April 5, 1938. H. R. POLLEYS 2,112,976

MACHINE FOR COMPACTING RUBBER SHOE UPPERS

Filed June 11, 1937 4 Sheets-Sheet 1

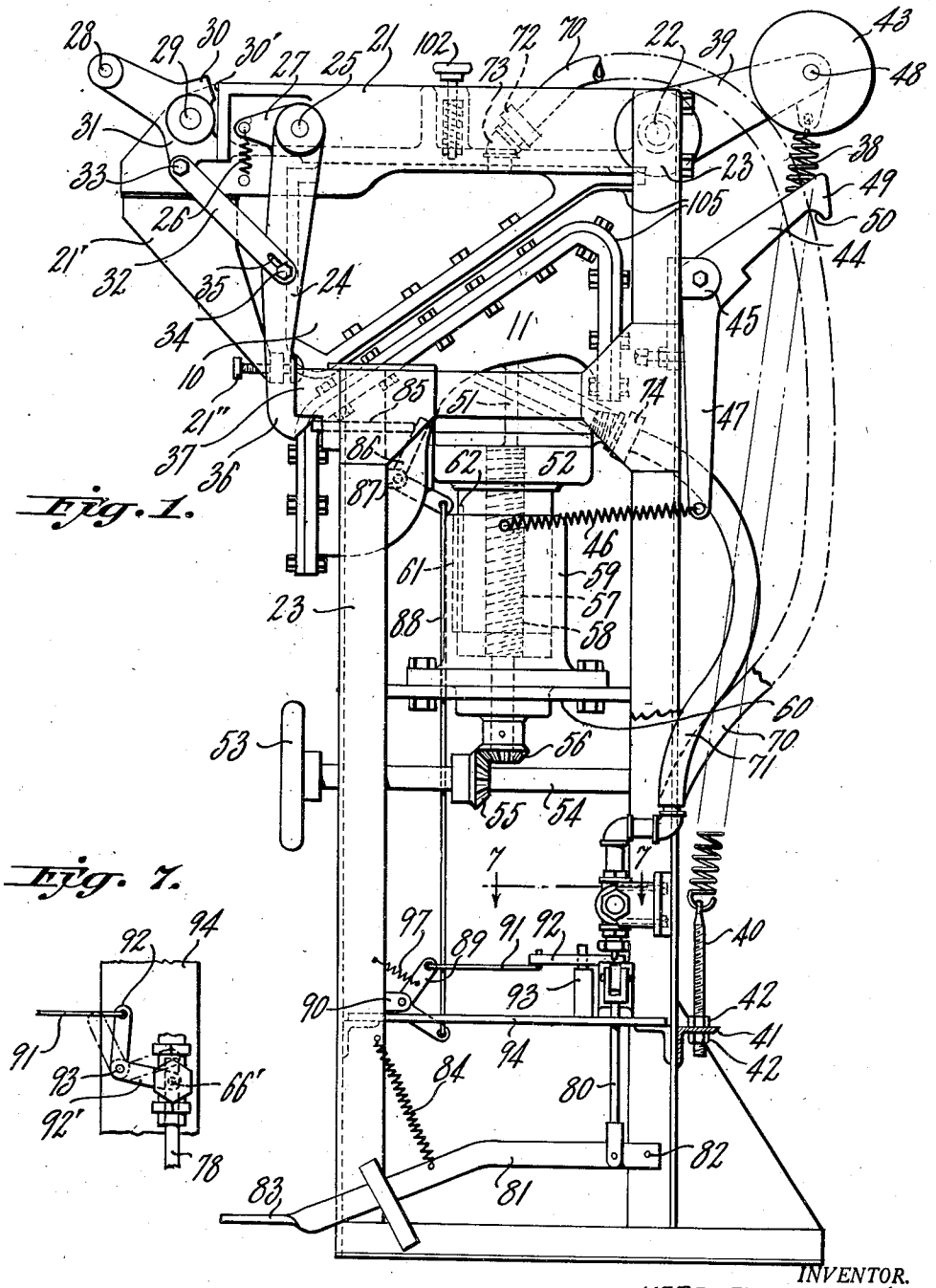



Fig. 1.

Fig. 7.

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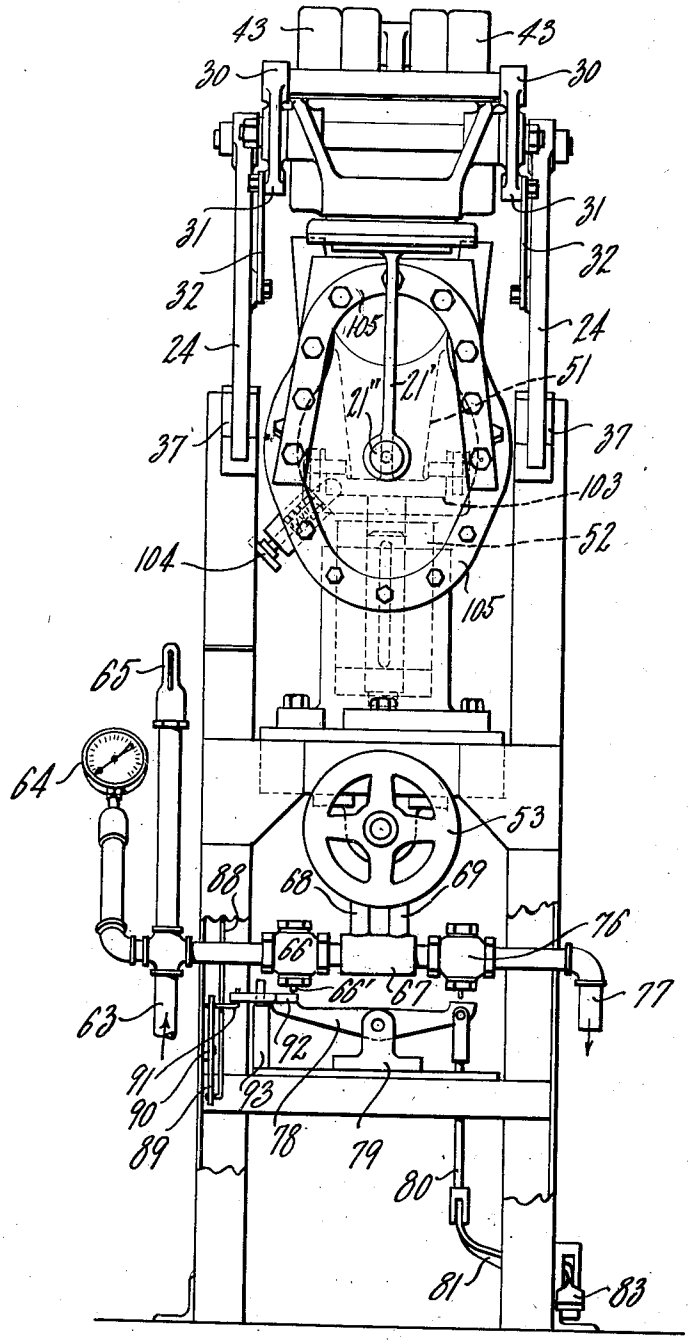



Fig. 2.

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Fig. 3.

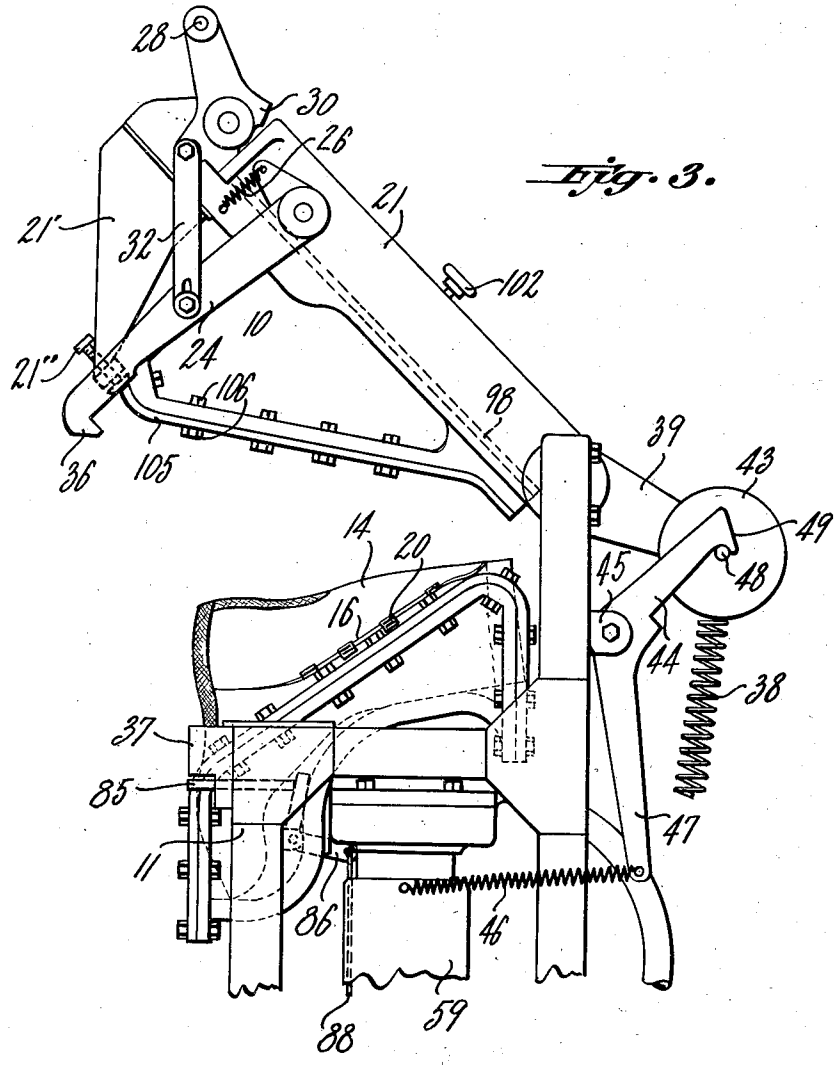
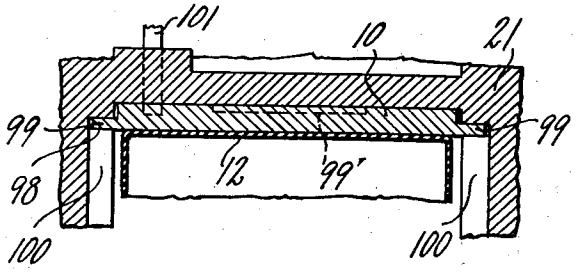



Fig. 6.




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Fig. 4.

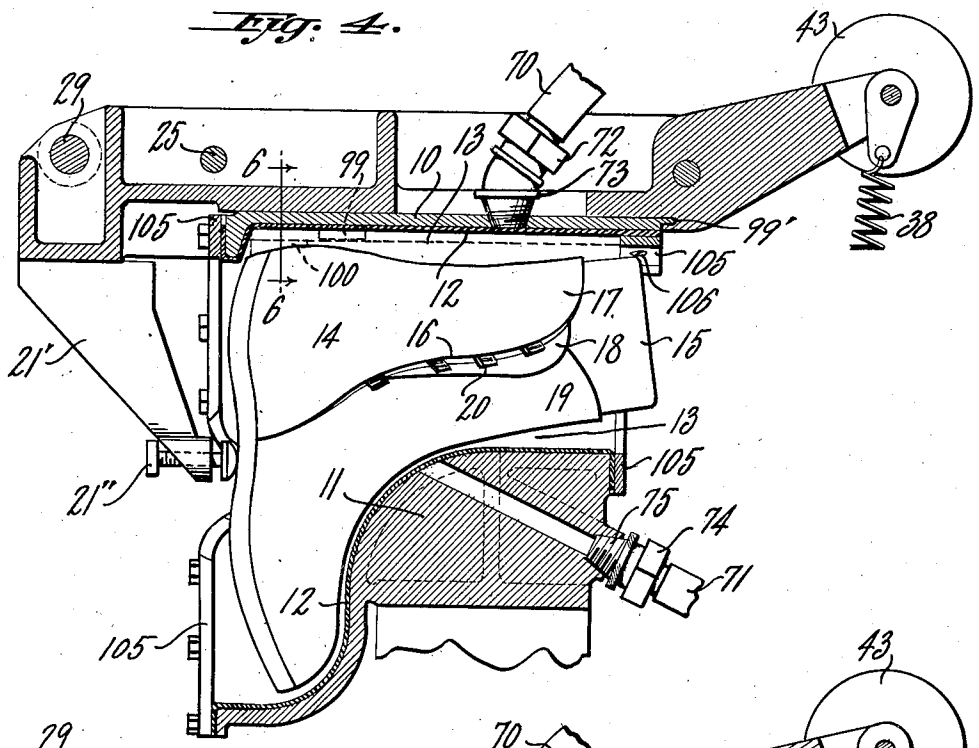
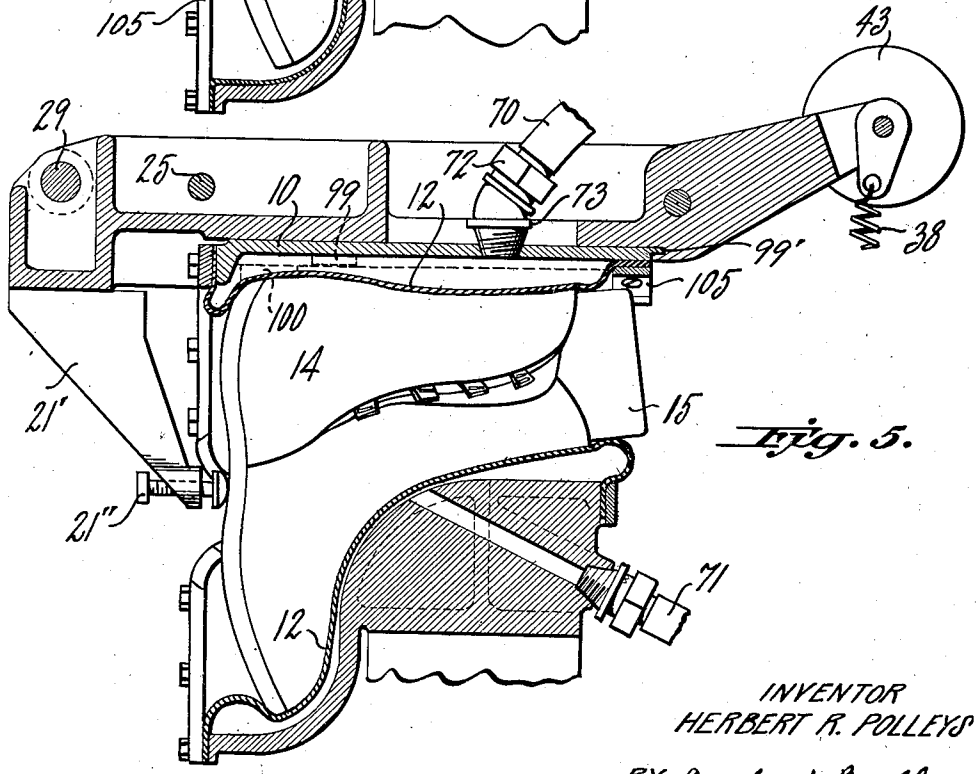



Fig. 5.




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2,112,976

# UNITED STATES PATENT OFFICE

2,112,976

## MACHINE FOR COMPACTING RUBBER SHOE UPPERS

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Application June 11, 1937, Serial No. 147,663

8 Claims. (Cl. 12—51)

This invention relates to an improved machine for compacting rubber footwear uppers, and more particularly for compacting such shoe uppers of the bellows type having a lengthwise fold or pocket formed in the tongue and thereby producing a flap along the outer edge of the pocket between the tongue and the quarter of the shoe.

The uppers of rubber footwear are built up of a plurality of plies of rubber and fabric. The layers are plied up while the rubber is in a soft plastic unvulcanized state, and are compacted together to cause the rubber to adhere to the layer upon which it is superimposed and to drive out any air that may be entrapped between the layers and thereby prevent blisters from being formed in the finished product. It is impracticable to compact such shoe uppers of the bellows type in the conventional type of compacting machine, without pressing the flaps and fasteners attached thereto into the soft shoe uppers and thereby marring them. Due to this difficulty it has been the practice heretofore to compact the uppers by rolling them with hand operated steel rollers.

In accordance with the present invention such bellows type uppers are mechanically compacted. The machine embodying this invention comprises two inflatable shells, each having a flexible diaphragm closing one side thereof and when the diaphragms are superimposed upon one another a cavity is formed between them for the reception of a shoe upper of the bellows type mounted on a last with the pockets open and the flaps of the uppers extending outwardly between the edges of the diaphragms. Fluid pressure is applied to the diaphragms which causes them to envelop the upper and compress or compact the layers thereof. During this operation the flaps are held outwardly from the other portions of the uppers and between the edges of the diaphragms and are thereby prevented from marring the surface of the shoe upper by being pressed into it. The machine is provided with a unique and novel mechanism for operating the shells and for preventing the fluid pressure from being admitted thereto while the shells are separated for the insertion of the upper. The shells are also made removable so that the diaphragms may be easily replaced.

This invention is further described herein and is shown in detail in the accompanying drawings in which:

Fig. 1 is a side elevation of a machine embodying the invention;

Fig. 2 is a front elevational view;

Fig. 3 is a side elevational view showing the top portion of the machine with shoe receiving cavity open;

Fig. 4 is a center section through the shoe compacting shells showing the diaphragms in the deflated position;

Fig. 5 is a view similar to Figure 4 showing the diaphragm in the inflated or shoe compacting position;

Fig. 6 is a section through the top shell on line 6—6 of Figure 4; and

Fig. 7 is a view of a detail of the safety control mechanism taken on line 7—7 of Figure 1.

Referring to the Figures 3, 4, and 5 of the drawings, the invention comprises a shoe compacting machine having a top shoe compacting shell 10 and a bottom shoe compacting shell 11. Each of the shells is provided with a flexible diaphragm 12 which closes one side of the shell, and when the diaphragms are brought into superimposed relation as shown in Fig. 4, a cavity 13 is formed between the uninflated diaphragms for the reception of the shoe upper 14 mounted on a last 15. This invention is particularly applicable for compacting rubber shoe uppers of bellows type as illustrated herein, in which flaps 16 are formed along the junction of the quarters 17 and the outer edges of the longitudinal folds or pockets 18 in the tongues or facings 19. The flaps are provided with a plurality of fastening elements 20. The shoe uppers are built up of a plurality of layers of rubber and fabric, and the rubber or rubber composition is in a soft unvulcanized state when placed in the cavity 13 to be compacted. The shoe is placed in the portion of the cavity 13 formed in the bottom shell 11 with the flaps 16 extending outwardly and with the top of the upper extending to the rear of the machine and the toe of the shoe extending downwardly. When the top shell 10 is brought to the superimposed relation with the bottom shell 11, the flaps 16 are caught in the position shown in Fig. 3 between the edges of the diaphragms 12, and when fluid pressure is admitted to the shells the diaphragms 12 are forced inwardly from the position shown in Fig. 4 to the position shown in Fig. 5 and thereby compact the entire upper portion of the shoe. Since the flaps 16 are held outwardly and securely between the edges of the diaphragm they are prevented from being forced against the other portions of the shoe upper and marring the surface of the upper.

Referring to Fig. 1 the top shell 10 is carried in a frame 21 which is pivoted on a pin 22 mounted in the main frame 23. Latches 24 are pivoted on a pin 25 at each side of the front end

of the pivoted frame 21 for the purpose of securing the top shell 10 in its superimposed position over the bottom shell 11. Springs 26 having one end of each secured to the frame 21 and the other end of each secured to an arm 27 on each of the latches 24 are provided for holding the latches in their latching position. A handle 28 is provided for operating the latches 24 and the pivoted frame 21. The handle is pivoted on a pin 29 mounted in the frame 21 and is provided with arms 30 and 31. The arms 30 and 31 are adapted to strike the shoulder 30' on the frame 21 to respectively raise and lower the latter. A pair of links 32 are pivotally connected at one end to the arms 31 by cap screws 33 and are pivotally connected at the other end to the latches 24 by cap screws 34 which extend through slots 35 in the links 32 and are threaded into the latches 24. The lower ends of the latches 24 are provided with hooks 36 which cooperate with shoulders on abutments 37 on the main frame 23 for securing the top shell 10 in the shoe cavity forming position. Assuming the top shell 10 is in the downward position as shown in Fig. 1, when the handle 28 is moved upwardly, the links 32 operate the hooks 36 on the latches 24 and thereby release the latches and permit the frame 21 carrying the top shell 10 to be pivoted about the pin 22 to open the shoe cavity 13 to receive the shoe to be compacted therein.

The pivoted frame 21 has an extension 21' provided with an adjustable screw 21'' threaded into its lower end. The end of the screw 21'' is adapted to contact with the sole of the shoe to retain and position it in the shoe cavity 13 when the cavity is closed.

For the purpose of balancing the movement of the frame 21, one end of a tension spring 38 is secured to an arm 39 on the frame 21 and the other end is secured to a threaded rod 40 which passes through a hole in an angle brace 41 which is secured to the frame 23. The rod 40 is provided with nuts 42 cooperating with the threads on the rod 40 for adjusting the tension of the spring 38 and for locking the rod 40 in the position in which it may be adjusted. A fixed counterbalance weight 43 is also secured to the arm 39.

A latch 44 pivoted in the bracket 45 on a main frame 23 is provided for securing the shell frame 21 in its raised position. A spring 46 having one end secured to the lower arm 47 of the latch 44 and the other end secured to a fixed portion of the machine is provided for holding the latch in its latch securing position. The arm 39 is provided with a lug 48, and when the frame 21 is raised upwardly the lug 48 descends and cooperates with the beveled head 49 on the latch 44 and moves it to the left, as viewed in Fig. 1, in opposition to the spring 46. When the lug 48 passes over the lower point of the head 49, it is caught in the recess 50 on the latch 44 and holds the frame 21 in its raised position. When the handle 28 is pulled downward the latch 44 pivots in a counter clockwise direction and releases the lug 48.

The bottom compacting shell 11 is provided with a foot 51 which is mounted on a vertically movable support 52. The support is operated by a hand wheel 53 keyed to a shaft 54. A bevel gear 55 is keyed to the shaft 54 and cooperates with the bevel gear 56 keyed to a screw 57 cooperating with threads in a bore 58 in the vertically movable support 52. The support 52 is mounted in a cylindrical recess in a bracket 59 mounted upon a cross brace 60 of the main frame 23. The support 52 is prevented from turning in the bracket 59 by a key 61 secured in the bracket and extending into a longitudinal groove 62 in the support 52. The size of the shoe receiving cavity may be thus adjusted by turning the hand wheel 53.

As shown in Fig. 2, pressure fluid, for example air, is supplied to the shoe compacting shells 10 and 11 respectively through an inlet pipe 63. The inlet is provided with a pressure gauge 64 and a safety release valve 65. An inlet valve 66 admits pressure fluid from the inlet pipe 63 to a supply header 67, having supply nipples 68 and 69 connected to hoses 70 and 71 respectively (see Fig. 1), which are connected to the top shell 10 and the bottom shell 11. The upper end of the hose 70 is connected by a union nut 72 to a nipple 73 leading into the shoe compacting shell 10. The hose 71 is connected by a union nut 74 connected to a nipple 75 leading into the bottom shell 11. The pressure fluid is exhausted from the header 67 through an exhaust valve 76 which leads to an outlet pipe 77.

The exhaust and inlet valves 66 and 76 (Fig. 2) are operated by a lever 78 pivoted in a bracket 79 on the frame 23. A link 80 connects one arm of the lever 78 to a foot lever 81 which is pivoted on a pin 82 (Fig. 1) in the frame 23. The foot pedal 83 of the lever 81 is normally held in a raised position by a spring 84, connected at one end to the lever 81 and at the other end to the frame 23 of the machine, so as to normally hold the exhaust valve 76 in an open position. However, as shown in Figs. 1 and 2, the lever 81 is pressed downwardly to operate the inlet valve 66 and close exhaust valve 76.

As shown in Figs. 1 and 7, a safety control mechanism is provided for preventing fluid pressure from being admitted to the compacting shells 10 and 11 when the shoe receiving cavity is open. The mechanism is operated by the hook 36 on the latch 24 which actuates a pin 85 slidably mounted in a post of the frame 23. One end of the pin 85 actuates a bell crank lever 86 pivoted on a bracket 87 on the main frame. The bell crank lever 86 is connected by a link 88 to a second bell crank lever 89 pivoted in a bracket 90 on the main frame. A link 91 connects the bell crank lever 89 to a third bell crank lever 92 pivoted on a lug 93 supported on a cross brace 94. As shown in Figs. 1 and 7 the arm 92' of the lever 92 is positioned between the lever 78 and the inlet valve stem 66' and is raised on its pivot to operate the inlet valve 66. When the foot pedal 83 is moved to its exhaust valve operating position and the hook 36 on the top shell frame latch 24 is moved away from the pin 85, the arm 92' is carried from between the lever 78 and the valve stem 66' by a spring 97 connected to the lever 89 and the frame 23. When the arm 92' is carried into such position the stem 66' cannot be moved by the lever 78 to operate the inlet valve 66 because the space between the end of the stem 66' and the lever 78 is greater than the permissible movement of the lever end.

As shown in Figs. 2 and 6, the top and bottom shells 10 and 11 are made removable from their respective supports for the purpose of repairing the diaphragms 12, or for replacing them. The top shell 10 is slidably mounted in grooves 98 formed in the pivoted frame 21 which receives slides 99 formed on the shell 10. A tongue 99' fits into a groove in the frame 21 for supporting the rear end of the shell 10. The shell 10 may

be removed from the frame 21 by sliding the slide 99 opposite openings 100 in the grooves 98. In such position the slides 99 may be dropped through the openings 100 and the shell may be removed. The shell 10 is retained in the grooves 98 by a pin 101 in the frame 21 and which extends into a notch in the shell 10. The pin 101 is actuated inwardly by a spring and may be pulled outwardly by a knob 102 to release the shell 10.

The foot 51 of the bottom compacting shell 11 is slidably mounted in a groove 103 (Fig. 2) of the support 52. The foot 51 is held in the groove by a spring actuated pin 104. The pin 104 may be pulled outwardly and the shell 11 may be removed from the support 52 by pulling the shell forward.

The edges of diaphragms 12 are secured to the shells 10 and 11 respectively between metal strips 105 and the edges of the shell by means of bolts or screws 106 passing through the respective numbers. Upon removing the shells 10 and 11 the diaphragm 12 may be replaced by removing the screws 106.

While one embodiment of this invention has been described herein in detail, it will be understood that changes as shown and described may be made without departing from the spirit of this invention or the scope of the appended claims.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

1. A machine for compacting rubber shoe uppers provided with flaps formed along the junction of the quarters and the outer edge of the pockets in the tongues, said machine comprising two inflatable shells, each shell having a flexible diaphragm closing one side thereof to provide an expansible chamber therein, means for superimposing one diaphragm over the other and thereby provide a cavity between said diaphragms for the reception of the shoe upper while mounted on a last, said cavity so formed having a marginal space formed between the edges of the diaphragms for the reception of the flaps while they are outwardly extended with the pockets open, means for securing said shells in the superimposed position of said diaphragms, and means for admitting and releasing pressure fluid to and from said inflatable shells.

2. A machine for compacting rubber shoe uppers provided with flaps formed along the junction of the quarters and the outer edge of the pockets in the tongues, said machine comprising an upper and a lower inflatable shell, each shell having a flexible diaphragm closing one side thereof, means for superimposing one diaphragm over the other, said diaphragms when so superimposed being adapted to provide a cavity therebetween for the reception of the shoe upper while mounted on a last, said cavity so formed having a marginal space formed between the edges of the diaphragms for the reception of the flaps while they are outwardly extended with the pockets open, means for securing said upper shell in said superimposed shoe cavity forming position, means for moving said lower shell to vary the distance between said diaphragms, and means for admitting and releasing fluid pressure from said shells.

3. A machine for compacting rubber shoe uppers provided with flaps formed along the junction of the quarters and the outer edge of the pockets in the tongues, said machine comprising an upper and a lower inflatable shell, each shell having a flexible diaphragm closing one side thereof, a pivotal mounting for supporting said upper shell in respect to said lower shell, means for moving said upper shell to superimpose the diaphragm of the upper shell on the diaphragm of the lower shell to form a cavity between the two diaphragms, said cavity being adapted to receive a shoe upper mounted on a last, with the upper extending towards the axis of the said pivotal mounting and with the toe of the shoe pointing downwards, said cavity having a marginal space extending between the edges of the diaphragms for the reception of the shoe flaps while they are outwardly extended with the pockets open, means for securing said shells in their cavity forming position, and means for admitting and releasing pressure fluid to and from said shells.

4. A machine for compacting rubber shoe uppers provided with flaps formed along the junction of the quarters and the outer edge of the pockets in the tongues, said machine comprising two inflatable shells, each shell having a flexible diaphragm closing one side thereof and having a depression formed therein adapted to be superimposed over one another to provide a cavity for the reception of the shoe, said cavity having a marginal space extending between the edges of the diaphragms for the reception of the shoe flaps while extending outwardly with the pockets open, means for moving one shell in respect to the other to and from the cavity forming position, means for securing said shells in the cavity forming position, means for admitting and releasing fluid pressure to and from said shells while secured in the cavity forming position, and means for preventing the admission of fluid pressure to said shells while out of such cavity forming position.

5. A machine for compacting rubber shoe uppers provided with flaps formed along the junction of the quarters and the outer edge of the pockets in the tongues, said machine comprising an upper and a lower inflatable shell removably mounted in a frame, each shell having a replaceable flexible diaphragm closing one side thereof, a pivotal mounting for supporting said upper shell in respect to said lower shell, means for moving said upper shell on said pivotal mounting to superimpose the diaphragm of the upper shell upon the diaphragm of the lower shell to provide a cavity between said diaphragms for the reception of the shoe upper, said cavity having a marginal space for the reception of the shoe flaps while extending outwardly with the pockets open, means for latching said upper shell while in said cavity forming position, and means for admitting and releasing fluid pressure to and from said inflatable shells.

6. A machine for compacting rubber shoe uppers provided with flaps formed along the junction of the quarters and the outer edge of the pockets in the tongues, said machine comprising an upper and a lower inflatable shell, each shell having a flexible diaphragm between which a cavity for the reception of a shoe upper is formed when mounted on a last, said cavity having a marginal space extending between the edges of the shoe flaps while extended outwardly with the pockets open, pivotal mounting for one of said shells, means for counter-balancing said shell on said pivotal mounting, and means for securing said pivoted shell in its cavity forming position.

7. A machine for compacting rubber shoe uppers provided with flaps formed along the junction of the quarters and the outer edge of the

pockets in the tongues, said machine comprising an upper and a lower inflatable shell, each shell having a flexible diaphragm between which a cavity for the reception of a shoe upper is formed when mounted on a last, said cavity having a marginal space extending between the edges of the diaphragms for the reception of the shoe flaps while extended outwardly with the pockets open, pivotal mounting for one of said shells, means for counter-balancing said shell on said pivotal mounting, and latches for securing said pivoted shell at each end of its movement.

8. A machine for compacting rubber shoe uppers provided with flaps formed along the junction of the quarters and the outer edge of the pockets in the tongues, said machine comprising two inflatable shells, each shell having a flexible diaphragm closing one side thereof to provide an expansible chamber therein, means for superimposing one diaphragm over the other and thereby provide a cavity between said diaphragms for the reception of the shoe upper while mounted on a last, said cavity so formed having a marginal space formed between the edges of the diaphragms for the reception of the flaps while they are outwardly extended with the pockets open, means for securing said shells in the superimposed position of said diaphragms, means acting on the sole of the shoe to position it in the cavity when the cavity is closed, and means for admitting and releasing pressure fluid to and from said inflatable shells.

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