2 Sheets—Sheet 1.

M. LEACH.

NAIL-PLATE FEEDER.

No. 170,002. Patented Nov. 16, 1875.

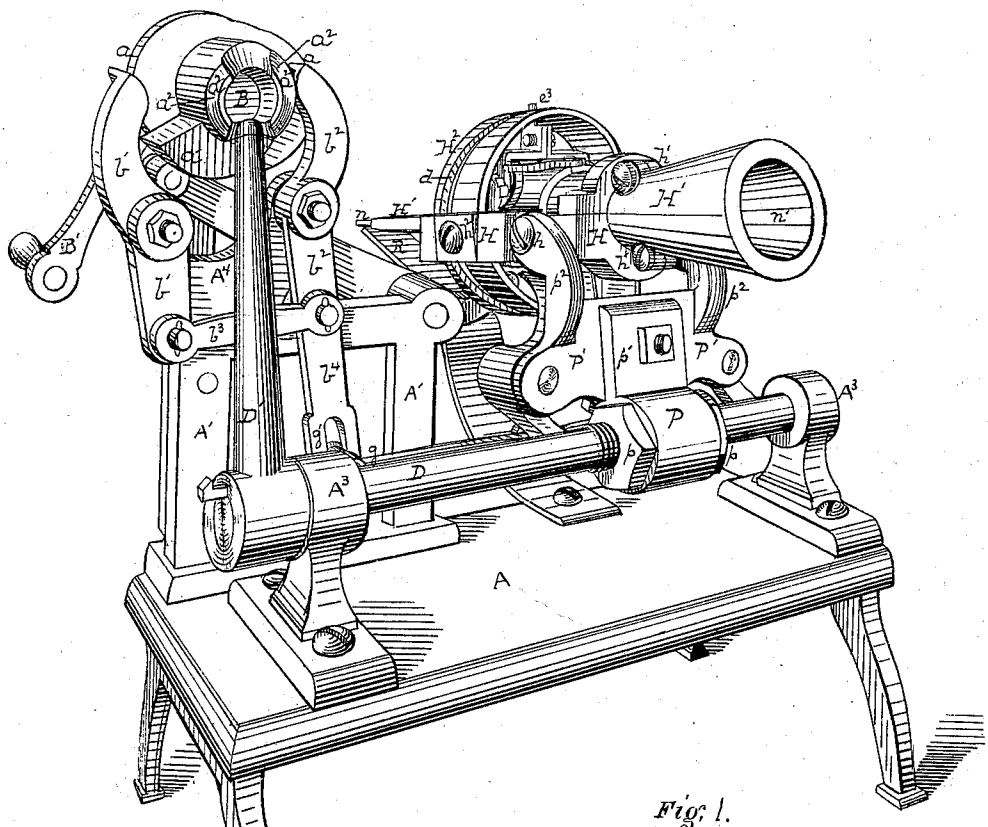

Fig. 1.

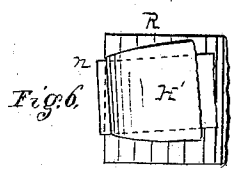

Fig. 6.

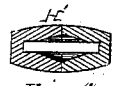

Fig. 5.

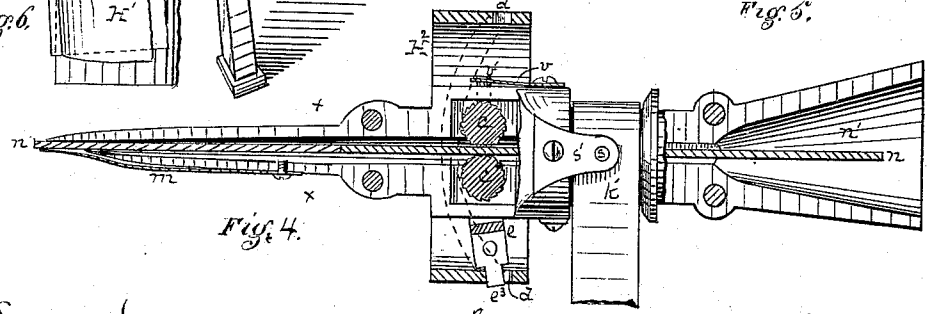

Fig. 4.

Witnesses
E. Boggs
Claudius L. Parker.

Inventor Matthew Leach
By. George N. Christy, Atty

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

2 Sheets—Sheet 2.

M. LEACH.

NAIL-PLATE FEEDER.

No. 170,002. Patented Nov. 16, 1875.

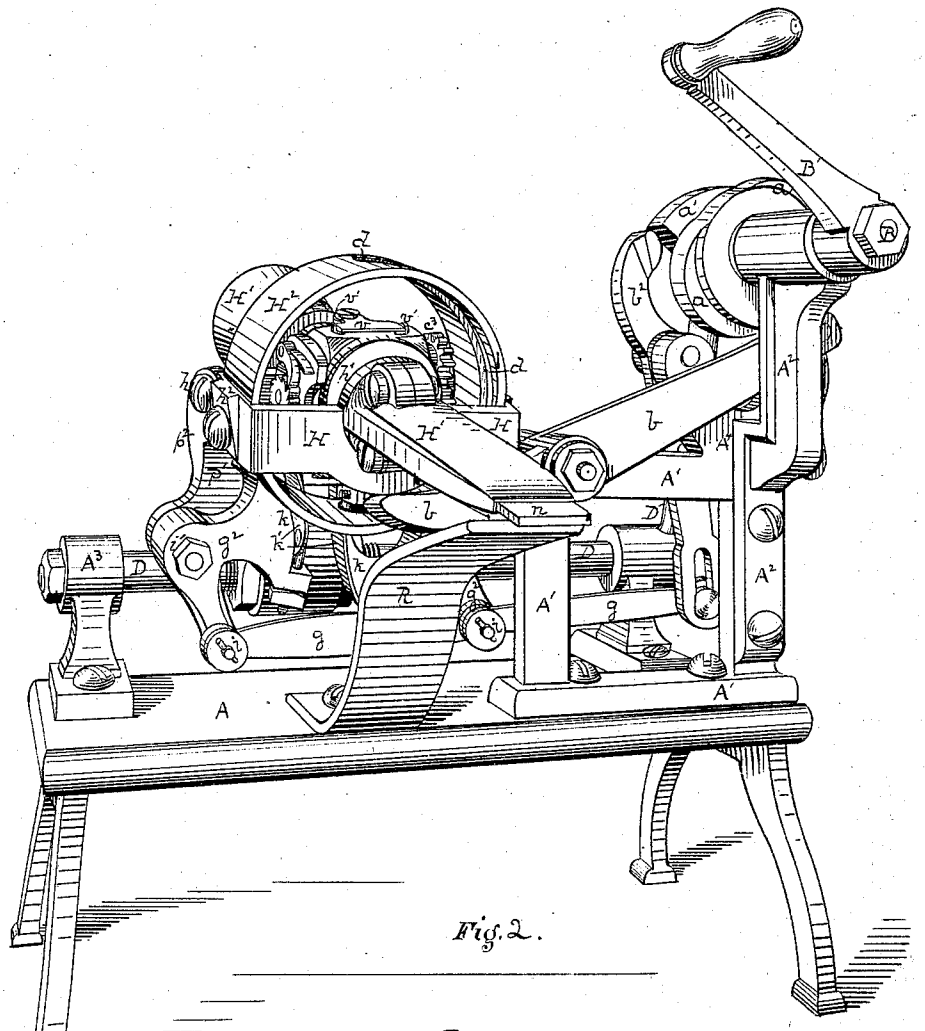

Fig. 2.

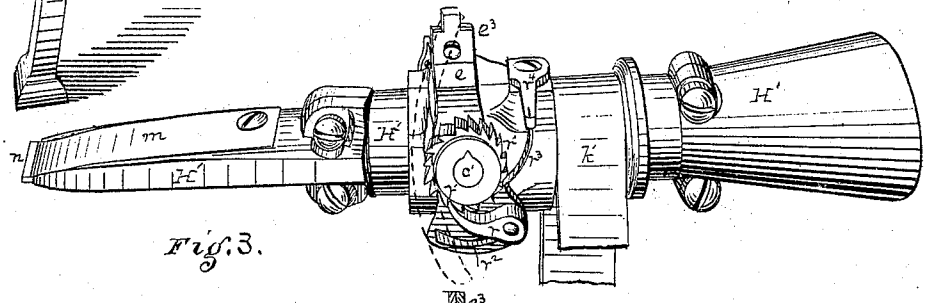

Fig. 3.

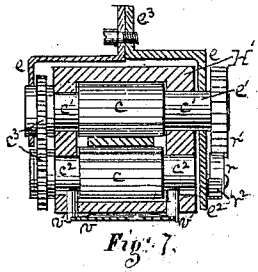

Fig. 7.

Witnesses.
E. Boggs.
Claudius Parker

Inventor
Matthew Leach
By George N. Christy
atty.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

MATTHEW LEACH, OF YOUNGSTOWN, ASSIGNOR TO HIMSELF AND JOHN SMITH, OF SAME PLACE, AND JOHN G. DECKER, OF COITSVILLE, OHIO.

IMPROVEMENT IN NAIL-PLATE FEEDERS.

Specification forming part of Letters Patent No. **170,002**, dated November 16, 1875; application filed October 5, 1875.

To all whom it may concern:

Be it known that I, MATTHEW LEACH, of Youngstown, county of Mahoning, State of Ohio, have invented or discovered a new and useful Improvement in Nail-Plate-Feeding Machine; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawing making a part of this specification, in which—like letters indicating like parts—

Figure 1, Sheet 1, is a perspective view of my improved machine, looking at the feeding side and driving end. Fig. 2, Sheet 2, is a like view looking at the opposite or delivery side and the opposite end. Fig. 3, Sheet 2, is a detached side and top perspective of the feeding apparatus. Fig. 4, Sheet 1, is a longitudinal vertical section of the feeding apparatus. Fig. 5, Sheet 1, shows a transverse section through *x x*, Fig. 4. Fig. 6, Sheet 1, is a top or plan view of the delivery end of the feeding apparatus, particularly illustrative of the adjustment by which the desired taper is given to the nail; and Fig. 7, Sheet 2, is a transverse sectional view through the feeding-box, at or near the plane of the feed-rollers.

My improved machine is intended for the automatic feeding of nail-plates to nail-cutting machines, whereby the hand-labor of the nail-cutter is wholly dispensed with, and an equally good product is secured as by the hand method of operation; and the nature of my invention consists in the features of construction and operation, hereinafter described and claimed, whereby such useful results are secured.

The machine is mounted on any suitable support, A. A frame, A^1 A^2, supports a driving-shaft, B, to which motion is imparted by a crank, B′, or in other suitable way. This driving-shaft B carries a double-sided cam, *a a*, both working in the same plane, also a wiper, a^1, and at its end it terminates in a cam-wheel, having two projecting operative cam-surfaces, a^2 a^2. The plummer-blocks A^3 carry a rocking shaft, D, and this rocking shaft receives a short rotary or rocking motion by means of an arm, D′, keyed thereto, the upper end of the arm bearing against the cam-wheel on the end of the shaft B, and receiving its motion from the cam-surfaces a^2 and the intermediate recesses or depressions.

Securely fastened to the rocking shaft D is a rocking frame, P P′, the part P adjustably secured to the rock-shaft D by the nuts *p p*, and to its projecting arm p^1 is bolted the part P′, which latter consists of a cross-bar and two projecting arms, p^2 p^2. Between these projecting arms is pivoted or hinged the feeding apparatus H H^1 H^2, and other parts presently to be described.

This feeding apparatus consists, first, of an irregularly-shaped frame, H, pivoted to the arms p^2 p^2, as shown at *h*. The feeding box or tube H^1 rests in, and is securely attached to, this frame, as indicated at h^1 h^1, Figs. 1 and 2; but so that, while it cannot move endwise, except with the frame, it may be rotated or revolved therein. A ring or circle plate, H^2, is arranged within the frame H, and is secured thereto by screws h^2, so that it shall stand transversely across the frame H, and in a plane at right angles to the plane of the frame H, and with the feeding tube or box H^1 passing through it along its axial line. The feeding box or tube H^1 has an open bell-shaped mouth, *n′*, for the ready and convenient feeding in of the nail-plates *n* in succession. This bell-mouth gradually contracts into a throat or feeding-passage, such that the nail-plate shall, by its sloping sides, be brought into the plane and direction of feed; and the contracted walls of the passage-way of the nail-plate, as illustrated in Fig. 4, along with the feed-rollers *c c*, co-operate in bringing the nail-plate into line, and feeding it in line to the cutters. As illustrated in Figs. 1 and 2, the feeding box or tube H^1 is set with its delivery end lower than its receiving or bell-mouth end, so that the nail-plates, as dropped successively into the bell-mouth *n′*, shall by their own gravity pass endwise into the throat, and by its sloping and converging sides be guided into the proper plane to be caught and fed forward by the feed-rolls *c c*.

In feeding nail-plates to cutting-machines a number of motions are required. These I will now describe separately, with the devices by which they are secured. First, after each

stroke of the cutters the nail-plate must be drawn back so as to clear the moving cutter on its reverse stroke, and must also be raised up vertically, so as to clear any guide, support, shear-rest, or anvil which may be used in connection with the cutting operation, the relationship of which to the nail-plate is indicated by the rest R.

To secure the backward movement of the nail-plate between the intervals of cutting, I employ the cam-wheel a^2 a^2, arm D′, and rock-shaft D. As the projecting cam-faces a^2 a^2, with the rotation of the driving-shaft B, engage the arm D′, they impart thereby a slight or short rocking motion to the shaft D, and through it impart a corresponding back circular motion to the rocking frame P P′, so that thereby the frame H, which carries the feeding appliances, is drawn back the required distance for the forward end of the nail-plate to clear the cutters. To raise the feeding end of the nail-plate, so that it can be rotated, I make use of the cams *a a* or the driving-shaft B. A lever, *b*, is pivoted to the frame A^1, so that one outer end shall be engaged and depressed by the cams *a* as they rotate in succession, and the other end, taking a bearing under the forward end of the frame H, as illustrated in Fig. 2, shall raise the forward end of such frame, and with it the forward end of the feeding box or tube, the desired distance. In this latter motion the frame H turns on its pivots *h*. These devices are arranged and operated so that the backward and vertical motions described are simultaneous; also, after each such motion, the feeding apparatus will, by its own weight, come back to a feeding position.

Next, in order to rotate the nail-plate, I employ the wiper a^1. The frame A^1 carries a U-shaped lever-support, A^4. To the extremities of the arms of this support I pivot the levers b^1 b^2 in such position that their upper ends may, coming on opposite sides of the driving-shaft B, be successively engaged by the wiper a^1. The lower end of the lever b^1 is connected by a link, b^3, with lever b^2, at a corresponding distance from the pivoting-point of the latter, and an extension, b^4, of the latter lever connects by a slot and wrist, g^1, with a reciprocating connecting-rod, *g*, which latter is at *i i* pivoted to two bent levers, g^2, these latter being pivoted at *i′ i′* to the rocking frame P′. The opposite or free ends of the bent levers g^2 are made in the shape of the arc of a circle, as shown at *k*, and to the lower ends of such arc-shaped levers I secure the ends of a band, *k′*, which passes over a cylindrical bearing on the feeding box or tube H^1, as illustrated in Figs. 3 and 4, and the band is kept from sliding on its bearing by a pin, *s*, and keeper *s′*, the pin being supported at its outer end by the keeper, and passing through the band, entering the periphery of the bearing under the band. The heads of the levers g^2 face each other, so that whichever way the connecting-rod *g* is moved by the wiper a^1 and the levers b^1 b^2 it will throw the circular head of one lever, g^2, up, and the circular head of the other down, thereby rotating the feeding tube or box H^1 at the same time that the latter is thrown back and up, in the manner above described. With the stroke of the connecting-rod *g* one way, effected by the wiper a^1 engaging one of the levers b^1 or b^2, the feeding box or tube H^1, will be rotated one way a half-revolution. With the reverse stroke of the rod *g*, effected by the wiper a^1 engaging the other lever, it will be rotated back.

To secure an intermittent feed of the desired length, and at the proper intervals, I employ the feed-rollers *c c*, which are arranged in a chamber in the feeding box or tube H^1, as shown in Fig. 4, and are preferably made with rachet-shaped longitudinal flutings or corrugations. These feed-rollers rotate with the box H^1. Their bearings or journals c^1 c^2 extend outside the box at both ends, as shown in Fig. 7, and one side of the box they are geared together by cog or spur, or other suitable gearing, as at c^3. A yoke, *e*, extends around the box H^1, and is pivoted, as at e^1, to the extended axis or bearings c^1 of one of the rolls, so as to have a rocking motion thereon. An extension, e^2, of one arm or leg of this yoke carries a pawl, *r*, which engages a ratchet-wheel, r^1, or the extension of the adjacent bearing c^1, and this pawl is held down by a spring, r^2, so as to allow it to slide from tooth to tooth when moving one way, and cause it to engage a tooth when moving the other way, and a backward motion of the ratchet-wheel is at all times prevented by a spring-dog, r^3, which is carried in the proper position by an arm, r^4. To give a reciprocating or rocking motion to the yoke *e*, and thereby cause it to actuate the pawl, ratchet-wheel, and feed-rollers, I make on the yoke a lug, e^3, which plays in an inclined slot or groove, *d*, made in the ring or circle plate H^2. This groove *d* is, with a double or reverse incline mechanically, a grooved double cam, and as the feeding box or tube H^1 rotates or turns over and back this groove imparts a reciprocating motion to the lug e^3, and causes the yoke *e* to rock on the bearings c^1. Hence, as the extended leg e^2 of the yoke reciprocates forward while moving along one incline of the groove *d*, its pawl causes the ratchet-wheel to revolve and rotate the feed-rollers c^1, and thereby give a forward feed of the desired length to the nail-plate *n*, and as it moves backward along the other incline the pawl slides back on the ratchet-teeth to take a new bite for a new feed. And to make sure that the feed-rollers *c* shall take a firm bite on the nail-plate *n*, so as to feed it along without slipping, and also to adapt the feed-rollers for varying thicknesses of nail-plate, I apply a yielding pressure to the bearings of one of the rolls by a spring, *v*, and bearing-pins *v′*, as illustrated in Fig. 7. In order to have the nails receive the desired taper as cut, I arrange the feeding tube or box H^1 so that it shall feed

the nail-plate a little obliquely to the plane of the cutters, as illustrated in Fig. 6, the plane of the cutters being indicated by the end line of the rest R. And the amount of this obliquity may be varied so as to vary the taper by inserting under one edge or the other of the arm p^1, and between it and the part P′, a thin washer—say, of paper or other material, or by the adjustment of the plummer-blocks A^3.

That the feeding orifice of the box H^1 may conform to the slightly-varying thicknesses of nail-plates, I prefer to make one side of it of a spring-plate, *m*, as illustrated in Fig. 4.

To work different-sized nail-plates on the same machine, I make the feeding box or tube removable, so that others of different sizes as to feed openings or passages may be inserted, and in such changes I vary the taper by the means already indicated, or in connection therewith, by setting the frame P P′ one way or the other on the shaft D by means of the nuts *p p*.

While I have described specifically and in detail the construction of the devices which make up my machine, I do not limit myself therein, but include other equivalent devices, and substantially like combinations, as within the scope of my invention; hence,

I claim—

1. As a means of rotating the feeding box or tube, a pair of bent levers, g^2, and band k', in combination with a reciprocating rod, *g*, substantially as described.

2. The frames P, P′, and H, carrying loosely pivoted therein the feeding box or tube, in combination with a rock-shaft, D, substantially as set forth.

3. The levers b^1 b^2, in combination with the wiper a^1, connecting-rod *g*, bent levers g^2, band k', and feeding box or tube H^1, substantially as set forth.

4. The combination of the pivoted frame H, ring or circle plate H^2, formed with cam-groove *d*, feeding box or tube H^1, yoke *e*, with stud e^3, pawl *r*, ratchet-wheel r^1, feed-rollers *c c*, spring *v*, and bearing-pins *v′*, substantially as and for the purposes set forth.

5. In combination with a pair of feed-rollers, *c c*, arranged within the feeding tube or box, a yoke, *e*, and cam-groove *d*, and ratchet and pawl, arranged and operative substantially as set forth.

6. The frame P P′, made in two parts and bolted together, whereby, by the interposition of a washer, the angle of feed may be varied at pleasure, the combination of these parts with the angularly-arranged feed-tube being substantially as described.

In testimony whereof I have hereunto set my hand.

MATTHEW LEACH.

Witnesses:
J. D. RANY,
JOSHUA C. BATES.