

J. NEWELL.
NAIL-PLATE FEEDER.

No. 178,873.

Patented June 20, 1876.

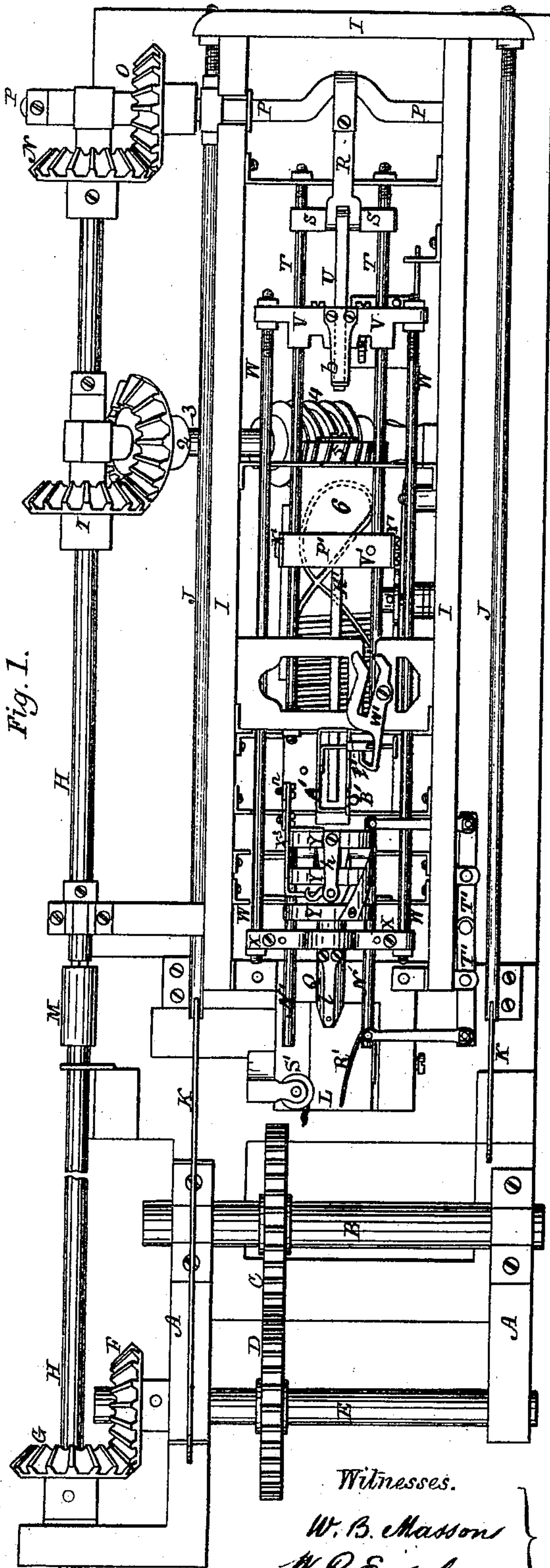


Fig. 1.

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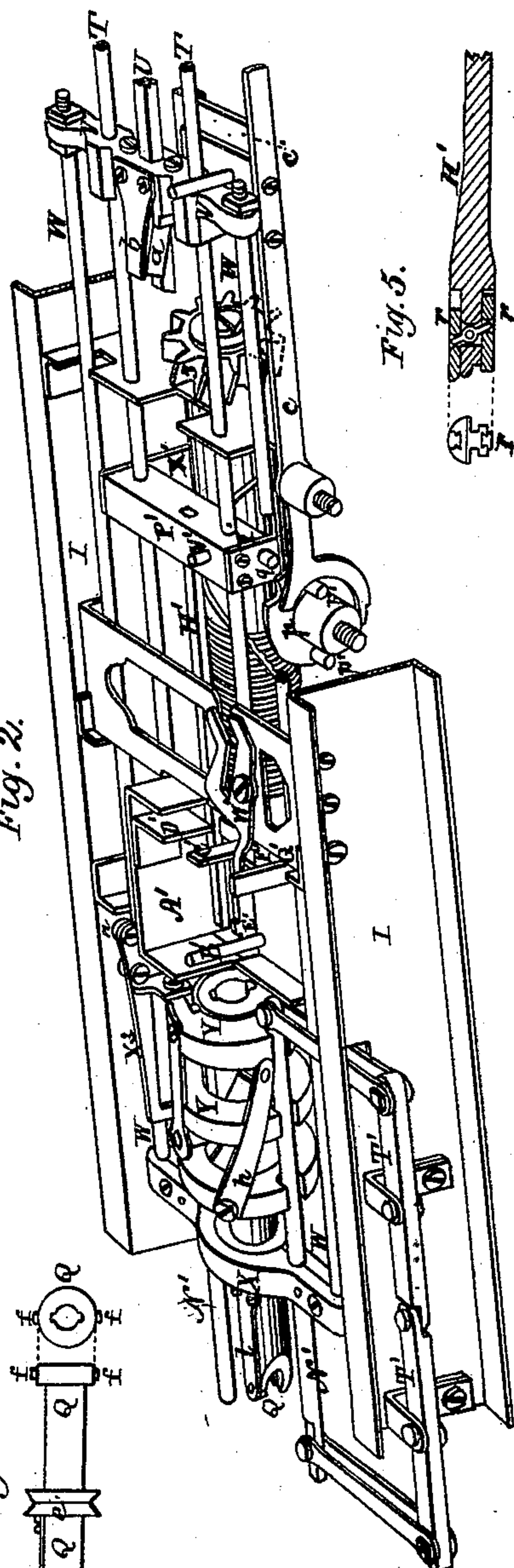


Fig. 2.

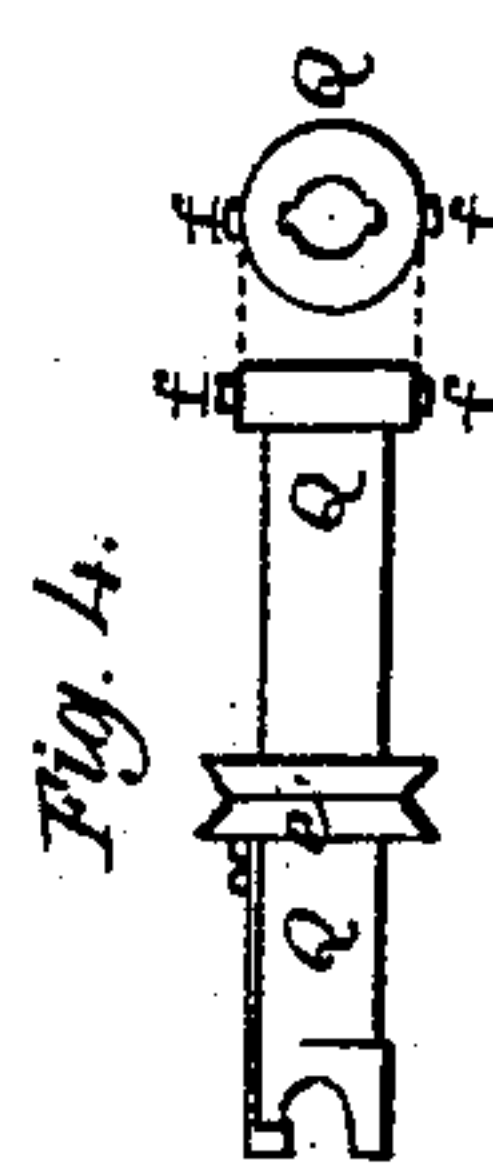


Fig. 4.

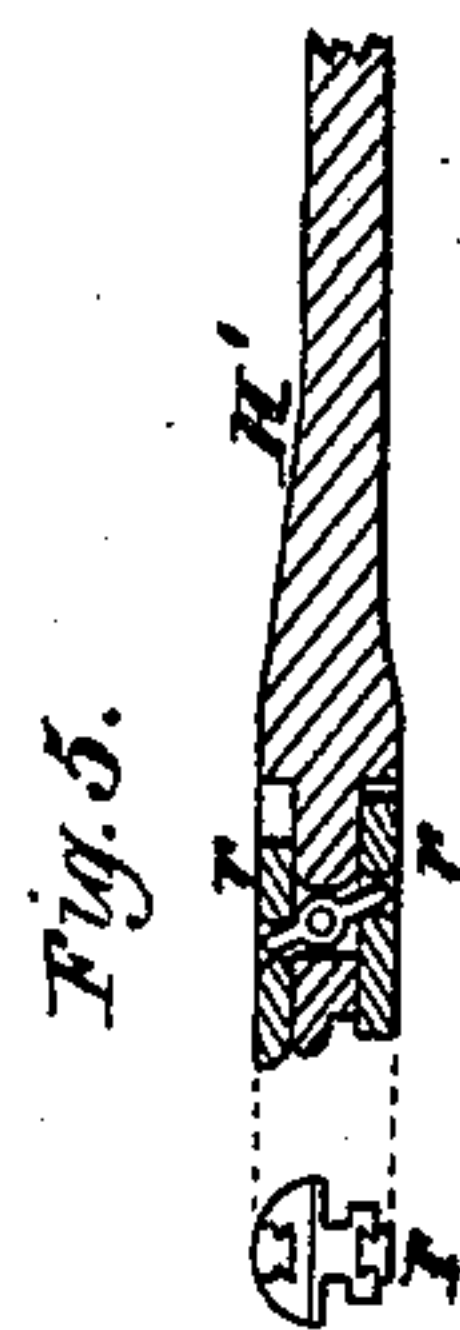


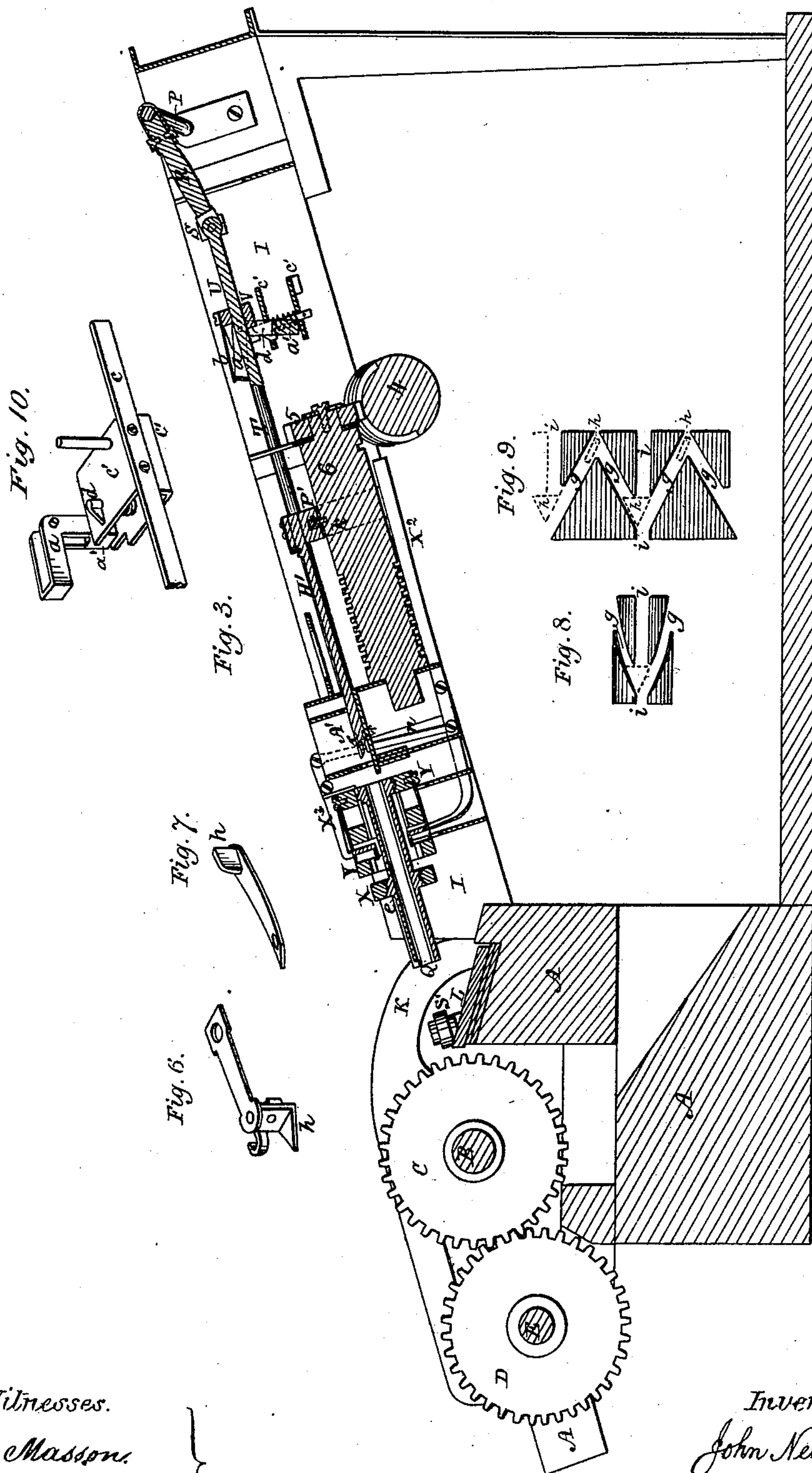
Fig. 5.

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UNITED STATES PATENT OFFICE.

JOHN NEWELL, OF DETROIT, MICHIGAN.

IMPROVEMENT IN NAIL-PLATE FEEDERS.

Specification forming part of Letters Patent No. 178,873, dated June 20, 1876; application filed December 18, 1875.

To all whom it may concern :

Be it known that I, JOHN NEWELL, of Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Automatic Nail-Plate Feeders for Nail-Machines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents a top plan of the nail-plate feeder as it appears when connected to, and working in co-operation with, a nail-machine, that receives the blank and forms it into a perfect nail. Fig. 2 represents a perspective view of the nail-plate feeder, a portion of its frame being represented as broken away, to better show the working parts, otherwise concealed by said frame. Fig. 3 represents a longitudinal vertical section, taken through the machine, as shown at Fig. 1. Figs. 4, 5, 6, 7, 8, 9, and 10 represent detached portions of the mechanism not clearly seen in the other figures.

The object and purpose of this machine are to take nail-plates one by one from a pile deposited in a stationary receptacle or magazine, and feed them up in succession to the cutter of any ordinary nail-machine, wherein the cut-off portions or blanks are formed into nails, without attendance, except to supply a pile of plates, from time to time, to the receptacle or magazine.

The operation, in brief, is as follows: A pile of plates being placed in the magazine, the under plate of the pile is moved into the line of direction of the feeding, and is pushed out of the stationary magazine into the sheath. The sheath moves it forward to the knives of the nail-machine, and after a piece has been cut off from the fore end for a nail, said sheath carries the plate back, for the double purpose of turning it over or the other side up, and of pushing it forward within the sheath as much as the breadth of a nail, by pressing the rear end of the plate against the advancing feed-rod.

My invention consists in the combinations of mechanisms hereinafter more particularly referred to, for carrying out the object and purpose of the machine.

To enable those skilled in the art to make and use my invention, I will proceed to describe the same, with reference to the drawings.

On the frame A, of any ordinary well-known nail-machine, is arranged a shaft, B, which is driven from the nail-machine or from the first driving-power, but timed to run with the nail-machine. This shaft B carries a gear, C, that works in and turns a gear, D, on a second shaft, E, and upon one end of this shaft E there is a bevel-gear, F, that meshes with a similar bevel-gear, G, on the shaft H, giving motion to said shaft, and through it to all the moving mechanisms of the nail-plate feeder.

The frame I of the nail-plate feeder is adjustably connected to the frame A of the nail-machine by screw-rods J, on the former, attached to brackets K on the latter frame, by which the nail-plate feeder may be adjusted to or from the cutters L of the nail-machine, a slip-joint being made in the line of the shaft H, as at M, to admit of this adjustment, and still keep up the timed motions of the feeder.

On the end of the shaft H there is a bevel-gear, N, that meshes with and drives a similar gear, O, on a crank-shaft, P, and from the crank of this shaft the sheath Q, that carries and turns the nail-plate, and the several mechanical appliances that work in connection with it, as will be hereafter explained, are operated.

To the crank of the crank-shaft P there is attached a pitman, R, by one of its ends, the other end thereof being hinged to a cross-head, S, that slides, by the turning of said crank, upon guide rods or ways T T in the frame I; and to the cross-head S there is also hinged a second pitman, U, which projects into a second cross-head, V, which also slides, when it is in action, upon the guides or ways T. Connected to or with the cross-head V, and to or with the second pitman U, there is a connecting and disconnecting mechanism, (shown at a, Fig. 3,) which, while the nail-plate is being fed up to the nail-machine, holds the pitman U to the cross-head V, and causes the latter to traverse on its ways; but when a nail-plate is cut up, and the sheath is placed in position for receiving a fresh nail-plate from the mag-

azine or holder, then the pitman *U* is disconnected from the cross-head *V*, and this allows the gearing to continue in motion, but without moving the cross-head *V* or the sheath *Q*, as the latter must then remain at rest.

The connecting and disconnecting mechanism above referred to consists of a pivoted bell-crank lever, having two arms, *a a'*, which is held to the pitman *U* by a spring, *b*, causing the cross-head and pitman to move together; but when the sheath is to be furnished with a fresh nail-plate, a trigger, *c*, is raised up automatically, and when the arm *a'* of the bell-crank comes against it, by the backward movement of the cross-head *V*, the connecting-arm *a* of the bell-crank is raised up, and disconnects the pitman and cross-head, the latter remaining stationary, and the former playing through it; and at the same time that the pitman and cross-head are disconnected, a spring-stop, *d*, comes into action and stops the cross-head positively from any reciprocation.

To the extremities of the cross-head *V* are attached connecting-rods *W W*, which, extending forward, connect with a cross-head, *X*, which supports the sheath *Q*, and in which cross-head the sheath can turn by means of a grooved collar, *e*, on the sheath working against *V*-shaped bearings in the cross-head. As the cross-head *V* moves back and forth, it moves in a similar manner the cross-head *X* and the sheath *Q*; but as the sheath moves back and forth it has a rotatory motion imparted to it, so as to turn over the nail-plate at every reciprocation, and this is accomplished by means of projections *f f* on the sheath taking into angular grooves *g g* in the hub of the disks *Y*, and so turning the sheath during its reciprocation. The grooves *g* are shown at Fig. 8, and the entire hub in a spread-out form is shown at Fig. 9, by which the form of the grooves is better shown. There are switches *h*, (shown separate and in perspective at Figs. 6, 7, and by dotted lines in position at Figs. 8 and 9,) which work in connection with the grooves *g*, as well as in connection with the straight grooves *i* in the hub of the disks *Y*, so as to guide the projections *f f* into the proper grooves for rotating the sheath, or into the grooves *i*, when it is to move back to receive a fresh nail-plate and without rotating. Motion is transmitted to the feeding apparatus from the shaft *H* by means of a bevel-gear, *1*, mounted upon said shaft, meshing with a similar gear, *2*, on the inclined shaft *3*, upon which is mounted the worm-wheel *4*, which latter meshes with the cog-wheel *5*, attached to one end of the screw-shaft *6*, that advances the feed-rod *H'*. This feed-rod is attached to a cross-head or carriage, *P'*, mounted upon the guides or ways *T*. It carries on its under side a switch-pin, *k*, that enters the grooves of the screw-shaft *6*, by which it is advanced slowly forward by its taking the slow threads or grooves, and rapidly backward by following the long groove.

The pile of plates is placed between the side *A'* of the magazine and the vertical rod *B'* near the fore end, and between the two rods or plates *C' D'*, the under plate resting near its fore end on an eminence at *E'*, while between the rods or plates *C'* and *D'* it rests on the sliding sleeve *F'*, when that sleeve is in its forward position, or on the rod *G'* on which the sleeve slides when the sleeve is drawn back.

The object of resting the plate near the fore end on a projection is to enable the plate, even if warped, to rest fairly on the edge of the rod *G'*, so that the end of the sleeve *F'* may fairly encounter the edge of the plate when it moves to push the back end of the plate into the line of the direction of feeding.

The fore end of the pile as originally deposited is directly over the line of direction of feeding. At the appropriate time, the sleeve *F'*, which has previously been drawn back, permitting the under plate to drop upon the edge of the rod *G'*, moves forward, encounters the edge of that plate, and pushes it into the line of direction of feeding, so that it lies upon the feed-rod *H'*. Soon afterward the feed-rod *H'* moves backward, until its fore end has passed out of the magazine, permitting the plate to drop down upon the floor of the magazine with its rear end in front of the feed-rod *H'*, and its fore end near the aperture or slit in the fore end of the magazine through which the plate is to be driven into the sheath *Q*, by the feed-rod moving forward toward the knives of the cutter.

The thickness of the sleeve *F'* on the top of the rod *G'* is a little less than the thickness of a nail-plate, so that it can encounter only the under one. The height of the aperture between the bottom of *D'* and the edge of the rod *G'* is somewhat greater than the thickness of a nail-plate, but less than the thickness of two, so permitting only one to pass at a time.

The sheath *Q* is a tube, having two longitudinal grooves to guide the plate, the inside diameter being large enough for the feed-rod *H'* to pass through. One of these grooves is furnished at its fore end with a spring, *l*, slightly longer than the opposite groove, to press upon the edge of the nail-plate, holding its opposite edge against the bottom of the opposite groove firmly enough to communicate to it the longitudinal reciprocating movement of the sheath, and to overcome the resistance of the gage-spring near the cutter when the end of the plate is pressed against it. Supposing a plate to have been pushed into the sheath *Q* and being fed to the cutters: after a cut, the sheath is drawn back, the plate meets the end of the feed-rod *H'*, and is moved forward in the sheath the breadth of a nail, then carried forward toward the knives. A short distance before the plate reaches the knives, the side of the nose of the sheath and the edge of the plate, or the edge of the plate, encounters obliquely a spring, *R'*, which diverts the nose of the sheath sidewise until the

opposite side of the nose comes against a guide or roller, S' , attached to the cutter-frame near the edge of the stationary knife, on the side where the head of the nail is to be formed, placing the edge of the plate that is to furnish the head of the nail in the same position on the stationary knife at the time of each cut, and so providing a length uniform on the blanks for the heads.

In order that all the nails may have the same slope from head to point it is necessary that the rear end of the sheath should move sidewise as much, or nearly so, as the nose. This can be effected by connecting both ends of one of the guide-rods N' by two equal levers, T' ; these guide-rods, with the disks Y rigidly attached to them, being allowed sufficient lateral movement in their seats in the brackets by which they are connected to the frame I . Thus the guide-rods N' and the disks Y , encircling the grooved cylinder, and the sheath with its collar, have an equal lateral movement throughout from the nose of the sheath to the back end of the cylinder. The edge of the plate being thus placed into position for furnishing the proper amount of metal for the head, it is carried forward between the knives, the blank is cut off, and the crank P draws the sheath back, the lugs of the sheath traveling for a short distance in straight slots, as shown in Figs. 8 and 9, in which the spiral ones terminate at the fore end; then encountering the latches h , which have closed the spiral slots in which the lugs f made their forward movement, as well as the two straight ones parallel to the axis, they are guided into the other spiral slots, receiving as they move a rotary motion, which is partaken of by the plate, amounting to a quarter of a turn in the course of the backward movement. Just before the end of this backward movement the plate encounters the end of the feed-rod H' , which has been moving up, is pushed forward in the sheath the breadth of a nail, the lugs or projections f of the sheath following the second pair of spiral slots, (the first pair being closed by the latches,) so that when they get back near the forward end of the cylinder they will have completed the half-revolution. Before the end of the operation of feeding up a sheet the pin V' , on top of the cross-head P' , of the feed-rod, entering the slot in the lever W' , moves the sliding sleeve F' back clear of the pile of plates, so that they drop, and the under one rests on the rod G' upon which the sleeve travels. After the last nail has been cut out of a sheet the piece of scrap in the succeeding backward movement of the sheath encounters the feeding-rod, and is pushed out, and the instant its edge is clear of the bottom of the slot the spring l snaps it away from the machine.

In order that the spring l may snap away the remnant of the plate when it is finally pushed out from the sheath, it is essential that the spring should continue to press upon it for

an instant after it is relieved from its support in the groove on the opposite side of the sheath. This may be effected by pushing the opposite edge of the remnant out from the sheath in advance of the edge in contact with the spring, or by making the spring a little longer than the opposite side of the sheath. I use both together, but either one is sufficient with ordinary plates. The feed-rod then begins its backward movement, during which time another plate is moved into the line of direction of the feed, on top of the feed-rod, the rotation of the sheath and its longitudinal reciprocating movement being suspended preparatory to the reception of another plate. To move a new plate in line to be fed, the pin V' , in withdrawing from the slot of the lever W' , throws the sleeve F' laterally toward the line of feed, carrying before it the under one of the pile of plates until its further edge is near the further side of the magazine, when the sleeve stops and the plate lies on the feed-rod.

In the progress of the feed-rod backward a lug, X^1 , extending downward from the cross-head P' , acts on a lever, X^2 , that opens and holds open the two triangular latches h at the fore ends of the spiral slots g in the hub of the disks Y , the latch underneath being opened directly by the end of the lever X^2 , while the upper latch is opened by a second lever, X^3 , operated from the first one by a connecting-rod, n . These two latches being held open, the next time the sheath is drawn back by the crank P , its lugs f , no longer encountering the latches to interrupt their movement in a straight line, enter the two slots that are parallel to the axis.

Immediately after the lugs of the sheath enter the straight slots the reciprocating motion of the sheath is suspended by a lug, Y' , attached to one end of the cross-head P' , which lug carries a pin, q , that acts on a disk, p , provided with stubs p' , which act upon a lever or trigger, c , the back end of which being raised presents a stop, c' , against which the arm a' of the bell-crank is brought, near the end of the backward movement of the sheath, causing the bell-crank to move on its gudgeons in the cross-head V , which carries the back ends of the two rods W , disengaging the clevis a by an upward movement from the fore end of the pitman U , so that the crank P , although continuing its revolutions, leaves the sheath at rest in its extreme backward position, with its grooves directly in front of the ends of the aperture in the front end of the magazine.

The pivoted lever or trigger c , which is attached to and raises, when its fore end is depressed, the stop c' , to lift the bell-crank clevis a , also presents a stop, d , for preventing any forward movement of the cross-head V , either from gravity or friction of the nail-plate when entering the slot of the sheath Q , attached to cross-head X , which is connected

with the said cross-head V by the rods *w*. The lug *y'*, attached to the cross-head P', carries a small pin, *q*, which enters a notch in a disk, *p*, provided with stubs *p'*, which stubs act as cams to tilt the lever or trigger *c*, and thus either elevate or depress the stop *c'* attached to said lever.

When the cross-head P', carrying the feeding-rod H', retreats, in order to let a new nail-plate fall upon the floor of the magazine, the pin *q* enters the notch and causes the disk *p* and stubs *p'* thereon to rotate and act upon the fore end of lever *c*, depressing it and bringing the stop *c'* of said lever into action, which causes, as the said cross-head continues its retreat, the arm *a'* of the bell-crank lever *a* to tip forward and raise said lever, and disconnect the pitman U and cross-head V. When, however, the cross-head V' advances to feed the nail-plate into the sheath, the pin *q* turns the disk *p* and stubs *p'* in the reverse direction, and the said stubs cause the lever or trigger, with stops *c c'*, to return to its normal position.

The bearing-surfaces of the clevis and the pitman are slightly beveled, so that the clevis may pass freely down in front of the pitman when coming into action, but come, finally, into perfect contact, and preclude any lost motion of the pitman between the clevis and the bearing of the shoulder of the pitman against the cross-head, by which shoulder the pitman communicates its backward movement to the cross-head V, rods W, cross-head X, and the sheath Q.

When the feed-rod is ready to push the plate out of the magazine into the sheath, the lugs X' Y' upon the cross-head P' have reached the point where they are disengaged from their respective levers, the first permitting the latches *h* at the fore-ends of the slots *g* to close said slots in one direction. When the cross-head P' advances, the lug X' and pin *q* turn the cam-disk *p*, as before stated, allowing the clevis *a* to engage the pitman U, and the sheath to resume its reciprocating and rotary movements.

The service performed by the two lugs X' and Y' with their levers may be performed by one lug and lever.

To make sure that the edge of the scrap on the opposite side from the spring *l* shall pass out a little in advance of the edge in contact with the spring—a condition which enables it to be snapped in the most desirable direction—two slides, *r r*, Fig. 5, are placed in grooves in the fore-end of the feed-rod, one on the upper surface, the other on the lower, connected by a vertical lever. When the sheath makes its backward movement to push the scrap out, a projection on the interior of the sheath, near its nose, or on the spring *l*, encountering the under slide *r*, causes the upper one to move forward on the rod, and start the scrap out at that point.

To prevent the feather-edge sometimes left

on the plate from holding to the stationary knife when the plate is drawn back, the guide-rods N' are so set as to carry the plate a little above the knife, and, by their elasticity, lift the plate as soon as the two edges meet.

The spring *l* at the nose of the sheath is made to come on the under side every time when the scrap is to be pushed out by allowing the sheath to make an even number of half-revolutions during the process incident to disposing of a plate. The feed-rod is attached to the cross-head P' by being inserted into a hole in the cross-head, through which it can slip freely. It is attached to the cross-head rigidly against all proper resistance by a V-shaped dog attached to the cross-head, and fitting into a notch of the same shape in the top of the feed-rod, into which it is pressed by a spring.

It is obvious that a guide-plate could be fastened to the frame near the stationary cutter L in place of the roller S' without departing from the spirit of my invention; and I may add that, in lieu of using the two equal levers T' with the sheath to give the same slope from head to point of the nails, I have used a long rod fastened to the side of the machine, near the rear of it, and connected its fore-end with the sheath, and found it to produce nearly the same results as furnished by the equal levers T'.

Having thus fully described the construction and operation of the machine for feeding nail-plates, what I claim therein as new, and desire to secure by Letters Patent, is—

1. The sheath Q, provided with internal longitudinal grooves to guide the nail-plates, and a central opening for the admission of the feed-rod, in combination with outside lugs *f*, and a grooved collar, *e*, to guide it in its longitudinal and rotatory motions, substantially as described.

2. In a nail-plate-feeding machine, in combination with a sheath carrying the plate, a spring, *l*, acting on the edge or side of the remnant of the plate after the opposite edge or side passes out from the sheath, for the purpose of snapping it away, substantially as described.

3. In combination with the sheath Q and lugs *f*, the hub of the disks Y, having angular grooves *g*, so formed and combined with latches *h* as to give to the sheath one-half of a revolution between each cut of the knives, substantially as shown and described.

4. In combination with the sheath Q and lugs *f*, the hub of the disks Y, having grooves *i* parallel with the axis of the machine, to retain said sheath at rest while introducing a new nail-plate, substantially as described.

5. In combination with the sheath Q and grooved hub of the disks Y, the two equal levers T', connected to the front and rear end of said hub by means of the rods N', so as to give a uniform slope to the cut nails, substantially as described.

6. In combination with the sheath Q, guiding-grooves *g* and *i*, and latches *h*, the latch-opening-and-closing mechanism, composed of levers X², operated by the lug X¹, substantially as and for the purpose described.

7. In combination with the sheath Q, revolved in the manner as specified, and operated lengthwise by means of the rods W, the bell-crank clevis *a*, to connect or disconnect the sheath-moving cross-head V from the pitman U of the machine, substantially as described and represented.

8. In combination with the feed-rod H', connected to the cross-head P' by a V-shaped spring-dog, the screw-shaft 6, when revolved by means of a worm-wheel, substantially as and in the manner specified.

9. In combination with the sheath Q, and spring *l*, the two slides *r r* of the feed-rod, constructed and operated substantially as shown and described.

10. In combination with the sheath Q, and feed-rod operated by the screw 6 of a nail-plate-feeding machine, the guide or roller S, to guide the nail-plate while being fed up to the cutters, substantially as described.

11. In combination with the magazine that holds the nail-plates and eminence E', the sliding sleeve F' and lever W', operated substantially as and for the purpose described.

12. In a nail-plate-feeding machine, in combination with a magazine for containing a pile of nail-plates, a mechanism for transferring them automatically in succession to the feeding mechanism, and a feeding mechanism moving the plate forward, sidewise, and turning it, a guide, S', for limiting the lateral movement of the nail-plate, whereby that edge of the plate which is to furnish the head is adjusted to the same place each time, so as to give uniformity of size to the heads, substantially as described.

13. In a nail-plate-feeding machine, in combination with a magazine for containing a pile of nail-plates, which are transferred automatically in succession to the feeding mechanism, a mechanism for turning, directing, and presenting the plate to the action of the knives, and a guide, S', a feed-rod, H', operating to carry the plate out from the magazine to the feeding mechanism, substantially as described.

14. In combination with the guide S', the sheath, and the feed-rod, the magazine for containing a pile of nail-plates, from which the under one is removed and fed automatically to the cutters, substantially as described.

15. In combination with the guide S' and the sheath for guiding and turning over the nail-plate, and the feed-rod, constructed as specified, the switch-pin *k*, and screw-shaft 6, substantially as set forth.

16. In a nail-plate-feeding machine, in combination with a magazine for containing a pile of nail-plates, which are transferred automatically in succession to the feeding mechanism, a mechanism for turning and carrying the plate between the knives, and a guide, S', a feed-rod, operating to feed the plate forward in the jaws of the sheath, which insert it between the knives, substantially as set forth.

17. In a nail-plate-feeding machine, in combination with a magazine for containing a pile of nail-plates to be transferred automatically in succession to the feeding mechanism, an eminence, E', in connection with two others, or more, to support the bottom plate of the pile of plates in proper positions for removal from the pile, substantially as described.

18. In a nail-plate-feeding machine, in combination with a magazine for containing a pile of nail-plates to be transferred automatically in succession to the feeding mechanism, a mechanism for turning and feeding the plate to the knives, and a guide, S', the screw-shaft 6, made to revolve in unison with the feeding mechanism by connected gearing, operating with the switch-pin *k* to move the feed-rod.

19. In combination with a magazine for containing a pile of plates, a mechanism for transferring them automatically in succession to the feeding mechanism, and a guide, S', the jaws of the sheath, which communicate to the plate a longitudinal, rectilinear, reciprocating movement in one direction to present it to the action of the knives, and in the other to withdraw it from interference with the bed-knife and its frame while turning.

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