

C. D. FOYE.
 MECHANISM FOR INSERTING FASTENINGS.
 APPLICATION FILED JULY 6, 1908.

1,032,329.

Patented July 9, 1912.

2 SHEETS-SHEET 1.

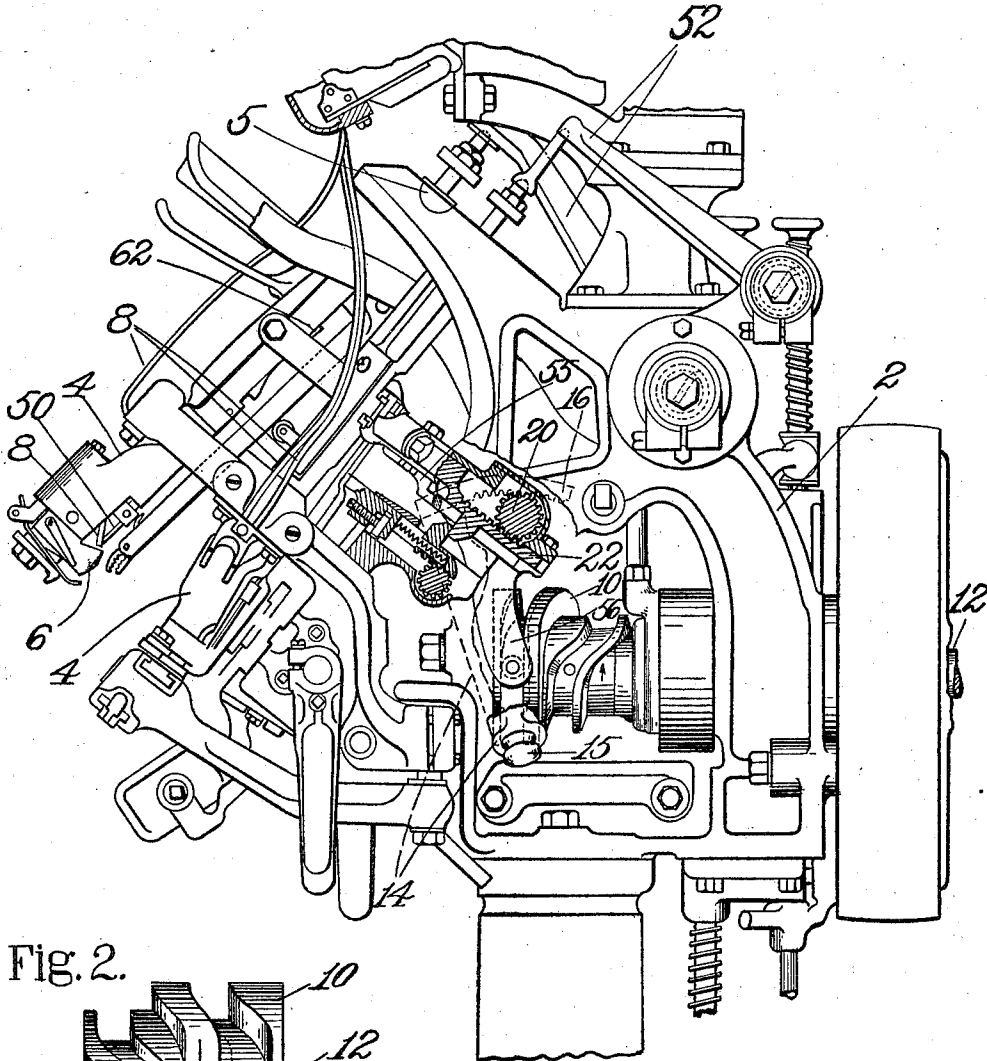


Fig. 2.

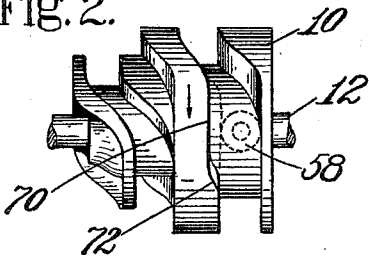


Fig. 1.

WITNESSES.

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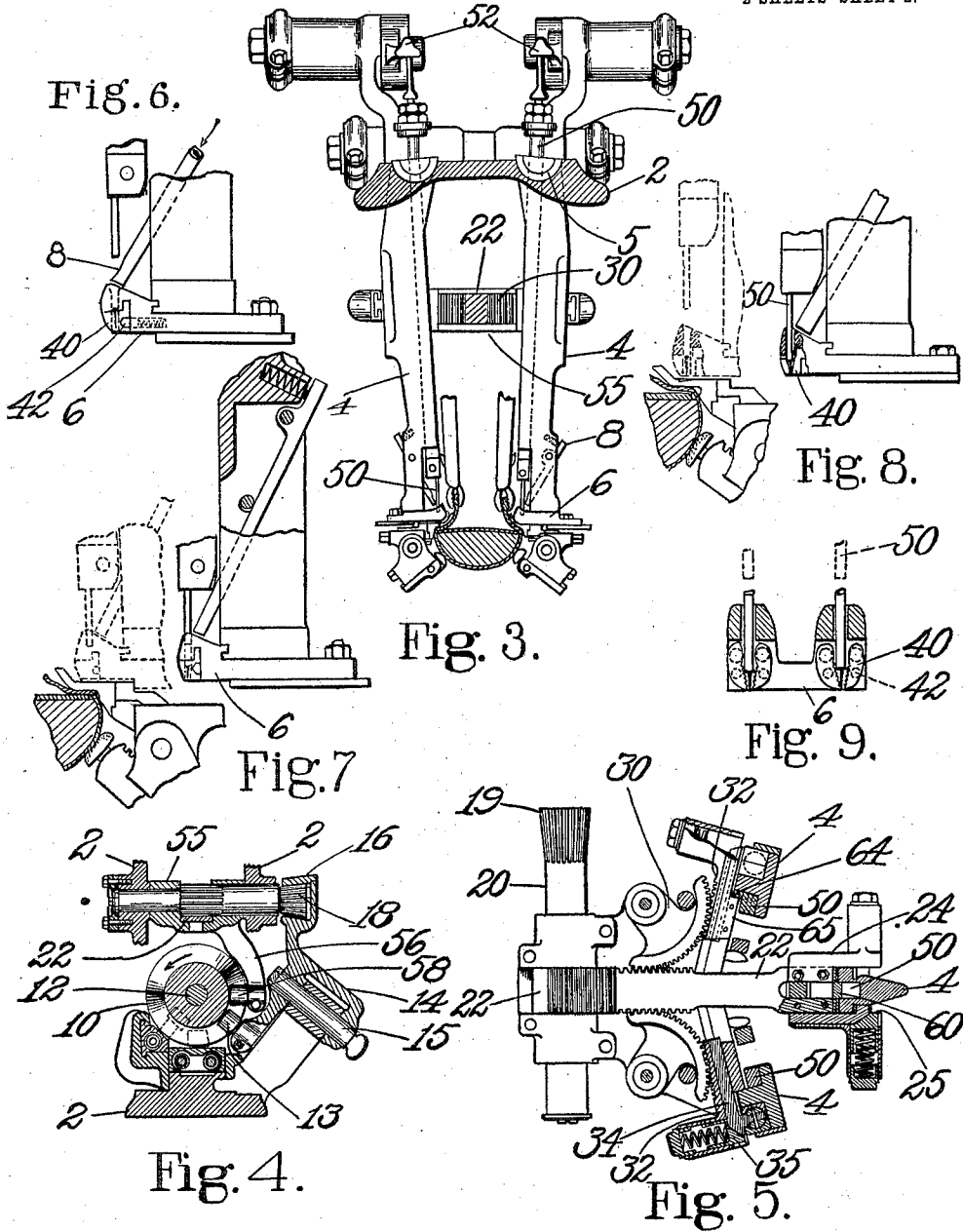
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UNITED STATES PATENT OFFICE.

CYRUS D. FOYE, OF BEVERLY, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

MECHANISM FOR INSERTING FASTENINGS.

1,032,329.

Specification of Letters Patent.

Patented July 9, 1912.

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To all whom it may concern:

Be it known that I, CYRUS D. FOYE, a citizen of the United States, residing at Beverly, in the county of Essex and Commonwealth of Massachusetts, have invented certain Improvements in Mechanisms 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 tacks or nails in which a tack holder is employed which is movable between tack-receiving and tack-driving positions, as is customary, for example, in the tacking mechanism of shoe lasting and pulling-over machines in which the upper is overworked by grippers or the like which give place to a movable tack holder from which the tack is driven to secure the upper.

The invention is shown as embodied in a pulling-over machine of the type shown in United States Letters Patent No. 663,777 in which the several tack holders move inwardly from a tack-receiving position to a position over the last bottom. In modern high speed machines the movements of the tack holder must be effected so rapidly that it frequently happens that the tack is displaced in the holder and does not occupy a suitable position to be driven when the holder arrives at the driving point. In the illustrated machine the tacks are driven in a direction inclined to the vertical and also to the direction of movement of the holder and it is found in practice that the tacks sometimes "jump" up in their holders during the quick inward movement of the holders to their driving position. Sometimes the tacks fall outside the holder so that no tack is inserted and the shoe comes from the machine incompletely fastened. At other times the tack either fails to fall back straight in the holder or has not had time to return to its normal position before the driver descends and it becomes jammed in the holder so that neither it nor the following tack is properly driven and additional delay is caused in clearing the holder. Displacement of the tacks is particularly likely to occur when the machine is caused to make a rotation without any shoe in it as is occasionally necessary in the shoe factory. This idle running of the machine is also

practised for a considerable period in the machine shop for testing the several mechanisms of the machine before the machine is sent out for practical use. It is at these times, when the tack holders swing inwardly through the full stroke provided by their actuating mechanism and come to rest against the machine stop instead of against the shoe, that the jamming of tacks in the holder most often occurs with consequent clogging of the holder and feeder and occasional damage to the holder.

An important object of this invention is to overcome this difficulty and this is accomplished by making provision for retaining the tack in the holder during the movement of the holder from tack-receiving into tack-driving position. This may be accomplished by engaging the tack to restrain it from movement or by covering the tack entrance to prevent its escape.

A very important feature of this invention consists in providing means operating automatically to cover the tack entrance to the holder to an extent to prevent the escape of the tack during its movement from tack-receiving to tack-driving position. The means for covering the tack entrance may be any suitable member but in the preferred construction the driver bar is utilized for this purpose. To this end the driver bar is lowered to a position over the tack preferably while the holder is yet in its tack-receiving position. The driver bar may press the point or stem of the tack between the usual spring-actuated clamping or tack-supporting jaws of the holder so that the tack will be clamped and held by said jaws against being thrown out of the holder. The driver bar may be lifted after being thus lowered and be again depressed for driving the tack from the holder into the work by a full length stroke, but preferably the driver will remain in position to close the entrance to the holder during the movement of the holder to tack-driving position and then complete its descent for inserting the tack. It will be observed that in this arrangement the driver bar makes its descent or operative movement in two distinct steps during one of which steps it co-operates with other members of the mechanism for insuring the presentation of the tack in position to be driven, and then completes its descent for inserting the tack.

The invention will be more fully explained in connection with the following description of the machine in which it is shown as embodied and it will be more particularly pointed out in the claims.

Figure 1 is a side elevation of the machine, certain parts being broken away and others indicated in dotted lines for the purpose of illustrating the mechanisms of the machine which are concerned with the tacking operation. Fig. 2 is an elevation of the cam for actuating the tacking mechanism, the cam being shown from the opposite side to that which appears in Fig. 1. Fig. 3 is a section perpendicular to the shoe bottom in an approximately vertical plane between the side tackers and the toe tacker. Fig. 4 is a substantially vertical section through the cam and other parts shown in Fig. 1. Fig. 5 is a plan view of the mechanism for actuating the tack holders. Figs. 6, 7, 8, and 9 are detail views of the holder and driver, representing different relations of said parts.

The frame 2 of the machine provides support for the tack carrying arms 4 which are pivoted at 5 to swing toward and from the shoe and to the lower ends of which are fastened tack holders 6. For actuating the tack holders from their tack-receiving position, shown in Fig. 1, in which tacks are supplied from the tack tubes 8, to the tack-driving position, illustrated in Fig. 3, a cam 10 is provided on a driven shaft 12. The cam has a groove in which runs a roll 13 on a lever 14 which is fulcrumed at 15 and provided at its upper end with a rack bar 16 to engage teeth 19 on a shaft 20. The shaft is supported in the frame of the machine as shown in Fig. 5 and has a toothed formation to engage a slide 22 which projects forwardly and has connection with the tack arms 4. The front end of the slide is forked and each fork supports a socketed plate 24 provided with spring-pressed plungers 25 having beveled faces to engage corresponding faces on a slide that embraces the front tack arm 4 and, for the purpose of this description, may be considered as a portion of that tack arm. This arrangement is such that when the slide 22 is retracted or moved to the left in Fig. 5 and to the right in Fig. 1 the arm 4 will be yieldingly drawn in the same direction for moving the tack holder 6 thereon from its tack-receiving to the tack-driving position. The opposite edges of the slide 22 have toothed engagement with segments 30, which in turn engage rack slides 32 carrying spring-pressed plungers 35 which engage slides 34 carried by the side tack arms 4. This connection, as will be readily understood, provides for moving the two side arms inwardly together in the same yielding manner as the toe arm is moved. When a shoe is in the machine the inward movement of the arms is stopped by the en-

gagement of devices carried by the tack holders with the sides of the shoe, the yielding plungers 25 and 35 permitting the actuating mechanism to have its full stroke. When no shoe is in the machine the arms move through the distance provided by the full stroke of the actuating mechanism and are brought to rest by stops which are not shown. The tack holders comprise a main block having a tack and driver passage and pivoted clamping jaws 40 held yieldingly together by devices 42 and having tapering faces to center and support the point or stem of the tack. The drivers 50, which are connected by the arms 4, are engaged at their upper ends by spring-actuated levers 52. For lifting the drivers against the pressure of these spring-actuated levers a lifting plate 55 is fulcrumed on the shaft 20 above mentioned and has a depending arm 56 with a roll 58 running in the same cam groove that receives the roll 13. The lifting plate supports the slide 22 and the parts connected with it and acts through connections between these parts and the drivers for lifting the drivers. These connections include on the front of the slide 22 a plate 60 (see Fig. 5) adapted to engage a shoulder 62 (see Fig. 1) on the front driver bar. The slides 32 have plates 65 for engaging similar shoulders on the side driver bars, one of the shoulders being indicated at 64 in Fig. 5. The arrangement is such that when the tack arms, while being drawn inwardly, are stopped by their engagement with the shoe, and the spring-pressed plungers 25 and 35 yield to permit the slide 22 to continue its movement, the plates are withdrawn from under the shoulders on the driver bar and permit the drivers to descend under the influence of their spring-actuated levers 52 to insert the tacks. The lifting plate is then rocked to lower the devices carried by it, including the plates which engage the shoulders on the drivers, so that when the lifting plate is again tipped upwardly the drivers are raised out of the tack holders and into the position with relation to the holders shown in Figs. 1 and 3.

As above stated, the tacks are fed to the tack holders by the tubes 8 from suitable tack-supplying mechanism. The lower sections of the tubes 8 are pivoted in the arms 4 to permit those sections to swing out of the path of the drivers as the drivers descend for inserting the tacks, and, after the drivers rise, springs, see Figs. 3 and 7, return the tube sections to their normal positions with their mouths over the driver and tack passage in the tack holder so that the tack, which at this time is fed from the tubes, is conducted directly into the holder. This mounting for the conductor sections, by which they are yieldingly held with their lower ends over the tack passages, has been

found in practice to allow the conductor sections to fall behind the tack holder more or less when the machine is run at the high speed to which it is in other respects adapted. When the conductor sections thus fall behind the tack holder, the tacks can be, and sometimes are, thrown out of the tack holders. The arrangement of the parts is such that the roll on the arm 56 of the lifting plate bears against the wall 70 of the groove in the cam block 10 (see Fig. 2). This wall is formed at 72 in accordance with this invention to lower the lifting plate or to permit it and the drivers to descend under the pressure of the driver springs at the point in the machine's operation after the tacks have been fed into the tack holders and then the tack holders are moved inwardly toward tack-driving position by their connection with the lever 14. The extent to which the drivers are lowered may be varied by suitably forming the cam. As shown in Fig. 7, the drivers are lowered far enough to cover the entrance to the tack passage in the holder. In this position the driver prevents any possibility of the tack getting out of the tack holder. The driver may remain in this relation to the tack holder during the inward movement of the holder and until the drivers are tripped for completing their descent to drive the tack. It will be observed that in the machine illustrated the tack and driver passage in the tack holder slants outwardly, the holder and the driver being arranged to insert the tacks in a direction inclined inwardly from the edge of the last. It will also be observed that the direction of movement of the tack holders, particularly the tack holder at the toe of the shoe, is oblique to the horizontal. This oblique disposition of the tack passage and downwardly inclined movement of the tack holders renders the tacks in this machine particularly liable to jump out of the holders during the quick inward movement from tack-receiving position to tack-driving position. In Fig. 8 the driver is shown as lowered by the formation of the cam surface 72 far enough to force the stem of the tack down between the spring-pressed jaws of the holder where it is clamped and the tack so held by said jaws that it is not liable to jump out during the movement of the holder from tack-receiving position to tack-driving position. If it is desirable that the drivers have a longer stroke for the purpose of inserting the tack than they have if they move only from the tack-restraining position shown in full lines in Figs. 7 and 8 the cam wall 70 may be formed to raise the drivers after they have pressed the tacks into gripped position between the jaws of the holder, as is indicated, for example, in Fig. 8. Preferably the cam wall 70 is formed to allow the drivers to remain down to act as a cover to the

tack pockets during the movement of the tack holder from receiving position to tack inserting position. By this means each driver may have its full length of stroke for inserting the tack instead of dividing its downward movement into two steps as indicated in Fig. 7.

The operation of the tacking mechanism of the machine has been sufficiently explained in connection with the description of the mechanism. For a general description of the machine reference may be had to said prior Patent No. 663,777.

Having explained the nature of the present invention and described a preferred embodiment thereof, I claim as new and desire to secure by Letters Patent of the United States:

1. A machine of the class described having, in combination, a tack holder movable between tack-receiving and tack-driving positions, a conductor for delivering tacks to the holder and additional means movable from and into position for preventing the escape of the tack from the holder during the movement from receiving to driving position.

2. A machine of the class described having, in combination, a tack holder, automatically operating means for moving the holder from tack-receiving to tack-driving position, a conductor for delivering tacks to the holder and additional means movable automatically from and into position for restraining the tack from displacement during the said movement.

3. A machine of the class described having, in combination, a tack holder movable between tack-receiving and tack-driving positions, a conductor for delivering tacks to the holder and additional means movable into and out of position for covering the entrance to the tack holder during the movement for delivering the tack.

4. A machine of the class described having, in combination, a tack holder movable between tack-receiving and tack-driving positions, a driver movable endwise to close the entrance to the holder during the tack-delivering movement, and means for actuating the driver to insert the tack.

5. A machine of the class described having, in combination, a tack holder movable between tack-receiving and tack-driving positions, a driver, and actuating mechanism constructed and arranged to lower the driver into position to prevent the escape of the tack from the holder during the tack-delivering movement and for further operating the driver to insert the tack.

6. A machine of the class described having, in combination, a tack holder movable between tack-receiving and tack-driving positions, said holder comprising yielding tack-supporting jaws, a driver, means for

actuating the driver to force the point of the tack between the jaws to be held thereby during the tack-delivering movement of the holder and for further actuating the driver to insert the tack into the work.

7. A machine of the class described having, in combination, a tack holder movable between tack-receiving and tack-driving positions, a tack driver, means for gripping the tack in the holder, means for actuating the holder, means for actuating the driver to force the tack into said gripping means prior to the advance of the holder and to actuate the driver to insert the tack after the holder reaches tack-driving position.

8. A machine of the class described having, in combination, means for supplying tacks, a tack holder, means for moving the holder from receiving to tack-delivering position, a driver, and means for actuating the driver in the direction of its tack inserting movement into a position to prevent the escape of the tack from the holder during the movement of the holder and for imparting a separate actuation to the driver to insert the tack after the holder reaches delivering position.

9. A machine of the class described having, in combination, means for separating and feeding tacks, and other means for presenting the separated tacks in position to be driven, a driver, and means for imparting to the driver two downward movements for each cycle of the machine, said driver being arranged to cooperate with the tack-presenting mechanism to insure the delivery of tacks with the driver in the position occupied by it as a result of the first downward movement and to insert the tack during the next downward movement.

10. In a machine of the class described having, in combination, means for supplying fastenings including a tack holder, a driver movable through the tack holder, and actuating means for the driver arranged to effect in one cycle of the machine a complete downward stroke of the driver in a plurality of distinct steps and to effect a rise of the driver relatively to a tack in the holder between two steps.

11. A machine of the class described having means for supplying tacks, a tack holder movable between tack-receiving and tack-delivering positions, a driver, means for raising the driver clear of the tack holder before the tack is fed, means for lowering the driver to cover the tack in the holder, and means for moving the holder to deliv-

ering position; said machine having provision for thereafter actuating the driver to insert the tack.

12. A machine for feeding and driving tacks having, in combination, a tack holder comprising tack-holding jaws, a driver, and means for actuating the driver to press the tack into gripped position between the jaws and for thereafter imparting to the driver a separate actuation to drive the track.

13. A machine for feeding and driving tacks having, in combination, a tack holder comprising tack-holding jaws, a driver, and actuating mechanism for lowering the driver to press the tack into gripped position between the jaws and for then lifting the driver and depressing it to insert the tack by a full length stroke.

14. A machine of the class described, having in combination, a tack driver, a tack holder, a conductor section movable relatively thereto and from which tacks are received, and power driven means for moving the tack holder and conductor from tack receiving position toward position for the tack to be driven, said conductor being mounted to permit it to be displaced backwardly to let the driver enter the tack pocket, and said machine having provision for preventing the tack from being thrown out of the holder while the conductor section is so displaced backwardly.

15. A machine of the class described, having in combination, a tack driver, a tack holder, a conductor section movable relatively thereto and from which tacks are received, and power driven means for moving the tack holder and conductor from tack receiving position toward position for the tack to be driven, said conductor being mounted to permit it to be displaced backwardly to let the driver enter the tack pocket, and said machine having provision for lowering the driver to the mouth of the tack holder in time to prevent the escape of the tack from the mouth of the holder which might otherwise occur by reason of the displacement of the conductor and the jar of the machine or other cause during or at the termination of movement of the holder to driving position.

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

CYRUS D. FOYE.

Witnesses:

JOHN F. REID,
ARTHUR L. RUSSELL.