

J. C. RICHARDSON.

Machines for Rolling Sword-Blades.

No. 143,094.

Patented September 23, 1873.

Fig 1.

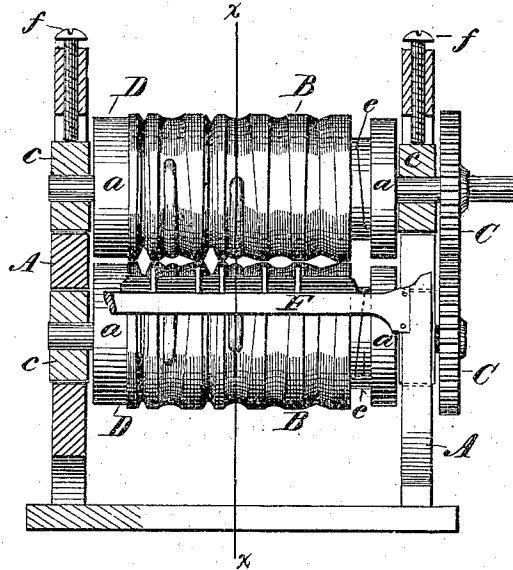
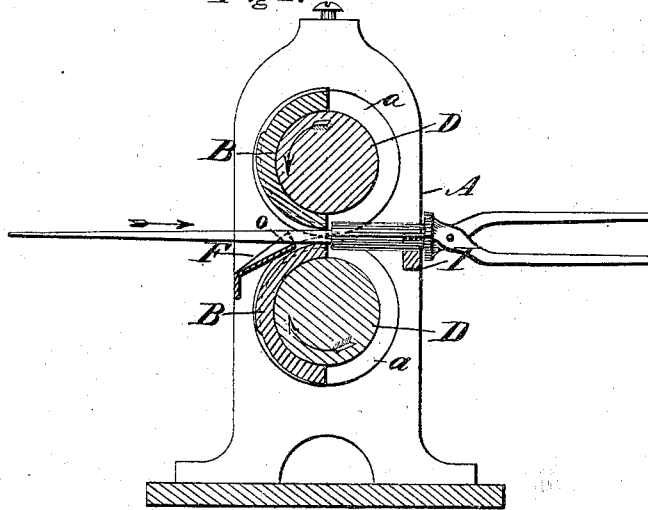


Fig 2.



Witnesses.

Harry King.
Wm. H. Henderson

Inventor.

J. C. Richardson.
by Dodge & Son
Atty

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Fig 3.

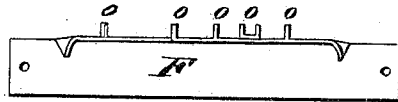


Fig 4.

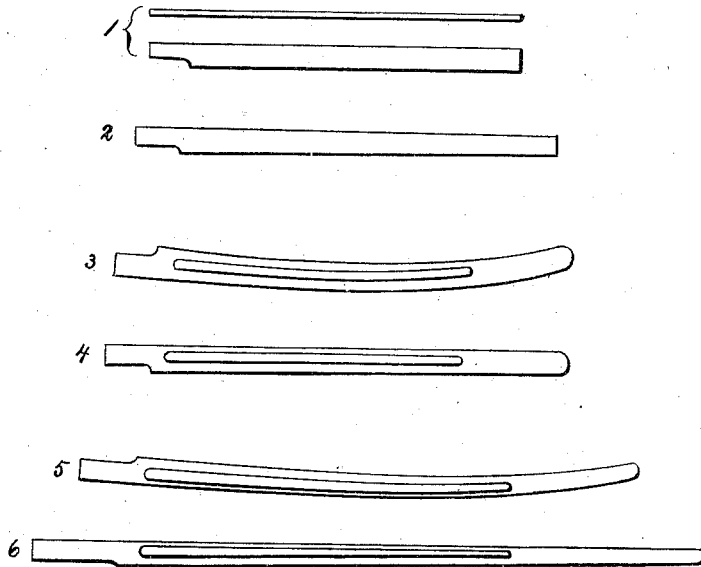
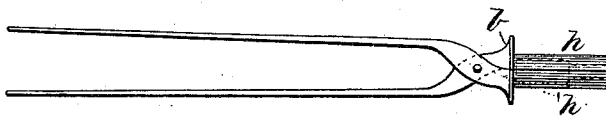


Fig 5.



Witnesses.

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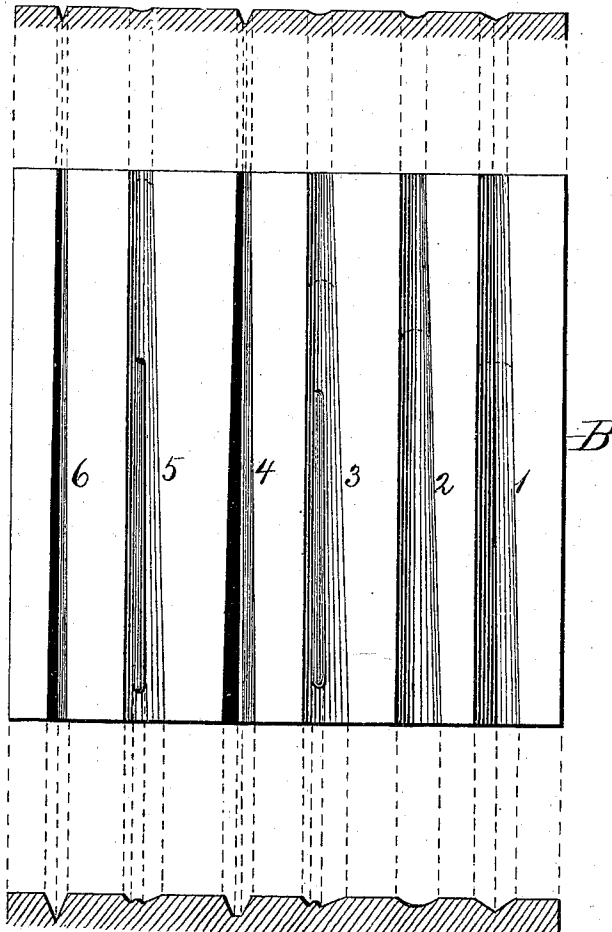
J. C. RICHARDSON.

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Fig 6.



Witnesses.

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Inventor.

J. C. Richardson
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UNITED STATES PATENT OFFICE.

JULIUS C. RICHARDSON, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF HIS RIGHT TO E. REMINGTON & SONS, OF ILION, N. Y.

IMPROVEMENT IN MACHINES FOR ROLLING SWORD-BLADES.

Specification forming part of Letters Patent No. **143,094**, dated September 23, 1873; application filed June 2, 1873.

To all whom it may concern:

Be it known that I, JULIUS C. RICHARDSON, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain Improvements in Machines for Rolling Sword-Blades, of which the following is a specification:

My invention relates to a peculiar suit or system of drawing and shaping grooves mounted on a pair of rolls for rolling or drawing the blades, as hereinafter explained.

Figure 1 is a rear elevation of the rolls, showing the dies thereon ready for use. Fig. 2 is a transverse vertical section on the line *x* of Fig. 1. Fig. 3 is a face view of the guide-plate detached. Fig. 4 represents the blade in its several stages during the process of construction. Fig. 5 is a view of the gage-tongs used; and Fig. 6 represents the suit of grooves reduced to a plane, and also in sectional elevation.

The object of the present invention is to forge or roll a sword-blade into the required form from a blank at a single heat, and thus facilitate and cheapen their manufacture. In order to accomplish this result I use a pair of rolls, *D*, on which are mounted a pair of dies, *B*, as shown in Figs. 1 and 2. These dies extend but part way around the rolls, as shown in Fig. 2, so that during a portion of the revolution of the rolls there will be an open space between them to permit the blank to be thrust through between the rolls. The dies may be formed by cutting the grooves in the projecting portion of the rolls themselves; or they may be formed of separate pieces of the proper curvature, and then securely fastened upon the rolls by keys *e*, as shown in Fig. 1, or in any suitable manner. The grooves are six in number, though they may be varied, if desired, and their form is represented in Fig. 6, where they are numbered from 1 to 6, consecutively, each of the dies being a duplicate of the other, and being so arranged that the larger end of the grooves shall be opposite each other when mounted on the rolls, as shown in Fig. 1. Groove No. 1 is of *V* form, as shown in Fig. 6, while No. 2 is of an oval or concave form. No. 3 is of *V* shape, but has one side more inclined

than the other, for the purpose of making the blade thinner on the edge than on the back; and in the bottom of this groove for half or two-thirds of its length is a raised rib or projection for the purpose of forming a longitudinal depression in the blade. Grooves Nos. 4 and 6 are simply *V*-shaped, but are narrower and deeper, as shown in Fig. 6, they being used for rolling the edge and back of the blade to straighten it, and to make the two edges even and true. Groove No. 5 is in form like No. 3, and differs only in size, it being shallower, and having the raised projection or rib somewhat longer. This groove No. 5 is the exact counterpart of the blade when completed. To the frame, on each side of the rolls, I secure a transverse bar or guide, as shown in Figs. 1 and 2. The bar *I* on the front is provided with a series of notches, arranged to be exactly in line with the series of grooves, and which serve as rests or guides in which the tongs are placed with the blank, in order to have it in the proper position to enter the grooves at the instant the dies reach it in their revolution, the tongs (shown in Fig. 5) being provided with a shoulder, *b*, which rests against the front of the bar, as represented in Fig. 2, by which means the blank is always inserted to the exact distance required. The bar *F* on the back side of the rolls has a series of small vertical projections, *o*, as shown in Fig. 3. They are so arranged in relation to the grooves of the dies as to hold the blank in line therewith on that side, and thus prevent the blank from bending sidewise to any great extent, as it otherwise would when passed through those grooves, which roll it thinner on one edge than the other. The projections *o* also serve as guides to keep the blank in the grooves. The upper roll is mounted in adjustable boxes *C*, and set-screws *f* are arranged to adjust it, as is usual in this class of machines.

The operation is as follows: The blank No. 1 of Fig. 4 is first cut from a steel bar of the proper size, and preferably has the tang forged on it before rolling. The blank is then heated and seized with the tongs, the lips *h* of which are made concave on their inner faces, as shown by dotted lines in Fig. 5. When the

rolls are in such a position that their blank portions are opposite each other, the blank is thrust through the space between the rolls until the shoulder *b* of the tongs rests against the face of bar *I*, as shown in Fig. 2, where it is held until the dies come around and seize the blank, carrying it along with them back toward the operator, as indicated by the arrow in Fig. 2, the arrows upon the rolls also indicating the direction in which they revolve. The blank, being thus passed through grooves Nos. 1 and 2, will be elongated and thinned along its edges, assuming the form indicated by No. 2 of Fig. 4, when it is instantly thrust again through the space in line with groove No. 3, which will impart to it the form shown by No. 3 of Fig. 4, which, being curved edgewise, is straightened and made to assume the form shown by No. 4, by being turned on edge and passed through groove No. 4. It is then turned flat and passed through groove No. 5, which completes the rolling or forging of the blade; but which leaving it curved, as shown by No. 5 of Fig. 4, it is then passed edgewise through groove No. 6, which completes the operation, and leaves the blank in the form shown by No. 6 of Fig. 4.

It will be understood that these passes of the blank through the several grooves are made in regular order from the first to the last groove, and that a pass is made at each successive revolution of the rolls, thus enabling the entire operation to be performed at a single heating of the blank, by which there is effected

a great saving in time, labor, and expense over any method heretofore used for this purpose. It is, of course, not absolutely necessary that all the passes should be made at a single heating, but it is desirable; and in practice I find it perfectly practicable, the speed of the rolls being properly adjusted.

I am aware that a patent was granted in England to one Barnes, February 2, 1863, No. 296, for rolling bayonets and saber-blades; but in that case the dies contain grooves for rolling the sides only, and the blanks were held by a complicated sliding carriage. In that, also, the grooves, only four in number, are all of substantially the same form, and varying only in size, and the machine does not have the guides used in my machine. I am also aware that die-rolls have been used for a great variety of purposes; and I do not claim such broadly; but

What I do claim is—

1. The dies *B*, having formed in their faces the drawing and edging grooves, substantially as shown and described.

2. In combination with the dies *B*, having the grooves formed therein, as described, the stop-bar *I* and the guide-bar *F*, having the ribs or projections *o* thereon, all constructed and arranged to operate as and for the purpose set forth.

JULIUS C. RICHARDSON.

Witnesses:

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AD. HAUG.