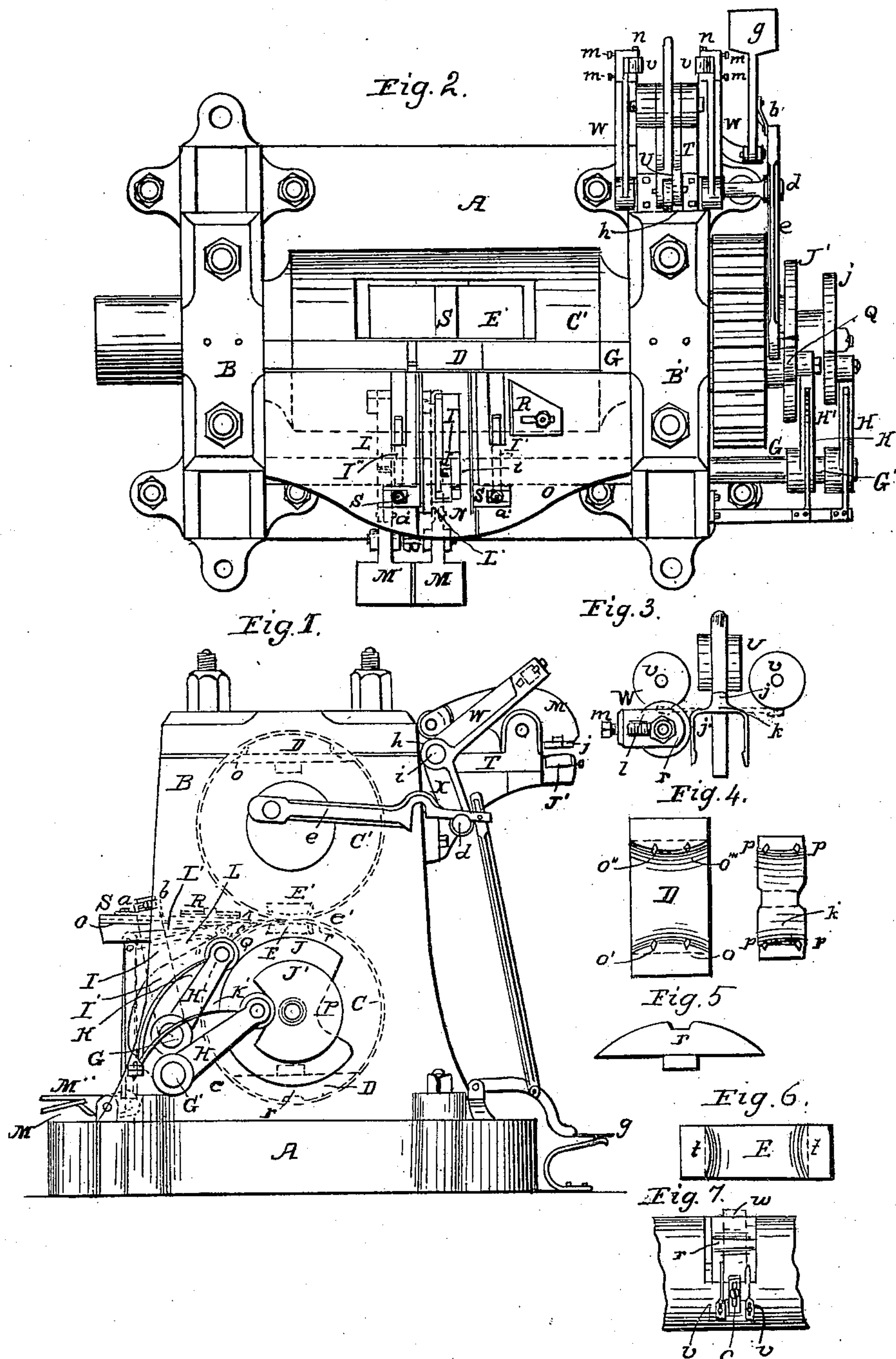


G. REYNOLDS.  
Making Axes.

No. 20,957.

Patented July 20, 1858.





# UNITED STATES PATENT OFFICE.

GEO. REYNOLDS, OF MANCHESTER, NEW HAMPSHIRE.

## MACHINE FOR MAKING AX-POLLS.

Specification of Letters Patent No. 20,957, dated July 20, 1858.

*To all whom it may concern:*

Be it known that I, GEORGE REYNOLDS, of Manchester, in the county of Hillsborough and State of New Hampshire, have invented certain new and useful Improvements in Machines for Making Ax-Polls, of which the following is a full and exact description, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1, is an end view. Fig. 2 is a top view with one half of roll C' removed and with die E' shown on top of roll C'. Fig. 3 is a front view of the bending device. Figs. 4, 5, 6, are views of my improved dies and Fig. 7 is a view of one of the dies on the under roll with two guide springs used in my improvement.

The same letters refer to like parts in all the figures.

The manufacture of ax-polls by machinery has for a long time been exercised and has consisted mainly in grasping a heated blank of iron in a pair of tongs and passing it through a pair of rolls to compress the metal into such a form that when the blank so rolled was doubled and the steel bit welded in, the eye would be in the proper place. Dies of a peculiar shape placed on the faces of a pair of rolls have also been used as described in the Letters Patent granted to David P. Estep Oct. 14, 1856.

By all the processes of making ax-polls now in use the services of experienced workmen are necessary to guide the blank accurately through the rolls, and a very considerable portion of the hand labor required in the manufacture has to be expended upon the heads of the ax-polls after they come from the dies or rolls in consequence of the bulging and irregular form into which the metal at that place is piled, besides too an examination of any ax manufactured by machinery by any other process than by the means herein described will show that in the center of the eye where the bit is welded into the poll an irregular canoe shaped seam exists owing to the irregular distribution of the metal by the rolls, it being necessary to make the eyes of all axes tapering from the ends toward the middle.

To make an ax-poll more expeditiously by saving the necessity of a great portion of the hand labor in finishing the head, now required as well as to cause the machine to

feed in its own blank with accuracy and certainty and thereby dispense with the necessity of skilled labor in this part of the manufacture are the objects of my improvements.

C and C' (Fig. 1) are two rollers of suitable size for the work required geared together having two dies keyed or otherwise fastened on the periphery of each. Two of these dies D, D'—one on each roll and working into each other are called "draw dies" and the other two E E' arranged in the same way are called "plating dies." Instead of forming the ends of D' on the upper roll and the ends of E on the lower roll at right angles to the sides as has heretofore been done I form them slightly curved as represented in Figs. 4 and 6, and furnish D' also with projections *o o' o'' o'''* (Fig. 4) by means of which the blank in its passage through the rolls is drawn out and the metal distributed at the ends in such a manner that when the poll blank is doubled the bit can be without difficulty welded into the poll and the eye be made of a perfectly true taper from the ends toward the center. I also form the bottom of the recess or groove in die D (Figs. 5 and 7 in which the head of the poll is formed, convex as represented at E, (Fig. 5) instead of making it flat as is now done—by means of which the iron is piled toward the edges of the head and a great amount of labor in hand forging thereby avoided. This same groove or recess, I also make slightly wider on one side of the die than on the other the effect of which is to distribute a greater proportion of metal upon the back side of the ax, or on the side opposite the side where the handle is first inserted, where it is desirable that it should be placed. The plating dies E E' it will be observed are double and plate both sides of the poll at one operation.

The rollers C C' being furnished with dies formed as I have described, they are made to revolve and a heated blank ready for working is first placed by the attendant on the platform between the two guides S, S, (Fig. 2) with which as well as with gage R the table is furnished. Treadle M is then depressed and lever I is in readiness to thrust the blank between the draw dies at the proper moment. As the operation of lever I and levers I' I'' are substantially the same, the first (I) being used to feed in the blank when it is to be drawn in the di-



rection of its fiber for the first operation in making the poll and the other pair (I' I'') to feed in the same blank to the plating dies in a direction at right angles to its fiber, I will describe them together.

G and G' (Fig. 2) are rock shafts upon which I, and I' I'', are respectively keyed having bearings in the frame B, B' or arranged in any other convenient way. H, H' are arms keyed to the ends of the rock shafts having a friction roller at their ends which pressing against the peripheries of two cams J J' placed upon the end of the shaft of one of the rolls as shown by means of the action of a spring or weight attached to each arm as K K', so long as the friction rollers bear against that portion of the cams (J, J') which is a true circle I, I' I'' cannot act upon the blank, but as soon as by the revolution of the cams the broken edge is presented the springs K, K' acting upon the rocker arms throw I, I' I'' forward and push the blank between the dies. It will be observed that as the cams J J' are capable of adjustment to any position on the shaft I, I' I'' can be made to act at any desired moment in relation to the revolution of the main rolls, and are prevented from acting at all when the treadles M M' are not depressed one of which (M) governs I and the other (M') governs I' I'' by means of a stop and catch arranged as shown in the drawings, (Fig. 2) which stop is thrown out of the range of the catch when the levers are depressed. The opposite ends of the treadle lever are counterweighted or by means of a spring under the treadle brought back to place when the foot is removed.

The blank of metal having passed through the drawing dies D D' as above described it is again seized and placed on the table or platform in front of the rolls at right angles to its former position the gage R (Fig. 2) having been first adjusted; treadle M' is then depressed and at the proper instant the levers or fingers I' I'' pass the blank between the plating dies and finish both halves of the ax poll at once. In connection with the guides S, S, and gage R I have also used with great advantage a pair of spring fingers placed in the back side of the roll as shown in Fig. 7, (v, v,) for the purpose of giving a true direction to the blank as it leaves the guides S, S. The next operation is the bending of the pole so that the portion which has been raised by the action of the recess or groove, r, described on the drawing die may form the head of the ax. To accomplish this I use instead of the means heretofore employed a pair of powerful compressing tongs or clamps,—Fig. 1—having a die upon each jaw of the form which it is intended the head of the ax shall be when finished—the lower jaw is stationary while the upper jaw works upon

a fulcrum pin and has the end of its longer arm furnished with a friction roller—u x (same figure) is the bent lever or wiper to which a vibratory motion is given at will by depressing the spring treadle, g, and causing the eccentric rod e to be hooked on the wrist pin d. On the shaft, i, of the wiper and directly under the friction roller is placed a projection, h,—having its face a true circle which projection or cam can be removed at pleasure and a thicker or thinner one substituted in its place so that the space between the dies j j on the jaws shall be accommodated to the thickness of the metal to be worked—or the dies themselves be removed and the same effect produced by substituting others of different size.

The ax poll having undergone the operations previously described is now placed between the jaws j j—the treadle is depressed—when as the rock shaft wiper—x, y, is put in motion, the projection, h, causes the dies on the jaws—j, j—to approach each other and grasp the ax poll with a firm grip—the wiper arms at the same time complete their motion and bend down the sides of the poll in the ordinary way, and when the wiper has returned to its first position the jaws relax their hold and the ax poll is ready to receive the bit.

I do not claim, broadly the method described of manufacturing an ax poll by compressing a bar of metal between dies or swages projecting from the face of the rolls in which they are set. Neither do I claim as new the use of a die provided with a groove or recess in which the head of the ax poll is to be formed, but

What I do claim as my invention and desire to secure by Letters Patent is—

1. The use of a drawing die D' provided with projections o o' o'' o''' or their equivalents substantially as described, so that the blank of metal when subjected to compression shall be thereby drawn out farthest at the corners—whereby the bit can be more completely welded into the pole and the eye of the ax in consequence be made more perfectly, as set forth.

2. I also claim making the lower die D with a recess or groove across its face of the form substantially as described, so that the metal which forms the head of the ax poll shall be thereby crowded toward the edges of the head instead of being piled into a ridge in the middle, and at the same time a greater proportion of metal be forced into the back of the head as and for the purposes specified.

3. I claim the combination of the feeding fingers I, I', I'' or their equivalents with one or more cams J, J', or their equivalents—so arranged and operated that at the proper moment of time the blank of metal can be by the machine automatically fed be-



tween the dies to undergo the several operations to which it is to be subjected—as described.

4. In combination with the dies or rolls  
5 an adjustable guide S, S, and gage, R either with or without the spring fingers *v v* Fig. 7 for the purposes specified.

5. The compressing clamp for holding the

ax poll and shaping the head of the ax during the operation of bending constructed 10 and operated in the manner and on the principle substantially as described.

GEORGE REYNOLDS.

Witnesses:

GEO. BELL,

B. P. CILLEY.