

(No Model.)

J. U. HUBBARD.
MACHINE FOR FORMING AX POLLS.

No. 427,689.

Patented May 13, 1890.

Fig. 1.

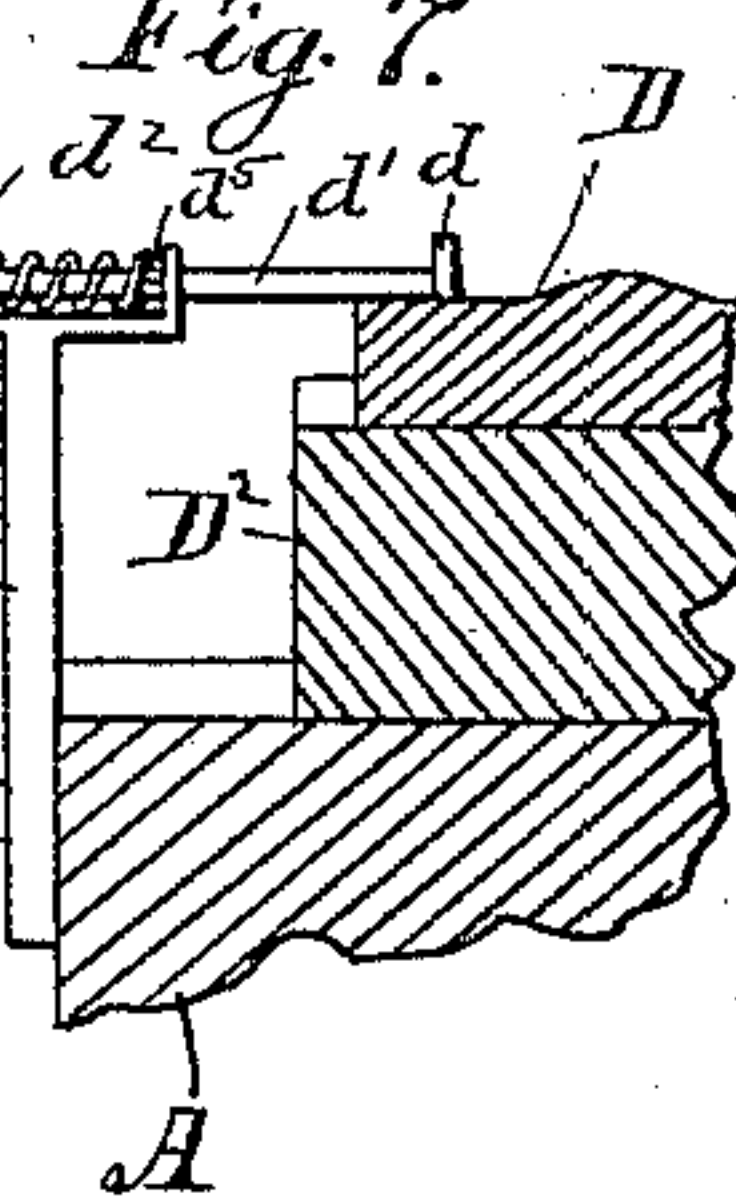
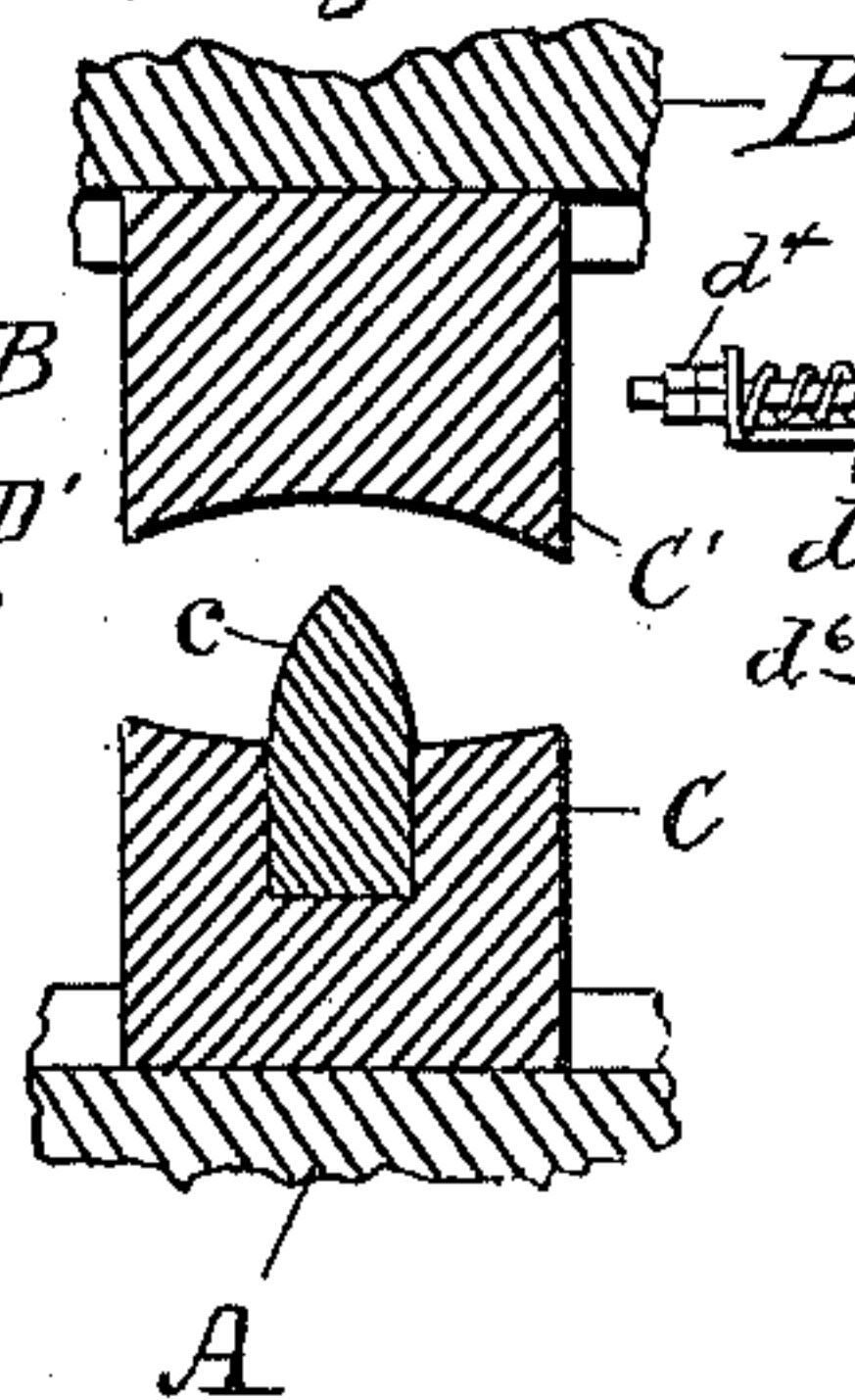
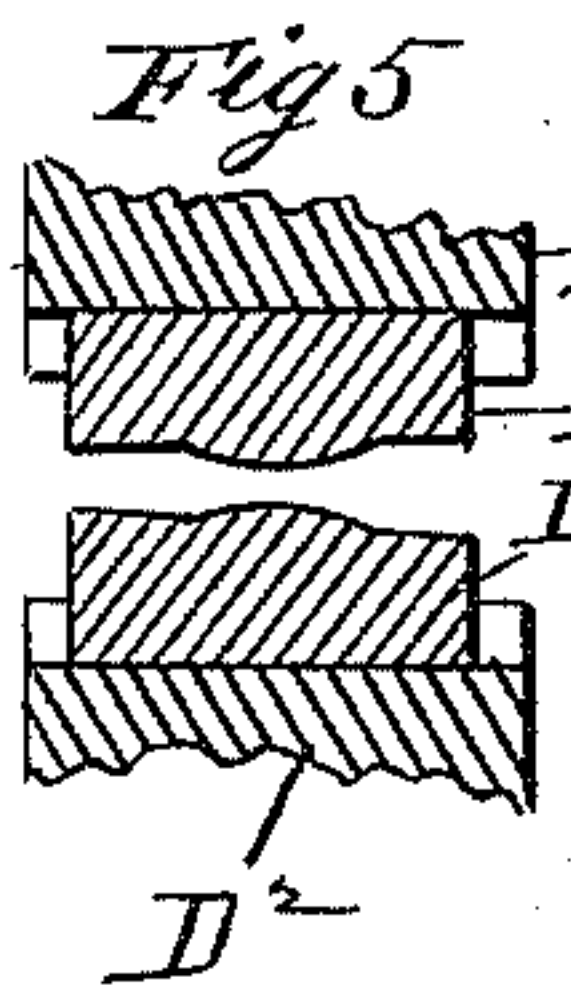
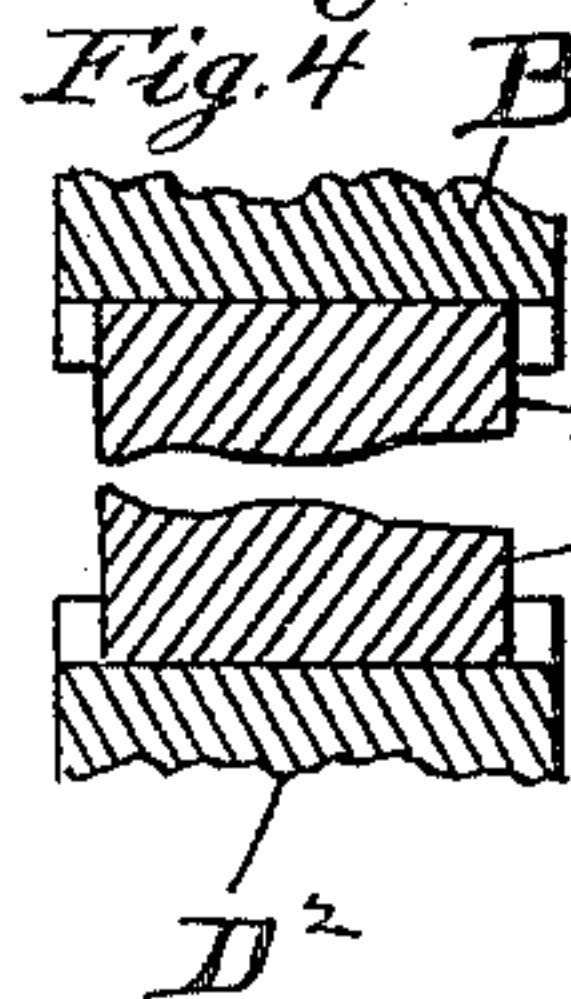
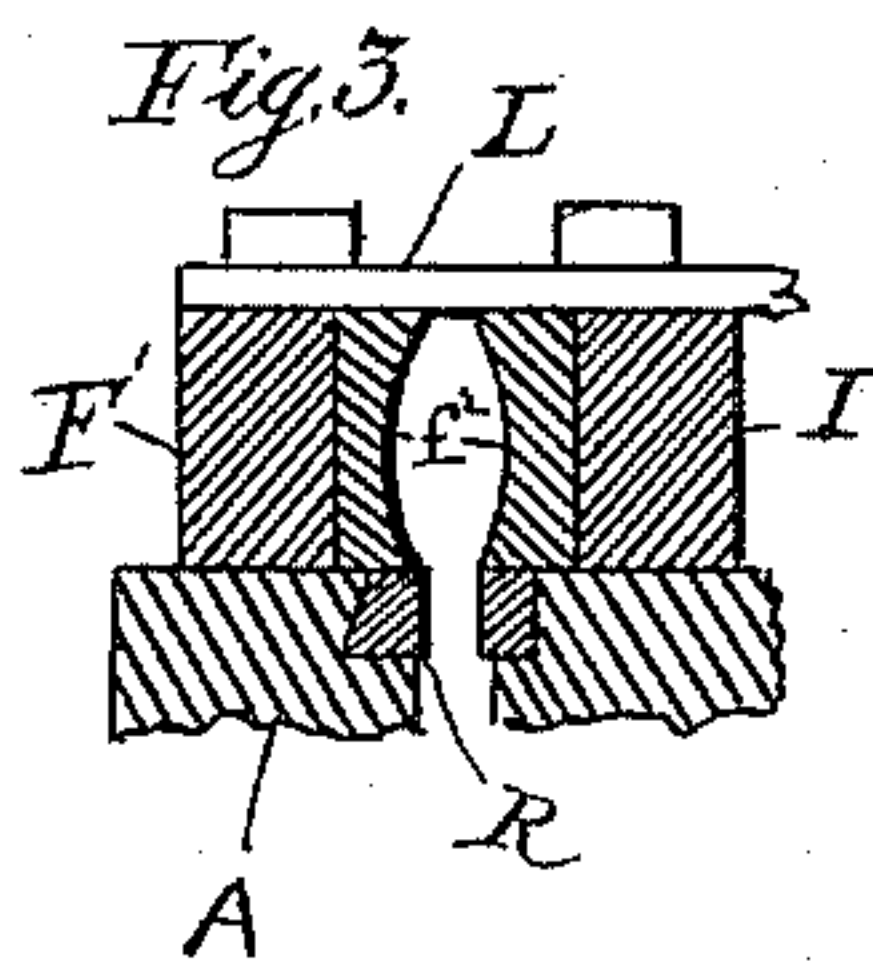
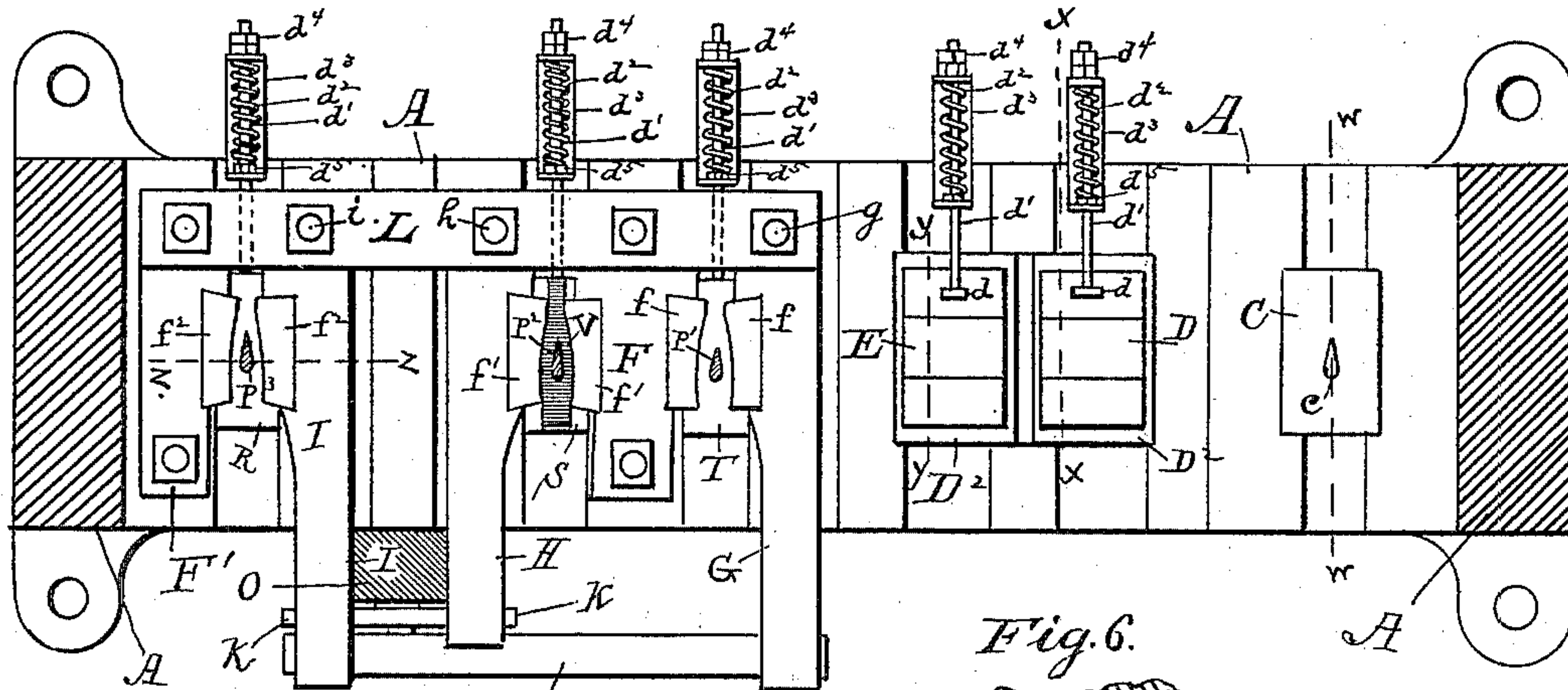
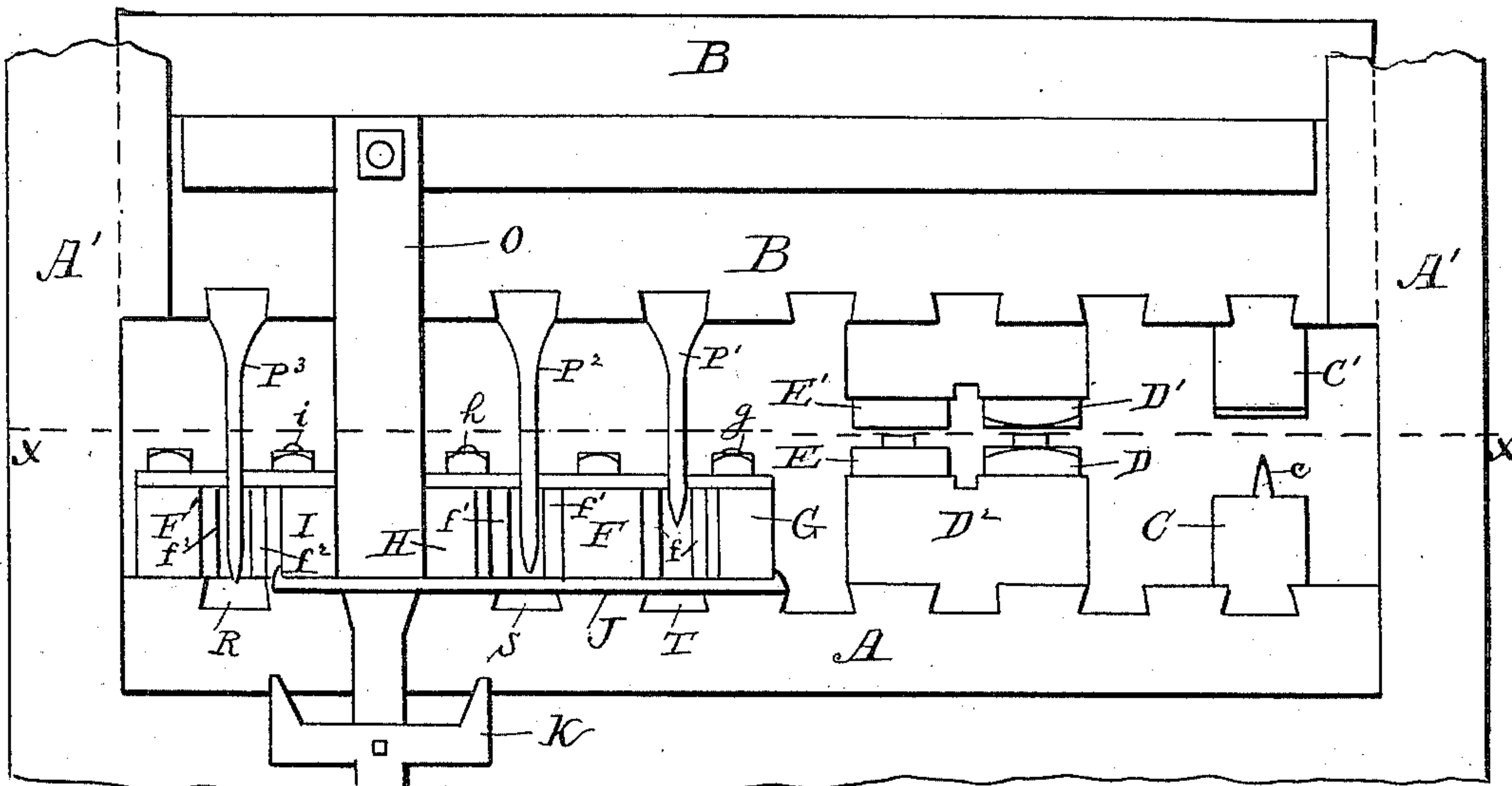


Fig. 2.



Witnesses *George W. Hubbard*
E. B. Bryant

Inventor *John U. Hubbard*
S. W. Bates
his atty.

UNITED STATES PATENT OFFICE.

JOHN U. HUBBARD, OF OAKLAND, MAINE.

MACHINE FOR FORMING AX-POLLS.

SPECIFICATION forming part of Letters Patent No. 427,689, dated May 13, 1890.

Application filed January 23, 1890. Serial No. 337,822. (No model.)

To all whom it may concern:

Be it known that I, JOHN U. HUBBARD, a citizen of the United States, residing at Oakland, in the county of Kennebec and State of Maine, have invented certain new and useful Improvements in Machines for Forming Ax-Polls; and I do hereby 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.

My invention relates to a machine for forming and punching ax-polls, and it is designed to carry out that process of forming ax-polls wherein a blank of suitable length is cut from a flat bar of iron, and is then heated and the sides concaved at the point where the eye is to be punched, the eye then being formed with a pointed punch, which forces the thin metal out against dies to form the sides of the poll. The machine on which this process has hitherto been carried out has made use of a drop-hammer for punching the eye, this drop-hammer having been provided with a single punch, which was forced with one blow nearly or quite through the ax-poll. The clamps by which the polls were held while being punched were operated by foot-power in the machine. With this manner of using a punch it was difficult to remove it after it had been forced into the metal and the clamps closed in on each side, and in running the machine continuously the single punch soon became red-hot, so that the machine had to be stopped.

The object of my invention is to work this process by means of a press wherein the ax-poll can be completed with one heat.

The important features of my press are a set of dies for concaving the sides of the blank, a series of pointed punches of varying length for punching the eyes, laterally-movable clamps for holding and forming the sides of the blank while the latter is being punched, and automatically-operated cams for opening and closing said clamps, dies for shaping the edges of the poll and spring-gages for these various sets of dies and punches arranged to yield as the bit end of the poll is elongated. These dies and punches are arranged along the bed and cross-head of a press of any suitable construction, and the poll is completely finished on the press.

In the accompanying drawings I have illustrated a machine built according to my invention.

In the drawings, Figure 1 is a section on line *xx* of Fig. 2, and shows a plan view of the bed of the press. Fig. 2 is a front elevation. Fig. 3 is a section on line *zz* of Fig. 1. Fig. 4 is a section on line *yy* of Fig. 1. Fig. 5 is a section on line *xx* of Fig. 1. Fig. 6 is a section on line *ww* of Fig. 1. Fig. 7 is same as Fig. 5, showing the spring-gage in elevation.

A represents the bed of any suitable press, *A'* being the uprights at the sides, and B the vertically-reciprocating cross-head moving in guides in the uprights *A'*.

I will describe the dies and punches in the order in which they are used. A pair of dies D and D' are secured to the bed of the press and the cross-head of the press respectively. In the middle of each die is a convex portion adapted to concave the two faces of the blank opposite the eye of the poll. At the sides of the dies D D' are two more dies E E', shaped like the dies D D', except that they are formed to draw down bit end of the poll to produce the required taper from the head to the bit.

The dies D and E are secured to the bed by means of a block D² placed directly on said bed, the dies being secured to the top of the block. For each of these set of dies a spring-gage is provided which is adapted to yield when the bit end of the blank which is placed against it is elongated by the pressure of the dies. This gage may be of any ordinary construction; but as I here show it it consists of a horizontal rod *d'*, having on its end a head *d*, which rests on the back end of the lower die. This rod *d'* is held in a guide *d*³, in which it is adapted to slip longitudinally, these guides being secured to the top of a standard *d*⁶, which is secured to the back side of the bed by bolts or other suitable means. A spiral spring surrounds the rod *d'* and presses against the stop *d*⁵ and the guide *d*³ to force the gage toward the die. On the back end of the rod *d'* are check-nuts *d*⁴ for moving it in and out. These dies above described are for concaving and shaping the sides of the blank to prepare it for the operation of punching and shaping.

The blank is cut the proper length from a flat bar of iron of suitable size and is then heated and placed on the die D, the end against

the spring-gage d . The die D' comes down and concaves the side opposite the point where the eye is to come, the gage d yielding as the bit end of the poll elongates. The partially-shaped blank is then placed on the die E and further shaped and concaved, so that it has the proper amount of material in the central web to form the sides of the eye. The eye is punched by means of punches of various lengths. In the present instance I employ three, $P^1 P^2 P^3$, which are secured to the cross-head side by side. They gradually increase in length from right to left. The polls are held in position for punching by means of movable clamps having forming-dies in their faces and which automatically move in and grasp the poll as the punch descends and hold it firmly until the punch is withdrawn. The clamps here shown are three in number, $G H I$, and they are pivoted at their rear ends to the bed of the machine near its rear portion by pivots g, h , and i . The forward ends of these clamps or levers project out in front of the bed of the machine. In the working-face of each clamp G, H , and I are secured forming-dies f, f' , and f^2 , respectively, and each of these dies has a similar die secured rigidly in an opposing position. The fixed dies $f f'$ are secured in opposite sides of a block F , which is secured to the bed of the machine, while the fixed die f^2 is secured to a block F' . The clamps are so disposed that the two clamps I and A , which are adjacent, move away from each other in closing the dies, while the extreme outside clamps G and I move in the same direction. For this reason I have united the clamps G and I by means of a link J , so that the movements of the clamp I are imparted to the clamp G . I operate all three of the clamps by alternately forcing apart and drawing together the two clamps H and I . This I do by means of a cam O , which is secured to the cross-head and passes down between the clamps I and H . This cam is in the form of a straight bar, the upper end of which is wider than the lower, the two portions being united by sloping sides placed at the proper point to force the clamps I and H apart when the cross-head begins to descend. The upper portion of the cam is just wide enough so that when it is inserted between the clamps I and H the sets of dies f', f^2 , and f will be closed. Attached to the lower portion of the cam O is a cross-piece or cam K , having upwardly-projecting ends with inclined surfaces thereon adapted to impinge on the outside edge of the clamps I and H to force them toward each other. Thus when the cam goes down the upper portion forces the clamps I and H apart, and when it comes up the cam K forces them together. A strap or bar L extends across the rear ends of the clamps to hold them in position. Beneath the dies f, f' , and f^2 are respectively located the dies T, S , and R , on which in turn rests the edge of the poll while it is being punched.

The die R has an aperture to allow the passage of the end of the punch P^3 . Each of the dies described has a spring-gage identical with that already described, except that the end of the rod d' has no head and occupies a position between and in the rear of the dies $f f' f'$, &c.

V represents the ax-poll in position between the dies f' .

After having been concaved as described, the pole is placed on edge between the dies f , the bit end of the pole resting against the spring-gage. The cross-head then comes down, and as it descends the pointed punch P' is forced into the central web, splitting it to a limited depth. The cam O meanwhile has forced the clamps L and H apart and drawn the clamp G to the left, bringing the two dies f into position, so that they firmly clasp the sides of the poll while it is being punched and while it is being withdrawn. An edge having been punched, the poll is reversed and the other edge punched in the same manner. It is then placed between the dies f' and still further punched, and then between the guides f^2 , where the eye is finally finished, the punch passing entirely through the poll.

It is to be understood that the dies f, f' , and f^2 are the exact form required of the sides of the poll. Having been punched, the edges are formed and finished by means of the curved dies C and C' , the former of which is secured to the bed and the latter to the cross-head. In the center of the lower die C is a short guide or pin c , which is made to extend into the eye of the poll to center it. The poll is placed on this pin, and the die C' comes down and gives the edges of the poll the proper shape.

All of the operations described are done with a single heating of the blank. The punches work quickly and easily, and do not get overheated in the poll, are very perfectly and evenly formed, with very little waste of material. The cross-head of the press may reciprocate steadily, or it may be arranged to stop at the upper end of the stroke, as in many well-known presses.

I claim—

1. A press for forming ax-polls having dies for concaving opposite sides of the blank, a series of pointed punches of varying length, laterally-movable clamps for holding the said blank on edge beneath each of said punches, and a cam for forcing said clamps toward each other to form the sides of said poll, in combination, substantially as shown.

2. In a press for forming ax-polls, dies for concaving the sides of the poll, and spring-gages for said dies arranged to yield as the metal at the end of the poll is drawn out, substantially as shown.

3. A press for forming ax-polls having in the bed thereof pivoted clamps forming dies in the faces of said clamps and opposing dies for holding and forming the sides of the poll,

a link for uniting the ends of said clamps, and a cam acting on one of said clamps to throw it and its connecting-clamp, substantially as shown.

5 4. In a press for forming ax-polls, three clamps, as G, H, and I, pivoted to the bed thereof, forming dies in the faces of said clamps and opposing dies therefor, a link for uniting the two outer clamps O and G, and a
10 vertically-moving cam O for forcing the adjacent clamps I and H apart, substantially as shown.

15 5. In a press for forming ax-polls, a pair of clamps pivoted side by side to the bed thereof, a cam moving vertically between the said clamps for forcing them apart, and a cross-piece with inclined ends secured to said cam, said ends being adapted to impinge against

the said clamps to force them toward each other, substantially as shown. 20

6. In a press for forming ax-polls, a pair of movable clamps placed side by side, forming dies in the faces of said clamps and opposing dies therefor, said clamps being arranged to close when moved in opposite directions, a
25 vertically-moving cam for forcing said clamps apart, composed of a straight upper portion and a narrower lower portion united by inclined faces, substantially as shown.

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

JOHN U. HUBBARD.

Witnesses:

GEO. H. BRYANT,
H. W. WELLS.