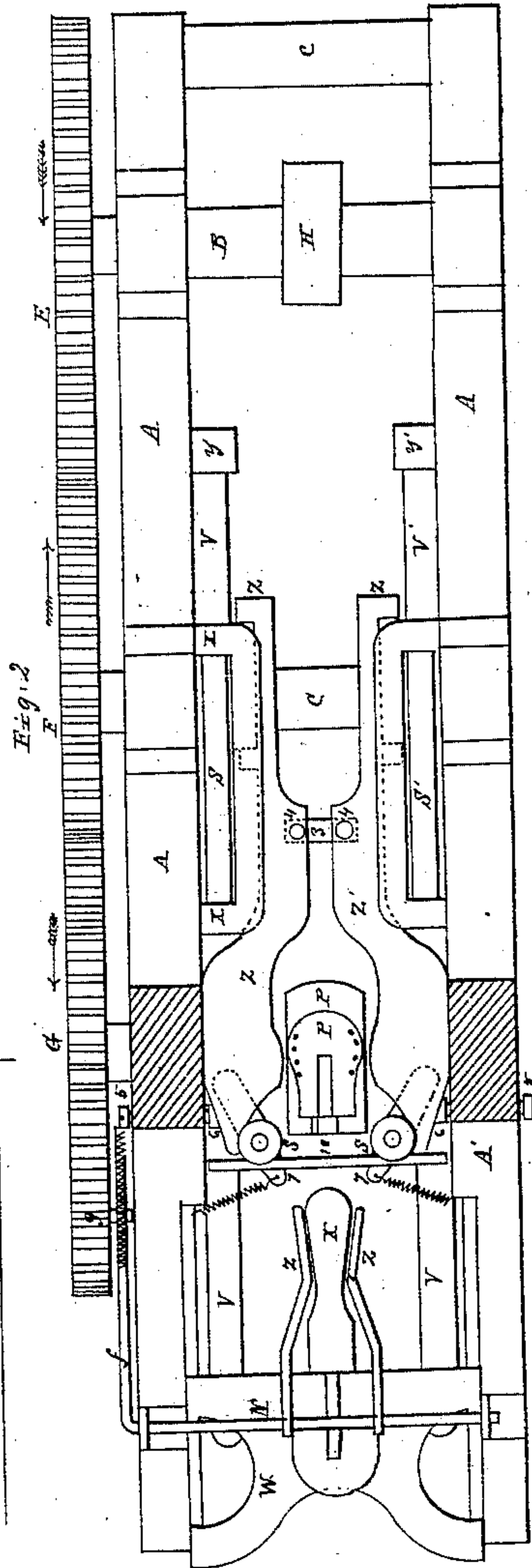
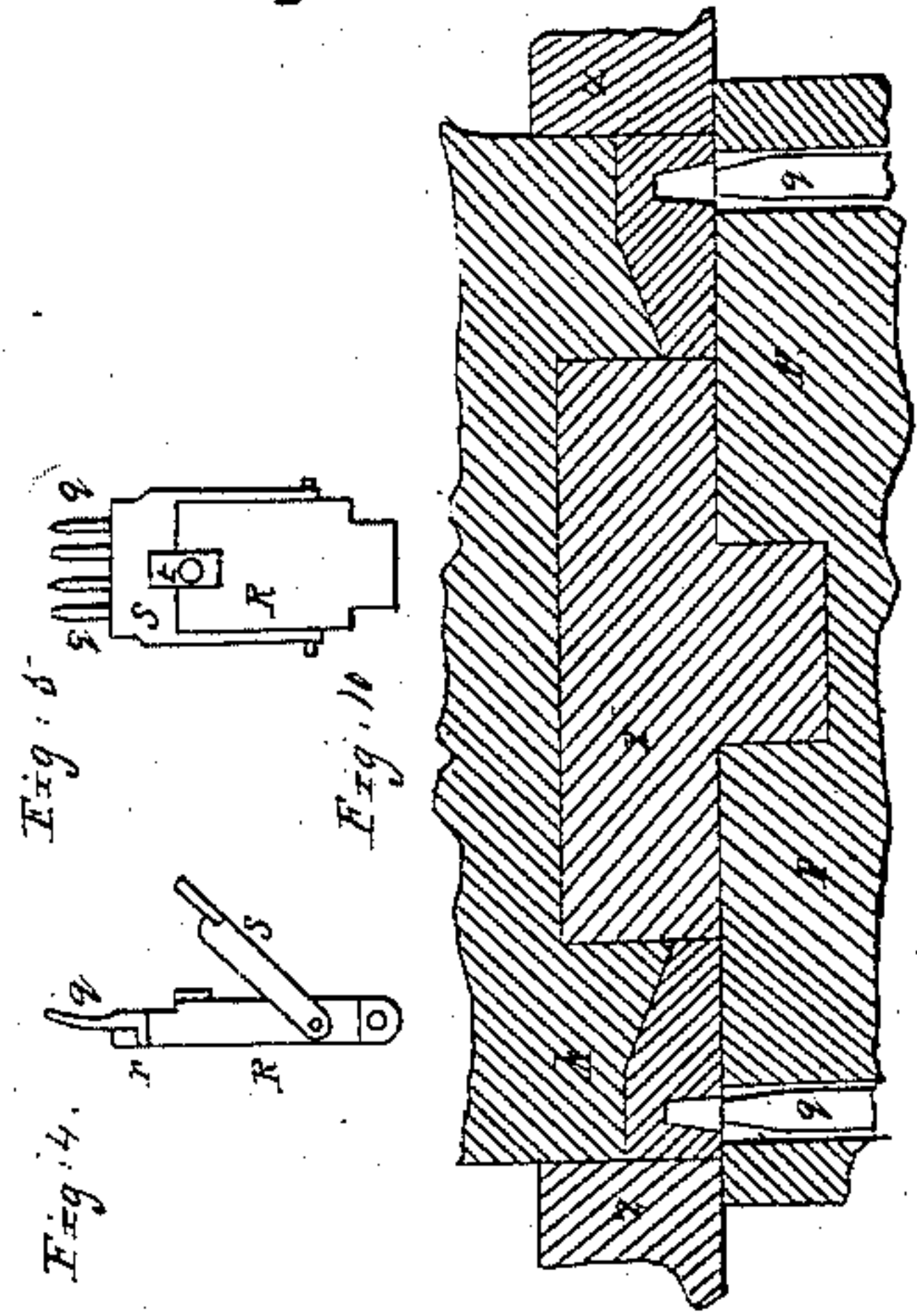
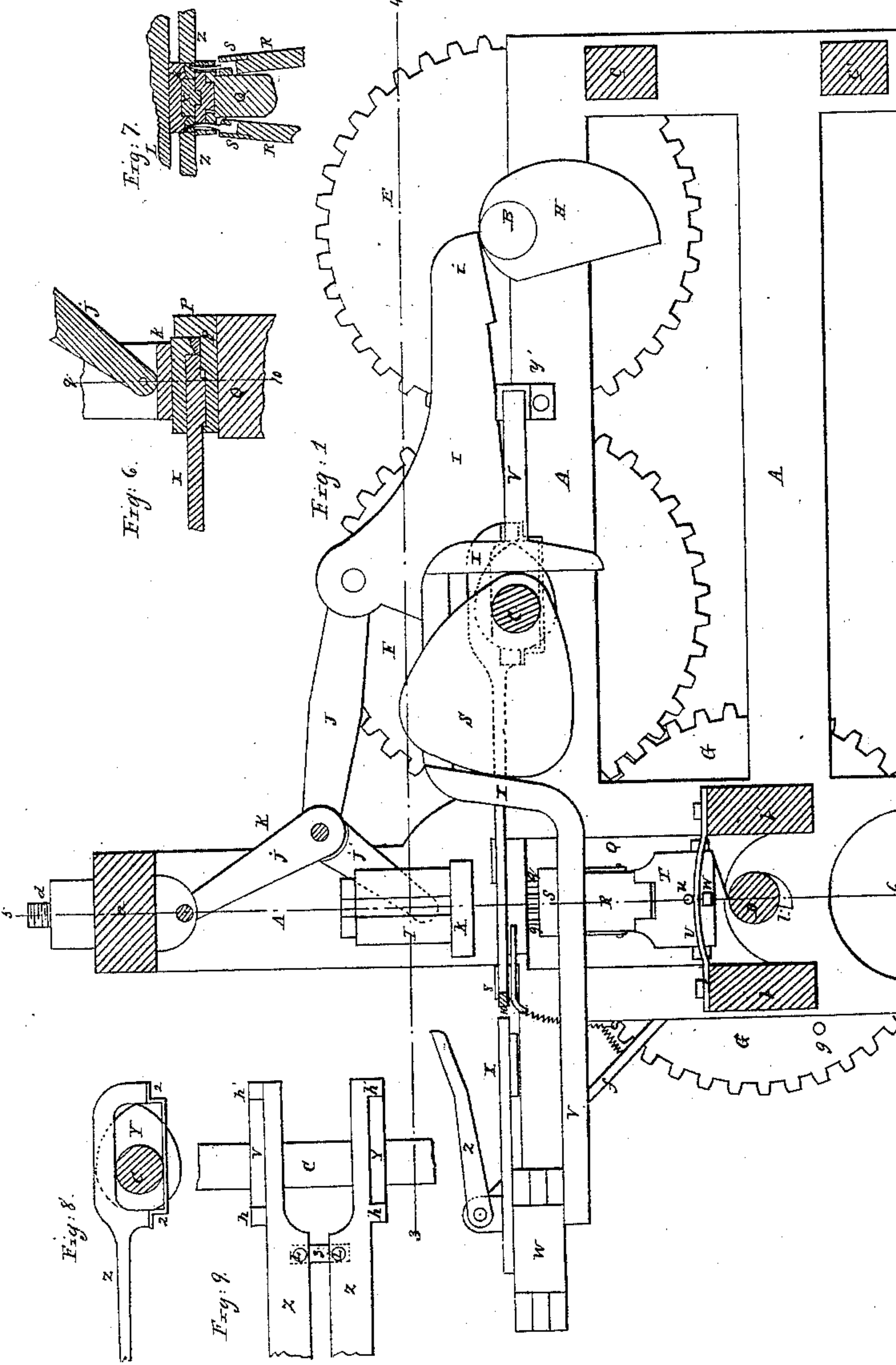
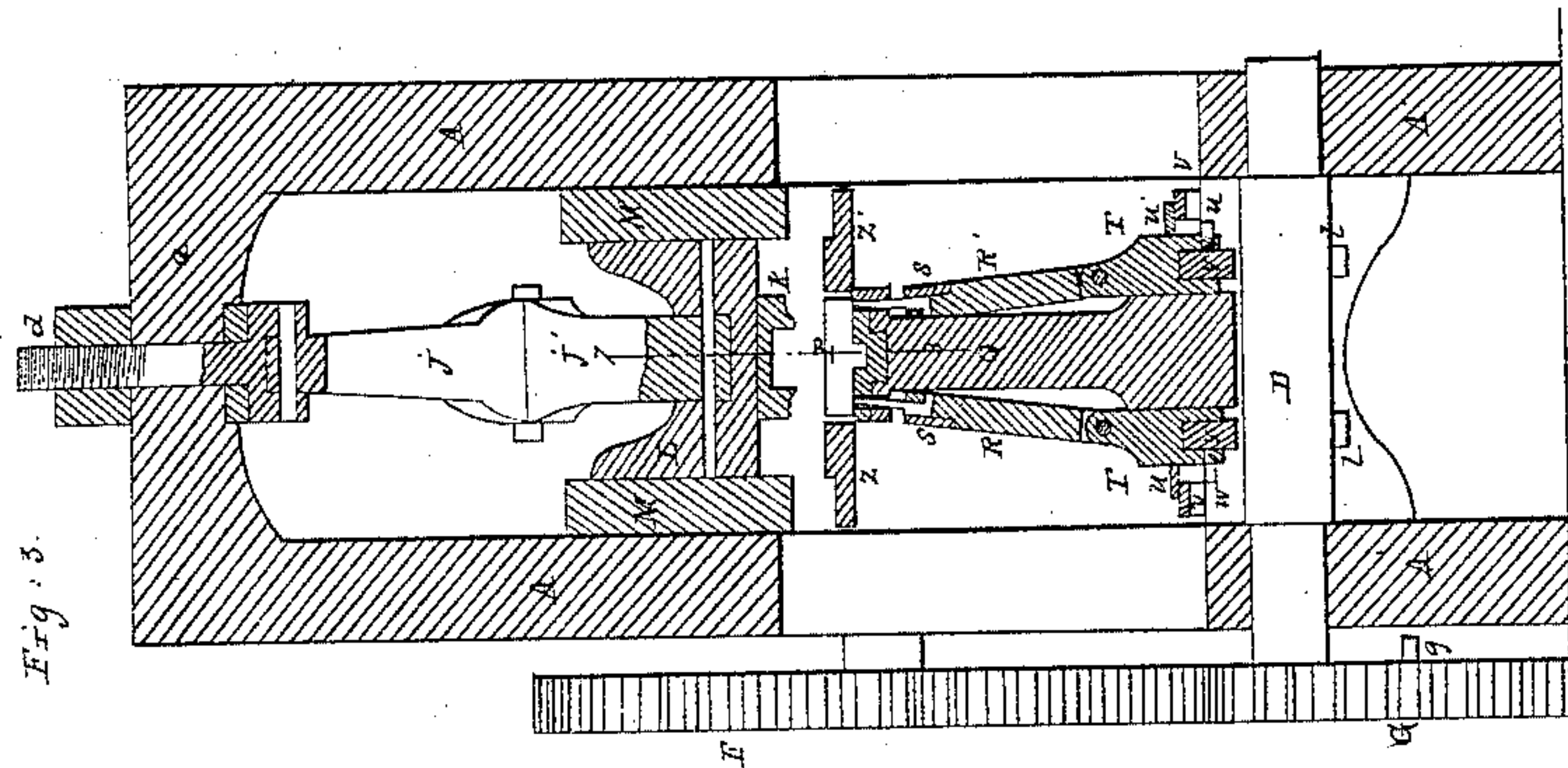


# J. Mc Carty, Horseshoe Machine,

N<sup>o</sup> 20,079.

Patented Apr. 27, 1858.





# UNITED STATES PATENT OFFICE.

JOHN McCARTY, OF PHILADELPHIA, PENNSYLVANIA.

## MACHINE FOR MAKING HORSESHOES.

Specification of Letters Patent No. 20,079, dated April 27, 1858.

*To all whom it may concern:*

Be it known that I, JOHN McCARTY, of the city of Philadelphia and State of Pennsylvania, have invented a new and Improved Mode of Manufacturing Horseshoes; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing and to the letters of reference marked thereon.

My invention consists in the employment of certain combinations of mechanical devices, fully described hereafter, whereby a heated bar of iron may be bent, compressed into the form of a horse shoe, and pierced with the necessary nail holes.

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.

On reference to the drawing which forms a part of this specification, Figure 1 is an elevation of my improved machine for making horse shoes with the front frame removed; Fig. 2, a sectional plan on the line 3—4 (Fig. 1) with the upper die and operating lever removed; Fig. 3, a transverse section on the line 5—6 Fig. 1, with the upper die elevated; Figs. 4 and 5, views of the punches for making the nail holes in the shoes; Fig. 6, a sectional elevation of the dies on the line 7—8 (Fig. 3) showing the upper die at its lowest position; Fig. 7, a transverse section on the line 9—10 (Fig. 6); Figs. 8 and 9, views of the cams and yokes for operating the jaws; Fig. 10, full sized sectional view of the dies and part of the jaws.

Similar letters refer to similar parts throughout the several views.

The framework of my machine consists of two standards or housings A and A' connected together at the top by the cross-bar *a*, in front by the cross-bars *b* and *b'*, and at the back by the cross-bars *c* and *c'*. In the opposite frames turn the shafts B, C, and D so geared together by means of the cog wheels E, F and G that the three shafts revolve simultaneously and at the same speed. On the shaft B is secured a cam H, arranged to bear against the underside of the long arm of the bell crank lever I which has its fulcrum on the shaft C, the short arm of the lever being connected by means of the rod J to one end of the two arms *j*, and *j'* of the toggle joint K, the arm *j* of

the latter being jointed to the head of the bolt *d* which passes through and is secured to the cross bar *a* of the framework. Between the head of this bolt and the cross bar intervenes a wedge *e* by adjusting which the movement of the upper die may be regulated. The lower end of the arm *j'* of the toggle joint is jointed to the cross head L, which is arranged to slide in guides M cast or otherwise secured to the inside of the opposite frames A and A', and to the underside of the cross-head is secured the upper die *k*, the projecting portion of which is of the same form as the shoe to be manufactured and beveled so as to impart the required inclination to the shoe at the necessary points. The lower and stationary die P is attached to the vertical block Q which is either secured to or forms a part of the cross bars *b* and *b'* of the framework. This lower die has a flat surface with the exception of the elevated portion *p* which is curved on the inside (so as to be adapted to the form of the toe of the shoe) and a longitudinal recess for guiding the mandrel X, as hereafter described.

On each side of the lower die are holes corresponding, as regards number and locality, to the nail holes of the shoe, the holes being arranged to receive the punches *q q* which move freely therein. The punches are connected separately to the plates R and R' in the following manner: Each punch has a projection *r* (see Figs. 4 and 5) which fits into a corresponding hole in the plate R. A cover plate *s* is hinged to the edges of this plate so that while the punches are being inserted in their proper position the said plate may fall down as seen in Fig. 4. When the punches are placed with their projections *r* into the recesses of the plate R the cover plate *s* may be closed, and the punches retained in their proper position by turning the buckle *t*. The plates R and R' are jointed to blocks T and T' which are arranged to slide in openings cut into the edges of the plates U and U, the latter being secured to the cross bars *b* and *b'* of the framework. In the underside of each of the blocks is formed a recess for receiving the wedge shaped piece *v* which may be adjusted longitudinally and secured when adjusted by means of set screws *w* and *w'*. These wedge shaped pieces are so located as to be operated upon by cams *l* and *l'* on the shaft D. In order that the pieces *v, v*, may not



come in contact with the shaft when free from the cams I secure to the sides of the blocks T and T' studs or projections  $u$  and  $u'$  which, when the blocks are at their lowest position, rest on the plates  $v$  and  $v'$ . On the shaft C are secured the two cams S and S' so arranged in respect to the yokes  $x$  and  $x'$  of the bars V and V' that an irregular but simultaneous reciprocating movement may be imparted to the latter, which at one end slides in guides  $y$  and  $y'$  attached to the inside of the opposite frames, the other end of the bars being secured to a cross-head W which also slides on projections on the inside of the opposite frames. On this cross-head is secured the mandrel X the shape of which must correspond with the figure formed by the inner edge of the horse shoe.

A spindle N turns in boxes secured to the opposite frames of the machine, and from this spindle project the two arms  $z$  and  $z'$  which are so bent as to operate near the inclined edges of the mandrel X. From one end of the spindle N projects another arm  $f$  so situated as to be acted upon by the stud  $g$  on the wheel G. One end of a spiral spring is connected to the arm  $f$  at one end and at the other end to the frame, so as to maintain the arms  $z$  and  $z'$  in the elevated position shown in Fig. 1 when not moved from that position by the pin  $g$  striking the arm  $f$  as described hereafter. On the shaft C are secured two other cams Y and Y' (see Figs. 8 and 9) the points of which bear alternately against the projections  $h$  and  $h'$  on the lever Z and Z' and impart to the latter a simultaneous but irregular reciprocating motion. Underneath the levers are straps 2, 2, the cross-bar 3 forming part of the same and connecting them together. The straps and cross-bar serve the double purpose of guiding the levers during their reciprocating movement and of receiving the fulcrum pins 4, 4, of the same levers.

Into the sides of the opposite frames screw the studs 5, 5, on the points of which are buttons 6, 6, inclined on the face so as to be adapted to the inclined ends of the long arms of the levers Z and Z'.

To flanges on the inside of the opposite frames are pointed the levers 7, 7; on which are hung the flanged pulleys 8, 8; and from the ends of the levers to the frame extend spiral springs which have a tendency to maintain the levers in the position shown in Fig. 2 (that is turned outward) when not acted upon by the curved end of the levers Z and Z' which fit between the flanges of the rollers 8, 8.

*Operation of the machine.*—Supposing the different parts of the machine to be in the position shown in Figs. 1, 2, and 3—that is with the cross head W and its mandrel at the extremity of its outward stroke; the levers Z and Z' at their farthest backward move-

ment, the cross head L with its upper die  $k$  in its most elevated position, and the plates R, and R' with their punches  $q$ ,  $q$  at their lowest position. It will be observed that the several cams are so formed that a cessation or dwell takes place in the movement of the above mentioned parts when they are in the position described. During this cessation I introduce a heated bar 10 to the machine, the bar being of the requisite size for forming the shoe and being passed between the flanges of the rollers 8, 8 on the arms 7—7. The bar may be either introduced in the requisite lengths or may be cut from a longer bar by any suitable apparatus operated by any working part of the machine. The heated bar 10 being now in the position shown in Fig. 2, and the shafts B, C, and D being caused to revolve by any suitable driving apparatus in the direction of their arrows, the first movement that takes place will be that of the cross head W with its mandrel X. As this is caused to advance by the action of the cams S and S' on the yokes  $x$  and  $x'$  its rounded end strikes the heated bar, bends it and forces it toward and against the curved shoulder formed by the projection  $p$  on the lower die P. While this movement was being accomplished however the arms Z and Z' were being forced forward by the cams Y and Y', and as the levers advance, their inclined edges bearing against the inclined washers 6, 6, on the end of the set screws 5, it is evident that the long arms of the levers Z, and Z' must move toward each other; at the same time, as the curved ends of the levers bear against the pulleys 8, 8, the advance of the levers must cause the said pulleys to approach each other and thereby bend the heated bar of iron close around the edge of the advancing mandrel X, which continues its forward movement until the rounded portion of the heated bar has been forced against the curved edge of the projection  $p$  as before described. In order to guide the mandrel as it advances it is furnished with a projection underneath, which slides into the recess of the lower die. As the mandrel is forcing the heated iron against the curved shoulder of the lower die the levers Z and Z' continue their movement and consequently continue to close at the same time the upper die descends by the action of the cam H and bell crank lever I, on the toggle joint K until the upper die  $k$  and levers Z and Z' assume the position shown in Figs. 6, 7 and 10, that is the underside of the levers lapping a short distance over the face of the lower die P and covering a portion of the edges of the upper die  $k$  while the mandrel X fits into a recess formed in the underside of the upper die. It will now be seen that the heated and bent bar is confined above and below by the upper and lower die, at the



sides by the closed levers Z and Z', at the rounded end by the projection *p* on the lower die, and on the inside by the mandrel X, thereby not only imparting to the bar the required form of the shoe, but at the same time compressing the metal on the outside edges, inner edges, top and bottom, making it perfectly smooth and giving to the shoe the necessary bevel at the required points. When the upper die had nearly reached its lowest position the punches *q, q*, through the action of the cams *l, l*, on the shaft D, were beginning to ascend. After the die has reached its lowest point this ascent of the punches is continued until they pierce the nail holes the required distance into the underside of the shoe, when the blocks T and T' being released from the cams drop of their own weight until their further descent is retarded by the projections *u* striking on the plates U, thus withdrawing the punches from the shoe. As the machine continues to move and the cam H to turn, the upper die by the weight of the long arm of the bell crank lever I, ascends, the levers Z and Z' move back toward their former position, and the long arms of the same consequently separate from each other, thereby allowing the shoe, which still adheres to the mandrel X, to be withdrawn from the dies and carried with the mandrel to the original position of the latter. When the mandrel has arrived at this point the pin *g* on the wheel G strikes the arm *f* on the spindle N in such a manner as to cause the arms *j* and *j'* to strike the shoe and force it from the mandrel onto the ground. The moving parts of the machine are now in their original position preparatory to making a repetition of the above movements.

By the peculiar form and arrangement of the dies in conjunction with the mandrel and jaws and by the relative position to each other which they assume when closed as illustrated in Figs. 6 and 7 and in the full sized view (Fig. 10) it is evident that the shoe must not only have the proper bevel at the required points, but must be compressed into one solid mass free from the rounded and burred edges common to horse shoes made by other machines.

By jointing the plates R and R' to the blocks T and T' it will be seen that the punches *q, q*, may be adapted to the holes of different sized dies, which may be applied to the machine, for forming horse shoes of different sizes.

Without claiming separately the various parts illustrated and described, I claim and desire to secure by Letters Patent—

1. The combination of the mandrel with the rollers 8, 8, when the said mandrel is of the same form as that presented by the inner edge of the shoe to be manufactured, when it is so operated as to convey the bent bar to the dies, there retain it while it is submitted to the action of the said dies, and subsequently withdraw the formed shoe from the same, and when the rollers are caused to approach each other as the mandrel advances.

2. I do not claim exclusively the employment of opening, closing and reciprocating dies;—but I do claim the jaws Z and Z', the reciprocating mandrel X, with its projection underneath, the lower die P, with its recess for receiving the projection of the mandrel, and with its projecting lip *p*, and the upper die *k*, when the said dies, mandrel and jaws are arranged to close and lap over each other, in the manner set forth, and when they are otherwise arranged and actuated, substantially as, and for the purpose specified.

3. Piercing the requisite nail holes in the shoe by means of the punches *q*, when the same are attached to the plates R and R', when the latter are hinged to the guide blocks T and T', when the upward movement of the latter is regulated by the adjustable wedges V, and when the whole is arranged and operated, substantially in the manner set forth, and for the purpose specified.

In testimony whereof, I have signed my name to this specification before two subscribing witnesses.

JOHN McCARTY.

Witnesses:

FR. W. BIMER,  
MARTIN LUTZ.