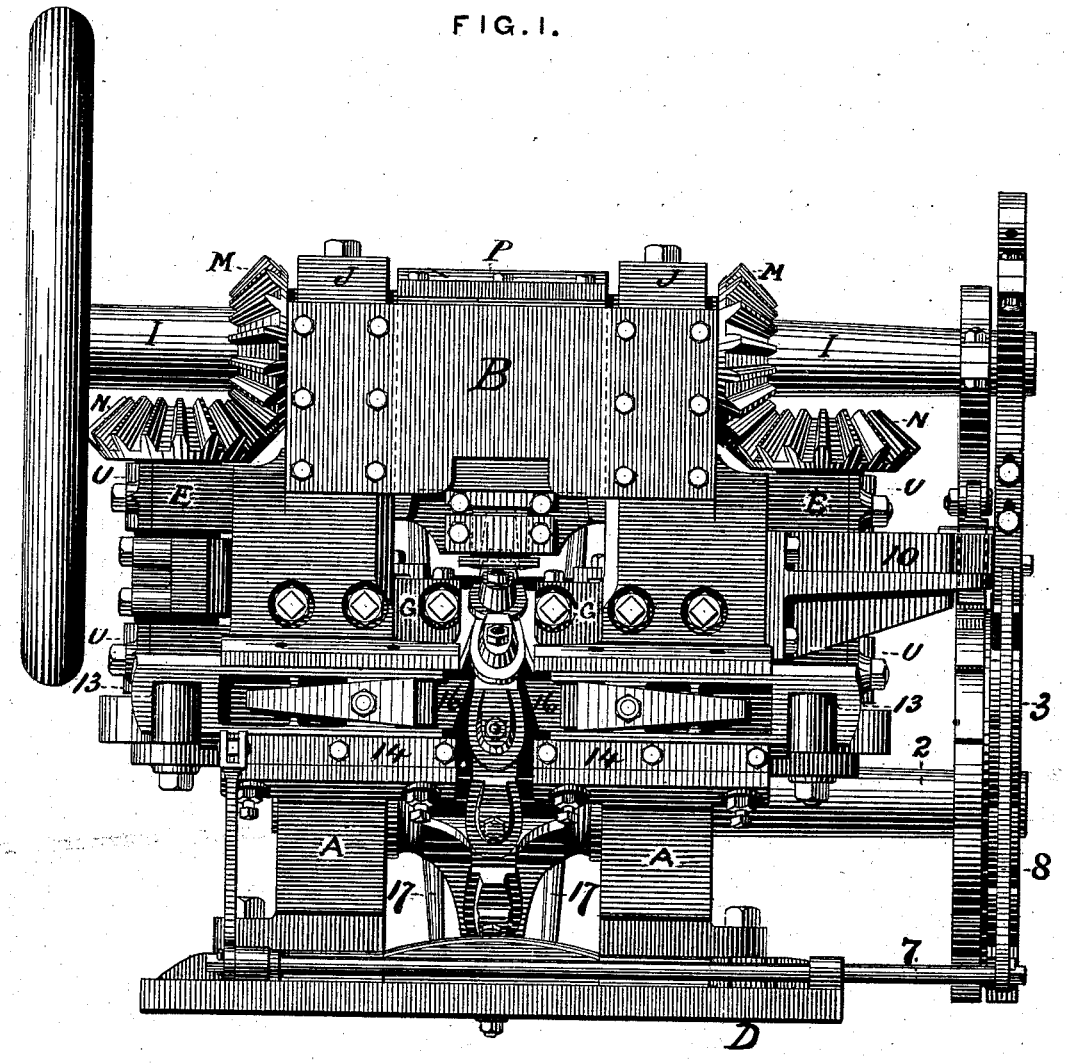
5 Sheets—Sheet 1.

J. A. BURDEN.

Machine for Making Horse and Mule Shoes.

No. 216,828. Patented June 24, 1879.

FIG. 1.



WITNESSES.

John L. Arts.

Elisha Foote

INVENTOR

Jas. A. Burden

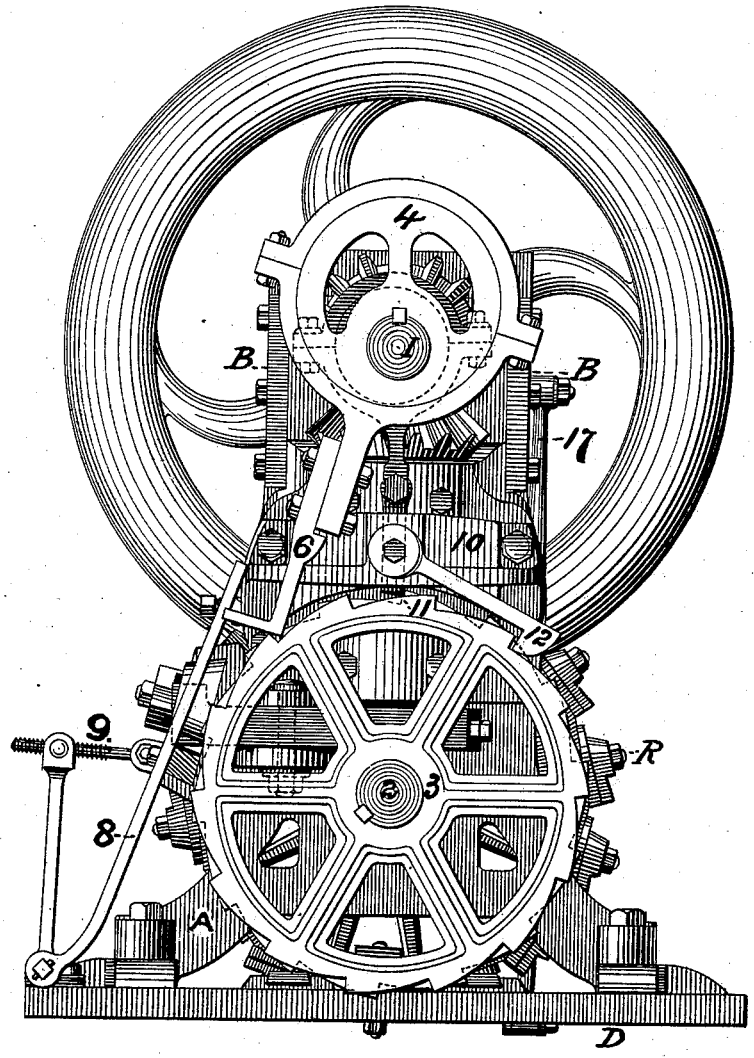
5 Sheets—Sheet 2.

J. A. BURDEN.

Machine for Making Horse and Mule Shoes.

No. 216,828. Patented June 24, 1879.

FIG. 2.



WITNESSES.

John L. Arts.

Elisha Foote

INVENTOR.

Jas A. Burden

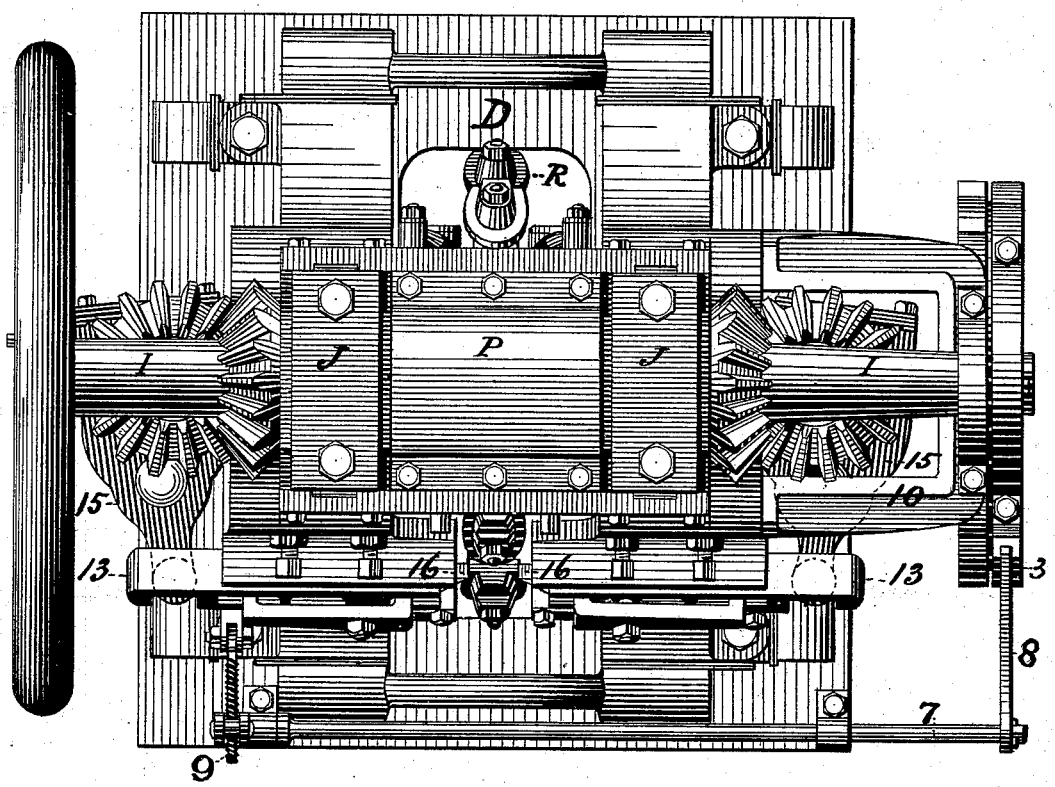
5 Sheets—Sheet 3.

J. A. BURDEN.

Machine for Making Horse and Mule Shoes.

No. 216,828. Patented June 24, 1879.

FIG. 3.



WITNESSES.

John L. Mrts.

Elisha Foote

INVENTOR.

Jas A. Burden

J. A. BURDEN.

Machine for Making Horse and Mule Shoes.

No. 216,828. Patented June 24, 1879.

FIG. 4.

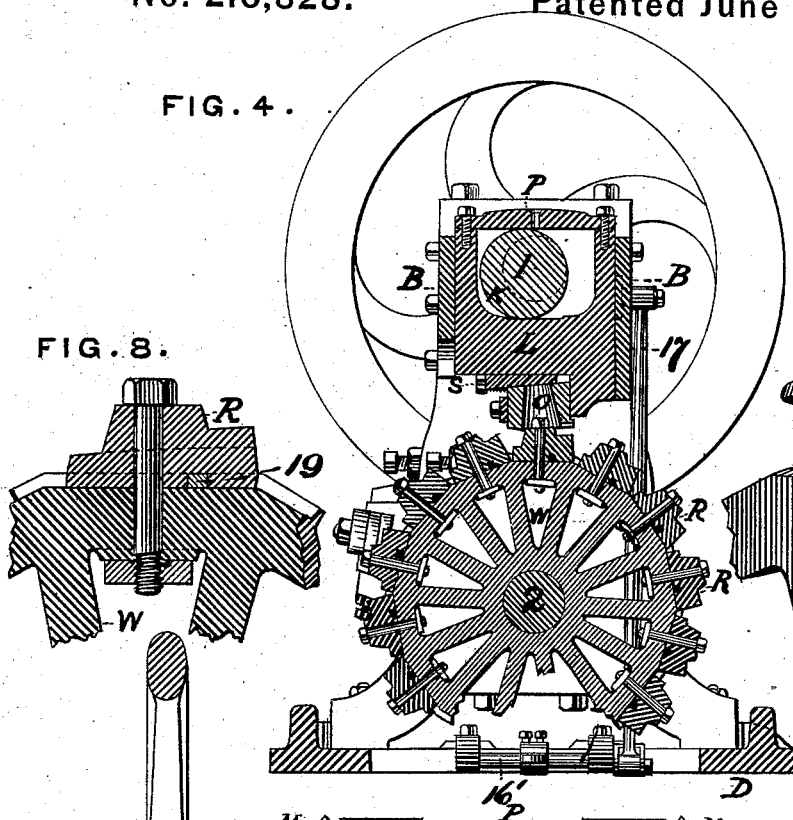


FIG. 8.

FIG. 9.

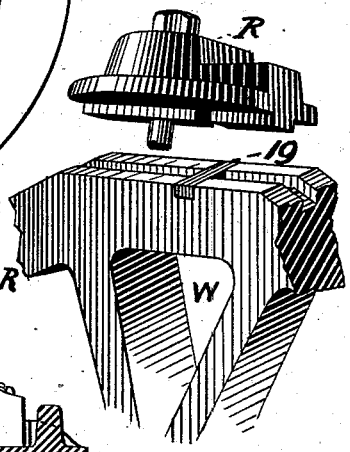
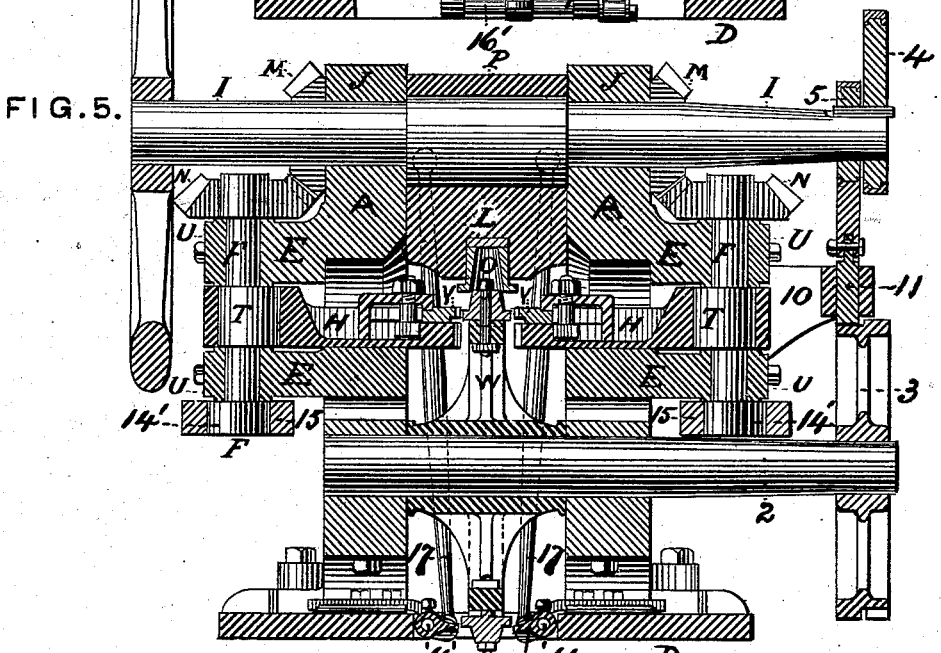


FIG. 5.



WITNESSES.

John L. Betts.

Elisha Foote

INVENTOR.

Jas. A. Burden

J. A. BURDEN.

Machine for Making Horse and Mule Shoes.

No. 216,828. Patented June 24, 1879.

FIG. 6.

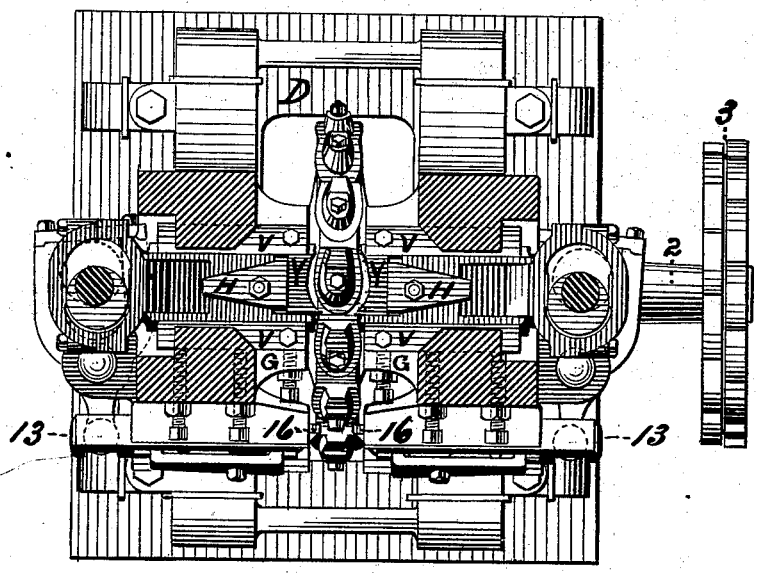
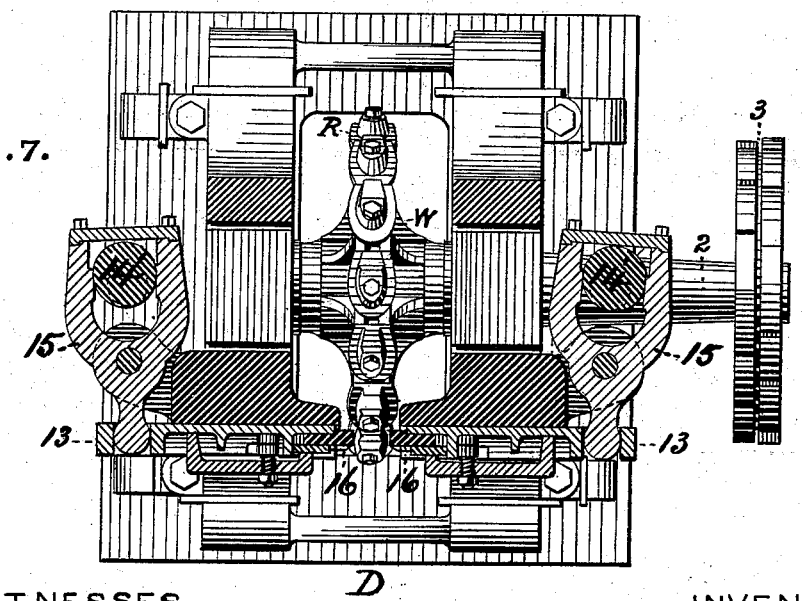


FIG. 7.



WITNESSES.

John L. Wirts.

Elisha Foote

INVENTOR.

Jas A. Burden

UNITED STATES PATENT OFFICE.

JAMES A. BURDEN, OF TROY, NEW YORK.

IMPROVEMENT IN MACHINES FOR MAKING HORSE AND MULE SHOES.

Specification forming part of Letters Patent No. **216,828**, dated June 24, 1879; application filed October 28, 1878.

To all whom it may concern:

Be it known that I, JAMES A. BURDEN, of Troy, in the county of Rensselaer and State of New York, have made Improvements in Machines for Making Horse and Mule Shoes, of which the following is a full and exact description.

My invention relates to certain improvements that I have made in a machine for swaging or finishing horse and mule shoes for which Letters Patent were granted to me on the 25th day of January, 1876, and numbered 172,604.

The annexed drawings represent the whole machine with the improvements attached.

Figure 1 is a front view; Fig. 3, a top view; Fig. 2 a view from one of the sides. The other figures are in part sections that will be explained hereinafter.

The frame, the plunger, the top die, and the side dies, and all the means of holding and actuating such dies, are substantially the same as those shown in my said patent, to which reference is made.

The great wheel W, to which the lower dies are attached, is also substantially like the similar one described in said patent; but the devices for moving or advancing it are quite different. One end of its shaft 2 is made to project out beyond the side of the frame, as shown in Fig. 5, which is a vertical section through the middle of this and the shaft I above it, and on this end is attached a double ratchet-wheel, 3, Figs. 1, 2, 5, 6, and 7. This may be cast in one piece or in two, and placed in juxtaposition and bolted together. They are of the same diameter and have the same number of teeth, alike in every respect, except that they face in opposite directions. By means of one the great wheel is propelled; by the other it is stopped and held from advancing when in proper position. The main shaft I also projects beyond the side of the frame, and carries upon its end two eccentrics. The outer one, 4, actuates a pawl, 6, which, acting against a tooth of the outer ratchet, advances the great wheel the distance that the dies upon it are apart, as shown in Fig. 2. In connection with this is a catch, 12, Fig. 2, which drops over the face of a tooth at the end of its movement, and holds the great wheel from any backward movement when the pawl is retracted. There is also a torsional spring, 7, with its stem 8, bearing against the pawl to hold it in contact with the ratchet-wheel. A screw, 9, regulates its tension.

The inner eccentric, 5, operates a stop, 11, which has its bearing in a casting, 10, screwed to the side of the frame, and in this it is fitted to slide up and down as moved by the eccentric. Its motion is such that it rises up out of the way when the great wheel starts to move forward, then it drops down, and the face of the inner ratchet strikes against it to arrest the great wheel and hold the same while a shoe is being swaged by the top and side dies.

This making of two opposing ratchets in one wheel, or in two in juxtaposition, I believe to be new, and it has advantages in the arrangement and construction of the machine, and will often be advantageous in other machinery.

Another improvement consists in a device for thickening the heels of shoes after they have been bent, swaged, creased, and punched.

In my machine for which said letters patent were granted the shoe, after being formed, creased, and punched, is submitted to the operation of dies, by which the creases and holes are narrowed and the contour of the shoe improved.

I find that the effect is much improved by using rods of greater width and less thickness than those I formerly used, and then upsetting and thickening the heels as the final part of the process. In this mode of proceeding the rods for shoes are rolled to a shape a little thicker than that required for the toe, and the machine spreads the toe no more than what is necessary to give it a small increase of width and a proper bevel on the inside, and the thickness at the heel is given by swages after the shoe has been otherwise completed.

On the front ends of each of the sides of the machine are cast and fitted ways for the slides 13 13, which are dovetailed into them. A plate, 14, makes the lower bearing of the slide, and this, by screws in front and on the under side, may be adjusted to proper tightness. These slides are represented by the front view, Fig. 1, and by the horizontal section of them, Fig. 7. The dies are held in these slides by

caps and screws, one leg of which caps bears on the slide, the other on a plate that rests on the die, and these, with packing behind each die, serve to adjust their positions. The motions of these slides may be seen from Fig. 7.

The two vertical shafts F F, Fig. 5, extend down below their bearings E E, and carry the eccentrics 14′ 14′. A lever, 15, has one end forked to embrace the eccentric, and the other end fits in an orifice in the slide and imparts to it the movement produced by the eccentric. By these means, at the same time that the upper and side dies are brought up against one shoe, the dies 16 press against the heels of another, upset the iron, and give to the shoe its finished shape and appearance.

In several machines heretofore made the rod has been compressed and upset to thicken the heels of shoes; but it has been done in the earlier stages of the manufacture, either before or immediately after the bending of the shoe.

My improvement consists in making it the final operation after the shoe has been creased and punched, whether or not the creases and holes have been partially closed, as described in my said former patent.

Another improvement consists in a device for taking the shoe from the machine after it has been finished.

At the bottom of the machine are two shafts, 16′ 16′, Figs. 4 and 5, running lengthwise of the machine, one on each side of the lowest die on the great wheel, and having bearings attached to the bed-plate, that may be adjusted by sliding in dovetail grooves therein. On the rear end of each of these shafts is a crank, the pitman 17 of which extends upward, and is attached to the plunger through slots in the plate B. The movement of the plunger thus gives a reciprocating motion to the shafts. At about the middle of each is attached by a set-screw a wiper, 18, that is up when the die is in motion; but when it has stopped it sweeps down across its edges and takes the shoe off onto a carrier below.

In machines heretofore in use the shoe has been removed by scrapers thrust in between the shoe and the die on which it rests. This often bends the shoe and otherwise defaces its surface.

My improvement removes the difficulties. The two wipers at about the middle of the shoe move downward, and remove it without the least injury.

Another improvement consists in the manner of securing the lower dies on the periphery of the big wheel. These dies have heretofore been liable to work loose by the wear of the bolt which held them to their places.

My improvement is shown in Figs. 8 and 9. Across the channel into which the rib on the bottom of the die is fitted I place a bar, 19, let into the sides, and a corresponding portion of the rib is cut away to fit over it, so that when the die is fastened down in place by the bolt the rib against the sides of the channel and the bar against the sides of the recess hold it firmly against any displacement.

What I claim as new in the above-described machinery, and desire to secure by this patent, is as follows:

1. The double ratchet-wheel 3, as above described.

2. As an improvement in the art of making horseshoes, the order herein named of thickening and shaping the heel portions of the shoe—namely, after the operations of bending, creasing, and punching have been performed.

3. As an adjunct to the process of partially closing the creases and holes in shoes, as described and claimed in my said patent of January 25, 1876, supplementing the operations therein set forth by the operation of dies that impart additional thickness and otherwise give shape to the heel portions of the shoe, as set forth.

4. The combination, with the series of revolving dies and the co-operating vertical and lateral edge-compressing dies, of the heel thickening and shaping dies, as herein set forth.

5. The oscillating wipers 18 for removing the shoes from the dies, substantially as set forth.

6. The bar 19 across the channel, jointly with the corresponding recess in the rib of the die, to hold it from displacement, substantially as described.

JAS. A. BURDEN.

Witnesses:
JOHN L. ARTS,
MICHL. P. CANTWELL.