

Dec. 8, 1942.

F. B. KEALL

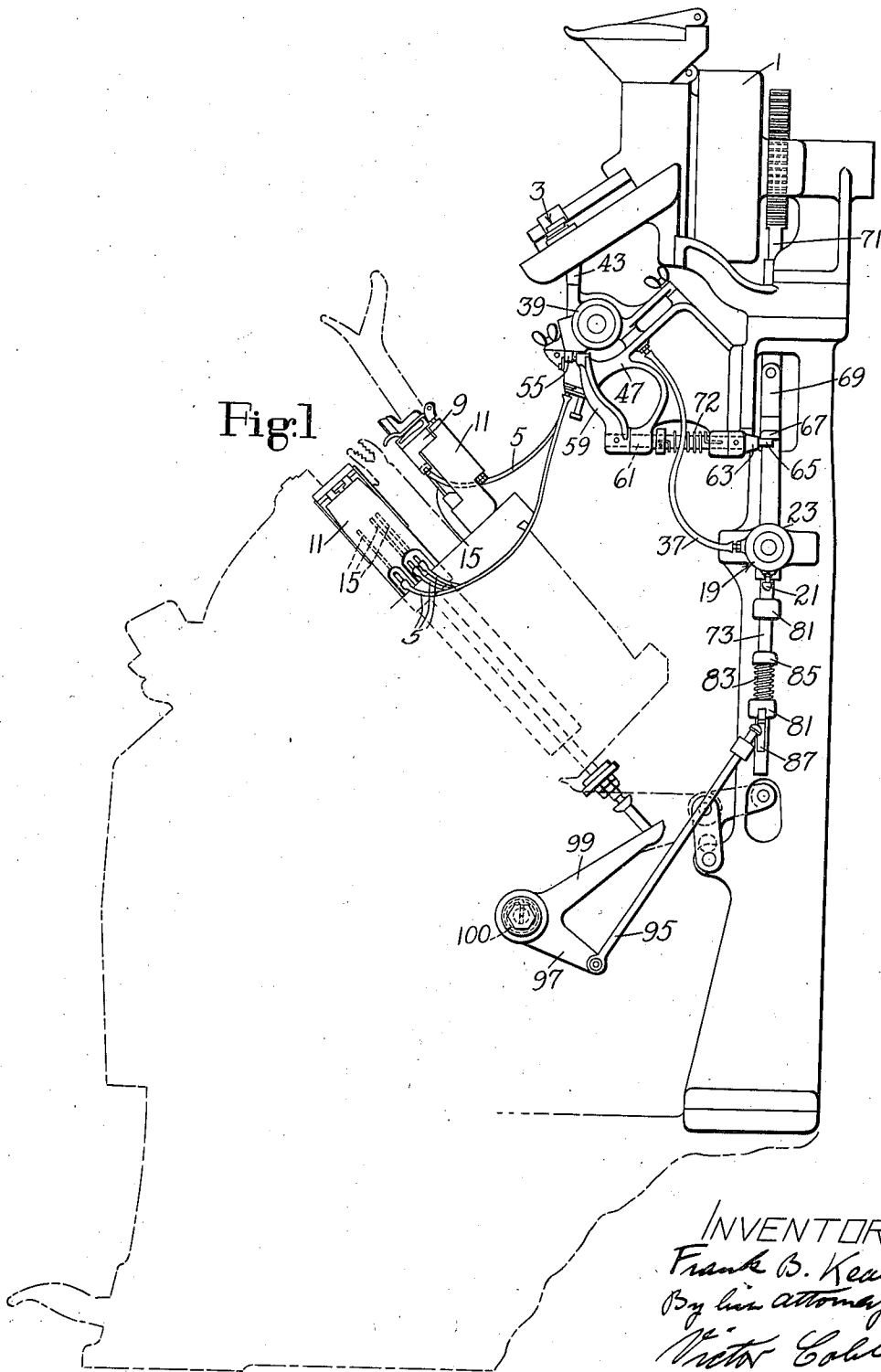
2,304,572

UPPER FASTENING MECHANISM

Filed Jan. 28, 1941

3 Sheets-Sheet 1

Fig. 1



INVENTOR.
Frank B. Keall
By his attorney
Victor Cobb.

Dec. 8, 1942.

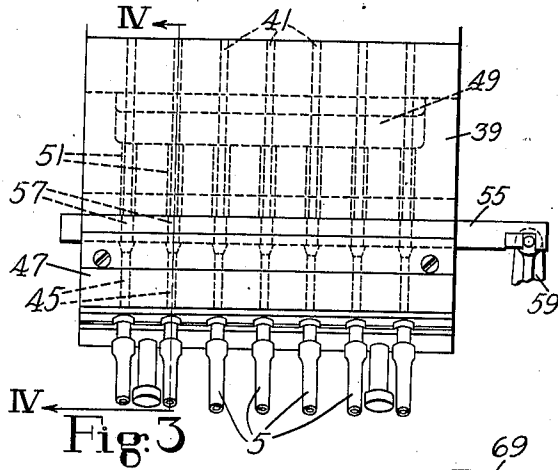
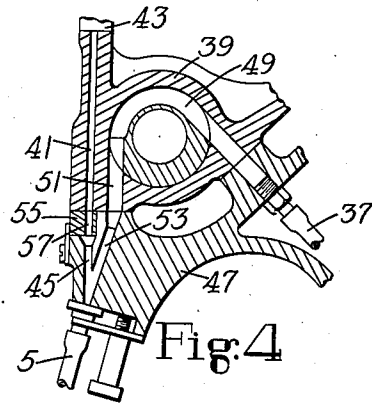
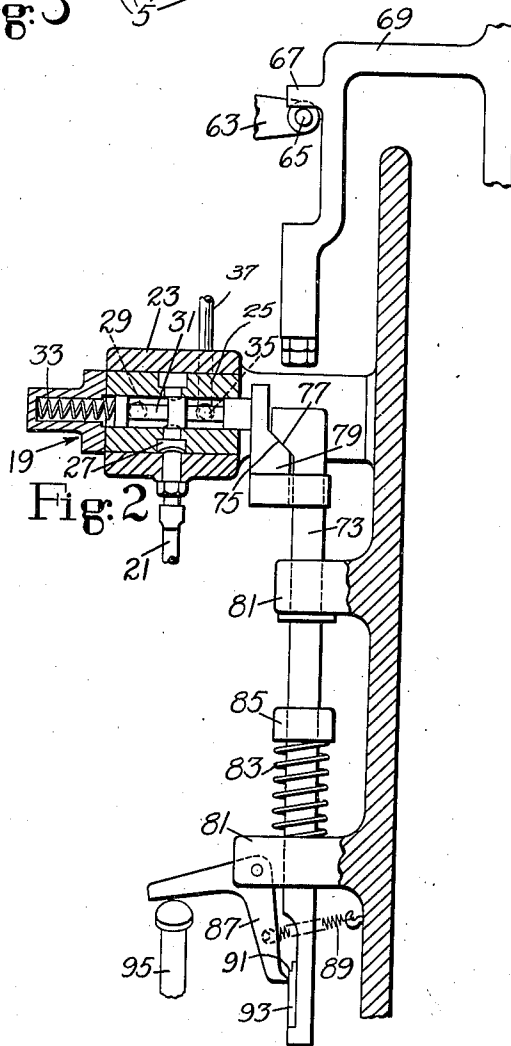
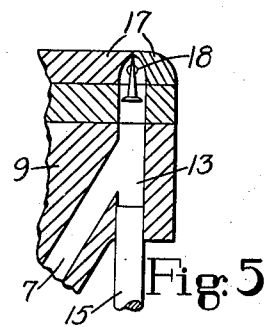
F. B. KEALL

2,304,572

UPPER FASTENING MECHANISM

Filed Jan. 28, 1941

3 Sheets-Sheet 2



INVENTOR
Frank B. Keall
By his Attorney
Victor Gold

Dec. 8, 1942.

F. B. KEALL

2,304,572

UPPER FASTENING MECHANISM

Filed Jan. 28, 1941

3 Sheets-Sheet 3

Fig. 6.

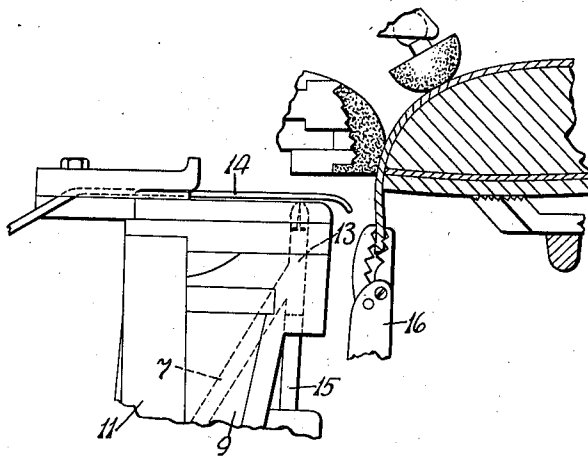
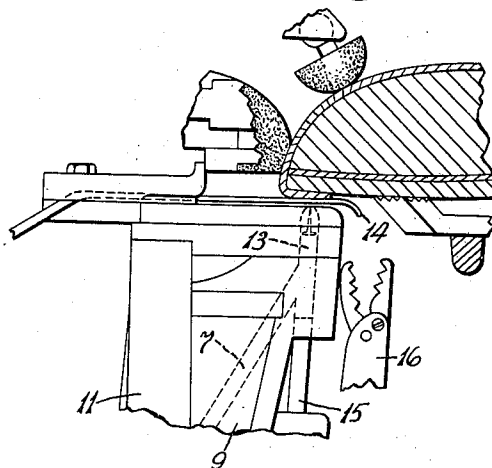


Fig. 7.



INVENTOR
Frank B. Keall
By his attorney
Merrill Kelley

UNITED STATES PATENT OFFICE

2,304,572

UPPER-FASTENING MECHANISM

Frank Bycroft Keall, Leicester, England, assignor
to United Shoe Machinery Corporation, Bor-
ough of Flemington, N. J., a corporation of New
Jersey

Application January 28, 1941, Serial No. 376,305
In Great Britain March 9, 1940

6 Claims. (Cl. 1—18.1)

This invention relates to machines for use in the manufacture of shoes for shaping uppers over lasts, and is herein illustrated as applied to a pulling-over machine of the type exemplified by the disclosure of United States Letters Patent No. 1,510,851, granted on October 7, 1924, on an application of A. E. Jerram and J. Gouldbourn. It is to be understood, however, that the invention is not limited to machines of that particular type.

Machines of the type illustrated in the above-mentioned Letters Patent are provided with grippers for pulling an upper over a last positioned bottom downward and with upper-fastening mechanisms which are movable from initial fastening-receiving positions into positions to operate on the shoe and include drivers movable in driver passages therein to drive fastenings, which are customarily tacks, upwardly into the shoe to fasten the upper. Such machines have been provided heretofore with means constructed as disclosed in United States Letters Patent No. 1,921,099, granted on August 8, 1933, on an application of W. T. B. Roberts, for feeding fastenings into the driver passages when the upper-fastening mechanisms are in their fastening-receiving positions. As therein disclosed, the upper-fastening mechanisms have upwardly extending ducts opening into the driver passages above the upper ends of the drivers when the drivers are in their initial positions, and conduits are arranged to communicate with the lower ends of these ducts and are curved to invert fastenings received point downward and to deliver the fastenings point upward into the ducts, the fastenings being forced into and through the ducts and into the driver passages by currents of air delivered into the curved conduits. The fastenings thus forced into the driver passages are propelled against tack-guiding fingers located at the upper ends of the passages and either become jammed between these fingers or fall back upon the upper ends of the drivers when the currents of air are discontinued. When the upper-fastening mechanisms are thereafter moved from their fastening-receiving positions into positions for driving the fastenings, gate valves located at the junctions of the ducts and the driver passages are closed to guard against return at that

time of any of the fastenings into the duct from which it was delivered.

An object of the present invention is to afford better insurance against the return of any fastening from a driver passage into the corresponding delivery duct, either in the movement of the upper-fastening mechanism from fastening-receiving position or at any other time, with consequent failure of the machine to drive a fastening in that location and probable interference also with the proper feeding of a fastening in the next cycle of operations of the machine. For the purpose in view the invention provides means for continuing the current of air whereby each fastening is fed into the driver passage, so as to support the fastening by the current of air above the upper end of the driver until after the upper-fastening mechanism has moved from its fastening-receiving position into position to drive the fastening. As herein illustrated, the current of air is, in fact, continued to support the fastening until the driver is operated, and the gate valve heretofore used at the junction of the driver passage and the delivery duct is dispensed with. In the construction herein shown an air valve is operated early in the cycle of operations of the machine to admit currents of air from a suitable source, such as a compressor pump, into conduits communicating with the several ducts which lead to the driver passages, these conduits comprising curved flexible tubes which receive fastenings point downward and deliver them point upward and are connected at all times to the ducts. This valve is held by a latch in position to continue the currents of air, the latch being operated to release the valve to cause discontinuance of the currents of air in response to the movement of one of the driver-operating arms with which the machine is provided.

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

In the drawings,

Fig. 1 is a view showing in right-hand side elevation portions of a pulling-over machine of the type illustrated in the above-mentioned

Letters Patent with the novel features of the present invention embodied therein, the outline of other portions of the machine being indicated diagrammatically;

Fig. 2 is a view partly in rear elevation and partly in section of a portion of the structure shown in Fig. 1;

Fig. 3 is a view in front elevation of certain parts which appear near the top of Fig. 1;

Fig. 4 is a section on the line IV—IV of Fig. 3;

Fig. 5 is a sectional view showing a portion of one of the upper-fastening mechanisms;

Fig. 6 shows, as viewed from the rear in a downwardly and forwardly inclined direction, a portion of one of the side upper-fastening mechanisms and of the gripper associated therewith as the parts appear after the pulling of the upper by the gripper but while the upper-fastening mechanism is still in its fastening-receiving position; and

Fig. 7 is a view similar to Fig. 6, but showing the parts as they appear after the upper-fastening mechanism has been moved into position to drive the fastenings.

Like prior machines of the illustrated type, the machine herein shown includes an oscillatory tack hopper 1 and tack-separating means 3 for separating and delivering tacks point downward from raceways which are supplied with tacks by the tack hopper, the tacks being delivered by the separating means into tubes 5 leading toward upper-fastening mechanisms with which the machine is provided. In the machine herein shown the tubes 5, instead of communicating with curved tack-inverting passages formed in stationary members like the blocks 30 shown in Letters Patent No. 1,921,099, are themselves curved for the purpose of inverting the tacks and delivering them point upward, the tubes being flexible and communicating directly with ducts 7, one of which is shown in Figs. 5, 6 and 7, formed in blocks 9 of the upper-fastening mechanisms. These blocks are carried by arms 11 corresponding to the arms 12 of the last-mentioned Letters Patent. It will be understood that there are three such arms 11, two of which are shown in Fig. 1, comprising an arm at the end of the toe of the shoe and a pair of arms at the opposite sides of the forepart respectively, these arms being provided with wipers 14 (Figs. 6 and 7) for wiping the margin of the upper inwardly over the insole as the arms are swung inwardly toward the shoe after the pulling of the upper by the usual grippers 16 and with means for then driving tacks upwardly to fasten the margin of the upper to the insole. In the machine herein shown the arm at the end of the toe is provided with means for driving a single tack and each side arm is provided with means for driving three tacks, so that a single one of the tubes 5 leads to the first-mentioned arm and three of the tubes lead to each of the side arms, each side arm having a single block 9 provided with three ducts 7 with which the tubes 5 communicate. The ducts 7 at their upper ends open into the sides of driver passages 13, one of which is shown in Figs. 5, 6 and 7, in locations somewhat above the upper ends of tack drivers 15 when the drivers are in their lowermost positions. Tack-guiding fingers 17 are arranged as usual to overlie the passages 13 to insure that the points of the tacks will be centralized relatively to the tack drivers, these fingers being wedged apart by the tacks and the drivers in the tack-driving operation.

After the tacks have been dropped into the tubes 5 by the separating means, they are blown upwardly into and through the ducts 7 and into the driver passages 13 by currents of air which, in the machine herein shown, are prolonged so that the tacks are held suspended at the upper ends of the passages 13 against the tack-guiding fingers 17 until the drivers 15 are operated, thus insuring that none of the tacks will fall back into its delivery duct 7 and thus fail to be driven while also interfering with the proper feeding of a tack in the next cycle of operations of the machine. A small opening 18 is provided in each pair of tack fingers for escape of the air. Since the tacks are of such little weight it has been found that air pressure of only about one pound per square inch is needed to feed them and to hold them thus suspended.

For introducing air into the tack tubes 5 there is provided on the right-hand side of the machine valve mechanism 19 connected by means of a pipe 21 to any convenient source of continuous air supply, preferably a suitable compressor pump (not shown). The valve mechanism 19 comprises a casing 23 which serves as a housing for a cylinder 25 having therein an inlet port 27 from the pipe 21, an exhaust port 29 and a slidable piston valve 31. A small spring 33 acting on the valve 31 maintains it normally in such a position that the inlet port 27 is in communication with the exhaust port 29, as illustrated in Fig. 2. By means hereinafter described the valve 31 is operated at a predetermined time to connect the inlet port 27 to an outlet port 35 in the cylinder 25, this port being connected by a flexible pipe 37 (Figs. 1 and 4) to an elongated block 39 extending laterally of the machine and located below the tack-separating means. The block 39 is provided with tack-guiding ducts 41 which receive tacks from tubes 43 leading downwardly from the tack-separating means. The ducts 41 are arranged to communicate with ducts 45 formed in a casting 47 on which the block 39 is supported, and the ducts 45 communicate, in turn, with the upper ends of the tack tubes 5. Air from the pipe 37 is led into a chamber 49 in the block 39 and passes from this chamber through passages 51 in the block into ducts 53 in the casting 47 which lead into the tack-guiding ducts 45.

In order to cause the currents of air to pass into the tack tubes 5 without escape of any of the air upwardly through the ducts 45 and 41 to the separating means, there is provided a bar 55 which serves as a gate member slidably movable in the casting 47. This bar is provided with ducts 57 arranged to register at times with the ducts 41 and 45 and through which, therefore, tacks must pass to reach the tubes 5. Initially the bar 55 is in such a position that its ducts 57 are thus in alinement with the ducts 41 and 45, and to slide the bar into position to prevent air from escaping upwardly through these ducts the right-hand end of the bar is connected to the upper end of an arm 59 fast on the front end of a rockshaft 61 journaled in the frame of the machine. A horizontally extending arm 63 (Fig. 2) fast on the rear end of the shaft 61 carries a pin 65 arranged to be engaged by a lug 67 on an arm 69 connected to a vertically movable bar 71 having rack teeth on its upper end for oscillating the tack hopper 1 and operating the separating means 3. In the machine herein shown downward movement of the bar 71 occurs early in the cycle of operations of the machine, and, accord-

ingly, at this time the rockshaft 61 is operated against the resistance of a return spring 12 thereon to move the bar 55 into a position in which its ducts 57 are out of alinement with the ducts 41 and 45.

The above-mentioned downward movement of the bar 71 serves also to move the valve 31 into position to connect the inlet port 27 to the port 35 and thus to admit air from the pipe 21 to the tubes 5. For this purpose the arm 69 is provided on its lower end with means for engaging the upper end face of a vertical rod 73 and for imparting downward movement to this rod. At its upper end the rod 73 has formed thereon an inclined cam face 75 arranged to engage a complementary cam face 77 on a small block 79 secured on a projecting end of the piston valve 31. The rod 73 is guided in lugs 81 on the frame and is held initially upraised by a spring 83 confined between one of the lugs 81 and a collar 85 on the rod. It will be understood that when the rod 73 is moved downwardly by the arm 69 the valve 31 is moved against the resistance of the spring 83 to connect the inlet port 27 to the outlet port 35. As illustrated in Fig. 2, the arm 69 is spaced initially far enough above the rod 73 to insure that the bar 55 will be moved into position to prevent upward escape of air before the air is admitted to the tubes 5.

To hold the valve 31 in position to maintain communication between the pipe 21 and the tubes 5 the required length of time, there is provided a latch 87 pivotally mounted on one of the lugs 81 and controlled by a spring 89 which swings it into position over a shoulder 91 formed on a wear plate 93 fast on the rod 73 upon downward movement of the rod, so that the latch holds the rod against return movement. The latch is swung into position to release the rod 73, to interrupt the admission of air to the tubes 5, by the operation of the tack-driving means. For this purpose an upwardly and rearwardly extending bar 95 guided in a lug on the frame is arranged with its upper end under a tail of the latch 87 and is connected at its lower end to an arm 97 integral with one of a plurality of spring-operated arms 99 with which machines of the illustrated type are provided for operating the tack drivers 15, each arm being thus operated by a spring 100. The driver-operating arms 99 are released to the action of their operating springs 100 after the several arms 11 have been swung into positions for the driving of the tacks, and in response to the driver-operating movement of that arm 99 to which the bar 95 is connected this bar is moved upwardly and swings the latch 87 out of operative position. It will be understood that by the time the currents of air are thus discontinued the quickly operated drivers 15 have arrived substantially in positions to drive the tacks, so that there is no opportunity for the tacks to fall back before the drivers have covered the upper ends of the ducts 7.

The manner of operation of the machine, in so far as it is of interest with reference to the present invention, will now be briefly summarized. In a machine of the illustrated type tacks will have been separated and dropped into the tubes 5 near the end of the preceding cycle of operations of the machine, so that these tacks are located in the lower curved portions of the tubes ready to be blown upwardly into the ducts 7. Shortly after the starting of the machine the bar 71 is moved downwardly and acts through the rockshaft 61 and the arm 59 to move the bar

55 into position to interrupt communication between the ducts 41 and 45. By the same downward movement of the bar 71 the rod 73 is moved downwardly to cause the valve 31 to connect the inlet port 27 to the outlet port 35 and thus to admit air to the several tubes 5 to force the tacks upwardly through the ducts 7 into the positions illustrated in Fig. 5. When the rod 73 is thus moved downwardly it is locked against return movement by the latch 87, so that the currents of air continue to hold the tacks at the upper ends of the driver passages 13. It will be understood that early in the cycle of operations of a machine of the illustrated type the several grippers grip and pull the upper over the last, the machine then coming to a stop with the grippers holding the upper under tension. After the machine has again been started, the several arms 11 are swung inwardly to cause the wipers 14 thereon to wipe the margin of the upper over the insole and to carry the tack-driving mechanisms into positions to drive the tacks, as illustrated by Fig. 7, the grippers being tripped to cause them to release the upper. Since the tacks are supported by the currents of air at the upper ends of the driver passages 13 as the arms are thus moved from tack-receiving positions to tack-driving positions, there is no danger that such movements of the arms will cause any tack to return into the duct 7 from which it was delivered. The drivers 15 are then released to the action of the spring-operated arms 99 to cause them to drive the tacks. In the tack-driving operation the bar 95 is operated by that one of the arms 99 to which it is connected and acts on the latch 87 to release the rod 73, so that this rod is returned upwardly by its spring 83 and the valve 31 is returned to its initial position by its spring 33, thus interrupting the flow of air to the tubes 5. Near the end of the cycle of operations the bar 71 is moved upwardly to separate and deliver another set of tacks to the tubes 5, communication between the ducts 41 and 45 being reestablished by reverse movement of the bar 55 effected by the spring 12.

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

1. In a machine for shaping uppers over lasts positioned bottom downward, upper-fastening mechanism movable from a fastening-receiving position into position to drive a fastening upwardly into a shoe to fasten the upper, said upper-fastening mechanism comprising a driver movable upwardly in a driver passage to drive the fastening and including also an upwardly extending duct opening into said driver passage above the upper end of the driver when the driver is in its initial position, and means for feeding a fastening along said duct and into the driver passage by a current of air and for supporting the fastening above the driver by said current of air while the upper-fastening mechanism moves from its fastening-receiving position into position to drive the fastening.
2. In a machine for shaping uppers over lasts positioned bottom downward, upper-fastening mechanism movable from a fastening-receiving position into position to drive a fastening upwardly into a shoe to fasten the upper, said upper-fastening mechanism comprising a driver movable upwardly in a driver passage to drive the fastening and including also an upwardly extending duct opening into said driver passage above the upper end of the driver when the

driver is in its initial position, a member mounted for swinging movement to operate the driver, means for feeding a fastening along said duct and into the driver passage by a current of air and for supporting the fastening above the driver by said current of air while the upper-fastening mechanism moves from its fastening-receiving position into position to drive the fastening, and means controlled by said driver-operating member for discontinuing said current of air only upon operative movement of the driver.

3. In a machine for shaping uppers over lasts positioned bottom downward, upper-fastening mechanism movable from a fastening-receiving position into position to drive a fastening upwardly into a shoe to fasten the upper, said upper-fastening mechanism comprising a driver movable upwardly in a driver passage to drive the fastening and including also an upwardly extending duct opening into said driver passage above the upper end of the driver when the driver is in its initial position, a spring-controlled, valve for admitting a current of air to said duct to feed a fastening into the driver passage, a latch for holding said valve in position to continue said current of air to support the fastening above the driver while the upper-fastening mechanism moves from its fastening-receiving position into position to drive the fastening, and means for operating said latch to release the valve and thus to discontinue the current of air only upon operative movement of the driver.

4. In a machine for shaping uppers over lasts positioned bottom downward, upper-fastening mechanism movable from a fastening-receiving position into position to drive a fastening upwardly into a shoe to fasten the upper, said upper-fastening mechanism comprising a driver movable upwardly in a driver passage to drive the fastening and including also an upwardly extending duct opening into said driver passage above the upper end of the driver when the driver is in its initial position, an air conduit connected to said duct, a valve associated with said conduit, means for moving said valve into position to admit a current of air to the conduit to feed a fastening along said duct and into the driver passage and to support the fastening above the driver when the upper-fastening mechanism is in its fastening-receiving position, a device for retaining the valve in that position to cause the current of air to continue to support the fastening while the upper-fastening mechanism moves from its

fastening-receiving position into position to drive the fastening, and means for operating said retaining device thereafter to release the valve.

5. In a machine for shaping uppers over lasts positioned bottom downward, upper-fastening mechanism movable from a fastening-receiving position into position to drive a fastening upwardly into a shoe to fasten the upper, said upper-fastening mechanism comprising a driver movable upwardly in a driver passage to drive the fastening and including also an upwardly extending duct opening into said driver passage above the upper end of the driver when the driver is in its initial position, a member movable to operate said driver, a spring for thus moving said member, means for admitting a current of air to said duct to feed a fastening along the duct and into the driver passage and for continuing said current of air to support the fastening above the driver while the upper-fastening mechanism moves from its fastening-receiving position into position to drive the fastening, and means for discontinuing said current of air in response to the operative movement of said driver-operating member.

6. In a machine for shaping uppers over lasts positioned bottom downward, upper-fastening mechanism movable from a fastening-receiving position into position to drive a fastening upwardly into a shoe to fasten the upper, said upper-fastening mechanism comprising a driver movable upwardly in a driver passage to drive the fastening and including also an upwardly extending duct opening into said driver passage above the upper end of the driver when the driver is in its initial position, a member movable to operate said driver, an air conduit connected to said duct, a valve associated with said conduit, means for moving said valve into position to admit a current of air to said conduit to feed a fastening along said duct and into the driver passage and to support the fastening above the driver while the upper-fastening mechanism is in its fastening-receiving position, a latch for retaining the valve in that position to cause the current of air to continue to support the fastening while the upper-fastening mechanism moves from its fastening-receiving position into position to drive the fastening, and means for operating said latch to release the valve and thus to discontinue said current of air in response to the operative movement of said driver-operating member.

FRANK BYCROFT KEALL.