5 Sheets—Sheet 1.

# W. ROBERTS.

## HORSESHOE MACHINE.

No. 189,322. Patented April 10, 1877.

*Fig. 1.*

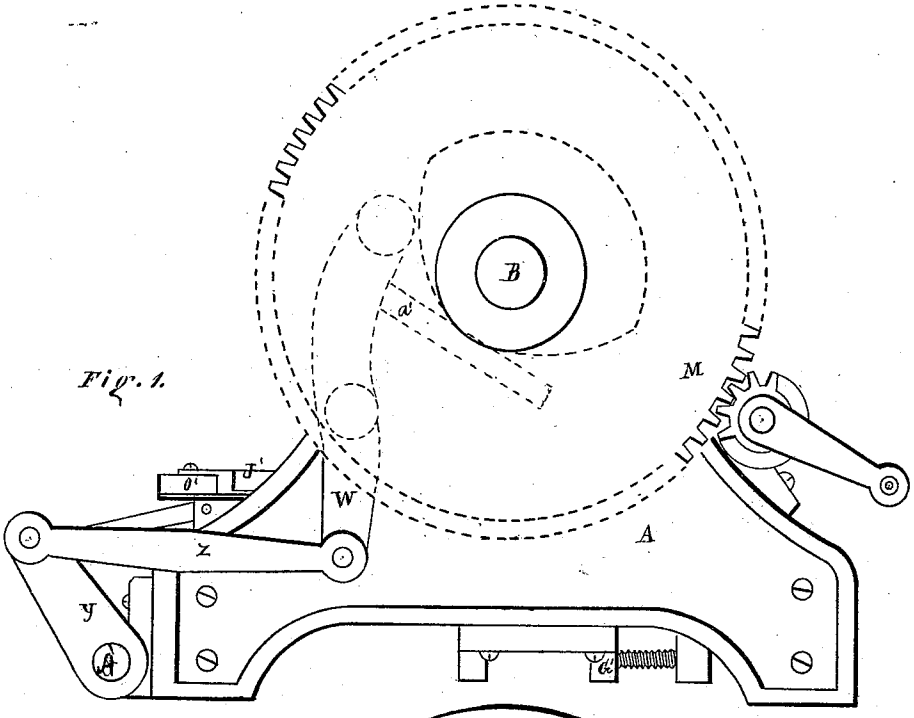
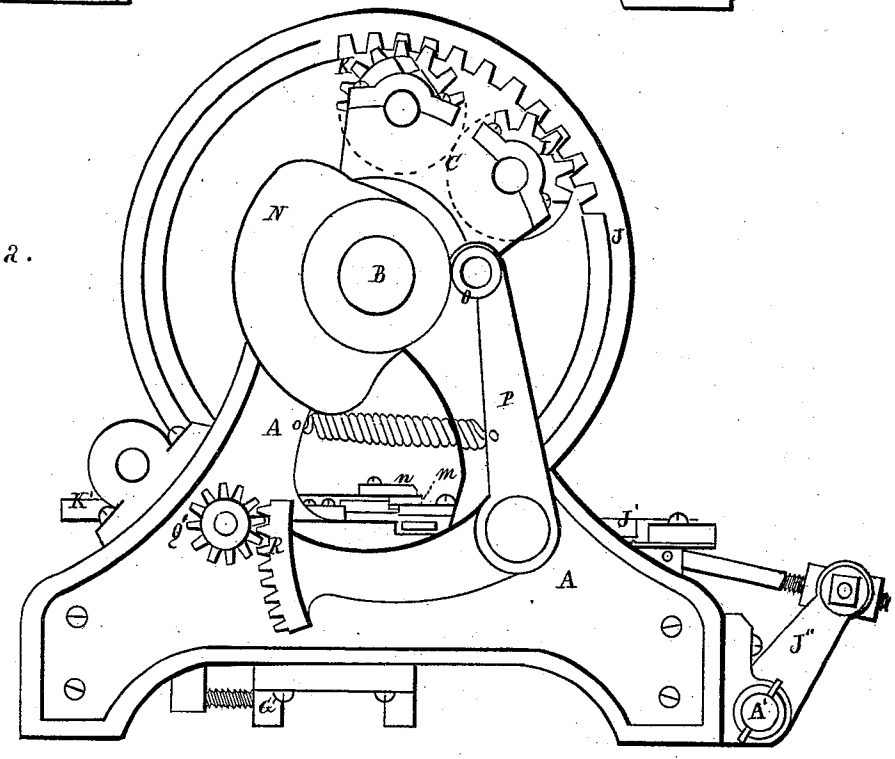



*Fig. 2.*

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5 Sheets—Sheet 2.

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## HORSESHOE MACHINE.

No. 189,322. Patented April 10, 1877.

*Fig. 3.*

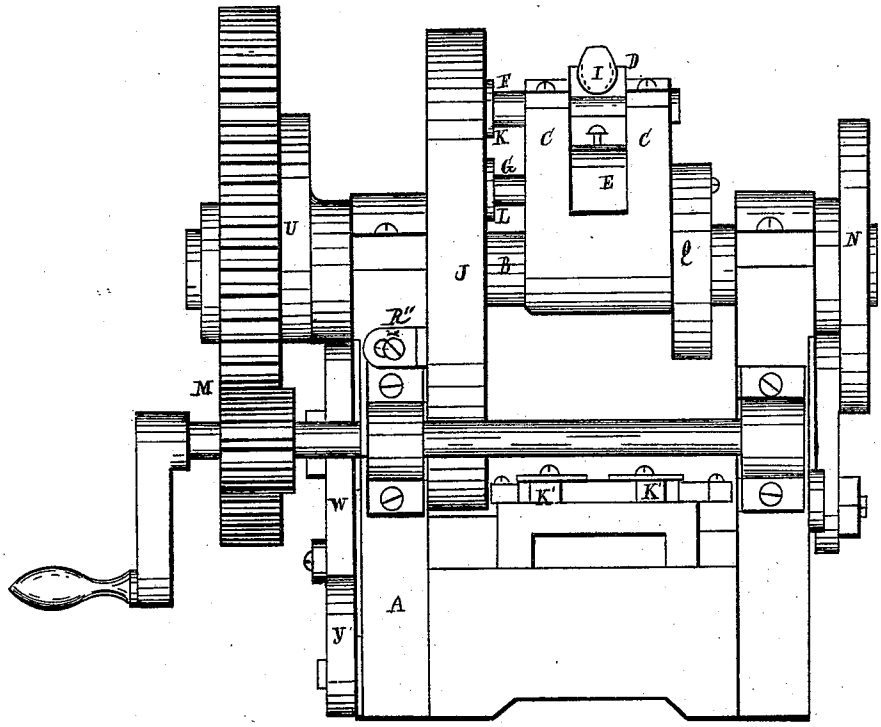
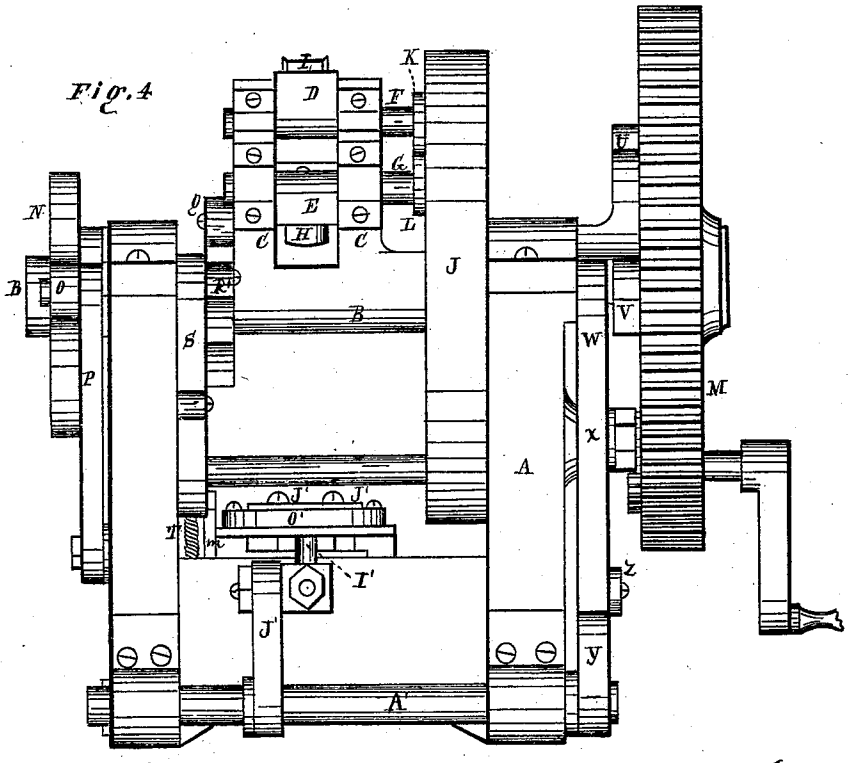



*Fig. 4*

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5 Sheets—Sheet 3.

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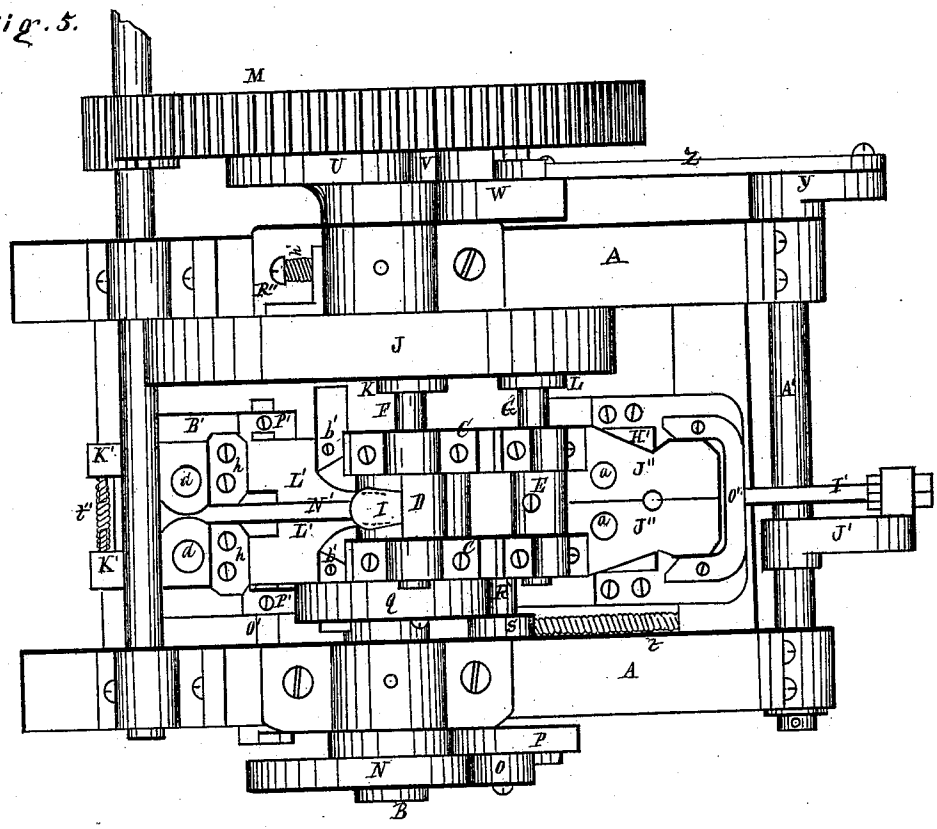
## HORSESHOE MACHINE.

No. 189,322. Patented April 10, 1877.

Fig. 5.

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5 Sheets—Sheet 4.

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## HORSESHOE MACHINE.

No. 189,322. Patented April 10, 1877.

Fig. 6.

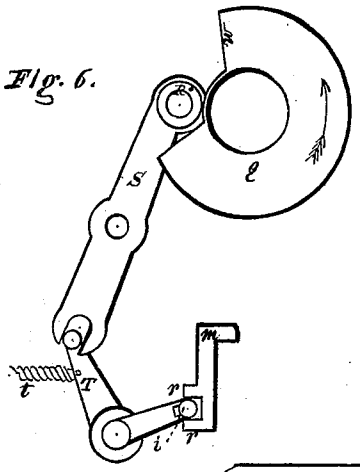


Fig. 7.

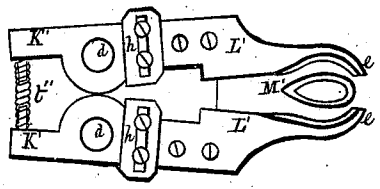


Fig. 8.

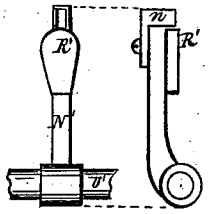


Fig. 9.

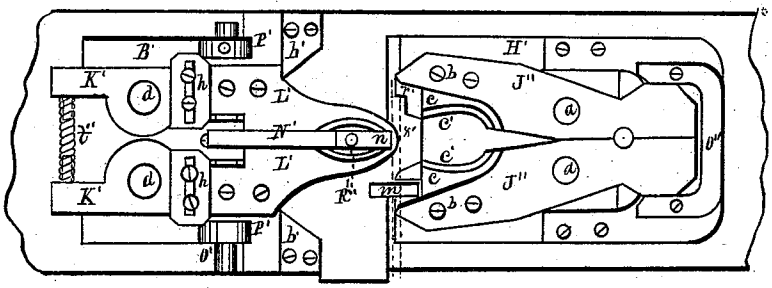


Fig. 10.

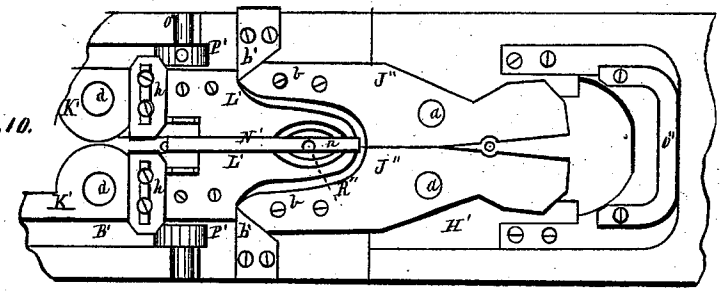
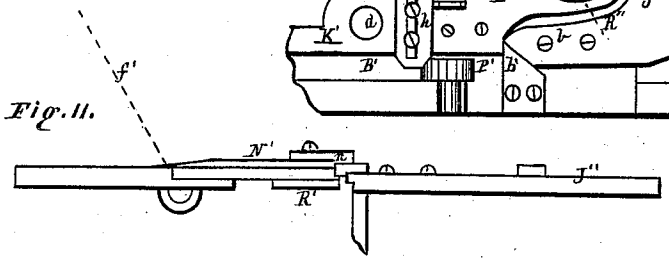


Fig. 11.



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5 Sheets—Sheet 5.

# W. ROBERTS.

## HORSESHOE MACHINE.

No. 189,322. Patented April 10, 1877.

Fig. 12.

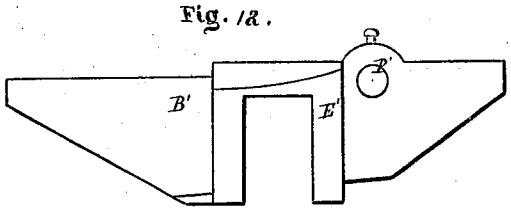



Fig. 13.

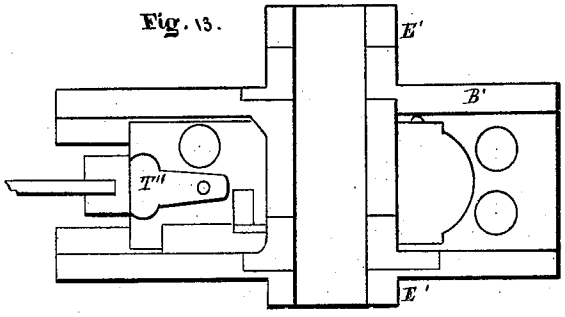



Fig. 14.

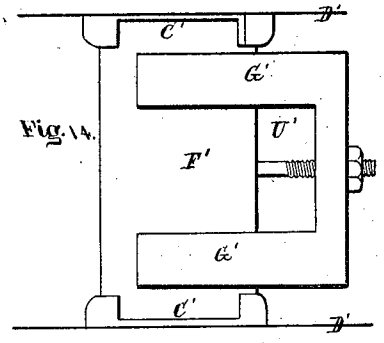



Fig. 15.

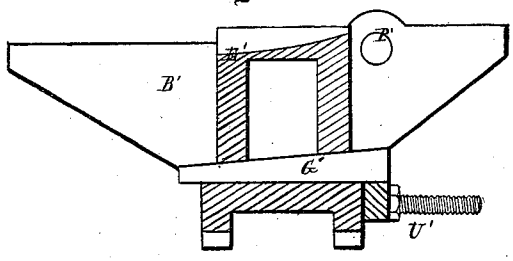
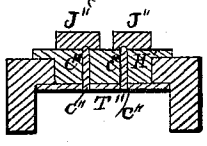



Fig. 16.

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Julius Schmidt

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Attys

# UNITED STATES PATENT OFFICE.

WEBSTER ROBERTS, OF CLEVELAND, OHIO.

## IMPROVEMENT IN HORSESHOE-MACHINES.

Specification forming part of Letters Patent No. **189,322**, dated April 10, 1877; application filed November 25, 1876.

*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 new and useful Improvements in Horseshoe-Machines, of which the following is a description, reference being had to the accompanying drawings, making a part of this specification, in which—

Figures 1 and 2 are side elevations of the machine. Figs. 3 and 4 are end elevations. Fig. 5 is a plan view. The several views on plates 4 and 5 are detached sections.

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

This invention is a machine for making horseshoes, the construction and operation of which are substantially as follows:

In the sides of a frame, A, Figs. 3 and 4, is journaled, in suitable bearings, a shaft, B, from which projects a pair of segmental radial arms, C, which, as will be seen in Fig. 3, form an integral part of the shaft.

Between said arms are fitted a pair of die blocks or heads, D E, secured, respectively, to the shafts F G, which have their bearings in the peripheries of the segmental arms referred to, as shown in the drawings.

In the face of the block E is secured a pressing-die, H, and in the face of the block D is secured a creasing-die, I, Figs. 3 and 4. Said dies will be referred to hereinafter. The blocks, with their respective dies, are made to revolve in the arms C by an inside gear-wheel, J, to which they are engaged by pinions K L, as shown in Fig. 2. The wheel J, in around which said pinions run for revolving the dies, (as the shaft B, together with the segmental arms carrying them, are rotated by the cog-wheel and pinion M,) is stationary.

On one end of the shaft B is secured a cam, N, Fig. 2, on the face of which runs a friction-roller, O, attached to the upper arm of a rectangular lever, P, pivoted to the side of the frame. The end of the lower arm of said lever terminates in a segment of gear, R, the purpose of which will hereinafter be shown.

Also, to the shaft B is secured a cam, Q, Fig. 5, on the face of which runs a friction-roller, R′, attached to the upper end of a lever, S, Fig. 4. The lower end of said lever is bifurcated, and fitted loosely therein is one end of a rectangular lever, T, pivoted to the bed of the machine.

Detached views of the cam Q and levers S T are shown in Fig. 6, Plate 4.

On the opposite end of the shaft B is secured a cam, U, Figs. 3 and 4, on the face of which runs a friction-roller, V, attached to a lever, W, pivoted at *x* to the side of the frame A. The lower end of said lever W is attached to an arm, Y, by a link, Z, whereby the shaft A′, Figs. 1, 4, and 5, is operated. Further reference will be made to this part of the machine. B′ in Plate 5 represents the bed of the machine, which is fitted in the frame A, as follows: On each inner side of the frame A is made a gain, C′, Fig. 14, which figure represents a plan view of the middle section of the inside of the frame, and of which D′ indicates the sides.

In said gains are fitted, so as to slide therein, the projections E′ of the bed, of which Fig. 13 is a view of the under side. The position of the bed, when in place, is as shown in Figs. 12 and 15. The bed when in place rests indirectly upon the bottom plate F′, Fig. 14, secured firmly to the under side of the frame A. Interposed between the bottom plate F′ and the bed is a pair of wedges, G′, whereon the bed stands, instead of standing directly upon the bed or bottom plate, and by means of said wedges the bed can be raised or lowered, for a purpose presently shown.

Upon the bed B′ referred to are arranged the following devices: Fitted in the face of the bed is a supplementary bed or slide, H′, Figs. 5, 9, and 10, to which a reciprocating movement is given by the shaft A′, and to which it is connected by a link, I′, attached thereto by an arm, J′, as shown in the drawings.

On said reciprocating bed or slide is pivoted, at *a*, a pair of arms, J″ J″, Fig. 9, 10, and 11. To the under side of the front end of each of the arms is secured, by screws *b*, a detachable plate, *c*. The shape of the inner edge of said plates is that of a half of a horseshoe, divided at the toe; hence, when the two

sections are brought together by the closing of the two arms, they form the contour of a horseshoe, as seen in said Fig. 10. The purpose of said arms and plates will presently be shown.

On the opposite end of the bed B′, above referred to, is pivoted, at *d*, a pair of levers, K′, Figs. 5, 9, and 10, to the inner ends of which is respectively attached a pair of detachable fingers, L′, having curved extremities, as seen at *e* in Fig. 7. Between and under said fingers is a horizontal adjustable die, M′, of the shape shown in said figure. N, Fig. 9, is an arm, secured to a shaft, O′, having its bearings in the seats P′ of the bed B′.

One end of said shaft O′ projects through the side of the frame A, and thereon is secured a pinion, Q′, Fig. 2, arranged to engage the segment R of the rectangular lever P, whereby said shaft is vibrated for raising the arm N′ from its position (shown in Figs. 9 and 10) to that indicated by the dotted lines *f′* in Fig. 11. To the end of said arm N′ is secured a head or former, R′, Fig. 8. Over the extreme end of the arm depends a lip, *n*, the purpose of which will presently be shown.

To each of the levers K′ is secured an adjustable plate, *h*, Figs. 7, 9, and 10, between the approximated ends of which the arm N′ passes on being elevated to the position aforesaid. Further attention will be called to said arm hereinafter.

Projecting upward through the bed B′ is a shear, *m*, Fig. 9. which is operated vertically by the rectangular lever T, Fig. 6, above referred to, to which it is engaged by a pin, *i*, held in the fingers *r* of the shear, as shown in the drawing, Fig. 6. Said lever T is pivoted to the side of the bed B′, and is operated by the lever S and cam Q before referred to.

Having described the various parts of the machine, and their relation to each other, the practical operation of the same is as follows: The position of the several parts of the machine, as shown in Figs. 5 and 9, is such as when about to make the first action in the process of making a shoe. At this moment, in the course of its general movement, the end of a bar of iron, of the proper size for a shoe, is pushed in under the shear *m*, which at this instant is raised above the face of the bed for its admission to a gage, *r′*. The action of the shear is effected by the cam Q as it revolves in the direction of the arrow. The upper end of the lever S (or the friction-roller R′ thereof) is held in contact with the surface of the cam by a spring, *t*, and caused to travel over the plane *w* onto the curve of the cam. This movement of the lever moves upward the arm of the lever T, engaged therewith, thereby drawing down the shear *m* upon the bar, and cutting therefrom a blank for a shoe, which at this time lies in front of the head or former R″, under the lip *n*, as indicated by the dotted lines *x′*, Fig. 9. The shear is again raised by the reaction of a spring, *t*, Fig. 5. The blank is now to be bent around the head R′, before which it lies. This is accomplished by the plates *c c* of the arms J″ J″, against which the ends of the blank rest. At this moment the slide H′ moves forward toward the head or former. This movement is caused by the vibration of the shaft A′, actuated by the cam U, which, at the proper moment in the general movement of the machine, impinges upon the lever W, connected to the shaft, as above described, the lever being held in contact with the cam by a spring. (Indicated by the dotted lines *a′*, Fig. 1.)

In this forward movement of the slide H′ the plates *c c* bend the blank around the end of the former into a U shape, and the said blank at this time is pressed against the sides of the former or head by the closing together of the arms J″ J″, caused by the ends thereof impinging on the angle or sides *b′*. The shape of the former is such as to give the blanks the contour of the inner edge of a shoe.

The bending-plates, in their forward and lateral movements, slide under the fingers L′, by which the bending blank is held from springing upward while being bent into shape around the former. The fingers also hold the blank down upon the beveling or bed die M′ while the former or head is being lifted therefrom for the admission of the dies H and I. The bending-plates also slide over the shear, which, during the operation of bending the blank, is down flush with the face of the bed, and continues there while the lever S is passing over the curved part of the cam.

The position of the machine when the blank is bent around the former and closed in by the arms J″ J″ is such as shown in Fig. 10.

The partially-formed shoe is now to be beveled on its inner side, and pressed to a proper thickness. To accomplish this, the former is lifted from the shoe by elevating it to the position indicated by the dotted lines *f′* in Fig. 11. This elevation of the arm and the former is effected as above described, viz., by means of the cam N and rectangular lever P, actuating at the proper time the pinion Q′ on the shaft to which the arm and former are secured.

The fingers L′ L′ are also to be removed from over the shoe, that it may be exposed to the action of the pressing or beveling die, as shown in Fig. 7. This spreading of the fingers is done by the arm or shank of the former, which, at the time of being elevated, passes between the plates *h h*, forcing them apart, and also the fingers to which the plates are attached to the position shown in Fig. 7, while the former is being elevated and the fingers removed from over the shoe. The above-mentioned segmental arms C, carrying the dies H I, have so far revolved as to bring the pressing-die H down upon the shoe, now lying uncovered by the fingers within the clasp

of the bending-plates. This action of the die H causes a bevel on the inner surface of the shoe, by its being forced down thereby upon the beveling or bed die M′, Fig. 7, above referred to.

Immediately following this action of the pressing-die the shoe is creased, and the prints for the nail-holes made by the creasing-die I, operated in the same manner as the preceding one H. Directly following the last-described operation on the shoe, the slide H′ moves back by the vibration of the shaft A′, actuated by the cam U, as above described. As the slide H′ moves back, the shoe, still held by the plates *c c*, is carried back with it until the arms reach the position shown in Fig. 9, at which point the rear ends of the arms impinge against the shoulders O″, which forces the open ends together and opening the front ends, as shown in Fig. 9, thereby releasing the gripe of the bending-plates from the shoe, which then falls therefrom through an opening in the bed to the floor.

During this rearward movement and dropping of the shoe, the shear is again raised by its respective spring, and the former or head returned to its position on the bed-die M′, in order for repeating the operation of making a shoe, substantially as above described. The hold on the shoe by the bending-plates *c c*, while the slide H′ is being moved back, is maintained by pins *c″ c″*, Fig. 16. Said pins project upward through the slide into shallow dents made respectively in the under side of the rear end of the arms J″ J″, and which are retained therein by a spring, T″, Fig. 13, whereon they stand and are pushed upward into the dents above mentioned. The hold the pins have on the arms is but slight, sufficient only to draw back the shoe to the opening in the bed, at which point the ends of the arms engage the shoulders O″, which forces the arms together and the pins from their respective dents, which in due time, in the order of the operation of the machine, again slip into the dents for the purpose aforesaid.

It will be observed that the dies H I have a common axial movement with the shaft B, obtained by the cog-wheel M, and that each of the dies has an independent axial movement in the arms C C, by the engagement of its pinion with the inside gear-wheel J; hence, as the dies are carried around by the arms, and thereby brought in timely relation to the shoe, for the purposes specified, they impinge upon the shoe in a rolling pressing manner, and that during one revolution of the arms the bending, pressing, creasing, and marking the prints for the nails are accomplished. In the event it becomes necessary to use thinner or thicker iron for shoes, the die-bed can be elevated or depressed for that purpose by the wedges G′, actuated by the screw U′, thereby adjusting the bed in its relation of distance in respect to the revolving dies H I as may be required for the thickness of the shoe.

To adjust the machine for various sizes of shoes the fingers L′ L′ and the bending-plates *c c* are to be removed and replaced by others as the size of the shoe may demand, or such as may conform to the size of the revolving dies H and I.

While the dies are pressing the blank the metal thereby stretches, and tends to carry forward the dies faster than their normal movement. In order to prevent the pinions K L from undue strain upon the inside gear-wheel, caused by the increased movement of the dies abovesaid, the wheel is not rigidly fastened to the frame, but is allowed a slight movement to relieve the strain upon the pinions. The wheel is again returned when relieved from the strain exerted upon it by the stretching of the shoe while being pressed by the dies by a spring, *h′*, Fig. 5, in a bracket, R″.

The die M′, referred to, or, rather, the bed-plate thereof, is adjustable longitudinally. Hence, as the toe part of the die may become worn it can be moved back, and thereby maintain a proper position and fullness for shaping the blank for a shoe. The bending-plates *c c* are rabbeted on their inner edge, as seen at *c′ c′*, to admit the pressing-die so that it may cover the shoe lying between the plates.

The bed B′ though adjustable vertically has no longitudinal movement, it being stationary, so far as any co-operative movement is concerned with the revolving dies.

*t″*, Fig. 9, is a spring, actuating the levers K′ K′ for closing the fingers L′ L′.

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

1. The shaft B, segmental radial arms or head C C, carrying the dies or blocks D and E journaled therein, as described, and pinions K L, in combination with the inside gear-wheel J, substantially in the manner as herein described, and for the purpose specified,

2. The revolving segmental arms or head C C and die-blocks D E, journaled therein, and operating conjointly, substantially as and for the purpose set forth.

3. The levers K′ K′, detachable fingers L′ L′, and spring *t″*, arranged to operate in relation to, and in combination with, the former R′ and arms J″ J″, substantially as and for the purpose set forth.

4. The levers K′ K′ and detachable fingers L′ L′, in combination with bending-head or former R′ and its cam-shank N′, in the manner substantially as described, and for the purpose specified.

5. The beveling or bed die M′, having a horizontal adjustment, in combination with the levers J″ J″, provided with the detachable bending-plates *c c* and fingers L′ L′, substantially as and for the purpose set forth.

6. The arms J″ J″ and detachable bending-plates *c c*, having a rabbet, *c′*, and their inner edges conforming to the configuration and thickness of a horseshoe, and serving to hold

the shoe while being pressed, creased, and nail printed, in combination with the former R′ and the pressing and creasing dies H I, in the manner substantially as described, and for the purpose set forth.

7. The angle-iron or bracket R″ and spring *h′*, in combination with the wheel J, substantially in the manner as described, and for the purpose specified.

8. The combination of the cam Q, lever S, lever T, spring *t*, and shear *m*, as and for the purpose set forth.

9. The levers K′ K′, detachable fingers L′ L′, spring *t″*, and adjustable plates *h h*, in combination with the bending-head or former R′ and its cam-shank N′, substantially as described, and for the purpose set forth.

10. The vertically-adjustable bed B′, arms J″ J″, and detachable bending-plates *c c*, in combination with the former R′, segmental arms or head C C, and die-blocks D E, and their respective dies, substantially in the manner as herein set forth, and for the purpose specified.

11. The arms J″ J″, in combination with the pins *c″ c″*, spring T″, and shoulders O″, substantially as and for the purpose specified.

WEBSTER ROBERTS.

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