

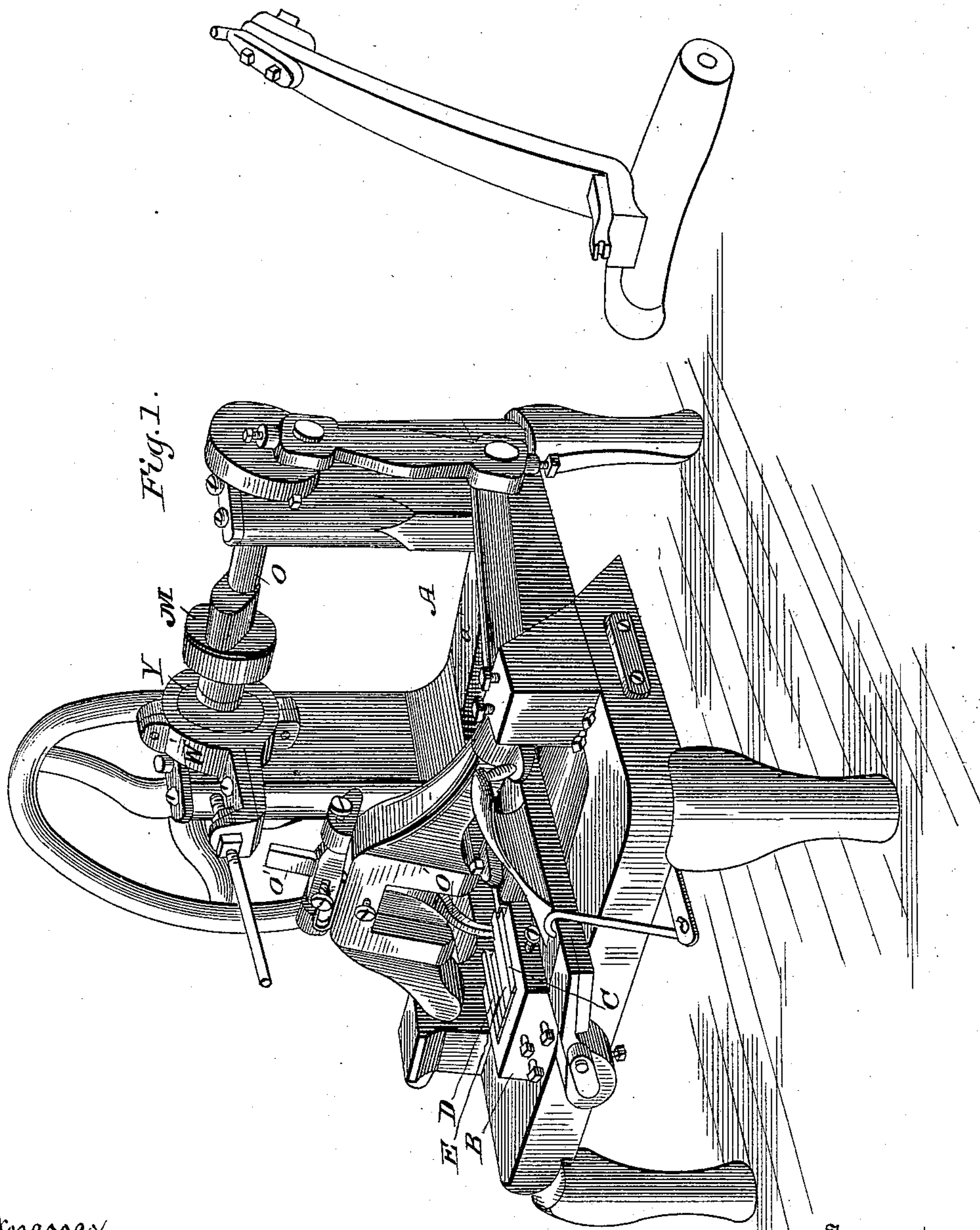
(No Model.)

5 Sheets—Sheet 1.

G. W. McKIM.
WIRE NAIL MAKING ATTACHMENT.

No. 447,895.

Patented Mar. 10, 1891.



Witnesses,
Fred G. Dieterich
W. D. Blondel

Inventor
George W. McKim

(No Model.)

5 Sheets—Sheet 2.

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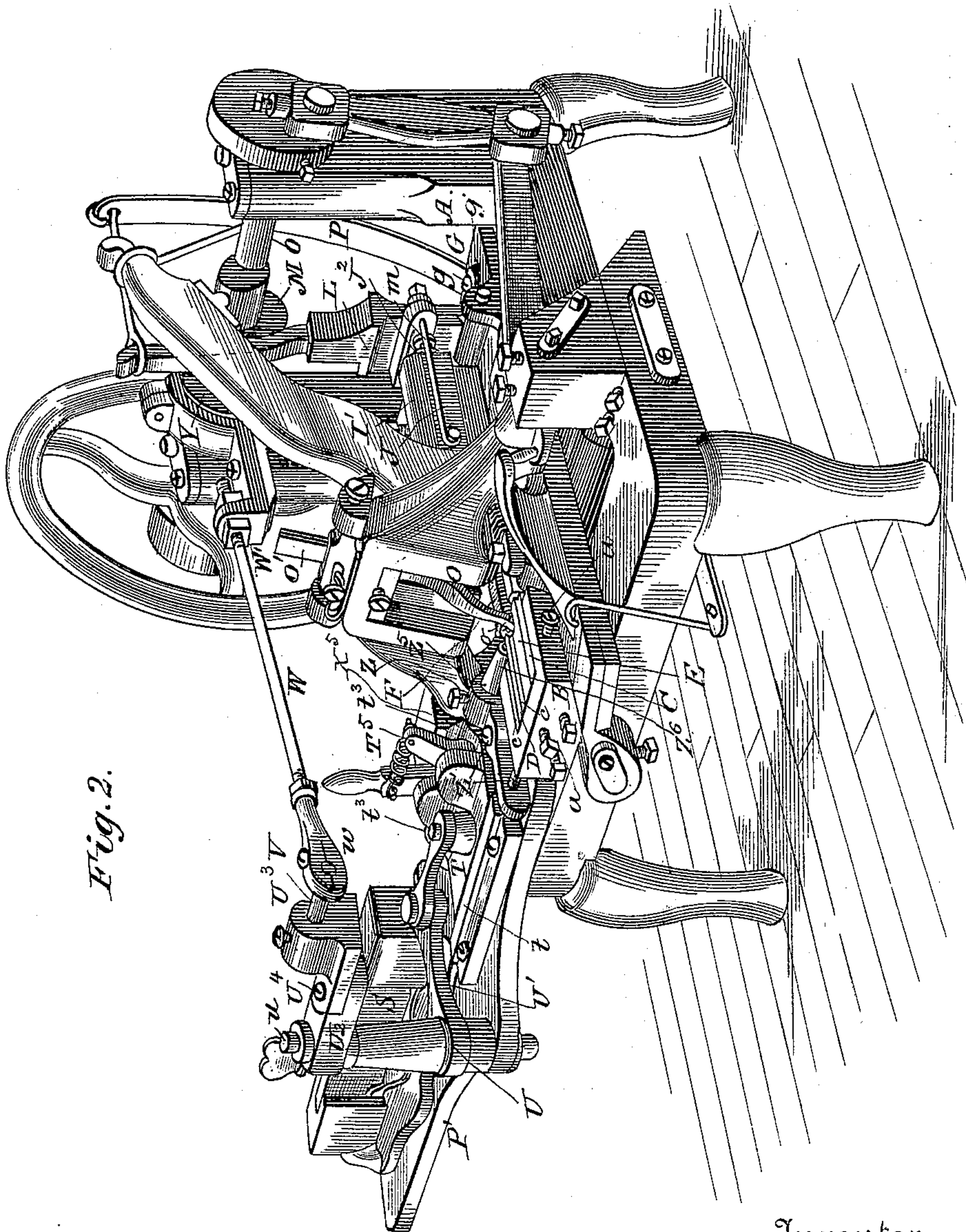


Fig. 2.

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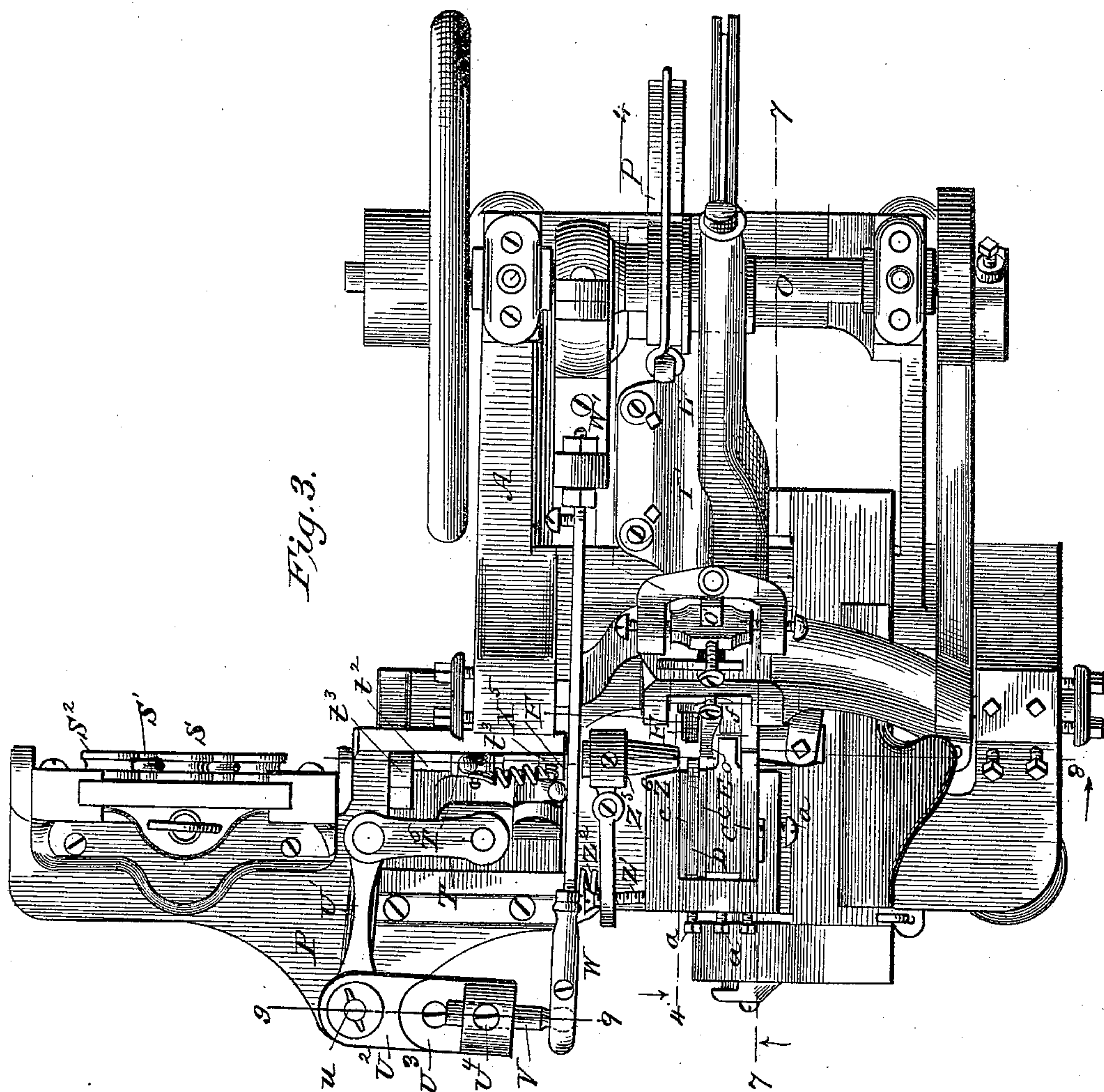


Fig. 3.

Fig. 9.

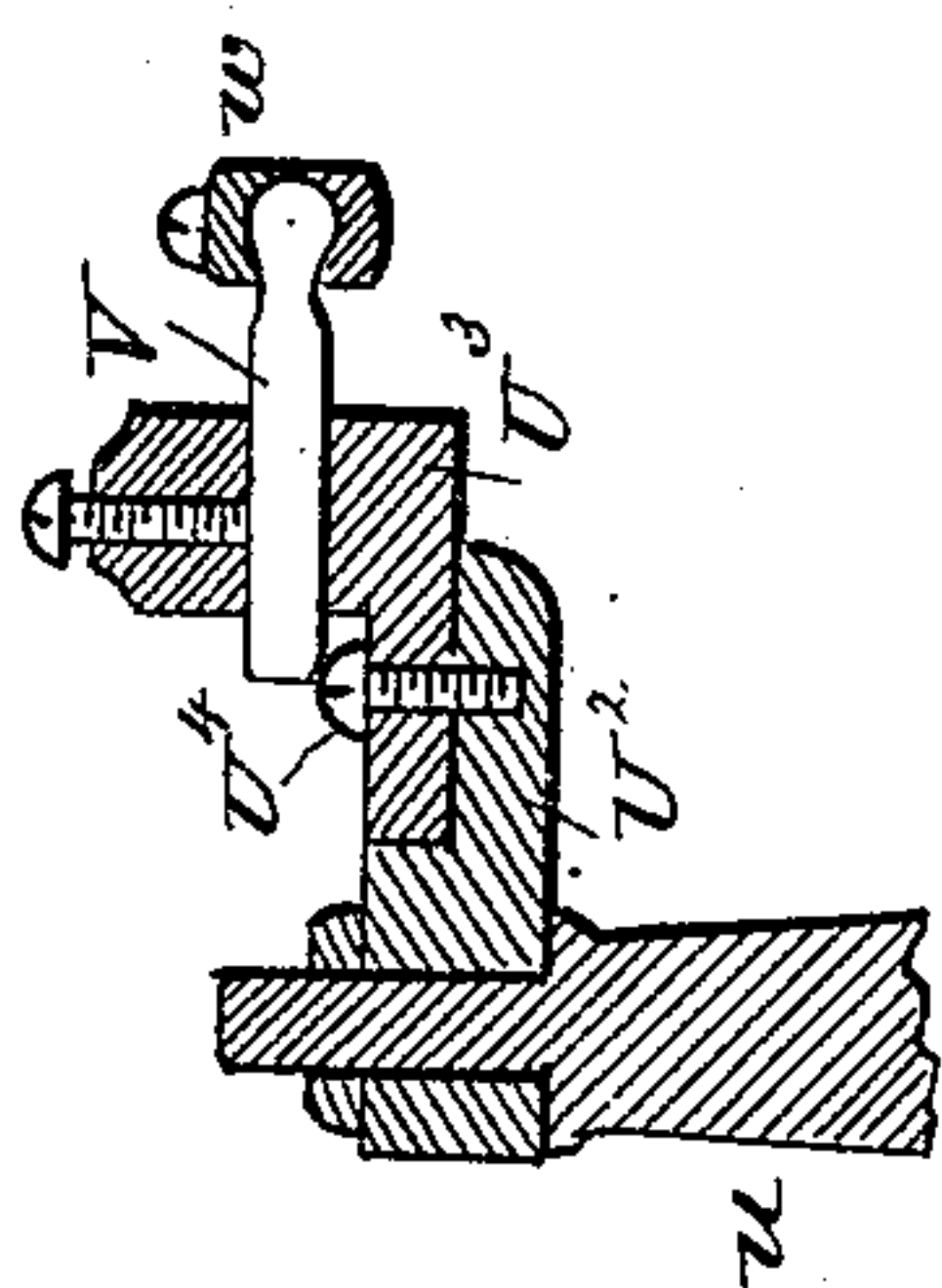


Fig. 10.

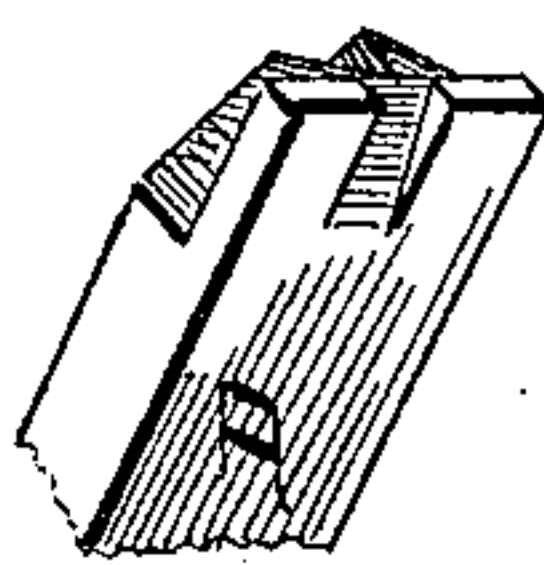


Fig. 11.



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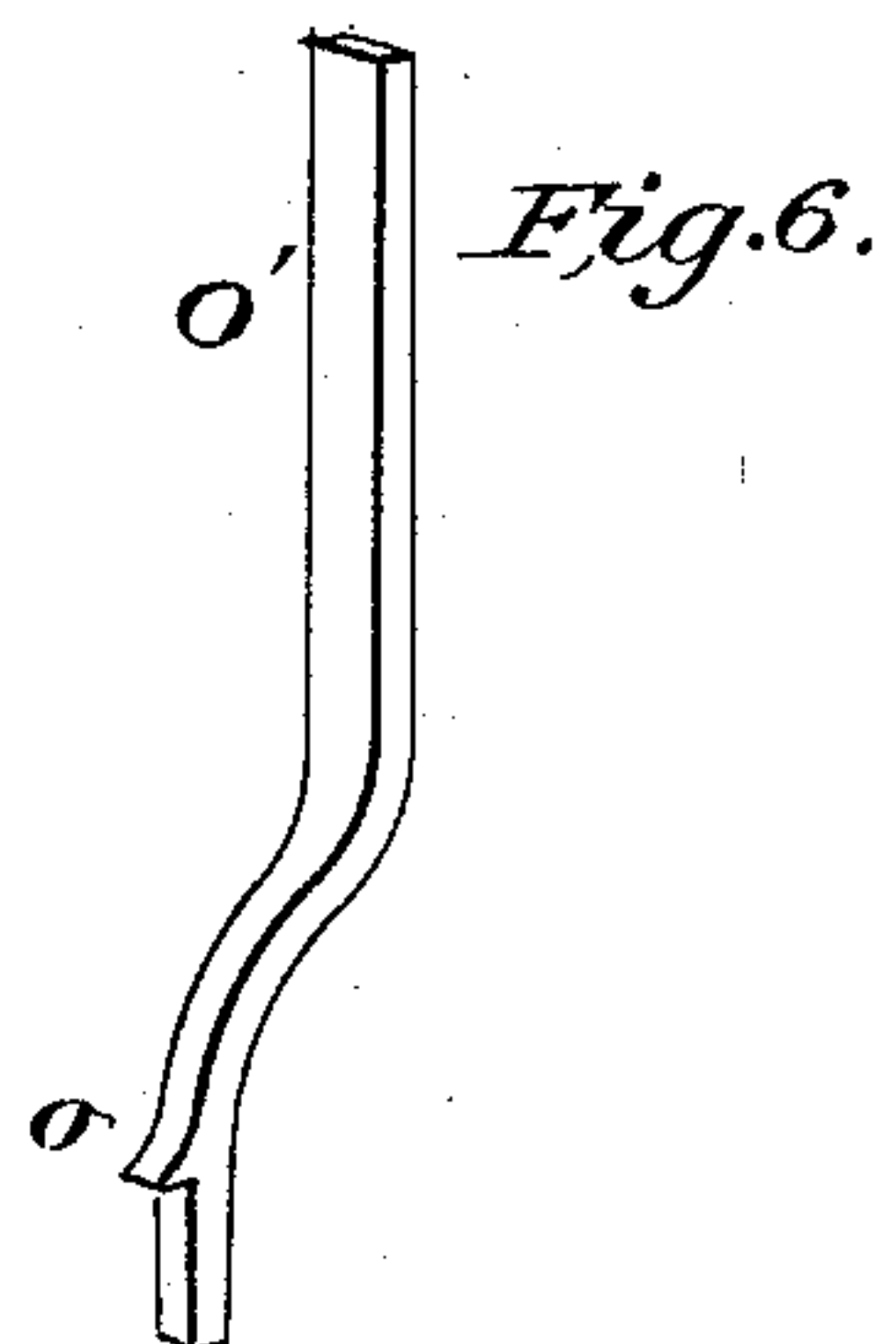
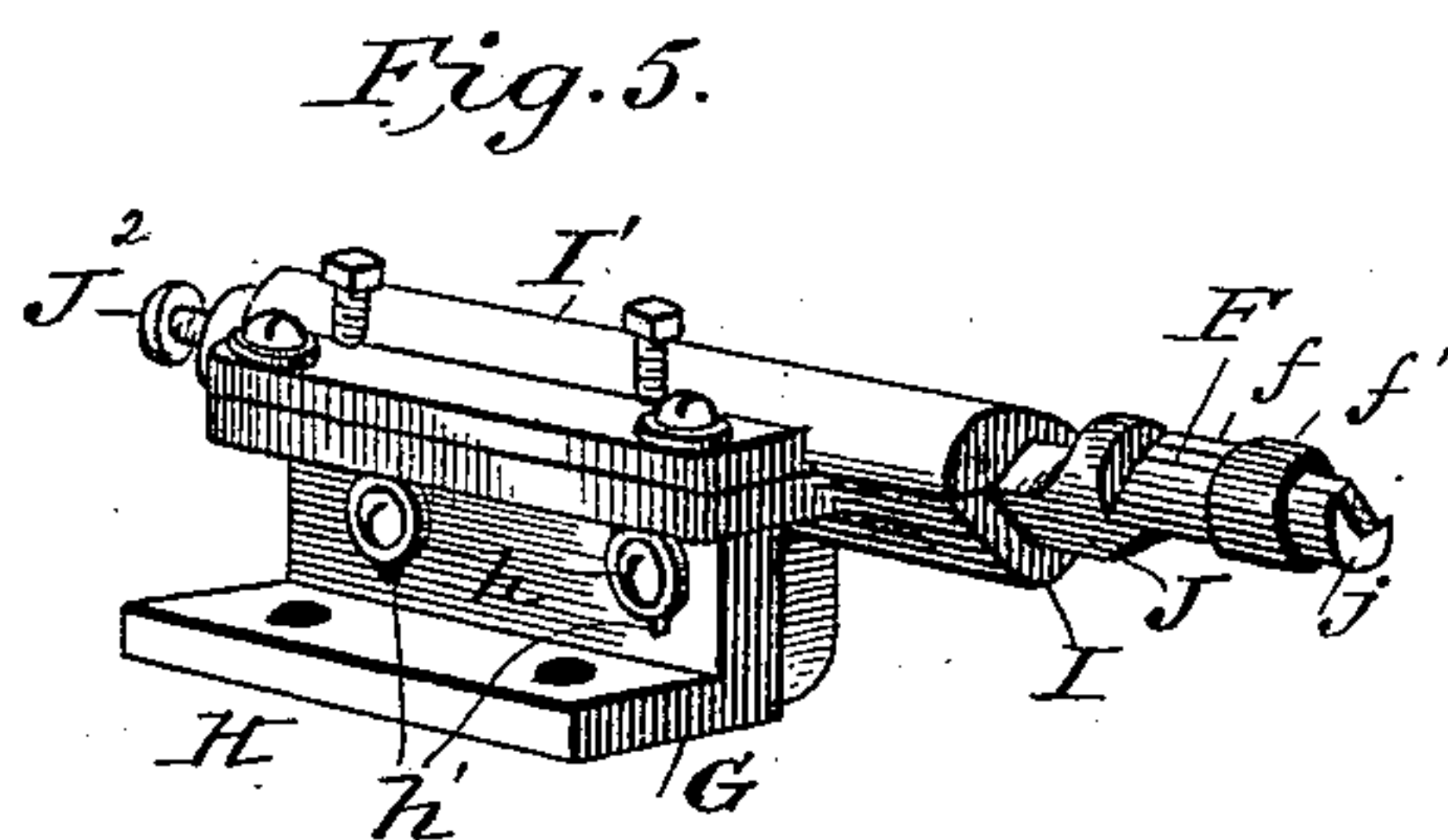
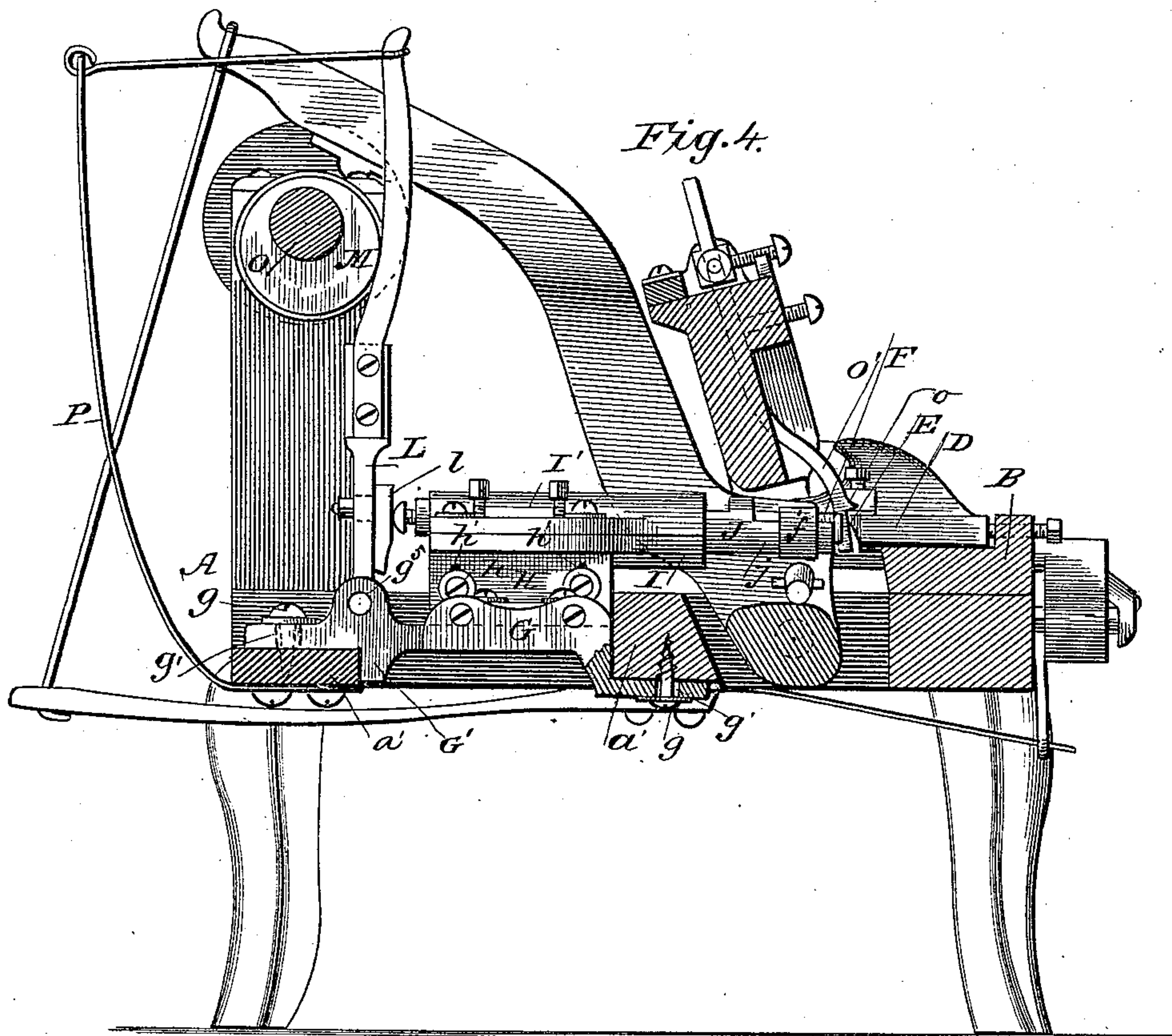
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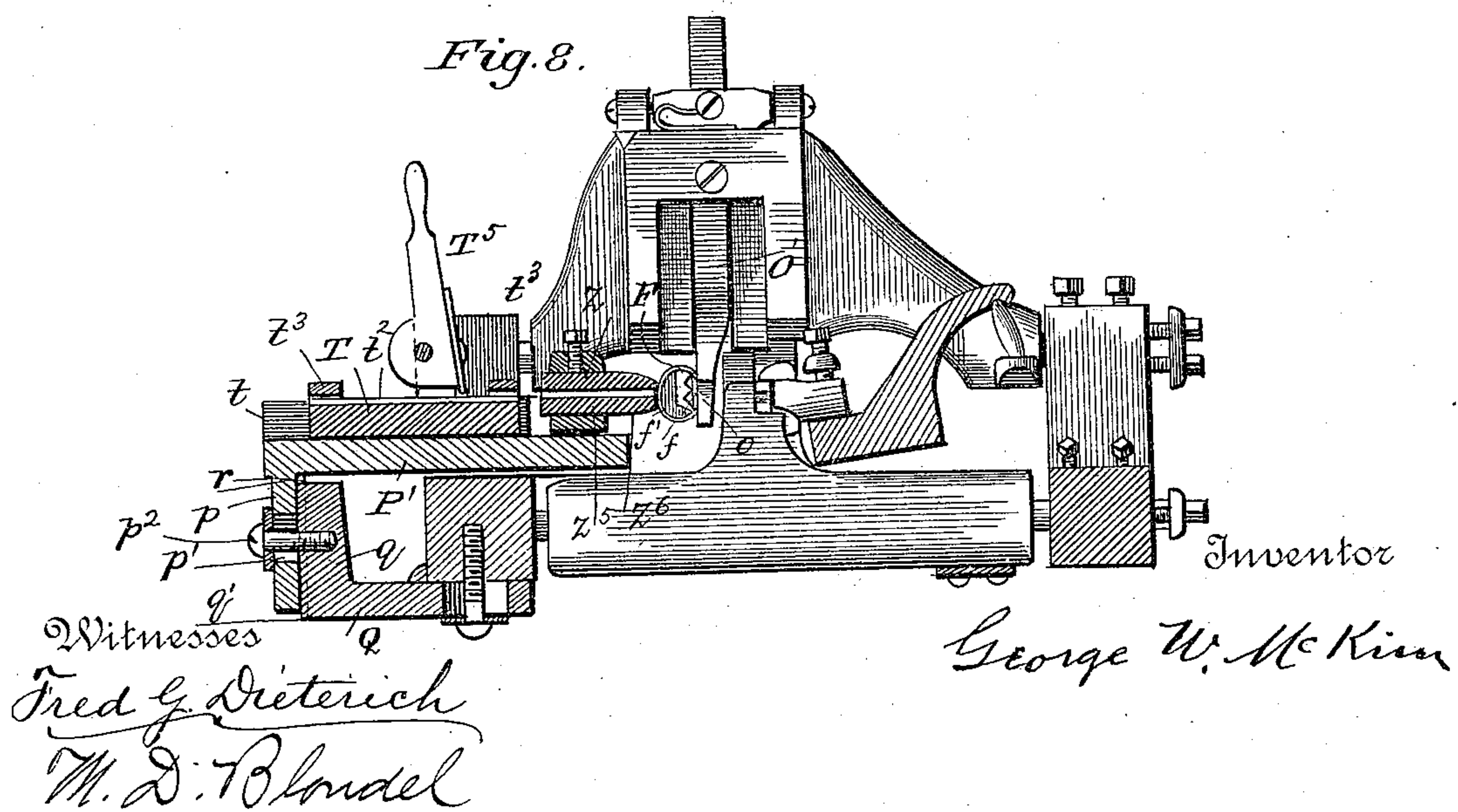
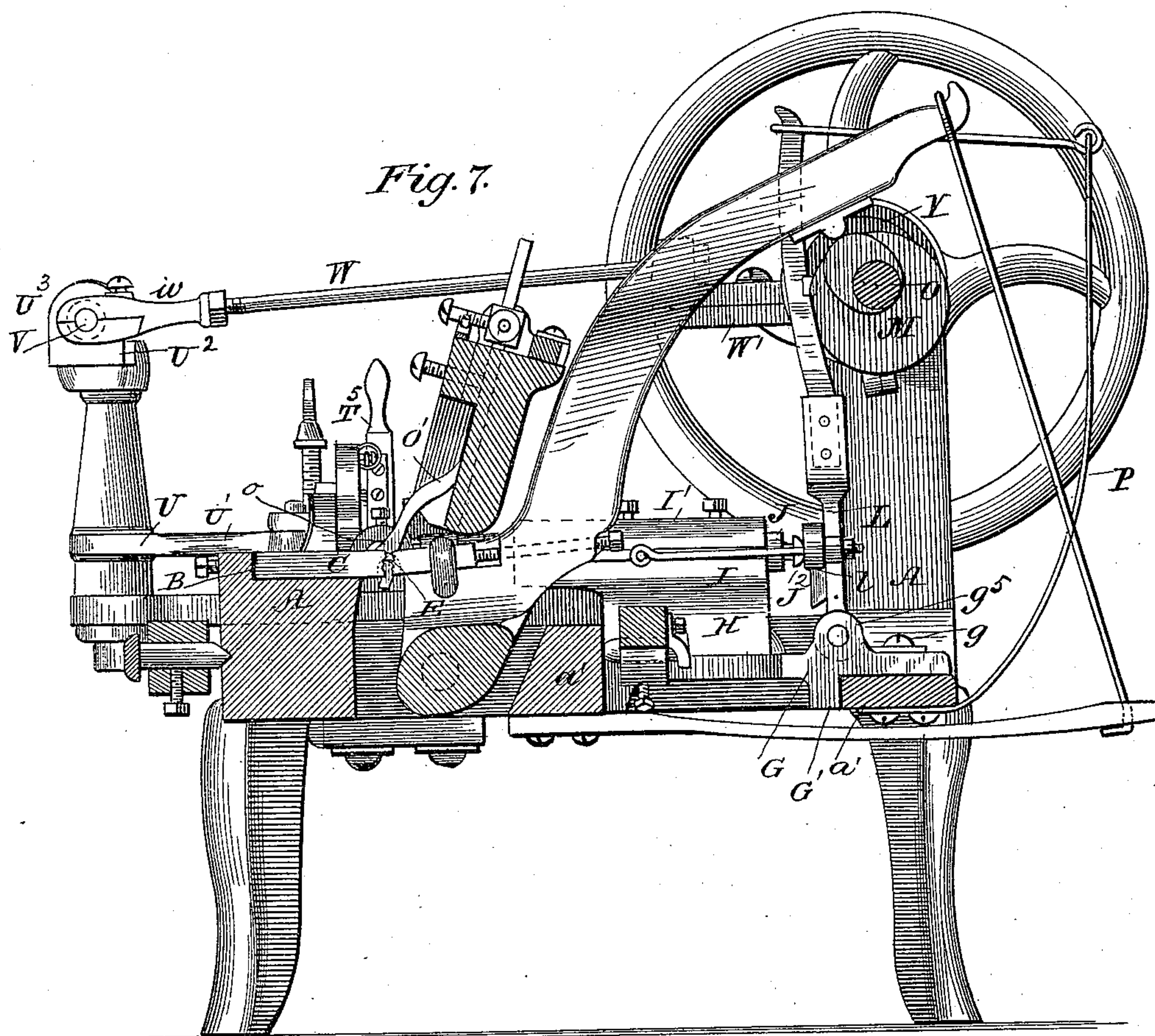
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5 Sheets—Sheet 5.

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Patented Mar. 10, 1891.



UNITED STATES PATENT OFFICE.

GEORGE W. MCKIM, OF MARTIN'S FERRY, OHIO.

WIRE-NAIL-MAKING ATTACHMENT.

SPECIFICATION forming part of Letters Patent No. 447,895, dated March 10, 1891.

Application filed September 23, 1890. Serial No. 365,897. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. MCKIM, residing at Martin's Ferry, in the county of Belmont and State of Ohio, have invented certain new and useful Wire-Nail-Making Attachments for Cut-Nail Machines, of which the following is a specification.

My invention has for its object to provide suitably-constructed devices which will be in the nature of attachments which can be readily secured to the ordinary cut-nail machines without the necessity of changing their present construction, and which will serve to convert such machines into wire-nail-making machines.

It is well known to those skilled in the art of nail-making that while the wire nail presents many advantages over the cut nail, and while the general demand for wire nails is steadily on the increase, the cost of putting up wire-nail-making machines is so great that many nail-manufacturers will not use them. Another reason why manufacturers will not adopt them is that it is almost impossible, owing to the regular demand for cut nails and to the amount of capital invested, to dispense with their regular machines.

To provide means whereby the same machines which are used for the manufacture of cut nails can be quickly converted or made interchangeable into wire-nail-making machines, or from wire-nail to cut-nail machines, without impairing the utility of the machines for either purpose, is the object of my invention.

To this end my invention consists in providing detachable devices so constructed, arranged, and combined in such a manner that they can be quickly attached to or detached from the cut-nail machines, so as to cause same to operate to head, cut, and point a continuous thread of wrought wire into suitable nail lengths.

It further consists in providing means which can be set to cut nails of different lengths, and which will also positively cause each nail as cut to be forced down into a suitable box or receptacle.

Finally, my invention consists in the sundry novel arrangement and peculiar combination of parts, all of which will hereinafter be fully described in the annexed specification

and particularly pointed out in the claims, reference being had to the accompanying drawings, in which—

Figure 1 represents a perspective view of an ordinary cut-nail machine, stripped and ready to receive my improved wire-nail-making attachments. Fig. 2 is a perspective view of a cut-nail machine with my improved attachments applied, showing the machine adapted for use as a wire-nail-making machine. Fig. 3 is a top plan view of the machine with my improved attachments applied. Fig. 4 is a longitudinal section of the same on the line 4 4, Fig. 3. Fig. 5 is a detail perspective view of the movable die, the mandrel, and support for holding same. Fig. 6 is a detail view of the combined pusher and guiding-finger hereinafter referred to. Fig. 7 is a vertical longitudinal section of the machine, taken on the line 7 7, Fig. 3. Fig. 8 is a transverse of the same on the line 8 8, Fig. 3. Fig. 9 is a detail section on the line 9 9, same figure. Fig. 10 is a detail view of the combined cutting and pointing dies, and Fig. 11 is a detail view of the guide E.

In the practical application of my improved attachments for the ordinary cut-nail machine I first remove from said machine the bed-knife, moving knife, and the nipping devices and leave the gripping and heading devices in their normal position, with the exception that I remove the gripping-lever and insert a bent gripping-lever in its place for the purpose hereinafter explained.

As the manner in which the gripping devices and the header are operated is the one common to all well-known cut-nail machines, the means for operating the same need not be specifically referred to.

For the purpose of clearness I will first describe the means for cutting, pointing, heading, and discharging the nail, set forth the operation thereof, and then describe the wire-feed mechanism and its operation.

By referring more particularly to Figs. 1 and 3 of the drawings the arrangement of the cutters, header, and grippers will be most clearly understood and from which it will be seen that in the bed-socket B are placed the fixed gripper-die C, the fixed cutting and pointing die D, the wire guide and support E, and the knife-spacing blocks *c c*, said parts

being securely held in socket B by means of the adjusting-screws *a a*, as shown. As before stated, the gripper-lever is removed and a bent lever is inserted in place thereof, the object of which is to permit of placing the movable cutting and pointing die in line with the fixed knife or die. In the construction shown I arrange the movable cutter or die F for a horizontal thrust movement, and I further arrange said die whereby the same can be readily adjusted laterally or vertically in relation to feed of the wire. To this end I employ the devices most clearly shown in Figs. 4 and 5 of the drawings, by reference to which it will be seen that a bed-plate G is provided, which is secured upon the cross-pieces *a' a'* of the frame A for lateral adjustment, preferably by passing the holding-screws *g g* through elongated slots *g' g'* in said bed-plate, and to form a solid bearing against back-pressure on said plate when the die F is thrust forward in a manner presently explained. I provide said plate G with a shoulder *G'*, which bears against the rear cross-piece *a'* of the frame A, as shown in Fig. 3. Upon plate G, I secure for lateral adjustment thereon, as shown, an angle-plate H, to which is secured the bearing-box I for the die-carrying mandrel J, said bearing or support being vertically adjustable on the angle-plate H by means of the screws *h* and the elongated slot *h'* in the plate H.

By reference to the drawings it will be seen that I make a long bearing for the die-mandrel J, and to avoid unnecessary friction I form said bearing V shape in cross-section and provide a similar-shaped cap-plate *I'*, between which the \diamond -shaped mandrel J slides. The forward end of the mandrel J is formed with a pocket-like portion *j*, in which is seated the pointing and cutting die F and the spacing-block *f*, said die and block being securely held in said pocket by means of a suitable clip *f'*. At this point I deem it proper to state that by means of the aforesaid manner of securing the die F the die can be adjusted by means of the block or blocks *f* to or from the heading devices, whereby it, in connection with the fixed knife or die C and the spacing-blocks *c* may be readily adjusted to cut longer or shorter or different-sized nails, as may be desired. The rear end of the mandrel J is provided with an abutting head *J²*, with which the pushing-lever L engages, said head being made adjustable, so the forward thrust of the mandrel can be readily gaged. The lever L has a pivotal connection between the ears *g⁵ g⁵* of the bed-plate G, the upper arm or extension being arranged to engage a cam or eccentric M, secured upon the drive-shaft O of the usual fly and band wheel, as shown. Upon the lower inner face of the lever L is secured a wear-plate *l*, against which the adjustable abutment *J²* of the mandrel J bears, said wear-plate being adjustably secured to lever L, so it can always be set for engagement with said abutting end of the

mandrel when the mandrel-support is adjusted vertically to suit the bed-frame of different cut-nail machines.

By means of the aforesaid construction it will be seen that as the power-shaft is revolved the cam or eccentric M will force the lever L forward, which in its movement will impart a thrust motion to the mandrel and cause it to move the die F up against the fixed die C at the proper time. Now to bring the mandrel slowly back to its normal position, I provide a spring P, which is secured at one end to the bed of machine and at its opposite end to the upper end of the lever L, serving to always hold it in contact with the cam M and draw the same backward, a link or rod *m* being secured to the wear-plate *l* at one end and at its opposite end to the mandrel, as shown, said rod serving to always hold the abutting end of the mandrel with the lever L, thus assuring a steady thrust and retractile movement of the die F, and thereby avoiding any unnecessary jars, which might knock the several parts out of their true positions.

The gripping-dies, which are of the ordinary construction, are arranged just in advance of the header, and just in advance of the fixed gripper-die is arranged the wire-guide or supporting-finger E, which is most carefully shown in Figs. 3 and 11 of the drawings, by reference to which it will be seen that the same is formed with a hooked member *e''*, projecting downward, forming a seat *e²*, which is in line with the meeting faces of the grippers when they are closed in, said finger E serving to guide the end of the wire in a true line between the grippers.

Heretofore great trouble has been experienced in getting the free end of the wire to feed through between the grippers. To provide means whereby the wire will always be fed through between the grippers, even though the free end thereof may have been bent downward during the preceding operation of cutting and pointing, I construct the pusher-finger O', which is generally used in the ordinary cut-nail machine, with an elastic end and form said end with a projecting nose *o*, which projects over the path of the moving wire, and serves, when forced down in the manner hereinafter described, to force the cut-wire nail down into a suitable trough or box.

The relation of the finger O' and the movement of the wire is such that after the nail has been cut and pushed down by the downward movement of the said finger the wire will be fed forward over the nose-piece *o* before it rises up, and as it rises the nose-piece will engage the under face of the wire and lift it into the guide-finger E in line with the grippers, the several parts being so adjusted relatively that when the nose-piece has lifted the wire into place the gripper will take hold of the same.

Thus far I have described the cutting, pointing, heading, and gripping devices, all of which will be clearly understood in connec-

tion with the aforesaid description by reference to the drawings.

The operation of the machine so far as described is as follows: Assuming the wire-feeding device to be in condition for operation and the end of the wire having been adjusted against the header and between the grippers, the relative position of parts is such that the grippers first grip the wire. The header then immediately after operates to upset the end of the wire and makes the head. The grippers then begin to recede, but ere they release the wire entirely the operating-die F comes into contact with the fixed die and serves to cut and point the wire. The knocker or pusher-finger O' then engages the cut nail and pushes it down, in case it has not already fallen by gravity, into the nail-receiving box. At this time the feed devices begin to force the wire forward for another operation, as before.

From practical experience in making wire nails I have found that it is absolutely essential, for producing a perfect uninterrupted operation of the cutting devices, that the feed of the wire must be steady, and the end of the wire must always be fed true or else serious results are encountered, such as bending up the wire into coils, thereby clogging the machine and frequently breaking some of the parts. I have also found that it is necessary that the wire should be allowed to have free movement laterally to the direction of the feed at its cut end, so that when the movable die comes in contact with the fixed die the wire as it is slightly bent in the direction of the thrust of the die F can, when the said die recedes, be quickly brought back into true time for a proper feed. Furthermore, as the condition of the bed of the different cut-nail machines varies slightly, it is absolutely necessary that the feed attachments be made both vertically and laterally adjustable to the bed of such machines. To this end I arrange the bed P' of the feed devices, which are most clearly shown in Figs. 2 and 3 of the drawings, for vertical adjustment on an angle-plate Q, laterally adjustable on the bed of the machine, (see Fig. 3,) the vertical wall of said plate being formed with a steadying-rib q', which enters a groove r on the downwardly-extending bracket p of the frame, said bracket being formed with elongated slots p' p', which ride on the screws p² p², screwed to the wall q', as shown, thus producing the lateral vertical adjustment of the feeding devices, as stated. At the outer end of the frame are mounted the wire-straightening rollers S, through which is passed the wire from the spool, (not shown,) said straightening-rollers being of the usual construction and formed into a fixed set S' and adjustable set S², as shown. In advance of the said rollers I arrange the feed-carriage T, which slides reciprocally in the guide t t, secured to the base P', said carriage being formed with the usual wire-guiding groove t² and the spring-actuated clamp-

ing-finger T⁵, which serves to hold the wire and carry it forward when the carriage is moved forward, but slips over the same on the reverse movement of the carriage.

Heretofore when the carriage has been provided with the guide-groove t² only great trouble has been had to keep the wire straight, it sometimes, as it leaves the rollers, being of such a condition as to bend up when the carriage was reciprocated. To avoid this trouble I provide additional guides t³ on the top of the carriage, over the grooved ends of the carriage, as shown, through which the wire passes, said guides serving to hold the wire down in the groove t², and thereby giving the same a long solid bearing on the carriage.

U indicates a bell-crank lever pivotally supported upon a vertical rod u, the lower arm U' of which is linked with the carriage, as shown. The upper arm U² is connected with the drive-shaft of the machine, from the rotary motion of which an oscillating motion is transmitted to the carriage, and to provide means whereby the carriage can be adjusted so as to feed a greater or less amount of wire forward, and also to provide against accidental breakage of the carriage-operating parts in case the wire should become clogged or bent in its guides, I employ devices most clearly shown in Figs. 3 and 9 of the drawings, by reference to which it will be seen that upon the outer end of the arm U² is pivoted a bearing-box U³, in which is held for longitudinal adjustment a coupling-pin V, to which is connected the end w of the rod or pitman W, the rear end of which is provided with the bearing-box W', which fits over the disk Y, eccentrically mounted on the drive-shaft O to turn therewith. By this construction it will be seen that as the drive-shaft revolves it will, through its connection with the feed-carriage, serve to reciprocate same with its bearings. It will also be observed that by adjusting the coupling-pin V inward or outward in its bearing-block U³ the sweep of the crank-lever U can be regulated whereby to adjust the amount of feed thrust of the carriage. In adjusting the box U³ in place I secure it by a single screw U⁴ for a tight frictional contact with the arm U², which will serve to ordinarily hold said box in position and rock the bell-crank lever. Should, however, the wire-feeding carriage become clogged in such a manner it could not travel in its guides, the block U³ would slip and turn on its pivotal screw U⁴, thereby effectually preventing any danger of accidental breakage of the parts.

Z indicates the yielding conductor or mouth-piece, which is pivotally screwed to the carriage-bed at Z for horizontal motion thereon, and held in normal or adjusted positions by means of a set-screw Z' and spring Z². The front end of said conductor has transversely and adjustably secured therein the mouth-piece proper Z⁵, which consists of a tube, bell shape at its receiving end, such end being arranged adjacent the end X⁵ of the feed-carriage frame,

while its reduced conical end Z^6 comes up close to the cutting and pointing dies. By this construction it will be observed that as the dies close to cut the wire the same will be slightly bent in the direction of the thrust of the movable die, and in moving the mouth-piece in such direction the cut end of the wire will be drawn slightly away from the cutters, and as the movable die recedes the mouth-piece will come back to its normal position and bring the end of the wire in the true position for feed.

From the foregoing description, taken in connection with the drawings, the advantages and complete operation of my devices will be readily understood. The same are of such a nature as to be quickly connected or disconnected with the ordinary machines stated, and can be manufactured at such a small cost that any nail-machine factory can carry them on hand even to manufacture a moderate supply of wire nails as the occasion may require.

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

1. The combination, with the wire-feed devices, of a fixed horizontal die having its cutting-edges in a vertical plane, a horizontally-movable cutting-die arranged to operate against said fixed die, and means intermediate the power-shaft of the machine and the horizontally-movable cutting-die, whereby it is operated, as and for the purpose described.

2. A wire-nail making attachment for cut-nail machines, consisting of an automatic wire-feed, a horizontally-disposed fixed cutting-die, a horizontally-movable cutting-die, and a horizontally-disposed and laterally-movable yielding conductor intermediate the device and the cutting-dies, in combination with the gripper and heading devices, and means for operating the feed, the dies, and the gripper and heading devices, substantially as and for the purpose described.

3. The combination, with the wire-feeding devices and the heading and gripping devices, of a horizontally-disposed fixed die having its cutting-face in a vertical plane, a horizontally-disposed cutting-die arranged to be moved to operate against the fixed die, said movable die arranged for vertical and lateral adjustment on the main frame, and means, substantially as shown, for operating the cutting, heading, and gripping dies and the wire-feed devices, substantially as shown and described.

4. The combination, with the pivotal head of a cut-nail machine provided with a yielding wire-lifter adapted to raise the wire between the grippers, of the fixed cutting-die, the longitudinally-movable cutting-die, the gripping and the heading dies, means for operating the said grippers, header and cutting dies, and the wire-feeding devices, all arranged substantially as and for the purpose described.

5. The combination, with pivotal head of

a cut-nail machine provided with a combined yielding wire-lifter and nail-pusher, of the gripping and heading dies and the detachable and adjustable feeding and cutting devices, substantially as shown and described.

6. In wire-nail-making attachments for cut-nail machines, the combination, with the drive-shaft, and header and gripper dies of such machines, of a fixedly-held horizontal cutting-die, a horizontally-disposed and longitudinally-movable cutting-die, and devices intermediate the rear end of said movable die and the drive-shaft for reciprocating said movable die, as described.

7. In a machine essentially as described, the wire-lifter O' , formed with a projecting nose-piece o and an upwardly and inwardly inclined face, substantially as and for the purpose described.

8. In wire-nail-making attachments for cut-nail machines, the combination, with the fixed cutting-die and the gripping and heading dies, of a longitudinally-movable cutting-die, a pivoted spring-actuated lever connected with the rear end of said movable die, the drive-shaft, and an eccentric cam mounted thereon adapted to engage and operate said lever, substantially as and for the purpose described.

9. The yielding conductor pivoted intermediate the wire-feed, and the cutting devices adapted to be swung in the direction of the movement of the movable cutter in one direction and back to normal position by spring-pressure; as and for the purpose described.

10. In a wire-nail-making machine, the combination, with the straightening-rolls, of a reciprocating wire-carriage arranged in advance thereof, formed with a wire-holding cam-lever, a rocking lever connected at one end to the said carriage, a connection between the opposite end of the said rocking lever and the drive-shaft, and a yielding conductor arranged in advance of the carriage, substantially as shown and described.

11. In a wire-nail-making attachment for cut-nail machines, a reciprocating wire-feed carriage formed with a longitudinal wire-groove, a locking dog or pawl, and apertured guide-lugs formed over the ends of said wire-groove, substantially as and for the purposes described.

12. The combination, with a reciprocating wire-feed carriage operating on the wire-feed stand, of a bell-crank lever mounted thereon, one arm of said lever connected to said carriage, the drive-shaft O , an eccentric mounted thereon, a pitman mounted on said eccentric, and an adjustable connection between the end of said pitman and the bell-crank lever, whereby the throw of the wire-carriage can be increased or decreased, substantially as and for the purpose described.

13. The combination, with the drive-shaft O , formed with an eccentric, and the reciprocating wire-feed carriage, of a bell-crank lever pivoted on the feed-standard, the lower arm thereof connected with the feed-carriage,

5 a frictional connecting-block pivoted on the outer end of the upper arm, and a pitman connecting said drive-shaft eccentric and the friction connection, substantially as and for the purpose described.

10 14. The combination, with the fixed bed-socket, a stationary cutting-die held therein, and a fixed wire-guide disposed parallel to said die and formed with a downwardly-projecting finger, of a longitudinally-movable cutting-die, the upper pivotal head, and the

combined yielding guide and pushing-finger held therein and adapted to operate between the fixed die and fixed guide, substantially as and for the purpose described.

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

GEORGE W. McKIM.

Witnesses:

W. M. LUPTON,
G. A. McKIM.