F. RICKS.

PULLING-OVER MACHINE.

APPLICATION FILED SEPT. 28, 1916.

1,346,256.

Patented July 13, 1920.

3 SHEETS—SHEET 1.

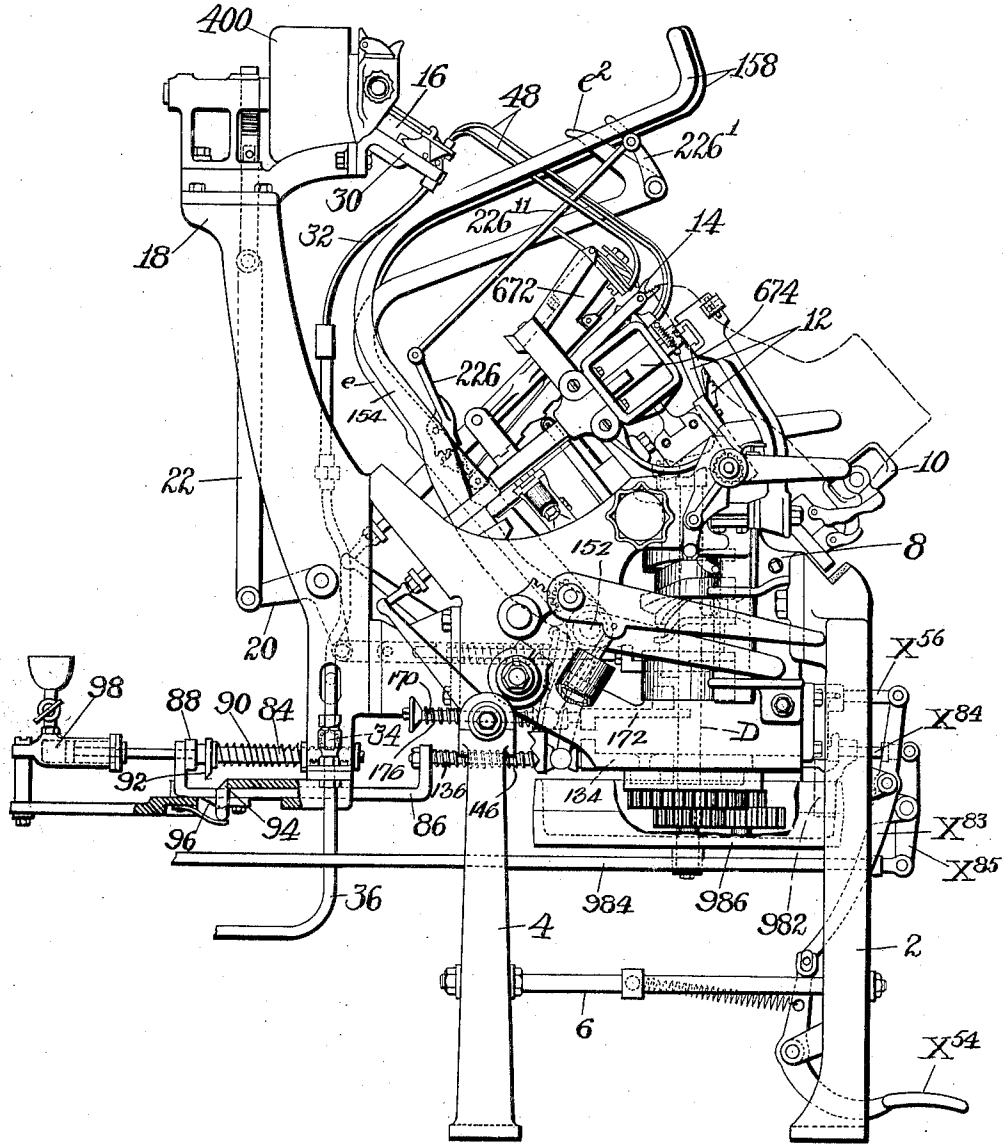


Fig. 1.

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By his Attorney

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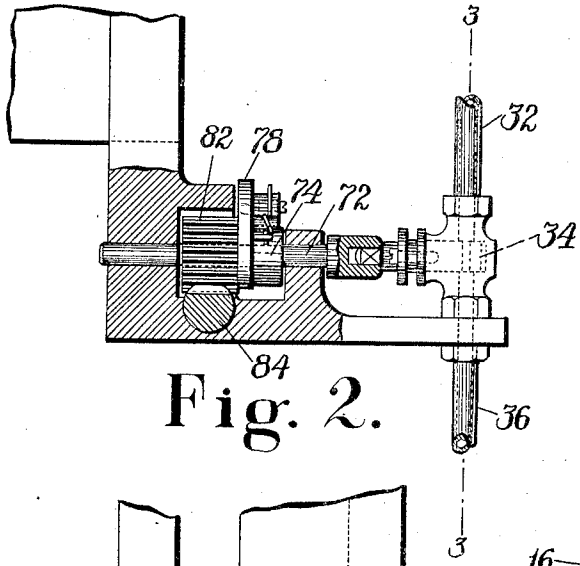


Fig. 2.

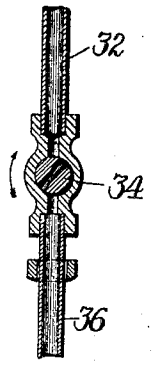


Fig. 3.

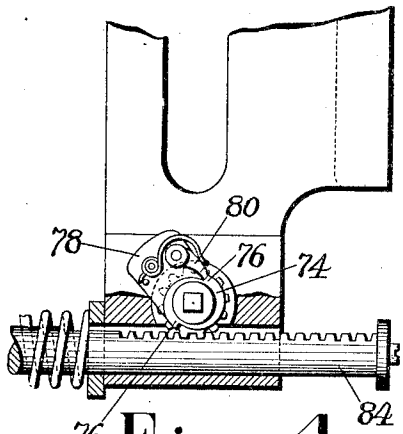


Fig. 4.

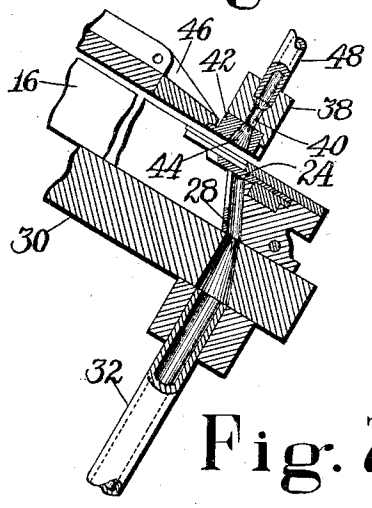


Fig. 7.

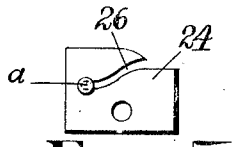


Fig. 5.

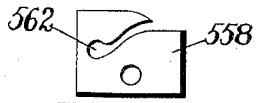


Fig. 6.

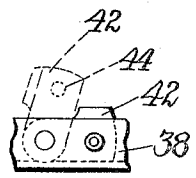


Fig. 8.

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3 SHEETS—SHEET 3.

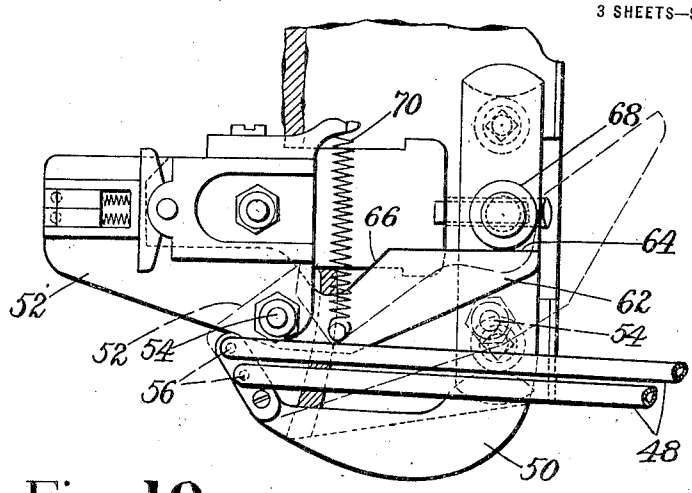


Fig. 10.

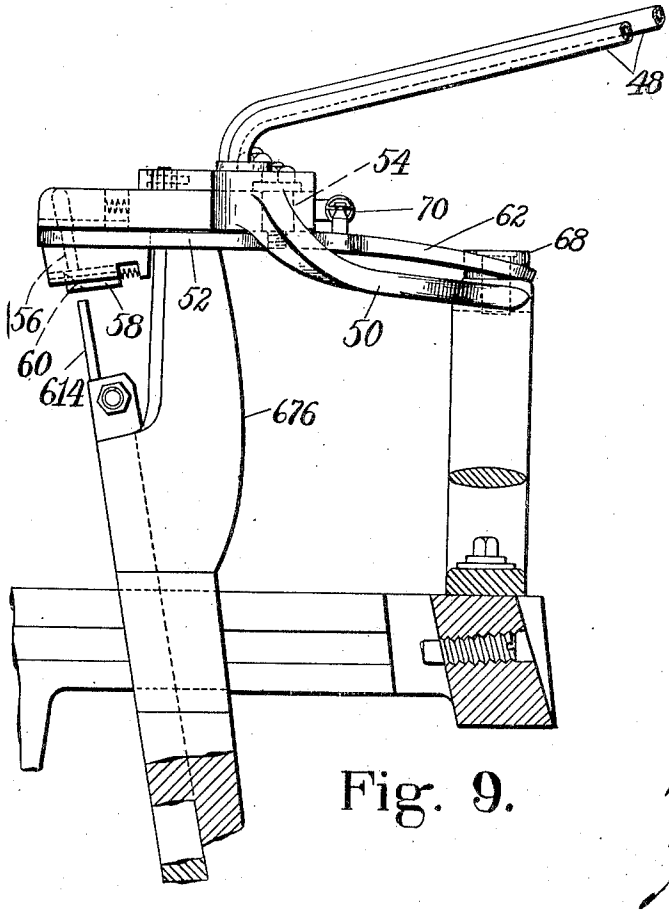


Fig. 9.

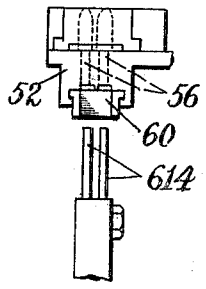


Fig. 11.

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UNITED STATES PATENT OFFICE.

FRED RICKS, OF LEICESTER, ENGLAND, ASSIGNOR, BY MESNE ASSIGNMENTS, TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

PULLING-OVER MACHINE.

1,346,256. Specification of Letters Patent. Patented July 13, 1920.

Application filed September 28, 1916. Serial No. 122,630.

To all whom it may concern:

Be it known that I, FRED RICKS, a subject of the King of England, residing at Leicester, Leicestershire, England, have invented certain Improvements in Pulling-Over 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 for use in the manufacture of boots and shoes for pulling uppers over lasts.

In the pulling-over operation on boots and shoes it is necessary that the operator observe critically the condition of the upper over the top of the forepart in order to determine whether any adjustment is required to position the tip line of the upper at the correct distance from the end of the last and in the correct angular relation to the longitudinal median line of the last and to the plane of the last bottom. Accuracy of judgment in these respects requires that the operator view the work with substantially the same perspective that the wearer of the shoe, for example, would have in viewing it upon his foot. In order that this and other operations may be performed with as little conscious effort and fatigue as possible, it is desirable that the work be so positioned as to afford the operator a satisfactory critical view of the forepart of the upper without requiring him to assume any unnatural or strained position, and that he be enabled to present the work to the machine and to perform any operations having to do with adjustment of the upper or with control of the machine without the necessity for any material change in his viewpoint with reference to the work. Notwithstanding this, prior pulling-over machines for pulling the upper by power-operated means have been so constructed and organized as not to afford the most satisfactory position for the work within the above-mentioned requirements. Power-operated means for pulling the upper are, of course, highly desirable.

The present invention provides a novel organization in which the shoe positioning means and the power-operating means for pulling the upper, and other parts of the pulling-over machine, are so organized and combined as to produce a power-operated pulling-over machine in which the work is positioned in the desired manner above outlined. In the construction shown power-operated upper pulling means and means for positioning the last and shoe are so constructed and arranged as to locate the plane of the tip seam of the upper substantially along a line of vision of the operator directed forwardly and downwardly toward the work, and the parts of the machine which the operator is required to manipulate are so constructed and arranged as to necessitate no change in the position of the operator such as to affect materially his critical view of the work. In the illustrative machine the shoe is inclined upwardly and rearwardly at an angle of substantially 50 degrees to the horizontal and is positioned somewhat below the level of the operator's eyes. The invention, however, is not limited to a construction in which the work is positioned at the precise angle and elevation illustrated, and it is to be understood that in hereinafter referring to the last or the shoe as positioned with its toe end pointing in a direction of non-intersection with a vertical plane extending between the last and the operator's working position it is intended to define a location of the work in which there is no substantial forward inclination of the last or shoe such that its forepart is tipped toward the operator, irrespective of whether the last or shoe may or may not be tipped more or less rearwardly away from the operator.

The invention is herein illustrated as embodied in a construction including many features of a well-known type of pulling-over machine, such as exemplified in prior United States Letters Patent No. 663,777 granted on December 11, 1900, upon an application of R. F. McFeely, and in other subsequent patents including Patent No. 1,029,387 granted on June 11, 1912, upon application of R. F. McFeely, to which reference may be made for an understanding of details of construction not hereinafter specifically described. While the invention presents various novel features of particular utility as embodied in this gen-

eral type of machine, it is to be understood that in many of its aspects the invention is not limited to machines of this type.

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:

Figure 1 is a view in side elevation of a machine in which the invention is embodied, the machine shown including in its organization many features of construction common to the type of machine hereinbefore referred to as exemplified in the prior patents cited;

Fig. 2 is a detail view in elevation and partly in section, showing a portion of the mechanism with which the illustrative machine is provided for effecting transfer of the fasteners used for retaining the upper in pulled-over position;

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 embodied in the illustrative machine 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 transferring device;

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 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.

In order that the invention may be more fully understood, in its relation to the type of machine shown in the prior patents hereinbefore referred to, the reference characters of the prior Patent No. 663,777, and in certain instances also of Patent No. 1,029,387, will be used herein where convenient 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 upper and the last, and operating means for such instrumentalities comprising a 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 manner disclosed in said prior patents, 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 half 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 Fig. 1, with the rear portion of the upper on the last in engagement with a heel rest 10 and with the forepart of the insole on the last positioned upon a sole rest 12. In this position the upper is engaged by the usual front and side grippers, of which the front or toe gripper is seen at 14 in Fig. 1, and is pulled over the last automatically during the first half of the cycle of operations of the machine above referred to. The front gripper is connected to an updraw lever *e* which is pivoted on rod 152 and has connection at its rear end through a rod 170 and a spring 176 with a cam slide 172. Through the movement of the slide 172 the front gripper is thus operated from the cam shaft D to pull the upper with a force determined by the degree of compression of the spring 176. The side grippers are similarly operated by levers 154 likewise pivoted at 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 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 portions of the cycle of operations, the operator is afforded opportunity to change the tension under which the upper is held or 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 which comprise upwardly and forwardly curved extensions of the side gripper levers 154, and a handle e^2 comprising a similar extension of the front 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 front gripper may be effected.

The work positioning means and the operating instrumentalities hereinbefore described are so arranged in accordance with the illustrated embodiment of this invention 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 and without bending over, look downwardly and forwardly upon the top and sides of the forepart and substantially along the plane of the tip seam 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 positioned 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 and the last.

The construction shown is particularly adapted for driving fasteners in the form of tacks, as is usual in machines of this type. 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 in the usual way 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 separators 24 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 alinement 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 inserting 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 fasteners 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 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 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 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 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 control 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 coöperation 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 its 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 half 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 arm 86 which 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 second half of the cycle of operations of the machine the return of the arm 86 as the grippers are returned to starting position causes a trip 96 on the arm to engage the catch 94 and withdraw it from the dog 92 in such manner as to permit the spring 90 to force the rack bar toward the left and effect an opening and 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 the tacks are caused to be delivered pneumatically to the transferring devices at a time when these devices are positioned to receive them while the driver bar arms are in their retracted position.

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 a full and critical view of the top of the upper and the portions around 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 retracted with the pockets 56 of the transfer 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 the 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 inserted to fasten the upper to the sole or innersole (herein termed generically the "sole"). The driver bar arms then swing 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 under the control of the separator plates 24 to be 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.

The novel features of the fastener transferring mechanism herein described are my invention in collaboration with others and are claimed in another application Serial No. 122,631, filed contemporaneously herewith.

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.

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

1. A machine of the class described having, in combination, power operated means for pulling an upper over a last and for holding the upper under tension to permit relative adjustment of the upper and the last, said means being constructed and arranged to operate upon the work with the last presented bottom downward and the toe end pointing upward away from the operator at such an angle as to enable the operator to view the top and front of the upper continuously during the pulling-over operation while maintaining a natural attitude in front of the machine, and means whereby the operator may effect relative adjustment of the upper and the last after the pulling operation, said adjusting means extending into position for manipulation by the operator without necessitating any change in his position such as to affect his normal view of the work.

2. A machine of the class described having, in combination, means for pulling an upper over a last comprising grippers arranged to exert a pull diagonally downward and toward the rear of the machine with reference to a last positioned below the level of the operator's eyes and inclined upwardly from its heel end in a direction away from the operator, power operated means for operating said grippers to cause them to pull the upper and to come to rest while holding the upper under tension, and handles connected with said grippers and extending into position above the level of the work to enable the operator to manipulate the grippers and adjust the upper on the last after the upper pulling operation without changing his position in such manner as to affect his normal view of the work.

3. A machine of the class described having, in combination, means for positioning a last and a shoe upper thereon with the last inclined upward toward the rear of the machine at such an angle to the vertical as to enable the operator to look downwardly in a forward direction upon all portions of the upper over the top and around the sides of the forepart of the last as he stands erect in front of the machine, power operated means for pulling the upper over the last, and means under control of the operator to effect relative adjustment of the upper and the last while the upper is under tension from the pulling means and while the operator maintains his normal viewpoint with reference to the work.

4. A machine of the class described having, in combination, means for positioning a last and an upper for a pulling-over operation with the bottom of the last facing downwardly and the last inclined upwardly from its heel end toward the rear of the machine, said means including a rest for the heel end of the last, power operated means for pulling the upper over the last as thus positioned, and means enabling the operator to effect relative adjustment of the upper and the last, said rest being positioned substantially in front of said pulling and adjusting means to facilitate the positioning of the last without interference by said means.

5. A machine of the class described having, in combination, a frame, means for positioning a last and a shoe upper for a pulling-over operation with the heel end of the last substantially over the front portion of said frame and the last presented bottom downward and inclined upwardly from its heel end toward the rear of the machine, power operated means for pulling the up-

per over the last as thus positioned, and means for initiating the operation of said pulling means comprising a treadle projecting in front of said frame.

6. A machine of the class described having, in combination, means for positioning a last and an upper for a pulling-over operation with the bottom of the last facing downwardly and the last inclined upwardly from its heel end toward the rear of the machine, said means including a rest for the heel end of the last, grippers for engaging the upper, and means for operating said grippers to pull the upper over the last, said operating means comprising a substantially vertical cam shaft positioned at the rear of said rest and connections between said shaft and the grippers.

7. A pulling-over machine having, in combination, means for positioning a last and an upper with the top of the forepart of the upper facing upward and the toe end of the last pointing in a direction of non-intersection with a vertical plane extending between the last and the operator's working position, power operated means for pulling the upper over the last and for fastening it in pulled-over position in a series of steps with a pause between the upper pulling and fastening operations to permit inspection of the tensioned upper and relative adjustment of the upper and the last, and means for enabling the operator to cause a relative adjustment of the upper and the last during said pause in the operation of the machine without materially changing his position with reference to the work.

8. A pulling-over machine having, in combination, means for positioning a last and an upper with the top of the forepart of the upper facing the operator and the toe end of the last pointing in a direction of non-intersection with a vertical plane extending between the last and the operator's working position, grippers for engaging the upper on the last, power operated means for imparting movement to said grippers toward the rear of the machine to cause them to pull the upper and for holding them with the upper under tension and the machine at rest to permit inspection and adjustment of the pulled upper, power operated means operative subsequently at the will of the operator to fasten the upper in pulled-over position, and means under control of the operator for effecting an adjusting movement of the different grippers prior to the fastening of the upper while the operator maintains his normal position with reference to the work.

9. A pulling-over machine having, in combination, means for positioning a last and an upper with the top of the forepart of the upper facing the operator and the toe end of the last pointing in a direction of non-intersection with a vertical plane extending between the last and the operator's working position, grippers for engaging the upper on the last, and means for imparting upper pulling movement to said grippers comprising a cam shaft arranged in angular relation to a horizontal plane and connections between said shaft and the grippers.

10. A pulling-over machine having, in combination, means for positioning a last and an upper with the toe end of the last pointing upward and the top of the upper facing the operator's working position at such an elevation as to enable the operator to look forwardly and downwardly upon the top of the forepart of the shoe during the operation of the machine upon the shoe, power operated means for pulling the upper on the last and for holding it under tension, means extending into position for manipulation by the operator while he remains in position to view all portions of the top of the forepart of the upper to enable him to cause a relative adjustment of the tensioned upper and the last, and power operated means operative subsequently at the will of the operator to fasten the upper in pulled-over position.

11. A pulling-over machine having, in combination, means for positioning a last and an upper in such relation to the operator's working position as to enable the operator to look forwardly and downwardly upon the top of the forepart of the shoe during the operation of the machine upon the shoe, upper gripping devices, power operated means comprising a cam shaft and connections between said shaft and devices for operating the devices to pull the upper and hold it under tension, and means extending upwardly and forwardly from said gripping devices to a position substantially over the shoe for manipulation by the operator to permit him to adjust the tensioned upper on the last without materially altering his position with relation to the shoe.

12. A pulling-over machine having, in combination, means for positioning a last bottom downward with its toe end pointing upward toward the rear of the machine, grippers for engaging an upper on the last, and power operated means comprising levers connected to said grippers for operating the grippers to cause them to pull the upper and to come to rest holding the upper under tension, said levers being extended upwardly and forwardly to a position substantially over the shoe to enable the operator to manipulate the grippers for adjusting the pulled upper without altering his viewpoint with reference to the work.

13. A pulling-over machine having, in combination, means for pulling an upper over a last comprising grippers arranged to exert a pull diagonally downward and toward the rear of the machine with reference

to a last positioned below the level of the operator's eyes and inclined upwardly from its heel end in a direction away from the operator, and power operated means comprising levers connected to said grippers to cause them to pull the upper and to come to rest holding the upper under tension, said levers being extended upwardly and forwardly to enable the operator to manipulate the grippers for adjusting the pulled upper without altering his viewpoint with reference to the work.

14. A pulling-over machine having, in combination, means for positioning a last and an upper with the top of the forepart of the upper facing the operator and the toe end of the last pointing in a direction of non-intersection with a vertical plane extending between the last and the operator's working position, grippers for engaging the upper on the last, a cam shaft arranged in angular relation to a horizontal plane, means operated by said cam shaft for imparting to the grippers an upper pulling movement toward the rear of the machine and for holding the grippers with the upper under tension and the machine at rest, means extending into position for manipulation by the operator to enable him to cause a relative adjustment of the last and the tensioned upper while the machine is at rest, and means for subsequently fastening the upper in pulled-over position

15. A pulling-over machine having, in combination, means for positioning a last and an upper with the top of the forepart of the upper facing the operator and the toe end of the last pointing in a direction of non-intersection with a vertical plane extending between the last and the operator's working position, grippers for engaging the upper on the last, power operated means for operating said grippers to cause them to move toward the rear of the machine to pull the upper and then to hold the upper under tension, means extending into position for manipulation by the operator to enable him to cause a movement of one or more of said grippers either in the direction of the pull or in the opposite direction while the upper is under tension, and means for subsequently fastening the upper in pulled over position.

16. A pulling-over machine having, in combination, a supporting frame, means for positioning a last and an upper substantially at the front of said frame with the toe end of the last pointing upward and the top of the upper facing the operator at such an elevation as to enable the operator to look forwardly and downwardly upon the top of the forepart of the upper while maintaining an upright attitude in front of the machine, means including a power shaft and gripping devices positioned substantially at the rear of the work for pulling the upper over the last and for holding it under tension to permit inspection and relative adjustment of the upper and the last, and means operative subsequently at the will of the operator for fastening the upper in pulled-over position.

17. A pulling-over machine having, in combination, means for positioning a last and an upper with the top of the forepart of the upper facing the operator and the toe end of the last pointing in a direction of non-intersection with a vertical plane extending between the last and the operator's working position, grippers for engaging the upper on the last, levers connected to said grippers, a cam shaft arranged in angular relation to a horizontal plane, connections between said cam shaft and levers comprising cam slides movable toward the front of the machine to operate the grippers and springs for transmitting the movement of said slides to the gripper levers, and means for controlling the operation of said cam shaft to cause the upper to be pulled and held under tension to permit inspection and relative adjustment of the upper and the last.

18. A pulling-over machine having, in combination, means for positioning a last and an upper with the top of the forepart of the upper facing the operator and the toe end of the last pointing in a direction of non-intersection with a vertical plane extending between the last and the operator's working position, grippers for engaging the upper on the last, levers connected to said grippers, a cam shaft arranged in angular relation to a horizontal plane, connections between said cam shaft and levers comprising cam slides movable toward the front of the machine to operate the grippers and springs for transmitting the movement of said slides to the gripper levers, means for controlling the operation of said cam shaft to cause the upper to be pulled and held under yielding tension, and means for enabling the operator to cause relative adjustment of the upper and the last while the upper is thus held under tension.

19. A pulling-over machine having, in combination, means for positioning a last and an upper with the top of the forepart of the upper facing the operator and the toe end of the last pointing in a direction of non-intersection with a vertical plane extending between the last and the operator's working position, grippers for engaging the upper on the last, levers extending upwardly at the rear of the shoe and connected to said grippers, a power shaft positioned at the front of said levers and extending in angular relation to a horizontal plane, connections between said shaft and the levers for imparting rearward pulling

movement to the grippers, and means for controlling the operation of said shaft.

20. A pulling-over machine having, in combination, means for positioning a last and an upper with the top of the forepart of the upper facing the operator and the toe end of the last pointing in a direction of non-intersection with a vertical plane extending between the last and the operator's working position, grippers for engaging the upper on the last, levers connected to said grippers, a power shaft extending upwardly in a position substantially between said levers and the shoe, connections between said shaft and levers for imparting upper pulling movement to the grippers, and means for controlling the operation of said shaft.

21. A machine of the class described having, in combination, means for positioning a last and an upper with the bottom of the last facing downward and the last inclined upward from its heel end toward the rear of the machine, grippers for engaging the upper on the last, a power shaft extending upward at an angle to the direction of inclination of the last, and connections to said shaft for effecting relative movement of the last and the grippers to pull the upper.

22. A machine of the class described having, in combination, means for positioning a last and an upper with the top of the forepart of the upper facing the operator and the toe end of the last pointing upward in a direction of non-intersection with a vertical plane extending between the last and the operator's working position, said positioning means including a rest for the heel end of the shoe, grippers for engaging the upper as thus positioned, and means comprising a power shaft extending upward substantially at the rear of said heel rest for effecting relative movement of the grippers and the last to pull the upper.

23. A machine of the class described having, in combination, means for positioning a last and an upper with the top of the forepart of the upper facing the operator and the toe end of the last pointing upward in a direction of non-intersection with a vertical plane extending between the last and the operator's working position, means for gripping the margin of the upper, a power shaft disposed in angular relation to a horizontal plane, and connections to said shaft for effecting relative movement of the last and the upper gripping means to pull the upper.

24. A machine of the class described having, in combination, means for positioning a last and an upper with the top of the forepart of the upper facing upward and the toe end of the last pointing in a direction of non-intersection with a vertical plane extending between the last and the operator's working position, means for gripping the margin of the upper, automatic means having a prescribed range of movement for effecting relative movement of the last and the upper gripping means to pull the upper, and manual means for controlling the operation of said automatic means.

25. A machine of the class described having, in combination, means for positioning a last and an upper with the top of the forepart of the upper facing the operator and the toe end of the last pointing upward in a direction of non-intersection with a vertical plane extending between the last and the operator's working position, grippers for engaging the upper as thus positioned, power operated means for effecting relative movement of the last and the grippers to pull the upper and for them holding the upper under tension, and means under control of the operator in his working position for moving one or more of said grippers in a direction to change the tension under which the upper is held.

26. A machine of the class described having, in combination, means for positioning a last and an upper with the top of the forepart of the upper facing the operator and the toe end of the last pointing upward substantially in a direction of non-intersection with a vertical plane extending between the last and the operator's working position, grippers for engaging the upper at the toe and at opposite sides of the last, power operated means for effecting relative movement of the last and the grippers to pull the upper, and means under control of the operator in his working position for subsequently effecting relative movement of the opposite side grippers to shift the upper laterally over the last.

27. A machine of the class described having, in combination, means for positioning a last and an upper with the top of the forepart of the upper facing the operator and the toe end of the last pointing upward in a direction of non-intersection with a vertical plane extending between the last and the operator's working position, grippers for engaging the upper as thus positioned, upper fastening mechanism, means comprising a power shaft extending upward in a direction transverse to the plane of the last bottom for effecting relative movement of the last and the grippers to pull the upper and for operating said fastening mechanism, and means for controlling the operation of said shaft to cause the upper to be pulled over the last and fastened with a pause between the upper pulling and the fastening operations to permit inspection and adjustment of the upper.

28. A machine of the class described having, in combination, means for positioning a last and an upper with the top of the forepart of the upper facing the operator and the toe end of the last pointing upward in a

direction of non-intersection with a vertical plane extending between the last and the operator's working position, grippers for engaging the upper as thus positioned, upper fastening mechanism, means comprising a power shaft extending upward in a direction transverse to the plane of the last bottom for effecting relative movement of the last and the grippers to pull the upper and for operating said fastening mechanism, means for controlling the operation of said shaft to cause the upper to be pulled over the last and fastened with a pause between the upper pulling and the fastening operations to permit inspection of the upper, and means under control of the operator in his working position for effecting movement of one or more of the grippers during said pause in the machine's operation in a direction to change the tension under which the upper is held.

29. A machine of the class described having, in combination, means for positioning a shoe for a pulling-over operation with the plane of the tip seam of the shoe coinciding substantially with the operator's line of vision as he looks diagonally forward and downward toward the shoe, automatic means having a prescribed range of movement for pulling over and fastening the upper of the shoe as thus positioned with a pause between the upper pulling and the fastening operations, and means under manual control for adjusting the upper during said pause in the machine's operations.

30. A machine of the class described having, in combination, means for positioning a last with an upper and a sole thereon with the upper toward the operator and the toe end of the last pointing in a direction of non-intersection with a vertical plane extending between the last and the operator's working position, grippers for engaging the upper as thus positioned, power driven means for effecting relative movement of the grippers and the last to pull the upper and for then holding the upper under tension with the machine at rest, means for adjusting the upper on the last while the upper is thus held, and power driven means arranged for operation upon a subsequent starting of the machine to fasten the upper.

31. A machine of the class described having, in combination, means for positioning a last and an upper with the top of the forepart facing the operator and the toe end of the last pointing upward in a direction of non-intersection with a vertical plane extending between the last and the operator's working position, upper gripping devices, power operated means for operating said devices to pull the upper and then to hold it under tension, and means extending forwardly from said gripping devices above the level of the work to enable the operator to effect a relative adjusting movement of said devices.

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

FRED RICKS.

Correction in Letters Patent No. 1,346,256.

It is hereby certified that in Letters Patent No. 1,346,256, granted July 13, 1920, upon the application of Fred Ricks, of Leicester, England, for an improvement in "Pulling-Over Machines," an error appears in the printed specification requiring correction as follows: Page 8, line 82, claim 25, for the word "them" read *then;* and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 30th day of November, A. D., 1920.

[SEAL.] L. B. MANN,

Acting Commissioner of Patents.

Cl. 12—4.