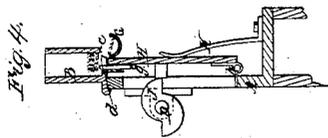
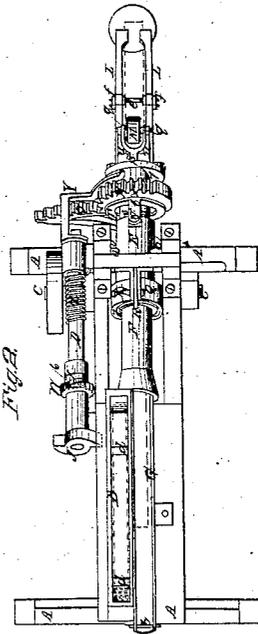
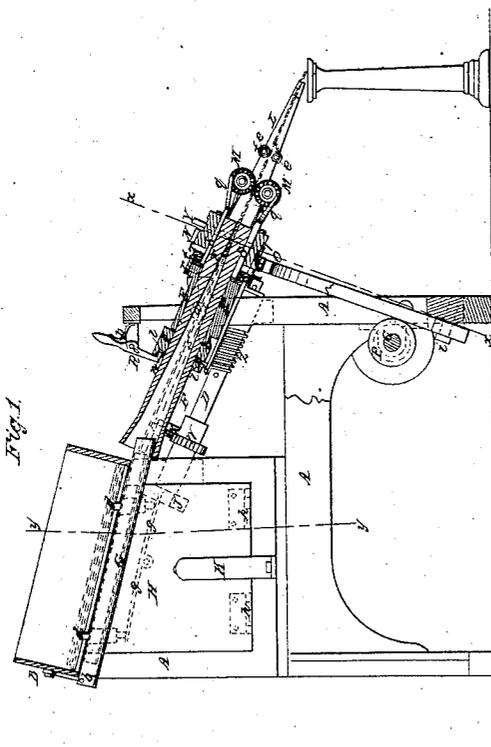
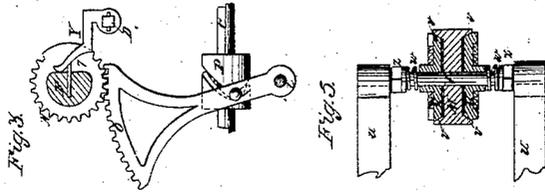


Hoard & Searle,

Making Cut Nails,

N^o 27,289-

Patented Feb. 28, 1860.



Witness:
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UNITED STATES PATENT OFFICE.

J. W. HOARD AND THOMAS A. SEARLE, OF PROVIDENCE, RHODE ISLAND.

NAIL-PLATE FEEDER.

Specification of Letters Patent No. 27,289, dated February 28, 1860.

To all whom it may concern:

Be it known that we, J. W. HOARD and THOMAS A. SEARLE, of the city of Providence and county of Providence and State of Rhode Island, have invented a new and useful Improvement in Nail-Plate Feeders; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a longitudinal vertical section of a feeder with our improvements. Fig. 2 is a plan of the same. Fig. 3 is a transverse section of the same in the line *x, x*, of Fig. 1. Fig. 4 is a transverse section of the same in the line *y, y*, of Fig. 1. Fig. 5 is a central section of one of the feed rollers and its driving ratchets.

Similar letters of reference indicate corresponding parts in the several figures.

Our invention consists in a certain arrangement in combination with a conductor for conveying the nail plates toward the cutter, of a box for containing a pile of plates, and in certain means of discharging the lowest plate of such pile from the said box into the said conductor as often as is necessary.

It also consists in a novel construction of and mode of applying a conductor, through which the plates are conveyed toward the cutter, and in certain improved mechanism for moving the plates toward the cutter, and turning them between the successive operations of the cutter.

To enable those skilled in the art to make and use our invention we will proceed to describe its construction and operation.

A is a stationary framing supporting the inclined box B, which contains the pile of plates represented in blue color; and containing bearings for the horizontal driving shaft C, for the inclined shaft D, by which the mechanism for discharging the plates from the box B is operated, and for the trunnions *a a* of a hollow cylinder E, to which is fitted the inclined barrel F, which constitutes the principal portion of the conductor through which the plates are conveyed to the cutters.

The barrel F has its interior of circular form at the upper end and of funnel shape, but gradually assuming toward the lower end the form of the transverse section of the plates. The said barrel is arranged with its

upper end near the lower end of the box B, and with its axis parallel with the sides of but in a plane at some distance in a lateral direction from the box as shown in Fig. 2. Above the barrel F, or principal conductor there is arranged beside but just below the box B, an open inclined trough G, which may be termed the auxiliary conductor into which the plates are received one at a time from the said box to be conveyed by gravitation into the barrel F. The said trough G, is attached at its upper end by a hinge or pin joint *b* to the bottom of the box B, and its lower end rests within the mouth of the barrel F. The lower plate of the pile in the box B is pushed out into the trough G, as often as it becomes necessary to keep up the supply of plates to the feeding apparatus, through an opening *c* (see Fig. 4) in the side of and close to the bottom of the said box, by means of two pieces *d d* which are attached to the top of a swinging frame H, the bottom of which is hinged at *h h* to the stationary framing A, the said pins working through suitable openings in the bottom of the box and being suitably arranged to catch the edge of the lowest plate, but to touch no other plate of the pile, and the said frame H, being acted upon to cause the pin to push out the plate by a cam J, on the shaft D, the manner of whose operation will be presently described and the said frame being pushed back again to bring the pins *d d* into a position to take the next plate by means of a spring K, attached to the stationary framing. The said springs *d d* are beveled on one side and supported by a spring *g* which allows them to slip down out of the way of the plate in the back movement of the frame H.

To the lower end of the barrel F, there is attached the pair of tongs L, L, which hold the plate which is under operation and present it properly to the cutters, and a pair of feed rollers M M, which feed the plates to the cutter, such tongs and feed rollers being properly arranged relatively to the flat lower portion of the interior of the barrel F, to receive the plates therefrom. The feed rollers are attached to the cylinder by elastic arms *u u* which contain their bearings, the elasticity of the arms serving to allow the rollers to yield to any inequality in the thickness of the plates. On the exterior of the barrel there is a spur wheel or toothed sector N, which gears with a toothed sector O, of

greater radius, which is arranged to oscillate upon a fixed pin *i*, and which derives an intermittent oscillating movement from a grooved cam P, on the driving shaft C. The said sector O, by its action on the wheel or sector N, is caused to impart to the barrel, the necessary movement on its axis within the cylinder E, to turn the plate over between the successive operations of the cutter, and it is by this movement of the barrel that its other movements, viz: a longitudinal movement within the cylinder E to draw the plate back out of the way, of the cutter as it turns, and a swinging or lever-like movement with the cylinder E on the trunnions *a a* to raise the plate for the purpose of allowing it to turn freely and letting it fall again on the die before the operation of the cutter is produced.

The above mentioned longitudinal movement within the cylinder is produced by the action of a groove *k* in the periphery of a cam Q which is fast on the barrel, upon a pin *j*, which is secured rigidly to the cylinder. The movement of the barrel and cylinder on the trunnions *a a* is produced by the action of a groove *l* in the upper end of the cam on a pin *n* that is secured rigidly to or forms part of a lever-like bar R, which is attached to the framing A, by a fulcrum pin *o*. The pin *n* is confined in the groove of the cam notwithstanding the longitudinal movement of the cylinder by a spring *p* which presses upon the bar R. It may be well here to remark that it is only on account of the longitudinal movement of the cylinder that the pin *n*, is attached to the lever R, and not made absolutely stationary.

The movement of the feed rollers is produced by the longitudinal movement of the barrel in the following manner: On each side of each feed roller there is provided a circular ratchet, and to the two ratchets of each roller are applied two spring pawls *q q* arranged in the form of a fork and attached to the lower end of two rods S, S, which are fitted to slide longitudinally to the barrel in guides provided on or in the barrel. These rods have heads *s, s*, which occupy positions between the lower end of the cylinder E and the upper face of a ring T, which is attached by lugs *t t* and screws *r r* to the cylinder. As the barrel is moved longitudinally in a backward or upward direction to draw back the plate from the cutter, the rods S, S, have their heads drawn back into contact with the end of the cylinder, and the rods, and pawls are so caused to be arrested, and the pawls, by the continued movement of the barrel which carries the rollers with it, are caused to slip over the ratchet teeth; but as the barrel moves forward again, the heads *s s* of the rods S, S, are brought into contact with the ring T, and the rods and pawls are arrested while the barrel continues to move forward

carrying along with it the feed rollers and the ratchets, and the latter being held by the pawls, are caused to turn and move the rollers in a direction to feed the plate.

In feeding the plate, it has always to be brought up to a stop gage that the nails may be cut of proper width and in order to compensate for any irregularity in the size of the teeth of the ratchet, which would tend to give too great a feed movement and so press the plate against the gage and strain some part of the feed apparatus if it were too positive in its action, we make the two ratchets of each feed roller M, on two separate wheels U, U, as shown in Fig. 5, and make the said wheels with conical faces *v v* to fit to conical recesses in the sides of the rollers, and produce sufficient friction between the ratchet wheels and the rollers to make the latter feed the nail plate by means of coiled springs *w, w*, applied outside of the ratchet wheels, around the spindle V, to which each roller, and ratchet wheels are fitted. The pressure of these springs is adjusted to produce the requisite friction by nuts *z z* fitted to screw threads on the spindle. By this method of driving the feed rollers, they are enabled to stop when the plate arrives at the stop gage, notwithstanding that the movement of the ratchet wheels may continue. The journals of the feed rollers, may consist of the hubs of the ratchet wheels or the extremities of the spindle V.

The shaft D, of the cam J, by which the discharge of the plates, from the box B, is effected, has its movements produced by the following means: The said shaft is made in two pieces, of which one is fitted into the other as into a sleeve, the one having rigidly attached to it, the cam J, and a ratchet wheel W, and the other having rigidly attached to it, arms Y and X, the latter arm carrying a pawl 6, arranged to engage with the said ratchet wheel, and the former arm, being arranged opposite to a recess *y* shown in Fig. 3 which is formed in the lower part of one side of the cylinder F, and which is of such depth as to meet the central passage of said cylinder, that the nail plates in passing through that part of the said passage may project into the said recess as shown in Fig. 3. The recessed portion of the barrel constitutes a cam by whose action on the arm Y, the portion of the shaft D to which the said arm is attached is caused to move the arm X, in a direction for its pawl to turn the ratchet wheel W. The said arm Y, is pressed toward the so formed cam by a spring Z, that is coiled around the part of the shaft D to which the said arm is attached, and this spring serves to carry the pawl 6 over the teeth of the ratchet wheel. The arm Y, is prevented falling into the recess *y*, while a plate is passing through the recessed

portion of the barrel, for the said arm rests on the edge of the plate while the recess is toward it, and hence the operation of the pawl C on the ratchet wheel does not take
 5 place till the rear end of the plate which is in the tongs is fed past the recess 7, and the arm Y, is permitted to fall into the recess, when the cam like operation of the recessed portion of the barrel on the said arm com-
 10 mences, and a few revolutions of the barrel are sufficient to give the shaft D, a sufficient portion of a revolution to make the cam J, by its action on the frame H, force out the lowest plate of the pile from the box B, into
 15 the trough G, along which the said plate immediately slides by gravitation into the barrel F, down which it passes till its lower end comes in contact with the upper end of the plate that is held by the tongs and
 20 feed roller, and from which the nails are being cut. The new plate now projects into the recess 7, of the cylinder and so prevents for the present any further action of the shaft D, but it is caused by gravitation to
 25 follow up closely the plate under operation in advance of it, and to be seized by the feed rollers, as they give up that plate and then serves the purpose by its being pushed against that plate of continuing to feed it
 30 forward through the tongs, in the same manner as though it were still held by the rollers until that plate is all cut up, and it takes the place of said plate in the tongs and is itself subjected to the operation of
 35 the cutters. In this way the plates follow each other down the trough, conductor or barrel F, a new one being supplied from the box B, as soon as the rear end of the one under operation passes the recess 7, in the
 40 barrel.

In the machine represented the bearings of the cylinder trunnions, are represented as fixed but, we propose generally to arrange the said bearings in a swivel having a ver-
 45 tical axis, for the purpose of enabling the nail plates to be adjusted against a side gage in suitable proximity to the cutter.

What we claim as our invention and desire to secure by Letters Patent, is:

50 1. The employment in combination with

an apparatus for conveying and feeding the plates toward the cutters, of a box contain-
 ing a pile of plates the lower one of which is by an automatic action discharged side-
 wise from the box and delivered to the feed- 55
 ing apparatus in a direction, transverse to the feed movement as often as a new plate is required.

2. The arrangement of the feeding apparatus or that portion of it which holds the
 60 plate and moves it forward, to swing upward and downward on trunnions or with a lever like movement substantially as herein described.

3. The barrel or conductor F, having at- 65
 tached the tongs and feed rollers, and furnished with a toothed wheel or sector N, through which it receives a movement back and forth on its axis and a cam Q through
 70 which it receives a longitudinal movement back and forth as herein described.

4. The arrangement of the sector O, and cam P, in combination with the wheel or
 75 sector N, on the barrel substantially as herein described.

5. The combination with the eccentric
 80 groove *l* in the cam Q of a lever like bar R furnished with a pin or prejection *n* and having applied to it a spring *p* substantially as herein described.

6. In combination with feed rollers ap-
 85 plied as described and furnished with ratchets, we claim the pawls, *g*, *g*, headed rods S, and ring *t*, applied in relation to the barrel or conductor F, and the cylinder E,
 or bearing of said barrel or conductor to operate the rollers substantially as herein described.

7. Controlling the action of the cam shaft
 90 D, by which the plates are discharged from the box B, by the action of the plates passing through a recess 7, in the barrel or conductor E, substantially as herein described.

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 THOMAS A. SEARLE.

Witnesses:

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 HENRY MARTIN.