

G. M. PETTENGILL.
HEEL NAILING MACHINE.
APPLICATION FILED JAN. 16, 1911.

1,042,374.

Patented Oct. 22, 1912.

3 SHEETS—SHEET 1.

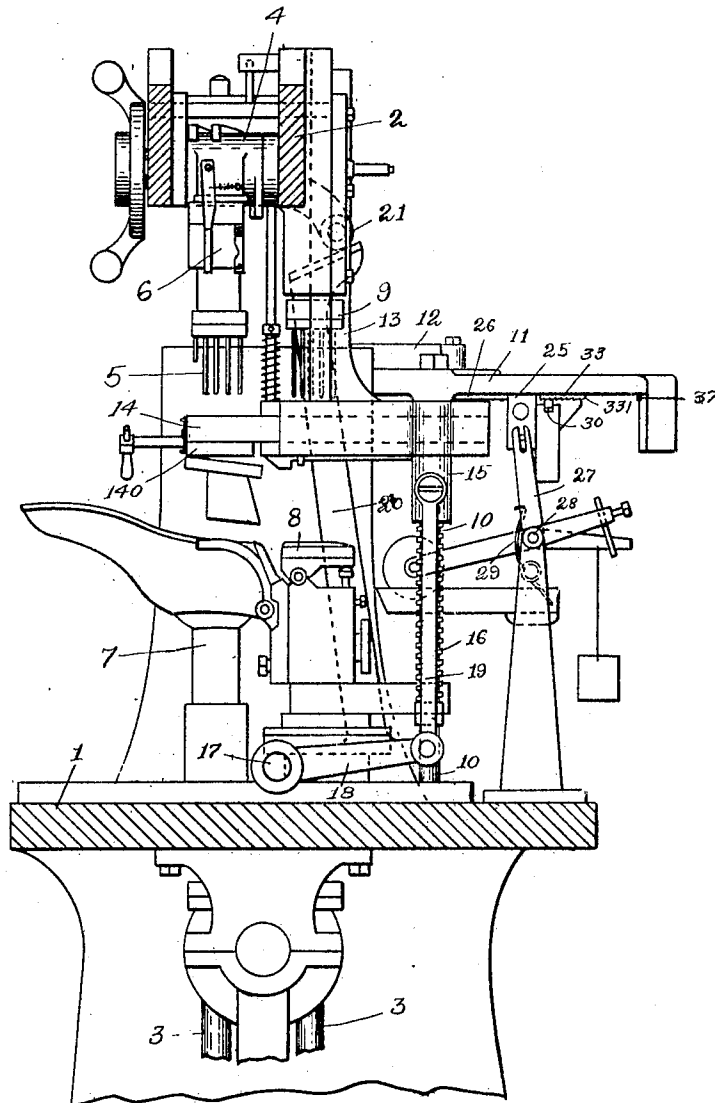


Fig. 1.

Witnesses:
H. B. Davis,
E. H. Cushman

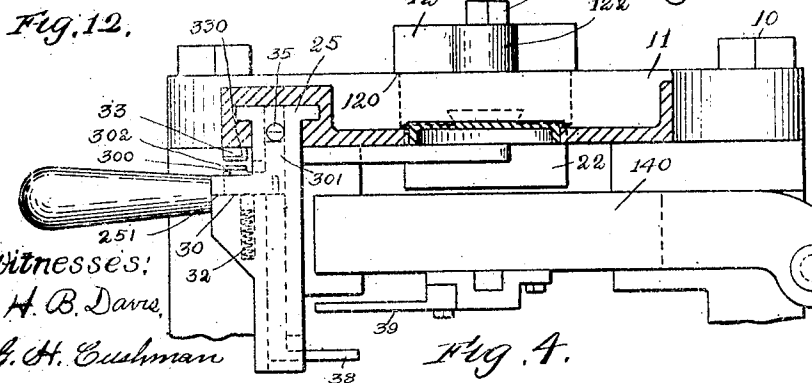
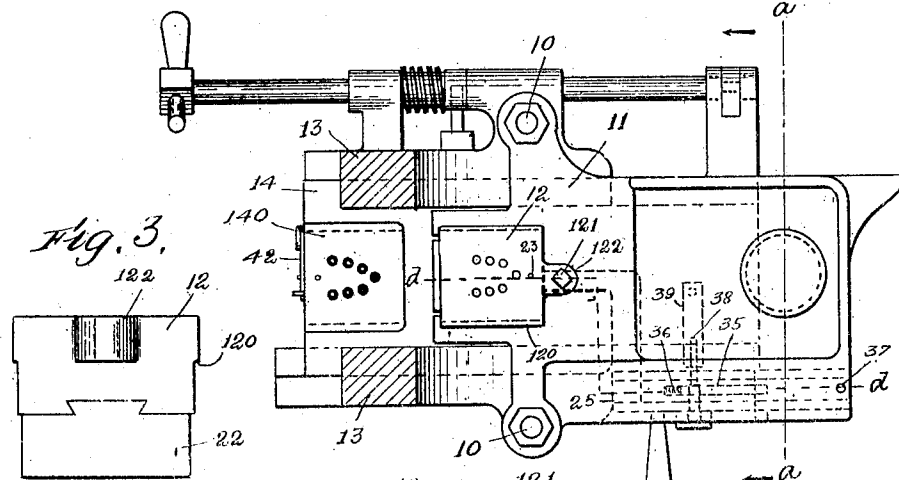
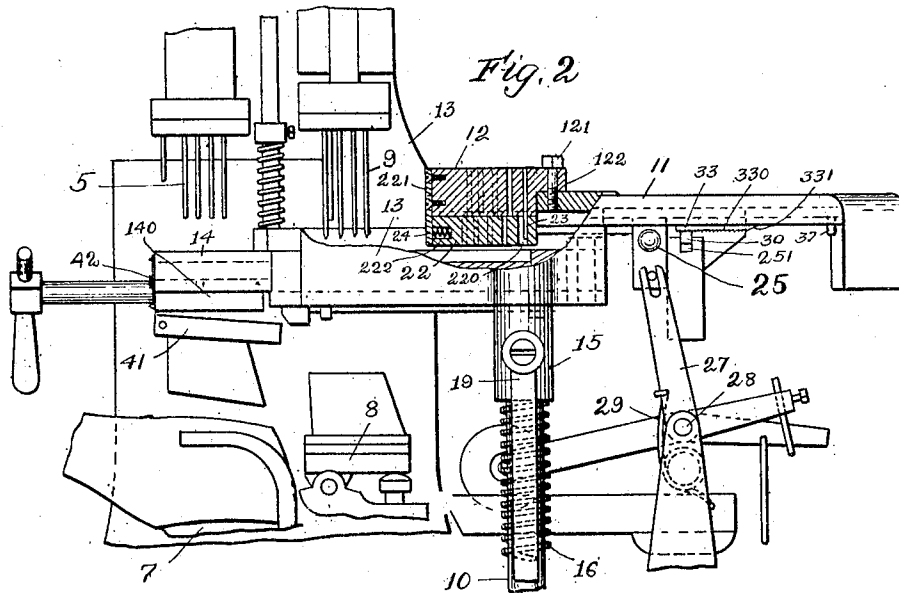
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3 SHEETS-SHEET 2.



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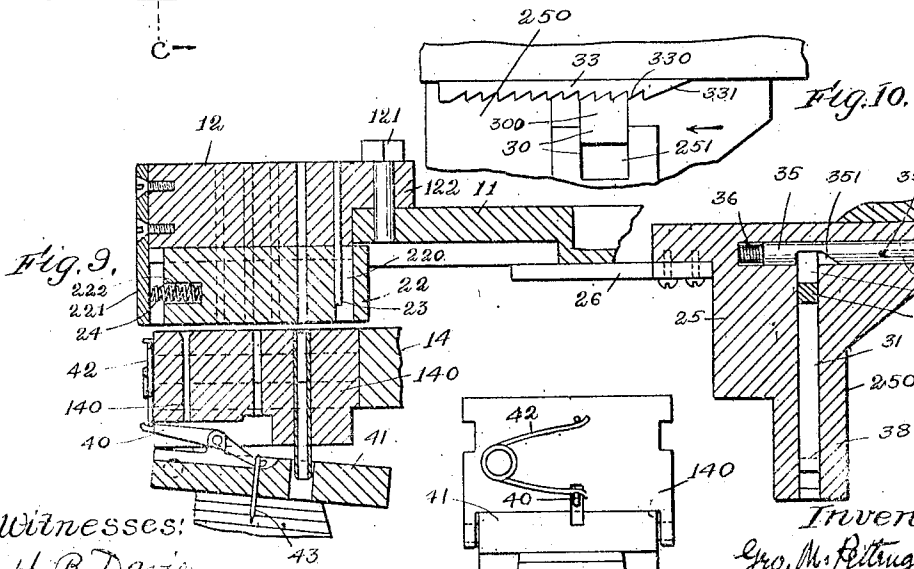
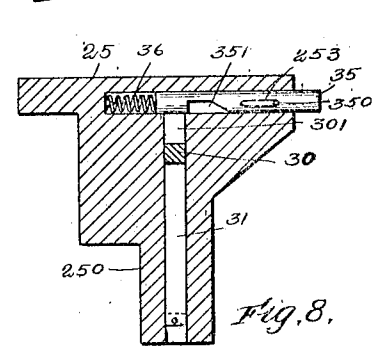
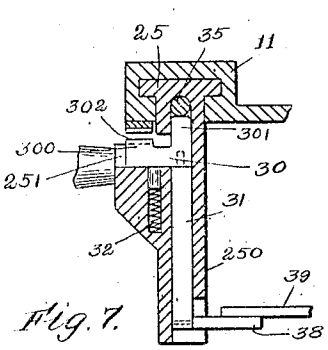
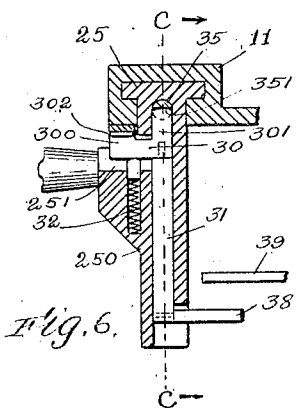
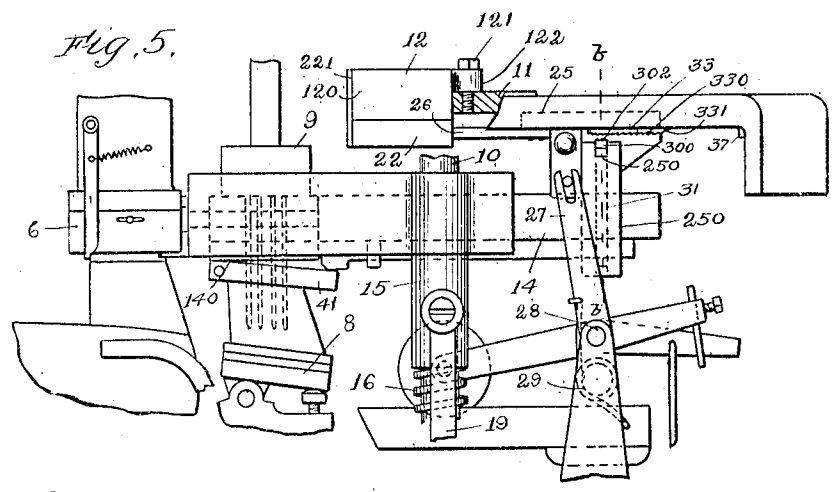
Fig. 4.

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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

GEORGE M. PETTENGILL, OF HAVERHILL, MASSACHUSETTS, ASSIGNOR TO HAVERHILL
SHOE MACHINERY COMPANY, A CORPORATION OF MAINE.

HEEL-NAILING MACHINE.

1,042,374.

Specification of Letters Patent.

Patented Oct. 22, 1912.

Application filed January 16, 1911. Serial No. 602,761.

To all whom it may concern:

Be it known that I, GEORGE M. PETTENGILL, residing at Haverhill, in the county of Essex and State of Massachusetts, have invented an Improvement in Heel-Nailing Machines, of which the following is a specification.

This invention relates to certain improvements in heel-nailing machines, and particularly heel-nailing machines of the type shown in my prior Patent #861,051, dated July 23, 1907, in which a heel is pricked for the next shoe to be nailed while the top lift is being spanked onto a heel which has just been nailed. In machines of this character difficulty has been occasioned and damage sometimes done by reason of the fact that the operator's assistant who sticks the nails in the nail-receiver has caused a second lot of nails to be discharged into the nail-plate before the first lot has been driven out. This has occurred in the following way. In the ordinary operation of the machine, when the cross-head descends to spank a top lift onto one heel and prick another heel held on a holder in the rear thereof, the heel which is pricked is attached to the nail-plate, and as the cross-head is lifted the operator pushes back the nail-plate to the nail-receiving position and the assistant moves the nail-support of the nail-receiver, so that the nails which he has previously placed in the receiver are allowed to fall into the nail-plate and into the prick-holes of the heel temporarily attached to the under side thereof. The nail-plate is then moved forward to nailing position, but the operator then sometimes discovers that either the top-lift has not been securely attached, or has not been attached at all in the previous spanking operation, so that it is necessary to repeat this operation. Before he does this he must push the nail-plate back to nail-receiving position, this being necessary, for, if the nail-plate were held in pricking position, the awls would be forced down onto the nails which had previously been dumped into the nail-plate. If the operator's assistant, under these conditions, has failed to notice that the operator is merely repeating a spanking operation, he is likely, having in the meantime filled the nail-receiver, to operate the nail-loading means again, before the plate is moved forward for the next nailing operation, so that a second lot of nails will be discharged into the nail-plate, with the re-

sult that, when the nail-plate is moved forward to nailing position, and the nailing operation is performed, the drivers will be jammed or broken and much difficulty and damage will be caused, or is likely to be caused, by reason of the fact that two nails have been placed in each nail hole.

The object of the present invention is to provide means whereby, when one lot of nails has been discharged into the nail-plate it will be impossible for a second lot of nails to be delivered thereto, until the nailing-operation has been performed and the first lot of nails driven into the heel.

In this connection a further object of my invention is to provide an improved form of nail-loader and simplify the apparatus which controls the same.

For an understanding of my invention reference is made to the accompanying drawing, in which,

Figure 1 is a side elevation, partly in section, of the portion of a heel-nailing machine which directly cooperates with the improvements forming the subject-matter of this application. Fig. 2 is a similar view on an enlarged scale, and partly in section. Fig. 3 is a detail plan view of the nail-plate and nail-loading mechanism. Fig. 4 is a section on line *a-a* of Fig. 3. Fig. 5 is a side elevation, similar to Fig. 2, showing the parts in a different position. Figs. 6, 7, 8 and 9 are detail views of the locking mechanism; Figs. 6 and 7 being sectional views on the line *b-b*, of Fig. 5; Fig. 8 a sectional view on the line *c-c*, of Fig. 6; and Fig. 9 a sectional view on the line *d-d*, of Fig. 3. Fig. 10 is an enlarged detail view of a portion of the locking device. Fig. 11 is a front view of the nail-plate and, Fig. 12 is an end view of the nail-receiver.

In the drawing 1 indicates the bed of the machine over which the cross-head 2 is mounted to reciprocate vertically on guide-rods 3, the cross-head carrying the usual turret 4 having a driver-gang 5 and a spanking plate 6 thereon. A jack 7 is mounted on the bed beneath the turret and a heel-holder 8 is also mounted thereon, in the rear thereof, and beneath the awl-carrier 9 mounted to move vertically in the rear of the cross-head. A pair of upright rods 10 are mounted in the bed in the rear of the cross-head and the nail-receiver frame 11 is mounted on the upper ends thereof, said frame having a rectangular shaped nail-receiver 12

removably supported by means of edge flanges 120 in a correspondingly shaped aperture in the frame, said receiver having a bolt 121 passing through a lug 122 at the rear end thereof to clamp it to the frame.

A nail-plate slide holder 13 is mounted in vertical guideways on the rear side of the cross-head, and has a horizontal portion which is slidably mounted on the rods 10, beneath the frame 11, said horizontal portion having horizontal guideways adapted to receive the nail-plate slide 14 bearing the usual nail-plate 140. Sleeves, as 15, are mounted to slide on the rods 10, beneath the holder 13, and springs, as 16, are so arranged on said rods beneath said sleeves that they may press against said sleeves, and normally act to support the holder 12 and press it against the underside of frame 11. A shaft 17 is mounted to oscillate on the table of the machine and horizontally extending arms, as 18, are connected thereto, said arms being connected by links, as 19, to the sleeves 15. Said shaft also has secured thereto an upwardly extending arm 20 having an inclined face at its upper end, arranged to be engaged by a roll 21 on the cross-head, so that when the cross-head descends said sleeves 15 will be drawn downwardly compressing the springs 16 and permitting the holder 13 to move downwardly. The construction thus far described is substantially the same as that already shown and described in my pending application Serial No. 526,561.

A nail-support 22 is slidably mounted in the under side of the receiver 12, by a tongue and groove connection, see Fig. 12, said receiver and support each being provided with nail-holes corresponding to the holes in the nail-plate 140. The extent of reciprocation of the support 22 is sufficient to cause the nail-holes therein to be held in and out of register with the nail-holes of the receiver, this movement being limited in each direction by means of a pin 23 mounted in the receiver 12, and entering a short slot 220 in the support 22. The receiver 12 is provided with an arm 221, which extends vertically in front of the support 22 and a spring 24 is arranged in a chamber 222 in the support 22 between said arm 221 and the bottom of said chamber, so that said spring 24 is adapted, when unopposed, to move the support 22 to its rearmost position, in which the nail-holes in the receiver and the support will be in alinement. The nail-receiver and its nail-support 22 are thus connected so that they may be readily removed and replaced together, by merely removing bolt 121, enabling changes from one form of nailing to another to be conveniently made.

The operating means for the nail-loading devices comprise a carrier 25 which is slidably mounted in guideways in the frame 11

at one side of the nail-plate, said carrier having a finger 26 which is adapted to engage the support 22 to push the same forward to its nail-supporting position. An arm 27, for operating the heel-gluing mechanism, is mounted on shaft 28 beneath the slide, said arm having a spring 29 connected thereto which is of sufficient strength to swing the same forwardly and to hold the carrier 25 in the forward position and the support 22 in nail-supporting position, as shown in Fig. 2, thus overbalancing the spring 24. When the carrier 25 is drawn back to its rearmost position, the spring 24 is then permitted to move back the support 22 to the position of Fig. 9, so that the nail-holes will be held in alinement with the holes in the receiver 12, and the nails therein will be discharged into the nail-plate. The length of this motion is much greater than would otherwise be necessary, on account of the motion required to perform the gluing operation on the heel, as described in said prior application. That is, if it were not desired to operate the heel-gluing apparatus by the carrier 25, any suitable actuating means for holding the carrier in the forward position, which was of sufficient strength to overbalance the spring 24, and move the support 22 into nail-supporting position, might be employed.

To prevent the discharge of a load of nails from the receiver 12 into the nail-plate 140 while another load of nails are still in the nail-plate, I provide suitable means for locking the operating means for the nail dumping mechanism, i. e., the carrier 25, which may be described as follows:—As best shown in Figs. 6 to 10, the carrier 25 is provided with a depending portion 250, in the upper portion of which a dog 30 is mounted to move vertically in a slot 251 formed in said carrier. A vertically disposed guide rod 31 is arranged to reciprocate vertically in the depending portion 250 of the carrier, and is connected at its upper end to said dog 30.

A spring 32 is arranged in a pocket formed in the depending portion of the carrier, directly beneath the dog 30, so that said spring may act to lift the dog in its guideways. The dog 30 is provided with two upwardly projecting lugs 300 and 301, on its upper side, the lug 300 having a series of rearwardly inclined teeth 302 on its upper end, see Fig. 10, to form a pawl. A plate 33 is mounted on the under side of the frame 11, adjacent the guideway for the carrier 25, and directly above the position in which the lug or pawl 300 is held when the carrier is in its forward position. Said plate 33 is provided with rearwardly inclined teeth 330 corresponding to the teeth 302, so that, when the pawl 300 is held in

engagement with the teeth 330 by means of the spring 32, the carrier 25 may be moved forwardly but will be prevented from being moved rearwardly. The rear end of the plate 33 is also provided with an inclined face 331 as shown.

A locking pin 35 is reciprocally mounted in the carrier 25 directly above the lug 301, on the dog 30 and at right angles to the guide rod 31, the reciprocating movement of the pin 35 being limited by means of a pin 350 which is mounted therein and engages a short slot 253, indicated in dotted lines in Figs. 8 and 9, in the carrier. A notch 351 is formed in the under side of pin 35 adjacent its inner end and a spring 36 is interposed between the inner end of the pin 35 and the bottom of the recess in which the pin is located, and acts normally to hold the pin 35 in its outer position, as shown in Fig. 8.

A stop-lug 37 is mounted on the frame 11 at the rear end of the guideway for the carrier 25 and in line with the pin 35, so that when the carrier is moved to its rear-most position the pin will engage said stop-lug and will be pushed back. A horizontally projecting arm or lug 38 is provided on the lower end of the guide pin 31 and a spring-finger 39 is mounted on the nail-plate 14 in position to engage said lug 38 when the nail plate is depressed, while in pricking position, but to be moved out of engaging position when the plate is moved either to nailing or nail-receiving position.

As shown in Figs. 9 and 11 the staple-lifting lever 40, which is mounted on the hingedawl stripper 41, is extended beyond the front of the nail-plate, and a spring 42 is interposed between the end of said lever and the nail-plate, so that said spring acts to draw upwardly the staple 43, which is driven into the heel on the pricking operation. The tension of spring 42 is not sufficient to withdraw the staple from the heel and is only sufficient to hold the tread face of the heel against the face of the stripper, while the nail-plate slide is being drawn back to receive the nails and is advanced to nailing position, preventing the back of the heel, in some instances, from striking the heel holder and gluing roll.

The operation is as follows:—During the operation of spanking on the top-lift, the heel is pricked and, at the end of this operation, the locking pin 35 will be in its outermost position in the carrier, as shown in Fig. 8, while the lug 301 will be held by the spring 32 against the side of the pin 35 in front of and closely adjacent the notch 351 therein, as also shown in Fig. 8, in which position the lug 300 will be held out of engagement with the toothed plate 33, as shown in Fig. 7. After the pricking

operation is finished, the nail-plate is pushed back to nail-receiving position, as shown in Fig. 9, and the operator's assistant pulls back the carrier 25 to its fullest extent, permitting the spring 24 to move the support 22 to its nail-discharging position, so that the nails are discharged into the nail-plate 140 and the heel-gluing operation is performed. Just before the carrier 25 reaches the end of its rearward movement, the end of the pin 35 is carried into engagement with the stop pin 37 causing the pin 35, as the carrier finished its rearward movement, to be moved forward until its notch 351 is opposite the lug 301, permitting the spring 32 to lift the dog 30, so that said lug passes into said notch, as shown in Fig. 9. The carrier is then moved forward to its normal position, causing the inclined teeth of the lug 300 to ride over the teeth of plate 33, until the carrier reaches its forward position, in which position it is locked against rearward movement by said engaging teeth, as shown in Figs. 10 and 6. As the support 22 is again moved to nail-supporting position by a forward movement of the carrier 25, it will not be possible to discharge nails into the nail-plate until the carrier is unlocked.

In the further operation of the machine, the nail-plate is pushed forward to the heeling position after the nails have been discharged therefrom and then the heel is nailed. Then the slide is pushed back to pricking position and the next heel is pricked and the top lift is simultaneously spanked on the heel which has just been nailed. As the nail-plate is moved downwardly on the downward motion of the cross-head to perform the pricking operation, the finger 39 on the slide 14 engages the finger 38 on pin 31 and draws downward the pin 31 and dog 30, moving lug 300 out of engagement with teeth 330 on plate 33, withdrawing the lug 301 from notch 351, and releasing the pin 35, so that its spring 36 may move it to the position of Fig. 8. The carrier 25 is thus unlocked, so that when the slide 14 is pushed back to nail-receiving position and the operation of dumping the nails is to be repeated, which operation immediately follows the pricking operation, the carrier 25 may be moved to perform this operation.

If, however, the nail-plate slide should be moved back to the nail-receiving position a second time before the heeling operation has been performed and the next heel has been pricked, and the operator's assistant attempts to move back the carrier, he will find that it is locked, so that he will be prevented from discharging a second load of nails into the nail-plate before the first load has been discharged therefrom. For example, if the operator, after having per-

formed a pricking and spanking operation and having pushed the nail-plate back to nail-receiving position, so that the assistant discharges a load of nails in the nail-plate and then pushes the plate forward, should discover that the spanking operation must be repeated, he must then push the plate back again to nail-receiving position before he can repeat this operation. If the assistant, however, thinking that the heeling operation has been performed, attempted to discharge a load of nails into the nail-plate, he would find that the operating means for doing this, the carrier 25, was locked. It will be observed that downward movement of the cross-head and consequent downward movement of the nail-plate in any position but the pricking position will not unlock the carrier 25.

20 I claim:—

1. In combination with a heel-nailing machine having operating mechanism, movable to perform the heeling operation, and including a nail-plate and a loading-device movable to deliver a load of nails to said plate, means for automatically locking said loading-device against operative movement when it has been moved to perform its nail-delivering operation, and means, actuated on operative movement of said operating mechanism, for automatically unlocking said loading-device.

2. In a heel-nailing machine having operating mechanism, normally movable to perform the heeling-operation in a predetermined cycle and including a nail-plate and a loading-device movable to deliver a load of nails to said plate, means for automatically locking said loading-device against operative movement when it has been moved to perform its nail-delivering operation, and means for automatically unlocking said loading-device actuated by said operating mechanism at a predetermined point in the cycle of its operations.

3. In a heel-nailing machine having operating mechanism, movable to perform the heeling operation, and including a movable nail-plate and a loading-device movable to deliver a load of nails to said plate, means for automatically locking said loading-device against operative movement when it has been moved to perform its nail-delivering operation, and means, actuated by said operating mechanism in a predetermined position of the nail-plate, for automatically unlocking said loading-device.

4. In a heel-nailing machine having operating mechanism, movable successively to perform the heel-pricking and nailing operations, a nail-plate movable to corresponding positions during said operations, a loading-device movable to deliver a load of nails to said plate after each pricking operation, means for automatically locking said load-

ing-device when it has been moved to perform its nail-delivering operation, and means, actuated by said operating mechanism on each pricking operation, for automatically unlocking said loading-device.

5. In a heel-nailing machine having operating mechanism, movable successively to perform the heel-pricking and nailing operations, a nail-plate movable between nail-receiving, heel-pricking and heel-nailing positions, a loading-device for delivering a load of nails to said plate when in nail-receiving position, means for automatically locking said loading-device at the end of each operative movement thereof, and means for automatically unlocking said loading-device disposed to be actuated by said operating mechanism only when the nail-plate is in pricking position.

6. In a heel-nailing machine a vertically movable nail-plate, horizontally movable between nail-receiving and heeling positions, a loading-device movable to deliver a load of nails to said plate when in nail-receiving position, a locking-device automatically movable to lock said loading-device at the end of each delivering operation, and means, disposed to be automatically actuated on vertical movement of the nail-plate, when in a predetermined position other than the nail-receiving position, for moving said locking-device to unlocked position.

7. In a heel-nailing machine a vertically movable nail-plate, horizontally movable between nail-receiving and heeling positions, a loading-device movable to deliver a load of nails to said plate when in nail-receiving position, an operating-device for said loading-device, a locking-device automatically movable to lock said operating-device at the end of each operative movement thereof, and means disposed to be actuated by the nail-plate, on vertical movement thereof when in a predetermined position other than the nail-receiving position, to move said locking-device to unlocked position.

8. In a heel-nailing machine a vertically movable nail-plate, horizontally movable between nail-receiving and heeling positions, a loading-device, movable to deliver a load of nails to said plate when in nail-receiving position, a locking-device for said loading-device automatically movable to locking position at the end of each operative movement of said loading-device, and engaging means carried by said nail-plate arranged to engage said locking-device, to move the same to unlocked position, on vertical movement of the plate when in a predetermined position other than the nail-receiving position, and to be carried out of engaging position on movement of the plate to nail-receiving position.

9. In a heel-nailing machine having operating mechanism, normally movable to

perform the heeling-operations in a predetermined cycle, and including a nail-plate, a loading-device movable to deliver a load of nails to said plate, an operating-device reciprocally movable to control said loading-device, a locking-device carried by said operating-device, means for moving said locking-device to operative position at the end of each reciprocation thereof, and means for automatically moving said locking-device to an inoperative position actuated by said operating-mechanism at a predetermined point in the cycle of its operations.

10. In a heel-nailing machine having operating mechanism, normally movable in a predetermined cycle to perform the heeling-operation, and including a nail-plate, a nail-receiver adapted to discharge nails into said plate, a nail-support beneath said receiver, means for reciprocating said support to discharge the nails from said receiver, means for automatically locking said support at the end of each complete reciprocation thereof, and means for automatically unlocking said support actuated by said operating mechanism at a predetermined point in the cycle of its operations.

11. In a heel-nailing machine having operating mechanism, normally movable in a predetermined cycle to perform the heeling-operation and including a nail-plate, a nail-loading device for said plate, a controlling-device for said loading-device, a locking-device for said controlling-device normally actuated to move to locking position, means for holding said locking-device in an inoperative position, means for automatically releasing said locking-device from said holding means on operative movement of said controlling-device, and means for moving said locking-device to an inoperative position actuated by said operating mechanism at a predetermined point in the cycle of its operations.

12. In a heel-nailing machine having operating mechanism, normally movable in a predetermined cycle to perform the heeling-operation and including a nail-plate, a nail-loading device for said plate, a controlling-device for said loading-device, a locking-device for said controlling-device normally actuated to move to locking position, a holding-device normally actuated to lock said locking-device in an inoperative position against the actuation thereof, means for moving said holding-device to release said locking-device on operative movement of said controlling-device, and means for moving said locking-device to its inoperative position actuated by said operating mechanism at a predetermined point in the cycle of its operations.

13. In a heel-nailing machine having op-

erating mechanism, normally movable in a predetermined cycle to perform the heeling-operation and including a nail-plate, a nail-loading device for said plate, a controlling-device for said loading-device, movable to permit the operation of the same, a locking-device carried by said controlling-device and normally actuated to lock the same against operative movement, a holding-device also carried by said controlling-device and normally actuated to lock said locking-device in an inoperative position, means for engaging said holding-device to move the same to an inoperative position on operative movement of said controlling-device, and means for moving said locking-device to inoperative position actuated by said operating mechanism at a predetermined point in the cycle of its operations.

14. In a heel-nailing machine, a vertically movable nail-plate horizontally movable into and out of nail-receiving position, a stationary nail-receiver for delivering nails to said nail-plate, a nail-support for controlling the delivery of nails from said receiver, a controlling-device movable to permit the operation of said support, a locking-device carried by said controlling-device and normally actuated to lock the same from operative movement, a holding-device, normally actuated to hold said locking-device in inoperative position, means for moving said holding-device to inoperative position on operative movement of said controlling-device, and an abutment carried by said nail-plate disposed to be held in position to engage said locking-device and move the same to inoperative position on vertical movement of the nail-plate when out of nail-receiving position and to be carried out of engaging position on movement of said plate to nail-receiving position.

15. In a heel-nailing machine, a frame, a nail-receiver removably mounted in said frame and having a series of nail-holes, a nail-support having a corresponding series of nail-holes and mounted on the under side of said receiver to move between nail-supporting and discharging positions, a spring actuated to move said support into discharging position, and a controlling-device movably mounted on said frame and spring actuated to engage said support to move the same, against the action of the spring thereof, from discharging to supporting position.

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

GEORGE M. PETTENGILL

Witnesses:

L. H. HARRIMAN,
H. B. DAVIS.