(No Model.) 2 Sheets—Sheet 1.

E. WOODWARD.

NAIL RACEWAY.

No. 580,589. Patented Apr. 13, 1897.

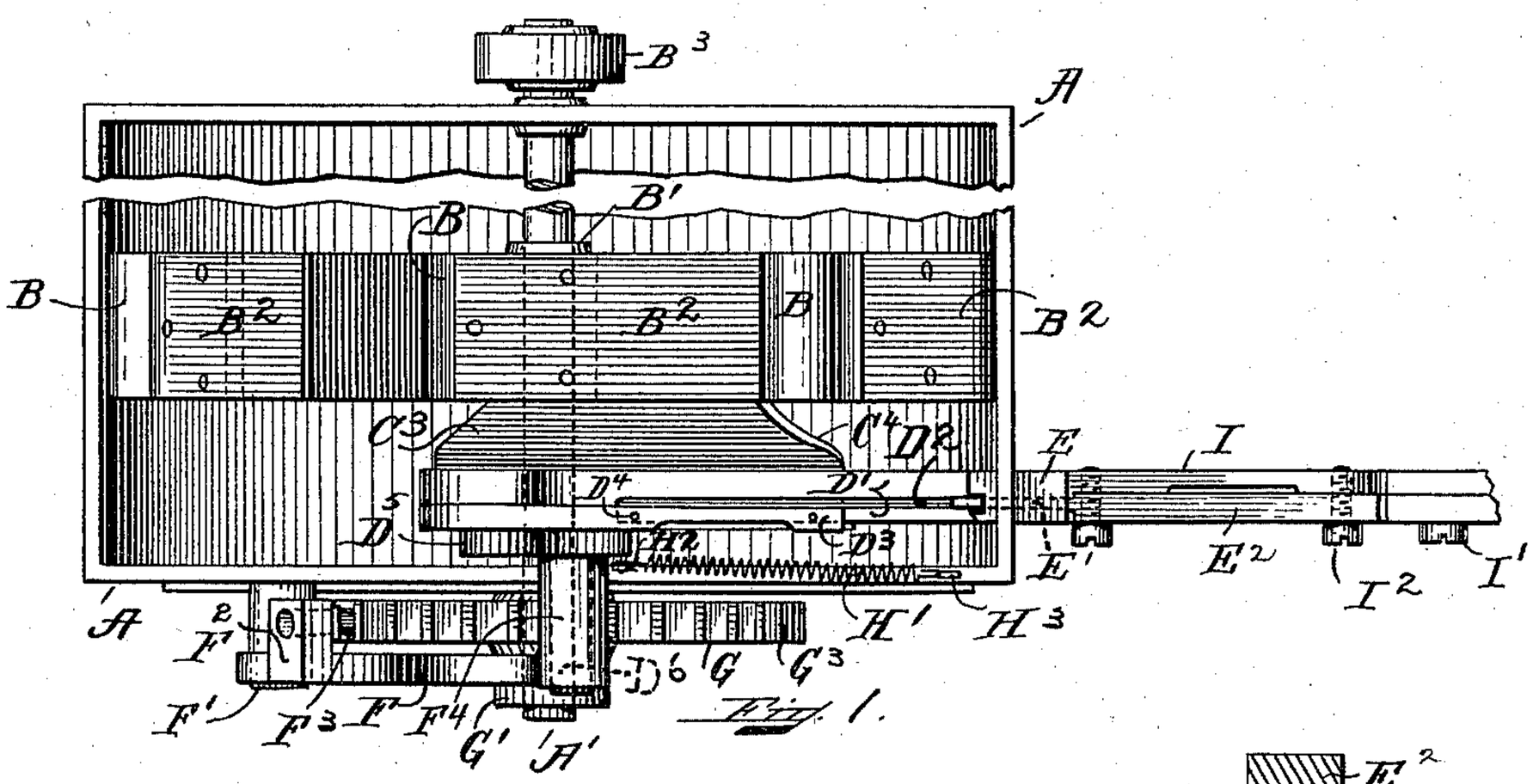

Fig. 1.

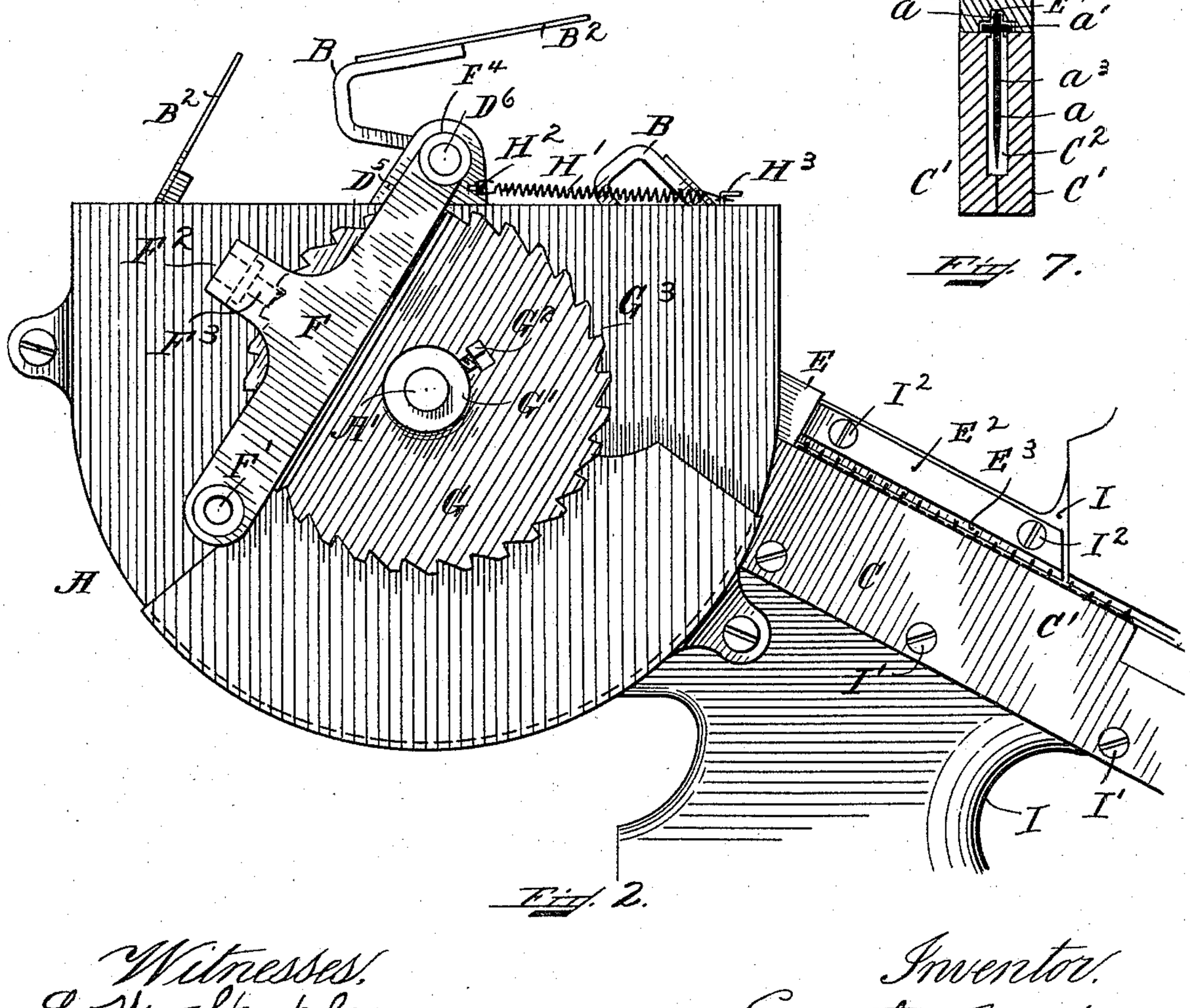

Fig. 2.

Fig. 7.

Witnesses.
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E. L. Harlow.

Inventor.
Erastus Woodward
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(No Model.) 2 Sheets—Sheet 2.

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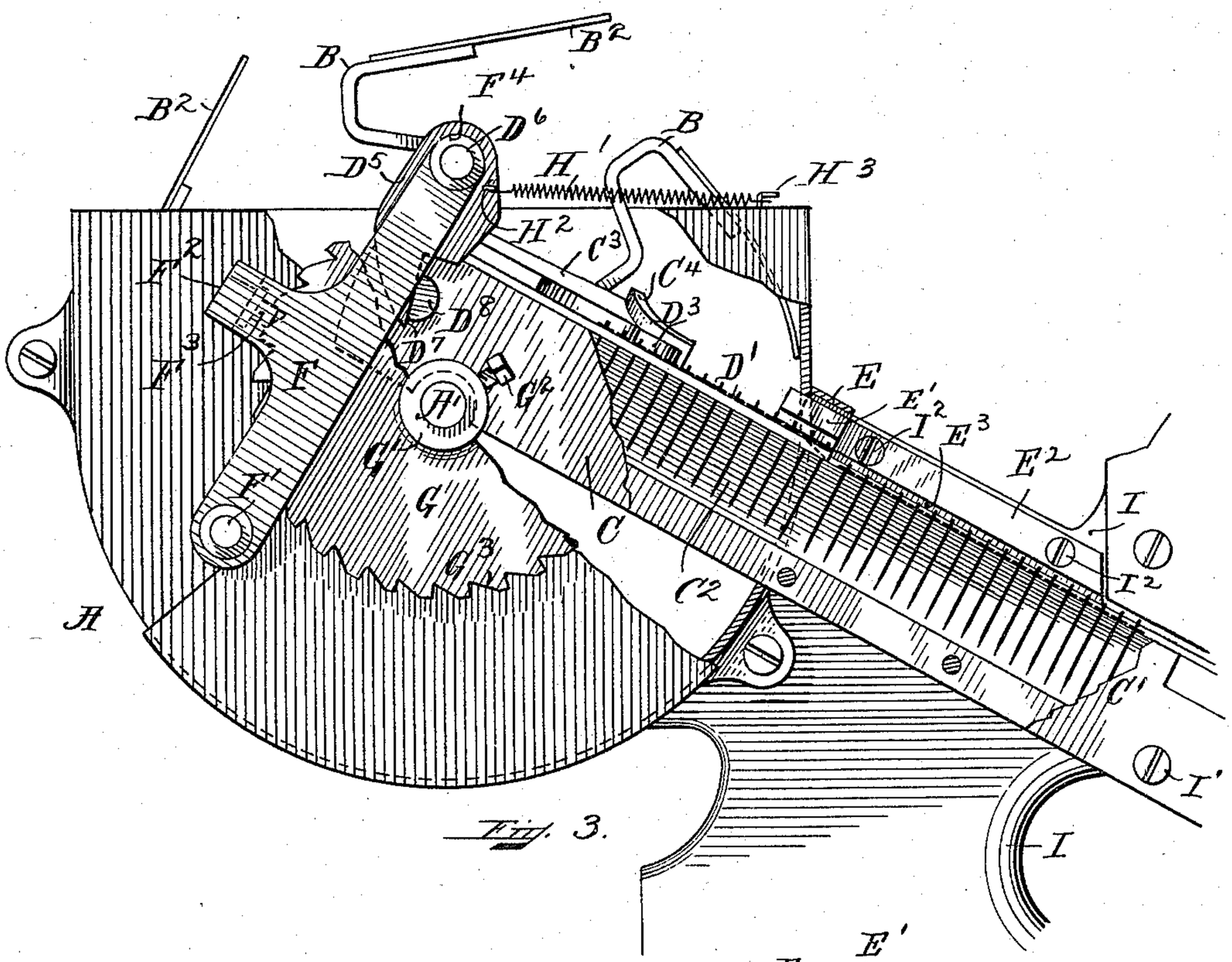

Fig. 3.

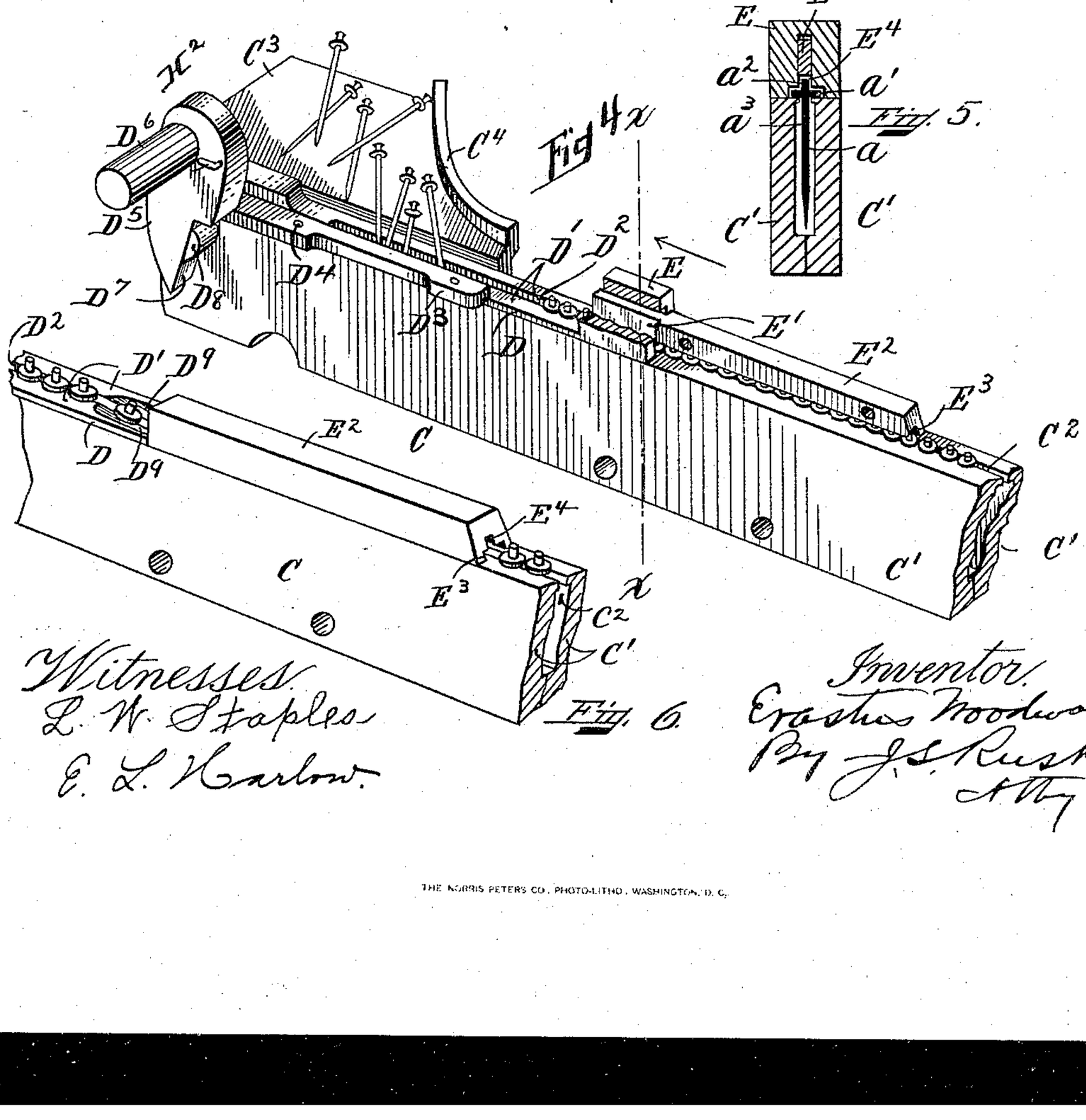

Fig. 4.

Fig. 5.

Fig. 6.

Witnesses.
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E. L. Harlow.

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UNITED STATES PATENT OFFICE.

ERASTUS WOODWARD, OF SOMERVILLE, MASSACHUSETTS, ASSIGNOR TO THE WOODWARD MANUFACTURING COMPANY, OF SACO, MAINE.

NAIL-RACEWAY.

SPECIFICATION forming part of Letters Patent No. 580,589, dated April 13, 1897.

Application filed February 13, 1896. Serial No. 579,145. (No model.)

To all whom it may concern:

Be it known that I, ERASTUS WOODWARD, of Somerville, county of Middlesex, and State of Massachusetts, have invented a new and useful Improvement in Nail-Raceways, of which the following is a specification; and I hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

The object of my invention, as will appear from the following specification, is to produce a nail-raceway adapted to feed wire collar-nails to the nail-driving mechanism of either heel-nailing machines or machines adapted to drive nails for other classes of work.

My invention consists of certain novel features hereinafter described, and particularly pointed out in the claims.

In the drawings which illustrate a construction embodying my invention, Figure 1 is a plan view of my improved nail-raceway with the nail-hopper and coöperating parts. Fig. 2 is a side view of the nail-hopper, nail-raceway, and coöperating parts. Fig. 3 is a side elevation, partly in section, to show the position of the nails in the nail-raceway. Fig. 4 is a detail view in perspective of the nail-raceway, the nail-guide over a portion of said raceway, the nail-shifter holder to which the nail-shifter is secured, and the inclined apron on which the nails are thrown by the nail-shovels from the nail-hopper. Fig. 5 is a cross-sectional view taken on the line $x\,x$, Fig. 4. Fig. 6 is a detail view in perspective of a modification embodying my invention. Fig. 7 is a cross-sectional view of a modification, taken on the line $x'\,x'$, Fig. 6.

Like letters of reference refer to like parts throughout the several views.

A represents a nail-hopper, in the opposite sides of which is journaled the shaft A′, on which there is secured, within the hopper, the nail-buckets B, cast with the hub B′ secured fast on the said shaft A′, and to the end of each nail-bucket B there is secured a nail-shovel B^2, of thin sheet metal, and on one end of the said shaft A′ there is secured fast a driving-pulley B^3, adapted to be revolved by a belt receiving its power from any suitable source and by means of which the shaft A′ is revolved and with it the nail-buckets B and also the ratchet-wheel G, hereinafter described.

Extending up into the nail-hopper is a nail-raceway C, composed of two opposite sections C′, held together and also secured to the frame I of the machine by means of suitable screws I′. The said sections C′ are recessed on their inner sides to form a throat C^2, and at the upper extreme end of said nail-raceway a nail-apron C^3 is secured to the side of one of the sections C′, (see Fig. 4,) which is inclined from its upper end toward the throat C^2 in the raceway C and is provided with a guard C^4 to guide the nails toward the throat C^2 and prevent them from falling back into the hopper as they are thrown upon said apron C^3 by the buckets B and shovels B^2 in the revolution of the shaft A′. Located at the upper end of said raceway and over the sections C′ is a nail-shifter D, consisting of two opposite pieces D′, between which there is provided a throat D^2, which is located over and in alinement with the throat C^2 in the nail-raceway (see Fig. 3) and of less width than the collar a' of the feeding nails a, so that in the downward movement of the nails after they leave the apron C^3 and pass into the throats D^2 and C^2, which are in alinement, the collar rests on the two opposite pieces D′ of the nail-shifter D. To the side of one of the pieces D′ there is secured, by means of rivets D^4, the shifter-holder D^3, and said shifter-holder D^3 is constructed at its upper end with a fixed vertical end D^5, having at its upper end a fixed arm D^6 and at its lower end a flat inner face D^7, adapted to engage with a lug D^8, projecting from the side of the raceway. At the lower end of said nail-shifter D there is formed a hollow rectangular cap E, and projecting into the cavity of said cap is a projection E′ of the upper nail-guide E^2, secured above the sections C′, forming the raceway C, and above the throat C^2. (See Fig. 4.) The extension E′ of said guide E^2 is of less width than the said guide and fits into the interior of the cap E and over the heads of the nails.

As shown in Fig. 4, the guide E^2 has a rib E^3 on one side, and by means of said rib and

the underside of said guide there is provided a guide for keeping the nails in an upright position after they have passed through the cap E under the extension E′ to beneath the guide E^2.

As will be seen from Fig. 5, a throat E^4 is provided in the cap E, which is of sufficient width to accommodate the head of the nail, and in the raceway C′ a throat C^2 is provided for the shank of the nail, and said throat E^4, as will be seen, is of less width than the collar a' of the nail a, but of sufficient width to allow the passage of the head a^2 of said nail, and the bottom of said cap E is arranged in such relation to the top of the sections C′ of the raceway C as to provide sufficient space for the passage of the collar A′ of the nail when lying flat, as shown in the drawings, but would prevent the entrance of the nail from the throat D^2 of the nail-shifter D if said nail was presented with the head foremost or the shank foremost or in any other position where the said collar was not lying flat on the sides D′ of the nail-shifter D, as shown in Fig. 4, so that in order for the nails to pass from the throat D^2 of the nail-shifter D through the cap E into the lower end of the raceway C it is necessary that said nails arrange themselves with the shank a^3 in the throat C^2 of the raceway C with the collar flat on the sides D′ of the nail-shifter D and with the head in position to pass into the lower end of the throat E^4 of the cap E and underneath the under side of the extension E′ of the guide E^2. Consequently under such provisions the nails must all pass with their points down in a substantially vertical position along the raceway, and in no case can the nails pass endwise, sidewise, or in any other position from the top of the raceway to the bottom of said raceway, because by means of said cap and the construction there provided the nails can only pass when arranged as shown. If the nails do not arrange themselves in the position shown in Fig. 4 as they are about to enter into the cap E, they will fall over the sides D′ back into the hopper, as it will be seen that the apron C^3 and the nail-shifter holder D^3 do not extend the entire distance to the cap E, but leave a free open space on each side. Consequently if the nails do not arrange themselves in a proper position in the nail-shifter D to enter and pass through the cap E they will fall over the sides back into the hopper.

The arm D^6 of the nail-shifter holder D^3 is mounted in the hub F^4, cast on the upper end of the lever F, pivotally secured on the lug F′, extending from the side of the hopper A, and on a lateral extension F^2 of said lever there is provided a fixed pawl F^3, held normally in the notches between the teeth G^3 of the ratchet-wheel G, having a hub G′ around the shaft A′ and a set-screw G^2, by means of which said ratchet-wheel G is secured fast on said shaft A′ and adapted to move therewith. Connected to the pin H^2, located on the vertical end D^5 of the nail-shifter holder, there is a spring H′, which at its opposite end is connected to another pin H^3, located on the top of one of the sides of the nail-hopper, as shown in Figs. 1 and 3, and said spring normally holds said flat surface D^7 of the vertical end D^5 of the nail-shifter holder in contact with the lug D^8 on the side of the nail-raceway C, and said spring also holds the pawl F^3 in engagement with the teeth of the ratchet-wheel G. Upon the revolution, however, of the ratchet-wheel G the teeth push said pawl F^3 outwardly, and with it the lever F, and said lever carries with it the arm D^6 and vertical end D^5, and also slides the nail-shifter D, with its cap E, upwardly along the top of the section C′ of the raceway C, and as said pawl F^3 falls into another notch between the teeth in the wheel G the spring H′ exerts its tension and pulls said vertical end D^5 forwardly, so that the flat surface D^7 comes in contact with the lug D^8 and gives a vibratory motion to the raceway, and at the same time the nail-holder D slides back along the raceway over the sections C′, and the ends of the cap E strike the ends of the guide E^2 beyond the extension E′ and also tend to shake said raceway, whereby upon each actuation of the lever F a vibration is given to the raceway, which agitates the nails and tends to keep up their movement down the said raceway. The extension E′ of the guide E^2, located in the throat E^4 of the cap E, acts as a guide to said nail-shifter in the up and down sliding movements of said nail-shifter along the top of the upper part of the raceway.

If desired, another rib can be provided on the other side of the guide E^2, so as to provide a groove in which the heads of the nails would be guided after passing the cap E, but, however, this is not necessary, nor in fact is the rib E^3 necessary, because after the nails have passed beyond the cap E they are in a vertical position and so close in contact that with the bottom of the guide E^2 near the top of the heads of the nails the said nails would not be apt to change their relative position, but would continue in a substantially vertical position down the raceway to the nail-driving mechanism.

In the drawings I have shown a construction embodying my invention for carrying out certain results, as above described, but it will be understood that various other constructions could be employed which would embody my invention and carry out the results set forth.

In Figs. 6 and 7 I have shown a modification in which the cap E and extension E′ are altogether omitted, and the upper guide E^2 is constructed with the groove E^4 adapted to fit around the head of the nail, and the lower ends of the nail-shifter D are adapted to contact with said guide E^2 in the reciprocations of said nail-shifter to and fro, caused by the rotation of the ratchet-wheel G, and in such construction the nails move along

the throat D^2 down into the cavity D^9, formed in the sides D', and thence pass into the throats E^4 and C^2 and out from the lower end of said guide E^2 down to the nail-driving mechanism.

It will be obvious that I have practically arranged two raceways or guides, one above and the other below, the groove or throat in the lower raceway being provided for the shank of the nail below the collar and the groove or throat in the upper raceway being provided for the head of the nail, so that it is necessary in order for the nails to move from the nail-shifter D into the guide E^2 that they arrange themselves in a substantially vertical position, as shown, with the collar in a substantially horizontal plane, so as to move along the throats E^4 and C^2 and thence down to the nail-driving mechanism.

It will be of course obvious that the ribs E^3 could be omitted from the construction shown in Figs. 6 and 7, and the guide E^2 could be simply provided with an upper groove which would receive the head of the nail, and the said upper guide E^2 would then be adjusted in such relation to the upper part of the sections C' of the raceway C that the space between said raceways would be less than the diameter of the body of the nail, so the nail could not pass sidewise under the guide E^2, and also less than the diameter of the collar of the nail, so that the nails could not pass endwise. Consequently the only position in which the nail could pass down the raceway from the nail-shifter would be a substantially vertical one, as shown in the figures of the drawings.

From all the above it will be clearly apparent that the devices provided are for the purpose of causing the nail to assume a substantially vertical position, as shown, and that in no other position can it pass from the nail-shifter to the nail-driving mechanism.

Having thus ascertained the nature and set forth the construction embodying my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a raceway for nails having collars, a lower guide provided with a longitudinal passage for guiding the shank of a nail and adapted to support the collar of the same on the edges of said passage, and an upper guide mounted above the lower guide having a longitudinal groove therein of a width less than the diameter of the collar registering with the passage in the lower guide and adapted to receive and guide the head of a nail and forming with said lower guide a passage for the reception of the collar of a nail.

2. In a raceway for collar-nails, a lower guide provided with a longitudinal passage for guiding the shank of a nail and adapted to support the collar of the same on the edges of said passage, and an upper guide mounted above the lower guide having a longitudinal groove therein of a width less than the diameter of the collar registering with the passage in the lower guide and adapted to receive and guide the head of a nail and forming with said lower guide a passage having a transverse width and of a depth sufficient to receive the collar of a nail, the depth of said passage being less than the diameter of the said collar, and a means for presenting a nail to said guide mechanism in an upright position with its shank down.

3. In a raceway for collar-nails, a lower guide provided with a longitudinal passage for guiding the shank of a nail and adapted to support the collar of the same on the edges of said passage, an upper guide mounted above the lower guide having a longitudinal groove therein registering with the passage in the lower guide and adapted to receive and guide the head of a nail and forming with said lower guide a passage for the reception of the collar of a nail, and a reciprocating cap for presenting a nail to said guide mechanism in an upright position with its shank down.

4. In a raceway for collar-nails, a nail-guide, a reciprocating shifter mounted on said guide, and a cap carried by said shifter for regulating the position of the nails as the latter pass into said guide.

5. In a nail-raceway, a lower guide provided with a throat for the reception of a nail-shank, an upper guide provided with a throat for the reception of a nail-head, a reciprocating shifter mounted on said lower guide, and a cap attached to said shifter and registering with an end of said upper guide.

6. In a nail-raceway, a lower guide provided with a throat for the reception of a nail-shank, an upper guide provided with a throat for the reception of a nail-head, a reciprocating cap mounted on said lower guide and registering with an end of said upper guide.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 11th day of February, A. D. 1896.

ERASTUS WOODWARD.

Witnesses:
L. W. STAPLES,
E. L. HARLOW.