

(No Model.)

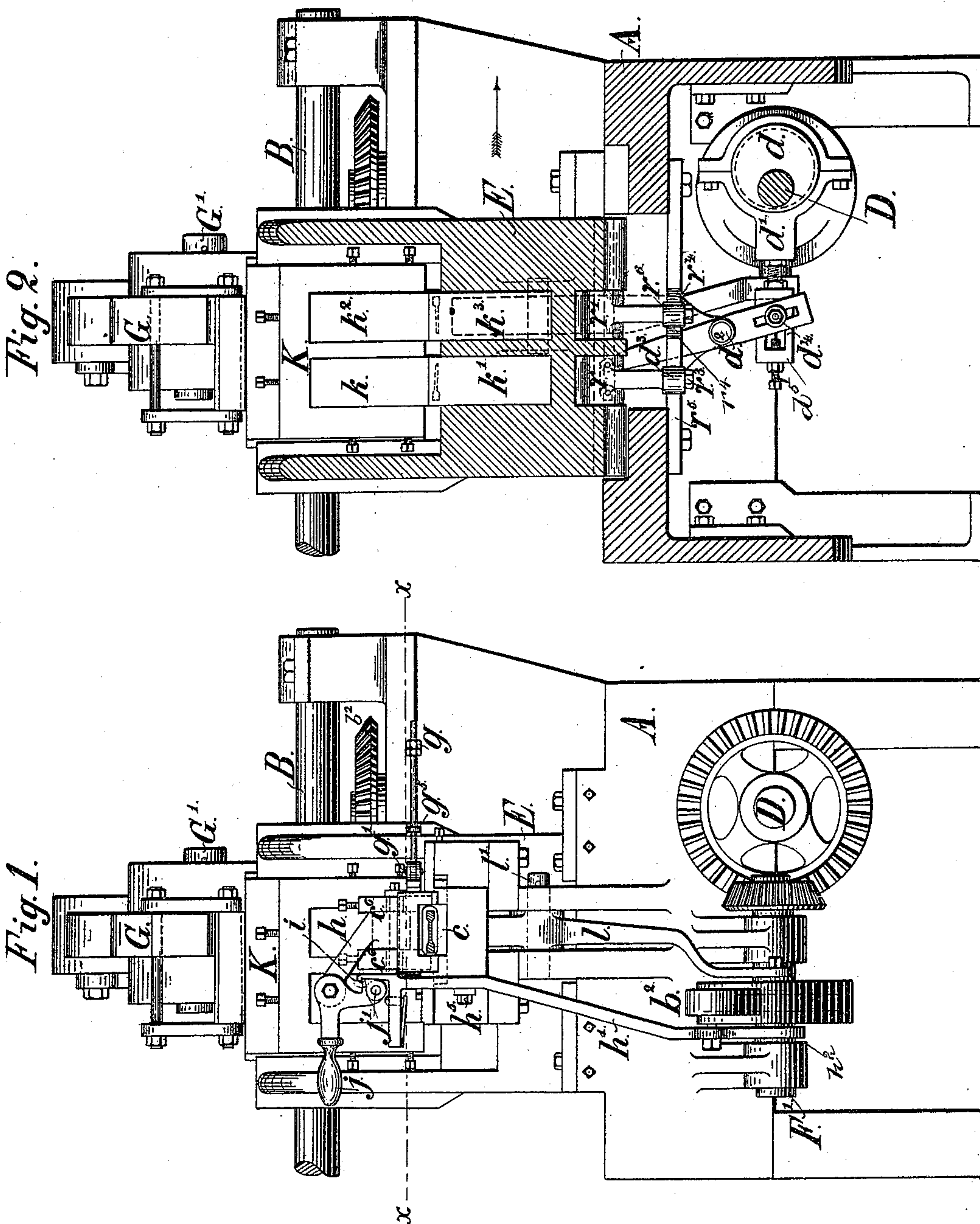
5 Sheets—Sheet 1.

P. A. NILSSON.

APPARATUS FOR THE MANUFACTURE OF NAILS.

No. 438,557.

Patented Oct. 14, 1890.



Witnesses.
 Clarence A. Bessendenberg.
 Walter Scott.

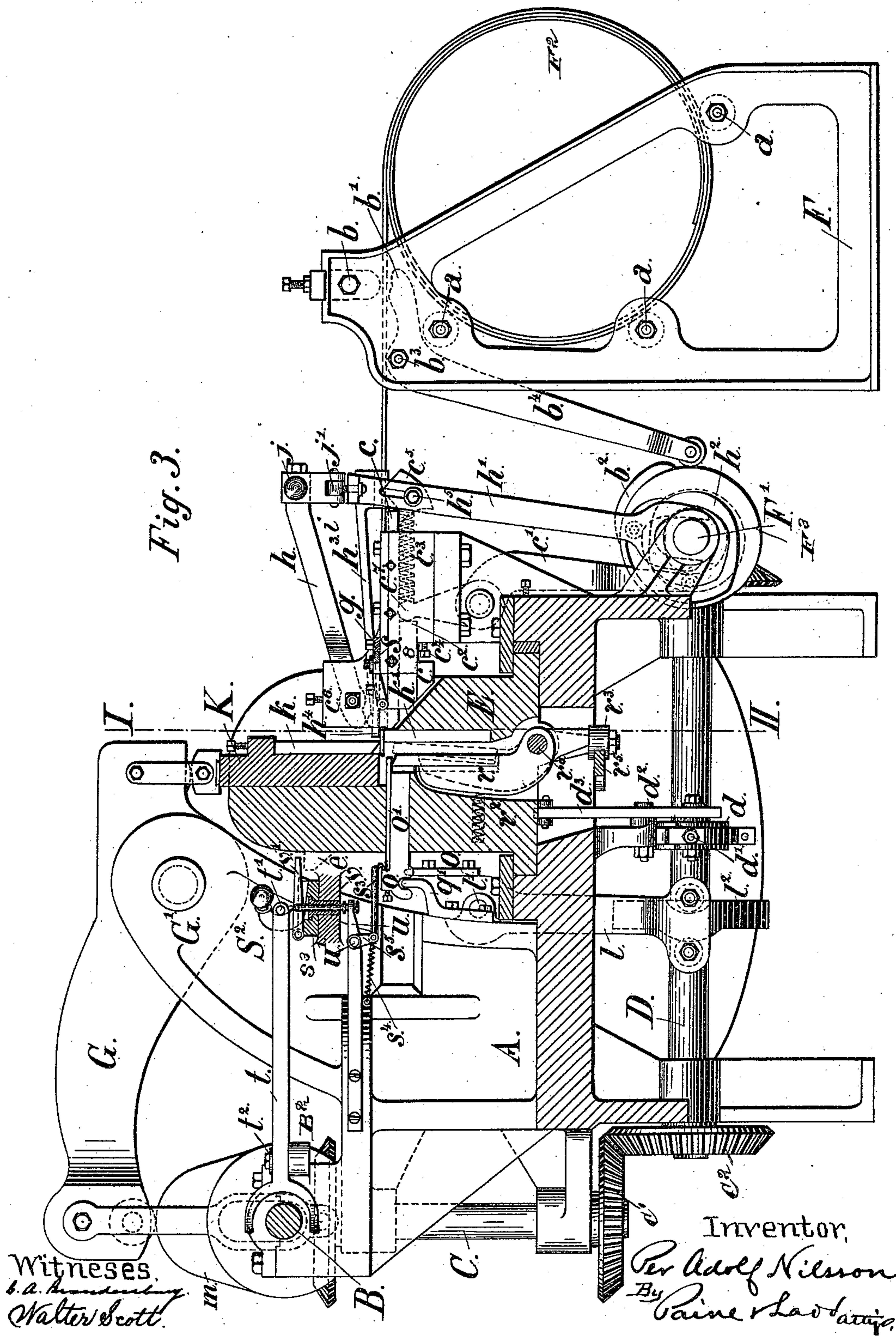
Inventor,
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P. A. NILSSON.

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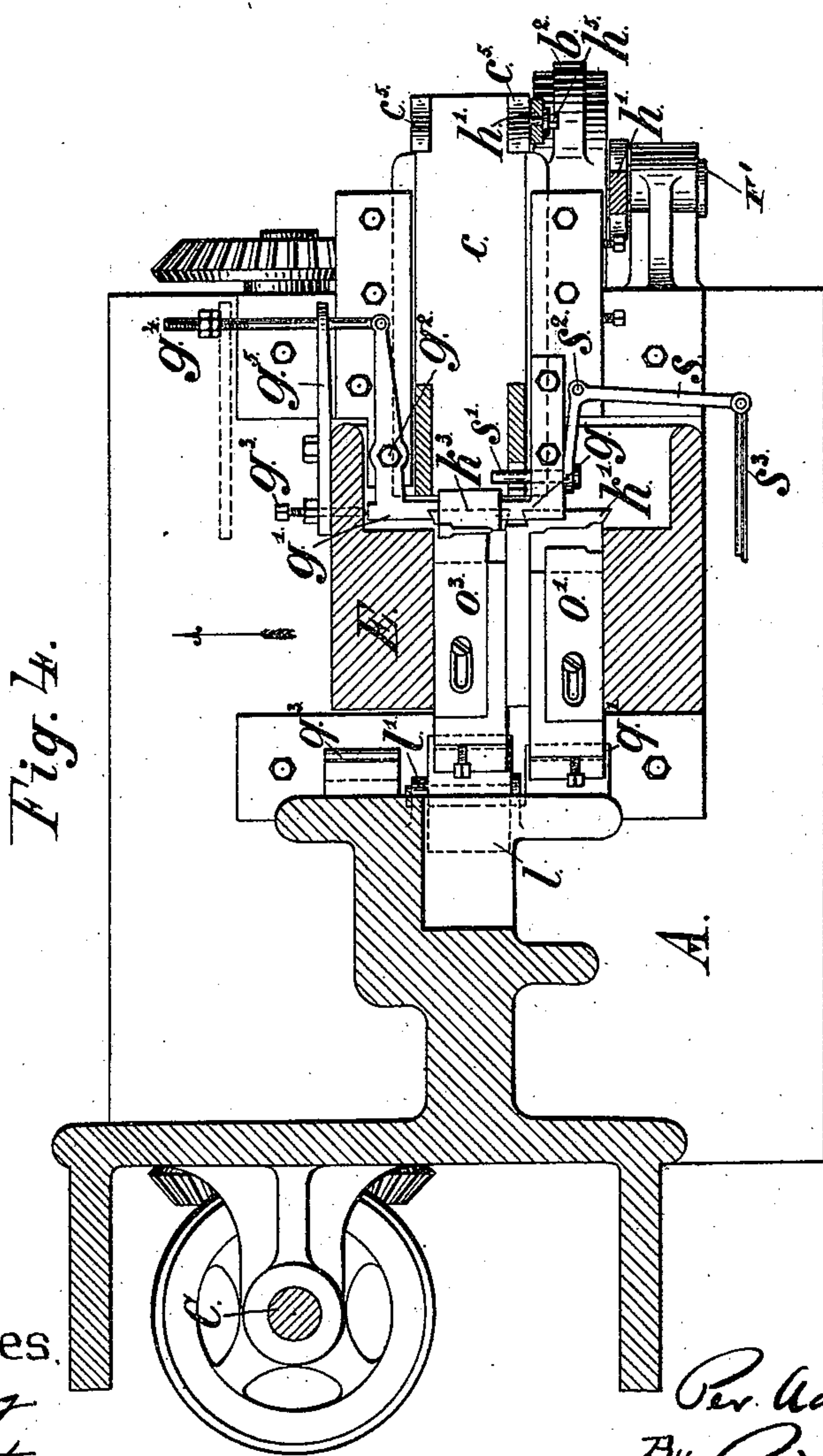
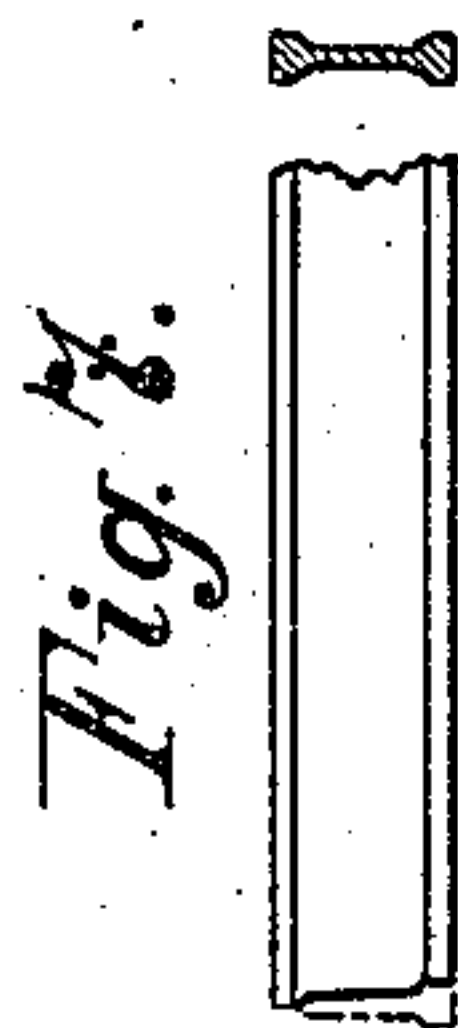
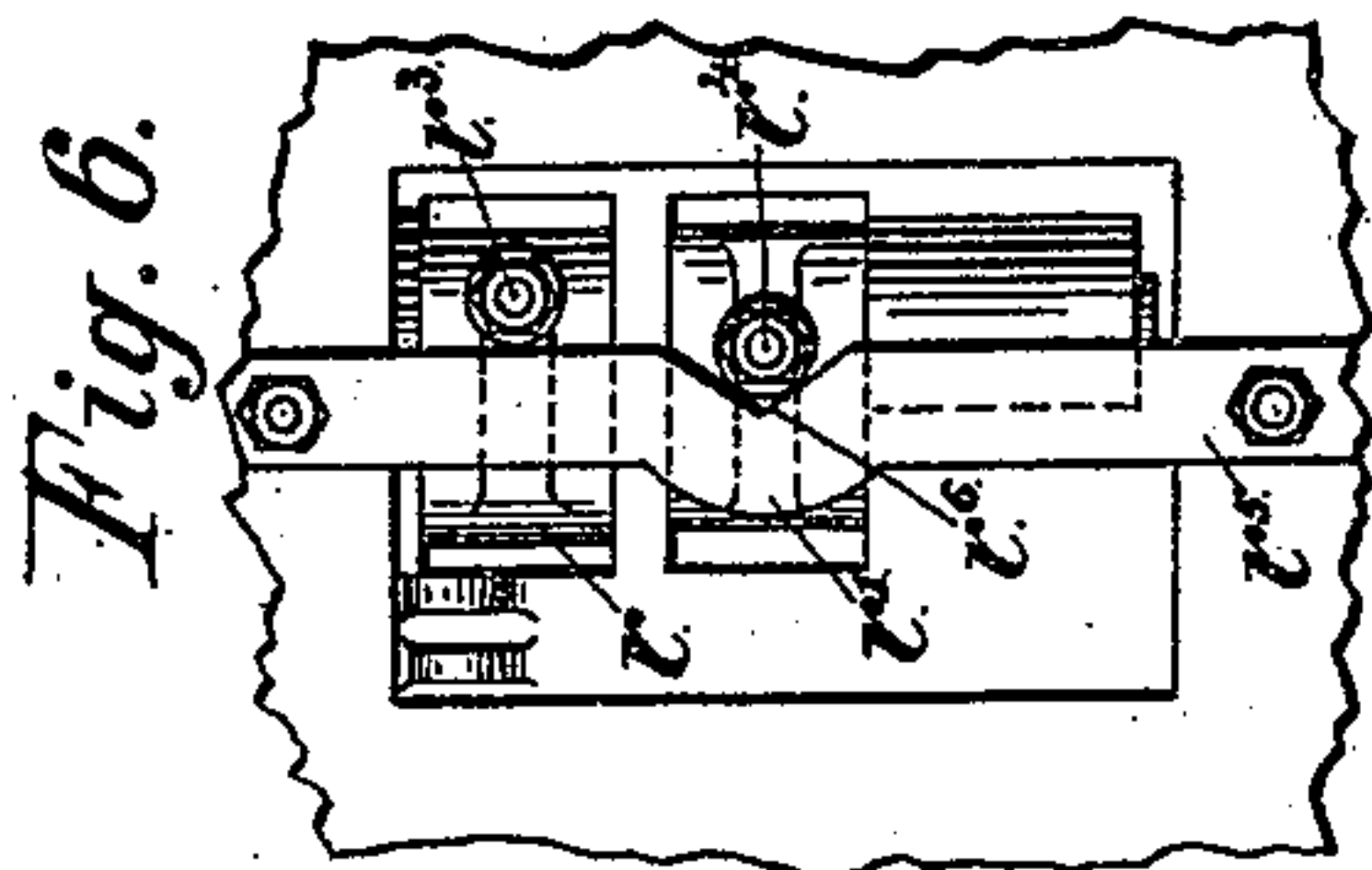
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P. A. NILSSON.

APPARATUS FOR THE MANUFACTURE OF NAILS.

No. 438,557.

Patented Oct. 14, 1890.



Witnesses.
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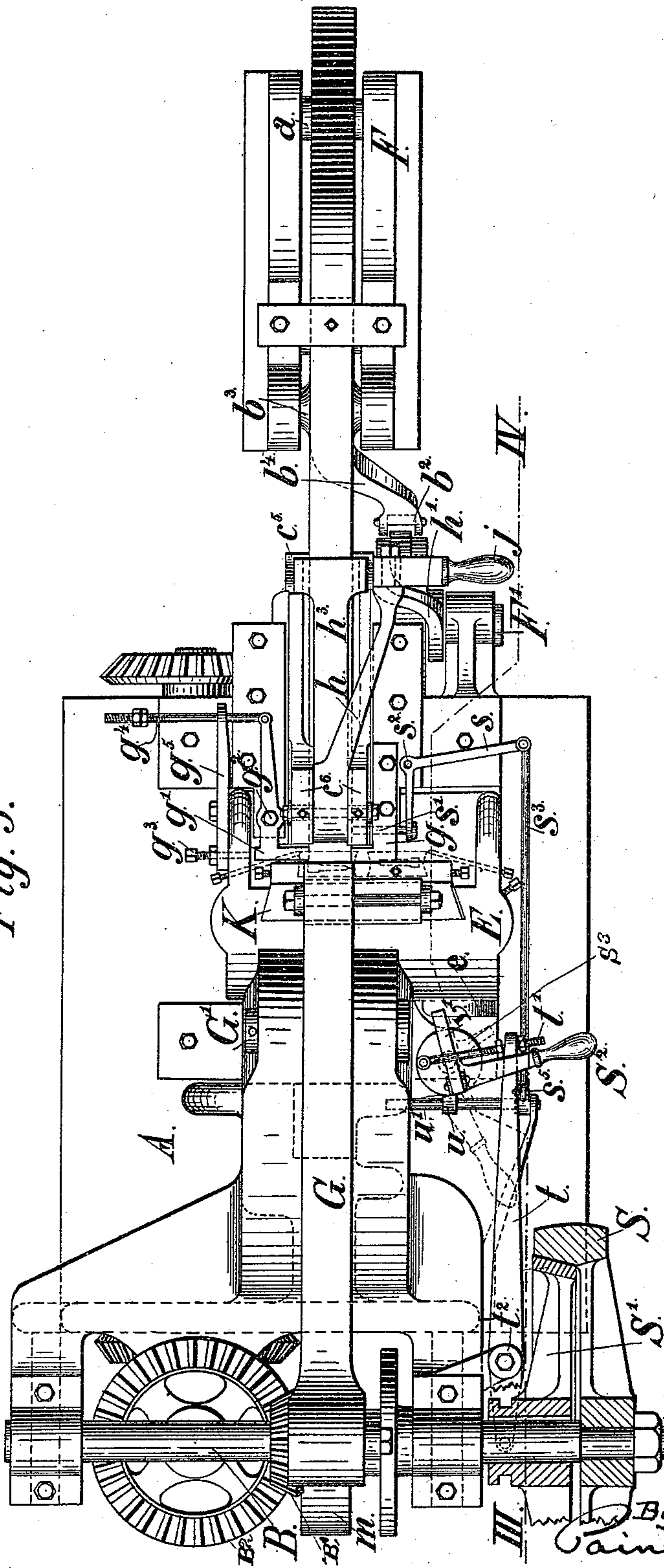
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Fig. 5.



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Walter Scott.

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Per Adolf Nilsson
By
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(No Model.)

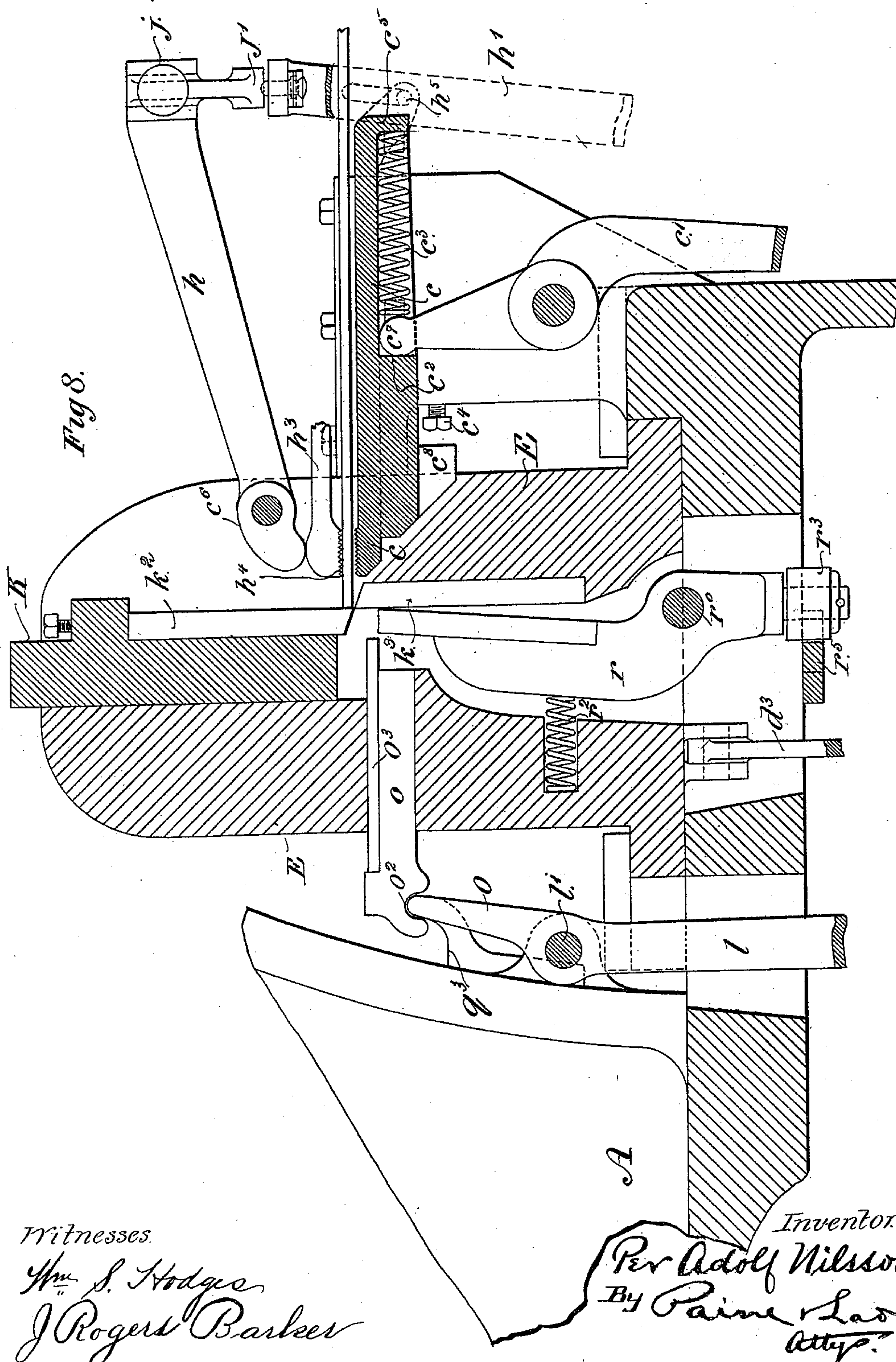
5 Sheets—Sheet 5.

P. A. NILSSON.

APPARATUS FOR THE MANUFACTURE OF NAILS.

No. 438,557.

Patented Oct. 14, 1890.



Witnesses.

Wm. S. Hodges

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UNITED STATES PATENT OFFICE.

PER ADOLF NILSSON, OF GOTHENBURG, SWEDEN, ASSIGNOR TO JOHANN HINRICH EHLERS, OF BAHRENFELD, GERMANY.

APPARATUS FOR THE MANUFACTURE OF NAILS.

SPECIFICATION forming part of Letters Patent No. 438,557, dated October 14, 1890.

Application filed January 29, 1890. Serial No. 338,495. (No model.)

To all whom it may concern:

Be it known that I, PER ADOLF NILSSON, a subject of the King of Sweden, and a resident of Gothenburg, in the Kingdom of Sweden, have invented certain new and useful Improvements Relating to the Manufacture of Nails and to Apparatus Therefor, of which the following is a specification.

My invention relates to improvements in the apparatus for the manufacture of nails; and it is particularly based upon a peculiar method of cutting out the nail-blanks from the iron or steel bars, which requires a corresponding shape of the cutters or knives; and the object of my said invention is to entirely obviate any waste of material whatever. I attain this object by the method hereinafter described and the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is an end view of the machine constructed according to my said invention; Fig. 2, a vertical section on the line I II in Fig. 3, which is a vertical section on the line III IV in Fig. 5. Fig. 4 is a horizontal section on the line *xx*, Fig. 1, and Fig. 5 a top view of the machine. Fig. 6 is a detail view of the mechanism actuating the dies for dressing the cut nail-blanks; and Fig. 7 a diagram of the iron or steel with a nail-blank cut off, with a vertical sectional view thereof. Fig. 8 is a partial vertical section through the middle of the machine drawn to a larger scale.

Similar letters refer to similar parts throughout the several views.

According to my said invention the nail-blanks are cut off from the metal bar or strip provided with raised side edges intended to form the heads of the nails by submitting the said bar or strip alternately to the action of two correspondingly-shaped cutters, arranged side by side and moving in the same direction transversely to the metal bar or strip, whereby at each stroke a blank is cut off, having the head portion alternately on the right and the left side.

The machine comprises a frame A, in which are mounted the horizontal main shaft B, for actuating the mechanism for operating the cutters, and another lower horizontal shaft D, driven by the said main shaft B through the

medium of suitable gearing B' B², a vertical transmission-shaft C and bevel-gears C' C², whereby the cutter-carrier E can be shifted horizontally and the guiding and feed apparatus operated.

The iron or steel bar or strip from which the blanks are to be cut is conveniently rolled up upon a drum F², guided between small rollers *a* upon a separate stand F. In moving toward the cutting-machine the said iron or steel bar passes between the stationary guide-block *b* and the curved cheek *b'* of a lever *b*⁴, pivoted at *b*³, which lever *b*⁴ in the intervals between the periodical forward movements of the iron or steel bar is acted upon by a cam *b*², mounted on a transverse shaft F', and guides the unrolling iron in the right direction by exercising thereon a corresponding pressure with its cheek *b'* in order to straighten it, as required, for its further treatment. The guide-block *b* is adjustable, so as to be capable of guiding metal bars of various thicknesses, although the play of the pivoted lever remains unaltered.

The cutters *k* *k*² are fixed in a frame K, located in a carrier E, reciprocating transversely to the direction of the feed of the metal bar, which is carried up to them on a carriage *c*. This carriage *c* is in its turn caused to reciprocate in the direction of the feed by a lever *c'*, Figs. 3 and 8, actuated by a cam F³, mounted on the shaft F'. The stroke of carriage *c* is adjusted to the width of the nail-blank required by means of a set-screw *c*⁴ in the guide of the carriage *c*, and a projection or stop *c*⁸ beneath the latter, Figs. 3 and 8. A spring *c*³ is arranged in the carriage and rests with its one end against the projection *c*⁵, while its other end rests on the lever-head *c*⁷. When the carriage makes its forward stroke—i. e., toward the cutters—the length of the same is regulated by the cam F³, lever-head *c*⁷ bearing against projection *c*² of the carriage. In returning, however, the stop *c*⁸ of the latter will come in contact with the screw *c*⁴, thereby arresting the carriage, while the lever *c'*, which has an invariable stroke, continues the same, simply compressing the spring *c*³. At the front end of the carriage, situated under the end of the metal bar, teeth are arranged, while

a gripper h^3 , having teeth h^4 , and oscillating on the knife-edges formed on the upper part of the projections c^5 is adapted to be pressed downward by the lever h , pivoted at its one end in the carriage at c^6 , and thus to grip the iron bar between its teeth and those on the carriage, Figs. 3 and 8. Lever h is operated from the cam h^2 by lever h' and intermediate hook i , provided with a handle j and a roller j' , and pivoted to lever h at i' , Fig. 1. Lever h' has a horizontal platform at its upper end, in which a pin i^0 , having its top rounded off is situated and actuated upward, so as to project through the upper surface of the platform by a spring from underneath. The object of this arrangement is to enable the gripper mechanism to be set out of gear at any moment, which is accomplished by pushing the handle j upward, when the roller j' will pass over the pin i^0 , pressing the same down, and hook i will be placed out of contact with the corresponding hook of the lever h' , and thus the levers h and h' disengaged, whereby h is thrown out of gear. Lever h' is guided on the projection c^5 of the carriage c by a slit and pin h^5 .

The gripper mechanism operates in the following manner: When the carriage makes its forward stroke, the lever h is elevated at its front end, thus depressing with its other end the gripper h^3 , which grips the metal bar, thus moving it forward with the carriage. The motion of carriage c , together with the metal bar, is so regulated that while the cutters are open the metal is moved forward a distance equivalent to the width of one nail-blank, and thereby placed between the cutters, in which position it remains until the blank is cut off. In order to prevent the metal bar from retiring when released by the gripper on the backward stroke of the carriage the same is firmly maintained in the position it has taken up between the fixed cheek g and the movable one g' , Fig. 5, pivoted at g^2 by the arrangement hereinafter described, while the carrier E in the interval between two forward steps of the metal changes the direction of its sideward motion it causes on one side the adjusting-screw g^3 to press against the back surface of cheek g' , pushing it toward g , and thereby clamping the metal bar, whereas in moving in the opposite direction the screw-bolt g^4 , supplying the place of the adjusting-screw g^3 , moves the cheek g' forward in the same manner when the arm g^5 of the carrier E butts against the adjustable nut on the bolt g^4 , which accordingly tightens the said cheek g' , Fig. 5.

The arrangement for cutting off the blanks consists of two pairs of cutters k k' and k^2 k^3 operating conjointly, the cutters k' k^3 being rigidly fixed in the lower portion of the carrier E with their sharp edge upward, while the others are fitted in the upper carriage K with their cutting-edge downward. The said carriage K is made to reciprocate in the carrier E , so as to cause the cutting-edges of the

upper cutters k k^2 to pass close by the corresponding edges of the lower pair of cutters k' k^3 , so that the metal bar introduced between the cutters, while they are open, is in the next moment cut as though by a pair of scissors. The cutting-blade of each of the cutters thus arranged for joint operation is so shaped as to impart the desired form to the cut surface of the blank, so that the cutters situated on the right will cut off a blank with the head portion on the right, and similarly the cutters of the left side will produce a blank with the head portion on the left, without any waste of metal in either case. Fig. 7 of the drawings illustrates the manner in which the nails are cut, the full lines showing the result of the action of one pair of cutters, while the dotted lines indicate the result of the operation of the immediately preceding pair.

The carriage K , in which the upper cutters k k^2 are tightly fitted, is operated from a cam m on the main shaft B through the medium of a press-lever G , and is connected with this lever G in such a manner as to be capable, together with the carrier E , of being shifted laterally, so that the said lever G exercises its pressure each time upon the portion of the carriage K under which the cutter then operating is fitted.

Fig. 2 of the drawings represents the position of the carrier E in which the cutter k^2 , arranged on the right, has just cut a blank from the iron or steel bar and the carriage K commences to recede. The hereupon following lateral displacement of the carrier E in the direction of the arrow, Fig. 4, does not take place until the feed-carriage c has completed its periodical forward stroke, and the gripper h^3 has seized hold of the iron or steel bar, so as to prevent it from receding. As soon as the cutter-carrier E is then shifted, the left-hand cutters opened in the meantime cut off a blank with the head portion on the left.

To provide for the reciprocation of the carrier E at suitable intervals corresponding with the periodical advance of the carriage c , an eccentric d is so mounted upon the lower horizontal shaft D as to impart motion to the carriage E , though not direct, but through the medium of a lever d^3 , pivoted at d^2 to the frame A , the lower arm of which lever is operated by a slide d^4 guided in the slot of a link d^5 connected to the eccentric-rod d' , Fig. 2.

In order to dress or stamp the blanks into shape after they have been cut off, the following mechanism is provided: Sliding in the carrier E and situated exactly behind each of the fixed cutters k' k^3 are two horizontal dies o' o^3 , mounted in a carrier in said carriage and having grooves o^2 in their back ends. The dies are operated forward by a lever l , pivoted at l' in the machine-frame and actuated by cam l^2 , as shown in Fig. 3, said lever being provided with a vertical upward projection o . When the lever is in its backward position—i. e., away from the cutters—projec-

tion or thumb o stands in a line with two hooks $g' g^3$, Figs. 3, 4, and 8. Pivoted in the carrier E at r^0 are two levers $r r'$, Figs. 3, 6, and 8, having below their pivots rollers $r^3 r^4$, which run on a guide-rod r^5 , fixed under the frame, and containing a curve or notch r^6 , Fig. 6. Said levers are each under the influence of a spring r^2 . When, now, immediately before a nail has been cut, the carrier E reciprocates, that lever r or r' which is opposite the cutter just coming into operation comes with its roller r^3 into the notch r^6 of the bar r^5 and will be pressed forward on the cutters by its spring r^2 , as shown in Fig. 8 or in dotted lines in Fig. 3. The nail on being cut will therefore fall onto the upper edge of this lever. The die o' or o^3 now advances by lever l , pressing the nail between its end and the flat side of the cutter and dressing or shaping it. The dies of o' have their ends cut to form the reverse of the cutter against which they work. Thus if the cutter has the shape shown in full lines in Fig. 7 the respective die will have its end shaped as shown in dotted lines in the same figure. As soon as the carrier E reciprocates again, the roller r^3 will pass out of the notch r^6 , whereby lever r or r' will be forced back against the pressure of its spring r^2 , allowing the finished nail to fall down under the machine. The hooks or rests $g' g^3$ are for retaining the die o' or o^3 , which is not at the moment being operated. Thus when the carrier E moves in the direction of the arrow, Fig. 4, die o' will be passed off hook g' and brought over the projection o on lever l , so that on the next movement of the latter the die o' will be slid forward while at the same movement of E in the direction above stated the die o^3 will be passed over the hook g^3 and retained.

The machine is driven from a loose pulley S on the main shaft B, acting as a fly-wheel, through the medium of a friction-clutch S', adjustably fitted by groove and tongue upon the shaft B. The clutch is thrown into and out of gear by means of the hand-lever S² of a pivoted disk S³, which is connected through the medium of an adjustable bolt t' to the disengaging-lever t , pivoted at t^2 . The clutch S', however, is also thrown out of gear automatically as soon as the supply of metal is exhausted, and the end of the metal strip when moved forward toward the cutters passes the pin s' of the bell-crank lever s , pivoted at s^2 , Fig. 5.

Under the action of a spring s^4 , Fig. 3, on the connecting-rod s^3 , Figs. 3 and 4, and of the lever-arm s^5 , mounted on the spindle u' , the forked or hooked arm u , mounted on the same spindle, can be turned round, whereupon it operates the bolt v and causes it and the catch or tumbler v' to descend, the latter being brought into the path of a projection e on the carrier E, which in its next backward stroke (opposite to the direction of the arrow in Fig. 2) brings round the catch v' and the disk S³ of the hand-lever S² into its other position.

(Shown in dotted lines, Fig. 5.) The bolt t' , which is connected with the disk S³, then throws the clutch S' out of gear through the medium of the lever t in the same manner as if the hand-lever S² was used for the purpose.

Although I have only described the mechanisms as used for cutting horseshoe-nails, I wish it clearly understood that the same method and mechanisms may be used for cutting other blanks.

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

1. In a machine for cutting nail-blanks and similar objects from a continuous metal bar or strip, the combination of the mechanism for periodically advancing said bar or strip toward the laterally-reciprocating cutters, consisting of a carriage c , an oscillating lever c' from a cam having its stroke regulated by set-screws c^4 , and a spring c^3 , the gripper h^3 , operated by lever h , connected with the reciprocated rod h' by means of a hand-lever j , hook j' , and catch i , substantially as and for the purpose hereinbefore described.

2. In a machine for cutting nail-blanks and similar objects from a continuous metal bar or strip, the combination of the mechanisms for maintaining the metal strip in position during the backward motion of the feed mechanism, consisting of the stationary cheek g and the oscillated cheek g' , the set-screw g^3 , adjusting-screw bolt g^4 , and arm g^5 of the carrier E, operating together substantially as and for the purpose set forth.

3. In a machine for cutting nail-blanks from a continuous metal bar or strip, the mechanism for dressing or stamping the blanks into shape, consisting of the dies $o' o^3$, reciprocating in the carrier E toward the lower stationary cutter-cheeks $k' k^3$, and the levers r and r' , pivoted to the carrier E and operated by the shifting motion of said carrier through the medium of a bar r^5 , having a recess r^6 , substantially as and for the purpose specified.

4. In a machine for cutting nail-blanks and similar objects from a continuous metal bar or strip, the mechanism for automatically throwing the friction-clutch S' into and out of gear, consisting of a pivoted disk S³, carrying the hand-lever S² and connected to the disengaging-lever t by an adjustable bolt t' and to the pin s' , pressing under the action of a spring s^4 toward the side of the metal bar or strip, a catch v' , a projection e of the carrier E, the bolt v , the levers u and s^5 , rod s^3 , and bell-crank lever s , substantially as and for the purpose hereinbefore described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 23d day of October, 1889.

PER ADOLF NILSSON.

Witnesses:

ANDERS GUSTAV NILSSON,
LOTH REINHOLD JOHANSSON.