2 Sheets—Sheet 1.

J. RUSSELL & L. G. CLAUDE.

HORSESHOE MACHINE.

No. 183,707. Patented Oct. 24, 1876.

Fig 1.

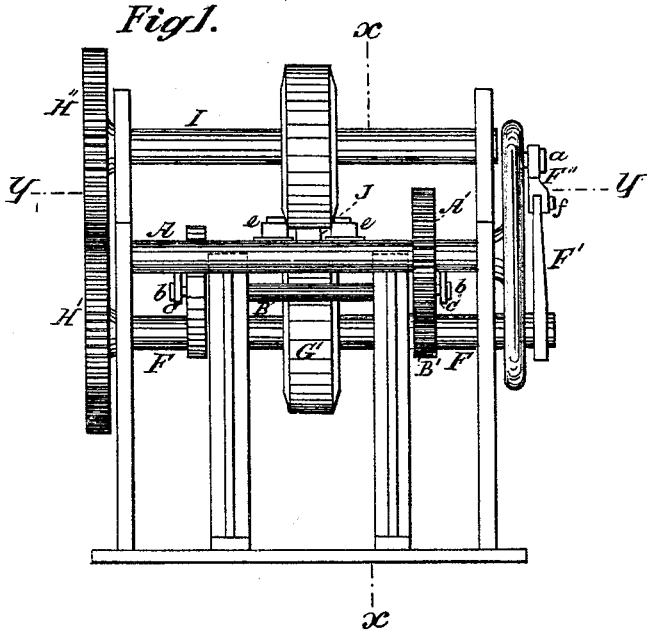
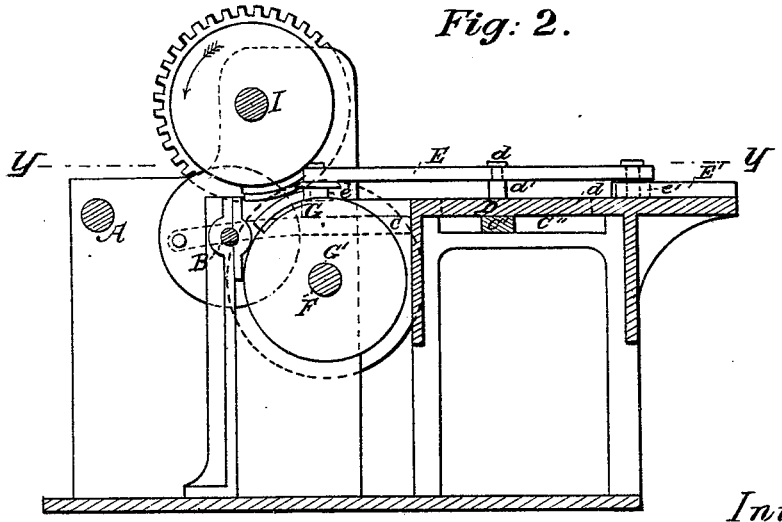


Fig: 2.



Witnesses:
Henry C. Hughes
Edward Holly

Inventors.
Jacob Russell & Louis G. Claude.
per James A Whitney
Atty

2 Sheets—Sheet 2.

J. RUSSELL & L. G. CLAUDE.

HORSESHOE MACHINE.

No. 183,707. Patented Oct. 24, 1876.

Fig. 5.

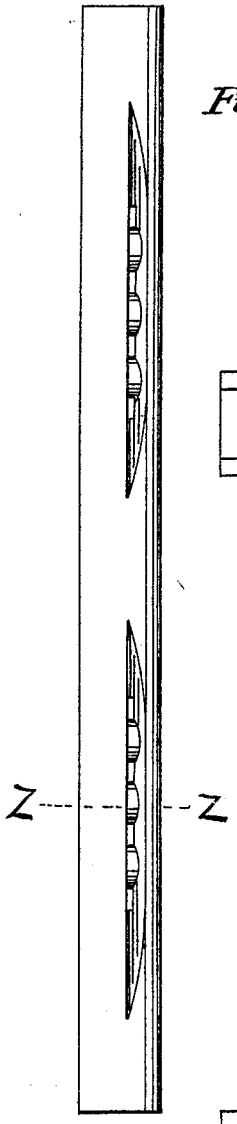


Fig. 3.

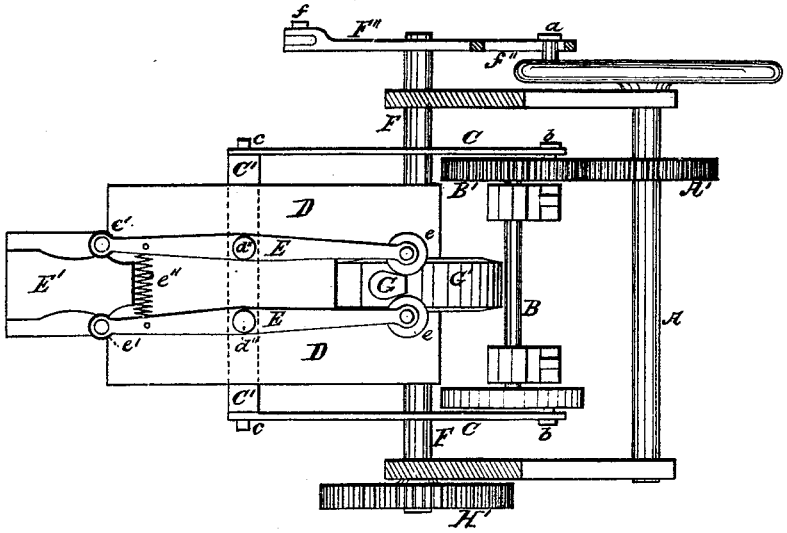


Fig. 6.

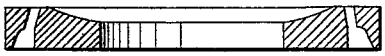
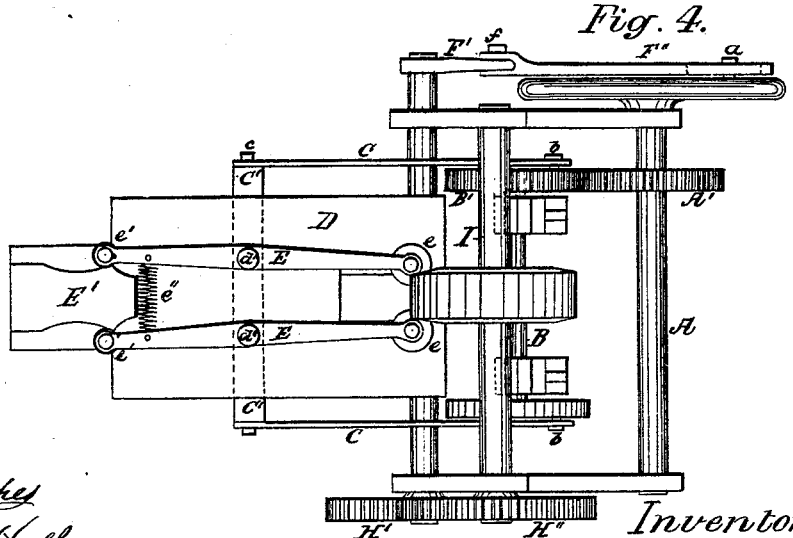


Fig. 7.

Fig. 4.



Witnesses.
Henry C. Hughes
Edward Holly

Inventors.
Jacob Russell & Louis G. Claude.
per James A Whitney
Atty

UNITED STATES PATENT OFFICE.

JACOB RUSSELL, OF NEWARK, NEW JERSEY, AND LOUIS G. CLAUDE, OF NEW YORK, N. Y.

IMPROVEMENT IN HORSESHOE-MACHINES.

Specification forming part of Letters Patent No. **183,707**, dated October 24, 1876; application filed August 19, 1876.

To all whom it may concern:

Be it known that we, JACOB RUSSELL, of Newark, in the county of Essex and State of New Jersey, and LOUIS G. CLAUDE, of the city, county, and State of New York, have invented certain Improvements in Machines for Making Horseshoes, of which the following is a specification:

In order to provide for the most secure attachment of a horseshoe to the hoof it is necessary that the inclination of the creases and nail-holes of the shoe should coincide with the slope of the walls of the hoof; but all attempts to provide this in machine-made horseshoes have hitherto been comparative failures.

The object of this invention is to provide for the manufacture of horseshoes possessing the above-specified meritorious feature in a high degree, at an expense no greater than that of machine-made horseshoes hitherto made, and defective in the direction or slope of the crease and nail-holes.

To this end the invention consists in a novel process of rolling the bent, creased, and perforated blank from the heel to the toe of the shoe, whereby the metal of the blank is, as it were, tilted outward on the under side of the shoe, so as to crowd the lower part of the crease and nail-holes of the shoe laterally, thereby changing their direction from a vertical to an upward and inward slope, as nearly as possible coincident with the average slope of the walls of the horse's hoof.

The invention further comprises, in a horseshoe-machine, a novel combination of an oscillating shaping or pressing die, and oscillating bending-die, and reciprocating and laterally-moving shaping or bending levers, whereby the blank, being bent around the bending-die, is rolled from heel to toe by the action of the pressing or shaping die much more rapidly and efficiently than would be possible with continuously-rotating dies, only a portion of a revolution of the dies being required in the formation of the shoe, instead of a double revolution of such dies.

The invention further comprises, in a horseshoe-machine, the bending-die, arranged to be stationary during the bending of the blank around the same, a pressing or shaping die, arranged to have a rocking movement coincident with that of the bending-die, and bending-rolls, arranged to move forward to bend the blank around the bending-die, while said die and the pressing or shaping die are stationary, and to move backward for repetition of the operation while the pressing or shaping and the bending dies are acting conjointly to press the shoe from heel to toe.

Figure 1 is an end view of the horseshoe-machine, constructed for operation according to our invention. Fig. 2 is a longitudinal sectional view taken in the line X of Fig. 1. Fig. 3 is a horizontal sectional view taken in the line Y Y of Figs. 1 and 2. Fig. 4 is a plan view. Fig. 5 is a view representing the blank rolled, creased, and punched, and ready for bending; and Fig. 6 is a transverse sectional view of a horseshoe made according to our process, and by our machine aforesaid. Fig. 7 is a cross-section of the blank on the line Z, Fig. 5.

A is the driving-shaft of the machine, provided at one extremity with a crank or crank-rest, *a*, and having a spur-wheel, A′, which gears into a spur-wheel, B′, on a secondary shaft, B, at each end of which is a crank rest or pin, *b*. From each of these crank rests or pins *b* extend rods C, the opposite extremities of which pivot at *c* to a cross-bar, C′, which slides back and forth in guides C″, underneath the table D. Projecting upward from this cross-bar through longitudinal slots *d* in the table D are two standards, *d*′, on each of which is pivoted, as shown at *b*″, a bending-lever, E. On the forward end of each bending-lever is a bending-disk, *e*, which may have the same general shape and configuration as those attached to the bending device of the well-known horseshoe-machine having rotary dies.

At the opposite or outer extremities of each bending-lever E is a friction-wheel, *e*′, which rests against the adjacent lateral surface of the pattern E′, these two ends of the bending-

levers being connected by a spring, e'', which draws their said ends inward in contact with the said surface of the pattern. The rotation of the secondary shaft B, therefore, gives a movement lengthwise of the machine to the cross-bar C′, and consequently a longitudinal movement to the shaping or bending levers E, which latter are also laterally oscillated on their pivots d'' by the varying curvature of the lateral surfaces of the pattern E′, the pattern being so proportioned that the motion given to the levers causes their opposite ends carrying the benders to describe the requisite curve in bending the blank around the bending-die, as hereinafter presently explained.

F is the shaft carrying the bending-die G, the latter placed upon the circumference of a block or disk, G′, on said shaft. On this shaft F is a rocking arm, F′, from the outer extremity f of which to the crank-pin a of the driving-shaft A extends a pitman or connecting-rod, F″, the crank-pin a passing through a slot, f'', in the pitman. From this it follows that a rocking or oscillating movement will be given to the shaft F by the revolution of the shaft A, with a definite cessation of motion at opposite points in the revolution of the shaft A, by reason of the sliding at such points of the crank-pin a in the slot f''.

The bending-block, at G, has the circumferential shape of the bending-die common in horseshoe-machines—that is to say, its circumference corresponds with the inner circumference in the finished shoe, and, therefore, needs no specific description here. On that end of the shaft F opposite the arm F′ is a spur-wheel, H′, which gears into another spur-wheel, H″, provided on the shaft I, which carries the pressing or shaping die J. This connection of the shaft I with the shaft F causes an oscillating movement to be given to the shaping and pressing die corresponding to and coincident with that of the bending-die.

In the operation of the machine, the driving-shaft being brought to the position represented more clearly in Fig. 2—that is to say, with the bending-die in a nearly or quite horizontal position, with the shaping or pressing die in an inclined position above it, and out of contact therewith, and with the shaping or bending levers drawn back therefrom—the blank, previously rolled, creased, and punched, as shown in Fig. 5, is held transversely in front of said benders, and opposite the rounded toe portion of the bending-die. This done, the continued rotation in the direction of the arrow in Fig. 2 of the shaft A causes the levers to move inward, feeding the blank up against the rounded toe end or portion of the bending-die, and to then advance along the sides of the latter (guided by the pattern E′ at their outer ends) to bend the blank around the toe end of the said bending-die. This, it will be observed is done while the movement of the bending-die is stopped by reason of the movement of the crank-pin a in the slot f'' at one of the two opposite points of revolution at which the lost motion is produced, as hereinbefore explained. The bending thus accomplished, the continued rotation of the shaft causes the simultaneous movement toward each other of the pressing or shaping die and the bending-die, the pressure or shaping die coming first in contact with the bending-die at the heel thereof, and consequently at the heel of the bent blank—in other words, of the shoe. As this partial rotation of the dies is continued, the pressing or shaping die presses the blank of the shoe from the heel toward the toe, thereby moving outward that portion of the metal most adjacent to the pressing or shaping die—in other words, that which forms the bottom of the finished shoe. This outward movement of said portion of the metal cants or tilts the same in such manner as to give a slope to the previously-formed crease and holes of the shoe, bringing the same to a slope with reference to the horizontal plane of the shoe, nearly or quite coincident with the walls of the horse's hoof, thereby providing for the more effective hold of the nails when driven through the crease and holes of the shoe in the shoeing of the horse. When the pressing or shaping die has traversed the entire length of the shoe, the continued though partial rotation of the two dies brings the same apart, and at the end of such partial rotation in one direction the shoe drops off from the bending-die. When this is accomplished a half-revolution of the driving-shaft A being reached, the rest a moving in the shot f'' produces again a lost motion, after which the pitman, acting upon the rocking arm F′, reverses the movement of the dies, and brings them back to their original position for repetition in the production of another shoe.

It is to be observed that the particular gearing between the driving-shaft A, the secondary shaft B, and the connections between said secondary shaft and the rod C, may be substituted, when desired, by other mechanical equivalents. The particular means and mechanical devices by which the movements are communicated to said secondary shafts and to the rods being subsidiary to the movements themselves of said shaft and rods.

What we claim as our invention is—

1. The herein-described process of shaping a machine-made horseshoe by rolling the bent, creased, and perforated blank from the heel to the toe of the shoe, substantially as and for the purpose herein set forth.

2. In a horseshoe-machine, the oscillating shaping or pressing die J, and oscillating bending-die G, and the reciprocating and laterally-operated shaping or bending levers, the whole combined and arranged for bending

the blank and rolling the same from heel to toe, substantially as and for the purpose herein set forth.

3. In a horseshoe-machine, the oscillating bending-die G, arranged and operated to be stationary during the bending of the blank around it, in combination with the pressing or shaping die J, arranged to have a movement coincident with that of the bending-die, and the bending rolls or benders *e*, the whole arranged for joint use and operation, substantially as and for the purpose herein set forth.

JACOB RUSSELL.
LOUIS G. CLAUDE.

Witnesses:
H. WELLS, Jr.,
EDWARD HOLLY.