

(No Model.)

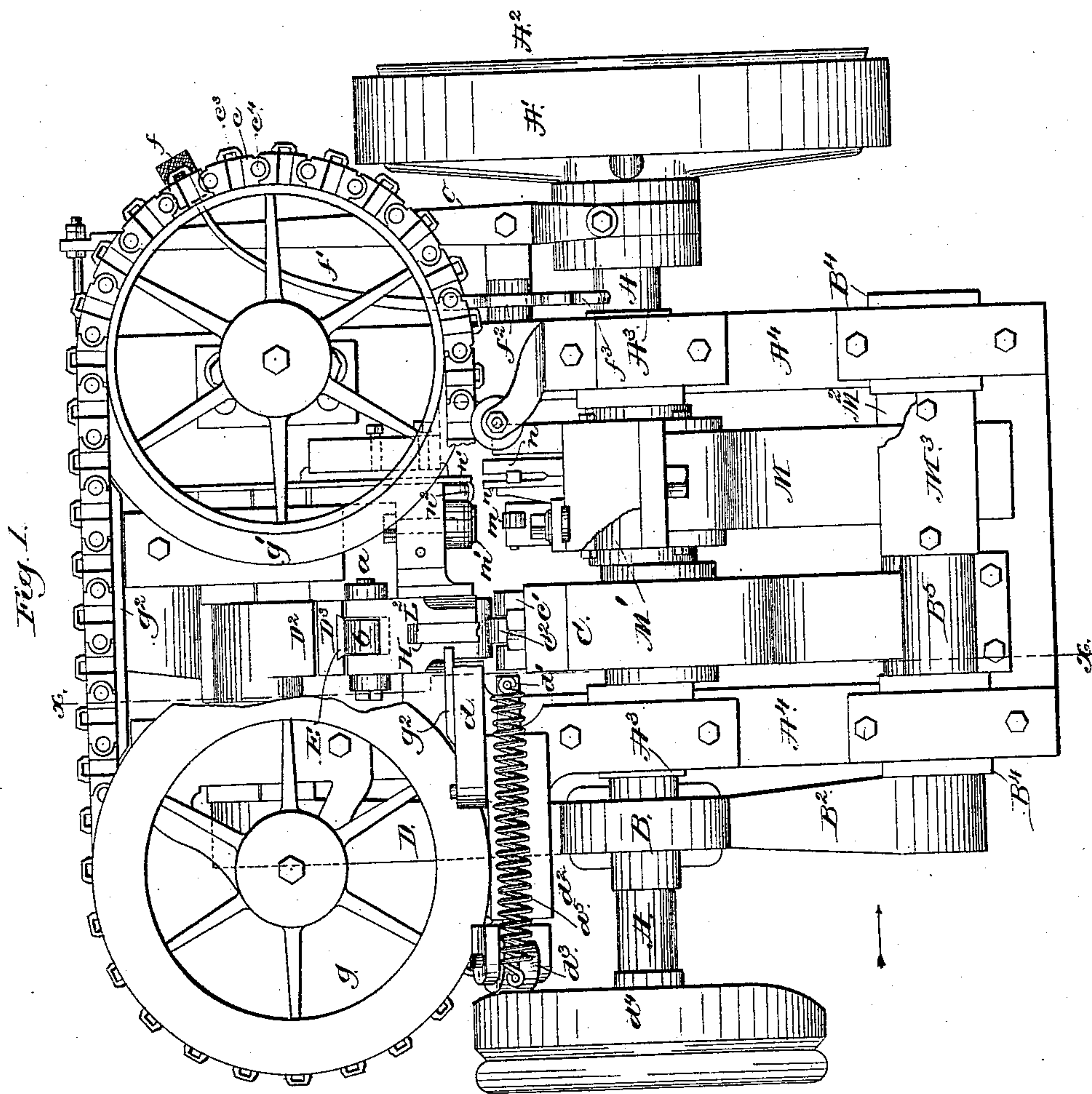
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J. B. WILLS.

MACHINE FOR FINISHING HORSESHOE NAIL BLANKS.

No. 287,206.

Patented Oct. 23, 1883.



Witnesses.

Fred A. Powell.

John F. C. Printz

Inventor.

John B. Wills.

by Crosby & Gregory  
Attys.

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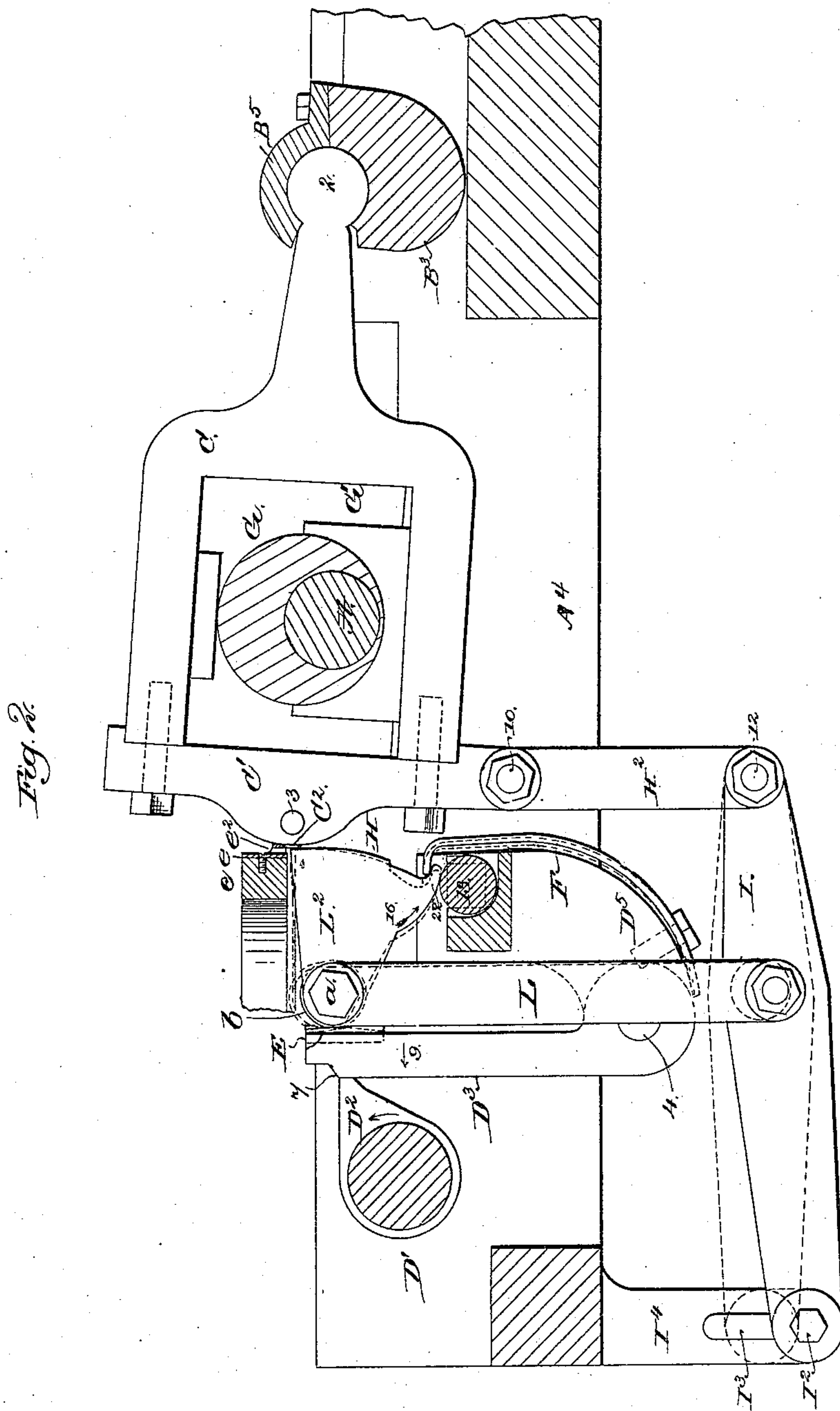
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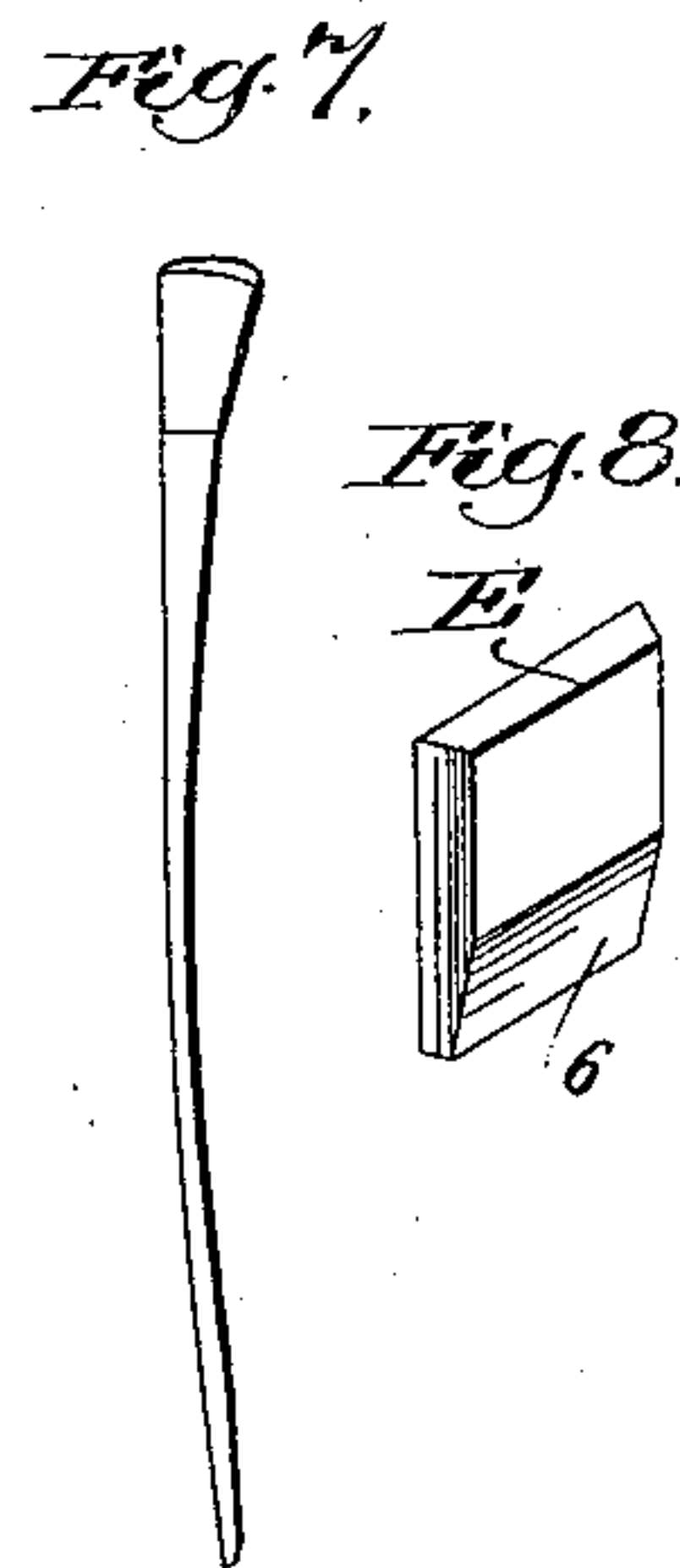
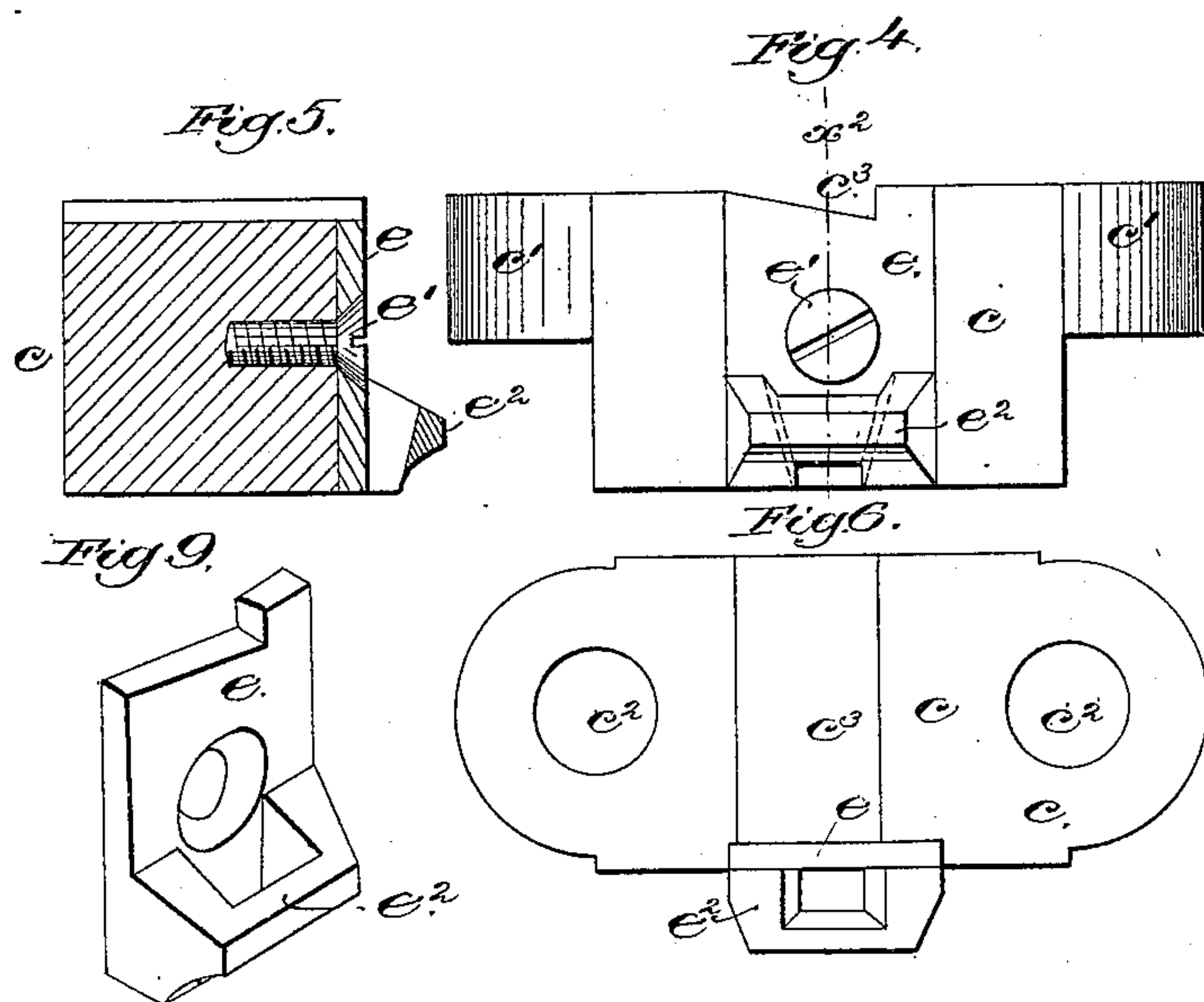
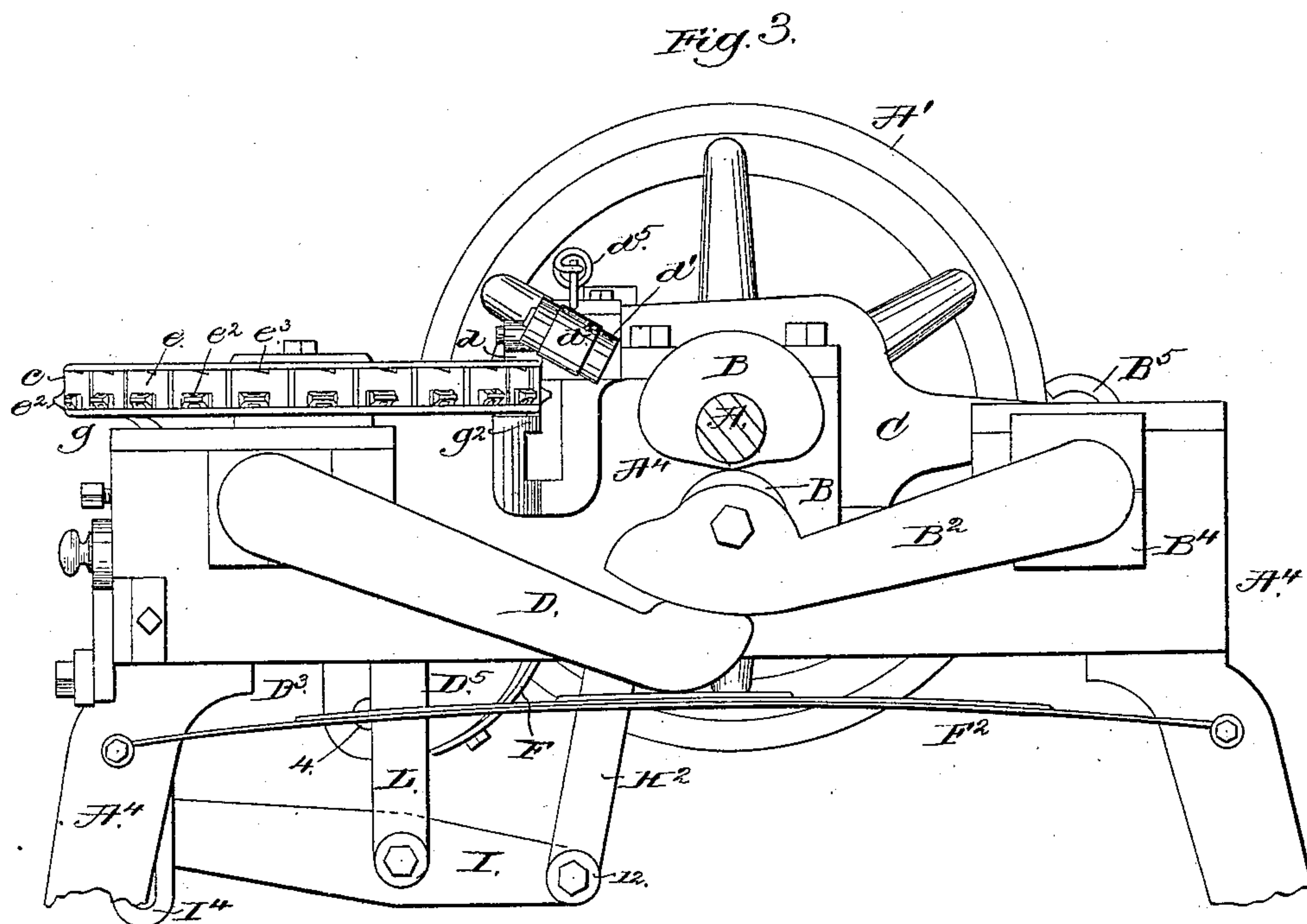
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# UNITED STATES PATENT OFFICE.

JOHN BOMAN WILLS, OF KEESEVILLE, NEW YORK.

## MACHINE FOR FINISHING HORSESHOE-NAIL BLANKS.

SPECIFICATION forming part of Letters Patent No. 287,206, dated October 23, 1883.

Application filed May 12, 1883. (No model.) Patented in Sweden June 24, 1883, No. 5,834.

*To all whom it may concern:*

Be it known that I, JOHN B. WILLS, of Keeseville, county of Essex, State of New York, have invented an Improvement in Machines for Finishing Animal-Shoe-Nail Blanks, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

10 This invention relates to improvements in that class of machines for finishing nail-blanks, wherein the blanks to be operated upon are carried by an intermittingly-operated chain, and are presented to dies to be drawn or elongated cold and beveled, and then sheared, the improvements having special reference to the machine for which Letters Patent No. 250,863 were granted to me the 13th of December, 1881.

My invention consists in improvements in the carrying-chain, in mechanism for cold drawing or elongating the blanks, and for curving the same, and in mechanism for discharging the nail from the carrying-chain.

25 In accordance with the first part of my invention, the links of the carrying-chain have secured to them detachable nail-holding plates having laterally-projecting ears provided with recesses or pockets beveled internally to receive the shank and beveled heads of the nail-blank, the said ears being also beveled at their outer faces, as will be described, to allow the drawing-roller to strike the blank close to its head, as will be described. The nail-blank having been rolled, beveled, and sheared, it must be discharged; so another part of this invention consists in the combination, with a carrying-chain, of a discharging device to strike the points of the nails and drive them from the pockets in the ears of the plates of the carrying-chain. To enable the fiber of the metal at the opposite faces of the nail-blank being rolled, and thus drawn or elongated, to be kept in a more uniform condition, and also to enable any desired curve to be given to the body of the nail, I have made the die-block that holds the die which is opposed to the roll so that its face may rock or turn in the arc of a circle, and at the same time the said die-block is made movable horizontally toward and from the roller-die, to permit the

introduction singly between the dies of the blanks to be drawn or elongated; so another part of my invention consists in a roller-die, combined with a rocking or tipping die, to operate as will be described.

Figure 1 is a top or plan view, partially broken out, of a nail-blank-finishing machine embodying my invention; Fig. 2, a section of Fig. 1 on the dotted line  $xx$ ; Fig. 3, a side view of the machine, looking at it in the direction of the arrow, Fig. 1, with the cam  $d^1$  removed. Fig. 4 is a side elevation of one of the links of the carrying-chain, with the attached nail-holding plate. Fig. 5 is a section of Fig. 4 on the line  $x^2$ . Fig. 6 is a top view or plan view of Fig. 4. Fig. 7 represents a nail-blank curved as it may be by the roller and bed-die, to be described. Fig. 8 is a view of the supporting-block E, to be described; and Fig. 9, separate view of the nail-holding plate.

The main shaft A, driven by a belt (not shown) on usual friction clutch-pulleys,  $A^1$   $A^2$ , has its bearings  $A^3$  of the frame  $A^4$ . This shaft A has a cam, B, (see Figs. 1 and 3,) which acts upon a roll,  $B^1$ , of an arm,  $B^2$ , and turns the rock-shaft  $B^3$ , (see Fig. 2,) having its bearings at  $B^4$ , and provided at its upper side with a cap-piece,  $B^5$ .

The upper side of the rock-shaft  $B^3$  is concaved, and the under side of the cap also concaved, to receive the round end 2 of the yoke C, to the front end of which is attached the cap  $C^1$ , having ears to receive the pin 3, which serves as the axis of the die-roller  $C^2$ . The rocking of shaft  $B^3$  moves the yoke and die-roller backward and forward longitudinally.

The arm  $B^2$  acts against a second arm, D, of a rock-shaft,  $D^1$ , having a cam-tappet,  $D^2$ , (see Fig. 2,) which bears against the rear side of the block-carrier  $D^3$ , forked at its lower end to fit a reduced part of the bracket  $D^5$ , the said carrier being attached to the said bracket by the pin 4. This carrier at its front side, near its upper end, is provided with a removable steel supporting-block, E, (see Fig. 8,) having a part, 6, of its face beveled more or less, according to the curve it is desired to give the body of the nail. The rear side of the block-carrier  $D^3$ , near the upper end of the latter, is shouldered or cut away, as at 7, to permit the



said carrier to fall back in the direction of the arrow 9 under the action of the spring F, when the tappet D is turned in the direction of the arrow on it far enough to permit the end of the tappet to rise above the corner of the shoulder 7. The arms D and B<sup>2</sup> are held up in the position Fig. 3 by the strong spring F<sup>2</sup>.

The main shaft A has an eccentric, G, which is fitted into a box, G', which in turn is fitted to guideways in the yoke C, (see Fig. 2,) so that rotation of the shaft A and eccentric G causes the yoke to vibrate about its fulcrum in the rock-shaft B<sup>3</sup>, so that the cap C' and its roller C<sup>2</sup> are caused to move up and down sufficiently to cause the roller-die C<sup>2</sup> to travel from end to end of the body of the nail, or from end to end of the die H, opposed to said roller-die.

The yoke, or, rather, the cap C', has a link, H<sup>2</sup>, pivoted to it at 10, and joined at its lower end by pin 12 with the die-operating lever L, having its fulcrum-pin I<sup>2</sup> adjustable in a slot, I<sup>3</sup>, of a hanger, I<sup>4</sup>, of the frame A<sup>4</sup>.

The lever I has pivoted upon it a link, L, having at its upper end a bolt or pin, a, which is extended loosely through a hole in the die-block L<sup>2</sup>, having the stud-die H, against which rests the back of the nail-blank, while the die-roller C<sup>2</sup> rolls over the face of the nail. This pin a has a roller, b, which bears on or against and rolls over the block E as the yoke is raised and lowered. The toe 22 of the die-block L<sup>2</sup> bears on a rest, 13, (herein shown as a roller,) to avoid friction, and the said toe is kept in contact with the said rest, which serves as a fulcrum for the die-block, by means of the spring F, one end of which is hooked to engage the said toe. This hook is not needed when the die-roller is descending, as the pressure exerted on the die-block at that time is sufficient to force it strongly against the said rest.

In the operation of rolling a blank from near its head to its point, the thickness of the block will be determined by the shape of the face of the die H, and the curve of the body of the block will be more or less, according to the shape of the block E and the position of the fulcrum I<sup>2</sup> of the lever I. When the die-roller C<sup>2</sup> descends to act upon a nail-blank, lever I, link L, and pin a are also drawn down, and during such movement the die-block L<sup>2</sup> is turned in the direction of the arrow 16, Fig. 2, causing the face of the die H to hold the said nail-blank closely against the roller-die C<sup>2</sup>, which then moves only in the arc of a circle, the yoke C and roller-die C<sup>2</sup> being then held forward by the cam B acting on the arm B<sup>2</sup>. The face of the die H is in substantially the arc of a circle, it varying from a true circle only to provide for the taper of the nail, the die being of greatest radius at its lower end. The curve in the body of the nail depends upon the position of the pin a and the face of the die H with relation to the path of movement of the roller-die C<sup>2</sup>. The higher the pin a when the said roller-die strikes the blanks the less the curve in the

blanks, and consequently by adjusting the fulcrum I<sup>2</sup> of the lever I and changing the block E the body of the nail-blank may be given any desired curve.

The carrying-chain is composed of links c, provided with ears c', having holes c<sup>2</sup>, to receive pins or bolts c<sup>4</sup>, the ears of adjacent links being thereby fitted together to form joints, as usual. Each link is grooved at its top transversely, as at c<sup>3</sup>, to form a ratchet-tooth, which may be engaged by the pawl d, pivoted on the reciprocating pawl-carrier d', having its shank guided in the guide-box d<sup>2</sup>. The head of the pawl-carrier is provided with a roller, d<sup>3</sup>, which is struck by the cam d<sup>4</sup>, fast on the shaft A, the said pawl-carrier being normally held by the spring d<sup>5</sup> with the roller d<sup>3</sup> against the said cam. The pawl moves the chain the distance of one link at each forward thrust, so as to properly place in succession each blank between the dies or devices to operate upon them. Each link has a nail-holding plate, e, attached to it by a screw, e', and each plate is provided with a projection, e<sup>2</sup>, in which is made a pocket (shown clearly in the drawings) beveled at its inner side, to properly receive the head of the blank, the projection e<sup>2</sup> holding the blank in position while being operated upon by the dies. The walls of the said projection bear against and guard each of the four sides of the head of the blank and nail, so that the same, once dropped into the pocket in the projection, cannot be removed except by lifting the nail vertically therefrom, which is done at the proper time by the discharging device f, (shown as a plate faced with rawhide, leather, or other material which will not bruise the point of the nail,) the said plate being carried by a lever, f', pivoted at f<sup>2</sup>, and having one end, f<sup>3</sup>, extended back of the said pivot, to be acted upon by a cam (not shown) on the shaft A. This discharging device is so pivoted with relation to the bottom of the chain that the nails struck by the discharger will be knocked up through and from the top of the pocket and so as to fall outside of the chain.

In all other endless carrying devices known to me the heads of the blanks and nails have been held by the carrying device only at their rear sides and side edges, a device not connected with or forming part of the chain being depended upon to retain the blanks or nails in the notches of the carrying device when being carried to and while being acted upon by the dies; but in this invention the projection e<sup>2</sup> surrounds the heads or blanks of the nails, and no other device or piece is required to retain or hold them while being presented to the dies.

The chain is extended over flanged sheaves g, g', and between the said sheaves are chain-rests g<sup>2</sup>. The die-stock M receives through it an eccentric, M', on the shaft A, and the tail of the die-stock is extended through an opening in a box, M<sup>2</sup>, mounted loosely on the shaft B, and having a cover or cap, M<sup>3</sup>, the said box oscillating as the tail of the die-stock is reciprocated through it. The die-stock carries a beveling-roller, m,



which rolls over the blank near its lower end, to form the usual bevel, the rear side of the blank being supported on an anvil,  $m'$ , made as a circular block having a circular hub extended into the frame-work and tapped to receive a bolt by which to hold the beveling-block in adjusted position, the said block being adapted to be rotated, so as to bring an unworn part of it into operative position.

10 The die-stock  $M$  also carries one part,  $n$ , of the shearing-dies, the other part, made as a punch and marked  $n'$ , being attached to the frame-work.

A spring,  $n^2$ , the lower end of which is attached to the frame-work, is interposed between the side of the die  $m'$  and the punch  $n'$ , to prevent the blank from striking against the side of the said punch as the blank is being placed by the carrier or chain between the shearing-die and punch.

The blank acted upon by the die-roll  $C^2$  may be left curved, as in Fig. 7, or more or less curved, by simply adjusting the lever  $I$  and changing the shape of the supporting-block  $E$ .

25 The shipper-lever is marked  $o$ .

By making the block-holding projection  $e^2$  act upon all sides of the head, the machine is simplified and made more positive in operation and as a means for accurately presenting the blanks to the several dies.

I claim—

1. The carrying-chain composed of links and nail-holding plates provided with projections having pockets to receive and retain the heads of the nail-blanks, fitting upon all sides of the same, combined with means to hold the said chain, substantially as described.

2. The sheaves  $g$   $g'$ , and carrying-chain having plates provided with projections and pockets to receive and hold the heads of the blanks on all sides, as described, and means to move the said carrying-chain, combined with a discharging device to act upon the points of and discharge the finished nails upward out from the said pockets, substantially as described.

3. The sheaves  $g$   $g'$ , and carrying-chain hav-

ing plates provided with projections having pockets to receive the heads of the blanks and inclose them on all sides, combined with the die-roller, means to move it, and the die  $H$  and die-block, the projections alone holding the heads of the blanks while the die-roller is made to travel over the shanks of the said blanks, substantially as described.

4. The die  $H$ , the die-block  $L^2$ , provided with the toe, and the rest or support for the end of the die-block, and the movable pivot  $a$  of the die-block, combined with the die-roll and with means to move the said die-roll and the said pivot, in order that the die-block may rock while the die-roll is being moved, substantially as described.

5. The die-block, its pivot  $a$ , and lever  $I$ , and means to adjust the said lever to place the said pivot in a normally higher or lower position, combined with the supporting-block  $E$  and block-carrier  $D^3$ , to operate substantially as described.

6. The block-carrier  $D^3$ , its beveled supporting-block  $E$ , the lever  $I$ , the links  $L$  and  $H^2$ , the die-roller, the cap  $C'$ , and means to move the said cap and die-roller, and the die  $H$  and the die-block  $L^2$ , pivoted upon the link  $L$  at  $a$ , and the rest for the other end of the die-block, combined with means to act upon and hold the block-carrier while the die-roller is descending in contact with the blank then resting against the die  $H$ , substantially as described.

7. The die-block provided with the toe  $12$ , and pivoted at  $a$ , the link  $L$ , and means to move it to slide and turn the die-block upon the said rest, combined with a spring to act upon the die-block and maintain it on the said rest, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN BOMAN WILLS.

Witnesses:

G. W. GREGORY,  
B. J. NOYES.