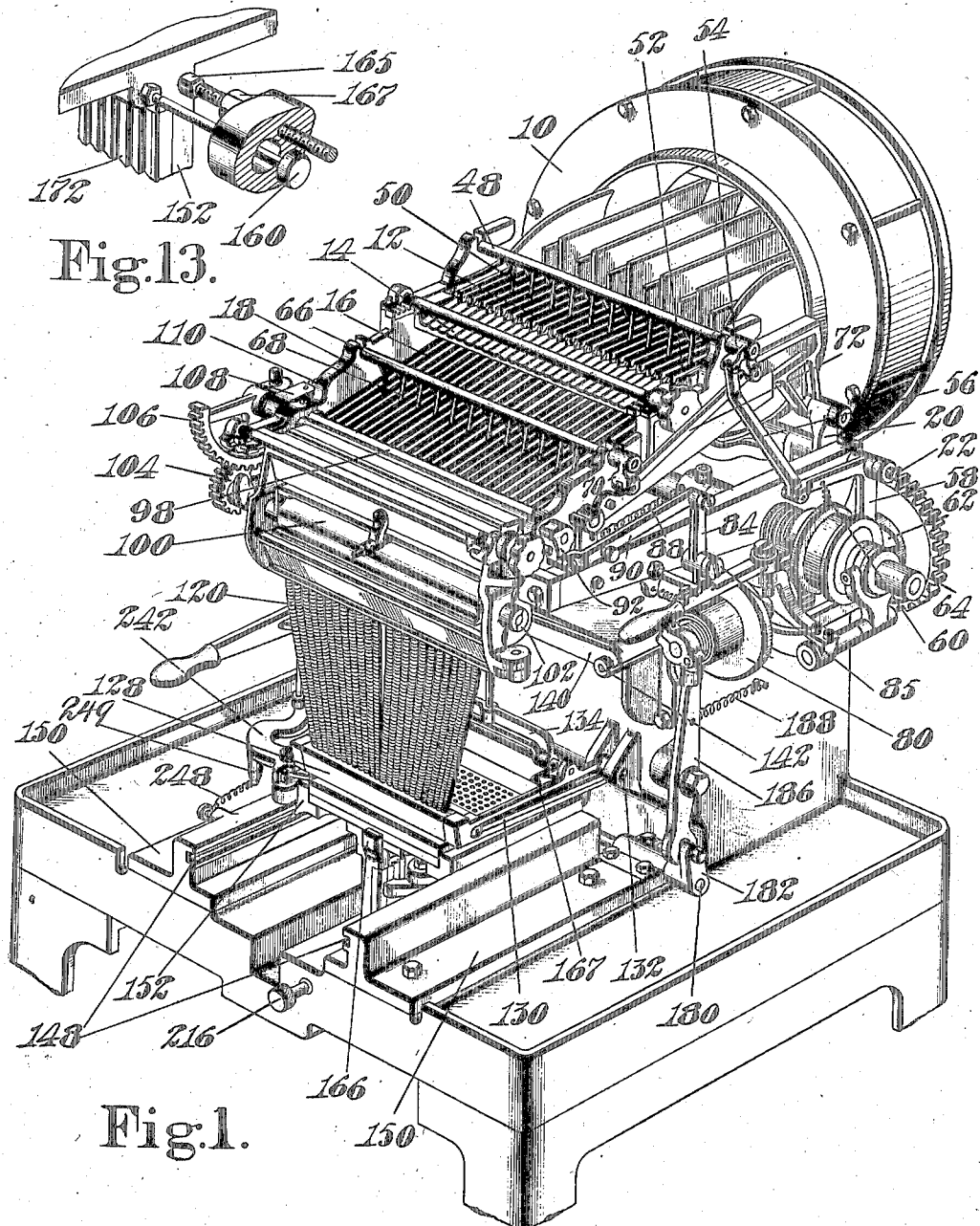


J. H. POPE.
 NAIL DISTRIBUTING AND LOADING MACHINE.
 APPLICATION FILED DEC. 14, 1916.

1,325,752.

Patented Dec. 23, 1919.
 3 SHEETS—SHEET 1.



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 Joseph H. Pope.

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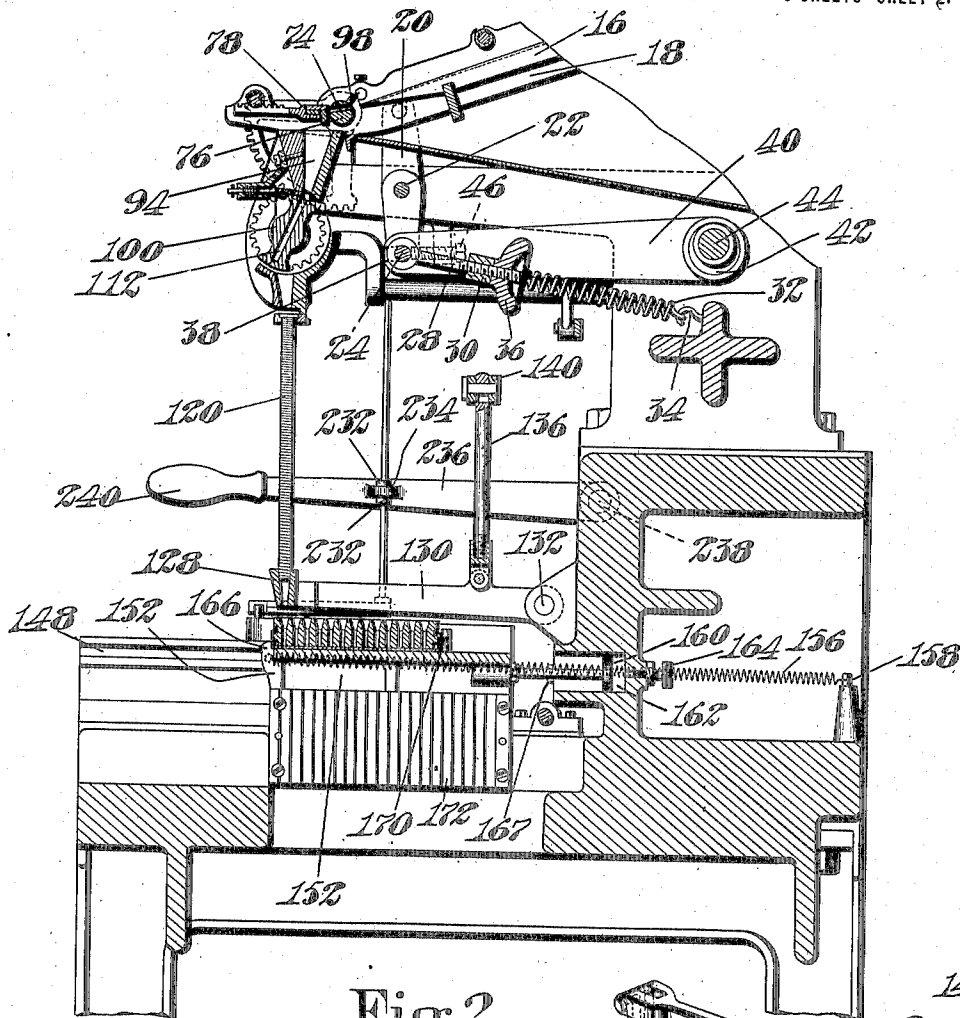


Fig. 2.

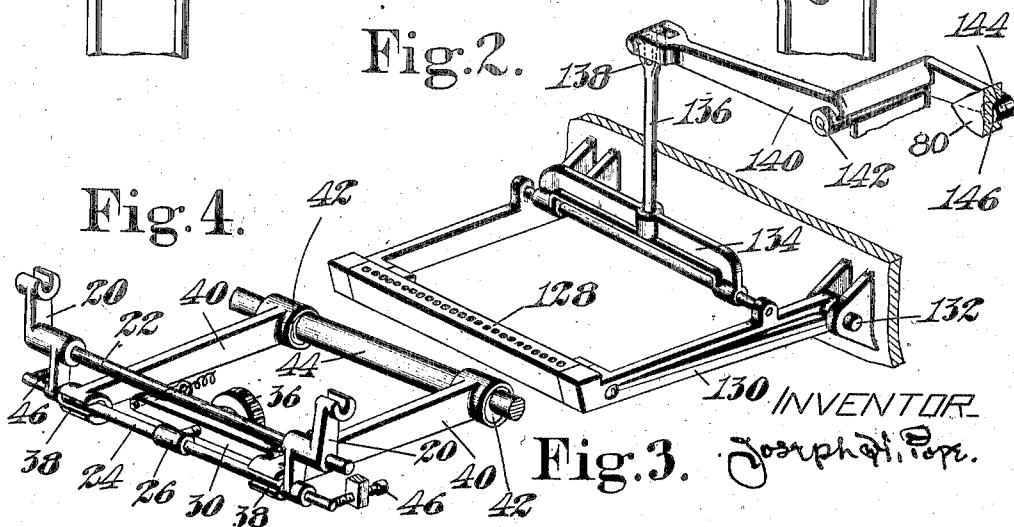


Fig. 4.

Fig. 3. INVENTOR Joseph H. Pope.

1,325,752.

3 SHEETS—SHEET 3.

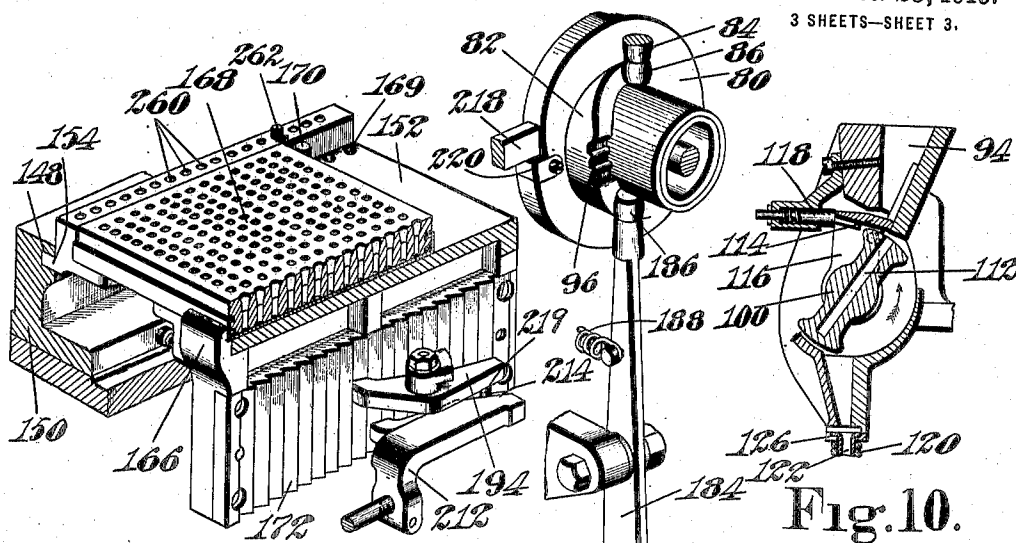


Fig. 10.

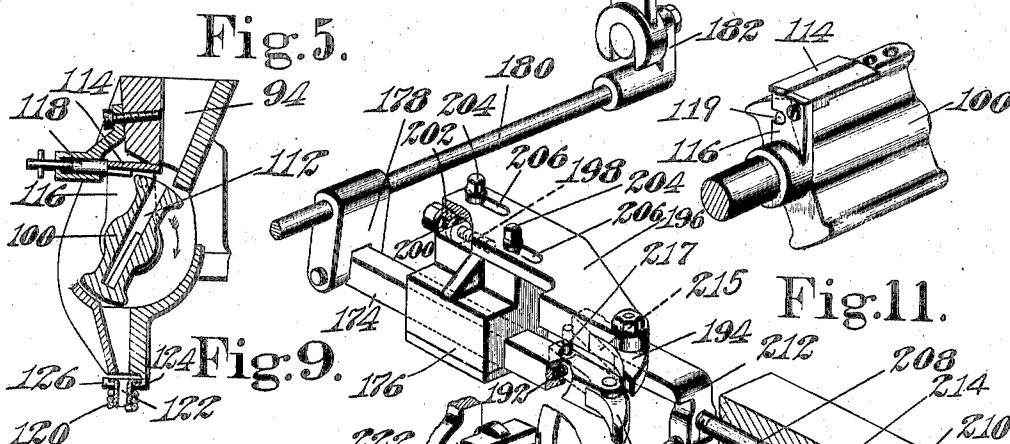


Fig.11.

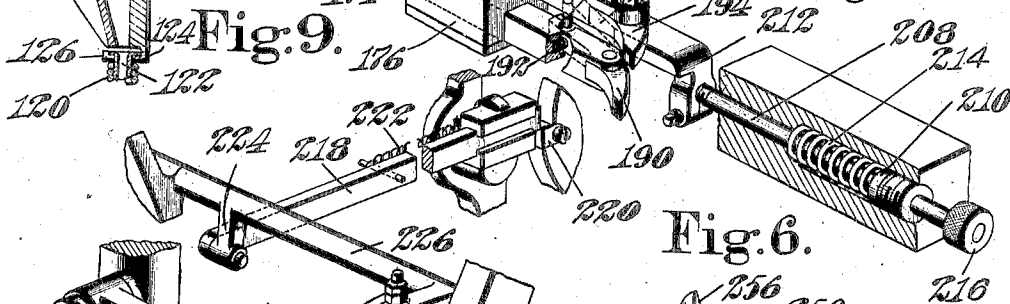


Fig. 6.



Fig. 8.

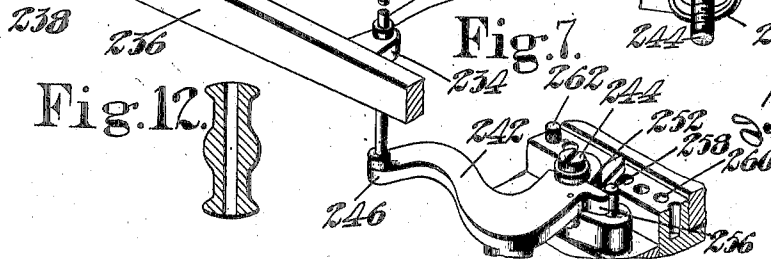


Fig. 12

INVENTOR
Joseph H. Pope.

UNITED STATES PATENT OFFICE.

JOSEPH H. POPE, OF HAMILTON, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

NAIL DISTRIBUTING AND LOADING MACHINE.

1,325,752.

Specification of Letters Patent.

Patented Dec. 23, 1919.

Application filed December 14, 1916. Serial No. 137,021.

To all whom it may concern:

Be it known that I, JOSEPH H. POPE, a citizen of the United States, residing at Hamilton, in the county of Essex and State of Massachusetts, have invented certain Improvements in Nail Distributing and Loading Machines, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to nail distributing and loading machines, and, more particularly, to a machine for taking nails from a container in which they are placed in bulk or miscellaneous arrangement, assorting and arranging them with their heads or points all in the same direction, distributing them into series of predetermined numbers and delivering them in loads to a receiving block or the like, from which they are eventually to be used.

One of the objects of the invention is to produce a machine for loading the nail supply blocks used in connection with the heel attaching system described and claimed in my co-pending application Serial No. 81,873, filed March 3, 1916, to which application reference may be had for a more complete description of such a block.

In loading such a receiver or nail supply block as above referred to with nails, the nails are preferably delivered to the block in successive series or rows. An important feature of the present invention, therefore, resides in the provision in a nail assorting and distributing and loading machine of means for supporting and feeding a nail receiver and delivering successive series of nails thereto. The nails are preferably delivered to the block while the latter is at rest and, therefore, in the present embodiment of the invention, I have provided means for feeding the block intermittently to present successive series of nail holes to the nail supplying mechanism, in combination with means for delivering the nails to the block during the periods between its successive movements. Inasmuch as it is frequently very advantageous to be able to supply to the heeling machine simultaneously nails of different lengths, another feature of the invention resides in the provision of means for

controlling the number of rows of holes in the receiver which shall be filled by the loading mechanism in any one series of its operations. By this means, I am able to load a predetermined number of holes in a supply of nail receivers with nails of one length and thereafter to load several rows of holes with nails of another length and so on, as desired. In this connection, an important feature of the invention resides in the provision of means for adjustably controlling the points at which the operation of feeding the block past the nail delivering mechanism shall begin and end. By this means, I am able to select any predetermined number of successive series of holes in any predetermined part of the receiver and fill them with nails without delivering nails to any of the other series of holes in the receiver.

In supplying nails from the distributing and loading mechanism to the holes in the nail receiver, it is very convenient and advantageous to deliver the nails to the receiver through a series of holes in a foot piece or bar, located in close proximity to the receiver. The nails may thus be guided to enter the holes in the receiver easily and accurately. When handling long nails, however, which project considerably above the receiver, the nails do not entirely leave the foot piece while the latter is in close proximity to the receiver, and would interfere with the feeding movement of the receiver. A further feature of the present invention, accordingly, consists in the provision of means for effecting relative separating movement between the receiver and foot piece prior to the feeding movement of the receiver. This function is effectively accomplished by the provision of mechanism for raising the foot piece just prior to the beginning of the feeding movement of the receiver from a position where one row of holes is in register with the foot piece to a position where the next row of holes is in register therewith, holding the foot piece elevated until the feeding movement has been completed and then lowering it again to a position closely adjacent to the receiver ready for the delivery of the next load of nails.

In the following specification and the accompanying drawings, my invention is de-

scribed and illustrated as embodied in a machine of the general type of that shown in my prior patent, No. 1,005,303, granted Oct. 10, 1911. The machine of that patent is constructed and organized to deliver the nails with their points upward; and for use with the heel nailing machine of my application hereinbefore referred to, it is necessary that the nails be placed in the receiver with their points downward. In pursuance of this object, another feature of the invention consists in the provision of certain mechanism for receiving the nails from the distributing mechanism, reversing them and delivering them with their points downward. The patent to Mayo, No. 694,656, granted March 4, 1902, discloses mechanism for performing a similar operation, but experience has shown that that mechanism has certain defects, which it is one of the aims of the present invention to overcome. In the machine hereinafter described, a nail reversing member is provided, which is movable from a receiving position relatively to the distributing mechanism to a nail delivery position, and separate means is provided for sustaining the preceding nails and preventing their entrance into the reverser during the movement of the latter. It has been found especially advantageous to use a rotary nail reversing element, having mounted upon it an oscillatory gate for preventing the delivery of nails to the reverser when the latter is out of receiving position, in combination with means for opening the gate and permitting the delivery of nails to the reverser when it is in receiving position.

A further feature of the invention resides in the provision of mechanism for disposing of any nails which may come down the raceways crosswise, or otherwise improperly positioned. Such nails interfere with the operation of feeding the properly positioned nails, and I have provided a series of nail clearers extending between the raceways, with means for oscillating the clearers to cause them to dislodge nails which are improperly positioned. I have found that the desired result is most effectively accomplished by causing the clearers to strike the improperly positioned nails with a quick blow and, by providing mechanism for operating them in this manner, I have succeeded in disposing very effectively of those nails which tend to interfere with the normal operation of the distributing mechanism.

In machines of the type under consideration, the problem of causing the nails to remain upon the raceways in proper order and to advance in the proper manner is a very delicate one. Heretofore, it has been customary to impart a rapid longitudinal shaking or reciprocating movement to the

raceways to cause the nails to advance. This movement was effected by positive actuating mechanism and could not be varied in extent or violence. I have discovered that to produce the most satisfactory results in this connection, it is desirable to change the character and extent of the movement of the raceways to meet different conditions as to the size of the nails and the condition of their surfaces and those of the raceways. Another important feature of the present invention accordingly, consists in the provision of a lost motion connection between the reciprocable raceways and the means which actuate them. I have found it advantageous to hold the raceways in engagement with the actuator by some yielding means, such as a spring, the tension of which can be varied to cause it to overcome part or all of the momentum of the raceways. By so adjusting the mechanism that only part of the momentum of the raceways is overcome, a sharp tapping movement may be given to the raceways, which is, under certain conditions, very effective. By the provision of means for adjustably limiting the throw of the raceways, I am also enabled to secure substantial improvement in the feeding of different nails under different conditions.

Other features of the invention and details of improvement will be made apparent in the following detailed description when read in connection with the accompanying drawings, in which—

Figure 1 is a perspective view of a machine embodying the invention;

Fig. 2 is a vertical section, from front to rear, of a portion of the machine;

Fig. 3 is a perspective view of a detail of the nail foot piece and the mechanism for operating it;

Fig. 4 is a perspective view of a detail of the raceway reciprocating mechanism;

Figs. 5, 6, 7 and 8 are views of details of the mechanism for feeding and returning the nail receiver;

Figs. 9, 10 and 11 are views showing details of the nail reversing mechanism;

Fig. 12 is a detail showing a modified construction for use when it is not desired to reverse the nails; and

Fig. 13 is a perspective showing a detail of the adjustable stop device for controlling the initial position of the nail receiver.

Referring to the drawings, the machine shown in Fig. 1 is of the general type of the machine disclosed in my prior Patent No. 1,005,303, above referred to, but with the various features of the present invention embodied therein. This machine embodies the usual nail supply drum 10 into which nails are thrown in bulk and is provided with means for rotating the drum to deliver the nails upon the upper sections 12 of a 13

series of raceways constituting what is known in shop language as the "wash board".

14 indicates the usual adjustable, nail balancing bar, the function of which is to reverse those nails leaving the upper sections of the raceways point first so that all the nails shall proceed along the lower sections 16 of the raceways with their head ends in advance.

The raceways are mounted in a frame 18 which is supported upon the upper ends of rocker arms 20 arranged for oscillatory movement about stationary axes 22. The lower ends of the front pair of rocker arms 20 are connected by a rod 24 upon which is a sleeve 26 having a rearwardly projecting screw 28 which passes loosely through a yoke 30. The yoke 30 is acted upon by tension springs 32 which are attached at their rear ends to the frame of the machine, as indicated at 34. A nut 36 upon the screw 28 bears against the rear face of the yoke 30, affording means for adjusting the tension exerted by the springs 32 to draw the yoke and the rod 24 rearwardly.

The rod 24 rests in slots 38 in the forward ends of eccentric rods 40 which are operated by eccentrics 42 upon the shaft 44. The shaft 44 is continuously rotated except at the moment when the delivery roll is actuated to deliver a load of nails, as more fully described in the patent hereinbefore referred to. Stop screws 46 threaded into lugs projecting from the frame of the machine afford means for adjustably limiting the rearward movement of the rod 24.

The variable condition of the nails and raceways as to smoothness, etc., very materially affects the accuracy and rapidity with which the nails are advanced along the raceways, and the extent and nature of the reciprocatory movement of the raceways has an important effect upon the operation of the machine. With the construction just described it is possible to adjust the amount of reciprocatory movement to any desired extent by adjustment of the screws 46. By adjusting the nut 36 to produce sufficient tension in the springs 32, the rod 28 will be held in the bottoms of the slots 38 within the limits of the movement of the rod, and the raceways will have in effect a positive reciprocatory movement. Under certain conditions, however, it has been found highly advantageous so to adjust the tension of the springs that the inertia of the raceways will not be overcome sufficiently to keep the rod 24 seated in the bottoms of the slots 38 throughout the entire stroke of the rod. In this way and by adjustment of the screws 46, to stop the rod 24 before the eccentric rods 40 reach their rearward limit of their movement, the rods 40, in their forward movement, engage the

rod 24 with a blow of greater or less force, depending upon the adjustments. This rapid tapping or hammering action upon the rod 24 causes a vibratory movement of the raceways which produces greatly improved results in feeding the nails under certain conditions.

It is not uncommon for a considerable number of nails to advance along the raceways crosswise or otherwise improperly positioned. To prevent these improperly positioned nails from arriving at the delivery roll where they are liable to accumulate and clog, means is provided for clearing them from the raceways. A transverse bar 48 is supported in bearings in the raceway frame 18 over the "washboard." A series of fingers 50 depending from the bar 48 enter the spaces 52 between the raceways. A bell-crank lever 54 is secured to one end of the bar and is connected by a link 56 to a bell-crank lever 58 journaled upon the axis 22. A spring 60 operates to hold the depending arm of the lever 58 in engagement with a stepped cam 62 mounted upon the continuously rotating gear 64 which imparts movement to the nail drum 10. As long as the machine is in operation, a continuous oscillatory movement is thus imparted to the bar 48 and the fingers 50. By reason of the stepped formation of the cam 62, the rearward stroke of the fingers 50 is sudden and imparts a quick blow to any nails resting across the spaces between the raceways. This tends to throw the nails backwardly and turn them so that they will either fall through the spaces between the raceways or arrange themselves properly upon the raceways. In order to take care of any nails which may escape the clearers just described, a second clearing device is provided above the lower sections of the raceways. This consists of a bar 66 and series of fingers 68 mounted in bearings in the raceway frame in the same manner as previously described. An arm 70 depending from the end of the bar 66 is connected by a link 72 to the bell-crank lever 54, and the oscillations of the first clearer are, through these connections, imparted to the second clearer.

All the nails arriving at the lower ends of the raceways are properly arranged longitudinally of the raceways and have their head ends in advance. The foremost series of nails leaves the raceways and enters a corresponding series of holes 74 in a nail delivery roll 76 extending transversely of the raceways and journaled in the raceway frame. The nails are stopped by engagement with the usual nail stop bar 78. When a load of nails is to be delivered from the delivery roll, means, to be hereinafter described, are thrown into operation to initiate a single revolution of a cam disk 80 having upon its face a cam 82. A cam lever 84 pivoted at 85

upon the machine frame has upon its lower end a cam roll 86 which is caused by a spring 88 to engage with the cam. A link 90 connects the upper end of the lever 84 to an arm 5 92 upon one end of the delivery roll. A revolution of the cam 82 causes the delivery roll to be rotated in a counterclockwise direction, as seen in Figs. 1 and 2, through an angle sufficient to permit the nails in the roll 10 to pass through the holes 74 and fall into chutes 94 located beneath the roll. Nails (particularly long ones) sometimes have a tendency to stick, or hang, in the delivery roll and not drop out readily. For the purpose of overcoming this tendency, the cam 15 82 is provided with a series of projections 96 which impart a rapid shaking or oscillatory movement to the roll 76 when the latter is in delivering position, thus dislodging any 20 nails which fail to pass readily from the roll. As the cam 82 completes its rotation and stops, the delivery roll is returned to its normal position, as shown in Fig. 2. An upwardly projecting bar or flange 98 is provided upon the delivery roll to prevent nails 25 arriving from the raceways from shooting over the top of the roll and arresting or interfering with the operation of the machine.

Beneath the chutes 94 is a rotatably 30 mounted reversing member 100 which is journaled in stationary bearings 102. A pinion 104 upon the reverser 100 meshes with a gear segment 106 upon the nail delivery roll. Since the bearings 102 are stationary 35 and the raceway frame 18 in which the delivery roll is journaled reciprocates, some backlash is allowed between the pinion 104 and the gear segment 106. This is taken up and the segment and pinion held in engagement with each other by a strap 108 secured 40 to the shaft of the delivery roll and held under tension by a spring 110.

Normally the reverser is in the position shown in Fig. 9, wherein a series of holes 112 45 in the reverser are in position to receive nails from the chutes 94. When the delivery roll is oscillated to deliver a new load of nails, the pinion and gear connection between it and the reverser causes the reverser to rotate 50 in a clockwise direction, as indicated by the arrow in Fig. 9. This rotation is continued until the reverser is in a position to allow the nails therein to drop out into the nail tubes beneath. It will be observed that the nails 55 which were delivered to the reverser with their head ends foremost are dropped into the nail tubes with their points foremost.

In order to sustain the new load of nails delivered to the chutes 94 by the delivery 60 roll, a gate 114, sustained upon arms 116 rotatably mounted upon the shaft of the reverser, is caused, by a spring pressed plunger 118, to assume a position in which it closes the lower ends of the chutes 94, as 65 shown in Fig. 10. The new load of nails is

sustained in the chutes by the gate 114 while the reverser is turned to deliver the load of nails which have previously entered it and returned in the direction indicated by the arrow in Fig. 10 to nail receiving position. 70 As the reverser approaches the limit of its return movement, pins 119 upon its ends (Fig. 11) engage the arms 116 and move the gate 114 from beneath the chutes 94, the spring pressed plunger 118 yielding 75 to permit this movement of the gate. As the gate is moved from beneath the chutes, the nails in the chutes fall into the reverser and the machine is then ready to deliver another series of nails to the tubes. 80

The nail tubes 120 are made of coiled spring wire and when in position are stretched sufficiently to produce a substantial amount of tension. In the upper end of each tube a head member 122 is secured. 85 The nail tube heads are flanged, and the flanges are seated in countersunk recesses in the nail tube supporting bar 124. The bar is slotted at 126 so that the recesses are opened at the front. By stretching the tube 120, the 90 flanged head 122 can readily be inserted in the slot 126. When released, the flange will seat itself in the countersunk portion of the recess and be held securely therein by the tension of the resilient tube. This feature 95 is very advantageous when it is desired to change the tubes.

The lower ends of the tubes 120 are secured in a foot piece or bar 128 which extends transversely of the machine and is 100 supported by arms 130 pivoted at 132 to the frame of the machine. A yoke 134 is pivotally connected to the arms 130 and is connected by a rod 136, through a pin and slot lost motion connection 138, to a lever 140 105 which is mounted to turn about a stationary axis 142. The other end of the lever 140 carries a cam roll 144 which travels in a cam path 146 formed in the rear face of the cam disk 80. The cam 146 is so formed that the 110 foot bar 128 is raised and lowered once during one revolution of the disk 80.

Beneath the foot bar 128 mechanism is provided for supporting and feeding a nail supply block or receiver of the type shown 115 in connection with the heeling machine of my prior application hereinbefore referred to. Guideways 148 are formed in castings 150 secured to, or forming part of, the base of the machine frame. A nail receiver support 152, having portions 154 fitting the 120 guideways 148, is mounted to slide forwardly and rearwardly in the said guideways. A spring 156 attached to the support and to a stationary pin 158 upon the 125 machine frame tends to draw the support rearwardly. The rearward movement of the support is regulated and the shock absorbed by a piston 160 operating in a dash pot 162 having an adjustable outlet controlled by a 130

split screw 164. The movement of the support rearwardly is limited by an adjustable stop screw 165, which is threaded into a stationary portion of the frame of the machine (see Fig. 13) and secured in adjusted position by a check nut 167. The stop screw 165 is of sufficient length to permit it to be so adjusted as to stop the support 152 with any desired row of holes in the nail receiver in register with the openings in the foot bar 128, so that the receiver may be initially positioned to start at any desired point the filling of its holes with nails.

An abutment 166 is provided at the front of the support 152 and so arranged that a nail supply block 168 may be properly positioned by engagement with the abutment. A pin 170 may be inserted in any one of a series of suitably located holes 169 in the support 152 to engage the other edge of the block 168 and maintain it in position relatively to the support. A ratchet plate 172, having its teeth pointing rearwardly, depends from the support, as best shown in Figs. 2 and 5.

The means for feeding the support 152, and the nail receiver carried thereby, will now be described. The feeding slide 174 is guided for longitudinal reciprocating movement in a stationary bearing 176 and is connected to an arm 178 on a rocker shaft 180 having another arm 182 pivotally connected to the lower end of the lever 184. The upper end of the lever 184 carries a cam roll 186 which is held against the cam 82 by a spring 188. The forward end of the slide 174 carries a pawl 190, upon the tail end of which bears a spring 192 tending to press the pawl into engagement with the teeth of the ratchet plate 172. A normally stationary retaining pawl 194 is also spring held in engagement with the ratchet plate 172, to prevent rearward movement of the latter during the retraction of the feeding pawl 190. The retaining pawl 194 is mounted upon a plate 196 carried by the guide 176. A screw 198, threaded in said guide, is provided with an annular groove 200 in which a projection 202 upon the plate 196 engages. By this means, longitudinal adjustment of the plate 196 and the retaining pawl carried thereby may be effected. Set screws 204 passing through slots 206 in the plate 196 serve to secure the plate firmly in adjusted position.

It will be understood that each single revolution of the cam 82 will cause the feeding pawl 190 to be advanced and retracted and the support 152, with the nail receiver upon it, to be advanced the distance between two teeth of the ratchet plate 172. This distance is the same as the distance between successive rows of holes in the nail receiver.

A plunger 208, having a collar 210 fixed upon it, is connected at its rear end to a

pawl releasing member 212 and is mounted to slide loosely in a hole in the base of the machine. A portion of the hole is bored to receive a compression spring 214, the rear end of which bears against the bottom of the bored out portion and the forward end of which bears against the collar 210. A knob 216 is provided upon the forward end of the plunger 208 to permit the plunger to be actuated conveniently by hand. The pawl releasing member 212 is formed with a cam face 215 arranged to engage an upright pin 217 upon the tail of the pawl 190 and a depending pin 219 upon the tail of the pawl 194 when the plunger is pushed rearwardly against the force of the spring 214. Normally, the spring holds the plunger forward and the cam 215 is out of engagement with the pins 217 and 219. When the cam 215 is moved into engagement with the pins, the pawls 190 and 194 are disengaged from the ratchet 172 and the spring 156 is permitted to draw the support 152 rearwardly until it engages the stop 165.

The starting and stopping of the feeding movement of the support 152 is controlled by a stop bar 218 engaging a projection 220 on the cam disk 80, the construction and operation of which are the same as those of the corresponding elements in the machine of my prior patent hereinbefore referred to. A spring 222 tends to move the stop bar 218 into engagement with the projection 220 in which position of the parts the disk 80 is held against rotation. The stop bar 218 is connected at its opposite end to an arm 224 upon a rock shaft 226. A connecting rod 228 is arranged to actuate the rock shaft through adjustable nuts 230. The connecting rod 228 passes through a lug 234 projecting from a hand lever 236, and collars 232, upon the rod, engage the lug. The lever 236 is pivoted at 238 to the machine frame and has a handle 240 at its forward end. By lifting the handle 240, the stop bar 218 is withdrawn from engagement with the projection 220 and the disk 80 is allowed to rotate as long as the bar is held out of engagement with the projection. For the purpose of controlling automatically the number of revolutions to be made by the disk 80 before it stops and, consequently, controlling the number of loads of nails delivered, a plate 242 is pivotally mounted at 244 in such a position that its rear end normally occupies a position beneath the connecting rod 228 and supports the latter at such an elevation that the stop bar 218 is held out of engagement with the projection 220 upon the disk 80. A spring 248 attached to a lug 249 depending from the plate 242 tends to throw the plate into the position described. A pawl 250 is mounted upon the same stud 244 with the plate 242 and a shoulder on the pawl engages a corresponding shoulder

upon the plate at 252. A spring 254 operates to hold these parts in engagement under normal conditions while allowing the pawl to swing rearwardly under the influence of force applied to it when a projection 256 on the plate engages a stationary stop pin 258. The pin 258 is so located as to stop the plate 242 with its end portion 246 under the end of the connecting rod 228.

A series of holes 260 is drilled in one edge of the support 152 and a pin 262 is provided which may be inserted in any one of these holes. When the pin 262 engages the rear face of the pawl 250, the forward movement of the support 152 and the pin inserted therein causes the plate 242 to be swung out from under the end of the rod 228, permitting the spring 222 to draw the stop bar 218 into the path of the projection 220, stopping the rotation of the disk 80 and, consequently, the feeding movement of the support for the nail receiver. The pin 262 may be inserted in any one of the holes 260 to cause the feeding movement to be stopped after any desired number of series of holes in the block 168 have been filled with nails. The stopping of the rotation of the disk 80 also stops the delivery of nails by the nail delivery roll 76 and the nail reverser 100, which are actuated by the same cam 82 which operates the receiving block feeding mechanism.

The operation of the machine is as follows: The nail drum 10 having been supplied with nails, the machine is started in the usual manner. The nails are delivered upon the "washboard" and proceed down the raceways in substantially the manner described in my prior patent. The raceway reciprocating mechanism is adjusted by the improved means hereinbefore described until the best possible nail feeding is secured. The clearers operate continuously to clear the raceways of improperly positioned nails, and the foremost series of nails in the raceways enters the holes in the nail delivery roll 76. An empty container 168 is placed upon the support 152 and the plunger 208 pressed in. The feeding and retaining pawls 190 and 194 are thus released and the spring 156 is permitted to draw the support and container backwardly to its predetermined initial position. When in this position, the first row of holes to be supplied with nails is immediately beneath the corresponding holes in the foot bar 128.

The handle 240 is now raised, releasing the cam disk 80, and the plate 242 is swung under the end of the connecting rod 228 by the spring 248, holding the connecting rod up with all the parts in running position. As the cam 82 actuates the cam lever 84, the nail delivery roll is rotated and vibrated while the nails pass therethrough into the chutes 94, being supported therein by the

retaining gate 114. When the cam 82 passes from beneath the cam roll 86 the nail delivery roll resumes its former position and a fresh series of nails enters the holes in it. At the same time the nail reverser 100 assumes the position shown in Fig. 9, the gate 114 being withdrawn and permitting the nails in the chutes 94 to fall into the reverser. The second revolution of the cam 82 effects a repetition of the movement of the nail delivery roll just described and causes the reverser 100 to be rotated sufficiently to discharge the nails contained therein into the nail tubes 120. The nails pass through the tubes and the foot bar 128 and enter the holes in the receiver 168. During the return movement of the nail reverser and the corresponding movement of the nail delivery roll to nail receiving position, the feed pawl 190 is actuated to feed the nail receiver one step so that the next row of holes shall be under the holes in the foot bar 128. The mechanisms are so timed that just before the last mentioned feeding movement begins the foot bar 128 is raised by the lever 140 (Fig. 3) sufficiently high to clear any nails which may project above the top of the block 168 and which might otherwise interfere with the feeding of the block. At the end of the feeding movement of the block the foot bar is again lowered until it is in close proximity to the block, to insure that the next series of nails shall be accurately guided into the holes in the block.

These operations are repeated until the pin 262, striking the pawl 250, automatically stops the operation of the machine, whereupon the partially or entirely filled block 168 is removed and an empty block substituted. The same operations are then repeated, and so on, until the desired number of blocks has been filled.

In Fig. 12 is shown a filling member or interponent which may be substituted for the nail reverser 100 when it is desired to deliver the nails to the receiver point upward, without reversing them. This interponent may be of substantially the same construction as the reverser 100, except that the nail holes pass entirely through it, and the gate 114 and mechanism for rotating the member are omitted. Under these conditions the interponent merely acts as a conduit between the troughs 94 and the nail tubes 120.

Having described the invention, what is claimed as new and desired to be secured by Letters Patent of the United States is:—

1. In a machine of the class described, the combination of means for supporting a nail supply block, means for assorting loose nails from bulk and delivering a series of nails to the block at each successive delivery, and means for feeding the block between successive deliveries of nails thereto.

2. In a machine of the class described, the

combination of means for supporting a portable nail supply block, means for delivering nails to a block upon the supporting means in successive series, means for feeding the supporting means between successive deliveries of nails to the block, and means for stopping the feeding movement of the supporting means after a predetermined number of series of nails have been delivered.

3. In a machine of the class described, the combination of means for supporting a separable nail supply block, means for delivering nails to a block upon the supporting means in successive series, means for feeding the supporting means between successive deliveries of nails, and means for stopping the delivery of nails after a predetermined number of series have been delivered.

4. In a machine of the class described, the combination of means for supporting a block having a plurality of series of holes for receiving nails, means for moving the support step by step to present successive series of holes in nail receiving position, and means for releasing and returning the support to initial position.

5. In a machine of the class described, the combination of means for supporting a block having a plurality of series of nail receiving holes in an initial nail receiving position, means for feeding the supporting means step by step to present successive series of holes in nail receiving position, and means for returning the parts to initial position, whereby another block may be located in initial nail receiving position.

6. In a machine of the class described, the combination of means for supporting a block having a plurality of series of nail receiving holes, means for feeding the support step by step in one direction to present successive series of holes in nail receiving position, and means for returning the support to initial position.

7. In a machine of the class described, the combination of means for supporting a block having a plurality of series of nail receiving holes, means for feeding the support step by step in one direction to present successive series of holes in nail receiving position, and means for releasing the support from the feeding mechanism and returning it to initial position.

8. In a machine of the class described, the combination of means for supporting a block having a plurality of series of nail receiving holes, means for feeding the support step by step to present successive series of holes in nail receiving position, and means for releasing the support and automatically returning it to initial position.

9. In a machine of the class described, the combination of means for supporting a nail supply block, means for feeding the support

in one direction, and means under the control of the operative for returning the support to initial position from any desired point in its feeding movement.

10. In a machine of the class described, the combination of means for supporting a block having a plurality of series of nail receiving holes, means for positioning the block with any predetermined series of holes in nail receiving position, means for feeding the block to present successive series of holes in nail receiving position, and means for stopping the feeding movement of the block when a predetermined number of series of holes have been filled.

11. In a machine of the class described, the combination of means for supporting a block having a plurality of series of nail receiving holes, means for positioning the block with any predetermined series of holes in nail receiving position, and means for feeding the block to present successive series of holes in nail receiving position.

12. In a machine of the class described, the combination of means for supporting a nail receiver having a plurality of holes, means for feeding the receiver step by step to present successive holes in receiving position, and means under the control of the operative for releasing the receiver and permitting its return to initial position at any desired point in the feeding movement.

13. In a machine of the class described, the combination of means for supporting a nail receiver having a plurality of holes, means for feeding the receiver step by step to present successive holes in nail receiving position, and means under the control of the operative for releasing the receiver and returning it to initial position at any desired point in the feeding movement.

14. In a machine of the class described, the combination of means for supporting a nail receiver having a plurality of nail holes, means for feeding the receiver step by step to present successive holes in nail receiving position, and adjustable means for determining the initial position of the receiver constructed and arranged to determine which of the holes in the receiver that are presented successively in nail receiving position shall receive the first nail.

15. In a machine of the class described, the combination of means for supporting a nail receiver, a foot piece through which nails are delivered to the receiver, and means for raising the foot piece, to move it from a position adjacent to the receiver, away from the receiver to permit the receiver to be moved without interference of projecting nails with the foot piece.

16. In a machine of the class described, the combination of means for supporting a nail receiver having a plurality of nail holes, means for feeding the receiver step by step

to present successive holes in nail receiving position, means, including a foot piece located adjacent to the receiver, for delivering nails to the receiver, and means for raising the foot piece during each feeding movement of the receiver to a position clear of nails projecting from the receiver.

17. In a machine of the class described, the combination of means for supporting a nail receiver, means for imparting intermittent movement to the receiver, means including a foot piece, for delivering nails to the receiver between its movements, and means for raising the foot piece during each movement of the receiver.

18. In a machine of the class described, the combination of means for supporting a nail receiver, means for imparting intermittent movement to the receiver, means, including a foot piece, for delivering nails to the receiver between its movements, and means for effecting relative separating movement between the nail receiver and the foot piece during each movement of the receiver.

19. In a machine of the class described, the combination of nail delivering means, including a nail chute, nail reversing means movable from a receiving position in register with the chute to a delivering position, and separate means carried by the nail reversing device for sustaining a nail in the chute when the said device is out of receiving position.

20. In a machine of the class described, the combination of a nail delivery chute, a nail reverser mounted to oscillate between a nail receiving position in register with the chute and a nail delivering position, a gate carried by the reverser for closing the outlet of the chute, and means for automatically closing the gate when the reverser is out of nail receiving position.

21. In a machine of the class described, the combination of a nail delivery chute, a nail reverser mounted to oscillate to and from a nail receiving position relatively to the chute, a nail gate located in cooperative relation to the chute and mounted to oscillate about the same axis as the reverser and independently thereof, and means for opening the gate when the reverser is in receiving position and closing it when the reverser is out of receiving position.

22. In a machine of the class described, the combination of a nail delivery chute, an oscillatory nail reverser located at the mouth of the chute, an oscillatory nail gate mounted upon the reverser and arranged to close the mouth of the chute, a spring bearing against the gate and tending to close the chute, and an abutment on the reverser arranged to engage the gate and move it away from the mouth of the chute when the reverser is in nail receiving position.

23. In a nail distributing and loading ma-

chine, a nail raceway, a perforated nail delivery roll having an aperture normally in alinement with the raceway, means for rotating the roll to permit a nail received from the raceway to be delivered from said aperture, and a projecting stop upon the roll to prevent nails arriving from the raceway from shooting over the roll.

24. In a nail distributing and loading machine, a series of nail raceways, a perforated nail delivery roll having apertures normally in alinement with the ends of the raceways, means for oscillating the roll to permit nails received from the raceways to pass through said apertures and be delivered from the roll, and a nail stop bar projecting from the roll to prevent nails arriving from the raceways from shooting over the roll.

25. In a nail distributing and loading machine, a nail delivery roll having a nail receiving aperture, means for moving the roll between a nail receiving position and a nail delivering position, and means for vibrating the roll in said nail delivering position, to insure the dislodgment of any nail which may not readily leave the roll.

26. In a nail distributing and loading machine, a nail delivery roll having an aperture passing therethrough, means for moving the roll from a position for receiving a nail in one end of the aperture to a position for delivering the nail from the other end of the aperture, and means for agitating the roll when in nail delivering position, to insure the dislodgment of any nail which may not readily leave the aperture.

27. In a machine of the class described, the combination of a series of nail raceways, a series of nail clearers extending between the raceways, constructed and arranged to prevent the forward movement of misplaced nails, and means for oscillating the clearers to dislodge nails positioned transversely of the raceways.

28. In a machine of the class described, the combination of a series of nail raceways, a series of nail clearers extending between the raceways constructed and arranged to prevent the forward movement of misplaced nails, and means for causing the clearers to strike with a quick blow nails positioned transversely of the raceways, to dislodge said nails.

29. In a machine of the class described, the combination of a series of inclined raceways, a series of clearers adjacent to the upper portions of the raceways constructed and arranged to prevent the forward movement of misplaced nails, means for causing the clearers to strike and dislodge improperly positioned nails extending transversely of the raceways, a second series of clearers further down the raceways, and means for causing the second series of clearers to

strike and dislodge any improperly positioned nails which may escape the first series of clearers. 40

30. In a machine of the class described, the combination of a series of inclined raceways, a series of oscillatory clearers adjacent to the raceways, a second series of clearers adjacent to another portion of the raceways, connections between the two series of clearers whereby movement of one series is transmitted to the other series, and means for oscillating the clearers. 45

31. In a machine of the class described, the combination of a nail raceway mounted for reciprocatory movement, and means for reciprocating the raceway, comprising a member having a reciprocating movement of fixed amount, and a lost motion connection between said member and the raceway. 50

32. In a machine of the class described, the combination of a nail raceway mounted for reciprocatory movement, and means for imparting movement to the raceway, comprising a member having a positive movement, a lost motion connection between said member and the raceway, and adjustable means for varying the amount of movement imparted to the raceway. 55

33. In a machine of the class described, the combination of a nail raceway mounted for reciprocatory movement, and means for imparting movement to the raceway, comprising an actuating member having a positive movement, a lost motion connection between the actuating member and the raceway, yieldable means tending to hold the raceway and actuating member in engagement with each other, and means for varying the force exerted by said yieldable means. 60

34. In a machine of the class described, the combination of a reciprocable nail raceway, an actuating member for said raceway, and yieldable means for holding the raceway and actuating member in engagement with each other. 45

35. In a machine of the class described, the combination of a reciprocable raceway, an actuator for the raceway, a lost motion connection between the actuator and the raceway, a spring tending to hold the actuator and raceway in engagement with each other, and means for varying the tension of the spring to overcome various proportions of the inertia of the raceway. 55

36. In a machine of the class described, the combination of a reciprocable raceway, an actuator for the raceway, a lost motion connection between the actuator and the raceway, a spring tending to hold the actuator and raceway in engagement with each other, means for varying the tension of the spring, a stop for limiting the movement of the raceway in one direction, and means for adjusting the stop to different positions. 65

37. In a nail distributing and loading machine, nail raceways, a nail delivery roll having a plurality of straight holes there-through normally in alinement with said raceways, means for arresting the nails entering said holes, and means for rotating the roll to permit nails received from the raceways to be delivered from said holes. 70

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

JOSEPH H. POPE.