A. E. JERRAM, J. GOULDBOURN, AND F. RICKS.

FASTENER INSERTING MACHINE.

APPLICATION FILED SEPT. 28, 1916.

1,426,389.

Patented Aug. 22, 1922.

3 SHEETS—SHEET 1.

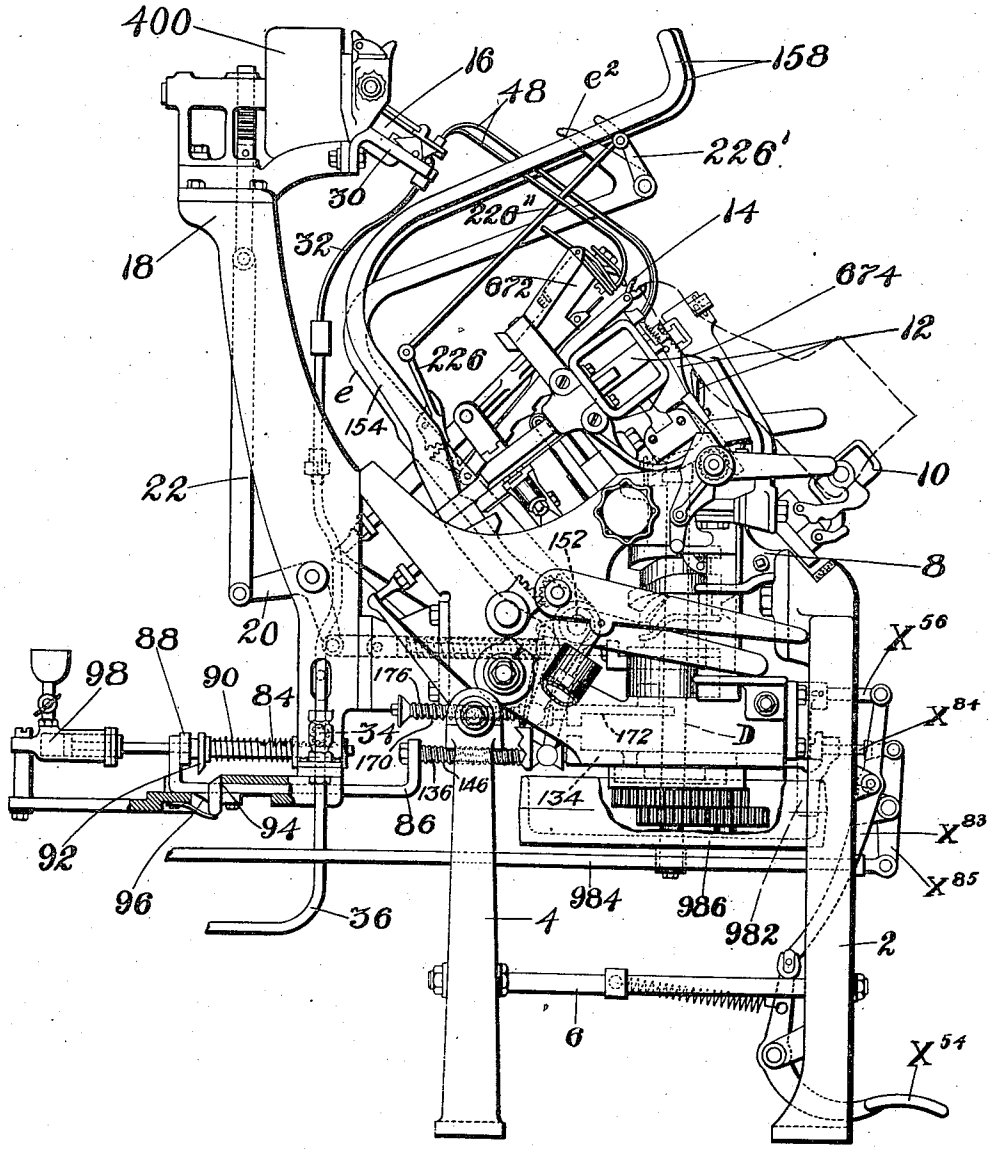


Fig. 1.

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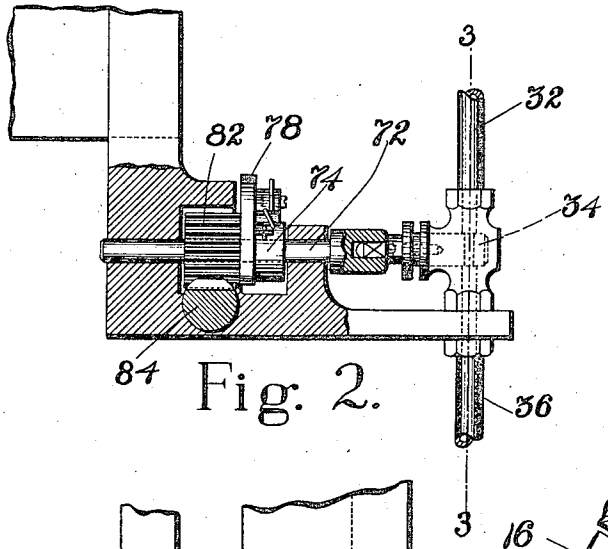


Fig. 2.

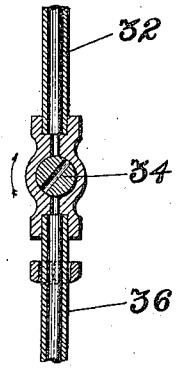


Fig. 3.

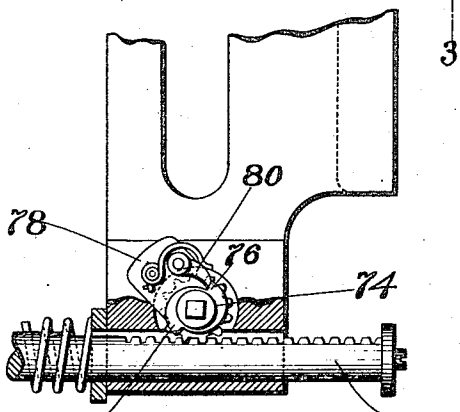


Fig. 4.

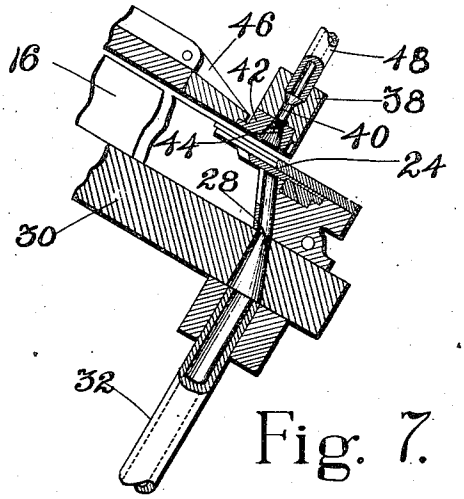


Fig. 7.

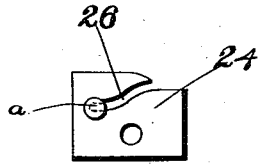


Fig. 5

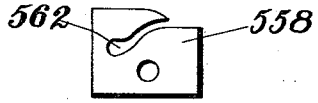


Fig. 6.

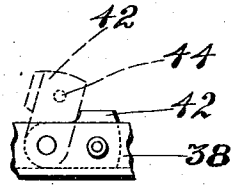


Fig. 8.

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3 SHEETS—SHEET 3.

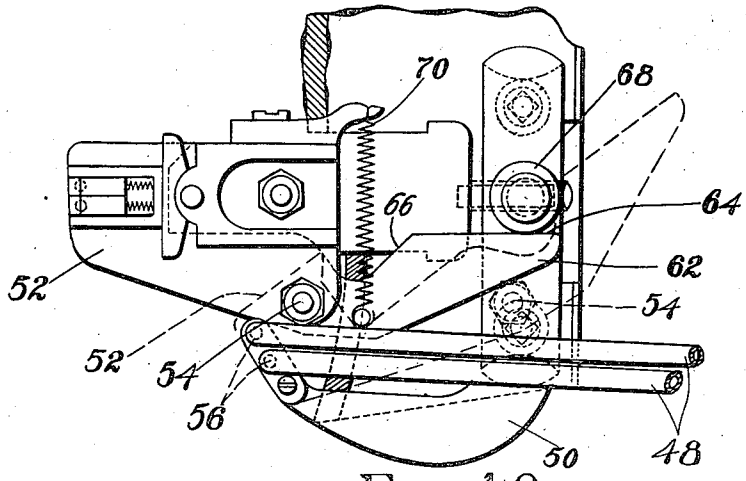


Fig. 10.

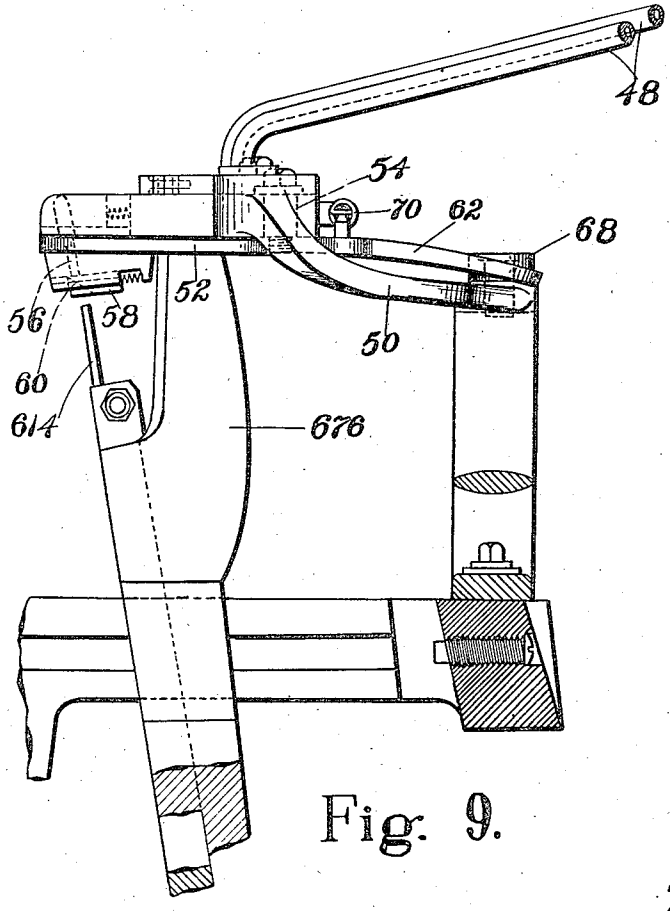


Fig. 9.

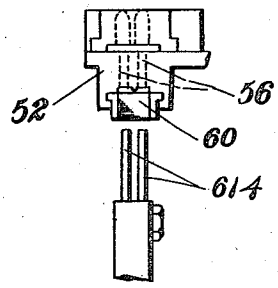


Fig. 11.

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UNITED STATES PATENT OFFICE.

ARTHUR ERNEST JERRAM, JOSEPH GOULDBOURN, AND FRED RICKS, OF LEICESTER, ENGLAND, ASSIGNORS, BY MESNE ASSIGNMENTS, TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

FASTENER-INSERTING MACHINE.

1,426,389. Specification of Letters Patent. Patented Aug. 22, 1922.

Application filed September 28, 1916. Serial No. 122,631.

To all whom it may concern:

Be it known that we, ARTHUR E. JERRAM, JOSEPH GOULDBOURN, and FRED RICKS, subjects of the King of England, residing at Leicester, Leicestershire, England, have invented certain Improvements in Fastener-Inserting Machines, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to machines which include in their organization fastener inserting mechanism. The invention is herein shown, by way of illustration, as embodied in a pulling-over machine for use in shoe manufacture and having features of novelty which are the sole invention of Fred Ricks, one of the present applicants, and are claimed in Patent No. 1,346,256 granted on July 13, 1920, but it will be apparent from the following description that the invention, in its broader aspects, is not restricted in its applicability to machines involving such novel features nor, in fact, to machines for use in pulling uppers over lasts, but is of general applicability to machines employed for various purposes.

Features of the invention are to be recognized in a novel construction and arrangement of means for effecting the delivery or presentation of fasteners to fastening mechanism. One important object of the invention is to provide effective means for delivering fasteners under certain conditions where the force of gravity may not be relied upon as heretofore to effect invariably the transfer of fasteners from the source of supply and their proper presentation to the fastening means, for example where the fasteners are to be inverted and driven upwardly into the work. The construction shown comprises means for separating fasteners point downward in the manner customary heretofore, with pneumatic means for inverting the fasteners and for delivering them point upward to devices whereby they are supported for the driving operation. More particularly, the construction shown comprises conduits, the receiving ends of which are over the fasteners as the latter are supported in separated position, with means for delivering a blast of air to lift the fasteners and force them head foremost into the conduits, the latter being curved to effect an inversion of the fasteners and to deliver them point upward. In the illustrated application of the invention to a machine in which upper securing fasteners are driven upwardly at the toe end and the opposite sides of the forepart of a shoe supported bottom downward, a plurality of fasteners are inverted and delivered by the pneumatic means substantially simultaneously to the different fastening mechanisms.

The invention also provides novel means for transferring each fastener from a point of presentation or delivery, to which it may be advanced pneumatically, as hereinbefore explained, or otherwise, into such relation to the respective driving member as to permit it to be driven, and such means constitutes a further feature of the invention. In the construction shown the fasteners, after having been inverted and advanced pneumatically to their respective points of presentation, are received in carrier plates which are moved relatively to the driver bar arms on which they are mounted to present the fasteners to the drivers.

The above and other features of the invention, including certain details of construction and combinations of parts, will now be described with reference to the accompanying drawings and pointed out in the claims.

In the drawings:

Fig. 1 is a view in side elevation of a machine in which the invention is embodied;

Fig. 2 is a detail view in elevation of a portion of the pneumatic means for effecting transfer of the fasteners, with portions of the mechanism shown in section;

Fig. 3 is a section on the line 3—3 of Fig. 2;

Fig. 4 is a view in elevation, and partly in section, of a portion of the mechanism shown in Fig. 2 as viewed from the right hand side of said figure with the parts in a different position from that indicated in Fig. 1;

Figs. 5 and 6 show respectively a portion of the tack separating mechanism as constructed for the purposes of the present invention and as commonly used heretofore;

Fig. 7 is a view in vertical section through a portion of the tack transferring mechanism;

Fig. 8 is a detail plan view of a portion of the mechanism shown in Fig. 7;

Fig. 9 shows in elevation the upper end of one of the driver bar arms and its associated tack carrier;

Fig. 10 is a plan view of the mechanism seen in Fig. 9, different positions of a portion of the mechanism being indicated respectively by full and by dotted lines; and

Fig. 11 shows in elevation a portion of the mechanism shown in Fig. 9 as viewed from the left hand side of said figure.

The machine herein shown includes in its general organization many features of a well known type of pulling-over machine such as exemplified in prior United States Letters Patent No. 663,777, granted upon an application of R. F. McFeely on December 11, 1900, and exemplified also in various modifications in other United States Letters Patents of which it is only necessary herein to refer to Patent No. 1,029,387, granted on an application of R. F. McFeely on June 11, 1912. In order that the invention may be more clearly understood, the general features of construction of the illustrative machine, some of which are set forth in detail in Patent No. 1,346,256 above mentioned, will be briefly described, and where convenient the reference characters of the prior Patent No. 663,777, and in certain instances also of Patent No. 1,029,387, will be used to indicate corresponding parts.

The operative parts of the machine are supported upon a frame comprising front and rear plates 2 and 4 respectively, connected by stay rods 6. Bolted to the front frame plate 2 and suitably supported at the top of the rear plate 4 is the head portion 8 of the machine upon which are mounted the various instrumentalities for operating upon the shoe, and operating means for such instrumentalities comprising the cam shaft D which in the present construction is supported vertically with its driving pulley 986 in a horizontal position between the frame plates. The operation of the machine is controlled by a treadle X^{54} connected to one end of a lever X^{83}, to the other end of which is pivoted a short rod X^{56} which serves in the usual way, upon the operation of the treadle, to actuate automatic means for retracting a brake shoe 982 from the pulley 986, such means acting through a rod X^{84} and a lever X^{85} to operate a rod 984 whereby the clutch (not shown) is actuated to cause the pulley 986 to be driven by means of a suitable belt to effect the first portion of the cycle of operations of the machine, after which the clutch is automatically disconnected and the brake applied through the connections above described by such means as are fully disclosed in prior Patent No. 663,777.

When the work is in position in the machine the last, with the upper positioned loosely upon it, is supported, as indicated by dotted lines in Figs. 1, with the rear portion of the upper on the last in engagement with a heel rest 10 and with the forepart of the sole or insole on the last positioned upon a sole rest 12. In this position the upper is engaged by the usual toe and side grippers, of which the toe gripper is seen at 14 in Fig. 1, and is pulled over the last automatically during the first portion of the cycle of operations the machine then coming automatically to a stop. The toe gripper is connected to an "updraw" lever *e* which is pivoted on a rod 152 and has connection at its rear end through a rod 170 and a spring 176 with a cam slide 172 operated by a cam on the cam shaft D. Through movement of the slide 172 the toe gripper is thus operated to pull the upper yieldingly with a force determined by the degree of compression of the spring 176. The side grippers are similarly operated by levers 154 pivoted on the rod 152 and connected through springs 146 and rods 136 to a cam slide 134. During the second half of the cycle of operations, which takes place upon a second depression of the treadle X^{54}, the margin of the upper is carried inwardly under the bottom of the last and, following movement of fastener driving means comprising driver bar arms 672, 674 and 676 inwardly under the last bottom, the fasteners are inserted to retain the upper in its pulled-over position. While the machine is at rest between the two periods of the cycle of operations, the operator is afforded opportuntiy to effect such adjustment of the upper on the last as may be necessary in order to correct any inaccuracy in its position, through the manipulation of various instrumentalities of which it is only necessary herein to refer to handles 158, each of which has operative connection with one of the side gripping instrumentalities, and a handle e^2 connected with the toe gripper operating lever *e*, whereby the operator is enabled to manipulate the different grippers as desired. Pivoted on the handle e^2 is a lever 226^1 connected by a link 226^{11} to the usual lever 226, whereby the opening of the toe gripper may be effected.

The work positioning means and the operating instrumentalities hereinbefore described are so arranged that the heel end of the last is supported substantially over the front frame plate 2 of the machine and the last is inclined upwardly from its heel end toward the rear of the machine at such an angle that the operator, as he maintains

a natural attitude at the front of the machine, may, without special effort, look downwardly and forwardly upon the top and sides of the forepart of the upper on the last and keep the work continuously in view in this manner until the operations are completed. The various instrumentalities whereby adjustment of the upper may be effected, comprising particularly the handles 158 and e^2, together with the lever 226^1, are, moreover, arranged in such relation to the work and to the position of the operator that he may manipulate them without the necessity of changing materially his viewpoint with reference to the work and without in any way obstructing his view of the work. In order to insure these results the handles referred to are preferably extended, as shown, to positions somewhat higher than the work and far enough forwardly to permit the operator to manipulate them without stooping. In the construction shown the last is positioned at an incline of substantially 50 degrees to the horizontal, this angle having been determined as particularly satisfactory for the objects in view under average working conditions, but it should be understood that the invention is not limited to a construction in which the last is inclined at the precise angle shown. It will be observed by reference to Fig. 1 that the operative portions of the machine are substantially at the rear of a vertical projection of the treadle X^{54}, and by reason of this arrangement the operator may maintain a single position close to the work both for operating the treadle and for manipulating the upper on the last.

The construction shown is particularly adapted for driving fasteners in the form of tacks, as is usual in machines of this type, but the invention in many of its aspects is not limited to the use of tacks. For assorting and arranging the tacks the machine shown includes a tack pot 400 of any usual form and raceways 16. equal in number to the number of tacks to be driven at each operation, upon which the tacks hang suspended in rows by their heads. The tack pot 400, in the construction shown, is supported upon a bracket 18 and is rotated from the cam shaft D through connections including a bell crank 20 and a link 22. Mounted to reciprocate in the usual manner at the lower ends of the raceways are separator plates 24 (Fig. 7) which are so formed (Fig. 5) that when the tack, shown at *a* has been advanced to the inner end of the groove 26, it is still suspended by its head and is not permitted to drop through the usual opening 562 in separator plate 558 (Fig. 6) as heretofore constructed. The tack, as thus supported, is moved into alignment with an opening 28 in the bracket plate 30 which serves to support the raceways. Communicating with this opening at its lower end is a pipe 32 which leads to a valve 34 arranged to control the admission to the pipe 32 of compressed air from a supply pipe 36 which may communicate with an air pump or with any suitable supply of air under pressure. The construction shown comprises a single pipe 32 leading to the several openings 28, but it will be understood that several conduits 32 may be arranged to communicate with the several openings if desired. Positioned over the separators 24 is a bar 38 provided with openings 40 which are over the heads of the respective tacks after the latter have been moved by the members 24 to separated position. Associated with each of the openings 40 is a block 42 pivoted to the bar 38 and having an opening 44 arranged to aline with the opening 40 when the block 42 is in the position shown in Fig. 7 and in full lines in Fig. 8. Raceway covers 46 rest upon the blocks 42, and upon the lifting of any one of these covers the corresponding block may be swung aside, as indicated by dotted lines in Fig. 8, in order to permit the raceway to be cleared in case a tack becomes wedged therein.

Supported at one end in the bar 38 and communicating with the respective openings 40 are curved conduits 48 which lead to various points of delivery or presentation for the tacks to permit them to be supplied to the different tack driving instrumentalities. The conduits 48 are, it will be understood, equal in number to the number of tacks to be driven at each operation and are grouped and arranged as required with reference to the particular points at which the tacks are to be driven in the work, the delivery ends of these conduits being supported on brackets 50 on the machine frame. With this construction and arrangement, a blast of compressed air from the pipe 32 will lift the tacks from the separator plates 24 and force them head foremost into and through the respective conduits 48 to their points of delivery, the curved form of the conduits 48 causing the tacks in their passage to become inverted in such manner as to be finally presented point upward.

The driver bar arms 672, 674 and 676 have their usual movement toward and from driving positions with respect to the margin of the last bottom. With reference to Figs. 9 and 10, the driver bar arm 676, which is one of the side arms having means for driving two tacks simultaneously in the side margin of the last bottom, is arranged for movement toward the left into position to drive the tacks and toward the right away from the last to its inoperative position, the arm being shown in these figures as in position to permit the tacks to be driven. It will be noted that the delivery ends of the

corresponding conduits 48 are positioned adjacent to and at one side of the path of movement of the driver bar arm, and the machine is provided with means controlled by the movement of the arm for effecting a transfer of the tacks from delivery position into position to be driven. The construction shown for effecting this transfer comprises a carrier plate 52 pivoted at 54 on the upper end of the driver bar arm, the plate having tack pockets 56 normally closed at their lower ends by a spring pressed gate 58 provided with a sloping bottom face 60 arranged to be engaged by the ends of the drivers 614 in their driving movement to cause the plate 58 to be pushed aside and permit the drivers to enter the tack pockets and expel the tacks therefrom. The plate 52 is provided with a tail portion 62 having surfaces 64 and 66 arranged to engage a stud 68 on the bracket 50 to determine the position of the plate, the tail 62 being held in engagement with the stud by means of a spring 70 connected at one end to the tail and at its other end to a projection on the driver bar arm. When the parts are in the positions indicated in Figs. 9 and 10 the surface 64 is in engagement with the stud 68 and the plate 52 is positioned in such relation to the drivers 614 and the tack block that the tacks are supported point upward in the pockets 56 and are in position to be driven upon the operative movement of the drivers. When the driver bar arm is moved to its inoperative position, which is toward the right in Figs. 9 and 10, the stud 68, in co-operation with the surface 66, permits the plate 52 to be swung by the spring 70 about the axis 54 to the dotted line position (Fig. 10), in which the pockets 56 are in line with the delivery ends of the conduits 48. While the transfer plate is in this position tacks are forced through the conduits 48 and deposited, point upward, in the pockets 56 in the manner hereinbefore described. While the tack transferring means is illustrated in its relation to only one of the driver bar arms, it will be understood that each of the arms has similar mechanism associated therewith.

In order to control the admission of compressed air to the conduit 32, the valve 34 is connected to a short shaft 72 upon which is secured a hub 74 provided with diametrically opposite ratchet teeth 76. Mounted loosely on the shaft 72 is an arm 78 provided with a spring pressed pawl 80, the arm 78 being rigid with a pinion 82 which is arranged to be turned in opposite directions alternately by the movement of a rack bar 84. The bar 84 is arranged to be moved toward the right (Fig. 1) during the pulling movement of the grippers in the first period of the cycle of operations of the machine through connection of the bar with one of the side lever updraw rods 136 by means of an angled arm 86 which is fast on the rod and bears at its outer end upon a collar 88 on the bar 84. During this movement, whereby the pawl 80 is turned about the hub 74 to cause it to engage the diametrically opposite tooth 76 without operating the valve 34, a spring 90 on the bar 84 is compressed and a dog 92 on the bar 84 is caused to engage a spring catch 94, whereby the rack bar is retained in the position to which it is moved. In the latter part of the final period of the cycle of operations of the machine the return of the arm 86 effected by the return movement of the gripper operating means causes a trip 96 on the arm to engage the catch 94 and withdraw it from the dog 92 against the pressure of its spring in such manner as to permit the spring 90 to force the rack bar toward the left and effect an opening and a closing movement of the valve 34, movement of the rack bar in this direction being retarded by means of a dash pot 98. In this manner a blast of air is forced through the pipe 32 and the tacks are delivered pneumatically point upward to the carrier plates at a time when these plates are positioned to receive them while the driver bar arms are in their retracted position away from the shoe.

In the use of the machine the operator stands close to the front frame plate 2 in position to operate the treadle X^{54}. The work, positioned within easy reach of the operator, as indicated in dotted lines in Fig. 1, is below the level of the operator's eyes and is inclined at such an angle as to afford the operator full view of the top of the upper and the portions round the sides of the forepart of the last without any special effort upon his part such as would finally cause fatigue. The various handles which frequently require manipulation for the purpose of adjusting the upper, including the handles 158 and e^2, are so arranged as to be within easy reach of the operator as he stands in the position described without involving any obstruction of his view of the work. Upon the first depression of the treadle X^{54} the upper is pulled over the last in the well known manner through the action of the grippers, and at the same time the rack bar 84 is retracted in preparation for the subsequent operation of the valve 34, the driver bar arms at this time being held in retracted position with the pockets 56 of the carrier plates 52 in line with the conduits 48 from which they have received inverted tacks in a previous operation of the machine. Upon a subsequent depression of the treadle, after any necessary adjustment of the upper on the last has been effected, the margin of the upper is carried inwardly under the

last bottom, the driver bar arms move inward causing the plates 52 to swing about their pivots and carry the tacks into alinement with the drivers, and through the operation of the drivers the tacks are driven upwardly into the upper and the sole or innersole. The driver bar arms are then swung outwardly and cause the pockets 56 again to aline with the conduits 48, and substantially simultaneously, as the grippers are returned to starting position, the valve 34 is operated in the manner described to cause the several tacks supported on the separator plates 24 to be lifted and forced through the conduits 48 and deposited point upward in the pockets 56 which arrive in alinement with the conduits in time to receive the tacks.

Although the invention has been described with reference to a particular illustrative embodiment, it will be understood that various modifications in details are contemplated within the spirit and scope of the claims.

It should be understood that the term "inverted", except where the context requires a more limited interpretation, is used herein in a relative sense referring to substantial reversal of the position of a fastener end for end irrespective of any particular position which the fastener may occupy prior to such reversal.

Certain features of the construction herein shown, involving a combination of upper pulling means and fastening means, are claimed in a divisional application, Serial No. 366,030, filed on March 15, 1920.

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

1. In a machine of the class described, the combination with fastener driving means, of a source of supply for fasteners, means for separating individual fasteners from said source of supply with the points of said fasteners projecting in a certain direction, and means for transferring the fasteners from said separating means into position to be driven including pneumatic means for lifting the fasteners from the separating means and turning them to cause their points to project in a different direction.

2. In a machine of the class described, the combination with fastener driving means, of a source of supply for fasteners, means for separating individual fasteners from said source of supply, and means for transferring a fastener from said separating means into position to be driven including a conduit and pneumatic means for forcing the fastener head foremost through said conduit, the conduit being curved to effect an inversion of the fastener during its transfer.

3. In a machine of the class described, the combination with fastener driving means, of a source of supply for fasteners comprising a raceway, a separator movable to disengage a fastener from the raceway, said separator being constructed to support the fastener in separated position, a conduit arranged to aline with the fastener in separated position, and pneumatic means for disengaging the fastener from said separator and forcing it through said conduit toward the driving means.

4. In a machine of the class described, the combination with fastener driving means, of a source of supply for fasteners comprising a raceway in which the fasteners are suspended point downward, a separator movable to disengage a fastener from the raceway, said separator being constructed to support the fastener in separated position, a conduit over the fastener, and pneumatic means for disengaging the fastener from said separator and forcing it through said conduit toward the driving means, the conduit being curved to effect an inversion of the fastener during its transfer to cause the point of the fastener to project upwardly.

5. In a machine of the class described, the combination with fastener driving means, of a source of supply for fasteners comprising a raceway in which the fasteners are suspended point downward, a separator movable to disengage a fastener from the raceway, said separator being constructed to support the fastener in separated position, a conduit arranged to present its receiving end over the fastener in separated position, and means controlled by the operation of the machine for causing a blast of air to lift the fastener from said separator and force it through said conduit toward the driving means.

6. In a machine of the class described, the combination with fastener driving means, of a source of supply for fasteners, a separator movable to present a fastener in separated position, and means for lifting the fastener from said separator to advance it toward the driving means.

7. In a machine of the class described, the combination with fastener driving means and a source of supply for fasteners, of means for supporting a fastener point downward, and pneumatic means for lifting said fastener from its supporting means and for delivering it with its point projecting in a predetermined relation to the driving means.

8. In a machine of the class described, the combination with a source of supply for fasteners, of a separator for individual fasteners constructed to support a fastener in separated position, and pneumatic means for lifting the fastener from said separator.

9. In a machine of the class described, the combination with a source of supply for fasteners, of a separator for individual

fasteners constructed to support a fastener in separated position, a conduit arranged to aline with the fastener in separated position, and means for directing a blast of air through said conduit to lift the fastener from the separator.

10. In a machine of the class described, the combination with fastener driving means movable toward and from driving position in a path transverse to the direction in which the fastener is driven, of means for presenting fasteners to said driving means, said presenting means being movable laterally of said path of movement of the driving means into position to receive a fastener as the driving means moves away from driving position and movable relatively to the driving means to present the fastener to the driving means upon a movement of said means toward driving position.

11. In a machine of the class described, the combination with fastener driving means movable toward and from driving position, of a fastener transferring device carried by said means and movable relatively thereto, upon a movement of said means, to present a fastener in position to be driven.

12. In a machine of the class described, the combination with fastener driving means movable toward and from driving position, of a fastener transferring device carried by said means and movable relatively thereto, said device being movable into position to receive a fastener as the driving means moves away from driving position, and means for causing said device to transfer the fastener into position to be driven as the driving means moves toward driving position.

13. In a machine of the class described, the combination with fastener driving means movable toward and from driving position, of a fastener transferring device pivoted on said means for movement relatively thereto, yielding means for causing said device to swing into position to receive a fastener upon a movement of the driving means away from driving position, and means operative upon a movement of the driving means toward driving position for moving the transferring device in opposition to said yielding means to bring the fastener into position to be driven.

14. In a machine of the class described, the combination with fastener driving means movable toward and from driving position, of a fastener transferring device pivoted on said means for movement into or out of position to present a fastener to said means, a spring tending to swing said device out of said position, and means for swinging the device into fastener presenting position upon a movement of the driving means toward driving position.

15. In a machine of the class described, the combination with fastener driving means mounted for positioning movements toward and from the work and also for driving movement, of a fastener transferring device having means for supporting a fastener, and means for operating said device in time relation to positioning movements of the driving means to cause it to swing alternately into position to receive a fastener and into position to present the fastener to the driving means.

16. In a machine of the class described, the combination with fastener driving means arranged to drive fasteners upwardly, of a fastener transferring device having a fastener receiving recess, said device being movable alternately into position to receive a fastener in said recess and into position to present the fastener to the driving means, said device having a gate arranged to close the bottom of said recess to form a pocket for the fastener, and the gate having a sloping face on its bottom surface to permit it to be retracted by engagement of the upwardly moving driving means therewith.

17. In a machine of the class described, the combination with fastener driving means movable toward and from driving position, of fastener delivery means, and means arranged to be moved into and out of alignment with the driving means for transferring fasteners from the delivery means to the driving means, said transferring means being mounted to move bodily and also to swing laterally of the path of its bodily movement to effect the transfer of a fastener.

18. In a machine of the class described, the combination with fastener driving means movable toward and from driving position, of fastener delivery means, a fastener transferring device carried by said driving means and movable relatively to the driving means into position to receive a fastener from said delivery means as the driving means moves away from driving position, and means operative upon a movement of the driving means in the opposite direction for moving said device to carry the fastener into position to be driven.

19. In a machine of the class described, the combination with fastener driving means, of means for advancing fasteners pneumatically to a point of delivery, and means mounted for movement to carry the fasteners from said delivery point and present them to the driving means.

20. In a machine of the class described, the combination with fastener driving means movable toward and from driving position, of means for advancing fasteners pneumatically to a point of delivery in determined relation to the path of movement of said means, and a transferring device arranged for operation through said movement of the driving means to carry the

fasteners from said delivery point into position to be driven.

21. In a machine of the class described, the combination with fastener driving means including a driver movable toward and from driving position, of a conduit for directing fasteners to a delivery point in determined relation to the path of movement of said means, and a transferring device having a pocket to receive a fastener from said conduit, said device being mounted on the driving means and movable relatively thereto alternately into position to present said pocket in alinement with the conduit for the reception of a fastener and to carry the fastener into alinement with the driver.

22. In a machine of the class described, the combination with fastener driving means, of a source of supply for fasteners, means for separating individual fasteners from said source, pneumatic means for advancing the fasteners from said separating means to a point of delivery, and means movably mounted for receiving the fasteners at said point of delivery and transferring them into position to be driven by the driving means.

23. In a machine of the class described, the combination with fastener driving means arranged to drive fasteners upwardly, of a source of supply for fasteners in which the fasteners are presented point downward, means for advancing the fasteners from said source of supply and presenting them point upward, and means for receiving the fasteners as thus presented and carrying them into position to be driven.

24. In a machine of the class described, the combination with fastener driving means arranged to drive fasteners upwardly, of a source of supply for fasteners in which the fasteners are presented point downward, pneumatic means for advancing the fasteners from said source of supply and inverting them to present them point upward, and means for receiving the fasteners as thus presented and carrying them into position to be driven.

25. In a machine of the class described, the combination with work positioning means, of means for driving a fastener upwardly into the work, pneumatic means for delivering a fastener point upward for use by said driving means, and a device for receiving and supporting the fastener thus delivered.

26. In a machine of the class described, the combination with work positioning means, of means for driving a fastener upwardly into the work, a conduit arranged to receive a fastener point downward and curved to effect an inversion of the fastener and to present it point upward for use by said driving means, pneumatic means for blowing the fastener along said conduit, and a device for receiving and supporting the fastener delivered from said conduit.

27. In a machine of the class described, the combination with work positioning means, of means for driving a fastener upwardly into the work, means for positioning an individual fastener point downward, a conduit having its receiving end over the fastener thus positioned to receive it head foremost and its opposite end directed downwardly in position to deliver the fastener point upward by gravity, a holder for receiving the fastener thus delivered and for positioning it for the driving operation, and means for generating a current of air to lift the fastener and force it into the receiving end of said conduit.

28. In a machine of the class described, the combination with fastener supporting means and means for driving fasteners upwardly, of means for conducting a fastener from said supporting means to a point of delivery in predetermined relation to the driving means, said conducting means comprising a conduit curved to cause the fastener to arrive at the delivery point in an inverted position, and pneumatic means for forcing the fastener head foremost through said conduit.

29. In a machine of the class described, the combination with means for supporting a fastener point downward and means for driving the fastener upward, of means for conducting said fastener from its supporting means to a point of delivery, said conducting means comprising a conduit extending upwardly over the fastener and curved to cause the fastener to arrive at its delivery point in an inverted position, and means for directing a blast of air upwardly beneath the fastener to force it through said conduit.

30. In a machine of the class described, the combination with a source of supply for fasteners, of means for separating a fastener from said source of supply and supporting it in separated position, a conduit arranged to receive the fastener, and pneumatic means for disengaging the fastener from said separating means and forcing it through said conduit.

31. In a machine of the class described, the combination with a source of supply for fasteners, of means for separating a fastener from said source of supply and supporting it in separated position, a conduit arranged to extend upwardly over the fastener in separated position, and pneumatic means for lifting the fastener from the separating means and forcing it through said conduit.

32. In a machine of the class described, the combination with fastener driving means and a conduit arranged to deliver fasteners in predetermined relation to said driving

means, of means for presenting fasteners one by one in a position under said conduit, and pneumatic means for forcing the fasteners upwardly into the conduit.

33. In a machine of the class described, the combination with fastener driving means movable toward and from driving position, of means for presenting a fastener at one side of the path of movement of said driving means, and means controlled by the movement of the driving means for transferring the fastener into position to be driven by the driving means.

34. In a machine of the class described, the combination with fastener driving means movable toward and from driving position, of means for delivering a fastener at one side of the path of movement of the driving means, and fastener transferring means mounted on the driving means for movement relatively to the driving means alternately into position to receive a fastener at said delivery point and into position to present the fastener to the driving means.

35. In a machine of the class described, the combination with a fastener driving means movable toward and from driving position, of means for delivering a fastener at one side of the path of movement of said driving means, a fastener transferring device mounted on said driving means for swinging movement relatively to the driving means to carry a fastener from said delivery point into position to be driven, and means for causing said device to be operated by the movement of the driving means.

36. In a machine of the class described, the combination with fastener driving means movable toward and from driving position, of means for delivering fasteners at a point adjacent to the path of movement of said driving means, a fastener transferring device pivoted on said driving means, means for swinging said device into position to receive a fastener at said delivery point when the driving means moves out of driving position, and means for swinging the device to carry the fastener into position to be driven as the driving means moves toward driving position.

37. In a machine of the class described, the combination with fastener driving means movable toward and from driving position, of means for delivering fasteners at a point adjacent to the path of movement of said driving means, a fastener transferring device pivoted on said driving means, spring means for swinging said device into position to receive a fastener at said delivery point when the driving means moves out of driving position, and a relatively stationary member for engaging said device to swing it into position to present a fastener to the driving means as the driving means moves toward driving position.

38. In a machine of the class described, the combination with tack driving means and a source of supply for tacks to be driven by said means, of means for conducting tacks from said source of supply toward the driving means, said conducting means comprising a conduit constructed to cause the tacks to be inverted during their transfer, and pneumatic means for lifting the tacks and forcing them into said conduit.

39. In a machine of the class described, the combination with tack driving means arranged to drive tacks upwardly, of a source of supply for tacks to be driven, means for separating individual tacks from said source of supply and presenting them in separated position point downwardly, said separating means being constructed to support the tacks in separated position, and means for inverting the tacks and presenting them point upward to the driving means.

40. In a machine of the class described, the combination with means for supporting a fastener point downward, of means for conducting the fastener from said supporting means to a point of delivery, said conducting means comprising a conduit constructed to direct the fastener with its point projecting lengthwise of its path of movement and to cause the fastener to be substantially inverted end for end by its passage through the conduit, and means for directing a blast of air against the fastener on said supporting means to lift it and force it into said conduit.

41. In a machine of the class described, the combination with means for supporting a pointed fastener, of a conduit arranged to receive the fastener from said supporting means, said conduit being constructed to direct the fastener with its point projecting lengthwise of its path of movement, means for generating a current of air in said conduit to advance the fastener, and means constructed to receive the fastener at the delivery end of said conduit and carry it to a different location for use.

42. In a machine of the class described, the combination with means for supporting a fastener point downward, of means for conducting the fastener from said supporting means to a point of delivery, said conducting means comprising a conduit constructed to cause the fastener to be substantially inverted end for end by its passage through the conduit, means for directing a blast of air against the fastener on said supporting means to disengage it from said means and force it into the conduit, and means constructed to receive the fastener at the delivery end of said conduit and carry it to a different location for use.

43. In a machine of the class described, the combination with means for positioning a shoe bottom downward, of means for driv-

ing a fastener upward into the shoe bottom, means for presenting a fastener point downward, a conduit arranged to receive the fastener and direct it to a point of delivery, said conduit being constructed to cause the fastener to be substantially inverted end for end by its passage therethrough, means for generating a current of air in the conduit to advance the fastener, and means for receiving the fastener at said delivery point and transferring it into operative relation to the driving means.

44. In a machine of the class described, the combination with shoe positioning means, of fastener driving means comprising a driver mounted for driving movement and also for positioning movement transversely of the edge of the shoe bottom into and out of operative relation to the shoe, means for presenting a fastener at one side of the path of said positioning movement of the driver, and means movable laterally of said path and substantially horizontally to receive a fastener and present it to the driver.

45. In a machine of the class described, the combination with shoe positioning means, of fastener driving means mounted for movement transversely of the edge of the shoe bottom into and out of operative relation to the shoe, means comprising a conduit arranged to deliver a fastener adjacent to the path of said movement of the driving means, means for generating a current of air in said conduit to advance the fastener, and means for receiving the fastener and presenting it to the driving means.

46. In a machine of the class described, the combination with a source of supply for fasteners, of means for separating a fastener from said source of supply, a conduit to receive the fastener from the separating means, and means for directing a blast of air against the fastener to disengage it from the separating means.

47. In a machine of the class described, the combination with work positioning means, of means for driving fasteners upwardly into the work, means for positioning individual fasteners point downward, a conduit arranged to extend upwardly over a fastener as thus positioned to receive the fastener head foremost, means for forcing the fastener into said conduit, the conduit having its delivery portion directed downwardly to deliver the fastener point upward, and a holder to receive the fastener as thus delivered.

48. In a machine of the class described, the combination with means for positioning a shoe bottom downward, of a plurality of members arranged to drive fasteners upwardly at the end and at opposite sides of the shoe, a source of supply for fasteners, means for separating individual fasteners from said source of supply, a plurality of conduits arranged to receive the fasteners from said separating means and to deliver them for use by said driver members, said conduits being arranged to receive the fasteners point downward and curved to effect an inversion of the fasteners and to deliver them point upward, pneumatic means for blowing the fasteners along said conduits, and devices for receiving and supporting the fasteners delivered from said conduits.

49. In a machine of the class described, the combination with means for positioning a shoe bottom downward, of fastening means for driving fasteners upwardly into the bottom of the shoe at the toe end and at opposite sides of the forepart, means for positioning individual fasteners point downward, conduits arranged to receive the fasteners thus positioned and constructed to deliver the fasteners point upward to the fastening means, and pneumatic means for blowing the fasteners along said conduits.

50. In a machine of the class described, the combination with means for positioning a shoe bottom downward, of fastening mechanism comprising means movable upwardly to drive a fastener in the bottom of the shoe and movable transversely of the edge of the shoe bottom into and out of driving position, a conduit extending to a position near the shoe for delivering fasteners point upward, and a carrier on said fastening mechanism movable alternately into position to receive a fastener from said conduit and into position to present the fastener to the driving means.

51. In a machine of the class described, the combination with means for positioning a shoe bottom downward, of fastening means comprising members for driving a plurality of fasteners upwardly into the bottom of the shoe at the end and at opposite sides of the shoe, means for positioning individual fasteners point downward, conduits for receiving the fasteners thus positioned and for delivering them point upward to the fastening means, pneumatic means for blowing the fasteners along said conduits, and carrier members arranged to receive the fasteners from said conduits and movable to present the fasteners to the driving members.

52. In a machine of the class described, the combination with means for positioning a shoe bottom downward, of fastening mechanisms comprising supporting arms mounted for movement at the toe end and at opposite sides of the shoe into and out of position for driving fasteners upwardly into the bottom of the shoe, driver members on said arms, conduits leading to positions near the toe end and the opposite sides of the shoe for delivering fasteners point upward, and carrier members mounted on said arms for

movement relatively to the arms into position to receive fasteners from said conduits and into position to present the fasteners to the driver members.

53. In a machine of the class described, the combination with means for positioning a shoe bottom downward, of supporting arms mounted for movement at the toe end and at opposite sides of the shoe into and out of position for driving fasteners upwardly into the bottom of the shoe, driver members on said arms, means for positioning individual fasteners point downward, conduits arranged to receive the fasteners thus positioned and to conduct them to points near the toe end and the opposite sides of the shoe and to deliver them point upward, pneumatic means for blowing the fasteners along said conduits, and carrier members on said supporting arms arranged to receive the fasteners from the conduits and movable relatively to said arms to present the fasteners to the driver members.

In testimony whereof we have signed our names to this specification.

ARTHUR ERNEST JERRAM.
JOSEPH GOULDBOURN.
FRED RICKS.