

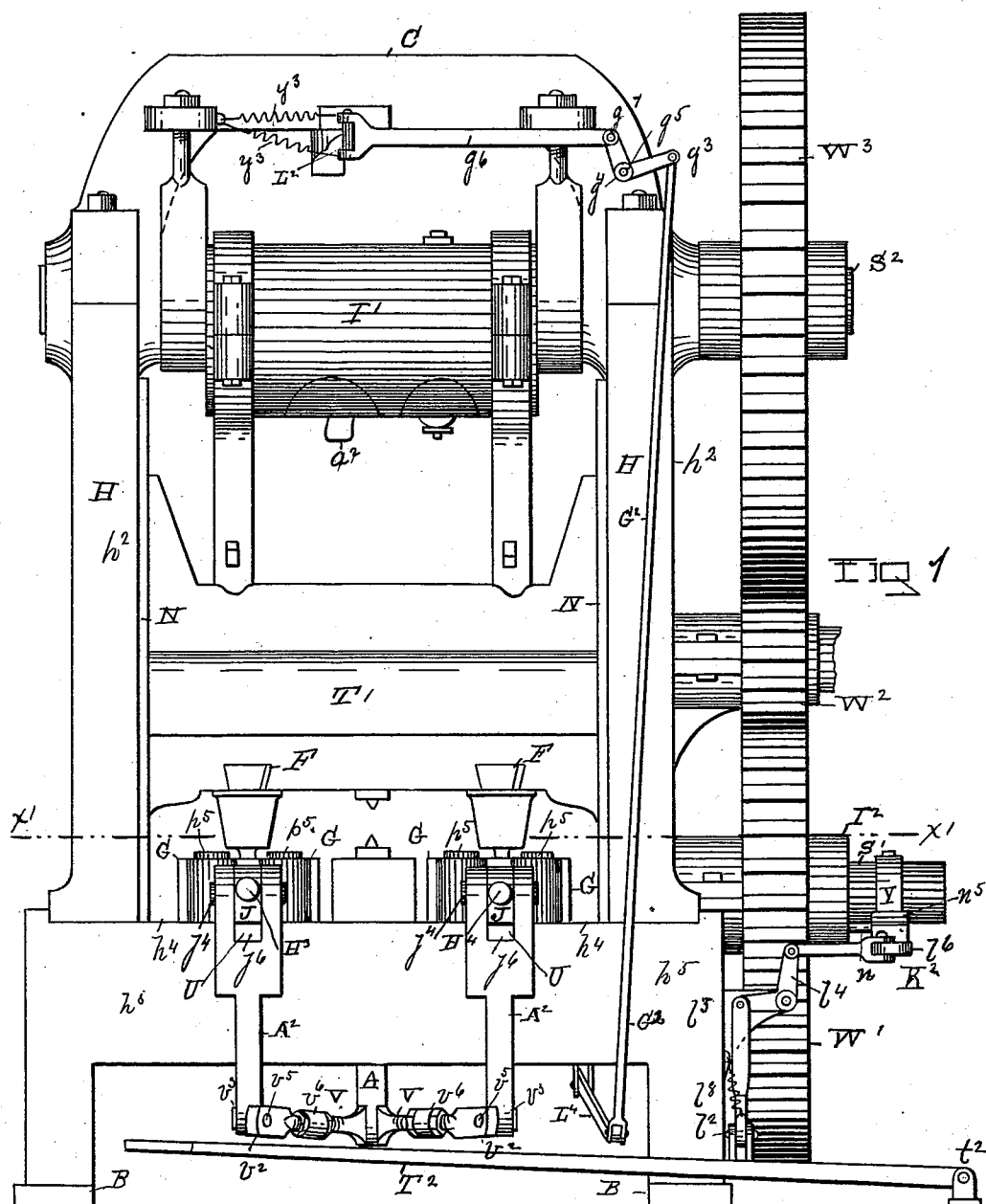
(No Model.)

12 Sheets—Sheet 1.

E. ROGERS.
MACHINE FOR MAKING AX POLLS.

No. 531,221.

Patented Dec. 18, 1894.



WITNESSES

William A. Lusk
Charles S. Brintnall

INVENTOR

Ethan Rogers by
W. Hagan atty

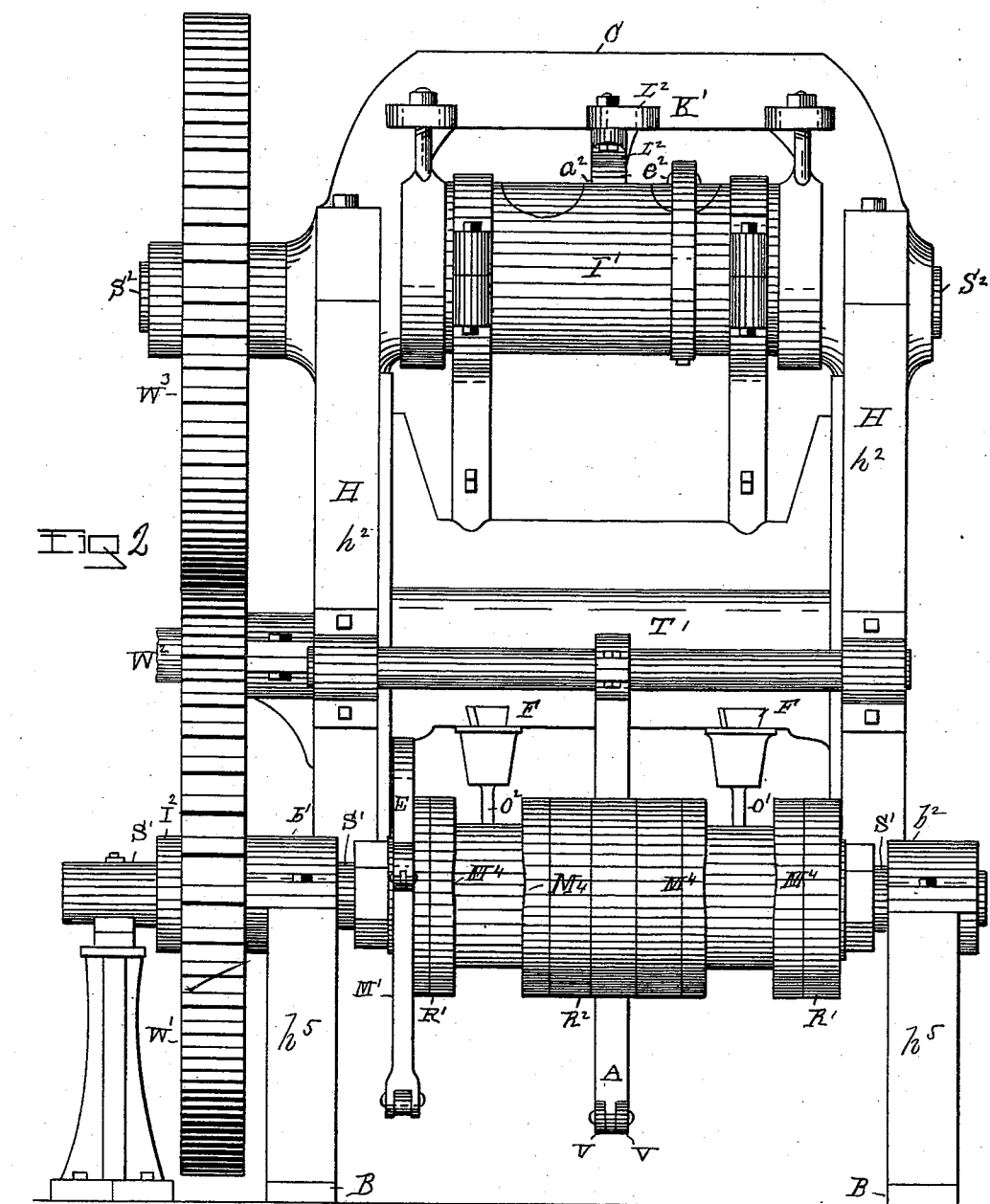
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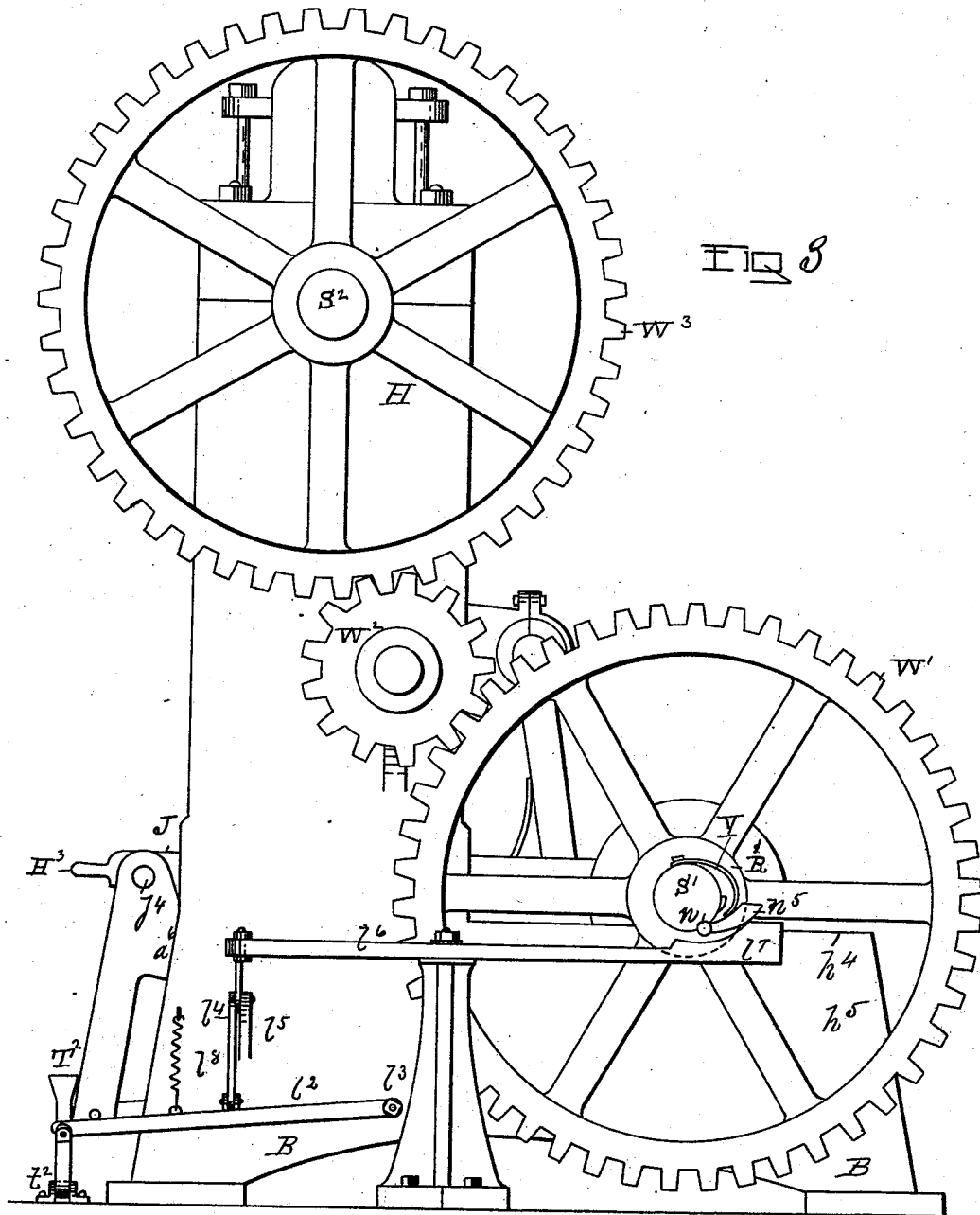
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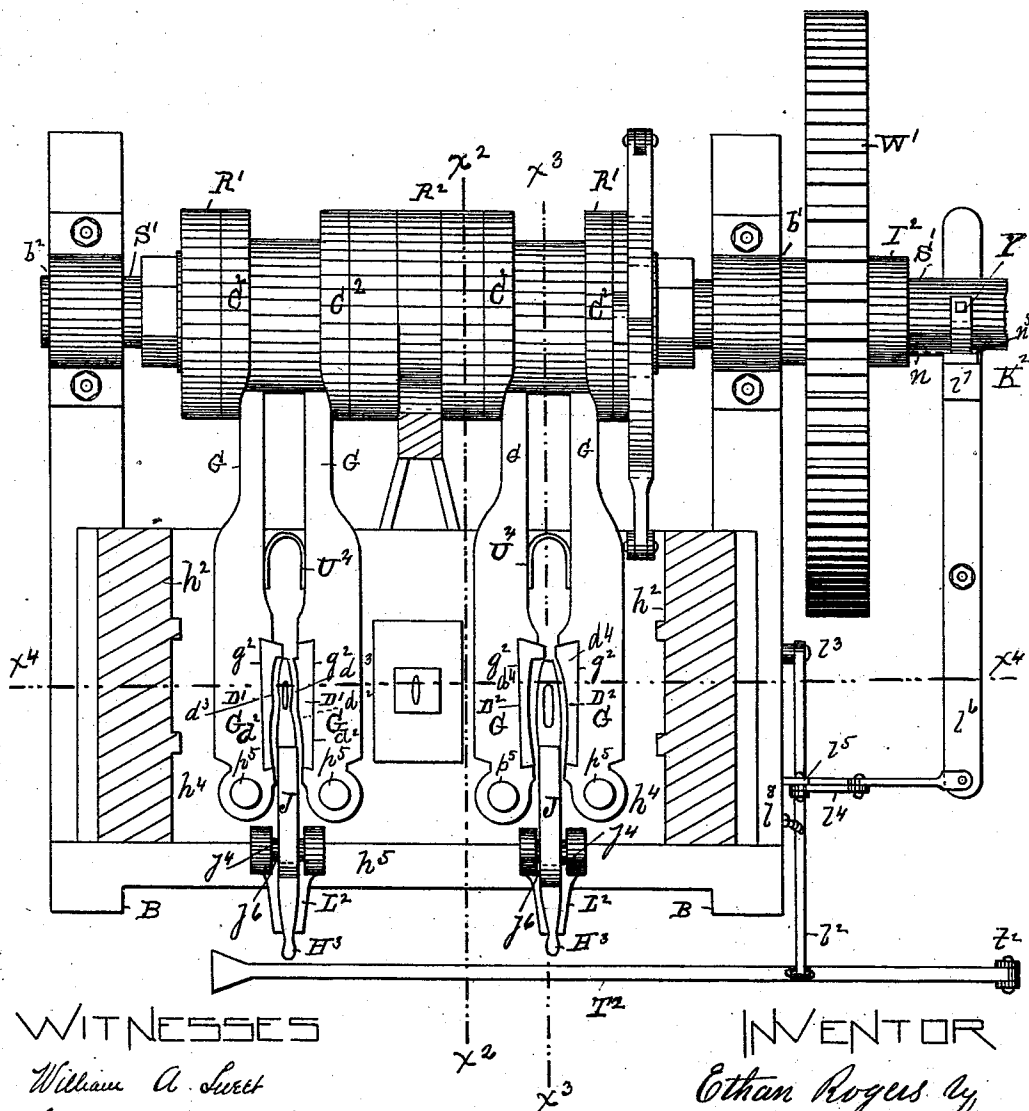
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FIG 4



WITNESSES

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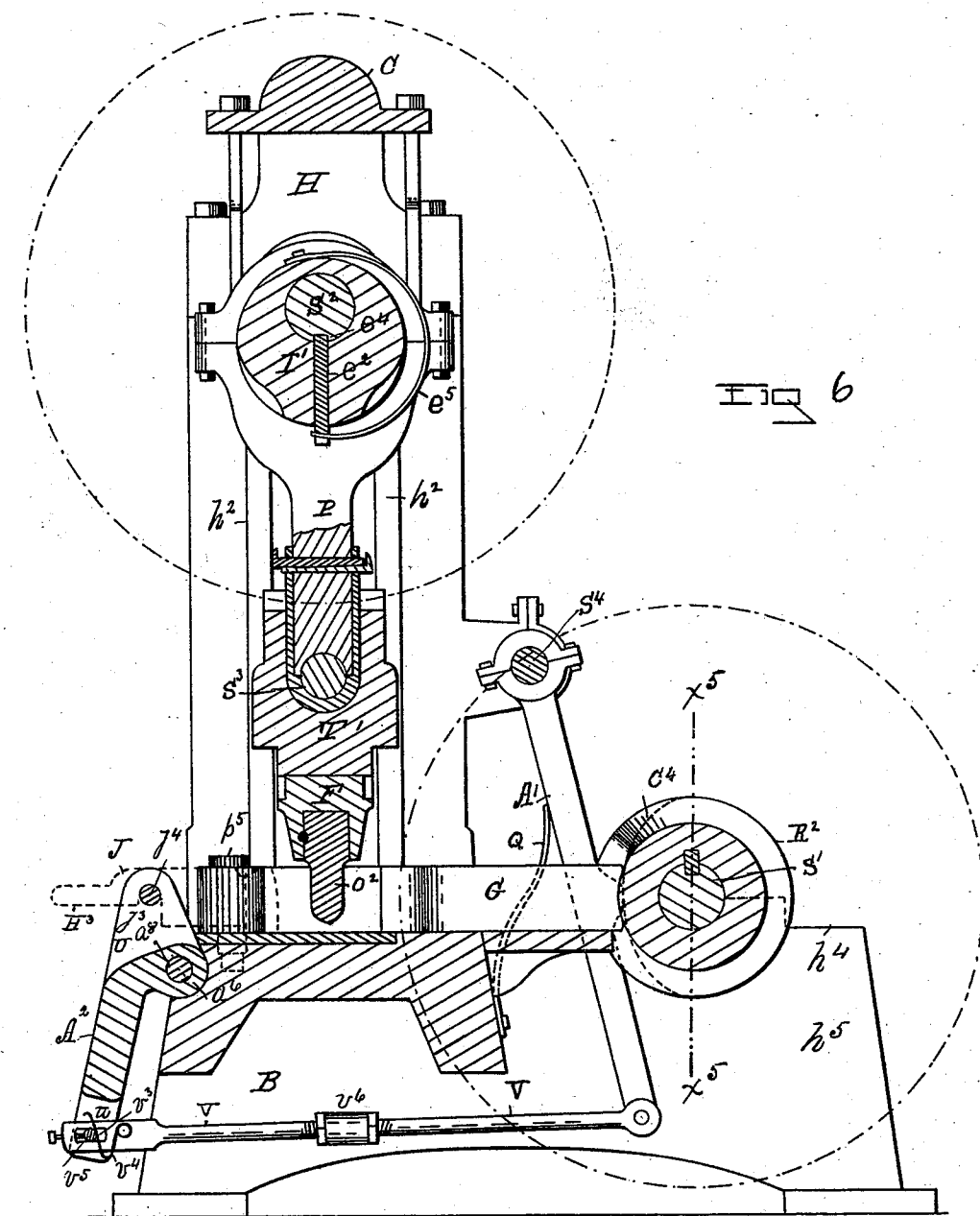
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WITNESSES

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(No Model.)

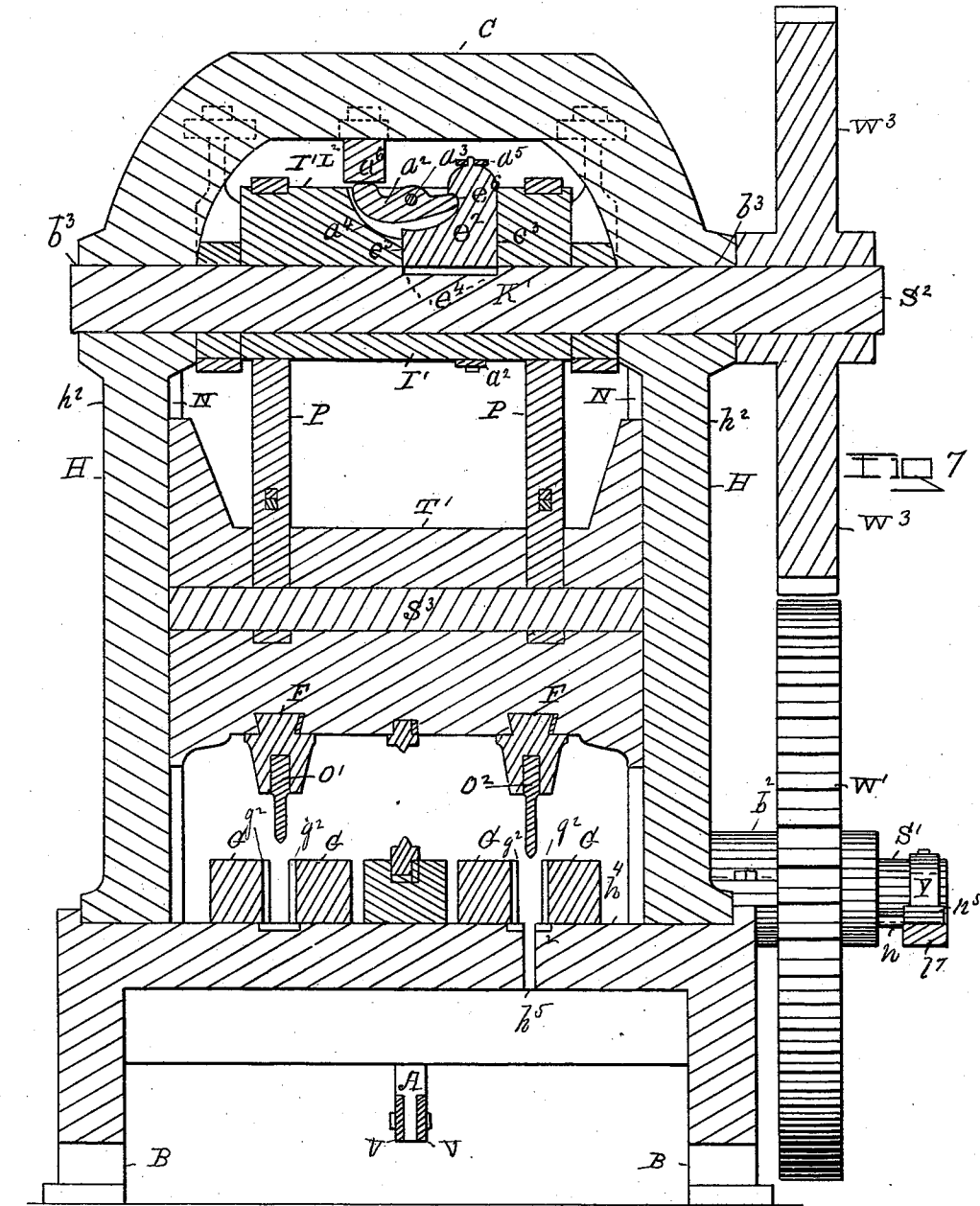
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WITNESSES

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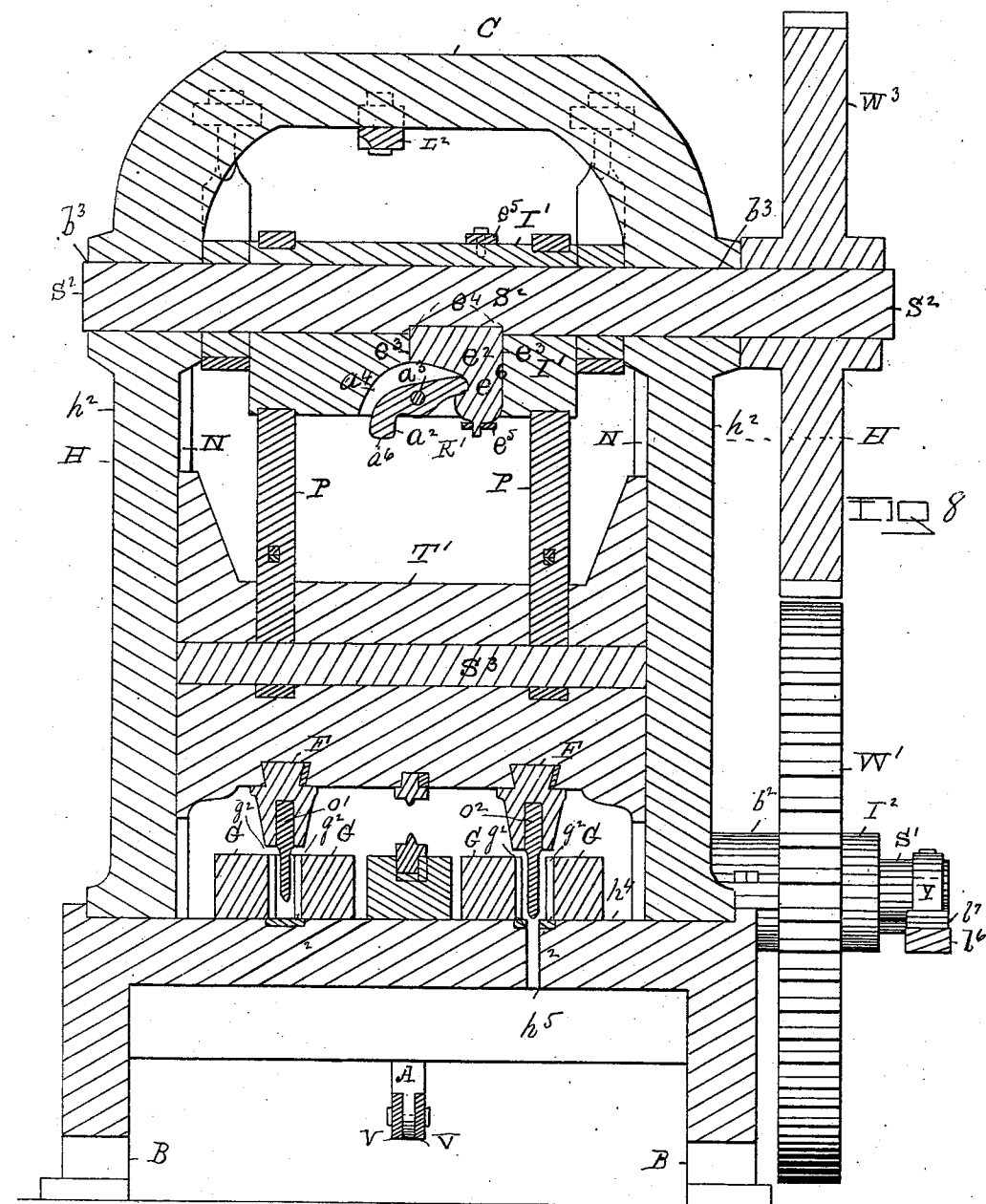
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(No Model.)

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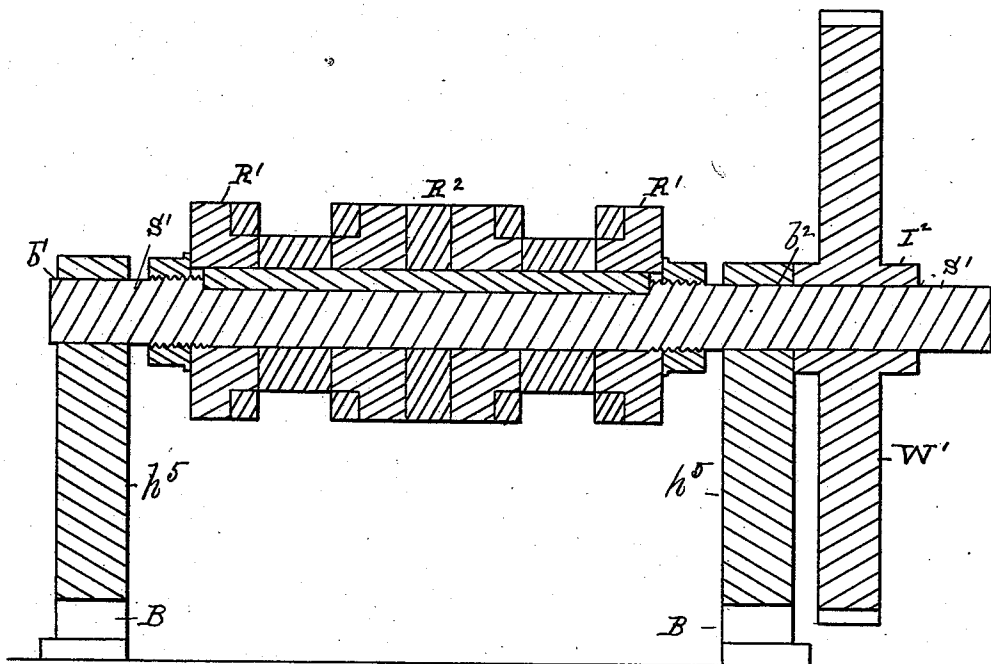


FIG 9

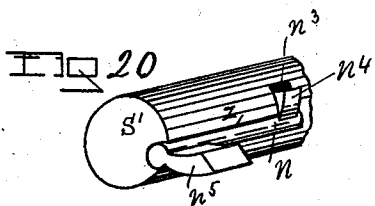


FIG 20

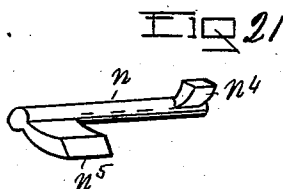


FIG 21

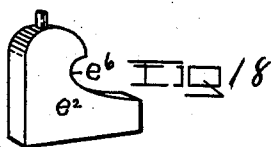


FIG 18

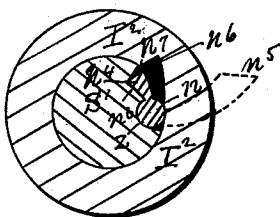


FIG 19

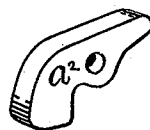


FIG 17

WITNESSES

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(No Model.)

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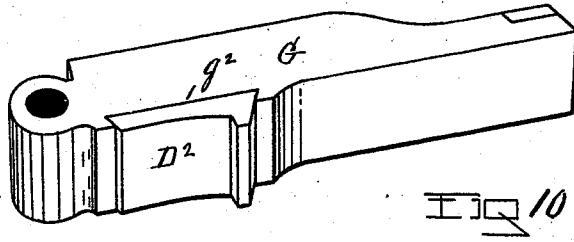


FIG 10

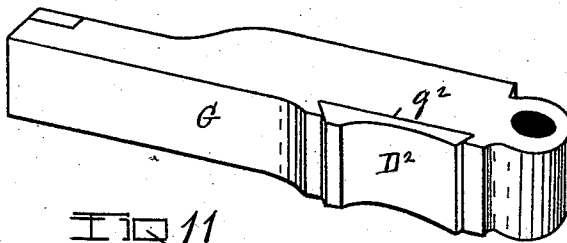


FIG 11



FIG 13

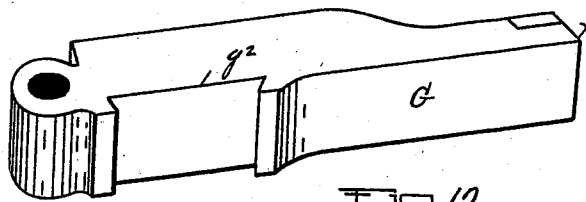


FIG 12



FIG 14

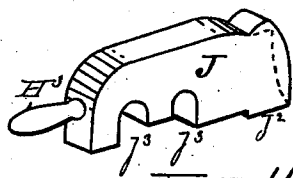


FIG 16



FIG 15

WITNESSES

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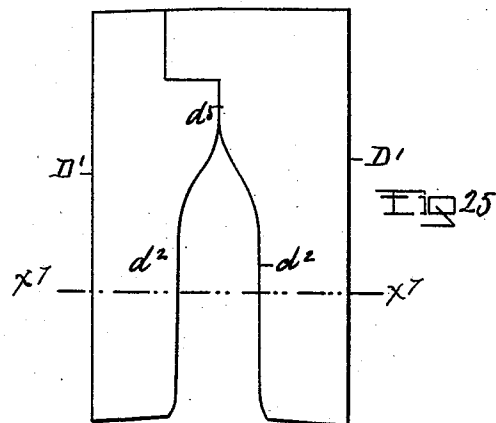
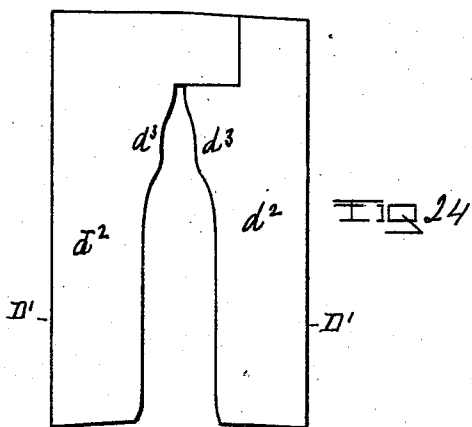
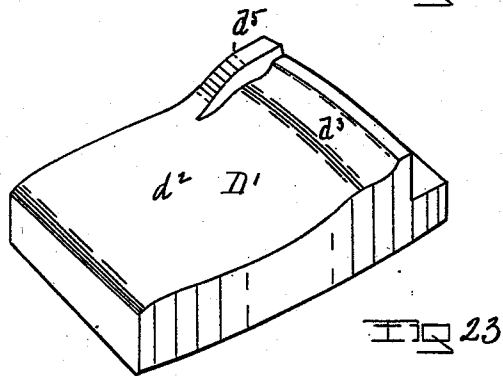
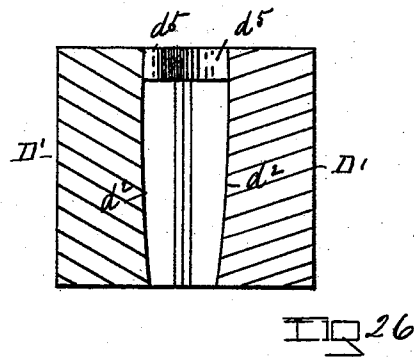
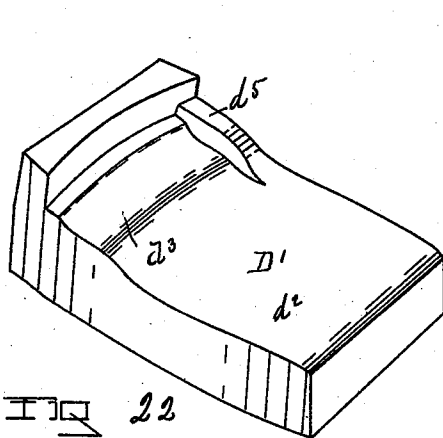
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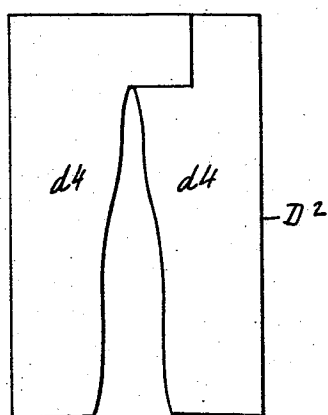
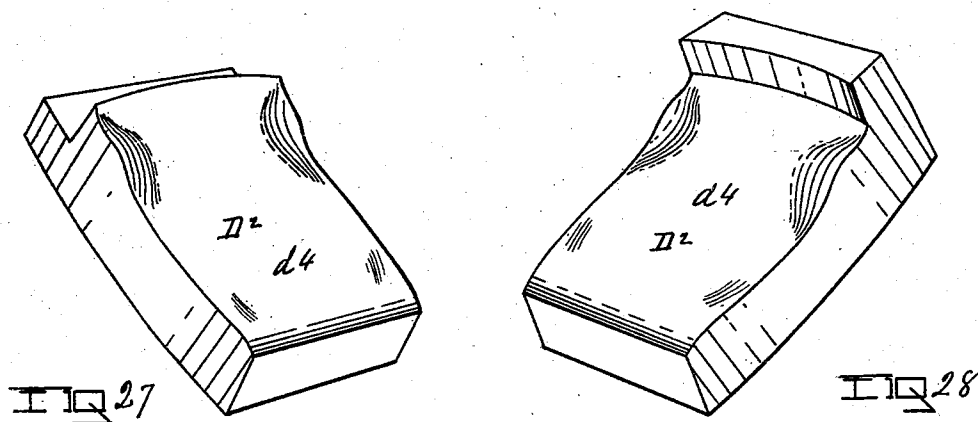


FIG 29

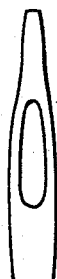


FIG 32

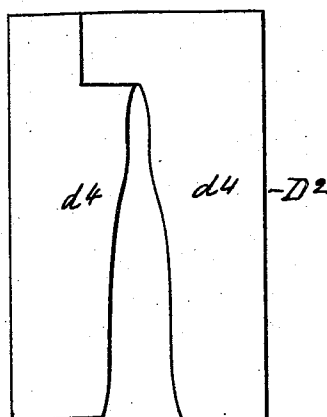


FIG 30

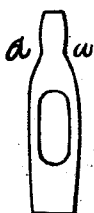


FIG 31

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UNITED STATES PATENT OFFICE.

ETHAN ROGERS, OF BALLSTON SPA, NEW YORK.

MACHINE FOR MAKING AX-POLLS.

SPECIFICATION forming part of Letters Patent No. 531,221, dated December 18, 1894.

Application filed May 16, 1894. Serial No. 511,418. (No model.)

To all whom it may concern:

Be it known that I, ETHAN ROGERS, of Ballston Spa, Saratoga county, State of New York, have invented new and useful Improvements in Machines for Making Ax-Polls, of which the following is a specification.

My invention relates to improvements upon that class of machines which are used to shape and punch the blanks from which ax-polls are made. These improvements have for their object to better adapt this class of machines to the purposes for which they are designed; and more particularly relate to an apparatus for rough-punching and finish-punching the polls; the manner of constructing the clutch which intermittently puts in motion the punching and swaging mechanism; the manner of shaping the side swaging dies; the application of a holder for the poll-heads to shape the latter, and by which the ax-polls are placed and held in position while being head-shaped, punched, and side swaged; the manner of constructing the roller cams which operate the grippers that actuate the swaging dies, all of which will be more fully described hereinafter and set forth in the claims.

Accompanying this specification to form a part of it there are twelve plates of drawings containing thirty-two figures illustrating my invention, with the same designation of parts by letter reference used in all of them.

Of the illustrations Figure 1 is a front elevation of a machine containing my invention and improvements with that side of the machine whereat the blanks are introduced facing the view, and with the driving wheel operating the mechanism, omitted. Fig. 2 is an elevation of the rear of the machine, with the master wheel omitted. Fig. 3 is an elevation of that side of the machine to which power is applied to operate it. Fig. 4 is a transverse section taken on the line x', x' , of Fig. 1, with the actuating gear wheel and pinion omitted. Fig. 5 is a section of the machine taken on the line x^2, x^2 , of Fig. 4. Fig. 6 is a vertical section taken on the line x^3, x^3 , of Fig. 4. Fig. 7 is a vertical section taken on the line x^4, x^4 , of Fig. 4, with the punching mechanism shown as raised. Fig. 8 is another section taken on the line x^4, x^4 , of Fig. 4, with the punches shown as down. Fig. 9 is a section taken through the cam-wheels which operate the

grippers and their shaft, taken on the line x^5, x^5 , of Fig. 6. Figs. 10, 11 and 12 are perspectives of the swaging-die grippers; those shown at Figs. 10 and 11, having die-plates therein, and that shown at Fig. 12, showing only the die-plate recess. Fig. 13 is a perspective of the rough-punch. Fig. 14 is an elevation of the finish-punch, and Fig. 15 a section taken through the finish-punch on the line x^6, x^6 , of Fig. 14. Fig. 16 is a perspective of the ax-poll head-holder and shaper, shown as detached. Fig. 17 is a perspective of the dog forming part of the clutching device, arranged on the eccentric sleeve which operates the punching mechanism, with the dog shown as detached. Fig. 18 is a perspective of the latch in which the clutch-dog illustrated at Fig. 17 engages, shown as detached. Fig. 19 is a section taken through the clutch on the cam driving shaft. Fig. 20 is a perspective of a part of the cam driving shaft and clutch, and Fig. 21 is a perspective of the cam driving shaft clutch, shown as detached. Figs. 22 and 23 are perspectives of the rough-punching swaging dies, shown as detached. Fig. 24 shows in a top view the position of the rough-punching dies as when placed in the grippers. Fig. 25 shows them with their position inverted. Fig. 26 is a section taken on the line x^7, x^7 , of Fig. 25. Figs. 27 and 28 are perspectives of the finish punching and swaging dies, and Fig. 29 shows the finish punching and swaging dies as in position for use, and Fig. 30 shows them as inverted. Fig. 31 shows the ax-poll after being rough punched, and Fig. 32 after being finished, punched and swaged.

The several parts of the mechanism thus illustrated are designated by letter reference and the function of the parts is described as follows:

The letter H designates the housing, with which the mechanism connects. The letter B designates the base. This housing consists of two side studs h^1, h^1 , a cap C, a transverse table-part h^4 , and an off-set frame h^5 , which is projected rearwardly, in which latter the cam roller journals. All of which parts are of the usual form employed in machines of this class.

The letter G designates the swaging-die grippers, which are arranged to rest on the table-part h^4 , and at their front ends each of

these grippers (of which there are two pairs) are vertically pivoted to the table-part h^4 , at p^5 , and each of which pairs is provided with an intermediately placed spring U^4 . Each of these grippers is made with a recess g^2 , on its inner side face, adapted to receive one of the parts of the two-part dies D' and D^2 .

The letter S' designates the cam roller shaft having its journals at b' , b^2 , in the off-set part of the housing h^5 , and upon its outer end where extending beyond its journal bearing, this shaft is provided with an operating gear-wheel W' , adapted to run on the sleeve I^3 , or with the latter, and the shaft S' , as shown at Fig. 9.

The letters R' , R^2 and R' , designate rollers which are arranged upon and so as to turn with the shaft S' . Upon the outer side face of the inner roller R^2 , and the inner side face of each of the rollers R' , there are oppositely formed the cam C^2 , with the ends of each pair of the swaging-die grippers G , arranged between one of the side faces of the end and middle rollers, so that as the shaft S' rotates, these cam surfaces C^2 , engage with the rearwardly extended arms of the grippers, and force those of each pair to approach each other, causing the swaging dies to grasp and side-swage the inserted ax-poll blank.

The letter M^2 , designates easing off cams formed in the rollers R' , R^2 , and R' , which after the dies have been brought together by the grippers, ease off the latter after the punches have entered and just before being withdrawn, and this manner of constructing the cam rollers constitutes a special feature of my invention.

The letter J , designates the ax-poll head-holders and shapers of which one of them is shown at Fig. 16, as detached from the machine, and they are shown in position in the latter at Figs. 1, 4 and 6. These head-shapers are adjustably arranged between the front pivoted ends of each pair of the grippers, and so that their entering ends will be within the dies with which they co-operate. These head-shapers are formed with a straight head as shown by the full lines of Fig. 16, or curved as shown by its dotted line. Each of these head-shapers on its under side is made with a bearing face j^2 , to rest on the table-part h^4 , and with two notches j^3 , j^3 , the inner one of the latter engaging with the pin j^4 , arranged in the slot j^6 , of the lever A^2 . When the shaper is in position within the slot and when the shaper is drawn out to insert a blank, then the shaper rests with the pin j^4 , within the outer one of the slots j^3 , for support. This shaper is made with a handle H^3 , by which it can be grasped and removed to insert a poll blank, the operation of which head-shaper will be more fully described hereinafter in connection with the mechanism actuating it.

The letter S^2 , designates the shaft operating the punching mechanism, said shaft having its journal bearing at b^3 , as shown at Figs. 7, 8 and 9.

The letter I' , designates a sleeve that is arranged eccentrically upon the shaft S^2 , to turn thereon, and the letters P , P , designate two pitmen arranged to journal at their upper ends on said sleeve, and at their lower ends upon the shaft S^3 , as shown at Figs. 6, 7, and 8.

The letter N , designates slide-ways made in the inner vertical face of the housing studs h^2 , and the letter T' , designates a traveler having the pitman shaft S^3 , and which traveler is adapted to be vertically reciprocated in said slide-ways by the movement of the pitmen P , as actuated by the sleeve I' , and the shaft S^2 .

The letters F , F , designate stocks which connect with the bottom of the traveler T' , and the letters O' , O^2 , designate punches which are detachably connected to the bottom of the traveler stocks F , in the lower ends of the latter. As thus made and connected the punches are adapted to be forced downwardly to enter the blank when placed within the swaging-die grippers G , and to recede therefrom. There are two of these punches, that one indicated at O' , being for doing the rough-punching, and that designated at O^2 , for finish-punching. Their construction as improved by me as to form will be more fully described in connection with the side-swaging dies with which they co-operate.

The rough-punch O' , in cross-section has the form of an ellipse with flattened sides, and it tapers as extended downwardly toward its entering point as shown at Fig. 13. The finish-punch O^2 , is made longer than the rough-punch so as to pass clear through the blank and excepting at its entering end it has straight sides which as shown in cross-section and as illustrated at Fig. 15, has the form of an ellipse which has been elongated at one of its ends by flattening its sides, so as to have less cross-diameter thereat, and to taper transversely toward what is the blade end of the ax-helve passage formed by it in the poll.

The swaging-dies D' and D^2 are each made in two parts and when placed within the recesses formed in the side of the grippers, they are applied thereto with their shaping surfaces facing each other, as shown at Fig. 4, and as separately illustrated at Figs. 22, 23, 24, 25, 26, 27, 28, 29 and 30; and the manner of constructing the swaging faces of these dies, constitutes a special feature of my invention. The rough-punching die D' is made to have on each of its two-part side faces d^2 , a shoulder or recess d^3 , and a lip d^5 , on its upper face, so that when the poll is swaged through the compression produced by the side faces of the die D' , and the spreading effect of the entering rough-punch O' , the metal of the poll will form a shoulder a , in the blank sides, just in advance of the punched out ellipse; the lip d^5 preventing the blank from being drawn out by the punch as it recedes. The die D^2 is made in two parts d^4 , d^4 , and the side faces of these die-parts taper inwardly toward the

blade end of the ax-poll, which they shape, as shown, Figs. 29 and 30. The blank is first rough-punched, and head-shaped in the die D' , by two operations, with the blank reversed as to vertical position in each punching operation, and the same procedure is had in finish-punching it, by the use of the die D^2 , and punch O^2 . The shoulder or recess d^3 formed in the opposite sides of the die D' , puts the metal in position for elongation as operated upon by the die D^2 , and the elongation of the ax-helve passage as produced by the tapering edge of the punch O^2 , the metal laterally displaced by the punch and dies being equally distributed as to the ax-helve passage.

The sleeve I' , eccentrically arranged upon the shaft S^2 , is provided with a clutch K' and this clutch consists of a clutch-dog a^2 , which is at a^3 , pivoted to the sleeve I' , within a recess a^4 , formed in the latter, with the outer end of the clutch-dog projecting from the recess so as to subtend the outer edge of the sleeve as shown at Figs. 7, 8, and 17.

The letter e^2 designates a clutch-latch, arranged to be moved outwardly and inwardly within a slide-way e^3 , formed in the sleeve, and to enter a recess e^4 , formed in the shaft S^2 , and to be held therein by the action of a spring a^5 . This clutch-latch is made with a catch e^6 , with which the clutch-dog a^2 , engages to draw the clutch-latch from out the recess e^4 , when the outer end a^6 , of the clutch-dog is forced inwardly. When the clutch-dog is within the recess of the shaft, the latter and the sleeve move together, and when the clutch-latch is drawn from the recess in the shaft, the latter turns, but the sleeve is stationary. This clutch-dog a^2 is shown as operated to remove the clutch-latch from the shaft, at Fig. 7, and with it actuated by the spring e^5 , to connect the sleeve and shaft for moving together at Fig. 8.

The letter L^2 designates a lever that is pivoted to the underside of the cap C , of the housing, and when the lever is swung inwardly so as to engage with the outer end of the clutch-dog, as is shown at Fig. 7, this lever engages with and operates the clutch-dog to move the latch from out the shaft S^2 ; and when this lever is put in a position not to engage with the clutch-dog, as shown at Fig. 8, the sleeve I' and the shaft S^2 , move connectedly. The manner in which this lever L^2 is actuated will be more fully described hereinafter in connection with the means employed to operate it.

The letter W' designates the gear-wheel which receives power from the pinion W^2 , and the latter meshes into the gear-wheel W^3 , on the shaft S^2 . This gear-wheel W' is made with a sleeve I^2 , which runs on or with the shaft S' , whereon the cam rollers are arranged which operate the swaging-die grippers. This gear-wheel W' is made with a clutch K^2 , by which the said wheel and shaft may be actuated to turn connectedly or the wheel to turn on the shaft without actuating the latter. This gear-

wheel W' , meshes into the pinion W^2 , and the latter into the gear-wheel W^3 , on the shaft S^2 . This clutch K^2 , is of ordinary construction and considered apart from the connection in which it is used is not my invention. This clutch K^2 , is as shown at Figs. 19, 20 and 21, made with a small shaft or rod n , arranged so as to turn in a groove which is formed in the shaft S' , at its side and the letter n^3 designates a recess formed in the shaft S' , at the end of the groove z ; n^4 , a clutch-dog arranged on the end of the rod n , so as the latter is turned this dog will be moved into or from out said recess.

The latter n^5 , designates a shipper arm arranged upon the rod n , where the latter projects beyond the shaft S' , and which shipper as moved outwardly moves the dog n^4 , from out the recess n^3 , and as moved inwardly causes said clutch-dog to enter the recess.

The letter n^6 , designates a recess formed in the interior face of the sleeve I^2 , on which the wheel W' , is attached, and this recess is formed in the sleeve so as to be in line with the recess n^3 , in the shaft. This recess n^6 , of the sleeve I^2 , has an engaging edge n^7 , with which when the clutch-dog n^4 , is moved outwardly it engages, and this causes the said wheel W' , and sleeve I^2 , to move together.

The letter Y , designates a spring which is arranged to bear on the shipper arm n^5 , to hold the clutch-dog n^4 , in constant engagement with the sleeve I^2 , to keep the wheel W' , and sleeve I^2 , from moving together excepting when operated upon by the shipper n^5 .

When inserting blanks for punching and swaging it is necessary to have the cam-roller, and the punching mechanism at rest, and to have this condition occur with the wheels W' , W^2 , and W^3 , continually revolving the following mechanism is used.

The letter T^2 , designates a treadle or foot lever which is shown in plan at Fig. 4. At its fulcrum end, it is pivoted at l^2 , and between the latter and its operating end it is pivoted to another lever l^2 , which latter at its fulcrum end l^3 , is pivoted to the machine housing.

The letter l^4 , designates a bell-crank which at its angle is pivoted to a bracket l^5 , and at one of its ends this bell-crank lever is pivoted to the lever l^2 , and at its other end to the lever l^6 , which latter is made with a shoe l^7 , that engages with the shipper arm n^5 , to operate the latter.

The letter l^8 designates a spring connecting the lever l^2 with the offset h^3 , as shown at Figs. 1 and 4. When the treadle T^2 , as thus made and connected is forced downwardly it forces inwardly the shipper arm n^5 , and causes the gear-wheel W' , and the sleeve I^2 , on the cam-roller shaft and the latter to run together, and when the end of the treadle is raised by the spring Y , the clutch disengages from the shaft S' .

The letter C^3 , designates a tappet-form cam which is arranged on the shaft S' , as shown at Fig. 5, and the letter E , a pivoted lever

which at its pivoted end m' is pivoted to the machine table-part, and is therefrom curved upwardly and rearwardly at m^2 , and then downwardly and rearwardly at m^3 , and at its rear end is pivoted to the lever M' , and the lever M' is pivoted to the horizontal lever L^4 which latter is pivoted at m^4 , for a fulcrum.

The letter G^3 designates a vertically placed lever which at its upper end g^3 is pivoted to the cap at g^5 , as shown at Figs. 1 and 5, and the letter g^6 designates a lever which at its end g^7 , is pivoted to the bell-crank lever g^4 , and at its outer end to the lever L^2 , as shown at Fig. 1.

The letter y^3 , designates springs arranged to connect the lever g^4 with the housing and the function of these springs is to draw inwardly the lever L^2 , so as to bring it in a position to engage with the clutch-dog in the sleeve I' .

As thus constructed and arranged when the shaft S' , commences to revolve its cam C^3 , actuates the lever E , and the latter by its connection made through the levers before described with the lever L^2 , moves the latter away from its engagement with the clutch-dog a^2 , when the latch a^3 , by the action of the spring e^5 , is caused to engage with the shaft S^2 , to operate the latter, its sleeve and the punches.

The letter A' , designates a lever which at its upper end is journaled on the shaft S^4 , as shown at Fig. 6, and at Fig. 1, this lever A' , is shown as pivoted to the rear ends of two levers V , V , which branch therefrom as extended frontwardly on an angle, and at their front ends v^2 , each of these levers V , is adjustably pivoted at v^3 , within a slot made therein, and a slot u , made in the lower end of one of the levers A^2 , and thereat each of these levers V , is provided with a leaf-spring v^4 , arranged to bear on the pivot-pin v^5 . Each of these levers V , is made in two parts having on their inner adjacent ends a right and left-hand thread connected by means of a coupling V^6 , having also a left, and right-hand thread by which the length and throw of these levers may be increased or diminished. These levers A^2 , are each made with an offset a^6 , by which they are each pivoted at a^8 , to the base B , as shown at Fig. 6, and at their upper ends they are each made with a slot U , having an interiorly placed cross-pin j^4 , to receive one of the ax-poll head shapers or formers with the latter inserted within the slot U , and with one of the notches j^3 , of the head-shaper engaging with the pin j^4 .

The letter C^4 designates a cam formed on the outer face of the roller R^2 , as shown at Fig. 6, and this cam when engaging with the lever A' , moves its lower end frontwardly, and this moves inwardly the upper end of the lever A^2 , also the ax-poll head-shaper J , thus forcing the latter and the blank to enter the dies, and the letter Q designates a spring arranged between the base B , and the lever A' , which acts to force outwardly the latter when

the cam on the roller R^2 , ceases its engagement with it.

The parts thus described are operated connectedly as follows: With the punching mechanism, and all the other parts at rest excepting the wheels W' , W^2 and W^3 , the head-former and shaper J , of the rough-punching and swaging die is removed, and a heated blank inserted within the die when the head-shaper is replaced. This being done the operator depresses the treadle T^2 , which sets in motion the roller shaft, and this a little in advance of its other functions moves inwardly the head-shaper so as to position the blank within the rough-punching and swaging die, when the clutch on the shaft S^2 , being tripped as before described, puts in motion the punching mechanism while the grippers having side-swaged the blank a little in advance of the descent of the punch, ease off the grasp of the grippers through the action of the lesser cams M^4 , after the punch has entered and just before being drawn from the blank, the lips d^5 , retaining the blank within the die as the punch recedes. When this has been done and the punching and side swaging has been accomplished the clutches become again operative and all the mechanism stops, but the continuously revolving wheels before described. At this interval of rest the inserted and partly rough-punched and swaged blank is reversed as to its vertical position within the die, and replaced therein to be repunched by the same rough-punch. After the rough-punching and side swaging is accomplished with the blank within the die D' , it is at a succeeding period of rest removed to the finish-punching and swaging die D^2 , to be finished-punched and swaged by the latter, the finish-punch going completely through the blank when first punched and when the blank is reversed as to vertical position. While the finish-punching and swaging is taking place the rough-punching of another blank is being proceeded with. By the use of the easing off cams M^4 , the pressure of the grippers and swaging dies is removed from the blank being punched, allowing the punch which has fully entered the blank to be more easily withdrawn and thus saving the wear upon and increasing the life and durability of the punches.

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

1. In a machine for side-swaging and punching ax-polls, the combination with the grippers G , G , vertically pivoted to the machine bed at p^5 , and each provided on its inner opposite side with a side swaging die-part; of the shaft S' , having mounted thereon the rollers R' , R^2 , each having upon its inner opposite sides the cam C^2 , and the easing off cam M^4 , and the spring U^4 , arranged between said grippers, substantially in the manner as and for the purposes set forth.

2. In a machine for side-swaging, punching

and head shaping ax-polls, the combination with the grippers G, G, each vertically pivoted to the machine table at p^5 , and each having die-parts placed on their inner opposite faces, of the shaft S' , made with the gripper operating rollers R' , R^3 , each having the cam C^2 , on their inner opposite faces and the roller R^2 , made with the cam C^4 on its outer face; the connected pivoted levers A' , V and A^2 , and the head holder and former J, adapted to be operated substantially as and for the purposes set forth.

3. The combination with the grippers G, G, each vertically pivoted to the machine table and each having swaging-dies on their inner opposite sides, and constructed to be operated substantially as described; of a head shaper and former made with notches j^3 , on its under surface; a lever A^2 , made with a slotted end to receive said head holder or shaper; a cross pin in said slot to engage with one of the notches in said holder; a lever V, pivotally connecting with the lower end of said lever A^2 ; a lever A' , pivotally connecting with said lever V, and a cam C^4 , on the roller R^2 , constructed and arranged to operate, substantially as shown and described.

4. The combination with the grippers G, G, arranged in pairs, each vertically pivoted to the machine bed, and each provided with a swaging die-part upon its inner opposite side face; of the shaft S' , having the rollers R' , R^2 , made with the cams C^2 , and the cam C^4 , arranged on the roller R^2 , constructed to be operated substantially as described; the head holders or shapers J, each made with notches on its under surface; and the lever A^2 , made with a slot and cross-pin; and the levers V and A' , substantially as and for the purposes set forth.

5. In a machine for rough-punching and rough-swaging ax-poll blanks, the combination with a pair of grippers G, G, which at their front ends are vertically pivoted to the machine table, and each made with a die-part recess on its inner opposite sides, and constructed to be operated substantially as described; of a two-part die D' , made with the

shoulder d^3 , formed oppositely on the inner side of each die-part in advance of its punching area, and each die-part arranged in one of said gripper recesses; and the rough-punch O' , made substantially as described, and operated to pass through a blank when held by said die and grippers, and then recede therefrom, as and for the purposes set forth.

6. The combination with the shaft S^2 , having bearings in the machine housing, of the sleeve I' , eccentrically arranged upon said shaft; the clutch-dog a^2 , pivotally arranged within a recess in said sleeve; the clutch-latch e^2 , arranged within a recess in said sleeve and caused to enter a recess e^4 , formed in said shaft, and by the spring e^5 , retained therein when not operated upon by the clutch-dog; the lever L^2 , pivoted to the under side of the cap C, and adapted when drawn in by the spring y^3 , to engage with said clutch-dog, and when drawn outwardly by the lever g^4 , to release and make active the clutch dog a^2 , substantially in the manner as and for the purposes set forth.

7. The two-part die D' , for swaging ax-polls, having each part thereof made with the interiorly opposite vertical side face d^2 , and with the shoulder d^3 , formed oppositely on the inner die-part sides in advance of its punching area, and each die-part made with a retaining lip d^5 , substantially as and for the purposes set forth.

8. The combination with two swaging die-grippers G, G, vertically pivoted to the machine table, of cam rollers R' , R^2 , made with the cams C^2 , and easing off cams M^4 , by which after the blanks are punched they will be loosely held by the die grippers, substantially in the manner as and for the purposes set forth.

Signed at Troy, New York, this 6th day of January, 1894, and in the presence of the two witnesses whose names are hereto written.

ETHAN ROGERS.

Witnesses:

W. E. HAGAN,
CHARLES S. BRINTNALL.