3 Sheets—Sheet 1.

D. J. & S. FARMER.

Machine for Making Horseshoes.

No. 243,536. Patented June 28, 1881.

Fig. 1.

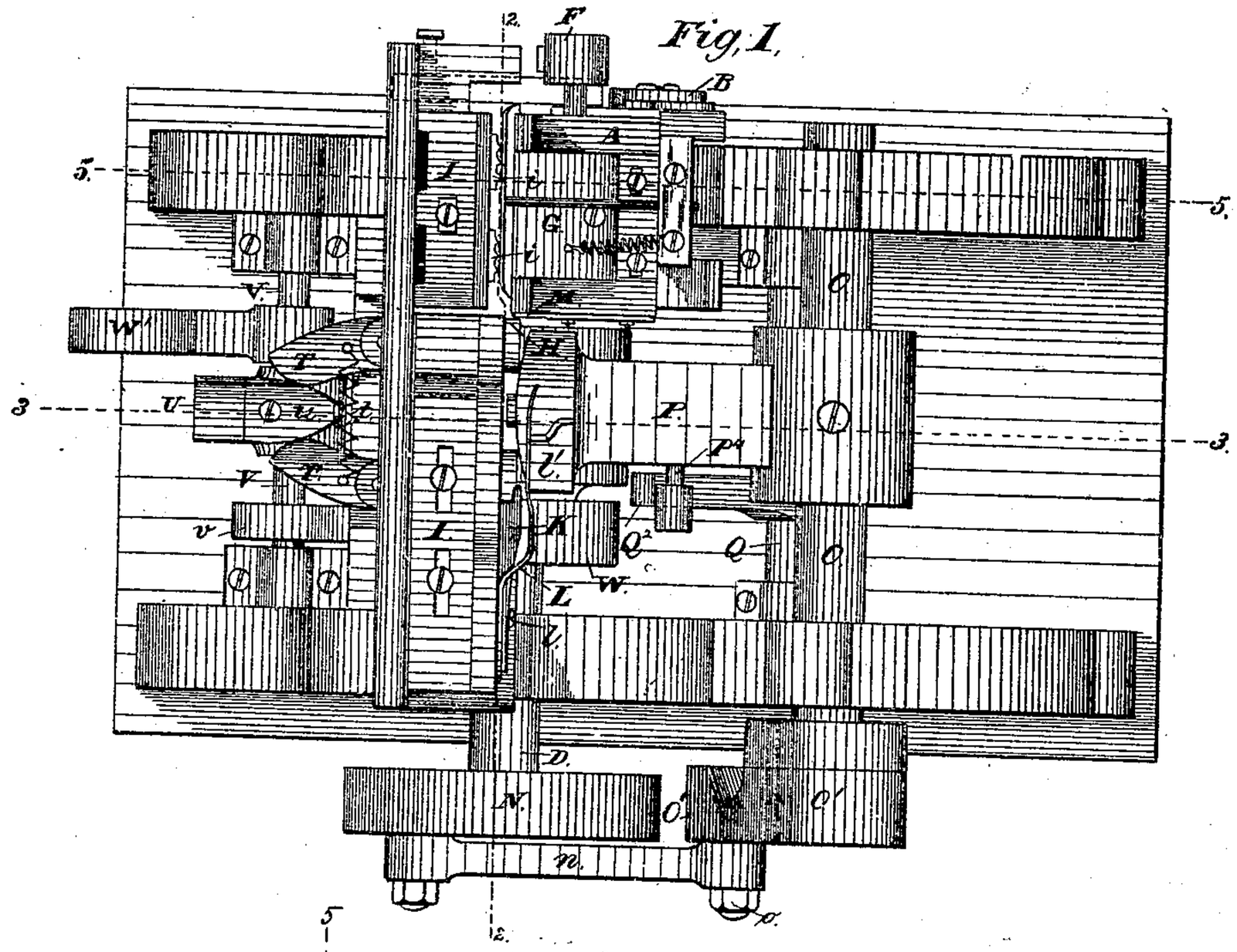
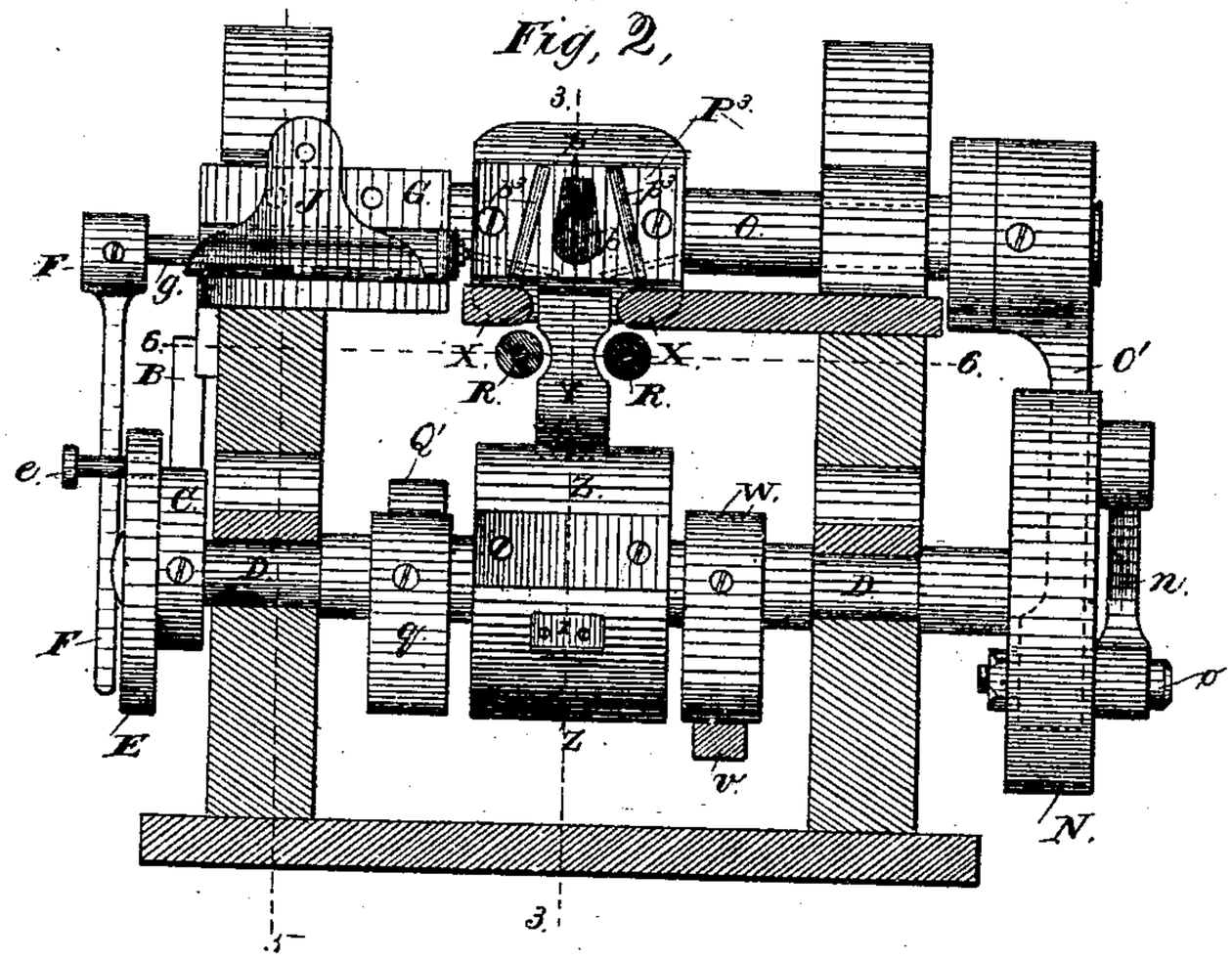


Fig. 2.



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3 Sheets—Sheet 2.

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Fig. 3.

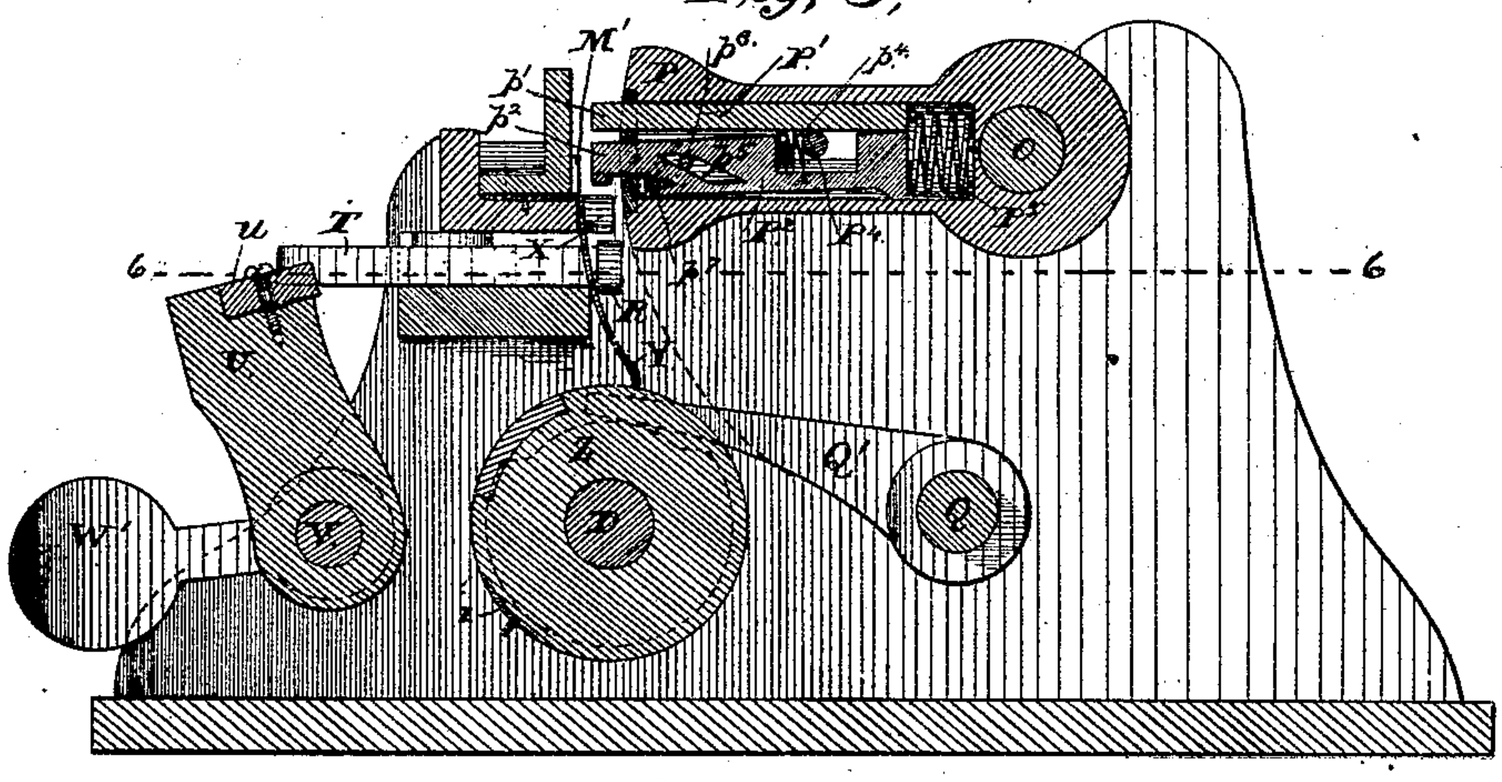

Fig. 4.

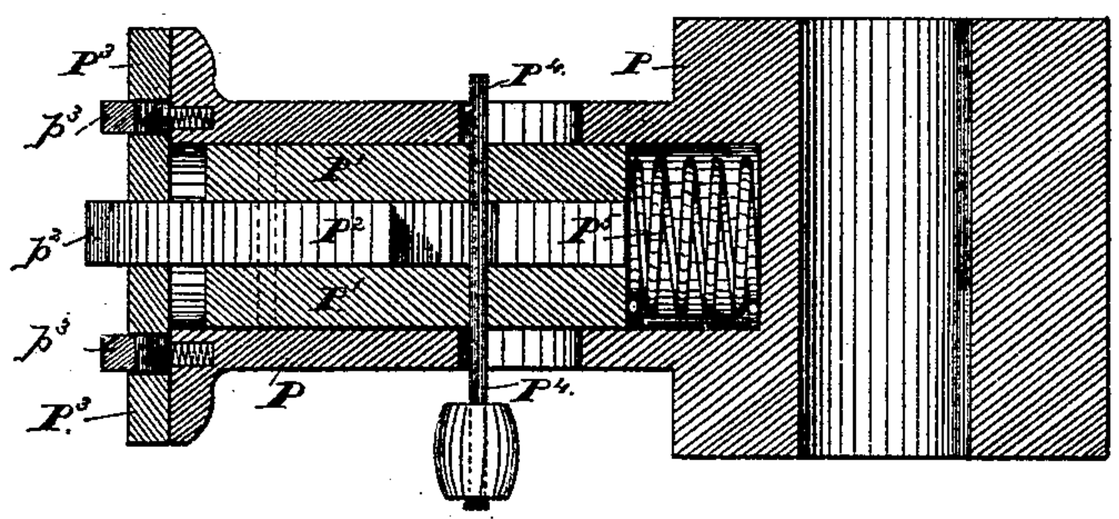

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Fig 6,

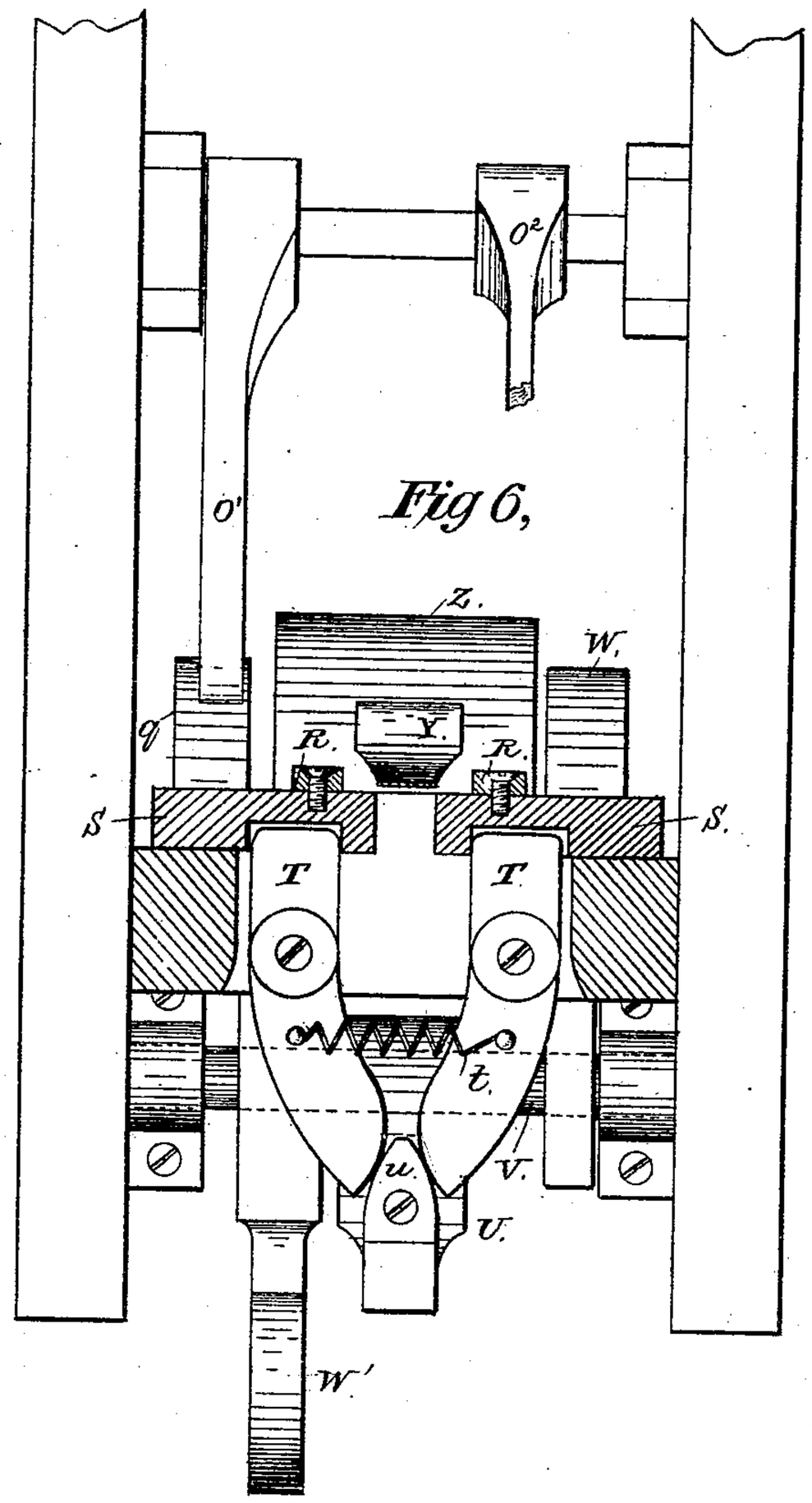
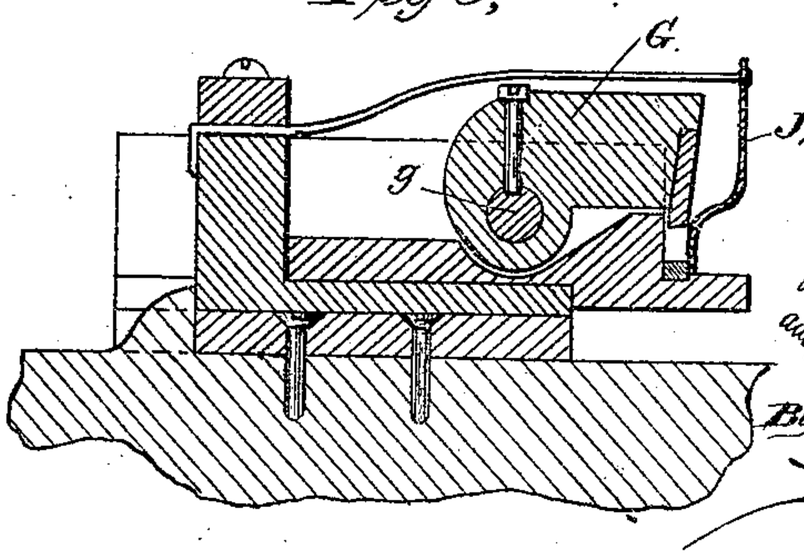


Fig 5,



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UNITED STATES PATENT OFFICE.

DAVID J. FARMER AND SAMUEL FARMER, OF PENN YAN, NEW YORK.

MACHINE FOR MAKING HORSESHOES.

SPECIFICATION forming part of Letters Patent No. 243,536, dated June 28, 1881.

Application filed February 3, 1879.

To all whom it may concern:

Be it known that we, DAVID J. FARMER and SAMUEL FARMER, both of Penn Yan, in the county of Yates and State of New York, have invented certain new and useful Improvements in Horseshoe-Machines, of which the following is a specification.

The subject of our invention is a machine adapted to manufacture horeshoes complete from the bar by a preliminary forming operation with a sliding swage and subsequent bending around a former carried by an oscillating arm between the benders and against the face of a pressure-roller.

The construction and operation of our machine will be clearly understood from the following description, in connection with the accompanying drawings, in which—

Figure 1 is a plan of the machine. Fig. 2 is a vertical section on the line 2 2, Fig. 1. Fig. 3 is a transverse vertical section on the line 3 3, Figs. 1 and 2. Fig. 4 is a longitudinal section of the die and former on a larger scale. Fig. 5 is a vertical section on the line 5 5, Figs. 1 and 2. Fig. 6 is a horizontal section on the line 6 6, Figs. 2 and 3.

The preliminary shaping of the portion of the bar which is to form a blank is performed by a slide, A, actuated by a vertical lever, B, to which motion is imparted by a cam, C, on the main shaft D. The same shaft carries a disk, E, on which is a stud or tappet, *e*, acting at each revolution on a lever, F, which depends from the shaft *g* of the swaging-jaw G, beneath the face of which a sufficient length of the bar is fed to form a shoe of the required size. A preliminary gage may be employed in beginning on each new bar, the said preliminary gage being moved out of the way after the preliminary shaping of the first unsevered blank, after which the feed is gaged by the last preliminarily-shaped blank, which is in position to be severed and bent, as will be presently understood. The horizontal motion of the slide A carries the face of the unsevered blank against creasers *i*, mounted adjustably in a stock, I, and on the return motion it is retracted by a stripper, J, which also serves as a guide in the first introduction of the bar and assists in holding it on edge in correct position. The preliminary shaping having been effected and the preliminary gage moved out of the way, the bar is fed in until its end comes in contact with the adjustable gage K, to which it is guided by a plate, L, hinged at *l*, and having a projecting arm, *l'*, to cause it to be raised out of the way of the oscillating former, as hereinafter described. The next impulse of the machine (which performs the preliminary shaping and creasing of the part of the bar from which the next blank is to be formed) now severs the first blank by means of a knife, M, attached to the side of slide A and acting against a stationary knife, M', on the frame.

At the opposite end from the disk E the shaft D carries a crank-wheel, N, connected by a rod, *n*, with an adjustable wrist, *o*, on an arm, O', which is thus made to impart an oscillating motion to its shaft O and to the former-arm P, which is keyed thereon and carries a former, $P'P^2$, consisting of two connected members, the construction and operation of which are best shown in Figs. 3 and 4. The ends p' p^2 of the respective parts P' P^2 of the former constitute the form around which the shoe is bent; and to this end they are made to project beyond the convex face of the die P^3 on the end of the former-arm P during the downward or active stroke of said arm, and to recede within the die during the upward or return stroke. This longitudinal retiring motion of the former, which is necessary to effect the discharge of the shoe and to permit the former-arm to pass the new blank in its upward stroke, is produced by a graduating-cam, *q*, on the shaft D, acting on an arm, Q', on a shaft, Q, from which projects obliquely upward a curved arm, Q^2, engaging with a stud or pin, P^4, projecting from the part P' of the former, and rigidly attached thereto through a slot prepared for it on the side of the former-arm. A spring, P^5, within the former-arm presses the connected former P' P^2 forward in opposition to the pressure of the arm Q^2, and a spring, p^4, placed between the pin P^4 and shoulder on the lower member, P^2, of the former, presses said member forward relatively to the upper member, P'.

Near the forward end of the lower member, P^2, is an oblique slot, p^5, through which passes a pin, p^6, fixed in the upper member, P'. The effect of this pin and slot is to cause the pro-

jecting extremities of the parts P′ P² to be expanded as the upper member, P′, moves forward, and to be drawn together as it moves backward relatively to the lower member, P². An adjustable stop, p^7, coming in contact with the inner side of the die-plate P³, limits the forward movement of the part P², so that a continued forward motion of the upper part, P′, will cause the expansion or separation of their ends.

On the face of the die-plate P³ are a pair of loose jaws, p^3 p^3, pivoted at one end and pressed outward by springs to form sides for the die box or chamber within which the shoe is compressed. The free ends and the outer edges of these hinged jaws are beveled, so that the jaws will recede automatically to permit the blank to pass within or between them during the bending operation. They also recede to pass the new blank on the upward movement of the former-arm. On the descent of the former-arm the blank receives a preliminary bend by the contact of its lower and outer edge with stationary lugs or ledges d' projecting from the face of the frame. The bending is completed by rollers R R mounted in horizontal slides S S, which are moved in and out by levers T T, the rear ends of which are drawn together by a spring, *t*, to retract the rollers, and are forced apart by a wedge, *u*, on the extremity of an arm, U, keyed on a shaft, V, and turned gradually by a cam, W, on the main shaft acting on an arm, *v*, on the shaft V at the proper period, and to the necessary extent to cause the rollers R R to be forcibly pressed against the partially-bent blank, and, by following around its outer edge and forcing it against the former, to complete the bending of the blank as it is carried down between said rollers by the former. The side jaws, p^3 p^3, of the die then spring out to keep the heel of the shoe from expanding, and the shoe, being thus held between the jaws p^3 p^3 and form p' p^2, is conducted by the guide-plate Y to the surface of the final pressure-roll Z upon the main shaft. The compression of the shoe between the roll Z and die-plate P³ causes a displacement of metal, which is provided for by the gradual contraction of the two parts p' p^2 of the form, caused by an inward movement of the upper member, P′, of the former, produced at the proper moment by the cam acting through the arm Q′ and shaft Q on the arm Q². This movement finally carries the extremity of the former p' p^2 completely within the die P³ to permit the discharge of the finished shoe, which is effected by a drag-plate, *z*, on the pressure-roll Z. A weighted arm, W, retracts the wedge *u* when the rollers R R are to be allowed to recede.

Operation: The iron is made in bars and fed into the machine in a heated state. The rod or bar first enters the machine to a sufficient length for the first blank, which is then creased and swaged. A second impulse given to the iron carries the length of iron representing a blank up to the second gage, K, and in position for the action of the former. The second blank on the bar is then, by the action of the machine, creased and swaged, and the first blank is at the same time cut from the bar. The former or oscillating arm comes up in position and carries down and bends the first blank, first over the stationary steel pieces, and, as it proceeds downward, between the forming-rollers, which completes the bending of the shoe. After leaving the rollers the oscillating arm carries the shoe to meet the revolving die or roll, which flattens out the shoe to the desired thickness, when the shoe is completed. After the first blank on the bar is introduced to the former a shoe is produced at each revolution of the main shaft until the bar is worked up.

We have described the shoe being bent or formed in the downward movement of the oscillating arm; but the shoe may be bent in the upward movement of the arm.

We have shown a machine with one arm, P, for compressing and swaging the blank, and with the lower part of the swage stationary; but, if found desirable, the lower part may be made to move simultaneously with the upper jaw or arm, P′.

We have not shown a feeder in the drawings; but it will be understood that suitable mechanism—either rolls or other well-known feeding devices—may be applied to the machine if found desirable.

Having thus described our invention, the following is what we claim as new and desire to secure by Letters Patent:

1. The combination of the sliding swage A, the swaging-jaw G, the creasers *i*, and the stripper J, substantially as and for the purpose set forth.

2. The combination of the oscillating former P, benders X, gage K, and the pivoted guide-arm L, as and for the purposes set forth.

3. The combination, in a horseshoe-machine, of an oscillating arm, P, carrying a die and former for bending the shoe, pressure-rolls Z, creasers *i*, cutters M, and benders X R, substantially as and for the purpose described.

4. The oscillating arm P, carrying jaws p^3 p^3, pivoted at one end so as to recede out of the way during the bending operation, in combination with a roll, Z, for pressing the shoe while confined between said jaws, as described.

5. The combination, with the die P³, of an internal former made in two parts, p' p^2, contractile during the pressing operation, to permit the widening of the toe of the shoe, as described.

6. A sliding former constructed in two parts, so combined that the outward movement of the rear part moves the front part forward away from the rear part, and the inward movement of the rear part retracts the front part, as described.

7. The combination of the cam *q*, connected arms Q′ Q², and sliding former P′ P², substantially as and for the purposes set forth.

8. The combination, with the oscillating arm P, carrying the forming-die P^3, of the compressing-roll Z, provided with a drag, *z*, for removing the shoe from the face of the die in case of sticking.

9. In a horseshoe-machine, the combination of the oscillating arm P, having a die and former for bending the shoe and carrying it for compression, benders for bending the iron edgewise to the former, the revolving die or compressing-roll Z, and the crank-wheel, connecting-rod, and arm for communicating motion from the oscillating arm to the rotary compressing-die, all substantially as herein set forth.

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SAMUEL FARMER.

Witnesses:
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A. H. JESSUP.