(No Model.)

M. V. B. ETHRIDGE.

METHOD OF MAKING TAPERING WASHERS.

No. 331,045. Patented Nov. 24, 1885.

Fig. 1.

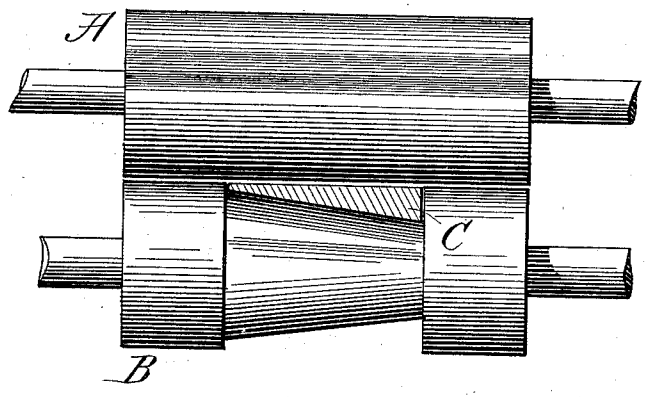


Fig. 2.

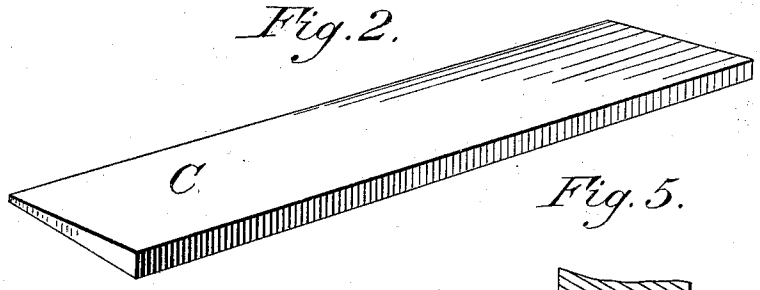


Fig. 5.

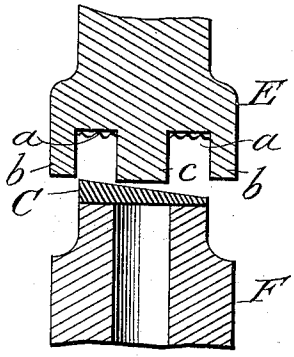


Fig. 3.

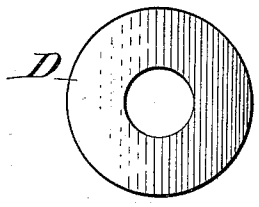


Fig. 4.



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UNITED STATES PATENT OFFICE.

MARTIN V. B. ETHRIDGE, OF BOSTON, ASSIGNOR TO HENRY E. WAITE, OF WEST NEWTON, MASSACHUSETTS.

METHOD OF MAKING TAPERING WASHERS.

SPECIFICATION forming part of Letters Patent No. 331,045, dated November 24, 1885.

Application filed July 16, 1885. Serial No. 171,755. (No model.)

To all whom it may concern:

Be it known that I, MARTIN V. B. ETHRIDGE, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Methods of Making Tapering Washers; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to an improvement in the process of making tapering washers, the object being to provide a method of making, by means of which tapering washers may be produced rapidly, cheaply, and in any number desired; and my improved process consists in rolling out or otherwise forming tapering bars of metal between rollers suitably constructed and arranged for the purpose, and then in stamping out the circular washers from these bars by means of any suitable stamping apparatus.

In another application for Letters Patent, filed previously to this and numbered 171,756, a tapering washer is described similar in form to those for the making of which this method is now proposed. This above-named washer is intended to be chiefly used, in combination with a slotted bolt and key, to form a fish-bar fastening, and by the method hereinafter described it is intended to make washers for use in this combination, although they will be equally well adapted for and may be used in any other branch of manufacture in which they are serviceable.

In order to represent mechanism through which my improved process may be carried out, I have hereunto annexed drawings, in which—

Figure 1 represents rollers for fashioning the tapered bars. Fig. 2 represents a completed bar. Figs. 3 and 4 are respectively a plan and a section of a completed washer, and Fig. 5 is a section of one form of punching apparatus.

The details of my method of making tapering washers are as follows: I first provide suitable means for rolling out the tapering bars, which, in the example of mechanism illustrated in the drawings, is shown to consist of two rollers, the one, as A, being cylindrical throughout, and the other, as B, having a conical portion of less diameter interposed between the remaining portions of the otherwise cylindrical roller in such manner that the conjunction of the two rollers A and B will leave a tapering aperture, which will give a tapering shape to the bars of metal which are passed through it. This is clearly illustrated in Fig. 1, where a bar is shown in section between the rollers. The completed bar is shown in Fig. 2. The bars in this condition are ready for the operation, by which the washers are to be punched from them, and this punching is effected by any ordinary suitable stamping apparatus, the only thing necessary being to cut off portions of the bar and to perforate these pieces so cut off with an aperture; but in order to further elucidate my process I have presented in Fig. 5 of the drawings one form of apparatus, which may be used to punch out the washer. This consists of the parts E and F. The tapering bar C is placed upon the lower portion, F, of the stamp or punch in such a manner that the beveled edge will form an angle with the portion E. Now, when the part E is driven downward the outer part of the punch will cut out the washer in circular form, and the inner part, *c*, will perforate the same with a central aperture; but it will be noted that the middle punch, *c*, extends downward slightly lower than the outer cutting portion, *b*, and hence engages the tapering bar C before the part *b* has descended far enough to meet it; and, further, this engagement with the bar does not take place all at once by the contact of two parallel surfaces; but one edge will begin to cut before the rest, as shown in Fig. 5, and hence the cutting out of the washers will be by means of a sort of shearing cut, both as regards the central aperture and the outer periphery of the washer. This mode of cutting is easier, neater, more rapid, and takes less power than were the or-

der of things reversed and the punching-dies compelled to meet the bar with its upper face lying horizontally and its lower at an angle to the part F.

It is evident that the washer may be of any shape—as square, rectangular, octagonal, circular, &c.—and the aperture in the same likewise be variable in size and position; but the form which I prefer is the circular form shown in the drawings, having a circular central aperture for slipping the washer over the bolt, and a circular washer may clearly be made by any circular stamp, and the circular hole in the middle of the washer may be similarly cut by any circular stamp.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

The herein-described method of making tapering washers, which consists of making tapering bars of metal and punching or stamping the washers from these bars, substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

MARTIN V. B. ETHRIDGE.

Witnesses:
CHAS. HALL ADAMS,
CHAS. F. BALDWIN.