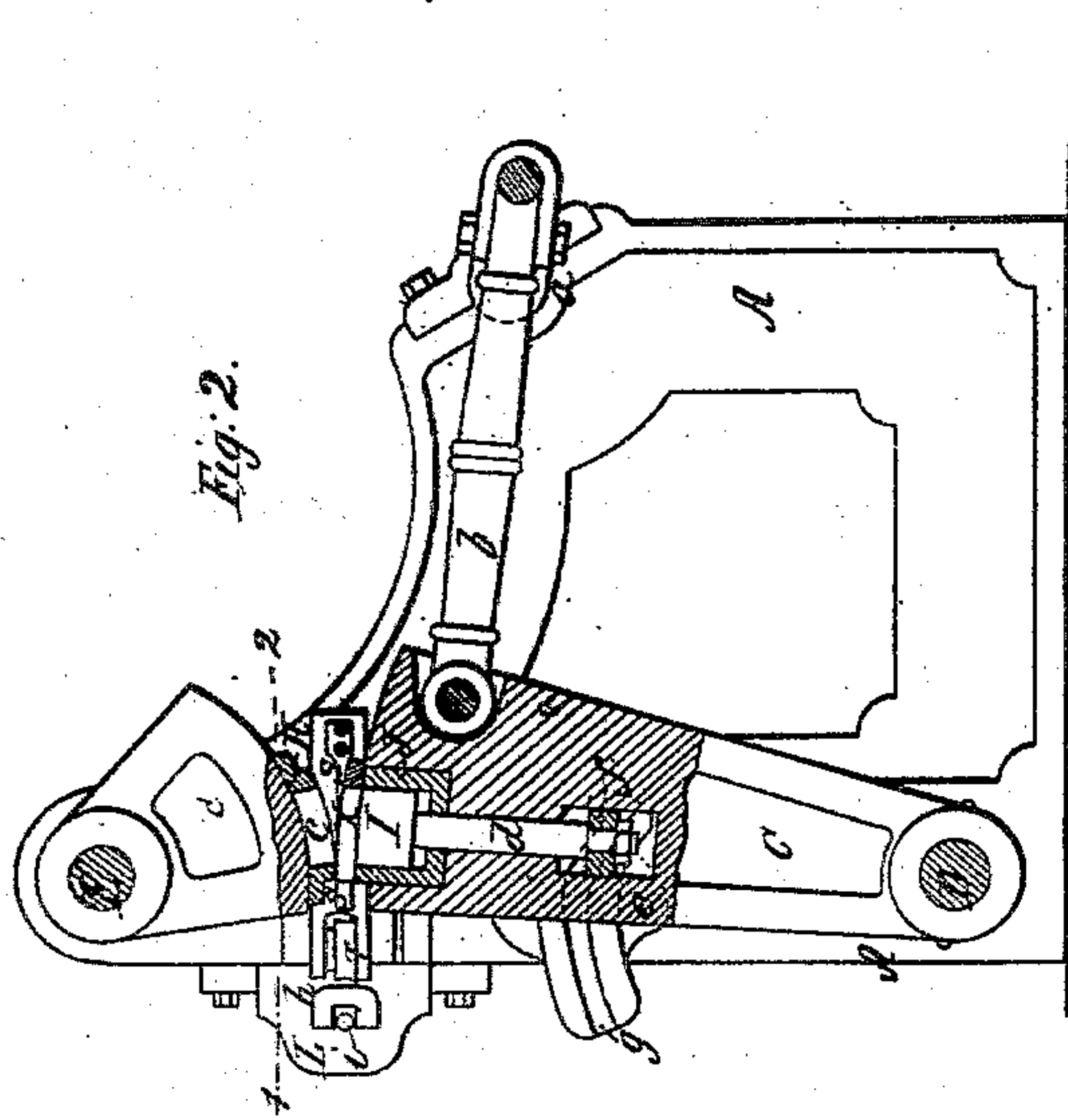


Fig. 2.

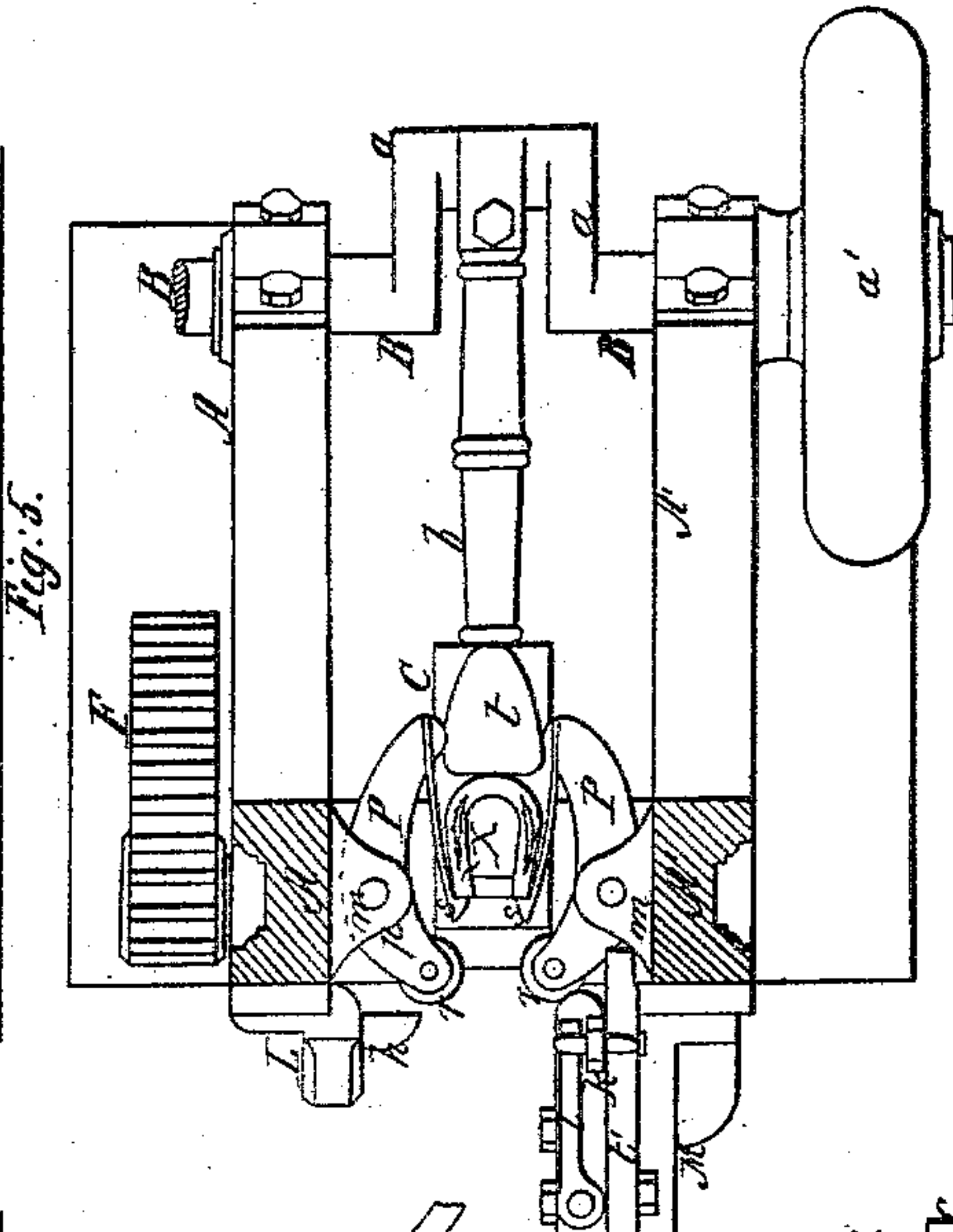


Fig. 5.

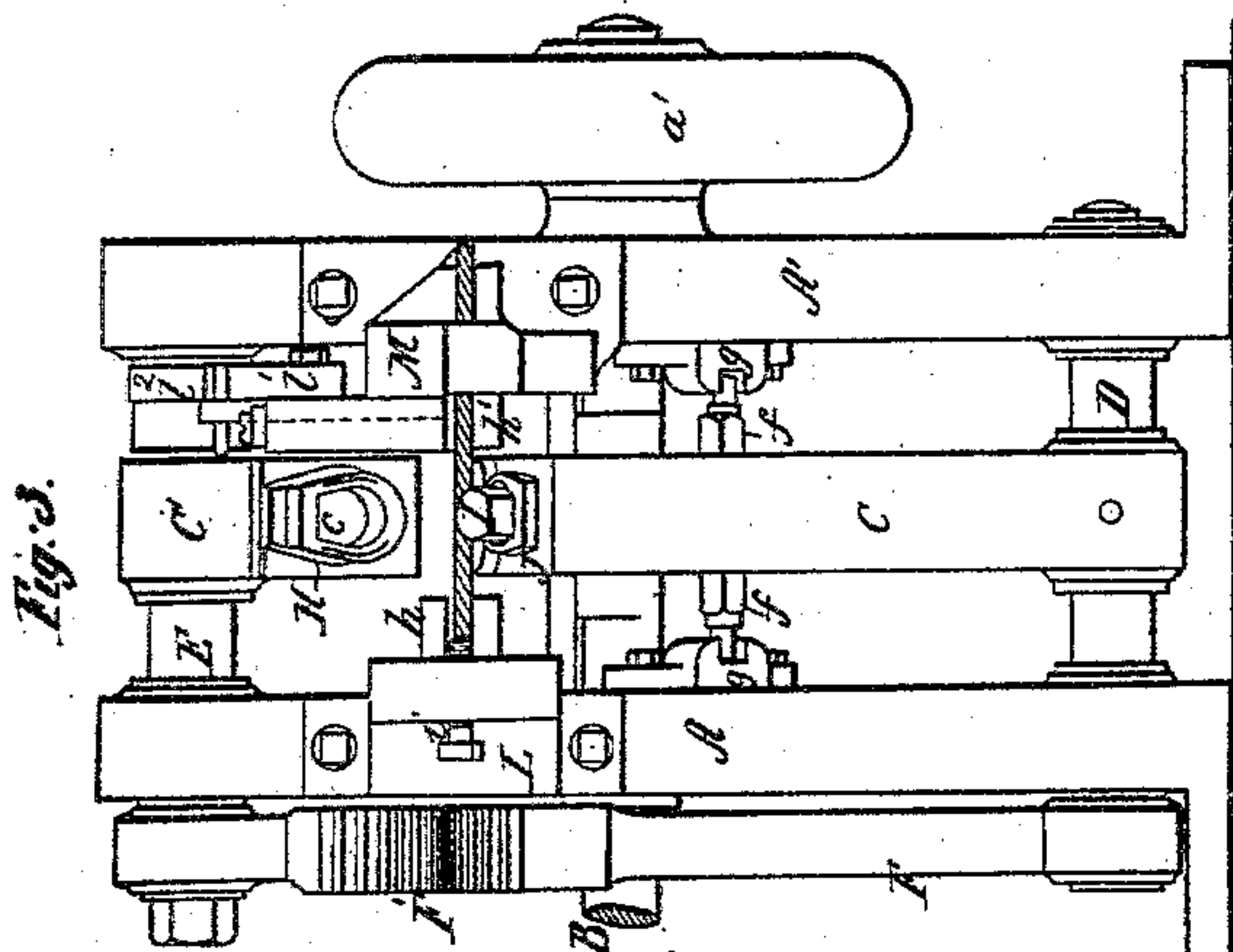


Fig. 3.

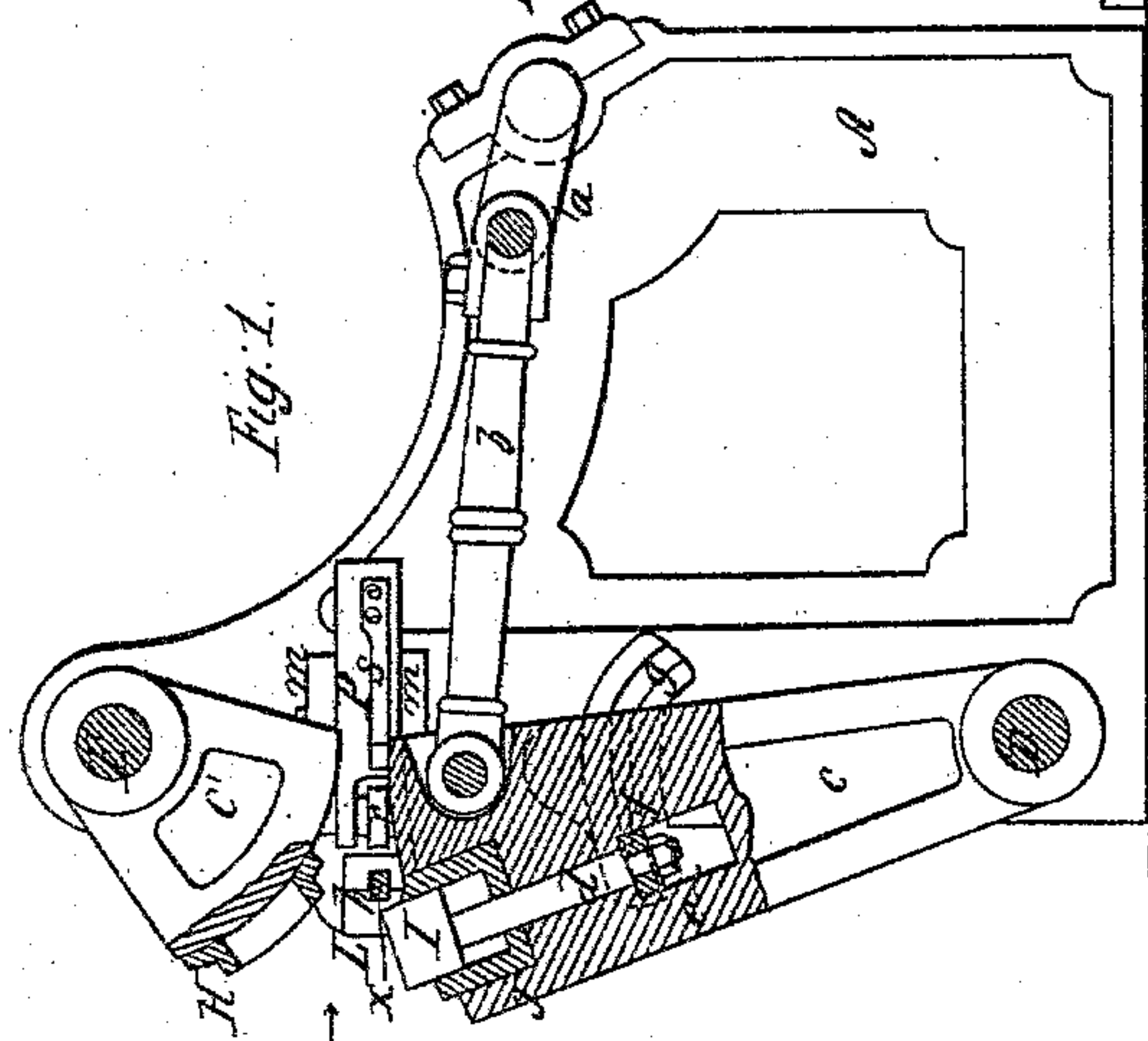


Fig. 1.

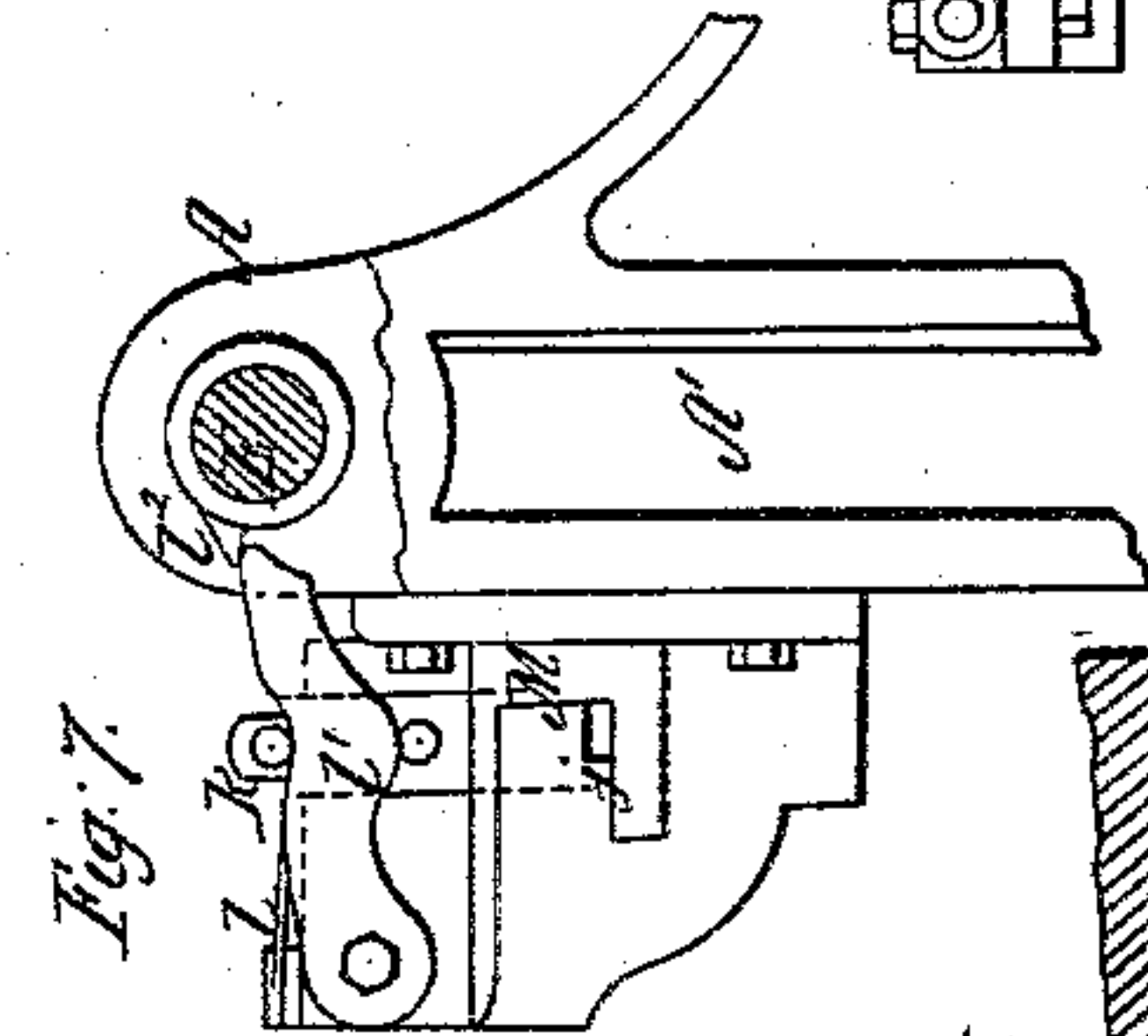


Fig. 7.

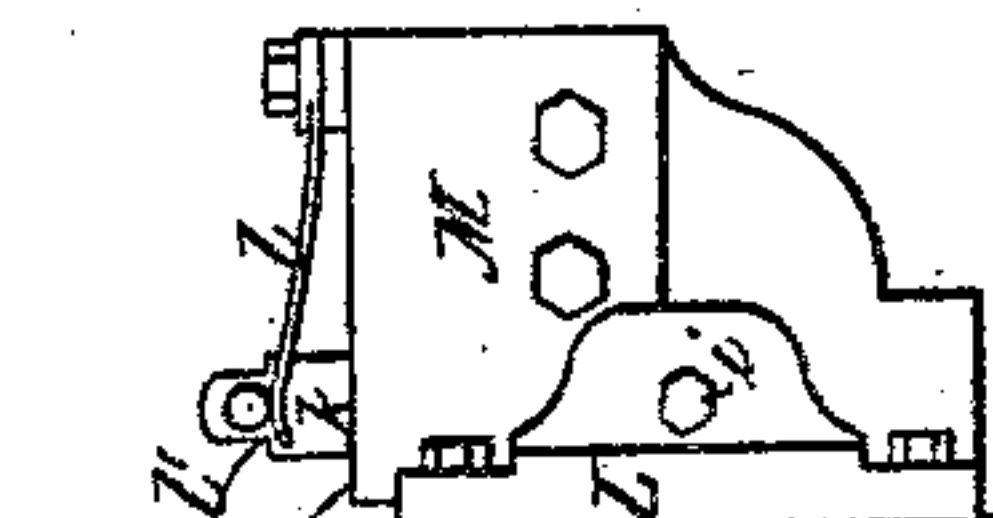


Fig. 4.

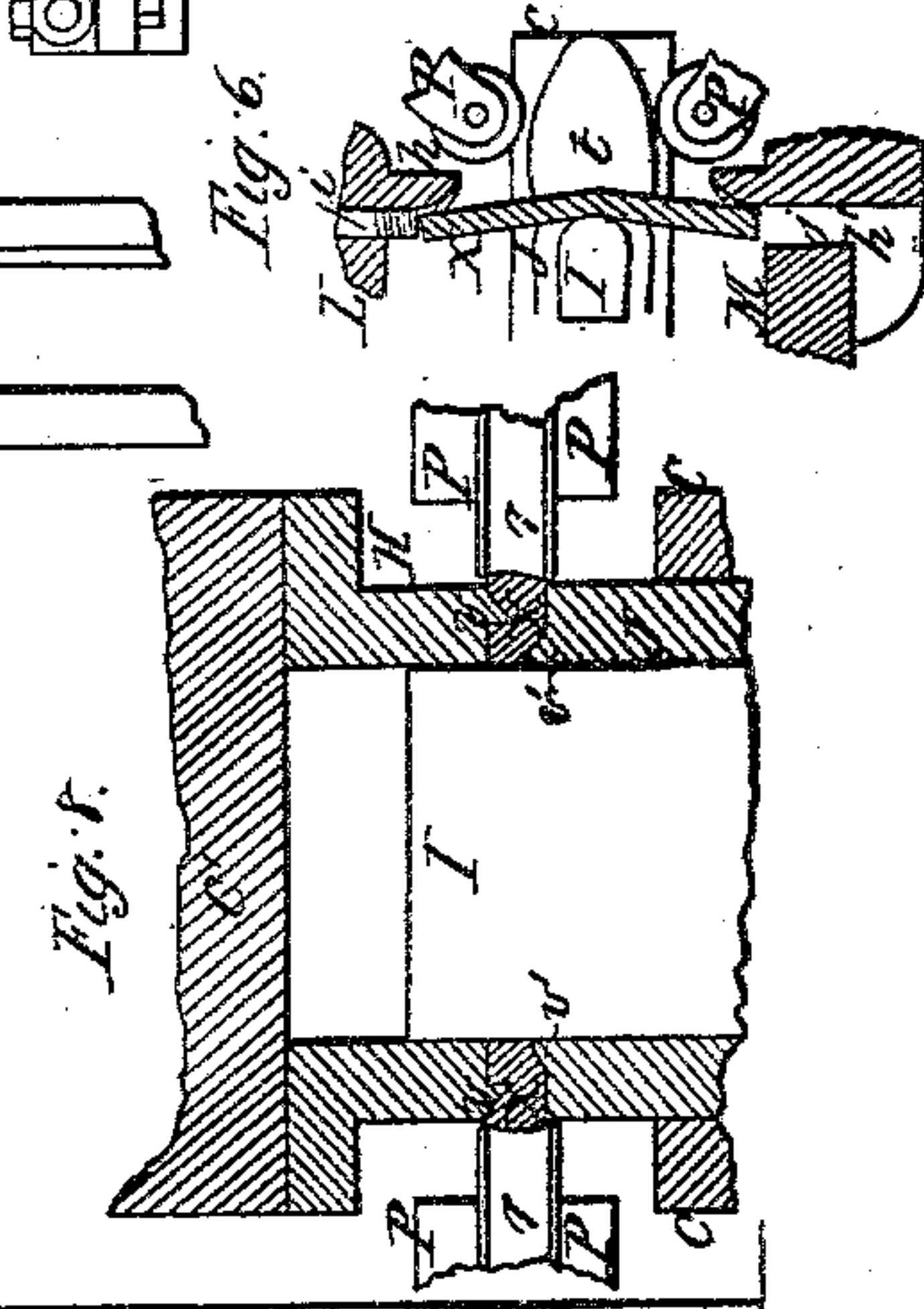
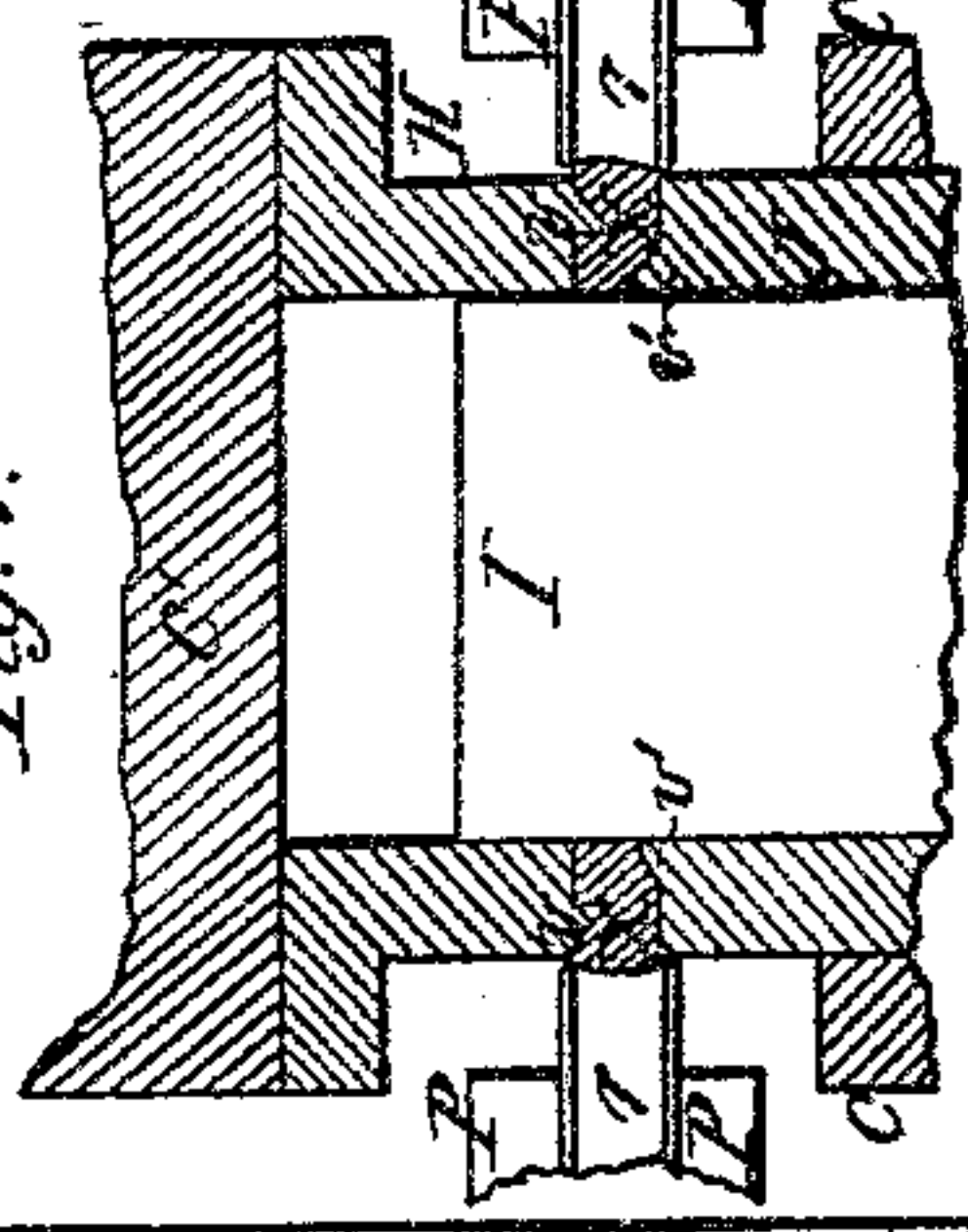


Fig. 6.

Fig. 8.



Witnesses;  
*Wm. Astue*  
*John Parker*

Inventor;  
*Jas Christie*  
*By his Atty*  
*J. Howson*



# United States Patent Office.

JAMES CHRISTIE, OF PITTSBURG, PENNSYLVANIA.

Letters Patent No. 89,737, dated May 4, 1869.

## IMPROVED MACHINE FOR MAKING HORSE-SHOES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, JAMES CHRISTIE, of Pittsburg, county of Allegheny, State of Pennsylvania, have invented an Improved Horse-Shoe Machine; and I do hereby declare the following to be a full, clear, and exact description of the same.

The main features of my invention consist of a vibrating segment, carrying a die for shaping one side of a horse-shoe, combined with another vibrating segment, carrying another die for shaping the opposite side of the shoe, all as fully described hereafter.

My invention also consists in the combination of the above with certain devices, hereafter described, for bending and compressing the shoe, and for withdrawing it from the dies when completed.

In order to enable others skilled in the art to make and use my invention, I will now proceed to describe its construction and operation, reference being had to the accompanying drawing, which forms a part of this specification, and in which—

Figure 1 is a sectional elevation of my improved horse-shoe machine;

Figure 2, the same, with the operating parts in a different position;

Figure 3, a front view;

Figure 4, a side view of the machine, the reverse of that shown in figs. 1 and 2;

Figure 5, a sectional plan view on the line 1-2, fig. 2;

Figures 6 and 7, detached views of parts of the machine; and

Figure 8, an enlarged vertical section of part of the machine.

Similar letters refer to similar parts throughout the several views.

A and A' are the two permanent frames of the machine, and are secured to a suitable bed-plate or foundation, not shown in the drawing; and at the rear, and near to the top of these frames, are suitable bearings, in which turns the driving-shaft B, the latter being cranked at *a*, between the standards, and having at one end a fly-wheel, *a'*, and at the opposite end suitable pulleys.

A rod, *b*, serves to connect the crank *a* of the driving-shaft to a segment, C, secured to a shaft, D, which is arranged to turn in the opposite frames A and A', and to which, outside of the frame A, is secured a toothed segment, F, gearing into a shorter segment, F', on a rock-shaft, E, the latter being also arranged to vibrate in suitable bearings in the frames of the machine, and having between the frames, and directly over the segment C, a segment, C', of a length corresponding to that of the toothed segment F'.

The upper die H is bolted or otherwise secured to the rounded surface of the segment C', and the die J is let into a recess in the segment C, and is itself recessed for the reception of a former, I, the latter being of a shape corresponding to that of the inside of a horse-shoe, as best observed in figs. 3 and 6, and

adapted to a similarly-shaped opening, *c*, in the upper die H.

The former I is attached to or forms a part of a rod, *d*, which is arranged to slide in the segment C, and is secured at its lower end to a cross-bar, *f*, the latter extending through a transverse opening, *e*, in the said segment, and the opposite end of the bar projecting into curved slides or grooves *g*, in plates secured one to the inner side of each frame.

These grooves *g* are so curved that when the segment C is in the position shown in fig. 1, the former I will be elevated above the die J, and will remain in this elevated position during a portion of the movement of the segment, but will be suddenly depressed, as seen in fig. 2, when the ends of the bar *f* pass into the rear portions of the said grooves; all of which will be fully described hereafter.

On the inner side of a projection, L, on the frame A of the machine, is a guard, *h*, into a groove in which extends a set-screw, *i*, as best observed in figs. 3 and 6, and at a point opposite to this projection L, and secured to the front of the frame A', so as to be adjustable thereon laterally to a limited extent, is a bracket, M, through which extends an opening, *j*, figs. 6 and 7, and which is provided with a guard, *h'*, similar to the guard *h* above alluded to.

A blade, *k*, which is arranged to slide vertically in the bracket M, is acted on by a spring, *l*, which has a tendency to raise it, and by a lever, *l'*, hung to the said bracket, and so operated by a cam, *l''*, on the rock-shaft E, as to depress the said knife at intervals and cause its cutting-edge to cross the opening *j*. (See fig. 7.)

Two curved levers P P, fig. 5, are hung to projections *m m* on the inner sides of the frames A and A', and on the front end of each of these levers is a roller, *r*, and at the rear end a spring-catch, *s*, the said levers being operated in such a manner as to cause their rollers *r r* to approach each other by a projection, *t*, on the segment C at the rear of its die J.

Motion having been imparted to the driving-shaft, and the segments C and C' caused to oscillate upon their shafts through the gearing described, a red-hot bar of iron, X, is passed through the opening *j* of the bracket M, at a time when the segments are in the position seen in figs. 1 and 3.

This bar can be fed to the machine either by hand or by suitable feeding-devices connected with the machine.

After having been passed through the openings *j*, the inner end of the bar X is introduced into the groove of the guard *h* until it touches the end of the set-screw *i*, which thus determines its proper length, the said bar being then severed by the blade *k*, which is operated by the cam *l''* and lever *l'*, as before described.

When a portion of the bar has been thus cut off the segments C and C' begin to move in the direction of the arrow, fig. 1, and the bar rests for an instant in the grooves of the guards *h* and *h'* until it is struck by



the elevated former I, as best observed in fig. 6, and bent upon the same until its ends can pass between the guards.

The bar next passes between the rollers *r r* of the levers P P, which, operated by the projection *t* of the segment, bear upon the said bar with a constantly-increasing pressure, and bend it to the required shape upon the former I.

At the same time the bent bar is compressed between the dies H and J, as best observed in fig. 8, a projection, *v*, on the upper die, forming the recesses for the nail-heads, while a rib, *v'*, on the lower die, forms the usual bevel on the inner and under side of the shoe.

It will be seen that the bent rod, in thus passing between the dies, is firmly held and pressed upon all four sides at once, so that the shaping of the outside of the shoe, and especially the squaring up of the ends or heel-calks can be effectually accomplished by the rollers *r*.

The motion of the segments being continued, the shoe passes between the spring-catches *s s*, and the bar *f*, entering the rear portions of the grooves *g g*, depresses the former I until its upper surface is level with that of the die J. (See fig. 2.)

The motion of the segments is then reversed, the shoe being retained between the spring-catches *s s* until the segments have been moved to such a position as to permit it to fall into a suitable receptacle.

The operation is repeated in a similar manner, the length of that portion of the bar which is cut off to form a shoe being in every case determined by the distance between the blade *k* and end of the set-screw *i*, so that, as both of these can be adjusted laterally to a limited extent, the length of the bar can be altered to suit the size of the required shoe.

It should be understood, also, that the dies are arranged in such a manner that they can be readily

detached from the segments and replaced by others of a different size.

I am aware that dies and formers have been so arranged, on rotating parallel disks or rollers, as to bend and compress a bar to form a horse-shoe. This arrangement greatly increases the weight and cost of the machine, and renders it difficult to gain access to the working parts.

By the use of vibrating segments instead of rollers, not only are the above difficulties obviated, but the capacity of the machine is greatly increased, as the segments can be vibrated more rapidly than it is possible to rotate the cylinders, while less power is required to operate the machine, owing to the diminution in the size of its parts and consequent decrease of friction.

Without claiming broadly the use for shaping articles of metal of vibrating segments, provided with dies,

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

1. The combination of the dies, secured to the vibrating sectors, the former I alternately elevated and depressed in the manner described, the presser-arms P and catches *s*, or their equivalents, the whole being arranged and operating together as and for the purpose herein set forth.

2. The combination of the bending levers P, reciprocating former I, catches *s s*, and the lower vibrating sector, all arranged as set forth.

3. The arrangement of parts, whereby the former I is reciprocated at the time and in the manner specified.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

JAMES CHRISTIE.

Witnesses:

J. W. GASKILL,  
SAM. W. MASTERS.