

(No Model.)

2 Sheets—Sheet 1.

W. B. BENNETT.
NAIL MACHINE.

No. 577,909.

Patented Mar. 2, 1897.

Fig. 1.

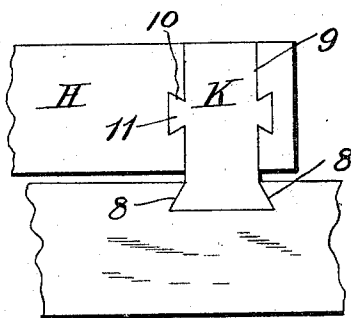
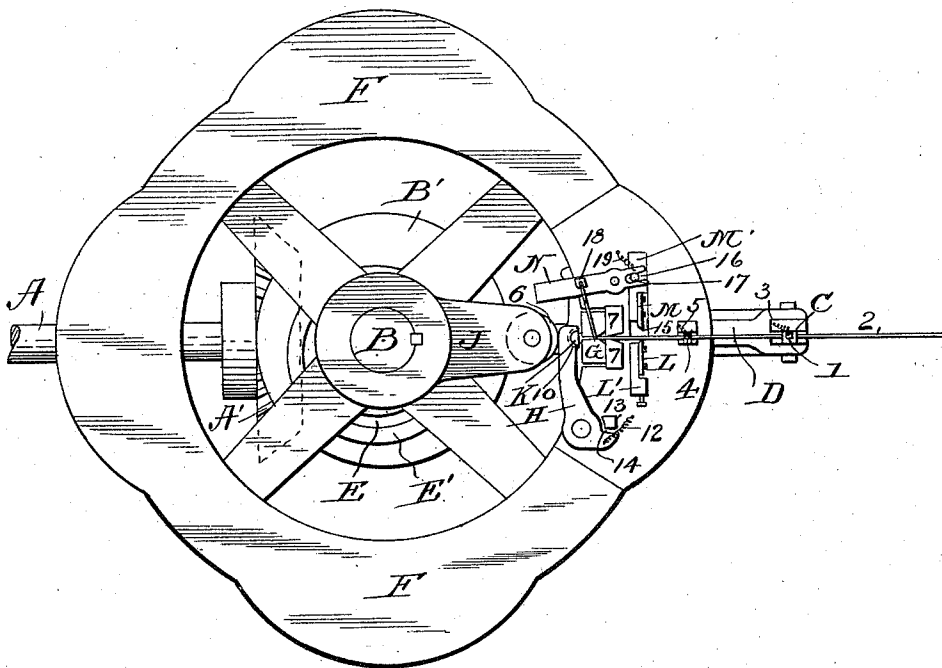
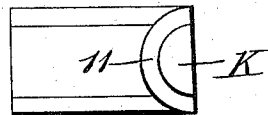


Fig. 2



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Wm B. Bennett.
By *John C. Manahan*
his Attorney

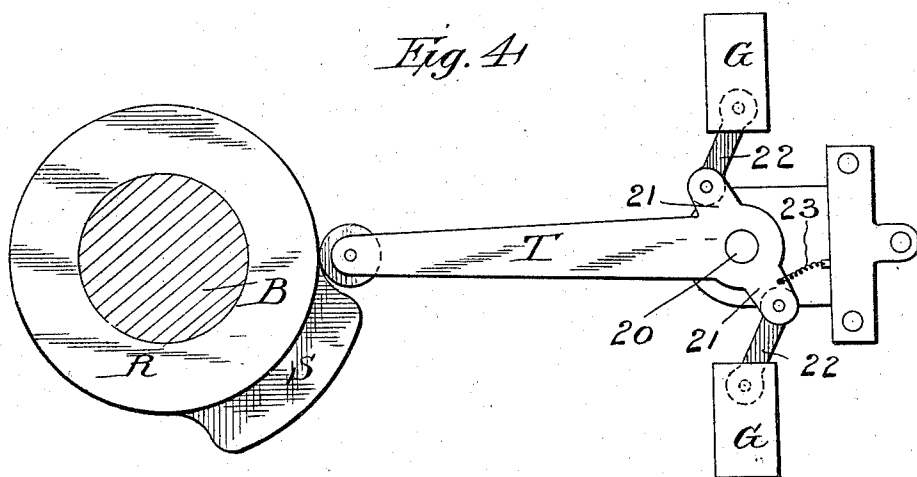
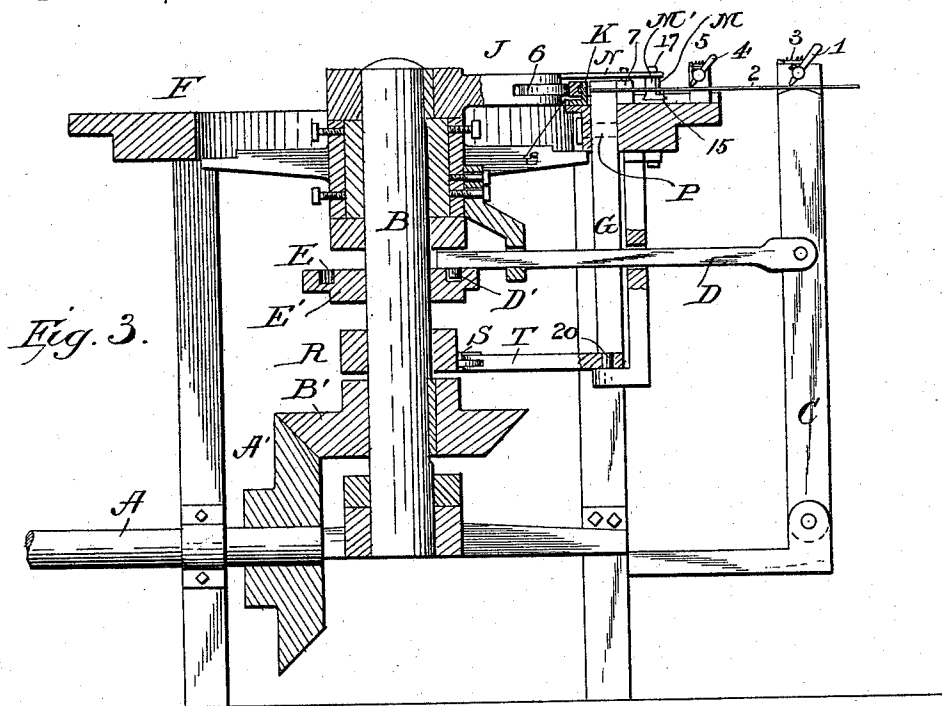
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UNITED STATES PATENT OFFICE.

WILLIAM B. BENNETT, OF STERLING, ILLINOIS, ASSIGNOR OF THREE-FIFTHS
TO JOHN V. EMMITT AND CHARLES H. RICHARDSON, OF SAME PLACE.

NAIL-MACHINE.

SPECIFICATION forming part of Letters Patent No. 577,909, dated March 2, 1897.

Application filed November 14, 1896. Serial No. 612,114. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM B. BENNETT, a citizen of the United States, residing at Sterling, in the county of Whiteside and State of Illinois, have invented certain new and useful Improvements in Nail-Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention has reference to improvements in nail-machines, and has for its object the manufacture of wire nails with great rapidity and uniformity, occupying meanwhile a comparatively small space for the location and operation of the machine.

In a general way my invention comprises a fixed metallic circular plate within which a rotating shaft carries a radial arm adapted to actuate the nail-heading mechanism at different localities around the interior of said metallic circular plate; also, suitable mechanism for feeding radially the wire over said plate and into the interior thereof; also, suitable straighteners and feeding and cutting and pointing mechanism.

I attain the above purposes by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a view of the top of the circular plate referred to, the end of the interior shaft, and the radial nail-heading arm, together with a detail of the top view of the feeding, cutting and pointing, gripping, and heading devices. Fig. 2 is a detail of the heading-die. Fig. 3 is a vertical cross-section of a machine embodying my invention. Fig. 4 is a detail of the mechanism for actuating the grippers.

Similar letters and figures refer to similar parts throughout the several views.

Referring to Fig. 3, A is a horizontal rotating shaft driven in any suitable mode and provided with beveled gear A'. B is a vertical rotating shaft suitably journaled in the frame of the machine, provided with beveled

gear B', adapted to be engaged and actuated by the beveled gear A'. C is a vertical arm suitably pivoted at its base to the frame of the machine and adapted to be oscillated in a vertical plane to and from the shaft B by an arm D, pivotally connected at its outer end to about the central portion of the arm C and extending horizontally toward the shaft B and provided at its inner end with a projection D', which traverses an annular groove E, formed in the upper surface of the collar E', seated on the shaft B eccentrically, which causes the oscillations of the arm C to be in accord with predetermined periods. The upper end of the arm C is provided with the usual feed-pawl 1, held in engagement with the wire 2 by the spring 3. The wire 2, from which the nails are made, is fed into the machine by the action of the arm C, and said wire is held from retrogression by the engaging pawl 4, held in contact with the wire by means of a suitable spring 5, suitably secured to the circular plate F.

Referring to Fig. 1, the wire 2 is fed radially over the circular plate F between the grippers G G, (the latter being actuated as hereinafter described,) the top ends only of said grippers being shown in said Fig. 1. The wire 2 is fed sufficiently beyond the internal face of the grippers G to afford material enough for the head of the nail. An oscillating arm H, suitably pivoted at one end on the plate F, has its opposite or free end forced against the aforesaid projecting end of the wire by means of a rotating arm J, keyed upon and projecting radially from the shaft B. The arm J is provided at its outer extremity with a friction-roller 6, adapted in the orbital movement of the arm J to strike the inner surface of the free end of the arm H a short distance back of its free extremity and to drive the opposite face of said free end against the said projected wire, thereby forming the nail-head against the inner sides of the grippers G G, said clamps gripping said wire firmly meanwhile.

The stationary metallic backers 77 support the ends of the grippers G against the impact of the arm H. To provide for a movement of the impacting-surface of the arm H in the

direct line of the wire 2, a hammer-head K is seated in the arm H, as shown in enlarged form in Fig. 2.

The vertical hammer-head K is semicylin-
5 drical in cross-section and is dovetailed at its base into conforming ways 8 8, formed in the frame of the machine in a radial line from the center of shaft B to the line of the wire 2. The head K is seated vertically in the arm H
10 and about midway of the vertical half-annular opening 9 in said arm, in which said head K is seated. There is formed in the wall of said opening a semiannular horizontal recess 10 of a dovetail form, and a semiannular pro-
15 jecting horizontal collar 11 of a dovetail shape to conform to the recess 10 is formed on the exterior of the head K. In the oscillations of the driving-arm H the ways 8 compel the head K to move in a line in the direct prolongation
20 of the wire 2, so as to form the head on the nail straight across the axis of the latter. The collar 11 oscillates sufficiently in the recess 10 to permit of the requisite changes of the relative positions of the head K and arm H. The
25 dovetailed form of the collar 11 and recess 10 prevents the half-cylindrical head K from dropping out of the semicircular opening 9 in arm H.

The arm H after the passage of the arm J
30 recedes from the grippers G either by the successive projection of the wire 2 or it can be thrown inward by the coiled wire 12, suitably attached to the outer extremity of said arm and to the circular plate F. A stop 13, seated
35 on the circular plate F, engages the recess 14 on the arm H, and thereby limits the inward throw of the free end of said arm.

The knife L is seated adjustably in the station-
40 ary block L', the latter being seated on the metallic circular plate F. The opposing knife-block M' is seated in ways 15 on the circular plate F and provided with adjustable knife M. The inner ends of the knives L and M are respectively of the same conformation
45 to sever and at the same time point the nail. The knife-block M' is at the proper intervals driven inward to sever and point the nail, as aforesaid, in conjunction with the knife L, by an oscillating arm N, pivotally seated on the
50 circular plate F and provided at its outer end with an elongated opening 16, adapted to bestride the vertical stud 17, formed on the knife-block M'. The arm N has its opposite end projected within the circular plate F and in
55 the path of the outer end of the arm J, so that said arm J, after having driven the header K outward and formed the nail-head, will next engage the inner end of the arm N and move it outwardly, thus driving the knife-block M'
60 inwardly, as aforesaid, and severing and pointing the nail. The latter is then released by the gripper G and falls by its own gravity in a perfected condition into a receptacle beneath. The escape of the finished nail is
65 rendered certain by an ejector O, pivoted intermediately to the circular plate F and hav-

ing its inner end extended over the locality of the finished nail and the opposite end in position to be lifted by a boss 18, formed on the arm N, when said arm is returned by the
70 spring 19, attached to the bifurcated end of said arm and to the circular plate F.

It will be understood that this description of the feeding of the nail and the finishing of the latter applies equally to each set of said
75 devices, which may be distributed around the circular plate F as frequently as room is afforded therefor by the selected size of said circular plate. It will be understood that the arm J in the orbital movement of its outer
80 end will form the head, as described, on each of the nail-wires which may be projected radially within the inner surface of the circular plate F, but that all the other devices will be repeated in each instance of the feeding of the
85 separate wire 2.

The grippers G G are actuated as follows: One of said grippers is seen in Fig. 3, pivoted in the frame of the machine near its top at P. Referring now to Fig. 4, R is a collar keyed
90 to the shaft B near the lower end thereof and provided with a cam S, adapted in the revolution of said shaft B to engage and carry laterally a short distance an arm T, pivoted near
95 the base of the machine at 20. From the pivotal seat 20 of the arm T there are formed oppositely and obliquely the projections 21, which are connected, respectively, to the bases of the grippers G by toggles 22. It will be un-
100 derstood that the arm T is horizontal, and that the aforesaid oscillation of said arm by said cam S brings the projections 21 and toggles 22 in line across the machine, and by the ac-
105 tion of the double-knee lever thereby forces the lower ends of the grippers G outward and their upper ends inward. After the cam S has passed the end of the arm T the projec-
110 tions 21 are drawn back into their normal position by a coiled-wire spring 23, attached at one end to one of said projections and at its other end to the frame of the machine.

Among the advantages of my invention are that it is simple in construction and operation, its main operative parts are easily ac-
115 cessible, it requires but little space for its location, a large number of different-sized nails may be simultaneously made by one machine, and in case of breakage of any of the parts involved in feeding the wire or forming the nail duplicate parts, kept in stock, could be
120 readily substituted.

Parts located on circular plate F may be placed on segmental plates fastened to circular plate F and removable bodily in case of fracture of any part and another such seg-
125 ment at once substituted.

What I claim as my invention, and desire to secure by Letters Patent of the United States, is—

1. In a nail-machine, the combination of a
130 circular plate F, a rotating shaft B seated centrally in said circular plate, means substan-

tially as shown for projecting a wire from the exterior to the interior of said circular plate, suitable grippers G, severing and pointing knives L and M, arm H pivotally seated at one
 5 end on said circular plate, and having its free end projected over the inner end of said wire, and an arm J affixed to said shaft B, and adapted in the rotation of the latter to drive the free
 10 end of said arm H down upon said projected wire to form the head of the nail; substantially as shown, and for the purpose described.

2. In a nail-machine, the combination of a circular plate F, a rotating shaft B seated centrally within said circular plate, one or more
 15 series of mechanisms located around said circular plate, and adapted to advance the wire radially toward the center thereof, and to point and sever nails from said wire, and for gripping said wire while being headed, a corresponding series of arms H, pivoted to said
 20 circular plate at one end and having their opposite or free end projected over the locality of the inner ends of said wires, respectively, and an arm J keyed to the shaft B, and adapted to have its outer end sweep around within
 25 said circular plate, and successively drive the free ends of said arms H outward to form the head of the nail; substantially as shown, and
 30 for the purpose described.

3. The grippers G G, pivoted vertically in the frame of the machine, the rotating collar R provided with a cam S, the pivoted arm T provided with the opposite and oblique projections 21, the toggles 22, and the returning-spring 23; substantially as shown, and for the
 35 purpose described.

4. The combination of the stationary knife

L seated on one side of the wire 2, and a reciprocating block M' provided with a knife M
 40 seated on the opposite side of said wire 2, lever N pivotally connected at its outer end to knife-block M', pivoted intermediately to the plate F, and an orbitally-moving arm J, adapted to engage and move laterally the opposite
 45 end of said arm N, and thereby force the inner ends of the knives L and M through the wire 2; substantially as shown, and for the purpose specified.

5. In a nail-machine, the combination of a
 50 heading-arm H pivoted at one end to the frame of the machine, and provided at its opposite end with a header K, located over the projected end of the wire 2, and an orbitally-moving arm J adapted to engage and force
 55 the free end of the arm H outward upon said projected wire in the manner substantially as shown, and for the purpose herein named.

6. The combination of the horizontally-oscillating arm H provided with the vertical
 60 semicircular opening 9 and with the dovetailed recess 10 in the walls of said opening 9, and the half-cylindrical head K seated in said opening and provided with the semian-
 65 nular exterior dovetailed collar 11 adapted to loosely fit said recess 10 and provided further with a dovetailed base adapted to traverse
 70 conformable ways 8 formed in the frame of the machine, substantially as shown and for the purpose described.

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

WILLIAM B. BENNETT.

Witnesses:

JOHN G. MANAHAN,
 CHATTIE L. MANAHAN.