Jan. 5, 1932. R. H. LAWSON 1,839,853

NAIL SUPPLYING APPARATUS

Original Filed Feb. 4, 1926 3 Sheets-Sheet 1

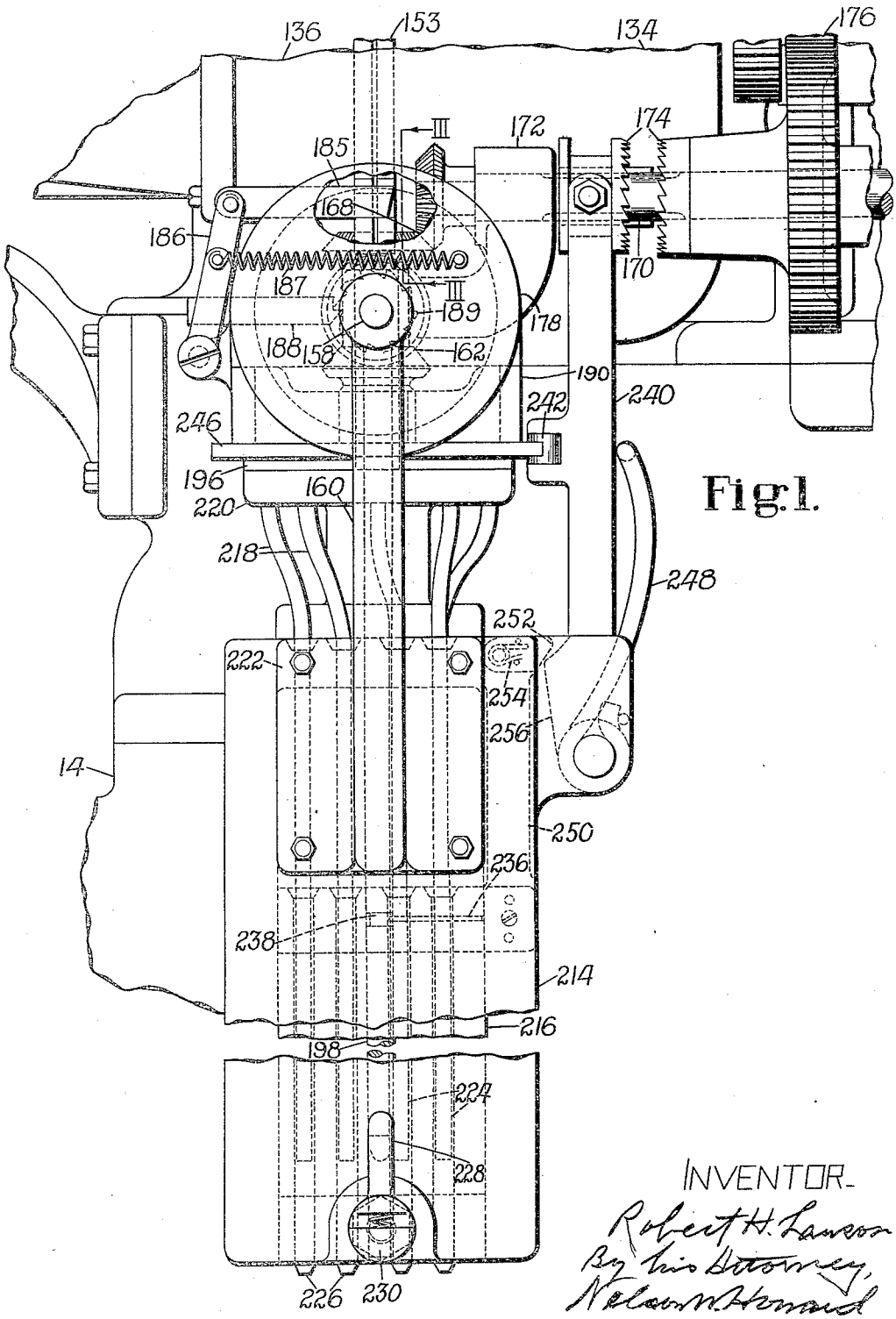


Fig. 1.

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Fig. 3.

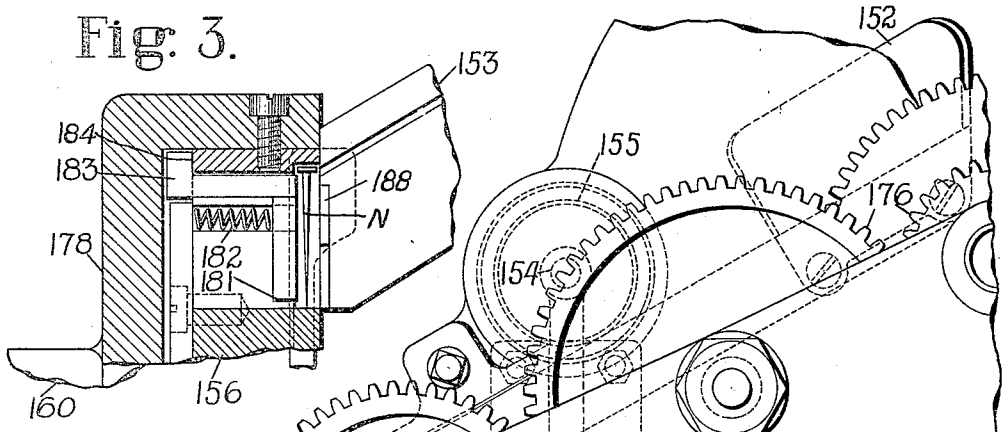
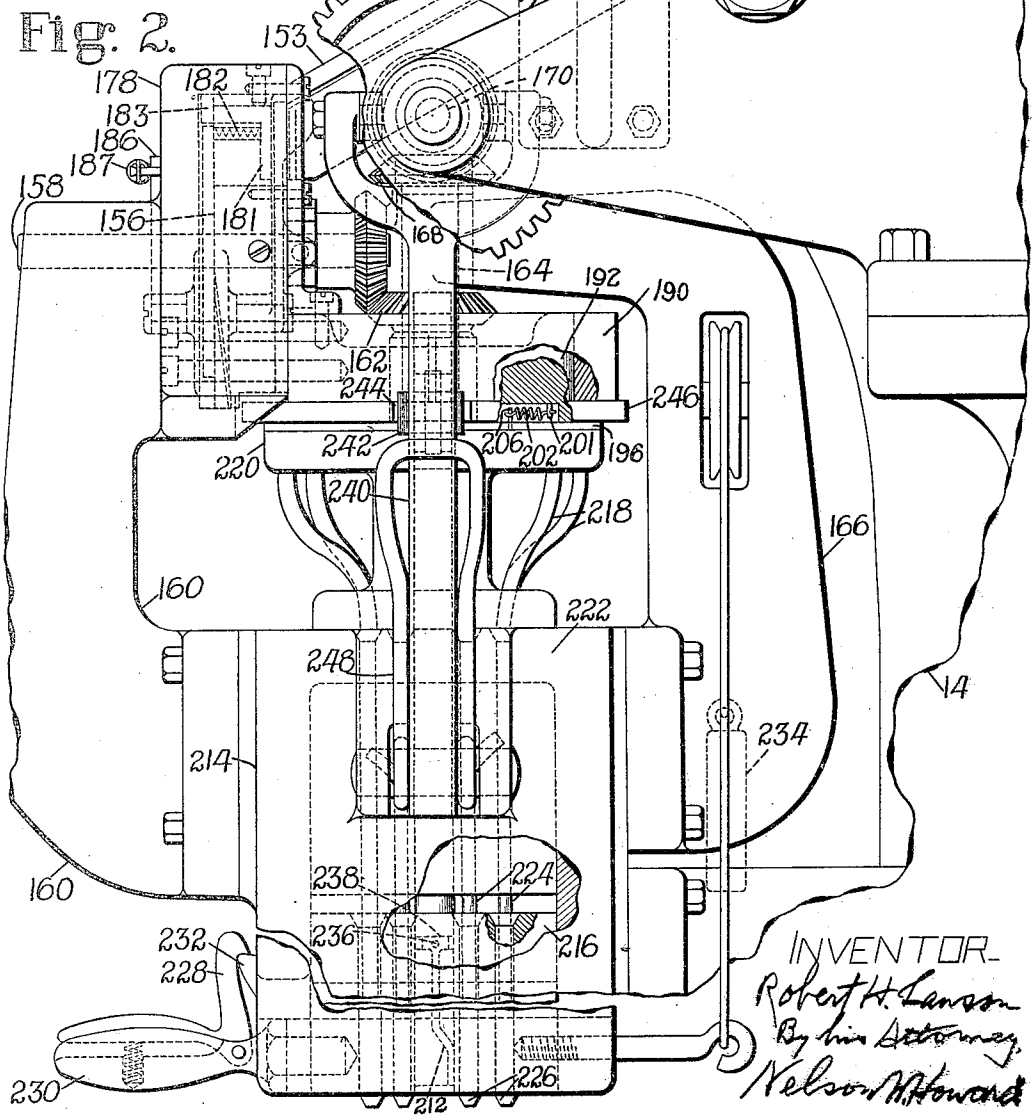


Fig. 2.



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Fig. 4.

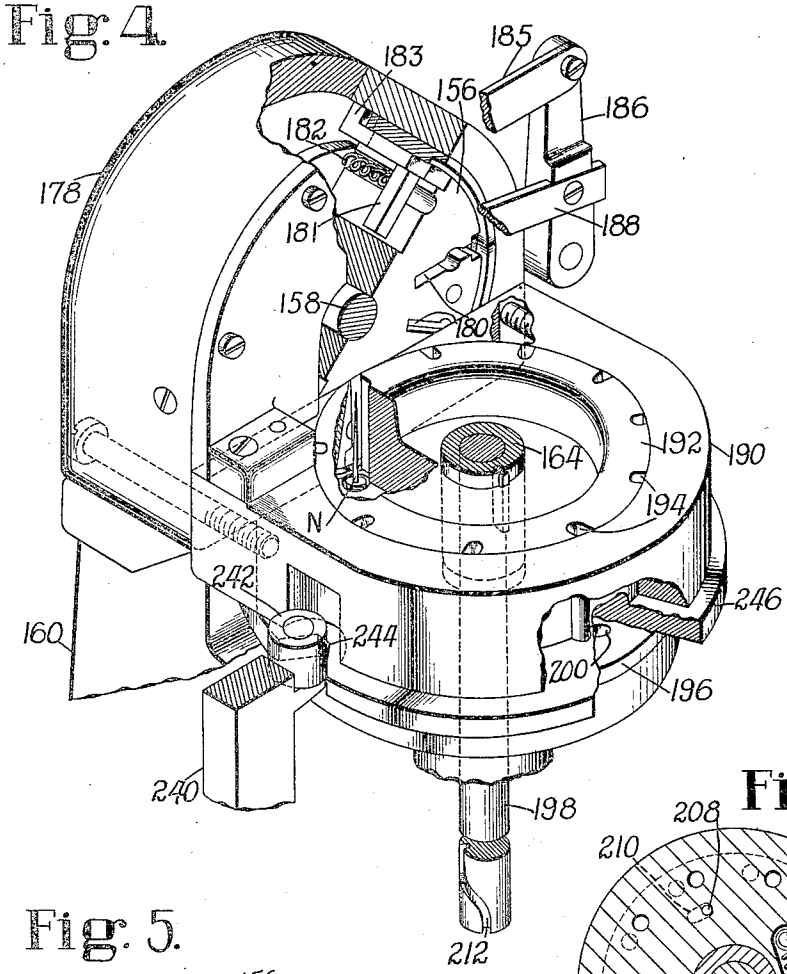


Fig. 6.

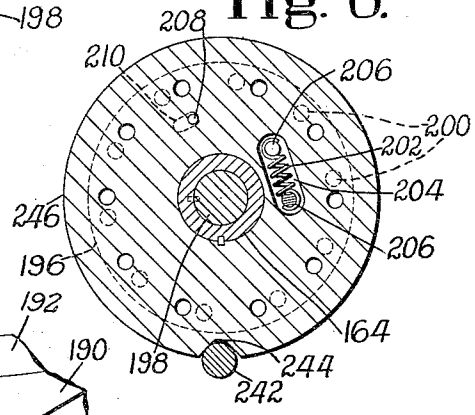
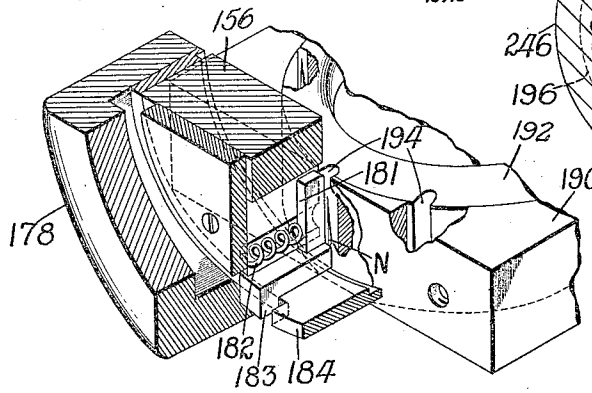


Fig. 5.



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UNITED STATES PATENT OFFICE

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NAIL SUPPLYING APPARATUS

Original application filed February 4, 1926, Serial No. 86,078. Divided and this application filed March 24, 1930. Serial No. 438,544.

This invention relates to apparatus for supplying nails or other fastenings to machines which are to insert them in work. Such a fastening-inserting machine is disclosed in the application for Letters Patent of the United States filed in my name on February 4, 1926, Serial No. 86,078, and of which this case is a division.

The present invention has for its object the provision of an apparatus of the character above indicated, which is positive in action and simple in construction. To this end, my invention comprises, as a portion of the novel organization, a movable nail-delivering member, as a reversing disk provided with a nail-receiving recess, which has means for ejecting nails from said recess, the action being positive and rapid; a movable slide or other member through which nails are delivered, having connections for controlling the operation of distributing mechanism; and a nail-retaining and releasing member co-operating with the delivering disk and actuated through a projection from it under the influence of means movable by the operator.

In the accompanying drawings illustrating a particular embodiment of the invention,

Fig. 1 is a front elevation of my improved apparatus;

Fig. 2 is a side elevation looking from the right in Fig. 1;

Fig. 3 is a vertical sectional detail on the line III—III of Fig. 1;

Fig. 4 illustrates in broken perspective the nail-receiving and reversing and the nail-delivering disks;

Fig. 5 is a similar view of the directly co-operating portions of the disks of Fig. 4; and

Fig. 6 is a partial horizontal section taken just above the nail-retaining and releasing shutter.

Supported at one side of a frame member 14 is a nail-receptacle consisting of a drum 134 rotatable at a slow speed and provided with a fixed end or head 136, only the lower portions of these being illustrated. About the interior of the drum is spaced the usual series of buckets, by which the nails are raised from the mass at the bottom and delivered upon an inclined receiving plate 152 attached to one side of a raceway or nail-conveyor 153. The raceway is slotted to convey the nails in a series, hanging by their heads, and passes downwardly in an inclined direction through the side-wall of the head 136. To prevent the nails from clogging in the raceway, there is shown as rotatable above it, upon a shaft 154, a rake-wheel 155. The direction of rotation of the wheel 155 adjacent to the raceway is upward, causing its teeth to engage and separate the descending nail-heads, and thus free them from one another for their downward travel.

The raceway 153 terminates against the vertical face of a nail-receiving and reversing disk 156 (Fig. 4). This disk rotates with a horizontal shaft 158 upon a bracket 160 (Fig. 2), which is mounted at the forward extremity of the frame-arm 14. Bevel-gearing 162 joins the shaft 158 to a vertical tubular shaft 164 journaled in a bracket 166 rising from the frame-arm. Bevel-gearing 168 connects the shaft 164 to a horizontal shaft 170, turning in a bracket-arm 172. A jaw-clutch 174 allows the shaft 170, and therefore the reversing disk, to be driven under the control of loading mechanism, the driving member of said clutch receiving power from the shaft of the distributor-drum by way of a chain of spur-gearing 176. A casing 178 surrounds the disk 156, the raceway passing through the inner head of said casing and terminating opposite the upper portion of the vertical or lateral inner disk-face. Arranged radially in this face of the disk, to be brought into registration with the extremity of the raceway in the rotation of said disk, are nail-receiving recesses 180, nine of these being provided in the present embodiment of the invention. Movable in each re-

cess is a plunger or ejecting member 181 (Figs. 4 and 5), acted upon by a spring 182 situated between the plunger and a cover-plate attached to the outer face of the disk. Each of the plungers has an angular projection 183 extending outwardly over an annular cam-track 184 situated between the periphery of the disk and the interior of the casing. When any one of the recesses is alined with the end of the raceway 153, so that it may receive nails therefrom, the plunger 181 is held back by the engagement of its projection with the cam-track. This relation is maintained until the recess reaches the delivering position, which is removed from the end of the raceway by substantially 180 degrees. Here there is an abrupt fall in the cam, releasing the plunger and allowing it to be sharply thrown toward the inner face of the disk by its spring to eject the nail. Individual delivery of the nails from the raceway to the successive recesses is insured by a separator-bar 185 (Fig. 1) sliding in a horizontal slot at the extremity of the raceway, and being united to a bell-crank lever 186 fulcrumed upon the casing 178. A spring 187 exerts its tension upon an outer arm of the lever to hold the separator-bar normally across the raceway, said bar being removed to release the terminal nail by a contact member 188 projecting from the lever and resting against a cam 189 upon the shaft 158. There is a projection upon this cam for each of the recesses in the disk 156. These cam-projections act to withdraw the separator-bar when each recess is opposite the raceway, the bar then being released by the projection and permitted to be drawn by its spring sharply between the terminal nail and that succeeding it, so that the latter is not only retained, but the former positively forced into the recess in the disk by the contact of the bar.

Mounted upon the casing 178 is a casing 190, enclosing a delivery-disk 192 rotatable with the shaft 164. The periphery of this disk contains vertical recesses 194 equal in number to the recesses 180 of the disk 156 and uniformly spaced so that pairs of recesses in the two disks may be successively brought into registration. Against the under face of the disk 192 is held a nail-retaining and releasing shutter-plate 196 fastened upon a spindle 198 rotatable within the tubular shaft 164. A circular series of delivery-openings 200 about the outer portion of the shutter may be alined with the recesses 194, but are normally held out of registration by a spring 202 contained in an elongated opening 204 in the disk and extending between a pair of pins 206, 206, one of which depends from the disk and the other rises from the shutter. A pin 208 also projects downwardly from the disk 192 into a generally segmental slot 210 in the shutter. The length of the slot 210 is such as to permit the desired opening and closing movement of the shutter, the right-hand end of the slot, as viewed in Fig. 6 of the drawings, furnishing a stop-surface, which limits the rotation of the shutter under the action of the spring 202. The shutter is operated against the tension of the spring 202 through the agency of a cam-slot 212 formed in the side of the spindle 198 and acted upon by the loading device in a manner explained below.

The brackets 160 and 166 are joined at their lower ends by a cylindrical guide 214 (Figs. 1 and 2) for a sliding loader-block 216, which causes and directs the delivery of nails from the distributing mechanism. Connecting the distributing and loading mechanisms are tubes 218 terminating at their upper extremities in openings in a fixed plate 220, these openings being alined with the recesses 194 and shutter-openings 200 when these are in the delivering position. The lower ends of the tubes terminate in openings in a foot-plate 222 extending across the top of the guide-cylinder. From the foot-plate-openings depend vertical tubes 224 entering nail-tubes 226 arranged in openings in the loader-block to correspond to the normal position of receiving tubes of the nailing mechanism to be supplied. The lower portions of the tubes 226 project somewhat below the under face of the loader-block, to enable them to project into the upper ends of the receiving tubes and so render more certain the delivery of nails thereto. In the normal raised position of the loader, it may be held latched by a spring-pressed detent 228 associated with a handle 230 secured at the lower front portion of the block 216, the detent, when the loader-block is raised, engaging a lug 232 upon the front of the casing 214. Preferably, the loader-block is counter-weighted at 234 so that it will tend to remain wherever it is moved vertically, and will require little effort on the part of the operator for its actuation. Upon the loader-block is a projection 236 entering the cam-slot 212. In the greater part of the upward and downard travel of the loader-block, the projection 236 occupies a vertical portion of the cam-slot, so that no effect is produced upon the spindle 198. But when the tips of the loader-block-tubes are on the point of entering the receiving tubes, the projection reaches the cam-portion of the slot, causing the rotation of the spindle and shutter against the tension of the spring 202. This brings the shutter-openings into alinement with the recesses in the delivery-disk, allowing the nails to be discharged and to pass through the tubes 218, 224 and 226 into the receiving tubes, where they are held for the nailing operation. Extending circumferentially of the spindle, at the upper extremity of the cam-slot 212, is

a groove 238. In this, the projection 236 is permitted to turn during the nail-collecting rotation of the delivery-disk 192.

To effect control of the distributing mechanism by the loader, there is fulcrumed at the top of the loader-guide 214 a lever 240, forked at its upper extremity to engage the bodily movable member of the clutch 174, this member being splined upon the shaft 170. At an intermediate point between its fulcrum and the clutch, the lever 240 carries a roll 242 arranged to enter a depression 244 (Fig. 4) in a flange 246 upon the lower portion of the delivery-disk. When the roll 242 is held in the disk-depression under the influence of a spring 248, the clutch is maintained disengaged, and the disk locked in the proper position to receive nails from the disk 156. When the roll rides upon the periphery of the flange, the clutch is held in engagement for one rotation of the disk, or until the depression 244 again reaches the roll, when the clutch is disengaged. Pivoted upon an upward extension 250 of the loader-block is a dog 252, held by a spring 254 with its end extending substantially horizontally. This end of the dog is arranged to contact with the lever 240 above its fulcrum, and to yield when the loader is moved down to make the nail-delivery. At such time, the lever 240, and therefore the clutch, is unaffected. Upon the upward idle movement of the loader, the dog engages an inclined edge 256 of the lever, swinging this to the right (Fig. 1) until the roll 242 is removed from the disk-depression and the clutch is engaged.

To trace a complete cycle of the distributing and loading mechanisms, the operator draws down the loader-block 216 by its handle 230, and, as the tubes 226 reach the receiving tubes, the cam-groove 212 in the shutter-spindle produces alinement of the openings 200 in the shutter with the recesses 194 of the delivering disk. In these recesses a load of nails N is held as a result of the previous operation, and thereupon falls through the connecting tubes to the receiving tubes of the associated machine. When the operator again raises the loader-block to its normal position, the projection 252, acting upon the lever 240, unlocks the disk 192, and therefore the disk 156 which is geared to it, by the removal of the roll 242 from the depression 244, and effects the engagement of the clutch 174. Under the control of the raised portion of the disk-flange 246, the disks of the distributor perform a complete rotation. The separator-bar 185, actuated by the cam 189, picks off a nail from the end of the raceway when each of the successive recesses 180 is alined with said raceway. At this time, the cam-track 184 holds back the plunger 181 in this particular recess. When each recess which has thus received a nail has moved through 180 degrees, at which time the contained nail has been inverted and is in registration with one of the recesses 194 of the delivering disk, the cam-track releases the plunger, which is forced inwardly by its spring to eject the nail into the recess 194. This transfer of each nail is effected with great rapidity, so the time of delivery of a complete load may be made very brief. After the collection of a load of nails has been made by a full rotation of the disk 192, the depression 244 again reaches the roll 242, which enters it, disengaging the clutch and locking the disks until the succeeding cycle.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a nail-supplying apparatus, a raceway arranged to support nails hanging vertically by their heads, a movable member provided with recesses arranged to receive nails from the raceway in such vertical position, and means situated in the recesses for ejecting nails therefrom.

2. In a nail-supplying apparatus, a raceway, and a plurality of movable members having nail-recesses, the recesses of adjacent members being movable into direct co-operation with each other and the recesses of one of the members co-operating directly with the raceway, and means for ejecting the nail from a recess of the member co-operating with the raceway directly into a recess in the adjacent member.

3. In a nail-supplying apparatus, a raceway, a plurality of movable members having nail-recesses, the recesses of one member receiving from the raceway and said recesses and those of an adjacent member being relatively movable into co-operation, and nail-ejecting plungers movable in the recesses of the receiving member.

4. In a nail-supplying apparatus, a raceway, a nail-directing member, a movable member situated between the raceway and directing member and having a nail-recess, a nail-ejecting plunger movable in the recess, and a relatively fixed actuating member with which the plunger contacts in its travel.

5. In a nail-supplying apparatus, a raceway, a nail-directing member, a plurality of movable members situated between the raceway and directing member and having nail-recesses, the recesses of adjacent members being movable into co-operation, nail-ejecting plungers movable in the recesses of one member, springs for actuating the plungers, and a cam arranged to withdraw said plungers.

6. In a nail-supplying apparatus, a rotatable reversing disk having a lateral face in which are nail-receiving recesses, each opening through said face to an extent as great as the length of the nail to be received, a raceway into registration with which the recesses are carried, and a rotatable delivery-disk having peripheral recesses in its outer face suc-

cessively registering with those of the reversing disk.

7. In a nail-supplying apparatus, a rotatable reversing disk having a substantially vertical face in which are nail-receiving recesses, a raceway into registration with which the recesses are carried, a nail-separator movable between the raceway and recesses in the reversing disk, and a rotatable delivery-disk having peripheral recesses in its outer face successively registering with those of the reversing disk.

8. In a nail-supplying apparatus, a rotatable delivery-disk having nail-recesses, a movable slide through which nails are delivered from the disk-recesses, and connections to the slide arranged to control the operation of the delivery-disk.

9. In a nail-supplying apparatus, nail-distributing mechanism, a clutch through which the distributing mechanism is driven, a movable slide through which the nails are delivered from the distributing mechanism, and a lever movable under the influence of the slide and controlling the clutch.

10. In a nail-supplying apparatus, nail-distributing mechanism, means for driving the distributing mechanism, a locking device for said distributing mechanism, a movable member through which nails are delivered from the distributing mechanism, and means movable under the influence of the member and controlling the locking device.

11. In a nail-supplying apparatus, nail-distributing mechanism, a locking device for the distributing mechanism, a clutch through which the distributing mechanism is driven, a movable slide through which the nails are delivered from the distributing mechanism, and a lever movable under the influence of the slide and controlling the clutch and locking device.

12. In a nail-supplying apparatus, a rotatable nail-disk having delivery-openings, a nail-retaining and releasing member co-operating with the openings, a projection from the member, and unitary means movable by the operator and contacting directly with the projection to actuate said member.

13. In a nail-supplying apparatus, a rotatable disk having nail-holding recesses, a shutter provided with openings movable into and out of alinement with the recesses, a spindle projecting from the shutter and having a cam-portion, and a movable loader engaging said cam-portion.

14. In a nail-supplying apparatus, a rotatable disk having nail-receiving recesses and a locking depression, a rotatable shutter provided with openings controlling the discharge from the recesses and with an actuating depression, and movable means having portions arranged to enter the disk-depression and the shutter-depression.

15. In a nail-supplying apparatus, a rotatable disk having nail-receiving recesses and a locking depression, a rotatable shutter provided with openings controlling the discharge from the recesses and with an actuating depression, a clutch through which the disk is driven, a lever movable to operate the clutch and to enter the disk-depression, and movable means having portions arranged to actuate the lever and to enter the shutter-depression.

In testimony whereof I have signed my name to this specification.

ROBERT H. LAWSON.