F. H. WARREN.

MACHINE FOR INSERTING FASTENINGS.

APPLICATION FILED AUG. 15, 1916.

1,312,598. Patented Aug. 12, 1919.

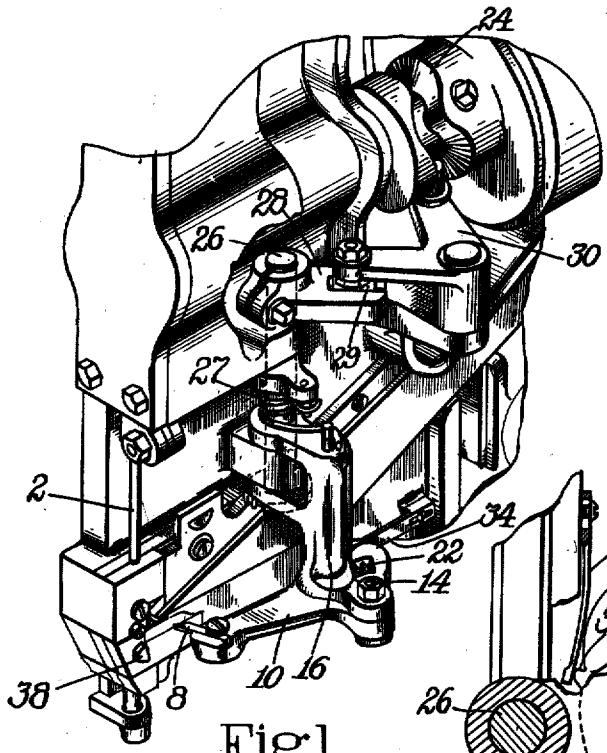


Fig. 1.

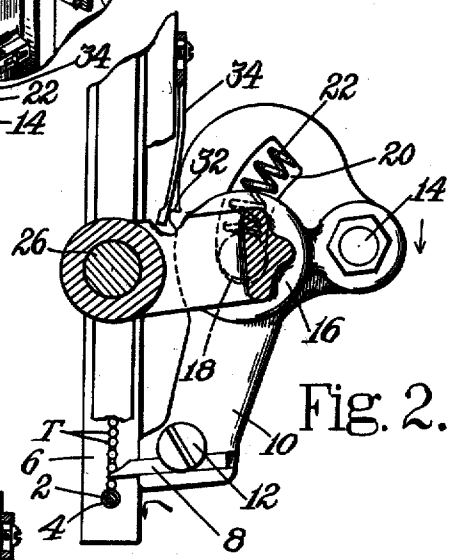


Fig. 2.

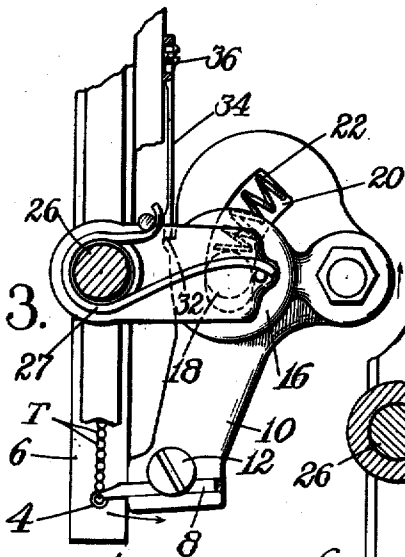


Fig. 3.

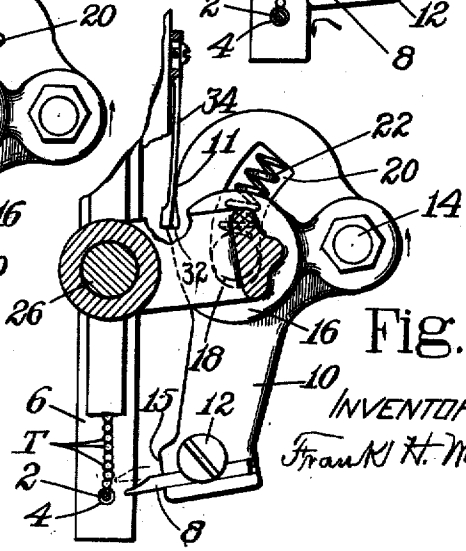


Fig. 4.

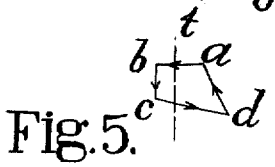


Fig. 5.

INVENTOR.

Frank H. Warren

THE COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

FRANK H. WARREN, OF SWAMPSCOTT, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

MACHINE FOR INSERTING FASTENINGS.

1,312,598. Specification of Letters Patent. Patented Aug. 12, 1919.

Application filed August 15, 1916. Serial No. 115,019.

To all whom it may concern:

Be it known that I, FRANK H. WARREN, a citizen of the United States, residing at Swampscott, in the county of Essex and State of Massachusetts, have invented certain Improvements in Machines for Inserting Fastenings, 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 machines for inserting previously formed fastenings. The invention is herein illustrated as embodied in a machine designed especially to insert headed tacks of the kind used in the manufacture of boots and shoes. For convenience the fastenings will hereinafter be referred to as tacks, although the invention is also applicable to machines designed to handle other fastenings. Machines of this type usually comprise a mechanism for driving the tacks, a container or pot into which the fastenings are thrown in bulk, a raceway which conducts the tacks from the pot to a point adjacent to the tack driving mechanism, and a separator operating intermittently to separate the endmost tack from the line of tacks in the raceway and to deliver the tack so separated to the driving mechanism.

A type of separator mechanism that has been much used in machines of this character includes a tack pick or separator which is mounted to move inwardly at nearly right angles to the line of tacks in the raceway to a point behind the endmost tack in the line, then along the raceway to deliver this tack to the throat or driver passage to which the raceway leads, and finally returns to its original position along the same path. The driver, of course, descends through the driver passage at the proper point in the cycle of operations of the machine to insert the tack so delivered into the work. The tacks are supported in the raceway by their heads, their shanks or points hanging downwardly, and the tack pick or separator engages each tack at a point below its head. Consequently when the separator makes its return movement, after completing its tack separating operation, it strikes one or more of the endmost tacks in the line and swings the points of these tacks backwardly past one or more of the tacks behind them. This action frequently results in overlapping or jamming together in the raceway the two or three endmost tacks in the line and thus clogs the raceway so that in the next cycle of operations of the machine the separator fails to deliver a tack or else delivers two tacks to the driver passage thus choking this passage. In either event the normal operation of the machine is interrupted.

The present invention aims to improve the tack separating mechanisms of machines of this type especially with a view to overcoming the difficulty just described and rendering such machines more positive and reliable in operation without sacrificing any of the well known advantages characteristic of mechanisms of this type as heretofore constructed. The invention also aims to devise a tack separating mechanism of the type above described which can be operated at higher speeds than those now in use.

With these and other objects in view the invention provides an operating mechanism for a tack pick or separator that moves the separator in such a path that not only is the difficulty above described entirely obviated, but a longer period is afforded in each cycle for the line of tacks to advance in readiness for the next tack separating operation.

Referring now to the accompanying drawings,—

Figure 1 is a perspective view of a tack inserting machine of a common commercial construction but provided with a tack separating mechanism embodying this invention;

Figs. 2, 3 and 4 are plan views (Figs. 2 and 4 being partly in section) showing, in different positions, the parts of the tack separating mechanism with which the present invention is particularly concerned; and

Fig. 5 is a diagrammatic view showing the path of movement of the end of the tack pick or separator.

The machine partially shown in the accompanying drawings is disclosed more completely in Patent No. 1,106,393 granted August 11, 1914. For a description of the general organization of the machine reference should be made to this patent. For the purposes of the present application it is sufficient to state that the machine includes a

driver 2, which reciprocates through a vertical driver passage or throat 4 to which the tacks are delivered one at a time by the separator, each tack, of course, being driven into the work by the driver 2 immediately after it has been delivered to the driver passage. A raceway 6 guides a line of tacks T from the tack pot (not shown) to the driver passage 4. The movement of this line of tacks down the raceway is prevented during a large part of each cycle of operations of the machine by the presence of either the driver 2 or the separator 8 in the path of movement of the tacks.

The tack pick or separator 8 is mounted in a slot formed in the forward end of a separator holder 10 and is secured in any desired position of adjustment by a clamping screw 12. This holder is pivoted by means of a bolt 14 to one end of a lever arm 16 of peculiar shape, as clearly shown in Fig. 1, this lever serving both to support and move the holder. A stud 18 projecting from the lower end of the lever arm 16 enters a short slot 20, curved about the axis of the pivot 14, and a spring 22 interposed between this stud and the rear end of the slot 20 tends to swing the holder 10 about the pivot 14 in a clockwise direction and thus to maintain the stud 18 at the forward extremity of the slot. The arm 16 is operated, as described more completely in the patent above designated, by connections with a cam 24 fast on the main shaft of the machine. Briefly stated, these connections consist of a vertical rock shaft 26 on which the lever 16 is mounted and with which normally it rocks, a spring connection 27, however, being provided, as fully explained in said patent, to transmit the forward throw of the rock shaft yieldingly to the arm 16; and another lever arm 28 secured to the upper end of the rock shaft 26 and slotted to receive a block 29 which is pivotedly supported on one arm of a bell crank lever 30, the other arm of which carries a roll running in the path of the cam 24.

The mechanism so far described is substantially that which has been used on this and similar machines for many years. It will be evident from an inspection of Figs. 2, 3 and 4 that when the lever arm 16 is swung forward in the direction indicated by the upper arrow in Fig. 2, the separator 8 will be swung toward the raceway about the axis of the shaft 26 and the pointed end of the separator will enter the line of tacks just behind the foremost tack. This swinging movement will continue until the flat face 15 (see Fig. 4) of the separator holder strikes the side of the raceway. As the lever 16 continues to swing forward it will produce a relative angular movement between itself and the separator holder 10; that is, the holder will turn in a counter clockwise direction about its pivot 14, thus compressing the spring 22 in the arc shaped slot 20, and causing the separator 8 to slide along the raceway from the position in which it appears in Fig. 2 to that in which it is shown in Fig. 3. This movement causes the separator to deliver the tack which it has separated from the other tacks in the line to the driver passage 4.

If no other mechanism than that just described were employed to control the movement of the separator, this member in making its return movement would merely retrace the path just described. During the first part of this return movement it would move backwardly along the raceway from the position shown in Fig. 3 to that in which it appears in Fig. 2, and it thus would push backwardly the foremost tack in the line and be very likely to cause exactly the trouble above described.

The present invention provides mechanism that causes the separator to move directly away from the raceway after it has completed its tack separating operation along a path that crosses the path of movement of the tacks at substantially the farthest point down the raceway that the separator reaches in making its entire movement. Consequently, all possibility of disturbing the tacks in the raceway is avoided. For this purpose a seat or shoulder 32 is formed on the holder 10 and a spring stop 34 is mounted on a stationary part of the machine so that it moves into engagement with this seat automatically when the separator holder arrives in the position in which it is shown in Fig. 3. At this time the separator has completed its forward or tack separating movement and is just about to begin its return stroke. When the lever 16 starts to swing backwardly the stop 34 prevents the separator 8 from sliding back along the raceway away from the driver passage, as it otherwise would do, and compels the separator to swing in a counter clockwise direction about the seat 32 as an axis. The separator thus moves away from the raceway along a path that is nearly perpendicular to the raceway but makes a slightly obtuse angle with the line of tacks in the raceway. It will be noted that when the separator is being moved toward the line of tacks the holder 10 and the lever 16 swing together about the axis of the shaft 26 until the face 15 of the holder strikes the raceway, but when the separator is moved away from the raceway the lever swings about the axis of the shaft 26 while the holder swings about the seat 32 as an axis, the angular relationship between these two parts constantly changing during this part of the separator movement. It will thus be evident that the separator has no component of movement toward the line of tacks in the raceway until

after it has cleared the raceway. Consequently there is no possibility of the separator acting on the tacks behind it in any way that will crowd them together and produce the objectionable result hereinbefore described. A further advantage of this construction is the fact that since the separator moves out of the path of the line of tacks immediately after delivering a tack to the driver passage, instead of moving back up the raceway and then swinging away from the line of tacks as in prior constructions, it gives the line of tacks a greater part of each cycle in which to slide down the raceway into position for the next tack separating operation to be effected.

As the lever 16 nears the end of its backward stroke and the parts arrive in substantially the positions in which they are shown in Fig. 4, a part 11 of the holder 10 just back of the seat 32 engages the stop 34 and shortly thereafter swings it out of engagement with said seat due to the movement of the part 11 about the shaft 26. The spring 22, which has been under compression during this time, immediately swings the holder 10 about the pivot 14 in a clockwise direction and restores the original angular relationship between the lever 16 and the holder 10. The separator is now positioned to repeat its cycle of operations.

The diagram in Fig. 5 shows clearly the path that the point of the separator 8 takes in making its cycle of movements. Starting from the point *a* it first swings about the axis of the shaft 26 across the line of tacks, indicated by the line *t*, to the point *b*, at which time its further movement in this direction is stopped by the engagement of the face 15 with the raceway 6. The separator now is behind the endmost tack in the raceway, and it next moves to the point *c*, thus delivering the tack so selected to the driver passage 4. The stop 34 now being positioned in the seat 32 compels the separator 8 to swing away from the raceway along the arc *c*—*d*. The stop then is moved out of engagement with the seat 32 and the separator immediately makes the stroke *d*—*a*, thus returning to the starting point.

The stop 34 is secured to the machine frame by a screw 36, which passes through a slot formed in the shank of the stop, and thus permits an adjustment of the stop toward and from the seat 32.

The usual eccentric adjustment is provided between the block 29 and its connection with the bell crank lever 30 so that the limits of the throw of the lever comprising the arms 16 and 28 can be adjusted along the path of movement of the lever, and the point at which the separator 8 enters and leaves the path of movement of tacks in the raceway can thus be varied longitudinally of the raceway. The usual gage block 38 also is provided on the side of the raceway to aid the operative in making this adjustment. When it becomes necessary for any reason to adjust the separator operating mechanism, the block 29 is loosened, the main shaft is turned until the high point of the cam 24 as shown in Fig. 1 is opposite the center of the roller on the arm of the lever 30, and then the end of the separator-holder 10—the end normally adjacent the gage 38—is brought into contact with the gage, the contact that is established being such that the holder may swing away from the raceway as above described without hindrance from the gage. With the parts of the operating mechanism in the positions indicated, the block 29 is securely attached upon the arm of the lever 30, and the mechanism is again ready for operation.

It is obvious that the invention is susceptible of embodiment in many forms differing specifically from that disclosed in this application while still operating in accordance with the principles herein set forth. It will therefore be understood that the invention is not limited to the precise details of construction herein described.

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

1. In a machine for inserting tacks, the combination with a driver passage, a raceway constructed to lead a line of tacks to said passage, and a tack separator for separating individual tacks from said line and advancing each tack so separated toward said driver passage, of operating mechanism for said separator constructed and arranged to swing the separator toward said raceway about one axis and away from said raceway about another axis.

2. In a machine for inserting tacks, the combination with a driver passage, a raceway constructed to lead a line of tacks to said passage, and a tack separator for separating individual tacks from said line and advancing each tack so separated toward said driver passage, of operating mechanism for said separator constructed and arranged to advance said separator to the raceway and to move it away from said raceway along a path that makes an acute angle with the path of said advancing movement.

3. In a machine for inserting tacks, the combination with a driver passage, a raceway constructed to lead a line of tacks to said passage, and a tack separator for separating individual tacks from said line and advancing each tack so separated toward said driver passage, of operating mechanism for said separator constructed and arranged to move the separator away from said raceway after it has delivered a tack

to said passage along a path that makes an obtuse angle with the line of tacks in the raceway.

4. In a machine for inserting tacks, the combination with a driver passage, a raceway constructed to lead a line of tacks to said passage, and a tack separator for separating individual tacks from said line and advancing each tack so separated toward said driver passage, of operating mechanism for said separator including a separator holder and means coöperating with said holder to move the separator toward and from said raceway, said means including a stop coöperating with said holder after the separator has completed its tack separating movement to prevent any movement of the separator along said raceway toward said line of tacks until the separator has moved clear of the path of the tacks in the raceway.

5. In a machine for inserting tacks, the combination with a driver passage, a raceway constructed to lead a line of tacks to said passage, and a tack separator for separating individual tacks from said line and advancing each tack so separated toward said driver passage, of operating mechanism for said separator including a separator holder, a lever connected with said holder, and means coöperating with said lever and holder to move the separator toward and from said raceway, said means being constructed and arranged to change gradually the angular relationship between said lever and holder during the movement of the separator away from the raceway.

6. In a machine for inserting tacks, the combination with a driver passage, a raceway constructed to lead a line of tacks to said passage, and a tack separator for separating individual tacks from said line and advancing each tack so separated toward said driver passage, of operating mechanism for said separator including a separator holder, a lever connected with said holder, and means coöperating with said holder and lever to move the separator toward and from said raceway, said means including a stop constructed and arranged to vary the angular relationship between said holder and said means during the movement of the separator away from said raceway.

7. In a machine for inserting tacks, the combination with a driver passage, a raceway constructed to lead a line of tacks to said passage, and a tack separator for separating individual tacks from said line and advancing each tack so separated toward said driving passage, of operating mechanism for said separator including a separator holder and means coöperating with said holder to move the separator toward and from said raceway, said means including a stop constructed and arranged to cooperate with said holder to cause the separator to move away from the raceway along a path different from that in which it advances to said raceway.

8. In a machine for inserting tacks, the combination with a driver passage, a raceway constructed to lead a line of tacks to said passage, and a tack separator for separating individual tacks from said line and advancing each tack so separated toward said driver passage, of operating mechanism for said separator including a separator holder and means coöperating with said holder to move the separator toward and from said raceway, said means including a stop, a seat in said holder for said stop, said stop being movable into and out of said seat and being operative when in said seat to cause the separator to withdraw from the raceway along a different path from that in which it advanced to the raceway.

9. In a machine for inserting tacks, the combination with a driver passage, a raceway constructed to lead a line of tacks to said passage, and a tack separator for separating individual tacks from said line and advancing each tack so separated toward said driver passage, of operating mechanism for said separator including a separator holder and means coöperating with said holder to move the separator toward and from said raceway, said means including a stop, a seat in said holder for said stop, said stop being movable into and out of said seat and being operative when in said seat to cause the separator to withdraw from the raceway along a different path from that in which it advanced to the raceway, and means for moving said stop out of said seat during the latter part of the movement of said separator away from said raceway.

10. In a machine for inserting tacks, the combination with a driver passage, a raceway constructed to lead a line of tacks to said passage, and a tack separator for separating individual tacks from said line and advancing each tack so separated toward said driver passage, of operating mechanism for said separator including a separator holder and means coöperating with said holder to move the separator toward and from said raceway, said means including a stop and a seat in said holder for said stop, said stop having a part movable into and out of said seat and being operative when in said seat to cause the separator to withdraw from the raceway along a different path from that in which it advanced to the raceway, and said holder having a part shaped and arranged to engage said stop and move it out of said seat while said separator is making its withdrawing movement.

11. In a machine for inserting tacks, the combination with a driver passage, a raceway constructed to lead a line of tacks to said passage, and a tack separator for sep-

arating individual tacks from said line and advancing each tack so separated toward said driver passage, of operating mechanism for said separator constructed and arranged to cause the separator to move directly away from said raceway after it has completed its tack separating operation along a path crossing the path of movement of the tacks at a point farther down the raceway than that at which the path of its advancing movement crosses the raceway, said operating mechanism including a stop operative to prevent the separator from entering the line of tacks on its movement to initial position, both said operating means and the stop being adjustable to permit the accurate determination of the point to which the separated tack is advanced by the separator.

12. In a tack feeding mechanism, a raceway, a tack separator, operating means arranged to oscillate about a vertical axis for moving the separator to cause it to separate a tack from the line of tacks in the raceway and to move the separated tack along the raceway, said means operating thereafter to return the separator to initial position, and means mounted independently of the first-mentioned means for preventing the entrance of the separator into the line of tacks in the raceway during the return of the separator to initial position.

13. In a tack feeding mechanism, a raceway, a member arranged to oscillate about a vertical axis, a tack separator arranged to be moved by said member during its oscillation in one direction to cause it to enter the line of tacks in the raceway to move a tack along the raceway, and a stop for preventing the entrance of the separator into the line of tacks in the raceway during the return of the separator to initial position.

14. In a tack feeding machine, a raceway, a tack separator, means for moving the separator to cause it to separate a tack from the line of tacks in the raceway and to progress the separated tack along the raceway, said means operating thereafter to return the separator to initial position, and a member fixed to the machine frame and arranged to coöperate with the separator-moving-means to cause the withdrawal of the separator from the raceway after the completion of its tack-progressing movement and to prevent the entrance of the separator into the line of tacks in the raceway during the return of the separator to initial position.

15. In a tack feeding mechanism, a raceway, a member arranged to oscillate about a vertical axis, a tack separator arranged to be moved by said member in its oscillation in one direction to cause it to enter the raceway and to move a separated tack along the raceway, and means operative during oscillation of said member in the other direction for locking the separator against movement into the line of tacks in the raceway while the separator is returning to initial position.

16. In a tack feeding mechanism, a raceway, a member arranged to oscillate about a vertical axis, a tack separator, a holder for the separator arranged to be moved by said member in its oscillation in one direction to cause the separator to enter the raceway to move a separated tack along the raceway, and means for locking the holder to prevent it from moving the separator along the raceway in operative relation to the tacks therein during the oscillation of said member in the other direction.

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

FRANK H. WARREN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."