

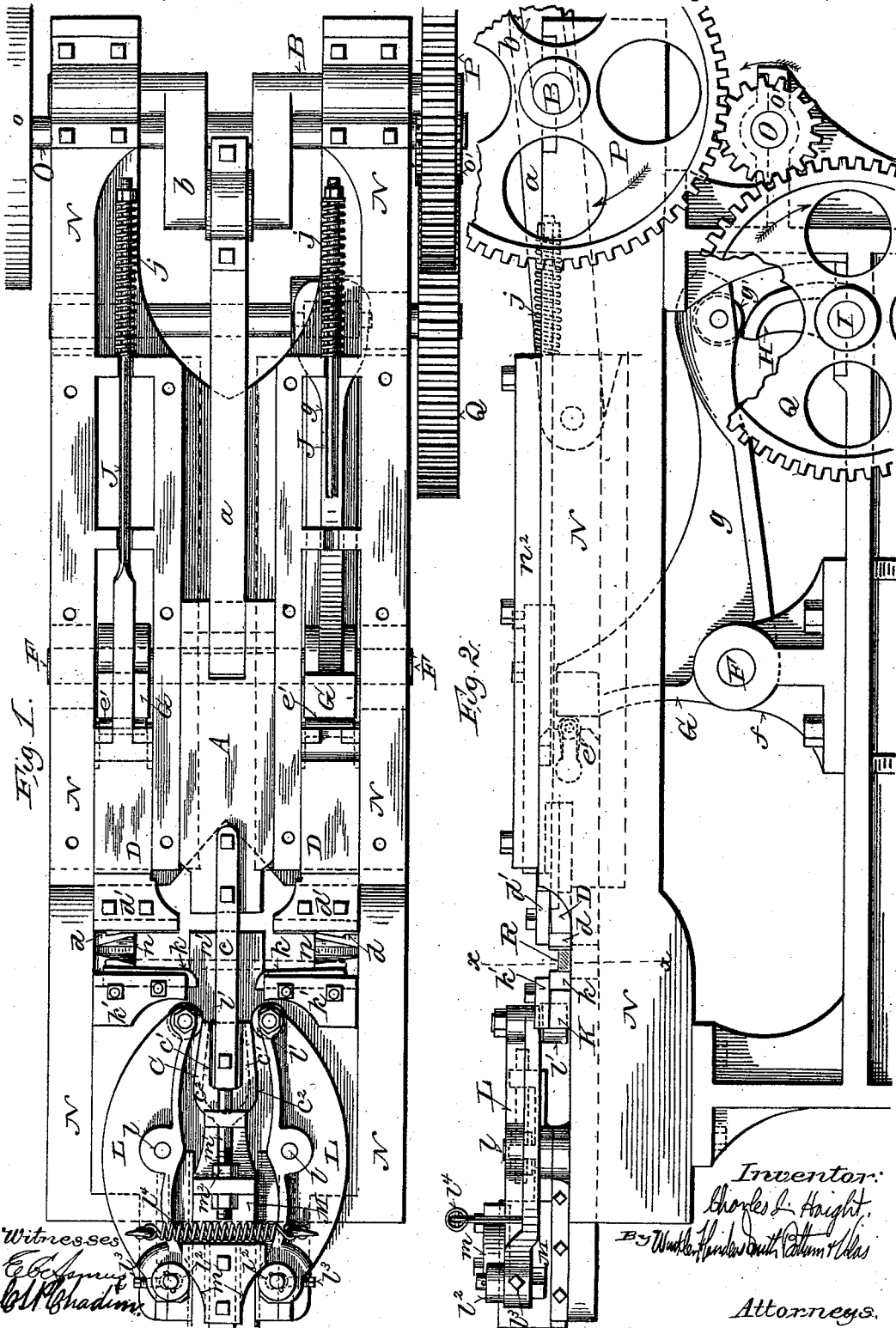
(No Model.)

2 Sheets—Sheet 1.

C. L. HAIGHT.  
HORSESHOE FORMING MACHINE.

No. 539,427.

Patented May 21, 1895.



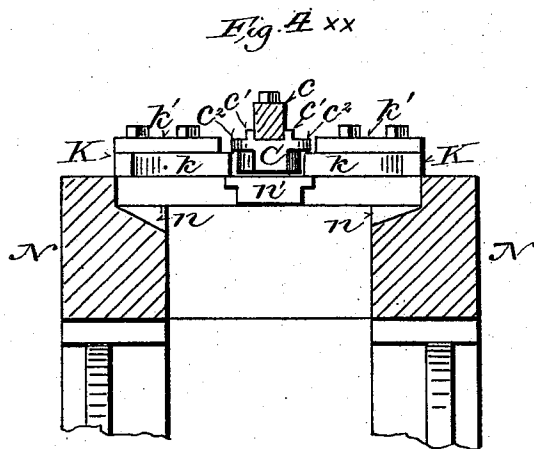
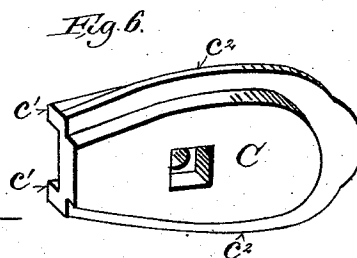
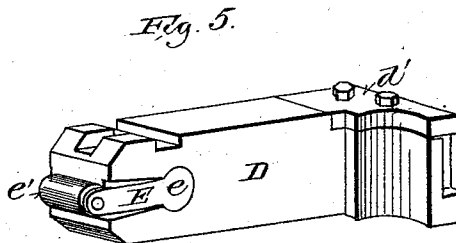
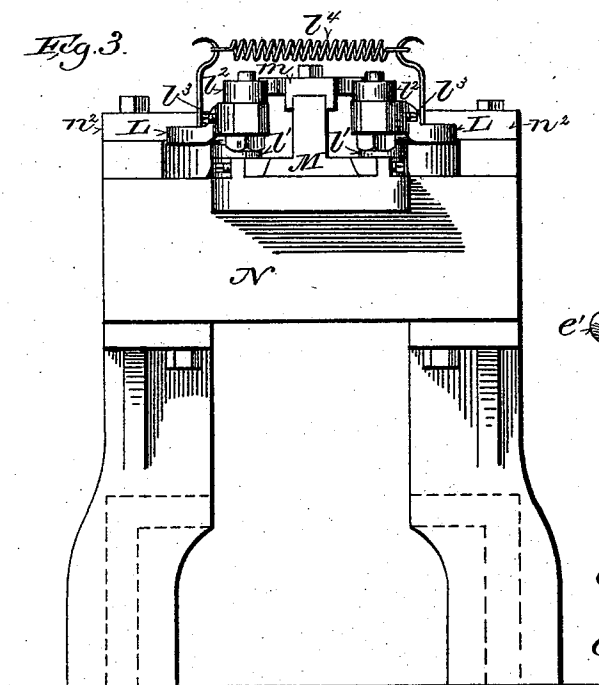
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Witnesses:

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# UNITED STATES PATENT OFFICE.

CHARLES L. HAIGHT, OF POUGHKEEPSIE, NEW YORK, ASSIGNOR TO THE  
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## HORSESHOE-FORMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 539,427, dated May 21, 1895.

Application filed July 27, 1892. Serial No. 441,351. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES L. HAIGHT, of Poughkeepsie, in the county of Dutchess and State of New York, have invented certain new and useful Improvements in Horseshoe-Forming Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The main object of my invention is to facilitate the production of horse-shoes and reduce the cost thereof.

It consists of certain novel features in the construction and arrangement of parts hereinafter particularly described and pointed out in the claims.

In the accompanying drawings like letters designate the same parts in the several figures.

Figure 1 is a plan view of a machine embodying my improvements, the slide-retaining cap-plates being removed. Fig. 2 is a side elevation of the machine. Fig. 3 is an end elevation viewed from the left with reference to Figs. 1 and 2. Fig. 4 is a vertical cross-section on the line *xx*, Fig. 2, looking from the right. Fig. 5 is a perspective view, on an enlarged scale, of one of the swage-slides; and Fig. 6 is a similar view of the forming-die as seen from the under side.

A is a reciprocating slide, movable horizontally in ways provided for it in the frame N. It is connected at one end by a rod or pitman *a*, with the crank *b*, on crank shaft B, by which it is actuated. To the opposite end of said slide is rigidly and detachably secured by a bar *c*, the forming die C, the contour of which corresponds with that of the inner curved edge of the shoe it is intended to form. On the upper side said die is formed with ribs *c'*, between which the bar *c* is bolted and securely held, and around its edge it is formed with an outwardly projecting flange *c*<sup>2</sup>, which holds the blank in place, preventing its upward deflection and displacement while it is being formed into a shoe.

D D are two horizontally reciprocating slides

movable parallel with the slide A in suitable ways in frame N and provided at one end with swaging dies *d d*, which are held in recesses therein by plates *d' d'* screwed to said slides. The slides A and D D are held in place in their ways in frame N by cap plates *n<sup>2</sup> n<sup>2</sup>*. Shown in Figs. 2 and 3.

E E are roller blocks formed at one end with transverse cylindrical enlargements *ee*, which are loosely inserted and held in correspondingly shaped recesses in the ends of slides D D opposite the dies *d d*. In the opposite ends of said blocks, projecting outside of or beyond the ends of said slides are journaled friction rollers *e' e'*, which are free to move a limited distance vertically, the enlargements *ee* turning in the recesses in which they are held.

Upon a horizontal shaft F supported in brackets *f* on the base of the machine frame N, are mounted two bell crank levers G G, the upwardly projecting arms of which bear loosely against the friction rollers *e' e'*. The horizontal arm *g* of each of said levers is provided on the under side of its free end with a friction roller *g'*, in range with a cam H on a rotary cross shaft I.

Each slide D is formed in its upper side with a T-shaped recess in which is inserted and held the similarly shaped flattened end of a rod J, supported horizontally in bearings in frame N and provided with a spiral spring *j*, bearing at one end against a nut thereon and at the other against the frame.

Opposite the dies *d d*, two dies *k k*, are adjustably held transversely to the movement of slide A against abutments K on frame N by cap plates *k' k'*.

At the opposite end of the machine from the crank shaft B on opposite sides of the path of the die C, are two levers L L, fulcrumed at intermediate points therein on pins *l l*, secured vertically to frame N. Said levers are provided at opposite ends with bending rollers *l' l'* and friction rollers *l<sup>2</sup> l<sup>2</sup>*. The pins on which the rollers *l<sup>2</sup> l<sup>2</sup>* are journaled, pass through transversely slotted openings in levers L L, and are adjustably held therein by set screws *l<sup>3</sup> l<sup>3</sup>*.

Between the levers L L in line with the slide A and die C, is a slide M, to which is attached

adjacent to rollers  $l^2 l^2$ , a wedge block  $m$ . A screw threaded striking rod  $m'$  is adjustably held by nuts  $m^2$  in upturned perforated ears on the upper side of said slide  $M$ , in line with the bar  $c$ .

A spring  $l^4$  connects the levers  $L L$  between the fulcrum pins  $l l$  and rollers  $l^2 l^2$  and holds said rollers in engagement with the opposite inclined or curved sides of the wedge block  $m$ .

$O$  represents the driving shaft provided with a suitable pulley  $o$ , and with a pinion  $o'$ , which engages on one side with a gear  $P$  on crank shaft  $B$  and on the other with a gear  $Q$  on cam shaft  $I$ .

It will be observed that the several shafts  $B$ ,  $F$ ,  $I$  and  $O$  have their bearings firmly and rigidly supported either upon the base or top of frame  $N$ , in such a manner as to most efficiently resist the strain to which they are subjected.

Channels  $n n$ , are formed in the frame  $N$  between the dies  $d d$  and  $k k$ , to receive and conduct off scales loosened from the blanks and to prevent accumulation of such scales and consequent clogging of the machine.

My improved machine operates as follows: The driving shaft  $O$  being rotated in the direction indicated by the arrow in Fig. 2, turns the crank shaft  $B$  and cam shaft  $I$  through the intermeshing pinion  $o'$  and gears  $P$  and  $Q$  in opposite directions also indicated by arrows in the same figure. The forming die  $C$  attached to slide  $A$  is thus driven back and forth between the inner ends of the dies  $k k$ , and the rollers  $l' l'$  in the adjacent ends of levers  $L L$ , by the crank  $b$  and connecting rod  $a$ ; and the dies  $d d$ , attached to slides  $D D$  are moved toward and from the opposing dies  $k k$  by the joint action of the cams  $H$ , bell crank levers  $G G$ , and the retracting springs  $j j$  on rods  $J J$ . The blanks or bars of iron of the proper length and size are placed as indicated by dotted lines in Fig. 1, one at a time crosswise upon a leaf or table  $n'$  on frame  $N$ , with their ends between the dies  $d d$  and  $k k$ , which closing against the blank  $R$  as shown in Fig. 2, swage and form the heels of the shoes. The forming die  $C$  then advancing forces the blank between the inner ends of dies  $k k$ , which bend it around said die  $C$ . The bar  $c$ , striking the adjacent end of rod  $m'$  on slide  $M$ , forces the wedge block  $m$  forward between the friction rollers  $l^2 l^2$ , thereby moving the bending rollers  $l' l'$  at the opposite ends of levers  $L L$  toward each other against the outer edges of the shoe and bending the heels inwardly against the contracted sides of the forming die  $C$ , thus completing the shoe with the exception of the calks, nail holes and groove. When the slide  $A$  is withdrawn, carrying the bar  $c$  out of contact with rod  $m'$  the spring  $l^4$  spreads the ends of levers  $L L$ , carrying the bending rollers  $l' l'$  and drawing the friction rollers  $l^2 l^2$  together against the inclined or curved edges of the wedge block  $m$ , forces the slide  $M$  backward into its normal position. As the forming die  $C$  passes

backward the shoe is removed and drops therefrom through an opening in the bed of the machine.

The friction rollers  $e' e'$  connected by the vertically swinging roller blocks  $E E$  with slides  $D D$ , prevent friction between said slides and the bell crank levers  $G G$ , due to the arc motion of said levers and cause the machine to run with greater ease and less wear.

By the substitution of dies of different shapes and sizes and by the proper adjustment of such dies and of the friction rollers  $l^2 l^2$  and striking rod  $m'$ , shoes of various sizes and shapes may be made by the machine.

Various changes in the details of the machine may be made within the spirit and intended scope of my invention.

I claim—

1. In a horseshoe forming machine, the combination with a reciprocating forming die, of levers fulcrumed at points between their ends to the frame on opposite sides of the path of said forming die and provided at one end with bending rollers, a reciprocating wedge block movable independently of and in line with said forming die between the opposite ends of said levers to close said bending rollers against a blank on said forming die, and a spring connecting said levers and holding them in engagement with opposite sides of said wedge block, substantially as and for the purposes set forth.

2. In a horseshoe forming machine, the combination with a reciprocating forming die, of heel bending levers fulcrumed at points between their ends to the frame on opposite sides of the path of said forming die and provided at one end with transversely adjustable friction rollers, a reciprocating wedge block movable independently of and in line with said forming die between said rollers, and a spring connecting said levers and holding said friction rollers in contact with opposite sides of said wedge block, substantially as and for the purposes set forth.

3. In a horseshoe forming machine, the combination with a reciprocating forming die, of heel bending levers fulcrumed at points between their ends to the frame on opposite sides of the path of said forming die, and a reciprocating slide movable independently of and in line with said die between said levers, and provided with a wedge block and with a longitudinally adjustable striking piece in the path of said forming die or of an adjunctive part thereof, substantially as and for the purposes set forth.

4. In a horseshoe forming machine, the combination with a reciprocating forming die, of heel bending levers fulcrumed at points between their ends to the frame on opposite sides of the path of said die and provided at one end with transversely adjustable rollers, a reciprocating slide movable independently of and in line with said die and provided with a wedge block engaging said rollers and

with a longitudinally adjustable striking piece in the path of said forming die or of an adjunctive part thereof, and a spring connecting said levers and holding said rollers in contact with opposite sides of said wedge block, substantially as and for the purposes set forth.

5. In a horseshoe forming machine the combination of a reciprocating forming die shaped to form the inside of a shoe, heel bending levers fulcrumed between their ends to the frame on opposite sides of the path of said die, a reciprocating wedge block movable independently of and in line with said forming die between the outer ends of said levers to close their opposite ends against a blank on said forming die, fixed heel swaging dies secured to the frame on opposite sides of the path of said shoe forming die, reciprocating slides movable parallel with the forming die and provided with dies opposing the fixed heel swaging dies, a cam shaft provided with cams, and bell crank levers engaging at one end with said cams and at the other with the swaging die slides, substantially as and for the purposes set forth.

6. In a horse-shoe forming machine, the combination with fixed dies, of reciprocating slides provided with heel swaging dies adjacent to the aforesaid dies, and at their opposite ends with rollers connected therewith by vertically swinging blocks or roller frames and vibrating arms loosely engaging at their

free ends with said rollers, substantially as and for the purposes set forth.

7. In a horseshoe forming machine, the combination of a reciprocating slide provided with a forming die, fixed heel swaging dies on opposite sides of the path of said forming die, slides movable parallel with and on opposite sides of said forming die and provided with heel swaging dies opposed to said fixed dies, a crank shaft connected with the forming-die slide, a parallel shaft provided with cams, bell crank levers engaging or connected at one end with the heel-swaging-die slides and projecting at their opposite ends into the paths of said cams, heel bending levers fulcrumed to the frame on opposite sides of the path of said forming die, a slide movable independently of and in line with said forming die and provided with a wedge block between the outer ends of said heel bending levers, and a driving shaft between and parallel with said crank and cam shafts and provided with a pinion engaging on opposite sides with gears on said crank and cam shafts, substantially as and for the purposes set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

CHARLES L. HAIGHT.

Witnesses:

E. H. BOTTUM,  
E. G. ASMUS.