E. J. COUCH.

NAIL-PLATE FEEDING-MACHINE.

No. 193,926. Patented Aug. 7. 1877,

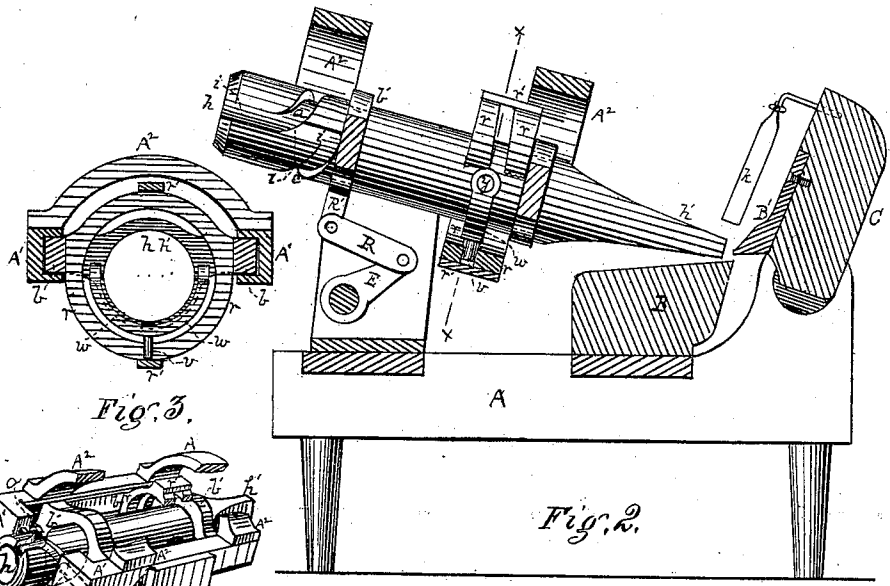


Fig. 3.

Fig. 2.

Fig. 5.

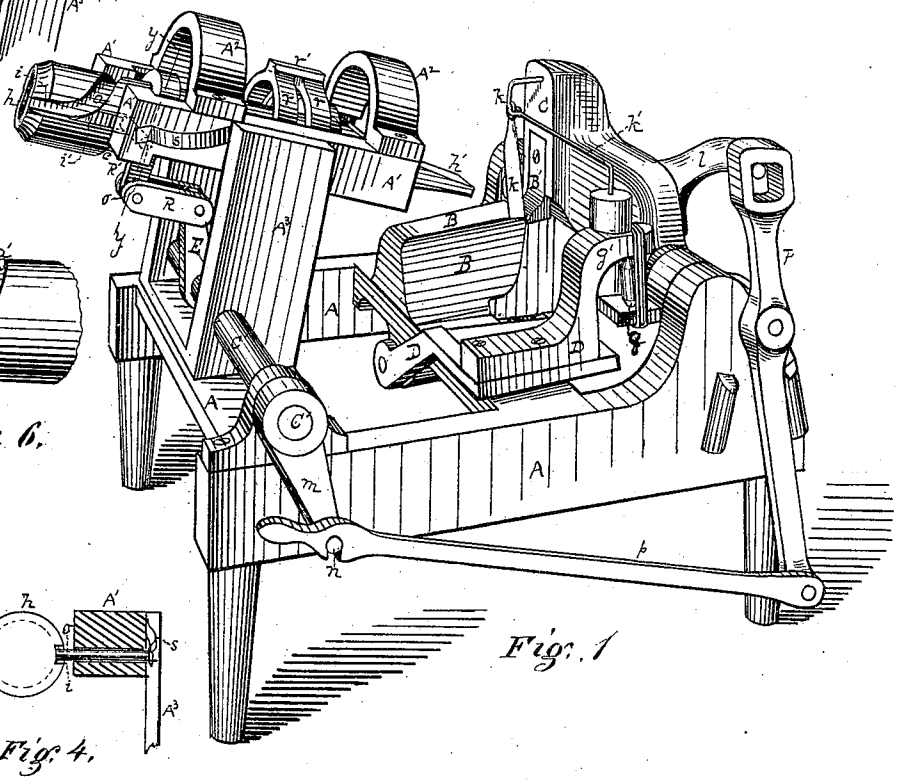


Fig. 1

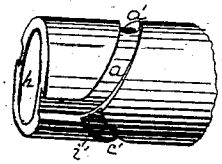


Fig. 6.

Fig. 4.

Witnesses

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IMPROVEMENT IN NAIL-PLATE-FEEDING MACHINES.

Specification forming part of Letters Patent No. **193,926**, dated August 7, 1877; application filed May 15, 1877.

To all whom it may concern:

Be it known that I, EDWARD J. COUCH, of Allegheny, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in Nail-Plate-Feeding Machines; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—like letters indicating like parts—

Figure 1 is a perspective view of my improved nail-plate-feeding machine. Fig. 2 is a longitudinal section of the same. Fig. 3 is a transverse section through the line *x x*, Fig. 2. Fig. 4 is a like section through the line *y y*, Fig. 1. Fig. 5 is a detached view, in perspective, of the feeding-barrel, a part of the outer frame being broken away; and Fig. 6 shows a part of the feeding-barrel, with a modified form of groove.

My present improvement relates to apparatus for feeding nail-plates to nail-cutting machines.

A represents the frame-work, which may be supported in the usual way. B represents the bed-knife or anvil upon which the plate rests while being severed. B′ is the cutting-knife, which is secured in the usual way to the rocking head C. This rocking head is operated in the ordinary way, and gives motion to the header-frame D by means of a suitable joint or connection, as at *g*.

The parts thus far mentioned are the same as are commonly used in nail-cutting machines.

To the arm *g′* of the header-frame D I attach a rod, *k′*, and connect it by some flexible joint with the brush or scrap-cleaner *k*. This scrap-cleaner is pivoted at one end to the rocking head C. The motion of the frame D gives it a vibratory motion by means of the rod-connection *k′*, already described, and, the scrap-cleaner being properly pivoted to the rocking head, it will be made to sweep over or vibrate back and forth across the face of the bed-knife B for every nail that is cut. It will thus brush away any scrap or pieces that may be left, and which would otherwise impede the feeding of the nail-plate, as hereinafter described.

The motion of the rocking head C is communicated to the rock-shaft C′ by means of the arm *l*, vibrating lever P, and bar or pitman *p*.

A frame, A^1, having curved or oval cross-pieces A^2, and supported on standards A^3, carries the feeding mechanism proper. The side pieces A^1 have grooves on their inner adjacent faces, in which slides an auxiliary frame, *b b′*, Fig. 5. The cross-pieces *b′* of this frame encircle the feeding-barrel *h h′*, and by so encircling it they furnish bearings in which it rests and turns, as hereinafter described.

The sliding frame *b b′* is connected to the shaft C′ by means of the arm E, link R, and stud R′, the stud projecting from the under side of one of the cross-pieces *b′*. By this means the rocking motion of the shaft C′ is converted into a reciprocating rectilinear motion in the frame *b b′*, and a like motion will be given through the frame to the barrel *h h′*. The range or extent of this motion may be varied at pleasure; but it should be sufficient, at least, to withdraw the barrel far enough to allow it to turn or rotate in its bearings *b′* without interfering with the bed-knife or anvil B, and, on the other hand, to feed well up to the cutting-knife without interfering with it. Such necessary adjustment can be readily made by the skilled mechanic.

In order to effect the turning of the barrel *h h′*, as mentioned, so as to reverse the plate for each nail cut, two spiral or cam grooves, *a c*, are used, one on each opposite half of the barrel, as at the end *h*.

I have shown two forms or modifications of such grooves, one in Figs. 1 and 2, and the other in Figs. 5 and 6. I will first describe the form shown in Figs. 1 and 2.

When arranged as here shown, the barrel is turned while moving in one direction, as backward, the barrel remaining or resting in its bearings without turning during the reverse or forward movement; and to this end straight grooves *i* are formed, one on each opposite side of the barrel, which are at least

equal in extent to the rectilinear movement of the barrel. Each of the two spiral grooves *a c* pass half way around the barrel, and connect or unite with the two straight grooves *i*, beginning on each straight groove at a point near its outer end, and terminating near the inner end of the opposite straight groove. Guide-pins *o*, passing through holes or mortises in the frames A^1, and seated against springs *s*, work in these grooves *i a c*. Fig. 1 shows these several devices with the barrel *h h'* drawn back to the limit of its motion. The movement next succeeding this position will be in a direct line to the cutting-knife without turning the barrel, the guide-pins *o* keeping the straight grooves *i*. At the end of this forward movement the barrel will have the position shown in Fig. 2, and the pins *o* will rest near the outer ends of the straight grooves. After the nail is cut, a reverse motion is given to the barrel in a direct line backward through the devices described, and in this backward movement the pins *o* take the spiral grooves *a c*, causing the barrel to make a half-turn in its bearings. This is effected by making the spiral grooves deeper than the straight ones at the point where the former diverge from the latter. This change of depth is an abrupt one, and the shoulder *i'* made thereby forms the inner wall of the spiral grooves at the diverging point. As the barrel moves forward the springs *s*, pressing against the pins *o*, cause them to keep the bottom of the grooves; but in the reverse or backward movement the walls made by the change in depth, coming against the pins, cause them to take the spiral grooves, as described.

In the modification of grooves shown in Figs. 5 and 6 the straight grooves *i* are dispensed with, and the barrel is made to turn during both the backward and forward movements. This is secured by passing each of the spirals *a c* one-quarter around the barrel, where they turn, as at *a'*, so as to unite with or connect with the opposite spiral at the point where it begins, each thus passing halfway around the barrel on opposite sides, and forming two cams thereon. The groove thus formed is substantially a continuous one, having four angles. The pins or guides *o* may be caused to keep the proper grooves by varying their depth at the angles, as already described.

Such a grooved barrel being substituted for the one before described, the operation will be as follows: The barrel *h h'* being at the limit of its forward motion, the guide-pins *o* will be at or near the outer angles of the grooves next to the end *h*. As the barrel is drawn back the guides take the grooves *a c* toward the inner angles, as at *a'*, which angles reach the guides at the limit of the backward movement of the barrel, by which the barrel is given a quarter-turn, as in Fig. 5. During the reverse or forward movement the guides *o* take the grooves *a' c'* toward the opposite outer angle from which each started, at which point the barrel will have completed the balance of a half-turn, and be in position for the succeeding cut. By properly shaping the grooves at the outer angles the barrel may be made to complete its half-turn before the limit of the forward motion is reached.

The barrel *h h'* is provided in its interior with any suitable feed-rolls and attendant apparatus for giving a forward feed to the nail-plate within the barrel. In order to give an intermittent motion to such feed-rolls a double ring, *r r*, is attached to the sides of the sliding frame *b b'*, and the parts connected by cross-ties *r'*. The inner adjacent faces of these rings are so shaped as to form a double cam-groove around the barrel, which passes through the rings. A wrist, *v*, works in this cam, which wrist is attached to the sector *w*, which, in turn, is pivoted to the barrel. Each half-revolution of the wrist gives the sector one vibration back and forth on its pivots *y*. If the feed-rolls within the barrel be geared by ratchet and pawl to this swinging sector *w*, they will receive therefrom the requisite motion.

Various modifications may be made in the means described for transmitting motion from the nail-cutting mechanism to the feeder, or motion may be given to the feeder from some other source, the essential element being that the proper reciprocating movement be given to the frame *b b'*, which carries the barrel *h h'*. Also, various modifications may be made in the frame A^1 A^2 and *b b'* without departing from the scope of my invention.

The two forms of spiral grooves described I believe to be the best for the purpose, yet modifications may be made in them, both as to shape and position, and still operate to turn the barrel, substantially as described—as for example, the guides *o* may be arranged in the barrel, and the grooves described may be made in a band or case surrounding the barrel.

I have shown the bar *p* as hooking onto the wrist or pin *n* of the crank *m*, for the purpose of readily disconnecting it therefrom, and thus throwing the feeding apparatus out of gear; but any of the well-known devices may be employed for that purpose.

It is essential that the nail-plate be at rest while the nail is being cut therefrom. To secure this I have made a loose connection between the arm *l* and lever P, so that the die B' may move far enough to sever the nail before the arm *l* shall actuate the lever P.

The barrel is made tubular or hollow, and I design using in connection therewith the internal mechanism and gearing for giving feed, described in patent granted to Matthew Leach, assignor, November 16, 1875, No. 170,002.

I claim herein as my invention—

1. In a nail-plate-feeding machine, the double ring *r r*, attached to frame *b b'*, and connected by cross-ties *r'*, the inner faces of said rings

being formed so as to constitute a double cam-groove around the barrel, in combination with the wrist *v*, attached to the sector *w*, the said sector being pivoted to the tubular feeding-barrel, all substantially as specified.

2. In combination with the feeding mechanism of a nail-machine, the scrap-cleaner *k*, having a vibratory motion back and forth across the path of the feeding mechanism at each back stroke of the same, said scrap-cleaner being pivoted at one end to the rocking head C, and connected by means of a flexible joint with the rod *k'*, which is secured to the arm *g'* of the header-frame, the said parts being constructed and arranged to operate substantially as herein specified.

In testimony whereof I have hereunto set my hand.

EDWARD J. COUCH.

Witnesses:

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CLAUDIUS L. PARKER.