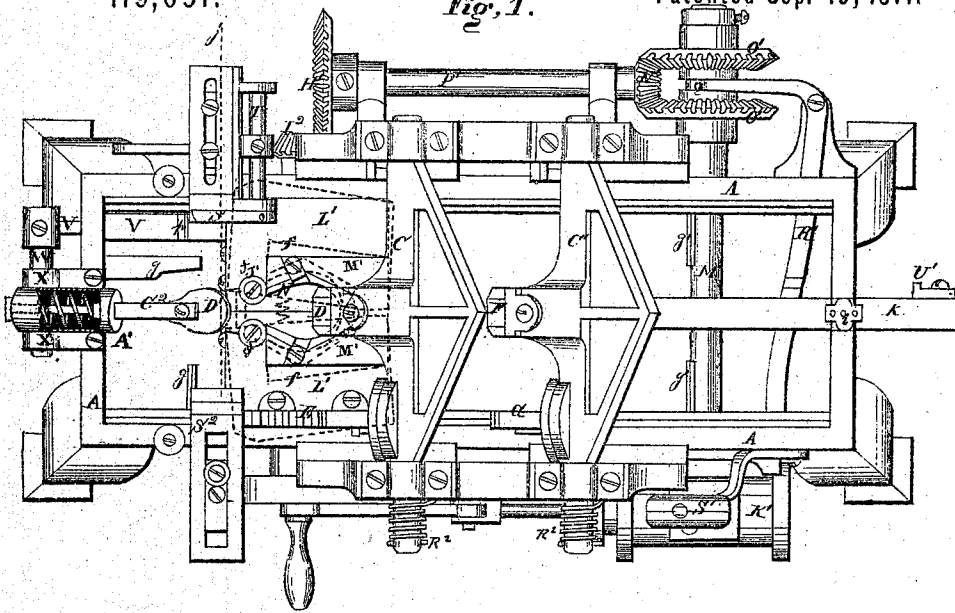
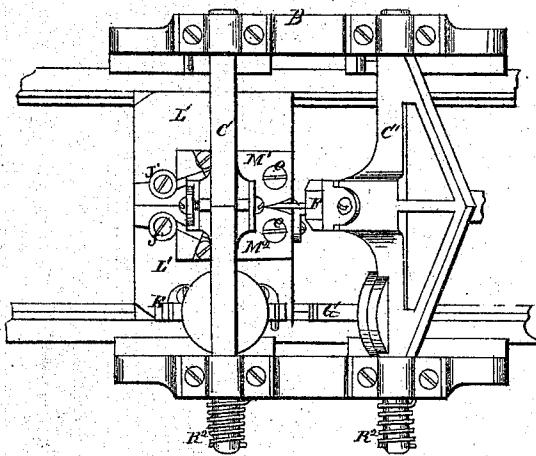
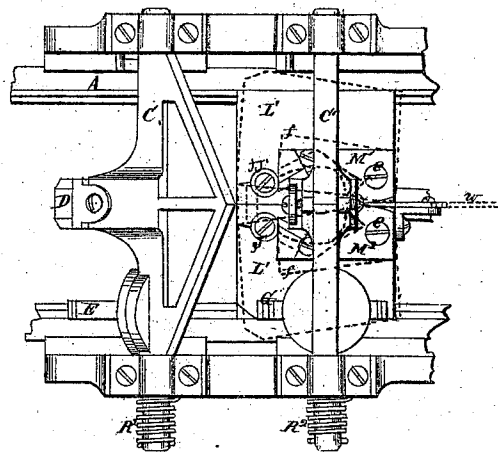


W. ROBERTS.*Horse Shoe Machine.*

119,051.

Fig. 1.

Patented Sep. 19, 1871.

*Fig. 2.**Fig. 3.***Inventor.**

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Witnesses.

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Horse Shoe Machine.

119,051.

Fig. 4.

Patented Sep. 19, 1871.

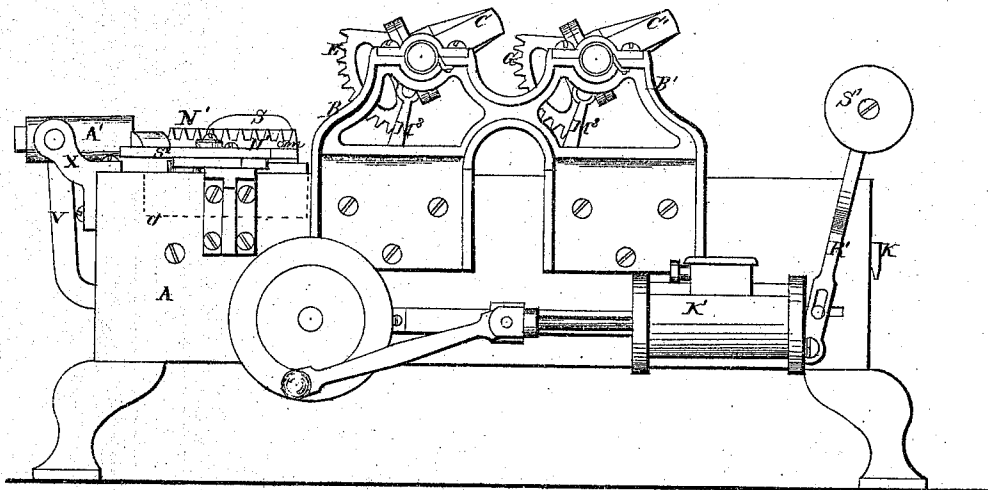
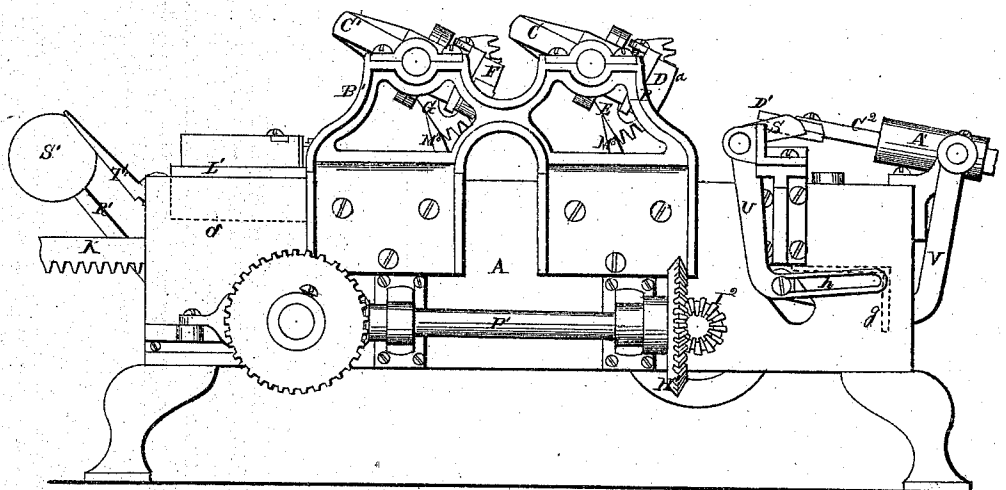


Fig. 5.



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Fig. 6.

119,051.

Patented Sep. 19, 1871.

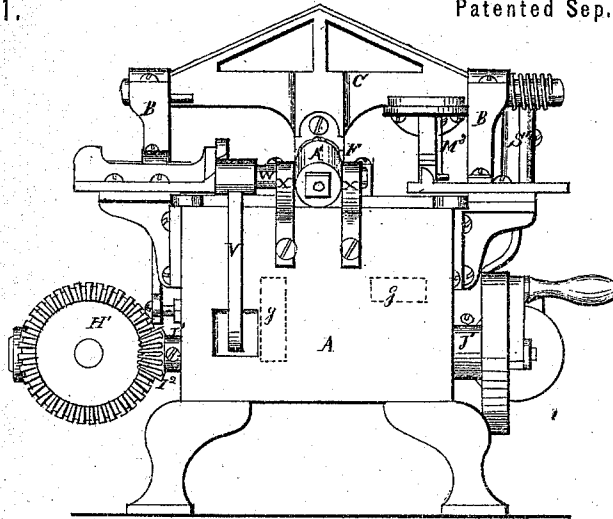
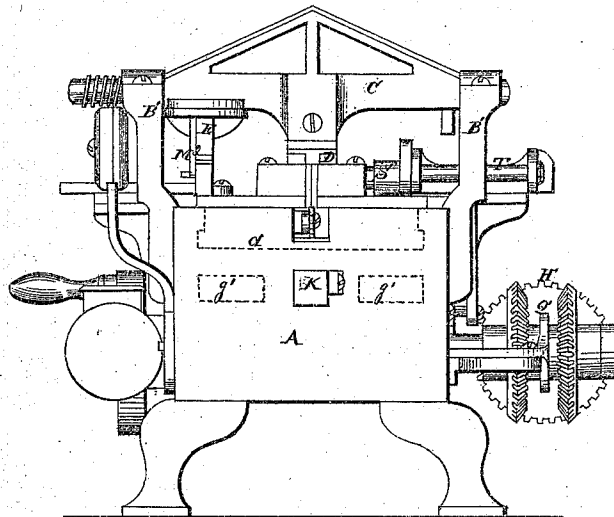


Fig. 7.



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119,051.

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Fig. 8.

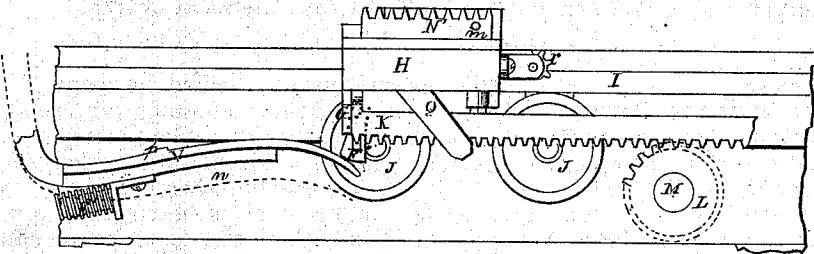


Fig. 9.

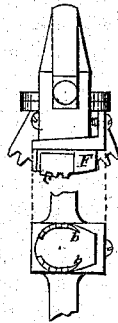


Fig. 10.

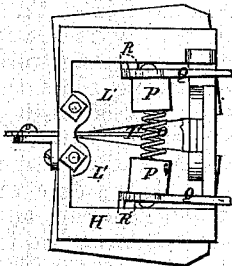


Fig. 13.

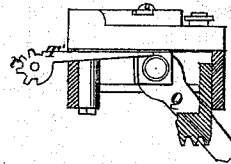


Fig. 11.

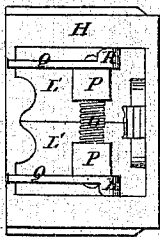


Fig. 12.

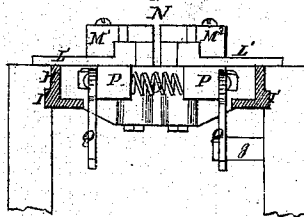
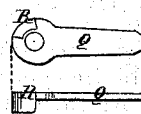


Fig. 14.



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UNITED STATES PATENT OFFICE.

WEBSTER ROBERTS, OF CLEVELAND, OHIO.

IMPROVEMENT IN MACHINES FOR MAKING HORSESHOES.

Specification forming part of Letters Patent No. 119,051, dated September 19, 1871.

To all whom it may concern:

Be it known that I, WEBSTER ROBERTS, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and Improved Horseshoe-Machine, of which the following is a description, reference being had to the accompanying drawing making part of this specification.

Figure 1, Plate 1, is a plan view of the machine. Figs. 2 and 3 are plan views of detached sections. Figs. 4 and 5, Plate 2, are side elevations of the machine. Figs. 6 and 7, Plate 3, are end elevations of the machine. The figures on Plate 4 are detached sections.

Like letters of reference refer to like parts in the different views.

The nature of this invention relates to a machine for making horseshoes; and the object thereof is to produce a machine more simple in construction and operation, and less expensive than those now in use. Said machine consists of two pairs of dies, the upper dies being hung transversely across the frame of the machine, and, by an appropriate mechanism, are caused to vibrate in a direction longitudinally therewith, while the lower dies move reciprocally in and lengthwise the frame and at certain regular intervals, so that they meet the upper dies at the proper time to receive them for pressing the bar or blank of which the shoe is made, said blank being cut off from a bar by a shear and bent into a rudimentary shape by a former preparatory to its being received into the finishing dies and pressed, all of which is hereinafter more fully described.

In the drawing, A represents the frame of the machine, in and on which the following devices are arranged. To each side of the frame is secured standards B B', in each of which is journaled a beam, C C', Fig. 1. In the center of the beam C is secured, by any appropriate means, a die, D, in outline the shape of a horseshoe, having a plain smooth surface, but slightly rounding in direction, of the length of the frame or of the toe and heel of the die, as shown at *a*, Fig. 5, the purpose of which will presently be shown. E is a toothed segment, attached to the under side of the beam at one end, near the journal seat of the standard, in which the beam has its bearings. The use of said segment will hereinafter be shown. Also, in the center of the beam C' is secured a die, F, the face of which, like that of die

D, referred to, is in outline the shape of a horseshoe, and is slightly rounding in the same direction, but is not smooth, there being in the face of the die a rib, *b*, Fig. 9, Plate 4, along each side of the edge of the die, whereby the nail-crease in the face of the shoe is made; also, a series of prints, *c*, for making the dents for the nail-holes. At one end of the beam C' is also secured a toothed segment, *g*, Fig. 5, holding the same relation to the die F, and for a similar purpose, as the segment E, referred to, does to the die D. To the inside of the frame A is fitted a movable bed, H, Fig. 8, also indicated by the dotted lines *b*, Figs. 5 and 7, detached views of which are shown in Plate 4, a groove, I, Fig. 8, being made in each side of the frame in which the bed slides on projecting tongues P, Fig. 12, fitting in the grooves, as indicated by the dotted lines *b* in Fig. 7. J J, Fig. 8, are friction-rollers, provided with a flange, and attached to the side of the frame, and in such relation to the grooves I as to allow the periphery of the rollers to reach even with their lower side, over and upon which rollers the bed slides. To the under side of the bed H, referred to, is attached one end of a rack, K, Fig. 8, whereas the opposite end is made to engage a pinion, L, on the shaft M, and whereby is obtained to the bed a reciprocating sliding movement, for a purpose presently shown. On the upper side of the bed H is pivoted, at the points *e*, Fig. 2, Plate 1, a pair of plates, L', to which are secured the blocks M' M' for forming the lower die N, which is of a shape to correspond with the upper dies F D, above described, and into which they are received for pressing and forming the shoe. Said die, in consequence of being made in two sections, and secured each to one of the plates L', pivoted to the bed at the points *e*, is free to spread apart or open at the heel laterally, as indicated by the dotted lines *f*, Fig. 1, but which are again closed by the following device, viz.: To the under side of each of the plates L' is secured a block, P, Fig. 12, Plate 4, between the cheeks of which is secured a spring, O. On the opposite side of each block is pivoted a lever, Q, on the pivoted end of which is a cam, R, Fig. 14, which, when the levers are actuated by contact with the arms indicated by the dotted lines *g*, Figs. 5, 6, and 7, and shown in Fig. 1 projecting from the sides of the frame, and which are so arranged in their relation to the levers as to actuate them by contact so as to close the die

N at the proper moment required, and which is done by the cam R, Fig. 14, being forced between the blocks P and the sides of the bed, as shown in the detached section, Fig. 11, Plate 4, which represents an under-side view of the bed H, plates L', and blocks, P, &c., showing the position of the blocks, plates, and die N when closed; whereas Fig. 10 represents the plates, die, &c., when open. A further description of the operation of the cams, plates, and dies will hereinafter be given. S, Fig. 5, Plate 2, is a shear, whereby the length of iron or blank for a shoe is cut from the bar. Said shear is operated by the following device: To the shaft T, Figs. 1 and 7, to which the shear is attached, is connected the arm of a right-angled lever, U, Fig. 5. In the horizontal arm thereof is a slot, *h*, whereby said arm is attached to a similar-shaped lever, V, Figs. 4 and 8. The upper arm of said lever V is connected to a shaft, W, Fig. 6, journaled in the stays X, between the cheeks of which and secured to the shaft is a socket or sleeve, A', shown more fully in Fig. 1. In said socket is fitted, so as to slide therein, a stem, C², to the outer end of which is attached a head or block, D'.

It will be obvious, on examination of this arrangement of levers, that on depressing the lever V the shear or cutter S and the sleeve and head A' and D' will have a downward action, at the same time the shear for cutting the iron and the head for holding it while it is being bent and forced into the die, as presently shown. The upward movement of the shear and head is effected by a spring, E', Fig. 8, acting on lever V. The depression of the lever V is done by a drop, F'. Fig. 8. Said drop is attached to an arm, G', by means of a bolt inserted in a slot cut in the drop, and whereby said drop is allowed a vertical movement and at the same time a slight vibratory one. Thus, as the bed H, from which depends the arm G', referred to, is moved by the rack and pinion K L toward the lever V, the lower end of the drop will slide along upon the face of said lever and depress it, as indicated by the dotted lines *n*; this, as a consequence, will actuate the shear and head for the purpose above specified. The slotted drop F' is prevented from being forced upward by its contact with the lever, by a shoulder formed in its upper end, which, when the pressure is exerted on the side of the drop fronting the spring, forces the shoulder under a ledge of the bed, against which the upper end leans, and from which ledge the shoulder is released by the pressure being changed to the opposite side of the drop, and which change is done by the rib *p*, Fig. 8, seen also in Fig. 1, over which the end of the drop slides, at which instant a reverse movement of the bed takes place, causing the rear angular corner of the drop to catch upon the edge of the rib, which will force the shoulder at the upper end from its engagement with the ledge, thereby allowing the lever V and drop to spring upward by the reaction of the spring E', which, as a consequence, will actuate the lever U and lift the shear and head S and D' for the purpose specified.

Around that part of the stem C² of the head

D' inclosed in the sleeve is coiled a spring, the purpose of which will hereinafter be shown. Motion is given to the pinion J for moving the rack by the bevel-gearing H¹ and I², Figs. 1 and 5. The bevel-wheel I² on the shaft J' is driven by a steam-engine, K', directly applied to the shaft, as shown in the drawing, or by the interposition of appropriate gearing. On the opposite end of the shaft P', Fig. 1, carrying the wheel H¹, is a small bevel-pinion, N', made to engage the wheels O' on the shaft M, carrying the rack-pinion L. Between the wheels O' is a reversing clutch, Q', operated by the lever R¹ and weight S¹. To the rear end of the bed H is pivoted a finger, T', Fig. 10, also shown in Fig. 5. In the pivoted end of said finger is a series of teeth, Fig. 13, Plate 4, which is made to engage the dents or holes in the rack-plate *i*, Fig. 1, whereby the finger is thrown from the position shown in Fig. 13 to that shown in Fig. 5, as and for a purpose presently made known.

Having described the construction and arrangement of the machine, the practical operation of the same is as follows: A bar of iron of the proper width and thickness of which to make a horseshoe is heated, and while hot one end thereof is placed under the shear and a piece cut off, the length of the piece or blank being determined by the gauge S², Fig. 1. A bar of iron in position for being cut is indicated by the dotted line *j*, Fig. 1. The relative position of the die to the bar while said blank is being cut off is such as shown in Fig. 1, in which it will be seen that it is a short distance in front of the bar, and that the die is open, as indicated by the dotted lines *f*. The head D' is also drawn in a horizontal position and a little back of the bar, as shown in Figs. 1, 4, and upon which the rim of the head rests, a shoulder or boss being formed on the under side of the head of the shape of the inside curve of a horseshoe, and against which shoulder the iron is pressed. As the bed and die advance toward the bar by means of the pinion and rack K L the iron is carried into the open die, and as it passes between the open ends or heel of the die the iron or blank is bent around the boss on the under side of the head D', by means of the rollers J', which roll along on each of the outer edges of the iron, pressing it in around the boss by the closing in of the heel of the die, thereby giving to the iron the outline shape of the shoe, and which also prevents the iron from turning up edgewise while bending. This closing in of the die is effected, as above said, by the cams R, actuated by the levers Q, which, at the proper moment, collide with the arms *g*, thereby forcing the cams between the side of the bed H and the blocks P, and which are thus retained during the pressing of the shoe into complete shape by the upper dies, as follows: At the moment that the rudimentary shape or outline of the shoe is obtained the head D' springs upward away from the closed die to the position shown in Fig. 5, and at the same instant a reverse movement of the bed takes place by the shifting of the clutch Q' from one wheel, O', to the other. Now, as the bed and die move back and

approach the upper die D, the first one of the two forming-dies, said die D is gradually turned from its position shown in Fig. 5 to a vertical position, as shown in Fig. 6. This changing of position is a rolling one; hence the upper die rolls into the lower die and upon the shoe held therein, thereby flattening it out and pressing it down into the lower die, and giving to it the thin inner edge and proper bevel for a shoe, and allowing the surplus iron to roll into the heel. The bed and on passing under and leaving the upper die D, said die immediately returns to its first position by means of the spring R², Fig. 2, and in turn the bed and die pass under the upper die F, which, in like manner as the die D, rolls into the lower die and upon the shoe therein, and which creases the shoe and marks the dents or places for the nail-holes. The position of the creasing-die at this time is shown in Figs. 3 and 7. The lower die, on passing on from under the die F, is now opened, as indicated by the dotted lines *t*, Fig. 3, and, as the bed approaches the end of the frame, the teeth *r* of the finger T' engage the holes or dents in the plate *i*, Fig. 1, referred to; the consequence of which is, that the finger, lying below the shoe and plates, is thrown upward to the position shown in Fig. 5, also indicated by the dotted lines *w*, Fig. 3. Said throwing upward of the arm or finger tosses the shoe from out of the die. The die and bed are now immediately returned to the front end of the machine by means of the clutch and reversing-wheels, when the operation of cutting off a blank from the bar is again repeated, and the process of bending it into shape by means of the head and rollers, preparatory to it being submitted to the action of the creasing-die, is gone through in the same way. The downward stroke of the shear for cutting off the iron or blank, and the descent of the head around which it is bent and carried into the open die, is, as aforesaid, accomplished by the lever V, Fig. 8, which, as the bed approaches the front end of the machine, the drop F' is forced along over the upper side of the lever, forcing it down, and also the shear and head, until it reaches the rib *p*, over which the drop slides. The bed then immediately returns by the reaction of the reversing-clutch. As the bed returns the drop is caught by the rib *p* and its upper end disengaged from its contact with the ledge of the bed, and which allows the shear and head to rise by means of the spring E'. The opening of the die for the release of the shoe is done by the cams being forced from between the blocks P and the side of the bed by the levers Q coming in contact with the arms *g'*, Fig. 1, which forces the lever back, or in the opposite direction from that when colliding with the arms *g* on the opposite end of the machine for closing the die, which, as a consequence, will force the cams from between the blocks and bed, and, therefore, allow the die to open by the resiliency of the spring O, as aforesaid. In order that the segments G E, secured to the under side of the beams C O', may become engaged with the rack N', above which the segments are raised so that

the rack can pass under them on returning to the front of the machine, an arm, M³, Fig. 4, is pivoted to the side of each segment, the free end of which is a little in advance of the lower end of the segment, so that the arm will strike a pin, *m*, Fig. 8, projecting from the side of the rack, before the rack reaches the first tooth of the segment, the effect of which will be to turn the beam sufficiently to cause the engagement of the segment with the rack, and thereby secure a timely and accurate relation of the upper and lower dies.

The shifting of the clutch from one wheel to the other, for reversing the movement of the bed, is done by the lug U', Fig. 1, secured to the side of the rack K, by its contact at the proper moment with the lever R' in one direction, and the contact of the lever with a lug depending from the under side of the bed for the reversed direction.

The object of the spring referred to as being coiled within the sleeve A' and around the stem C² is to prevent a too sudden and violent concussion of the end of the stem against the bottom of the sleeve as the head or block D' may contact with the bar or blank for forcing it into the die N. The end of the stem being cushioned by the spring, bending or breaking of the block or stem is thus consequently avoided.

The machine may be operated by other means or power than that of the engine connected with the machine before referred to.

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

1. The vibrating beams C O', segments G E, and dies D F, in combination with the opening and closing-die N and reciprocating rack N', in the manner substantially as described, and for the purpose set forth.

2. The die N, consisting of two sections, forming a part of the plate L', pivoted to the bed H, in combination with the mechanism to impart to said die reciprocating motion, and with the cams R and spring O for opening and closing said die, substantially in the manner and for the purpose specified.

3. The combination of the finger T', having a segmental gear at its lower end, with the die N and rack-plate *i*, in the manner and for the purpose set forth.

4. The combination, with the reciprocating opening and closing-die N, of the head D', and mechanized to impart to said head the several movements, substantially as specified, and for the purpose set forth.

5. The drop F', in combination with the lever V, shear S, and head D', substantially as and for the purpose specified.

6. The flanged rollers J, in combination with the reciprocating die N and vibrating head D', in the manner and for the purpose substantially as described.

7. The combination of rectilinearly-reciprocating opening and closing female die and two rotary male dies to co-operate successively therewith, the one to mold the shoe and the other to

crease and punch the shoe, thereby forming or making the said article in the manner described.

8. The movable gauge S^2 with the mechanism described to impart the desired movement to said gauge, in combination with the dies N, for the purpose substantially as described.

9. The spring O, blocks P, levers Q, provided with cams R and arms g , in combination with the plates L and die N, substantially as and for the purpose set forth.

10. The sleeve A' , spring within said sleeve connected with the stem C^2 , and head D' , oper-

ated as described, in combination with the reciprocating die N, substantially as and for the purpose set forth.

11. The springs R^2 and vibrating beams C^1 , in combination with the vibrating segmental gears E G, arms M^3 , and reciprocating rack N' , operating substantially in the manner and for the purpose described.

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