April 11, 1944. J. T. LANCASTER 2,346,262

FASTENING-LOADING MECHANISM

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Fig. 1.

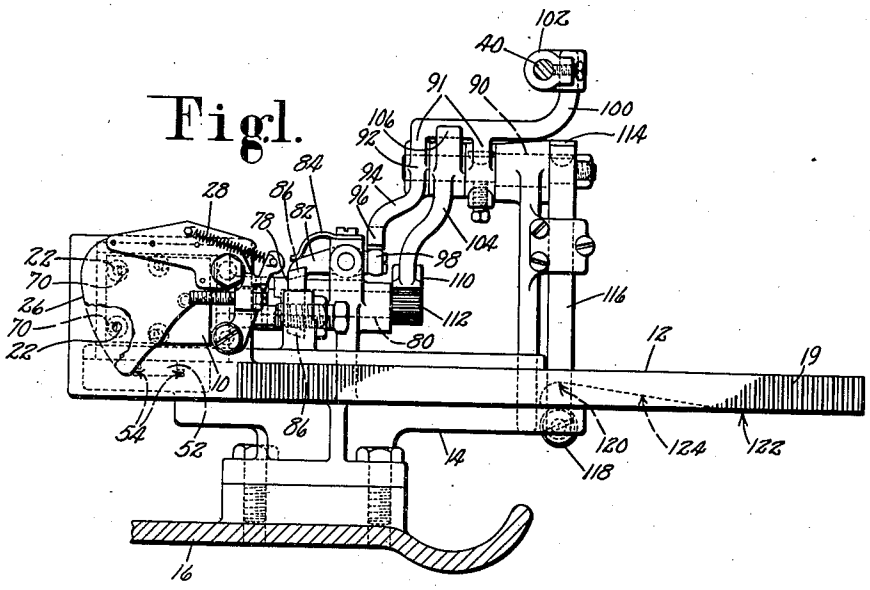
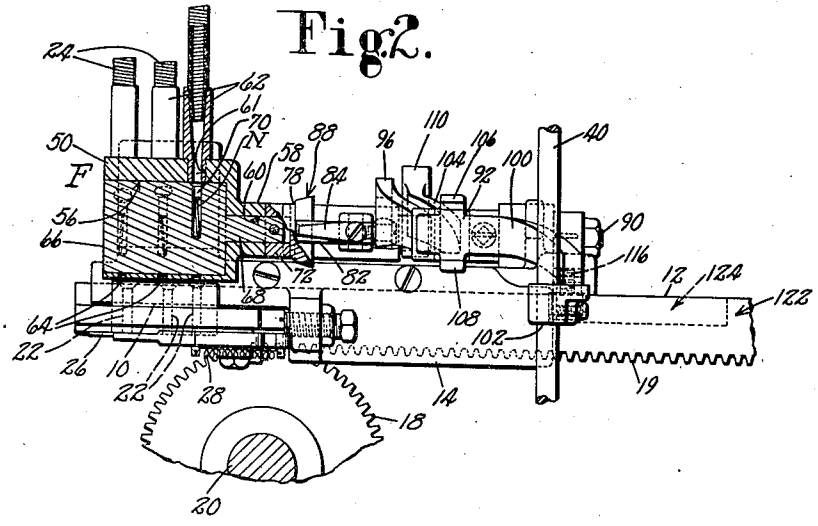


Fig. 2.



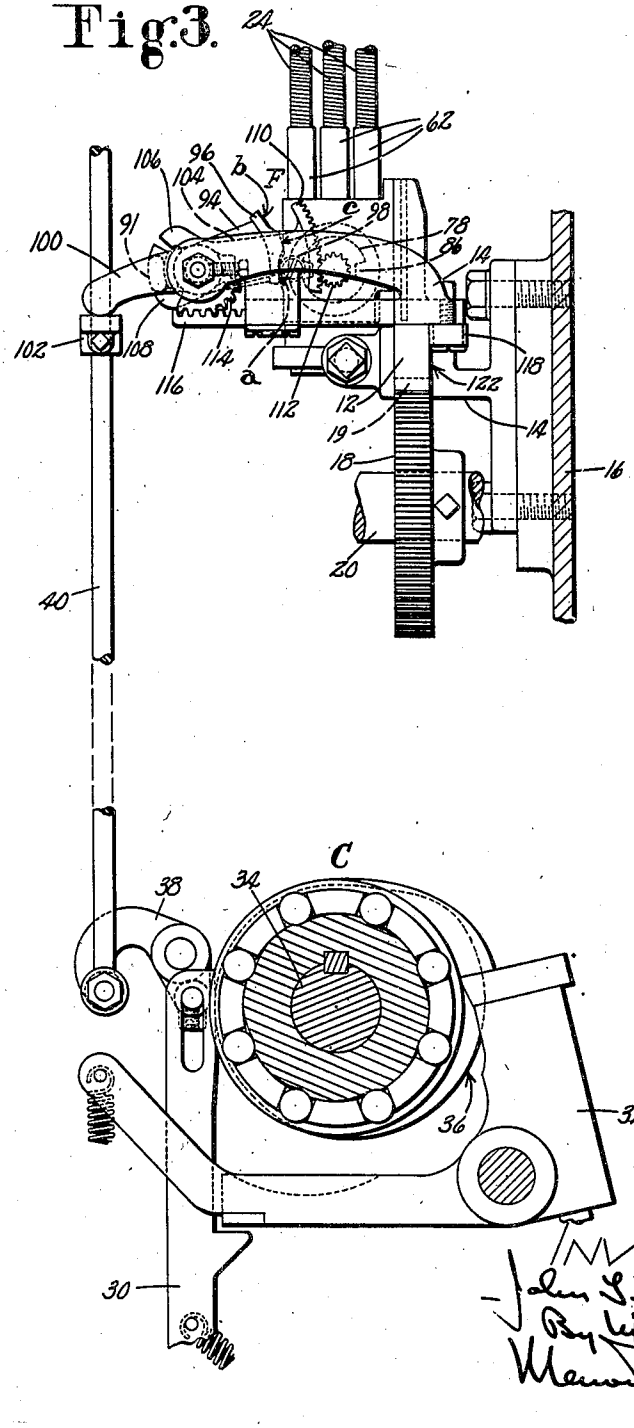
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FASTENING-LOADING MECHANISM

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Fig.3.



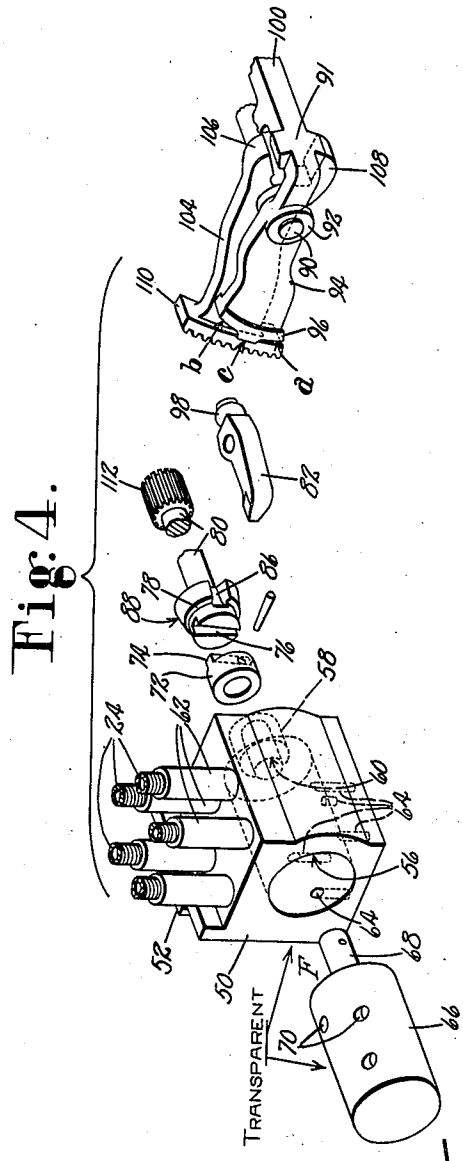
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FASTENING-LOADING MECHANISM

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Fig. 4.



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UNITED STATES PATENT OFFICE

2,346,262

FASTENING-LOADING MECHANISM

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Application May 4, 1942, Serial No. 441,645

24 Claims. (Cl. 1—32)

This invention relates to mechanisms by which such fastenings as nails are delivered to means by which they are to be utilized. An example of a mechanism of this character is furnished in heel-attaching machines, by the means which receives nails supplied by a distributor and delivers them in loads to the inserting mechanism of the machine. In some machines, the fastenings come from the distributor with their points directed oppositely to that of insertion, so that during their advance they must be inverted. An object of this invention is to thus arrange the fastenings during their progress through the loading mechanism by a simple organization, positive in its operation and reliable as to the delivery of the fastenings in the desired relation.

To accomplish the above object, I associate with fastening-supplying means, which may be the tubes leading from a distributor, a terminal device, commonly known as a foot-plate, having a portion rotatable or otherwise movable to invert the fastenings and deliver them to a loader-block or device which transfers them to the position at which they are to be used. The loading device is provided with fastening-holding passages arranged in accordance with a particular fastening-inserting design, and the movable portion of the terminal device has fastening-holding depressions with which the passages of the loading device register in their receiving position. This allows direct communication between the inverting means and the loading means, without the necessity for interposed fastening-stops or gates and with a general simplification of the supplying organization. The foot-plate preferably has a casing provided with an upper set of openings through which the tubes supply the fastenings, and a lower set through which the inverted fastenings pass into the loader-block. In the casing is rotatable a cylinder having pockets, which may register with either set of openings. Thus the cylinder, in turning as through 180°, will deliver the fastenings to the loader-block moving in a plane immediately below and into which the inverted fastenings at once descend. It will be seen that the inversion is not dependent upon the force of impact often employed, and is effected by a stationary device, as far as movement of translation is concerned. There can consequently be no doubt as to the sufficiency of the inverting force, and the actuating means for the inverting member is relieved of complication. To ensure accuracy in locating the inverting member, it is retained temporarily by a latch in both its receiving and delivering positions. After the inverting member has received a load of fastenings, the latch is disengaged; the member moved to its delivering position; and the latch released to there secure the member. Thereafter, the inverting member is moved oppositely, with corresponding movements of the latch, for the restoration of said member to its initial position. I have herein shown the movements for fastening-delivery as effected by a member actuated by the operator, and the restoring movement as under the influence of the fastening-transferring or -loading means. The actuation of the latch and inverting member may be through two cooperating levers and gearing, which establish the correct time-relation. The casing of the inverting device is mounted upon the supporting frame of the machine and its cylinder connected to the shaft through which it is rotated, by interengaging portions which permit convenient separation of the assembly by movement together in one direction, the form of the cylinder: and shaft-portions being such that they are engageable only when the cylinder is in its fastening-receiving position. Thus is ensured the correct assembly of the elements when the inserting design is changed. To enable the operator readily to determine whether a fastening or fastenings have been missed from a load supplied to the loading mechanism, the inverting cylinder and its enclosing casing are made of transparent material.

A particular embodiment of the invention is illustrated in the accompanying drawings, in which

Fig. 1 is a bottom plan view of my improved loading mechanism;

Fig. 2, a broken side elevation thereof, taken from the right of the heeling machine, in connection with which it is disclosed;

Fig. 3, a rear elevation of the loading mechanism and including the clutch mechanism of the heeler; and

Fig. 4, a separated perspective view of the foot-plate and its more closely associated actuating elements.

The general organization of the heel-attaching machine and the distributor by which it is supplied with nails may be that of Letters Patent of the United States No. 1,947,770, MacKenzie, February 20, 1934. Of this, there is herein illustrated only the loader-block 10, carried upon the forward extremity of its slide 12 guided for horizontal reciprocation fore and aft of the machine upon a bracket 14 secured to the frame 16. Movement of the loader-slide is produced by a spur-gear 18 meshing with a rack 19 upon the underside of the slide, the gear being fast upon a

horizontal shaft 20 and rotated alternately in opposite directions under the control of the operator. This travel is between the rearward position, shown in Figs. 1 and 2, and a forward position above the jack of the heeler. In the former position, the loader-block is receiving in its passages 22 through a foot-plate F, peculiar to this invention, nails N coming from an unillustrated distributor by way of tubes 24. In the latter, it is making its delivery. During this reception and the travel over the jack, the nails are supported in the loader-block-passages upon a shutter 26, movable at the underside of the loader-block upon its frame. This shutter is latched in normally closed relation for the reception of nails in the loader-block at the foot-plate, and is opened by a spring 28 upon engagement with the jack for the delivery of the nails thereto. To initiate the nail-inserting operation of the machine, a link 30 (Fig. 3) is raised by the operator, as through connection to a treadle, causing a stop-lever 32 to release the driven portion of a clutch C, the driving portion of which is constantly rotated by the main shaft 34. During this rotation of the driven portion of the clutch, a cam-projection 36 upon it not only acts upon the link 30 to free the stop-lever therefrom, so it will end the nail-inserting cycle after a single rotation, but also oscillates a bell-crank-lever 38. This raises a rod 40 to prepare the distributor for the delivery of a load of nails through the tubes 24 for use during the succeeding operation of the machine.

The elements more particularly belonging to the present invention will now be described. The foot-plate F includes a casing 50, mounted for ready removal from the machine-frame by a T-projection 52 fitting within complemental vertical ways 54 in the bracket 14. The body of the casing has a cylindrical bore 56 and a rearwardly extending boss 58, through which is a reduced bore 60 (Fig. 4). From openings 61 through the upper wall of the casing rise nipples 62, to which the nail-tubes 24 from the distributor are joined, while through the plane underside of the casing are discharge-openings 64. The two sets of openings, each shown as five in number, are vertically alined and are arranged in accordance with a particular nailing design, which is to be employed for the work in hand. Rotatable within the casing is a nail-inverting and delivering cylinder 66, an axial spindle 68 of which turns in the bore through the boss 58. In the cylinder is a set of pockets or depressions 70 of sufficient depth to contain the longest nail to be delivered to the inserting mechanism of the machine, and arranged to register with either the receiving openings 61 or the discharge-openings 64 by rotation of the cylinder through 180°. Both the casing and cylinder are preferably formed from some durable transparent plastic. This enables the operator to inspect at any time the foot-plate device, and thereby determine, without manipulation, whether it contains a full load of nails.

Secured to the spindle 68 of the foot-plate-cylinder is a collar 72, upon the outer end of which is a transverse rib 74 tapering in the direction of its length across the collar. The rib is received in a complemental slot 76 in the face of a collar 78, fixed upon the end of a shaft 80 journaled in the bracket 14. This collar 78, and therefore the cylinder, may be temporarily retained in either of two opposite positions by a latch 82, pivoted upon the bracket and forced by a leaf-spring 84 into one or the other of diametrically opposite depressions 86, 86 in the outwardly tapering surface 88 of the collar 78. When the latch rests in one of the depressions 86, the pockets 70 are in registration with the supply-nipples 62 and the casing-openings 61 for the reception of nails, and, when it is in the opposite depression, the pockets are positioned to deliver to the passages 22 of the loader-block through the discharge openings 64. It should be observed that, where there is a plurality of the pockets arranged side by side transversely of the cylinder (Fig. 1), they are staggered to lie in different positions longitudinally of the axis. See also the corresponding positions of the nipples 62 in Fig. 4. This avoids the interference which would be caused through the crossing of one of the openings 64 by a pocket which is to deliver to another opening. The usual beveled mouths of the loader-block-passages 24 allow them to receive the nails without exact registration with the casing-openings. Mechanism by which the nail-cylinder 66 is released from the latch 82 and turned in the casing 50 between its opposite positions will now be described.

Journaled in the bracket 14 parallel to the shaft 80 is a shaft 90, to the forward extremity of which is fixed the divided or yoked portion 91 of a lever 92 (Fig. 1). An arm 94 of this lever has formed upon its segmental end 96 a cam, movable in engagement with a roll 98 rotatable upon the tail of the latch 82. The cam-surface has depressions *a* and *b* upon opposite sides of a raised arcuate portion *c* (Figs. 3 and 4). When the depression *a* is opposite the roll 98, the latch may enter one of the depressions 86 to secure the cylinder 66 with its pockets in registration with the nipples 62. When the depression *b* is in co-operation with the roll, the latch fixes the cylinder with the pockets opposite the discharge-openings 64. The action of the portion *c* upon the roll removes the latch from the depressions, freeing the cylinder for rotation. The initial movement of the lever 92, which prepares for the rotation of the cylinder, is caused by the contact of a collar 102 secured to the rod 40 with a lever-arm 100 of the lever 92 projecting oppositely to the arm 94. This occurs when the operator starts the heeling machine in action by elevation of the link 30, to trip the clutch C and to arrange the distributor for supplying to the machine its next load of nails.

Arranged to turn about the shaft 90 is a lever 104, having upon its hub projections 106 and 108. Between these projections lies the connecting portion of the yoke 91 of lever 92, with some clearance between said yoke and the projections. Upon the end of the lever 104 is a gear-segment 110 meshing with a pinion 112 fast upon the shaft 80. Contact of the yoke with the projections 106 and 108 in its clockwise and contraclockwise directions, respectively (Fig. 3), turns the cylinder 66 to its nail-delivering and nail-receiving positions. The lost motion, due to the clearance between the contacting elements, gives intervals during which the effect is not transmitted and the cam 96 may cause the unlatching of the cylinder 66.

Secured to the shaft 90 is a gear-segment 114 meshing with a rack-bar 116, guided for horizontal movement at the rear of the bracket 14. Upon the inner end of the bar is a roll 118 rotatable about a vertical axis. The roll lies opposite a depression 120 in a side wall 122 of the loader-slide 12 (Fig. 1), when the loader-block 10 is beneath the foot-plate F in its nail-receiving

relation. During the reciprocation of the loader-slide, its side travels along the roll. From the depression 120 an inclined cam-wall 124 upon the loader-slide leads gradually to the outer wall 122. Consequently, when the slide travels forward to make its delivery, the wall 124, acting through the roll and rack-bar, will turn the shaft 90. This causes the yoke 91, by engagement with the projection 108, to return the cylinder 66 to its initial position.

Assuming that in putting into use the heeling machine with which this invention is associated, the nailing design is to be changed, the operator detaches the nail-supplying tubes 24 from the nipples 62 and lifts the supporting projection 52 of the casing 50 from the ways 54 in the frame-bracket. When the pockets 70 in the inverting cylinder 66 are in registration with the nipples, as is the case at the termination of the nail-delivering cycle, the projection 74 of the cylinder and the slot 76 of the collar 78, which by their engagement allow the rotation of the cylinder, extend vertically with their wider ends upward. Therefore, the casing and cylinder may be removed without other manipulation. A foot-plate-assembly, with its casing and cylinder having their pockets and openings arranged in accordance with the desired design, is applied to the bracket, entrance of the projection 74 of the substituted foot-plate into the upwardly diverging slot 76 ensuring that the cylinder-pockets will be in registration with the casing-nipples. Upon inserting the tubes 24 into the nipples, the foot-plate will be ready for operation.

At the beginning of an operating cycle, the loader-block 10 contains in its passages 22 nails N, which were delivered to it during the previous cycle. The operator actuates a member controlling the rotation of the shaft 20, causing the loader-slide 12 with its block 10 to advance, make the nail-delivery to the jack of the heeler and return to its initial position. At this time, the roll 118 lies opposite and outside the depression 120 in the loader-slide 12. The operator then jacks a shoe, applies a heel to its heel-seat and raises the link 30. This causes the engagement of the clutch C, through which the main power-shaft 34 is driven. As the nail-inserting operation approaches completion, the cam-projection 36 upon the driven portion of the clutch actuates the bell-crank-lever 38. This elevates the rod 30, to make possible the supply of a load of nails by the distributor only after those which have been delivered to the jack have been driven into the work, avoiding the danger of a double load. In this movement of the rod, produced by the operator, the arm 100 of the lever 92 is turned clockwise (Fig. 3). The roll 98 has been resting in the depression *a* of the cam 96, this allowing the latch 82 to enter one of the depressions 86 of the collar 78. The engagement of the latch with this depression locks the foot-plate-cylinder 66 in its nail-receiving position, with the pockets 70 alined with the nipples 62. As the arm 100 turns, the portion *c* of the cam forces the latch out of the depression, so the cylinder may be rotated, this occurring when the yoke-portion 91 of the lever 92 arrives at the projection 106 of the lever 104. The rotation of the cylinder is thereupon produced through the gearing 110, 112 and turns said cylinder through 180°, so its pockets containing a load of nails, heads up as they arrived from the distributor through the supply-tubes 24 and delivered when the operator caused the reciprocation of the loader-block, are brought into alinement with the casing-openings 64. The nails have thus been inverted, so upon receipt by the loader-block-passages 22 from the openings 64 they rest upon their heads on the shutter 26, correctly positioned for their discharge into the jack of the heeler. Since the delivery to the loader-block is dependent upon the production of the nail-inserting operation, it is made certain that the nails have been driven from the jack. This furnishes a second guard against a double load. From the jack, the nails are to be driven upwardly through the heel-seat of the shoe into the applied heel for its attachment. The depression *b* in the cam 96 is at this time opposite the roll 98, so the foot-plate-cylinder is locked by the entrance of the latch 82 into the second depression 86 during the delivery of nails to the loader-block. While the lever 104 is thus acting to effect nail-delivery, the segment 114, which turns with it, is drawing in the rack-bar 116. The roll 118 upon the rock-bar enters the registering depression 120 in the loader-slide 12. When the loader-block 10 transfers its next load of nails to the jack, the cam-surface 124, extending outwardly from the depression 120 to the surface of the slide, will force out the rack-bar 116 and through the segment 114 turn the lever 92 to its initial position. This, by the action of the cam-projection *c* upon the roll 98, first frees the inverting cylinder 66 from the latch 82, and then, by engagement of the yoke 91 with the projection 108 upon the lever 104, through the segment 110 and pinion 112, restores the cylinder to its nail-receiving position. Here it is again latched, as the roll enters the cam-depression *a*.

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

1. Fastening-loading mechanism comprising a loading device movable from a fastening-receiving position to a delivering position where the fastenings are to be inserted, said loading device having a set of fastening-holding passages arranged in accordance with a particular fastening-inserting design, means by which fastenings are supplied with their points in one direction, a terminal device for the supplying means having a movable portion provided with a set of fastening-holding depressions with which the fastening-holding passages of the loading device register in receiving position, and means for moving the terminal portion to invert the fastenings for delivery to the loading device.

2. Fastening-loading mechanism comprising means by which fastenings are supplied with their points in one direction, a terminal device for the supplying means having a set of discharge-openings and a movable portion provided with a set of depressions arranged for registration with the discharge-openings and which receive the supplied fastenings, means for moving said portion to invert the received fastenings, and a loader-block having a set of fastening-holding passages, said block being movable between a position in which its passages register with the discharge-openings of the terminal device and a fastening-delivering position.

3. Fastening-loading mechanism comprising fastening-supplying tubes, a foot-plate in which said tubes terminate and including means for inverting the supplied fastenings, and a movable loader-block receiving the inverted fastenings from the foot-plate.

4. Fastening-loading mechanism comprising a reciprocatory loader-block, a foot-plate situated immediately above the plane of reciprocation of the loader-block and including a rotatable cylinder provided with fastening-pockets delivering to the loader-block, means for rotating the cylinder, and tubes through which the fastenings are supplied to the foot-plate-pockets.

5. Fastening-loading mechanism comprising a casing having sets of upper and lower openings, a cylinder rotatable within the casing and provided with pockets which may register with either set of openings, tubes for supplying fastenings through the upper set of openings, and a movable loader-block receiving fastenings through the lower set of openings.

6. Fastening-loading mechanism comprising a casing having sets of upper and lower openings, a cylinder rotatable within the casing and provided with pockets which may register with either set of openings, the openings including a pair arranged side by side transversely of the cylinder and staggered longitudinally of the axis, tubes for supplying fastenings through the upper set of openings, and a movable loader-block receiving fastenings through the lower set of openings.

7. Fastening-loading mechanism comprising fastening-supplying and fastening-transferring means, a movable inverting member arranged to receive fastenings from the supplying means and to deliver them to the transferring means, and a latch for temporarily retaining the inverting member in both the receiving and delivering positions.

8. Fastening-loading mechanism comprising fastening-supplying and fastening-transferring means, a movable inverting member arranged to receive fastenings from the supplying means and to deliver them to the transferring means, a latch for temporarily retaining the inverting member in both the receiving and delivering positions, and means for successively disengaging the latch after the inverting member has received its load of fastenings, moving said member to its delivering position and releasing the latch to secure the member in its delivering position.

9. Fastening-loading mechanism comprising fastening-supplying and fastening-transferring means, a movable inverting member arranged to receive fastenings from the supplying means and to deliver them to the transferring means, a latch for temporarily retaining the inverting member in both the receiving and delivering positions, means for successively disengaging the latch after the inverting member has received its load of fastenings, moving said member to its delivering position and releasing the latch to secure the member in its delivering position, and means for effecting opposite movements of the latch and inverting member to restore and secure said member in its initial position.

10. Fastening-loading mechanism comprising fastening-supplying and fastening-transferring means, a rotatable inverting member arranged to receive fastenings from the supplying means and to deliver them to the transferring means, a member movable by the operator to turn the inverting member from its receiving to its delivering position, and a member movable by the transferring means for restoring the inverting member to its receiving position.

11. In a heel-attaching machine, mechanism supplying power for the attachment of the heels, nail-supplying means and nail-transferring means, a rotatable nail-inverting member interposed between the supplying and transferring means, and a member movable by the operator to render the power-supplying mechanism effective and to turn the inverting member.

12. In a heel-attaching machine, nail-supplying means and nail-transferring means, a rotatable nail-inverting member interposed between the supplying and transferring means, a latch by which the inverting member may be retained temporarily in its nail-receiving and nail-delivering positions, and a member movable by the operator to start the operation of the machine, to control the latch and to turn the inverting member.

13. In a heel-attaching machine, nail-supplying means and nail-transferring means, a rotatable nail-inverting member interposed between the supplying and transferring means, a member movable by the operator to start the operation of the machine and to turn the inverting member, and a member movable by the transferring means to reverse the movement of the inverting member.

14. In a heel-attaching machine, nail-supplying means and nail-transferring means, a rotatable nail-inverting member interposed between the supplying and transferring means, a latch by which the inverting member may be retained temporarily in its nail-receiving and nail-delivering positions, a member movable by the operator to start the operation of the machine, to control the latch and to turn the inverting member, and a member movable by the transferring means to reverse the movement of the inverting member and to control the re-engagement of the latch.

15. Fastening-loading mechanism comprising a casing having sets of upper and lower openings, a cylinder rotatable within the casing and provided with pockets which may register with either set of openings, a latch for temporarily retaining the cylinder with its pockets in registration with one or the other set of casing-openings, a lever through which the cylinder is rotated, a second lever acting upon the latch, and engaging the other lever to move it, means for oscillating the second lever, means for supplying fastenings through the upper set of casing-openings, and movable transferring means receiving fastenings through the lower set of casing-openings.

16. Fastening-loading mechanism comprising a casing having sets of upper and lower openings, a cylinder rotatable within the casing and provided with pockets which may register with either set of openings, a shaft connected to the cylinder and provided with two depressions, a latch which by engagement with the depressions may temporarily retain the cylinder with its pockets in registration with one or the other set of casing-openings, a pinion fixed to the shaft, a lever having spaced contact-surfaces and a segment meshing with the pinion, a second lever having a cam acting upon the latch and a portion movable in engagement with the contact-surfaces of the other lever, means for oscillating the second lever to control the latch and rotate the cylinder, tubes for supplying fastenings through the upper set of casing-openings, and a movable loader-block receiving fastenings through the lower set of casing-openings.

17. Fastening-loading mechanism comprising a casing having sets of upper and lower openings, a cylinder rotatable within the casing and provided with pockets which may register with either

set of openings, a latch for temporarily retaining the cylinder with its pockets in registration with one or the other set of casing-openings, a lever through which the cylinder is rotated, a second lever acting upon the latch and engaging the other lever to move it, means actuated by the operator to move the second lever in one direction, means for supplying fastenings through the upper set of casing-openings, and movable transferring means receiving fastenings through the lower set of casing-openings, said fastening-transferring means acting upon the second lever to move it oppositely to the operator-actuated means.

18. Fastening-loading mechanism comprising a casing having sets of upper and lower openings, a cylinder rotatable within the casing and provided with pockets which may register with either set of openings, a shaft connected to the cylinder and provided with two depressions, a latch which by engagement with the depressions may temporarily retain the cylinder with its pockets in registration with one or the other set of casing-openings, a pinion fixed to the shaft, a lever having spaced contact-surfaces and a segment meshing with the pinion, a second lever having a cam acting upon the latch and a portion movable in engagement with the contact-surfaces of the other lever, a shaft by which the second lever is fulcrumed, a pinion fast upon the shaft, a rack meshing with said pinion, means for moving the second lever to control the latch and rotate the cylinder, tubes for supplying fastenings through the upper set of casing-openings, a movable loader-block receiving fastenings through the lower set of casing-openings, and a slide by which the loader-block is carried and being provided with a depression to receive a portion of the rack.

19. Fastening-loading mechanism comprising a casing having sets of upper and lower openings, a cylinder rotatable within the casing and provided with pockets which may register with either set of openings, a shaft connected to the cylinder and provided with two depressions, a latch which by engagement with the depressions may temporarily retain the cylinder with its pockets in registration with one or the other set of casing-openings, a pinion fixed to the shaft, a lever having spaced contact-surfaces and a segment meshing with the pinion, a second lever having a cam acting upon the latch and a portion movable in engagement with the contact-surfaces of the other lever, a shaft by which the second lever is fulcrumed, a pinion fast upon the shaft, a rack meshing with said pinion, means for moving the second lever to control the latch and rotate the cylinder, tubes for supplying fastenings through the upper set of casing-openings, a movable loader-block receiving fastenings through the lower set of casing-openings, and a slide by which the loader-block is carried and being provided with a cam-surface for actuating the rack.

20. The combination with a frame, of a loader-block movable thereon, fastening-supplying tubes, a foot-plate having a casing in which the tubes terminate and a cylinder rotatable in the casing to receive fastenings from the tubes and deliver them to the loader-block, and a shaft through which the cylinder is rotated, the frame and casing and the cylinder and shaft having, respectively, interengaging portions permitting separation upon movement together in one direction of the casing and cylinder from the frame and shaft.

21. The combination with a frame, of a loader-block movable thereon, fastening-supplying tubes, a foot-plate having a casing in which the tubes terminate and a cylinder rotatable in the casing to receive fastenings from the tubes and deliver them to the loader-block, and a shaft through which the cylinder is rotated, the frame and casing and the cylinder and shaft having, respectively, interengaging portions permitting separation upon movement together in one direction of the casing and cylinder from the frame and shaft, the cylinder and shaft-portions being formed for engagement only when said cylinder is in its fastening-receiving relation.

22. The combination with a frame, of a loader-block movable thereon, fastening-supplying tubes, a foot-plate having a casing in which the tubes terminate and a cylinder rotatable in the casing to receive fastenings from the tubes and deliver them to the loader-block, and a shaft through which the cylinder is rotated, the casing having a projection received in ways upon the frame and the cylinder and shaft being provided with an interengaging transverse rib and slot.

23. The combination with a frame, of a loader-block movable thereon, fastening-supplying tubes, a foot-plate having a casing in which the tubes terminate and a cylinder rotatable in the casing to receive fastenings from the tubes and deliver them to the loader-block, and a shaft through which the cylinder is rotated, the casing having a projection received in ways upon the frame and the cylinder and shaft being provided with an interengaging transverse rib and slot, said rib and slot tapering in the direction of their length.

24. The combination with a frame, of a loader-block movable thereon, fastening-supplying tubes, and a foot-plate having a casing in which the tubes terminate and a cylinder rotatable in the casing to receive fastenings from the tubes and deliver them to the loader-block, the casing and cylinder being of transparent material.

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