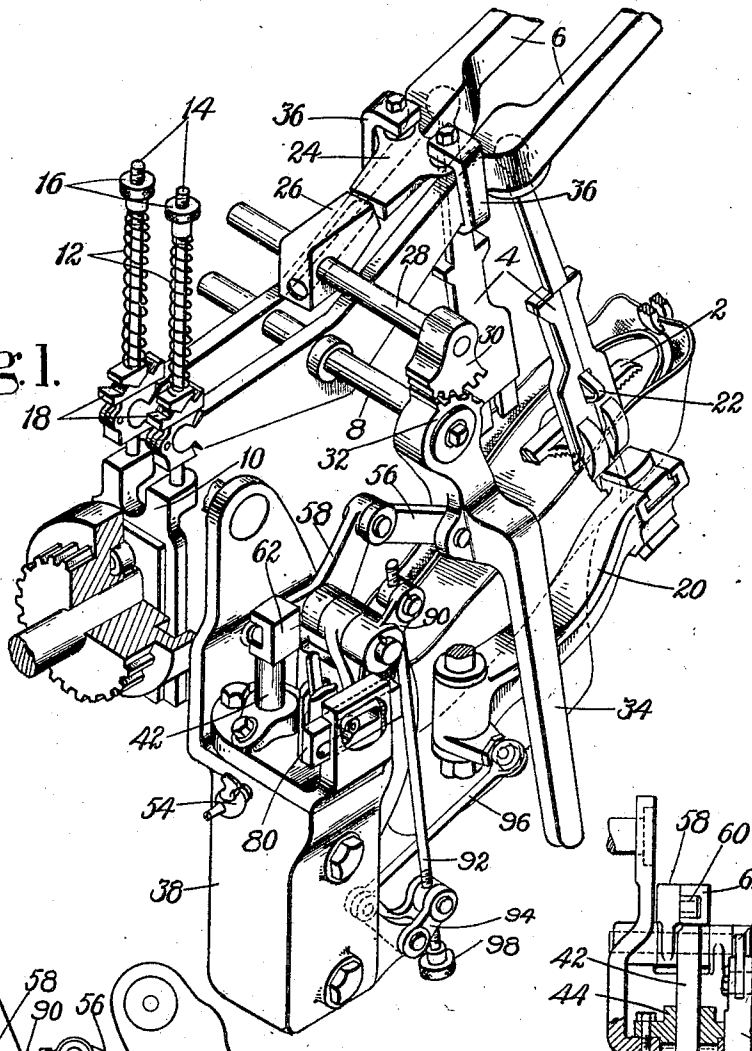
Mar. 20, 1923. 1,448,742

J. GOULDBOURN

PULLING OVER MACHINE

Filed Mar. 1, 1922

Fig. 1.



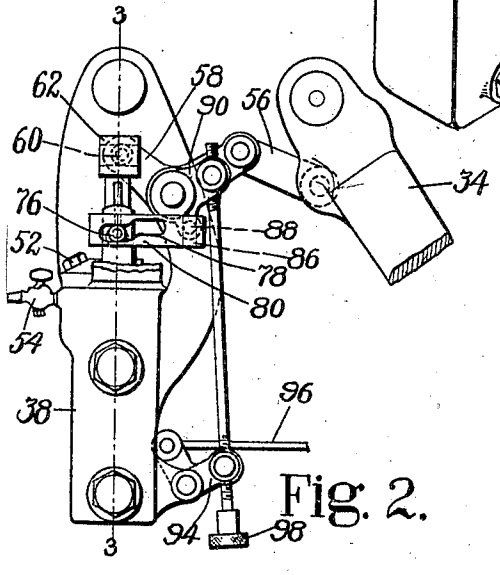




Fig. 2.

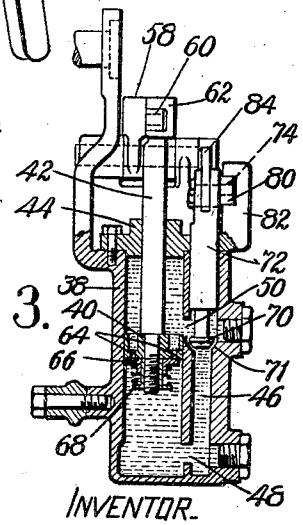



Fig. 3.

INVENTOR.

Joseph Gouldbourn

By his Attorney

Nelson N. Bramhall.

Patented Mar. 20, 1923. 1,448,742

# UNITED STATES PATENT OFFICE.

JOSEPH GOULDBOURN, OF LEICESTER, ENGLAND, ASSIGNOR TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

## PULLING-OVER MACHINE.

Application filed March 1, 1922. Serial No. 540,275.

*To all whom it may concern:*

Be it known that I, JOSEPH GOULDBOURN, 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 upper pulling or pulling-over machines, and more particularly to the control of the relative movement between upper gripping means and the last or form in the upper pulling operation. The invention is herein illustrated in its application to the control of the side grippers in a well-known type of pulling-over machine, but it will be understood that the invention is not limited to side gripper control nor to an organization of the particular type illustrated.

In machines such as are commonly used for pulling over uppers, of which the machine herein shown is a well-known example, the upper pulling movement of the grippers is effected through springs which are subjected to stress by a moving part of the machine and react in the upper pulling operation until the resistance of the upper balances the force of the springs. In such machines it has been found advantageous to provide means for controlling some or all of the grippers in such manner as to retard their movement in the pulling of the upper, in order to avoid the danger of damage to light uppers by strains too suddenly applied through springs of such force as it is desirable to use to insure the proper final tensioning of the upper, as well as to cushion the gripper mechanism against objectionable shock when the grippers are suddenly released from the upper. Such an organization is disclosed in United States Letters Patent No. 1,169,414, granted on January 25, 1916 upon an application of R. F. McFeely, wherein the movement of the side grippers is controlled by an air check which acts as a dash pot in opposition to the stress of the updraw springs. The use of such an air check, however, affords only an approximation to that regularity of gripper movement which is desirable, principally by reason of the compressibility of the fluid medium which renders the checking action comparatively ineffective in the early stages of the pulling movement. It has also been proposed to control pulling-over grippers by the use of liquid as a retarding medium, as disclosed in United States Letters Patent No. 1,095,261, granted on May 5, 1914 upon an application of Arthur Bates and No. 1,240,196 granted upon my prior application on September 18, 1917. Such liquid checks, however, for various reasons have not proved, on the whole as satisfactory as the air check. This has arisen partly from their failure to permit a quick withdrawal of the grippers out of the way of the overlaying and tacking devices when the grippers release the upper, and partly from the fact that in liquid checks such as have been provided heretofore in this type of machine the return springs utilized to restore parts of the retarding means quickly to normal position have detracted from the desired regularity of gripper movement by their increasing stress in opposition to the updraw springs in the upper pulling operation. In constructions heretofore proposed, moreover, a liquid check has been provided for each of a plurality of grippers, thus involving an undesirable multiplicity of parts as well as making it difficult to equalize the retarding effect as between the opposite side grippers.

The present invention aims to provide for better control than heretofore of relative movement between upper gripper means and the last or form, to the end that pulling of the upper may be effected through a spring or springs of sufficient force to stretch and tension the upper as much as is desirable on any class of work without the danger of damaging the upper materials. In its accomplishment of this and other objects, the invention provides, as an important feature, a novel organization of retarding mechanism and controlling means therefor, the construction shown comprising means for relieving the checking or retarding action at a predetermined point in the cycle of operations of the machine, thus rendering it feasible to utilize liquid, for example, as the retarding medium without disadvantages such as have heretofore attended its use in upper pulling machines. The construction shown comprises more particularly, a fluid check having a restricted passage for the flow of the fluid to retard the gripper movement during the upper pull-

ing operation, together with means which is automatically operated after the grippers have completed their pulling movement to permit a comparatively unobstructed flow of fluid when the grippers release the upper in order that they may be quickly withdrawn out of the way of the overlaying wipers and tackers.

A further feature of the invention consists in a novel organization comprising a liquid check with operating connections constructed and arranged to effect a quick return of parts of the retarding mechanism to normal position, the construction shown comprising a liquid chamber provided with a plunger or piston which is restored positively to its normal position by the return movement of the gripper operating mechanism. Still another feature is to be recognized in a novel organization comprising a single retarding mechanism constructed to utilize liquid as the retarding medium, with equalizing connections to the opposite side grippers for controlling and equalizing the pulling force applied at the opposite sides of the last. As an advantageous practical embodiment of the invention for the purposes in view, the construction illustrated comprises a liquid containing cylinder which is closed at its opposite ends and has a by-pass for the flow of the liquid from one of its ends to the other under control of means which variably restricts the flow.

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

In the drawings:

Fig. 1 is a perspective view of a portion of a pulling-over machine embodying the novel features of this invention, showing the parts in the positions assumed in the upper pulling operation;

Fig. 2 is a side elevation of a portion of the retarding mechanism with the parts in starting position, and

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

The machine herein shown, in common with other machines of the well-known type illustrated, comprises a sole rest 2 and grippers for engaging and pulling the upper at the toe and the opposite sides of the forepart, the side grippers 4 and their operating connections being shown herein in detail, such connections comprising updraw levers 6 which are mounted on a pivot rod 8 and are connected at their rear ends to a cam-operated slide 10 through springs 12 which are mounted upon rods 14 on the slide and are compressed by the downward movement of the slide to operate the grippers yieldingly, It will be understood that upon the starting of the machine the slide 10 receives a comparatively quick downward movement from its operating cam and that through the springs 12 the gripper levers are thereby operated to close the grippers on the upper and then to pull the upper over the last until the resistance of the tensioned upper balances the force of the springs, which react to complete the pulling of the upper after the slide 10 has completed its downward movement. The force of the springs may be varied by adjustment of nuts 16 on the upper ends of the rods 14 and by movement of wedges 18, as in prior machines. The machine comes automatically to a stop with the upper under tension, and upon a subsequent actuation of the starting means the side clamps, one of which is shown at 20, are swung inwardly at the opposite sides of the shoe, and overlaying and tacking devices (not herein shown) are operated to wipe the margin of the upper inwardly and to fasten it to the insole. By the inward movement of the overlaying and fastening devices the grippers are tripped by engagement with latches 22 to cause them to release the upper, whereupon the grippers are quickly withdrawn out of the way of the overlaying and fastening means by further reaction of the springs 12 which move the updraw levers 6 to the limit determined by the cam slide 10. Subsequently the gripper levers are positively returned to starting position by upward movement of the cam slide.

In common with the machine shown in Patent No. 1,169,414 the side gripper levers of the machine herein shown are connected to an equalizing lever 24 which is mounted for turning movement in a block 26 about an axis extending lengthwise of the gripper levers, the block 26 being fast upon a rock shaft 28 which carries a gear segment 30 operatively engaged with a co-operating gear segment 32 on a hand lever 34 which is pivoted on the rod 8 and is adapted to permit manual control of the side gripper movement when desired. The equalizing lever 24 bears upon the upper edges of the levers 6 and is connected to these levers by means of bridle members 36 so that swinging movement of the levers 6 in either direction is accompanied by a swinging movement of the lever 24 about the axis of the rock shaft 28, the lever 24 being permitted to turn in the block 26 to accommodate itself to different relative positions of the levers 6.

In the present machine there is mounted upon the side of the frame a liquid check or dashpot comprising a vertical cylinder 38 which is a double-ended cylinder, i. e. closed at its opposite ends, and has between its ends a piston 40 mounted on the lower end of a piston rod 42 which extends upwardly

through a cover plate 44 closing the upper end of the cylinder. Communication is afforded between the opposite ends of the cylinder 38 through a by-pass 46 and ports 48 and 50 which connect the by-pass to the cylinder at the opposite sides of the piston 40. The cylinder 38 is adapted to contain liquid, for example oil, which preferably, as in the construction shown, completely fills the cylinder and the by-pass 46, the cylinder having a screw cap 52 which normally closes an opening through which the oil is introduced and a cock 54 which permits the escape of air as the cylinder is filled. The piston rod 42 is connected to the lever 34 by means of a link 56 and a bell-crank 58, one arm of the bell-crank having a roll 60 mounted in a horizontal slot in a block 62 on the upper end of the piston rod. It will be evident that through these connections the piston 40 receives downward movement in its cylinder in response to the updraw movement of the side gripper levers 6 to pull the upper and receives a positive return upward movement in its cylinder in response to the return of the gripper levers to starting position. In order to assist in permitting the gripper levers to be returned freely to starting position, the piston 40 is provided with a plurality of bores 64 which extend vertically through it and are controlled by a valve 66 which is normally pressed upward by a spring 68 to close the bores but yields to permit the oil to flow from the upper to the lower side of the piston when the piston receives its upward movement. In the downward movement of the piston in the upper pulling operation the valve 66 closes the bores 64 so that the liquid retards the movement of the gripper levers in a manner determined by the resistance to the flow of the liquid through the by-pass 46.

For controlling the flow of the liquid through the by-pass 46 there is provided a conical valve 70 which co-operates with a corresponding valve seat 71 in the walls of the by-pass to provide a restricted orifice for the flow of the liquid and is mounted on the lower end of a vertical stem 72 which has a liquid tight fit with the walls of an opening in the cover plate 44. The upper end of the stem 72 has an eccentric connection 74 with a roll 76 which is mounted in a cam slot 78 in a slide 80 mounted to move horizontally in a lug 82 on the cover plate 44. The normal position of the valve 70 relatively to its seat is thus determined by the roll and the cam slot, and by means of a handle 84 the eccentric connection 74 may be turned to adjust the position of the valve and thus to vary the width of the orifice through which the liquid is permitted to flow and the consequent resistance to pulling movement of the grippers. By reference to Fig. 2 it will be seen that the cam slot 78 comprises two horizontal portions at different heights with an inclined portion connecting them, and by movement of the slide toward the left from the position indicated in Fig. 2 the valve is raised in the present machine after the upper pulling operation has been completed to permit a comparatively unrestricted flow of the liquid past the valve in the by-pass 46. In the machine shown such movement is imparted to the slide 80 through connections to one of the side clamp arms 20 which in this type of machine are swung inwardly to clamp the upper at the sides of the forepart when the machine is started for the second time in the cycle. For connecting the slide to the arm 20 the slide has a vertical slot 86 which receives a stud 88 on one arm of a bell crank 90 mounted on the same pivot as the bell crank 58. The other arm of the bell crank 90 has a trunnion connection with one end of a rod 92 the other end of which is similarly connected to one arm of a bell crank 94, the other arm of the latter being connected by a rod 96 to a boss on the hub of the clamp arm 20. The rod 92 has right and left hand threaded portions engaging the respective trunnion connections and is provided with a knurled head 98 whereby it may be turned to vary the time in the inward movement of the clamp arms when the slide 80 becomes effective to open the valve, as may be required for different widths of shoes.

In operation the valve 70 is adjusted to obstruct the flow of the liquid in the by-pass 46 as much as may be required, having regard to the character of the shoe materials and the strength of the updraw springs. Upon the starting of the machine the liquid check is effective to retard the movement of the grippers from the beginning of the operation of the cam slide 10, and is uniformly effective in its retarding action throughout the upper pulling movement of the grippers which continues until the resistance of the upper balances the stress of the updraw springs. It will be evident that the retarding means of the present machine affects only the rate of the movement of the grippers and not the final tension applied through the springs which is substantially the same as if the retarding means were not in use. When the machine is started for the second time in the cycle the valve 70 is lifted, as hereinbefore explained, before the grippers have been tripped by the overlaying and tacking means, and consequently a comparatively unobstructed flow of the liquid through the by-pass is permitted when the grippers are tripped, so that the updraw springs may effect a quick withdrawal of the grippers, as is necessary for the proper operation of the

overlaying and fastening devices. In the subsequent return of the parts to starting position the gripper levers are positively operated by upward movement of the cam slide 10 and through their connections to the piston 40 they move the piston positively upward to the starting position illustrated in Fig. 3, the liquid being permitted to flow through the bores in the piston as well as through the by-pass to permit the quick return movement of the piston.

The cylinder may be of such proportions and the parts so adjusted as to render the pulling movement of the grippers as slow as may be desired, provided the output of the machine is not unduly restricted. By reason of the substantial uniformity of gripper movement insured by the use of the construction shown, and the precision with which the movement may be controlled, it has been found practicable to use, for example, on women's work updraw springs which, if ruptures of the upper were to be guarded against, could only be used with the air check on men's heavy uppers.

While the invention is illustrated by reference to the use of liquid as a retarding medium, and while important advantages are to be recognized in such use in an organization embodying features of the invention, it will be evident that in various novel and useful aspects the invention is not restricted to a liquid check.

Having described the invention, what I 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 upper gripping means and means for pulling an upper yieldingly over a last by relative movement between said upper gripping means and the last, of means constructed and arranged to retard said relative pulling movement, and mechanism automatically operative at a predetermined time in the cycle of the machine to alter the resistance of the retarding means to relative movement of the upper gripping means and the last in the direction of the pull.

2. In a machine of the class described, the combination with upper gripping means and means for pulling an upper yieldingly over a last by relative movement between said upper gripping means and the last, of a fluid check for retarding said relative pulling movement, and controlling mechanism automatically operative at a predetermined time in the cycle of the machine to relieve the resistance of said fluid check to further relative movement of the upper gripping means and the last in the direction of the pull.

3. In a machine of the class described, the combination with upper gripping means and means for pulling on upper yieldingly over a last by relative movement between said upper gripping means and the last, of a fluid check constructed to provide a restricted orifice through which the fluid is permitted to flow in response to said relative pulling movement to retard said movement, and controlling mechanism automatically operative after said pulling movement has been substantially completed to enlarge said orifice and relieve the retarding action of said fluid check.

4. In a machine of the class described, the combination with upper grippings means and operating mechanism for imparting movement yieldingly to said upper gripping means to pull an upper over a last, of retarding mechanism constructed to determine a rate of movement of the upper gripping means which is slower than the movement of its operating mechanism, and a controlling device automatically operative at a predetermined time in the cycle of the machine to render said retarding mechanism comparatively ineffective to check the movement of the upper gripping means in the direction of the pull.

5. In a machine of the class described, the combination with upper gripping means and operating mechanism comprising spring connections for pulling an upper yieldingly over a last and for withdrawing the gripping means to an out of the way position upon its release of the upper, of mechanism for retarding the pulling movement of the upper gripping means, and a controlling device automatically operative after the upper pulling movement has been substantially completed to relieve the checking action of said retarding mechanism and permit a quick withdrawal of the gripping means upon its release of the upper.

6. In a machine of the class described, the combination with upper gripping means and operating mechanism comprising spring connections for pulling an upper yieldingly over a last and for withdrawing the gripping means to an out of the way position upon its release of the upper, of a fluid check for retarding the pulling movement of said upper gripping means constructed to provide a narrow orifice through which the fluid is permitted to flow in response to said movement, and controlling mechanism automatically operative to relieve the retarding action of the fluid check in time to permit a quick withdrawal of the gripping means upon its release of the upper.

7. In a machine of the class described, the combination with upper gripping means and operating mechanism comprising spring connections for pulling an upper yieldingly over a last and for withdrawing the gripping means to an out of the way position upon its release of the upper, of a fluid check for retarding the pulling movement of said upper gripping means comprising a

liquid containing chamber having a narrow passage through which the liquid is permitted to flow in response to said movement, and valve means automatically operative at a predetermined time in the cycle of the machine to provide a freer outlet for the liquid from said chamber in the withdrawing movement of the upper gripping means.

8. In a machine of the class described, the combination with upper gripping means and operating mechanism for imparting movement yieldingly to said upper gripping means to pull an upper over a last, of a fluid check for retarding the pulling movement of the upper gripping means, and an automatically controlled valve for varying at a predetermined time in the cycle the resistance of the fluid check to the movement of the upper gripping means in the direction of the pull.

9. In a machine of the class described, the combination with upper gripping means and operating mechanism comprising spring connections constructed and arranged to operate said upper gripping means to pull an upper yieldingly and to come automatically to a stop with the upper under tension, of mechanism for retarding the pulling movement of the upper gripping means, and a controlling device automatically operative upon a subsequent starting of the machine to relieve the checking action of said retarding mechanism and permit a quick withdrawal of the upper gripping means by the spring connections when said means releases the upper.

10. In a machine of the class described, the combination with upper gripping means and operating mechanism for imparting movement yieldingly to said upper gripping means to pull an upper over a last, of a fluid check for retarding the pulling movement of said upper gripping means comprising a liquid containing chamber having a passage through which the liquid is permitted to flow in response to said movement, a valve for restricting the flow of liquid from said chamber in the upper pulling operation, and mechanism automatically operative at a predetermined time in the cycle of the machine to relieve the resistance of said valve to the flow of the liquid.

11. In a machine of the class described, the combination with upper gripping means and operating mechanism for imparting movement yieldingly to said upper gripping means to pull an upper over a last, of mechanism for retarding said movement of the upper gripping means comprising a liquid containing cylinder having a piston therein and a by-pass connecting the opposite ends of the cylinder and through which the liquid is permitted to flow in the upper pulling operation, a valve for restricting the flow of liquid in said by-pass, and mechanism automatically operative at a predetermined time in the cycle of the machine to relieve the resistance of said valve to the flow of liquid in said by-pass.

12. In a machine of the class described, the combination with upper gripping means and operating mechanism for imparting movement yieldingly to said upper gripping means to pull an upper over a last, of a device for retarding said pulling movement of the upper gripping means, mechanism for adjusting said retarding device to vary its resistance to said movement, and controlling means automatically operative at a predetermined time in the cycle of the machine to relieve the resistance of said device to further movement of the upper gripping means in the direction of the pull.

13. In a machine of the class described, the combination with upper gripping means and operating mechanism for imparting movement yieldingly to said upper gripping means to pull an upper over a last, of a fluid check for retarding said movement of the upper gripping means comprising a chamber having a narrow passage through which the fluid is permitted to flow in response to said movement, means adjustable to vary the normal resistance to the flow of the fluid in the upper pulling operation, and mechanism automatically operative at a predetermined time in the cycle of the machine to relieve the resistance to flow of the fluid in response to further movement of the upper gripping means in the direction of the pull.

14. In a machine of the class described, the combination with upper gripping means and operating mechanism for imparting movement yieldingly to said upper gripping means to pull an upper over a last, of mechanism for retarding said movement of the upper gripping means comprising a liquid containing cylinder having a piston therein and provided with a by-pass through which the liquid is permitted to flow from one end of the cylinder to the other in response to said movement, a valve for controlling the flow of liquid in said by-pass, means for adjusting said valve to provide a restricted orifice of variably predetermined extent for the flow of the liquid, and mechanism automatically operative at a predetermined time in the cycle of the machine to move the valve in a direction to enlarge said orifice.

15. In a machine of the class described, the combination with upper gripping means, operating mechanism for imparting movement yieldingly to said upper gripping means to pull an upper and clamping mechanism movable into engagement with the shoe at its opposite sides after the upper has been pulled, of means constructed and arranged to retard the pulling movement of

the upper gripping means, and a controlling device arranged to be operated by said clamping mechanism to relieve the retarding action of said retarding means after the upper has been pulled.

16. In a machine of the class described, the combination with upper gripping means and operating mechanism for imparting movement yieldingly to said upper gripping means to pull an upper, of a device for retarding said movement of the upper gripping means, said retarding device comprising a double-ended cylinder substantially filled with liquid and having a piston movable therein, said cylinder having a by-pass affording communication between its opposite ends, and a valve for controlling the flow of liquid through said by-pass.

17. In a machine of the class described, the combination with upper gripping means and operating mechanism for imparting movement to said upper gripping means to pull an upper, of mechanism for retarding the pulling movement of said upper gripping means, said mechanism comprising a double-ended liquid containing cylinder having a piston therein and provided with a by-pass affording communication between its opposite ends to permit a restricted flow of the liquid from one end of the cylinder to the other in response to the pulling movement, a valve for controlling the flow of liquid in said by-pass, means constructed to permit a flow of the liquid through the piston in the return of the upper gripping means to starting position, and means for controlling said valve to permit a freer flow of the liquid in said by-pass in such return of the upper gripping means.

18. In a machine of the class described, the combination with opposite side grippers and means for operating them to pull an upper over a last, of a liquid check for retarding the pulling movement of said grippers, and equalizing connections between said liquid check and the grippers to permit the grippers to assume different relative positions in the pulling of the upper.

19. In a machine of the class described, the combination with opposite side grippers and means for operating them to pull an upper over a last, of mechanism for retarding the upper pulling movement of said grippers comprising a double-ended liquid containing cylinder having a piston therein and constructed to permit a restricted flow of liquid between the opposite ends of the cylinder in the upper pulling operation, and connections between said liquid check and the opposite side grippers for retarding movement of said grippers.

20. In a machine of the class described, the combination with upper gripping means and operating mechanism for imparting movement to said upper gripping means to pull an upper, of a liquid check for retarding the pulling movement of said upper gripping means, and connections between said upper gripping means and the liquid check for restoring said check to its initial condition by the return movement of the upper gripping means to its starting position.

21. In a machine of the class described, the combination with upper gripping means and operating mechanism for imparting movement to said upper gripping means to pull an upper, of a fluid check for retarding said movement comprising a liquid containing chamber and a piston in said chamber movable by the upper gripping means in the upper pulling operation, said chamber having a narrow passage for the flow of the liquid in response to the movement of said piston, means for returning the piston positively to starting position, and mechanism automatically operative to afford a freer passage for the liquid in such return of the piston.

22. In a machine of the class described, the combination with upper gripping means and operating mechanism for imparting movement to said upper gripping means to pull an upper, of a fluid check for retarding said movement comprising a double-ended cylinder having a piston therein and substantially filled with liquid at opposite sides of the piston, said cylinder having a by-pass for the flow of the liquid between its opposite ends, and connections between said upper gripping means and the piston for returning the piston positively to its starting position as the upper gripping means is moved reversely to its starting position.

23. In a machine of the class described, the combination with upper gripping means and operating mechanism for imparting movement to said upper gripping means to pull an upper, of a fluid check for retarding said movement of the upper gripping means comprising a double-ended liquid-containing cylinder having a piston therein and a by-pass affording communication between the opposite ends of the cylinder, a valve for controlling said by-pass to permit a restricted flow of the liquid therethrough in the upper pulling operation, connections between the upper gripping means and said piston for returning the piston to its starting position by the return movement of the upper gripping means to starting position, and controlling means for said valve automatically operative to open the valve and permit a freer flow of the liquid in said by-pass in such return of the parts.

24. In a machine of the class described, the combination with upper gripping means and mechanism for effective relative movement of said upper gripping means and a last to pull an upper over the last, of a liquid check for retarding said relative movement com-

prising a closed liquid-containing cylinder and a piston in the cylinder, and connections for effecting relative movement of said cylinder and piston in response to the relative movement of the upper gripping means and the last in the upper pulling operation, said liquid check being provided with a narrow passage connecting the opposite ends of the cylinder to permit a gradual flow of the liquid from one side of the piston to the other in such relative movement.

25. In a machine of the class described, the combination with upper gripping means and mechanism for effecting relative movement of said upper gripping means and a last to pull an upper over the last, of a liquid check for retarding said relative movement comprising a closed liquid-containing cylinder and a piston in the cylinder, said liquid check having a by-pass leading from one end of the cylinder to the other to permit a gradual flow of the liquid in response to relative movement of the cylinder and the piston in the upper pulling operation, and positive means for effecting relative return movement of said cylinder and piston after the upper has been pulled.

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

JOSEPH GOULDBOURN.