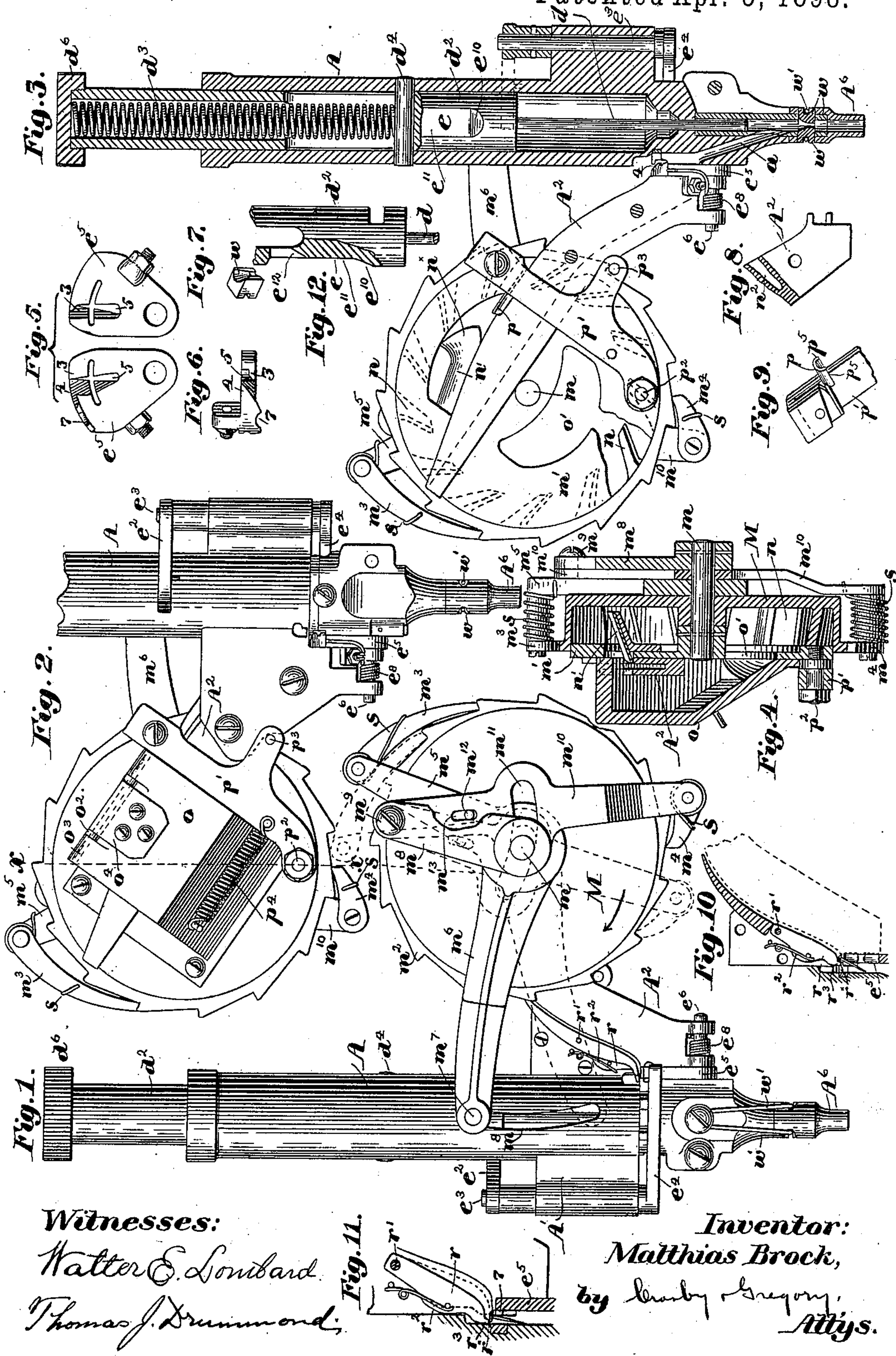


(No Model.)

M. BROCK.
NAILING APPARATUS.

No. 601,941.

Patented Apr. 5, 1898.



Witnesses:
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UNITED STATES PATENT OFFICE.

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NAILING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 601,941, dated April 5, 1898.

Application filed January 15, 1897. Serial No. 619,295. (No model.)

To all whom it may concern:

Be it known that I, MATTHIAS BROCK, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Nailing Apparatus, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention has for its object to provide a novel apparatus for driving nails or equivalent fastenings, the invention being especially applicable to apparatus of the class illustrated in Letters Patent of the United States No. 537,269, issued to me under date of April 9, 1895, in connection with which I have elected to herein illustrate and describe my invention.

In the apparatus illustrated in my patent above referred to the nails are delivered to the driver from a suitable raceway or conductor attached to the portable handpiece or case, this raceway having been previously loaded in suitable manner as from a stationary loading apparatus, such as is well known in the art.

My present invention has for one of its objects to provide a hand-driver of the class referred to with an improved receptacle for the nails, which receptacle shall be permanently attached to and movable with the handpiece or case to automatically supply the nails or fastenings to the driver as needed, thereby obviating the necessity of ceasing work for the replenishing of the raceway from a stationary loading apparatus or otherwise.

In applying to a nailing apparatus of the class above referred to a receptacle containing in bulk the nails which are to be delivered to the driver means must be provided for delivering the nails from the receptacle to the driver or from some position from which they will readily move to the driver.

Prior to my invention in hand nailing apparatus of the type referred to, so far as I am aware, such means for delivering the nails from the receptacle have been operated by or from the reciprocating driver, but by a movement of the said driver in one direction only—for example, at each downward or driving movement of the said driver—such means remaining inoperative or inactive during the

return movement of the driver. My experience with apparatus of this class has shown me that the success of the apparatus depends in a large measure upon the certainty with which the nails are delivered to the driver or into position to be driven by the latter into the work and that this certainty of deliverance of the nails is increased in proportion to the increase in the number of movements of the nail-delivering means. In other words, the oftener the nail-delivering means operates the more certain will it be that a sufficient number of nails or fastenings will be delivered from the receptacle to the driver.

One feature of my present invention in hand nailing apparatus, therefore, consists in providing intermittently-operated means for delivering the nails or fastenings from the receptacle and in actuating such nail-delivering means by or from the driver a plurality of times during each complete reciprocation of the driver, thereby increasing the certainty of delivery of the requisite number of nails to the driver.

In the preferred embodiment of my invention I employ a nail-receptacle mounted to be rotated step by step in the same direction during not only the driving but the return movement of the driver, this rotation of the receptacle serving to deliver the nails therefrom to a conductor leading to the driver, although my invention is not to be restricted to such a construction.

My invention further relates to means for positively impelling or shooting the fastenings endwise down the conducting-passage leading to the driver.

My invention comprehends other features, to be hereinafter more fully described, and set forth in the claims.

In the drawings, Figure 1, in side elevation, shows a nailing apparatus containing one embodiment of my invention; Fig. 2, a partial rear side elevation of the apparatus shown in Fig. 1; Fig. 3, a rear side view of the apparatus shown in Fig. 1, with many of the parts broken away and shown in section; Fig. 4, a vertical sectional detail taken on the dotted line *x x*, Fig. 2; Fig. 5, opposite face views of the gate to be described; Fig. 6, a top or edge view thereof; Fig. 7, a perspective de-

tail of one of the guide-blocks controlling the delivery of the nails from the driver; Fig. 8, a detail of the end of the raceway; Fig. 9, a detail illustrating a wiper or clearer for clearing the raceway where the latter leaves the receptacle; Fig. 10, a sectional detail showing the improved means cooperating with the gate for turning the tack or fastening into proper angular position to enable it to enter the conductor leading to the driver, and Fig. 11 a detail illustrating one means for positively moving the fastening endwise down the conducting-passage leading to the driver.

Referring to the drawings in the embodiment of my invention there shown, the hand piece or case A, provided with a head A', the driver d , arranged within the head, the tubular driver-bar d^2 , fitted with a cap d^6 and containing the spring d^3 , resting at one end against the said cap and at its opposite end against a pin d^4 , the swinging gate e^5 , provided with a shoulder 3, point 4, the diagonal opening 5, and a notch 7, said gate being mounted upon the short shaft e^6 , encircled by a spring e^8 , which tends to move the said gate always in one direction opposed by the arm e^4 on the shaft e^3 , controlled by the arm e^2 , resting against a cam-surface e on the driver-bar referred to, are and may be of a construction substantially as shown in my said Patent No. 537,269, to which reference may be had, like letters and figures representing like or equivalent parts, although it should be understood that as these parts do not constitute my present invention they may be varied or others substituted therefor without departing from the spirit and scope of this invention.

While the cam-surface e for controlling the movement of the gate referred to is arranged and operates upon the parts substantially as in my former patent referred to, yet in this my present invention I have changed said cam-surface in a manner to be hereinafter pointed out, whereby a result is accomplished which was neither shown nor described in my former patent.

The nail-receptacle M for receiving the nails or other suitable fastenings to be used with the apparatus is suitably mounted upon or connected with a part of the case A, so as to be movable freely therewith, said receptacle, as herein shown, being cylindrical in form and loosely mounted upon the shaft m , held rigidly by a disk m' , closing one side of the receptacle and constituting one wall thereof, said disk in turn being supported by the raceway A^2 , attached to the case A.

Upon the exterior of the receptacle M, I have formed a series of ratchet-teeth m^2 , adapted to be engaged by the pawls $m^3 m^4$, the pawl m^3 being pivotally mounted upon an arm m^5 of a bell-crank lever fulcrumed loosely upon the shaft m , and having its other arm m^6 reaching to the left, Fig. 1, into position at the side of the case A, where it is provided with a pin m^7 , which passes through a curved slot m^8 in the case and is suitably connected with the

reciprocating driver or driver-bar within the case.

Fast on the shaft m of the nail-receptacle, and therefore held rigidly in position, is the upright arm m^8 , to the upper end of which I have attached at m^9 the depending pawl-carrier m^{10} , on the lower free end of which the pawl m^4 is carried, said carrier m^{10} being slotted, as at m^{11} , to receive the shaft m , past which it vibrates, the said pawl-carrier m^{10} being connected with the arm m^5 by a pin m^{12} on the latter entering the slot m^{13} in the former.

It will be evident that as the driver is driven downwardly to drive a nail the bell-crank lever $m^5 m^6$ will be swung to the left, Fig. 1, causing the pawl m^3 to drag loosely over the ratchet-teeth of the receptacle, the pin m^{12} on the arm m^5 , however, throwing the pawl-carrier m^{10} also to the left, Fig. 10, causing its pawl m^4 to engage one of the teeth of the ratchet and rotate the receptacle one step in the direction of the arrow thereon. Return or rising movement of the driver moves the bell-crank lever in an opposite direction, causing its pawl m^3 to engage one of the teeth of the ratchet and move said receptacle a step farther in the same direction as before, the pawl m^4 , however, during this movement dragging loosely over the teeth of the ratchet. It will thus be seen that the receptacle is rotated intermittently or step by step always in the same direction at each downward and also at each upward movement of the driver, thereby doubling the number of steps or movements of the receptacle over what would be possible were the same to be moved step by step only during the movement of the driver in one direction. The pawls are held in contact or engagement with the ratchet-teeth by suitable springs s .

Referring now particularly to Figs. 2, 3, and 4, I have provided the nail-receptacle at its interior with a plurality of buckets n , (shown in outline in dotted lines, Fig. 3,) which as the receptacle is rotated, as described, pick up the nails or fastenings which gravitate to the bottom of the receptacle and carry the same in greater or less quantity to the top of the receptacle, where they are dumped or deposited upon an inclined table n' , secured to the stationary disk or wall m' of the receptacle or to the raceway A^2 , lying at the side of the said disk or wall, said inclined table causing the fastenings deposited thereupon to slide laterally out from the receptacle into the trough n^2 in the raceway A^2 , the points or shanks of the nails or fastenings dropping into the trough, where they are supported by their heads resting upon the side walls of said trough or raceway.

The inclined table n' is shown as having its lower end rolled or turned upwardly, as at n^x , to better direct the flow of tacks laterally therefrom.

Such tacks or fastenings as are not properly deposited in the trough of the raceway A^2 are dropped therefrom into the cup o , secured to

the outer side of the stationary wall of the receptacle, said cup having an inclined bottom to deflect the fastenings dropped thereinto back through an opening o' (see Fig. 3) again into the receptacle.

The cup o is shown provided with a cover o^2 , hinged at o^3 to the cup and acted upon by a spring o^4 , arranged to hold said cover in either its fully opened or closed position. To prevent any fastenings which rest on the top of the raceway getting into the opening in the wall of the cup through which said raceway passes to the driver, and thereby stopping the downflow of the fastenings, I have herein provided a clearer, shown in the form of a thin metal plate p , Figs. 3 and 9, overlying the raceway and removed from the top of the latter just sufficient to enable the heads of the properly-positioned tacks or fastenings to pass thereunder down the raceway, said plate p being attached to and carried by an arm p' , pivoted at p^2 to the stationary side wall of the receptacle, said arm being provided with a pin p^3 , arranged in the path of movement of the ratchet-teeth of the receptacle, so that at each step-by-step-movement of the latter one of the teeth of the ratchet will engage the pin p^3 and move the arm p' outwardly away from the cup to withdraw somewhat the shield or clearer p , permitting the latter to snap quickly back under the action of the spring p^4 , Fig. 2, as the said pin p^3 clears the tooth which moved it, due to the eccentricity of the axes about which the ratchet-teeth and the said arm respectively move. This sharp or quick vibration of the clearer p herein takes place at each movement of the receptacle—that is, at each downward and each upward movement of the driver—and acts to effectually clear the raceway of any loose tacks or fastenings which may chance to fall thereupon out of proper position to drop into the trough of the raceway. For the best results I provide the clearer p with downwardly-extended ears p^5 at opposite sides of the raceway to better clear the latter of any fastenings which may lie crosswise thereof.

Referring particularly to Figs. 1, 3, 5, and 10, the fastenings or tacks deposited in the raceway or conductor A^2 descend therein by gravity, supported by their heads resting upon the side walls of the conductor, the lowermost tack or fastening resting in the pocket formed by the lug 3 of the gate e^5 , which crosses the raceway. Immediately above the raceway A^2 , I have arranged a fastener-impelling device for impelling or shooting the fastening from the end of the conductor into the passage leading therefrom to the driver, said device acting quickly and positively to put the fastener into position to be acted upon by the driver, such action being far more certain than depending upon gravity to fit the fastening into position to be struck by the driver. This impelling device, as I have chosen herein to illustrate the same, is represented as a lever r , Fig. 1, pivoted on the

raceway at r' and acted upon by a spring r^2 , which presses said lever normally into its lowermost position, with the shoulder or downturned end r^3 at its free end lying in the path of movement of the heads of the tacks in the raceway, such shoulder or downturned end r^3 being preferably concaved at its face next the tacks in the raceway to better receive and hold the head of a tack, as will be described. As the driver is moved downwardly within the case A and within the nose A^6 , depending from said case, the cam-surface e on the driver-bar moves the arm e^4 outwardly and permits the spring e^8 to move the gate e^5 across the end of the raceway, thereby causing the point 4 of the said gate to engage the lowermost tack of the series, which tack was previously held in the pocket referred to and by the diagonal face leading to said point 4 force the said tack in the direction of the driver, said point at the same time entering between said lowermost and the rest of the series of tacks to hold back the series until the return of the gate, when a new tack will slip into the pocket. As the lowermost tack referred to is pressed forward by the diagonal face of the gate its head will meet the concaved shoulder r^3 on the lever r and will be retarded or stopped thereby in its movement, the said diagonal face, however, by its continued movement acting upon the shank of the tack to press the said shank to the left, Figs. 1 and 2, causing the tack to assume a diagonal position, as shown in Fig. 10, with its point directed away from the moving gate, where it cannot be caught by the latter in any of its movements, and more nearly in a line with the chute a , into which it is to be discharged. The head of the tack is thus held, as shown in Fig. 10, until the pressure of the diagonal face of the gate, tending by its action on the shank to push it to the left, exceeds the resisting power of the spring r^2 , holding the lever r in position in front of the head of the tack, when said spring r^2 will yield and permit the said lever and shoulder to rise and clear the head of the tack. The lower or shouldered end of said lever r may be provided with what may be called a "hammer-face" r^x , preferably flat, extended beyond the front or concaved edge of said shoulder, so that as the tack, under the action of the gate, lifts and clears said shoulder the return of the lever to its normal position will cause the said hammer-face to strike the head of the tack to impel or positively start the same down the chute and to the driver. This insures certainty of feed or delivery of the tacks to the driver.

As the driver rises for the next operation this tack drops into the driver-passage into position between the two blocks ww , arranged at opposite sides of the driver-passage and held in yielding contact one against the other by a suitable spring w' , (shown best in Fig. 1,) said guide-blocks acting to properly center the tack or fastening within the driver-pas-

sage and at the same time hold it in position to enable it to be properly acted upon by the driver in its further descent and be driven from the nose into the work.

5 It will be noted that in my apparatus as herein shown and described the cam-face e is provided with an initial incline e^{10} , followed by a relatively long dwell e^{11} and a final incline e^{12} , or said cam-face is otherwise shaped
10 or connected with the gate e^5 to cause an initial movement of the gate to pick out or separate a tack from the series in the raceway, then cause a relatively long dwell to give the tack so separated full opportunity to center
15 or position itself in readiness for final ejection and feeding, and, finally, just before the driver has finished its movement and after the driver-passage has been absolutely cleared of tacks the gate is given a final movement to free the
20 tack from its holding-shoulder and drive the latter down the chute to the driver-passage. This is of great importance, for it holds a tack from being dropped into the chute a until after the tack previously dropped therein has been
25 practically ejected from the apparatus, thereby effectually preventing two or more tacks entering together the driver-passage and clogging the machine, which would be possible if the gate were actuated early enough to
30 permit a partial descent of the driver by accident or otherwise to liberate a second tack before the first one had been driven or ejected from the apparatus. The arrangement described is also important, for so far as I am
35 aware it for the first time gives a dwell or period of rest between the commencement and the end of the tack separating or feeding movement, which herein is a movement in one direction, in which said tack can position
40 itself for final and accurate feed to the driver or tacker.

My invention is not limited to the particular embodiment herein shown and described, for the same may be varied without departing
45 from the spirit and scope of my invention.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A freely-portable hand-supported and
50 hand-operated nailing apparatus containing in combination a casing adapted to be carried by the hand; a fastening-receptacle mounted on said casing; a reciprocating hand-operable driver and nail or fastening feeding means
55 connected with and deriving feeding movement from said driver, said feeding means and connections between the same and driver moving without change in direction during movement of said driver in any one direction,
60 movement of said driver in opposite directions causing effective movement of said feeding means always in the same direction, substantially as described.

2. In a machine of the class described, the
65 combination with a reciprocating driver, of a fastening-receptacle, and intermittently-operated means acting always in the same di-

rection to deliver fastenings from the said receptacle for the said driver, and said means being actuated by said driver during movement of the latter in one and also in an opposite direction, substantially as described. 70

3. A freely-portable hand-supported and hand-operated nailing apparatus containing in combination a casing adapted to be carried
75 by the hand, a reciprocating hand-operable driver, and a rotatable fastening-receptacle, both mounted on said casing and devices actuated by said driver to impart relatively slow and easy step-by-step rotation to said receptacle both on and during substantially the entire driving and on the return movement of
80 said driver, substantially as described.

4. In a nailing apparatus of the class described, a reciprocating driver, a casing, a rotatable fastening-receptacle on said casing and provided interiorly with means to lift the contained nails, nail-conducting means to convey
85 nails from said receptacle to said driver and means actuated by said driver to impart rotation to said receptacle during both the driving and also during the return movement of said driver said means tending to move said
90 receptacle in but one direction during movement of said driver in either direction.

5. The combination with the driver, the casing, a rotatable receptacle and means to impart step-by-step rotation thereto from said driver during the driving and also during the return movement of the latter and a clearer
100 arranged over and clearing the properly-positioned fastenings on said conductor and connecting devices intermediate said rotatable receptacle and said clearer for communicating to the latter a vibrating motion by and
105 from step-by-step rotation of the said receptacle.

6. The combination with the driver and its case, of a conductor to convey fastenings to the said driver, a spring-controlled fastener-
110 impelling device, having a stop-surface to engage the head of a fastening from said conductor, and means acting upon the shank of the fastening to move the latter into inclined position while its head is yet engaged by said
115 stop-surface, said impelling device being actuated to release the fastening-head when the pressure upon the shank reaches a predetermined degree, substantially as described.

7. The combination with the driver, its case, and the conductor leading to the driver, of a yielding pivoted controller having a stop-surface and means engaging a fastening to press
120 the head of such fastening against such stop-surface first to position the fastening and then to turn said controller on its said pivot to free said fastening substantially as described. 125

8. In a machine of the class described, the combination with a driver, and a fastening-
130 conductor leading thereto, means for controlling the passage of fastenings toward said driver, said means being constructed to furnish a dwell intermediate the beginning and

the end of its movement in one direction in which a fastening can assume proper position for final and accurate movement, substantially as described.

5 9. In a machine of the class described, the combination with a driver and a fastening-conductor leading thereto, of a fastening separating and feeding gate having a fastening-separating point to separate a fastening from
10 a series of fastenings, and means to impart to said gate an initial movement to cause its said point to separate a fastening, and a final fastening-feeding movement in the same direction as said initial movement but separated from said initial movement by a period
15 of dwell, substantially as described.

10. The combination with a fastening-conductor, of a single means to act upon a fastening in said conductor and move the said
20 fastening into a new position to hold said fastening in its said new position so as to enable the said fastening to be positioned with certainty for a subsequent movement, and to finally impart such subsequent movement to
25 said fastening, substantially as described.

11. In a machine of the class described, a driver and means to convey the fastenings toward said driver, said means holding one or more of said fastenings in position approximately parallel to line of travel of said
30

driver, combined with means to act upon a fastening so positioned to impel the said fastening endwise into the path traversed by said driver, substantially as described.

12. In a machine of the class described, the combination with a driver and a fastening-conductor leading thereto, of means to feed
35 the fastening singly toward said driver, and a yielding impelling device to act upon and retard the movement of the head of a fastening, a face of said impelling device acting as
40 a hammer to positively impel a fastening so retarded toward said driver, substantially as described.

13. In a fastening-driving apparatus, a conductor to receive and guide fastenings, a driver, a fastening-passage in communication therewith and a spring-actuated impelling device to act on a fastening at the end of said
45 conductor and shoot said fastening endwise into said fastening-passage to be in position to be acted upon by said driver, substantially as
50 described.

In testimony whereof I have signed my name to this specification in the presence of
55 two subscribing witnesses.

MATTHIAS BROCK.

Witnesses:

FREDERICK L. EMERY,
MARGARET A. DUNN.