RUSSEL & MORRILL.

Horseshoe Machine.

No. 21,779. Patented Oct. 12, 1858.

Fig: 1.

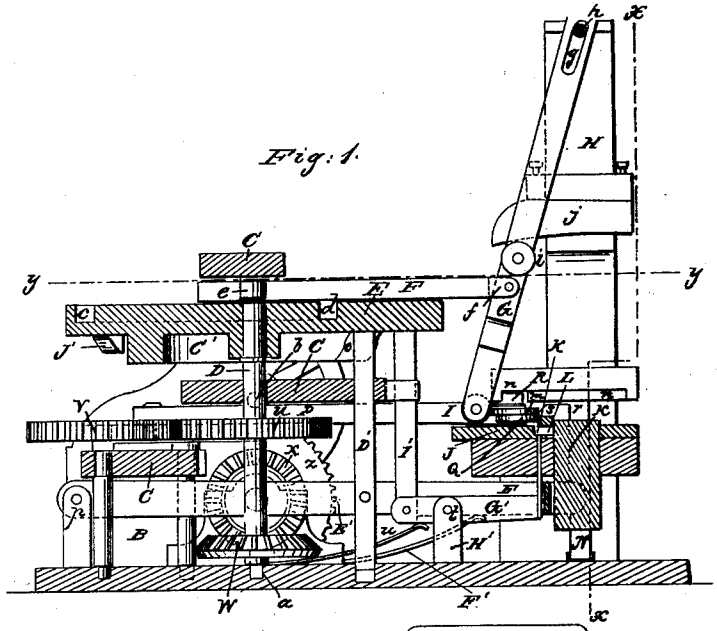


Fig: 2.

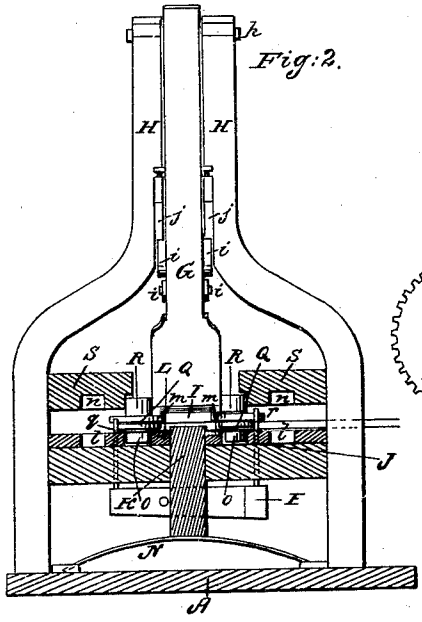
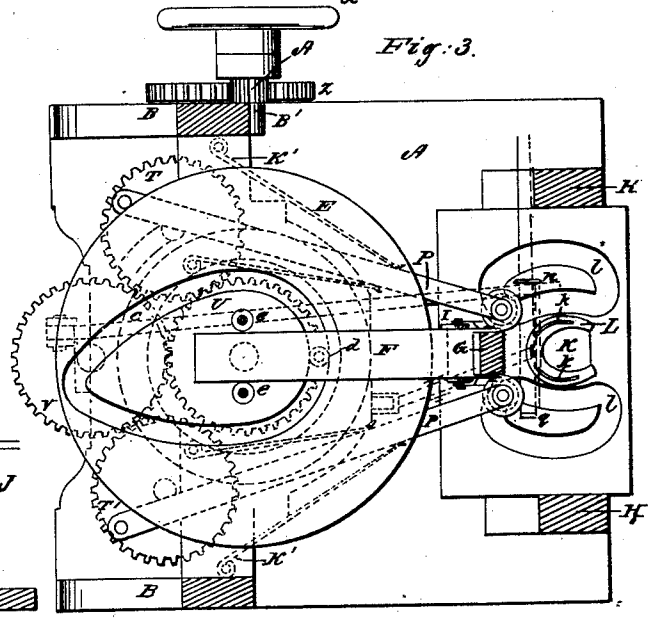


Fig: 3.



N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

T. H. RUSSELL, OF NORTHFIELD, AND AMOS MORRILL, OF STRAFFORD, VERMONT.

HORSESHOE-MACHINE.

Specification of Letters Patent No. 21,779, dated October 12, 1858.

To all whom it may concern:

Be it known that we, T. H. RUSSELL, of Northfield, in the county of Washington, and AMOS MORRILL, of Strafford, in the county of Orange, State of Vermont, have invented a new and Improved Machine for Making Horseshoes; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a longitudinal vertical section of our invention. Fig. 2 is a transverse vertical section of ditto, taken in the line *x*, *x*, Fig. 1. Fig. 3 is a horizontal section of ditto, taken in the line *y*, *y*, Fig. 1.

Similar letters of reference indicate corresponding parts in the several figures.

This invention consists in the employment or use of two lateral forming rollers, a vertical pressure roller and an adjustable or movable former and die, the whole being arranged and operated as hereinafter fully shown and described, whereby the desired work, to wit, the making of horse shoes, is performed at one operation, the shoes being made directly from the bar without any manipulation on the part of the operator or attendant except the feeding of the bar to the machine.

To enable those skilled in the art to fully understand, construct, and use my invention, I will proceed to describe it.

A, represents a bed or platform on which two uprights B, B, are placed and secured, one at each side. The uprights B, B, are connected by cross ties C, D, is a vertical shaft the lower end of which is stepped in the bed or platform A midway between the two uprights B, B, as shown at *a*, see Fig. 1, said shaft having a bearing *b*, on the central cross tie C. On the upper end of the shaft D, a circular disk E, is placed and this disk has an elliptical groove *c*, made in its upper surface eccentrically and forming a curve or eccentric for operating a horizontal bar F, which has a friction roller *d*, attached to its under side, said roller fitting in the groove *c*. The bar F works between two guide rollers *e*, *e*, which are attached to the under side of the upper cross tie C, and one end of said bar is connected by a joint *f*, with a bar G which is fitted between curved uprights H, H, attached to the bed or platform, said bar having an oblong slot *g*, through its upper end through which slot a pin *h*, passes. The bar G also has two roller *i*, *i*, attached to it, one on each side, and these rollers bear against the under sides of curved blocks *j*, *j*, attached to the uprights H, H. The form of the blocks *j*, is clearly shown in Fig. 1. The lower end of bar G has a roller I, fitted in it said roller working on a bed J and over a former K, and female die L.

The die L is formed precisely like a horse shoe and in fact gives the proper form to the shoes made by the machine. The die is formed by sinking into a steel bar, which is fitted in the bed J, a recess of the desired horse shoe form, said recess having projecting ledges *k*, to form the creases in the face side of the shoes, said creases receiving the nail heads, see Fig. 3. The central space formed by the die L is occupied by the former K which is made of the precise form of the space between the sides and front of the die L and is formed on the upper end of a quadrilateral bar, which is allowed to rise and fall freely so that the former may, at the proper time, be projected above the surface of the die L, and then be depressed so as to be flush with the upper surface of the bed J. The former K rests on a spring N—as shown clearly in Figs. 1 and 2—said spring having a tendency to keep the former in an elevated state.

In the upper surface of the bed J, and at each side of the female die L an endless groove *l*, is made. These grooves are of irregular form as shown clearly in Fig. 3, and their sides which adjoin the female die L approximate in form to the sides of the die. This will be clearly understood by referring to Fig. 3. O, O, represent rollers which are fitted and work in the grooves *l*, *l*. These rollers are attached to the outer ends of bars P, P, Q, Q are rollers which are placed on the same axes as the rollers O, O. The rollers Q Q however are larger in diameter than the rollers O and have a flanch *m*, at their upper edges as shown clearly in Figs 1 and 2. The rollers O are mere friction rollers, the rollers Q, Q, are forming rollers and their particular operation will be hereinafter described. On the same axes but above the rollers, Q, Q, rollers R, R, are placed, and these rollers fit and work in endless grooves *u*, *u*, which correspond in form to the grooves *l*, *l*. The grooves *n*, *n* are made in the under side of horizontal plates S, S, which are attached to the uprights H, H, and directly over the bed J, so that

the grooves l, l, n, n, will be in line with each other see Fig. 2.

The inner ends of the bars P, P, are attached to gear wheels T, T¹, near their edges. One wheel T is driven directly from a wheel V, on the shaft D, and the other T¹ is driven from said wheel through the medium of a wheel V, in order that the wheels T, T¹ may be rotated in opposite directions. This will be understood by referring to Fig. 3. On the lower part of the shaft D, a bevel wheel W, is placed, and this wheel gears into a corresponding bevel wheel X, which is placed on the inner end of a shaft Y, the outer end of which has a spur wheel Z, on it which wheel gears into a pinion A¹ on the driving shaft B¹.

To the under side of the disk E, an annular ledge C¹ is attached. This ledge has a recess o, made in it and the ledge performs the office of a cam actuating a vertical bar D¹ which has a bar E¹, attached to it—the bar E¹ being pivoted at one end, to an upright p; and the opposite end having the vertical bars q, r attached to it at a suitable distance apart. The bar q, may be made adjustable by any proper arrangement so that the distance between it and the bar r may be varied or regulated as desired. The upper parts of the bars q, r, work through the bed J and the bar r, at its upper end is made of hook form and has a cutting edge s, as shown clearly in Fig. 1. The bar E¹ rests on a spring F¹ attached to the bed or platform A, said spring having a tendency to keep the bars q, r, elevated so that their upper ends will be above the bed J.

F¹ is a vertical bar or rod which passes through the inner part of the die L. This rod is pivoted at its lower end to the outer end of a lever G¹ which works on a fulcrum pin t, in an upright H¹, on the bed or platform A. The inner end of the lever G¹, is pivoted to a vertical bar I¹ the upper end of which, by means of a spring n under the inner end of lever G¹, is made to bear against the under side of the disk E at the outer side of the ledge C¹, and to the under side of said disk adjoining the ledge C¹ an inclined or beveled projection J¹, is attached which projections at times actuates the bar I¹.

At each side of the bars P, P, there are placed springs K¹ which are clearly shown by dotted lines in Fig. 3. The operation is as follows. The horse shoes are made from bars of a proper size, and a bar shown in red is properly heated at one end, and the machine being put in operation by means of power applied to the shaft B¹, the operator thrusts the bar below the knife s, of bar r, and shoves the bar along until it is stopped by the bar q which performs the office of a stop—at this moment the bars q, r, are forced down, in consequence of the prominent part of the ledge, C¹ forcing down the bar D¹. As the bar r descends, its knife s, cuts off from the bar the part included between the bars q, r. As soon as the bars q, r, are fully depressed the rollers O, R, are moved forward by the wheels T, T¹ in the inner sides or parts of the grooves l n, said grooves serving as guides to the rollers O, R and causing the rollers Q, Q as they move forward to bend the bar around the former K, which projects above the die L. Where the rollers Q, Q, have reached the end of their outward movement the rollers O, R, are forced around the short outer curve of the grooves by the innermost springs K¹ and the bars P, P, move backward. Just previous however to the backward movement of the rollers Q, Q, the roller I, is moved forward through the medium of the eccentric groove e, in the disk E, and the bar F, and the roller I forces the bent bar down into the die L the former K being depressed in consequence of the resistance of spring N being overcome by the pressure of the roller I. The roller I, travels over the upper surface of the die plate and compresses the bar snugly into the die L giving the bar the proper or desired shape the blocks j, serving as bearings to allow the necessary pressure and the slot g, allowing the bar G, to rise and fall. The roller I, now moves backward with the rollers Q, Q, but with a quicker movement and the roller has a greater stroke so as to retire back of the rollers Q, Q, when the latter are at the end of their back movement. See Fig. 1. When the roller I passes off the die and the finished shoe thereon, the bar F¹ is thrown upward in consequence of the projection J¹ striking the bar I¹ and the bar F¹ throws the shoe from the die. By this time the operator has the bar reheated and inserts its end into the machine as before the bars q, r rising at the proper time, in consequence of the recess o, in the ledge C¹ passing over the top of the bar D¹. When the heated end of the bar is adjusted in the machine, the bars q, r, again descend the knife s cuts off the pieces and the operation is repeated. The eccentric groove e, in the disk has one end of semi-circular form so that the roller I, will be kept stationary at the end of its inward stroke or movement, while the rollers Q, Q move forward to bend the piece of bar around the former K.

We are aware that formers have been previously used and also forming or pressure rollers, for similar or analogous purposes as herein described, but we are not aware that a movable former arranged with lateral forming rollers and a vertical pressure roller and female die have been used, and so operated as to form the simple and efficient machine herein shown and described. We therefore disclaim all the above named parts

when separately considered and irrespective of arrangement, but,

Having thus described our invention, we do claim as new, and desire to secure, by Letters Patent,

1. The movable former K, lateral forming rollers Q, Q arranged with the guide rollers, O, R, and grooves, *l*, *l*, *n*, *n*, the vertical pressure roller I, and the female die L when combined and arranged for joint operation substantially as and for the purpose set forth.

2. We further claim the particular arrangement of the roller bar G, to wit, having said bar provided, with the rollers i^1, i^1, which bear against blocks *j*, *j*, attached to the uprights H, H, and having the pin *h*, pass through an oblong slot *g*, in the upper part of the bar, substantially as and for the purpose set forth.

T. H. RUSSELL.
AMOS MORRILL.

Witnesses:
JUSTIN S. MORRILL,
PHINEAS WALKER.