

2 Sheets, Sheet 1.

J. T. Walker,
Horseshoe Machine

N^o 100,222.

Patented Feb. 22, 1870.

Fig: 1.

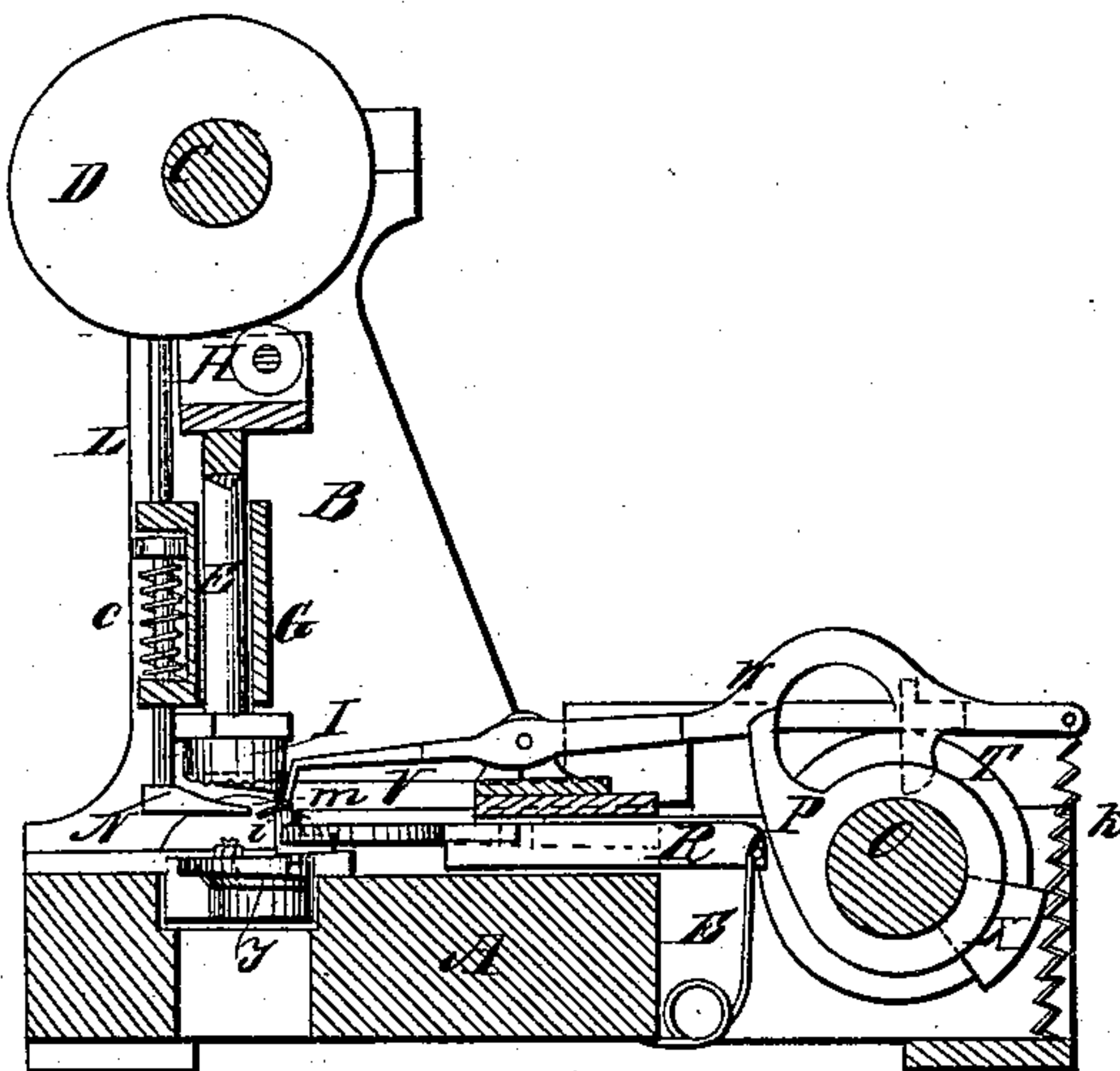


Fig: 2.

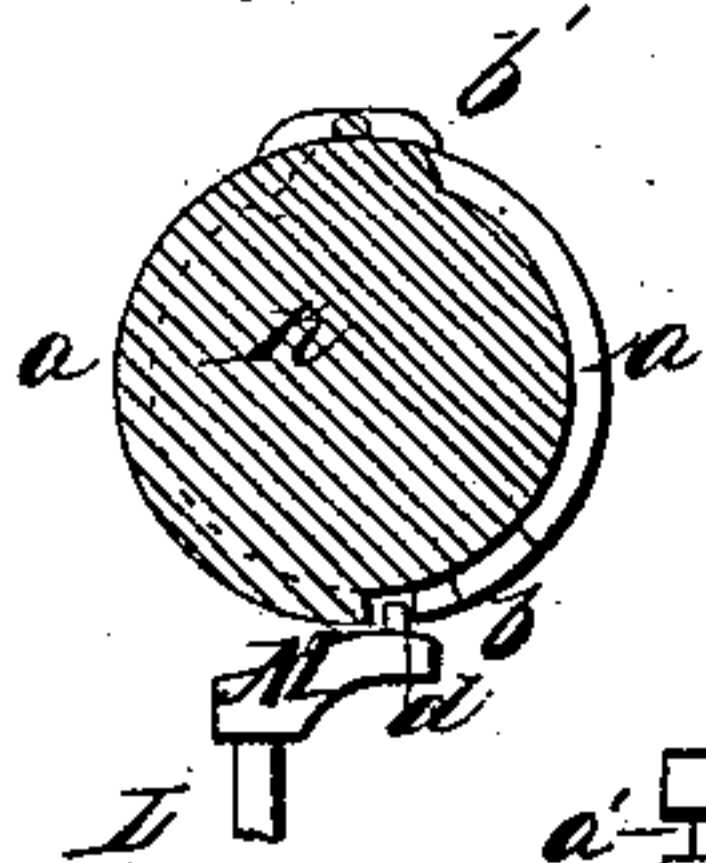


Fig: 5.

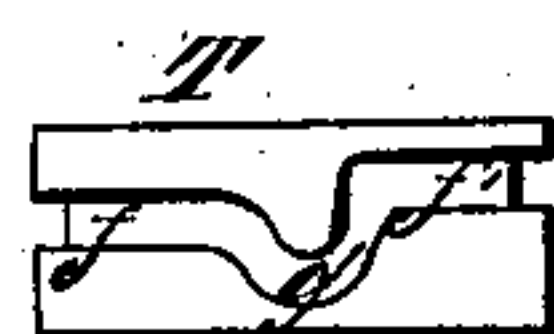
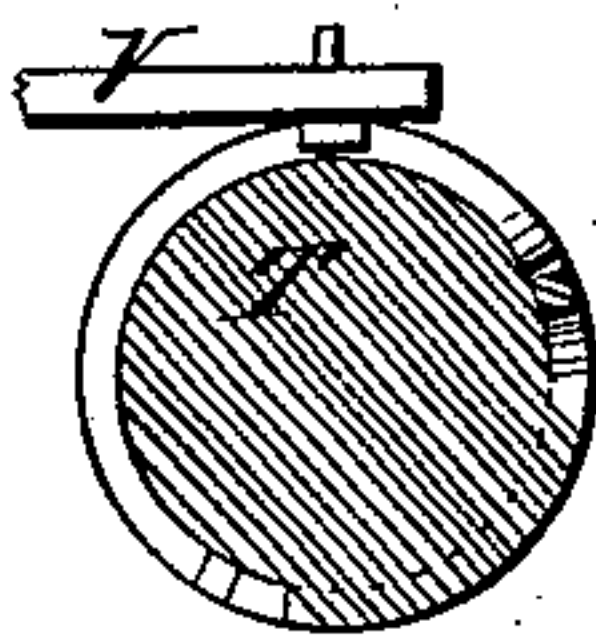


Fig: 6.



Fig: 7.



Fig: 3.



Fig: 4.

Witnesses:

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G. L. Lewis

Inventor:
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per Alexander Mason
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Fig: 8.

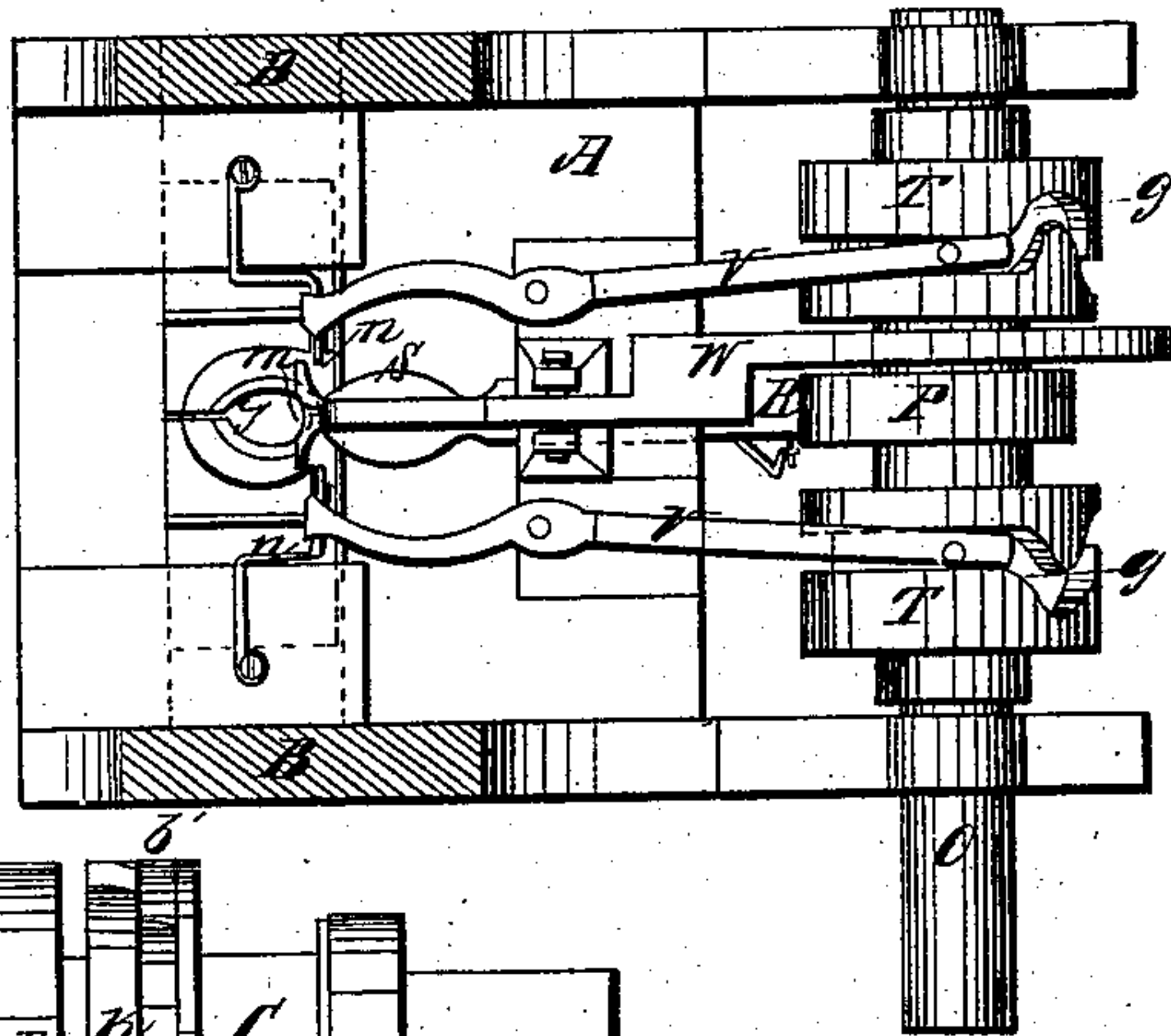


Fig: 9.

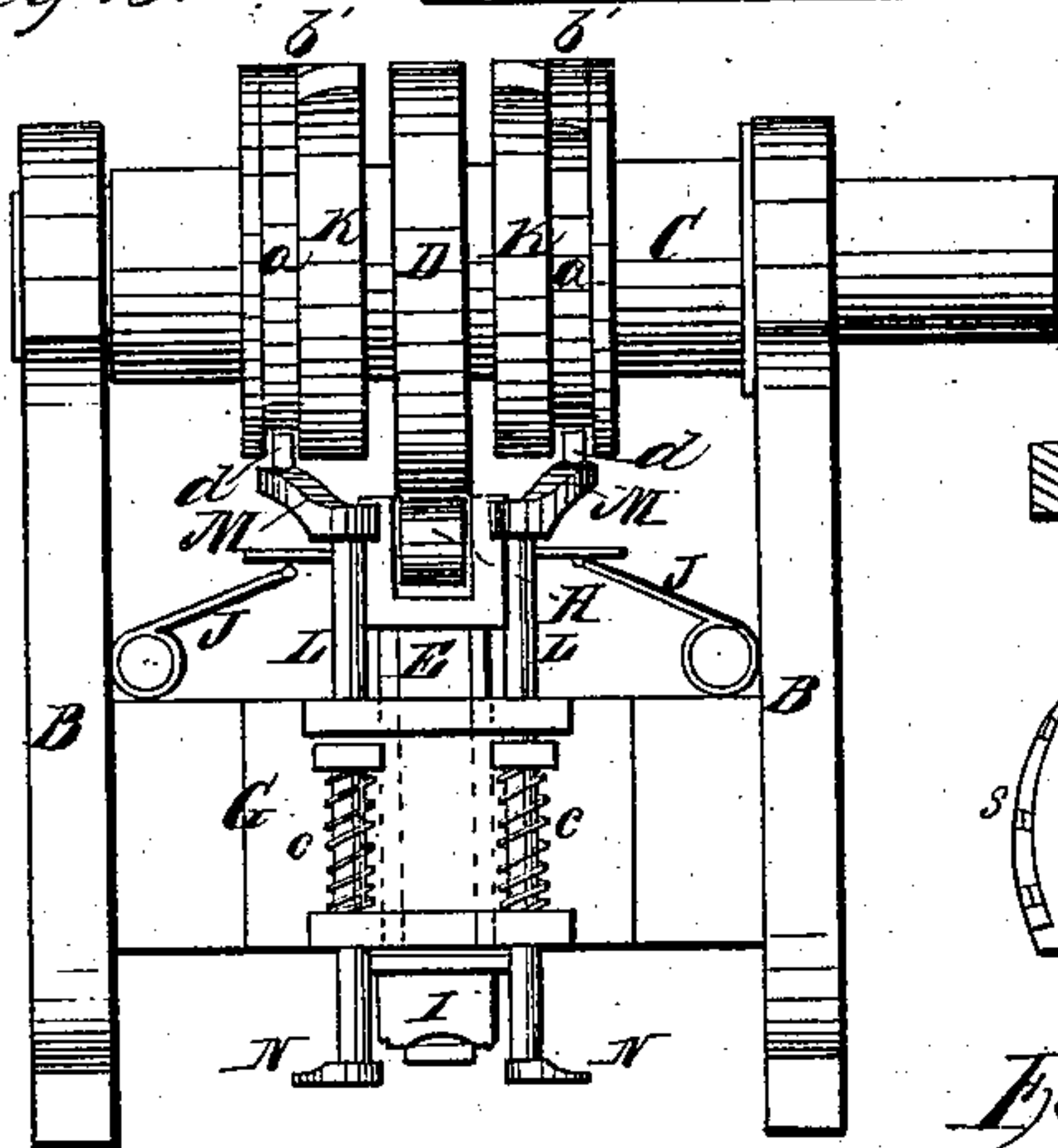


Fig: 10. Fig: 11.

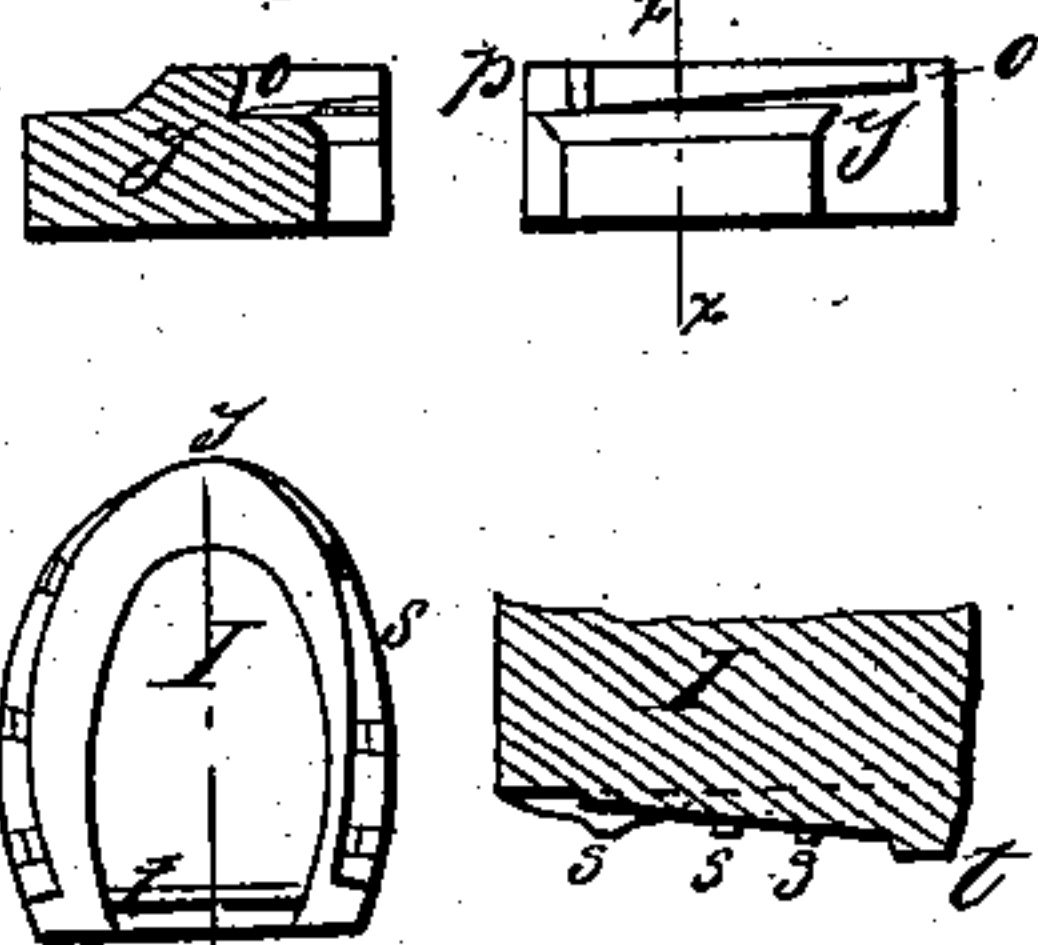
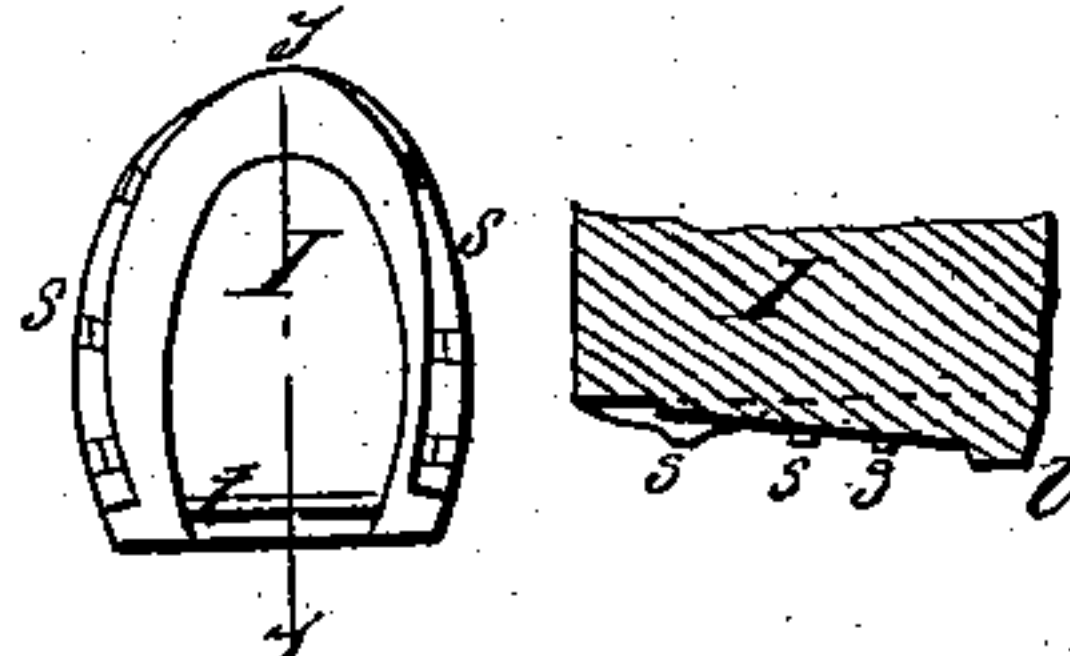


Fig: 12. Fig: 13.



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UNITED STATES PATENT OFFICE.

JAMES T. WALKER, OF ALBANY, NEW YORK.

IMPROVED MACHINE FOR MAKING HORSESHOES.

Specification forming part of Letters Patent No. 100,222, dated February 22, 1870.

To all whom it may concern:

Be it known that I, JAMES T. WALKER, of Albany, in the county of Albany and State of New York, have invented a new and useful Improvement in Horseshoe-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

The nature of my invention consists, first, in the construction of a horseshoe-machine so as to form the blanks the exact shape of the outside of the shoe; second, in the construction of a horseshoe-machine so as to keep the heels of the shoe outward while the dies operate to press the shoe; third, in the construction of the dies in a horseshoe-machine for pressing the shoes; and, fourth, in the construction and general arrangement of the entire machine, all of which will be hereinafter fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawings, in which—

Figure 1 is a longitudinal vertical section of my machine. Figs. 2, 3, and 4 are views of the eccentrically-grooved wheels or cams which operate the mechanism for dropping the shoe-blank into the bottom dies. Figs. 5, 6, and 7 are views of the eccentrically-grooved wheels or cams which operate the mechanism for bending the heels of the shoe-blank inward close to the tongue or former. Fig. 8 is a horizontal section of my machine. Fig. 9 is a front view of the same. Fig. 10 is a vertical section of one of the bottom dies, taken through the line *x x*, Fig. 11. Fig. 11 is a side view of one of the bottom dies. Fig. 12 is a bottom view of one of the upper dies, and Fig. 13 is a vertical section of the same, taken through line *y y*.

A represents the bed of my machine, at the front end of which are two standards, B B, supporting at their upper ends, in suitable journal-boxes, a shaft, C. On the shaft C is placed a cam, D, which operates the plunger E, moving vertically up and down in a cross-head, G, secured between the two standards B B.

At the upper end of the plunger E, in suitable bearings, is placed a roller, H, against

which the cam D bears to press the plunger downward. This roller is placed slightly back of the center of the shaft C, upon which the cam D is secured, for the reason that if it was directly beneath the center of said shaft the cam would, when pressing upon the roller, cause the upper end of the plunger to be drawn toward the front, throwing the lower end rearward, and consequently the dies would not fit, as the motion of the plunger would not be perfectly perpendicular. This could not be obviated by making the cross-head G so tight as to prevent any inclination of the plunger, because I have found by practical experience that the pressure necessary to be exerted upon the plunger to press the shoes is so strong that this forward action of the cam upon the upper end of the plunger will break the cross-head, it does not matter how strong it is made, unless there is room to allow the plunger to incline; but if the plunger was allowed to incline, the top die, I, secured to the lower end of the plunger, would not come down level on the bottom dies. All these difficulties are entirely overcome by placing the roller H a short distance back of the center, as then the tendency of the cam will be to throw the upper end of the plunger backward; but the friction counterbalances this tendency, and thus the plunger is moved with perfect ease perpendicularly through the cross-head. On each side of the plunger E, on top of the cross-head G, is a spring, J, for throwing the plunger up again as soon as the cam D ceases to exert the downward pressure upon the same.

Upon each side of the cam D, on the shaft C, is placed a wheel, K, the outer periphery of which is grooved in the following manner: For one-half the circumference it is grooved near the outer edge, and for the other half near the inner edge, the two grooves *a* and *a'* being connected at their ends by means of inclined passages *b b'*, the passage *b* being of the same depth as the grooves, while the passage *b'* is provided with projecting flanges, and so constructed that its bottom is on the same curve as the circumference of the wheel. The ends of the passage *b'* are inclined, so as to allow a pin moving in the grooves *a a'*, as will be hereinafter described, to slide freely up and down through said passage from one groove to the other.

In suitable bearings upon the front side of

the cross-head G, and on each side of the plunger, is a vertical rod, L, held upward by means of a spring, *c*, as shown in Figs. 1 and 9. Each of these rods is at its upper end provided with a handle or lever, M, having a pin, *d*, placed in the groove upon the periphery of the wheel K, and held there by the spring *c*, as before mentioned. The lower ends of the rods L L are provided with feet N N, the use and operation of which will be hereinafter described.

At the rear end of the bed A, in suitable journal-boxes, is placed a shaft, O, provided with a cam, P, which operates the horizontal plunger R, moving in guides upon the bed A. At the front end of the plunger R is secured the tongue S for bending the shoe-blank. This plunger and tongue are moved back as soon as the cam ceases to operate by means of the spring *c*, as seen in Fig. 1.

On each side of the cam P, upon the shaft O, is placed a wheel, T, grooved upon its periphery in the following manner: For one-half the circumference the groove *f* is at or near the center, while for the other half the circumference there is a groove, *f'*, near the inner edge of the wheel. The two grooves *f f'* are connected by means of two passages, *g* and *g'*, the passage *g* being straight, as shown in Fig. 7, while the passage *g'* is curved, as shown in Fig. 6, coming near the outer edge of the wheel.

Upon the bed A, at each side of the plunger R, is pivoted a lever, V, the rear ends of which extend over and rest upon the wheels T T, and are provided with a pin, *h*, moving in the grooves on the periphery of said wheels. The front ends of the levers V V extend to near the heel of the bottom die, and are on their under sides provided with guides or hooks *i*, turned toward the rear, as shown in Fig. 1. These hooks, by their construction, form a rest for the bottom and forward side of the rod on its passage in the machine from the furnace, and prevent the twisting or springing of the rod as the former acts upon it.

On top of the guide, through which the horizontal plunger R passes, are ears or projections, between which a lever, W, is pivoted, the rear end of said lever being of the shape shown in Fig. 1, so as to be operated upon by means of a cam-shaped projection, X, on the shaft O, between the cam P and one of the wheels T. The front end of the lever W is provided with a metal cross-bar or foot, *m*, resting under the rear edge of the upper die when the lever is not in contact with the cam X. The front end of said lever is held up in this position either by the excess in weight of its rear end or by a spring, *k*, attached to its rear end, as shown in Fig. 1.

The heated iron bar from which the shoes are to be pressed is introduced through a suitable aperture and groove in the side of the machine until it rests in the hooks *i i* of the levers V V, when it is cut off by a knife or cutter the desired length. I have not deemed

it necessary to represent nor describe this cutting device, as it is a very common mechanism. After the blank has been cut, and the shafts C and O revolving in opposite directions, the cam P moves the plunger R and tongue S forward, bending the blank, the ends of the blank being held by the hooks *i i*. Just before the tongue S bends the blank the feet N N, on the rods L L, have been turned inward by the pins *d d*, passing through the passages *b b* into the grooves *a' a'* on the wheels K K, and said feet are in such a position that the tongue S, with the shoe-blank, will pass directly under the same, or rather the blank alone will come directly under the feet. The plunger R, with its tongue S, having been moved forward the required distance to bend the blank, the front ends of the levers V V are moved inward by means of the pins *h h* moving through the curved passages *g' g'* on the wheels T T. This inward movement of the levers V V is only for an instant, but sufficient to bend the ends of the shoe-blank inward along the sides of the tongue S, forming the heel of the shoe. The pins *h h* passing directly into the grooves *f' f'*, the front ends of the levers V V are moved outward sufficiently to clear the dies. At the same time the pins *d d*, passing through the passages *b' b'* on the wheels K K, cause the feet N N to descend, carrying with them the shoe-blank from the tongue S and depositing it into the lower dies, *y y*, the spring *c* at the same time carrying the plunger R, with the tongue, backward. As soon as the feet N N have cleared the blank from the tongue and deposited it in the bottom dies they move outward by the pins *d d* passing into the outer grooves, *a a*, after completing the passages *b' b'*. The cam D now commences to operate upon the roller H, forcing the plunger E, with the top die, I, down upon the blank in the lower or bottom dies. The top die, I, in its motion downward, carries with it the front end of the lever W, it being remembered that the foot *m* on said lever is directly under the rear edge of the side. The front end of the lever W describing a circle, it will be understood that the foot *m*, at the time when the upper die is near the blank, has moved out of the way of the die, and is held down upon the ends of the blank in the bottom dies by the rear end of the lever resting upon the projection X of the wheel O. When the upper die moves upward again, by means of the springs J J, the foot *m* remains upon the heel of the shoe, as the entire projection X has not yet passed the rear end of the lever W, and thus the shoe will be prevented from adhering to and being carried up by the upper die. When the upper die has returned to its first position, the pins *d d* pass through the passages *b b* into the inner grooves, *a' a'*, which throws the feet N N inward again to their original position, and as soon as the projection X has cleared the rear end of the lever W, throwing the foot *m* up again, the hooks *i i* are thrown into their proper position to receive the next blank by the pins

h h passing through the passages *g g* into the grooves *f f*.

The bottom dies, *Y Y*, are opened and closed by any suitable mechanism, and I have not deemed it necessary to represent or describe the same, as I may employ for that purpose the mechanism described in the patent to Jacob Zepf, dated November 10, 1868, said patent being assigned to and owned by me. Still, I do not mean to confine myself to the mechanism therein described, as it may be accomplished in various ways.

When the upper die has pressed the shoe and moves upward again, the bottom dies separate and allow the completed shoe to fall down through an aperture in the frame or bed *A*; and to prevent the shoe from adhering to either die, I provide clearing-rods *n n*, which are secured to the bed *A*, and as the dies separate said rods project through grooves at or near the heel of the dies, striking the shoe and loosening it at once from the die, so as to allow it to drop down.

A horseshoe should invariably be thinner at the toe than at the heel, and to press the blank so as to produce this incline one of the dies must be inclined. If the bottom die is level and the top die inclined, there is no machinery that could withstand the pressure—belts, pulleys, wheels, and, in fact, everything, would break; but if the incline is in the bottom dies and the top die is made to come down level where it is to press the blank, then the iron will have a chance to spread inward and downward on the incline on which it is placed, and consequently there will be not the slightest danger of any injury to the machinery. For this reason I form the sides, or rather the bottom, of the lower dies, *Y Y*, with an incline from the toe *o* to the heel *p*, as shown in Fig. 11. When, now, the top die, *I*, comes down upon the blank, it strikes the blank at the toe first—that is, the main portion of the die does—and spreads the iron inward to the frog of the upper die, forming the inner edge of the shoe.

It will be observed that by my machine the blank is formed at first the exact shape of the outside of the shoe, and then the iron, by pressing, spreads inward the entire length of the shoe, while in all other horseshoe-machines the iron has been spread, by rolling, inward from the toe and outward from the heel and rear portion of the shoe.

Along the sides of the bottom dies, *Y Y*, are beveled grooves *r*, as shown in Fig. 10. The blank, when first placed in the dies, does, of course, not fill up these grooves, but occupies a perpendicular line drawn from the top of the bevel to bottom of die. When the creasers *s s* in the top die strike the blank, they force the iron into this bevel, forming the incline on the outside of the shoe usually found in hand-made shoes, but never in machine-made.

I do not wish to confine myself to the use of the die above described, which forms a bevel on the outer edge of the shoe, as I may use the

usual die with perpendicular walls, if I so desire it. The creasers *s s*, in forcing the iron into this bevel, have a tendency to draw the heels of the blank inward, and to prevent this I provide the frog of the upper die with a projection, *t*, which fits in the space between the ends of the blank and prevents them from contracting.

The upper die, *I*, is so formed that when it descends the projection will first come in between the ends of the blank; then the creasers strike the blank and force the iron into the groove *r*, and lastly the main portion of the die comes down, as above described, and presses the shoe.

The tongue *S* and dies *I* and *y y* can be readily exchanged for others of different size, and then other portions of the machine—such as the feet *N N* and *m* and pins *d d* and *h h*—must be adjusted to suit.

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

1. In a machine for making horseshoes, constructing and arranging the male or movable die with its operative surface at right angles to the line of motion imparted to it, and the female or stationary die with its operative surface inclined to said line of motion, the inclination being equal to the difference between the thickness of the toe and heel of the shoe, substantially as described.

2. In combination with the male and female dies constructed and arranged as above claimed, the projection *t*, or its equivalent, for holding the heel of the blank apart, and for preventing contraction while it is being pressed into shape, substantially as set forth.

3. The combination, in a horseshoe-making machine, of a reciprocating former of such shape as will, by bending the bar around it, give to the external edge of the blank the exact shape of the finished shoe, mechanism to strip the blank off the former, mechanism to withdraw the former out of the path of the male die, a vertically-reciprocating male die, and laterally-moving female dies made in two parts, all constructed and operated to form a pressed horseshoe, as set forth.

4. In a machine for making horseshoes, constructing the shoe-forming dies, as herein described, so that the shoe is beveled on its outer edge as it is being pressed into shape.

5. The combination of the eccentrically cam-grooved wheels *K*, levers *M*, rods *L*, and feet *N*, all substantially as and for the purposes set forth.

6. Arranging the friction-roller *H* on the head of the plunger *E* in a plane parallel to but on one side of that which passes through the center or axis of the shaft *C*, for the purposes set forth.

7. In combination with the former *S*, the elongated bending-levers *V V*, provided with hooks *i i* at their front ends, on their under sides, pivoted to the bed of the machine and operated through the medium of the cams *T T*

for the purpose of guiding and preventing the twisting or springing of the iron bar before the blank is formed, and for knocking inward the heel of the blank after it is formed, substantially as set forth.

8. The combination of the foot or clearer *m* with mechanism for operating the same, substantially as described, and with the male die I, for the purposes set forth.

9. The combination of the laterally-moving female dies *y y*, provided with an incline, *o p*, and bevel *r*, with the vertically-reciprocating male die I, with its creasers *s* and projection *t*, all operating substantially as set forth.

10. In combination with the laterally-moving female dies *y y* in a horseshoe-making machine, the angular metal clearers *n n*, secured to the bed of the machine and passing through grooves made in the heels of the dies, for operation as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 27th day of January, 1870.

JAMES T. WALKER.

Witnesses:

ARTHUR N. MARR,
C. L. EVERT.