J. A. HOULIHAN.

Apparatus for Shaping Cutters.

No. 211,908. Patented Feb. 4, 1879.

Fig. 1.

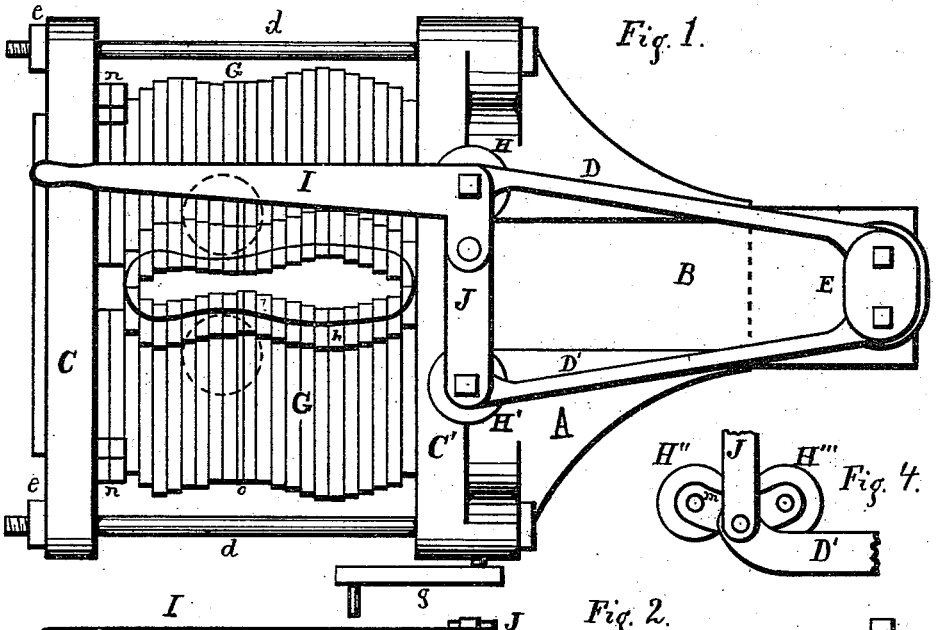


Fig. 4.

Fig. 2.

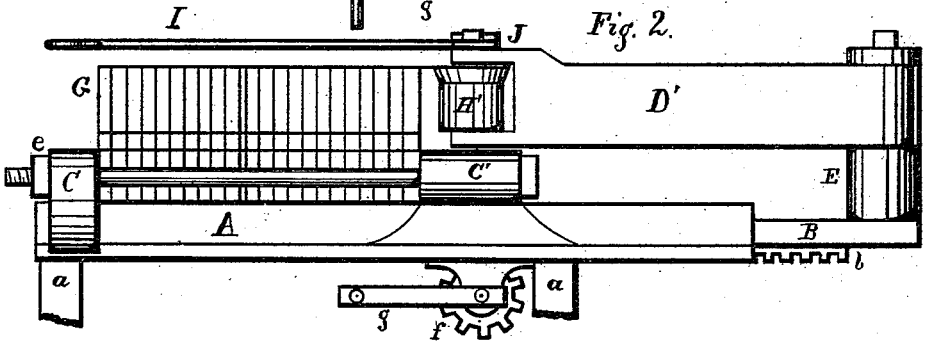


Fig. 3.

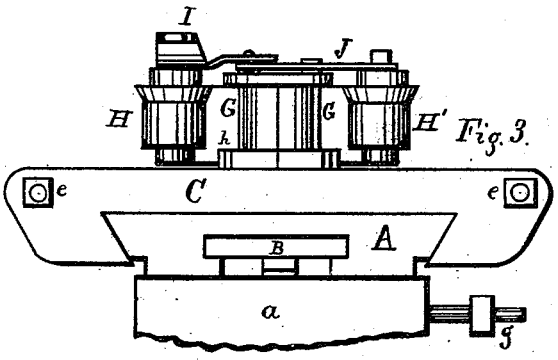


Fig. 5.

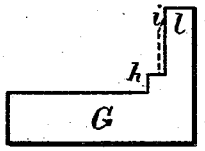
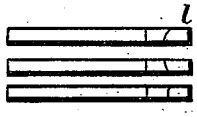


Fig. 6.



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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN APPARATUS FOR SHAPING CUTTERS.

Specification forming part of Letters Patent No. **211,908**, dated February 4, 1879; application filed August 16, 1878.

To all whom it may concern:

Be it known that I, JOHN A. HOULIHAN, of the city of Rochester, in the State of New York, have invented an Improvement in Machines for Shaping Dies, of which the following is a specification:

My invention relates to an improvement in machines for shaping the dies used for cutting boot and shoe soles, and for other similar purposes.

It consists in an adjustable former or die-shaping device composed of a double series of pieces of flat metal, secured against each other side by side by pressure in an inclosing-frame, so arranged that their projecting ends, made of suitable shape, may be adjusted to form any desired shape of die.

It also consists in the combination, with the said adjustable die-forming device or die-shaper, of one or more pressure-rollers, arranged to traverse along the sides of the shaping device, and operating, by pressure, to cause the blank or unformed die to take the form of the shaper.

It also consists in the combination, with the traveling pressure-rollers, of a lever and link, by which the rollers are caused to press the blank-die into the desired form against the die-shaper while traveling along the same.

It also consists in the general mechanical construction and arrangement of the machine, as hereinafter described.

In the ordinary mode of manufacturing dies for boot and shoe soles by hand, the stock, of the proper thickness of metal, beveled on one edge, is cut off, and the ends welded together of the right length to form a die of the desired shape, after which the blank is forged into the proper form by repeated heating and hammering, a portion at a time, over the horn of an anvil. The die is then ground and tempered and is ready for use.

My invention is intended to dispense with the repeated heatings and forgings of this process, and to form a completely-shaped die at one operation.

In the accompanying drawings, Figure 1 represents a plan view of my improved die-shaping machine. Fig. 2 is a side view, and Fig. 3 an end view, of the same. Fig. 4 shows a modified form of the pressure-rollers; and Figs. 5 and 6 are, respectively, side and plan views of the metallic plates composing the die-shaping device.

A A represent the top plate of the machine, which is supported on a suitable frame, partly shown at *a a*, Figs. 2 and 3. My improved die-shaping device is represented in plan view in Fig. 1. It is composed of a series of metallic plates, shaped as shown at G in Figs. 5 and 6. These plates are arranged upon the plate A of the machine, which affords them a support, in two series, with the projecting ends *l*, Figs. 1 and 5, toward each other. The plates are held in any desired position by the inclosing-frame composed of cross-bars C C′ and rods *d d′*, and nuts *e e*, being readily adjustable within the frame by slacking the nuts *e e*. The outside edges of the projecting ends *l* of the plates are shaped, as shown in Fig. 6, on curves differently inclined with the length of the plates, so that when all the plates are assembled together, each plate in its proper position, they will collectively constitute a die-shaped former, as shown in Fig. 1.

By using plates with edges of different curves any desired form may be made. The plates may be of any thickness consistent with strength, but I prefer to make them about one-quarter of an inch in thickness.

A shoulder upon the outside edge of the projection *l* supports the metal of the die-blank during the process of forming, said shoulder being either the main body of the plate or a raised portion thereof, as shown at *h*, Fig. 5.

In the manufacture of dies with a bevel on the inside, the plates which compose the shaper should have their outside edges slightly inclined outward, in which case, before removing the die, it would be necessary to loosen the plates in the inclosing-frame.

When it is desired to form a die shorter than the whole length of the die-shaper, some of the plates are reversed in position, as shown at *n*, Fig. 1. To make the series of plates adjustable to suit any length of die, one or more thinner plates may be used—*o*, Fig. 1.

Pressure-rollers H and H′, Fig. 1, are provided, for the purpose of causing the die-blank to conform to the shape of the former. The mode

which I have adopted of causing these rollers to travel along the sides of the die-shaper is as follows: Underneath the top plate of the machine a slide, B, Figs. 1 and 2, provided with a rack, *b*, is caused to travel backward and forward by the pinion *f*, moved by the crank *g*. At the outer end of the slide B a standard, E, affords support to two pivoted arms, D and D′, reaching inward and carrying at their inner ends the pressure-rollers H and H′. A bent hand-lever, I, is pivoted to the inner end of the swinging arm D, and is connected to the inner end of the arm D′ by means of a link, J. By this arrangement the two rollers H and H′ are forced toward each other.

By rotating the crank *g* and operating the hand-lever I, the rollers H H′ are caused to travel backward and forward along the sides of the die-shaper with any desired pressure, one position of the rollers being shown by dotted lines in Fig 1.

The upper ends of the rollers H and H′ should be enlarged and of a conical shape, as shown in the drawings, when the stock to be worked is beveled on the edge, as represented in dotted lines at *i*, Fig. 5.

From the foregoing description the operation of my improved die-shaping machine will be readily understood. The plates composing the die-shaper are arranged relatively to each other in their proper positions, and so as to conform to the desired shape, and secured in position by screwing up the nuts *e e*. The metal of which the die is to be formed is then cut off and welded together of the proper length, and heated and placed on the die-shaper. The die-blank is then shaped by the pressure of the rollers H and H′, which traverse backward and forward and press the metal of the die-blank into the form of the shaper. The pressure of the rollers upon the sides of the die-blank, in shaping the die, draws the metal into close contact with the ends of the die-shaper, thereby forming the heel and toe of the die.

I do not intend to confine myself to a machine of the exact form shown in the drawings annexed hereto, as it is evident that the mechanical parts of my machine may be altered in various ways without departing from the principle of my invention. Thus, instead of making the pressure-rollers travel longitudinally along the sides of the die-shaper, the die-shaping device itself may be arranged to travel between the rollers, supported on transverse slides or on pivoted arms, and operated by a lever or a spring.

One or more cams or eccentrics may be used to secure the requisite pressure upon the plates of the die-shaper, and various equivalent mechanical devices may be substituted for the pinion *f*.

As it rarely happens in practice that two dies are required of the same form, the advantages which my adjustable die-shaper possesses will be readily seen.

I claim—

1. The die-shaping device composed of the double series of adjustable plates G G, the end plates of the series being rounded to form the heel and toe, and the whole arranged together in the form of a die for boot and shoe soles, and secured within an inclosing-frame by pressure, substantially as described.

2. The combination of the die-shaping device composed of a double series of adjustable plates, G G, arranged and shaped in the form of a die for soles, and secured by pressure within an inclosing-frame, and the traveling pressure-roller H, substantially as set forth.

3. The combination of the adjustable die-shaper, traveling pressure-rollers H and H′, lever I, and link J, substantially as described.

4. The combination of the adjustable die-shaper, lever I, link J, pressure-rollers H and H′, pivoted arms D D′, slide B, and rack and pinion *b* and *f*, substantially as set forth.

5. The combination of the two series of plates, die-shaped on their projecting ends, with the top plate A, cross-bars C C′, and rods *d d′*, substantially as set forth.

JOHN A. HOULIHAN.

Witnesses:
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