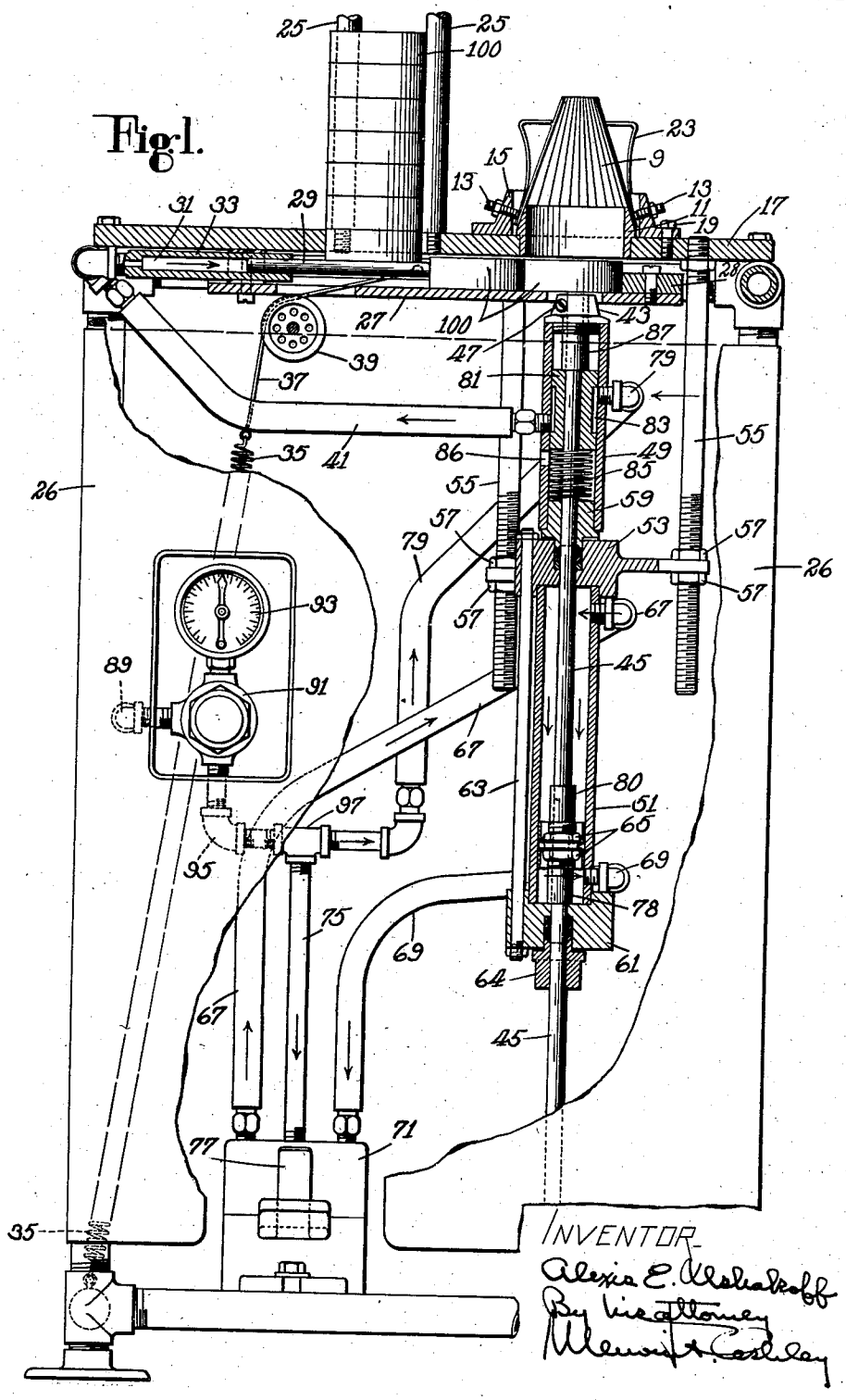
Sept. 29, 1942. A. E. USHAKOFF 2,296,964

MACHINE FOR INSERTING BLOCKS IN HOLLOW ARTICLES

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Fig. 1.



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Fig. 2.

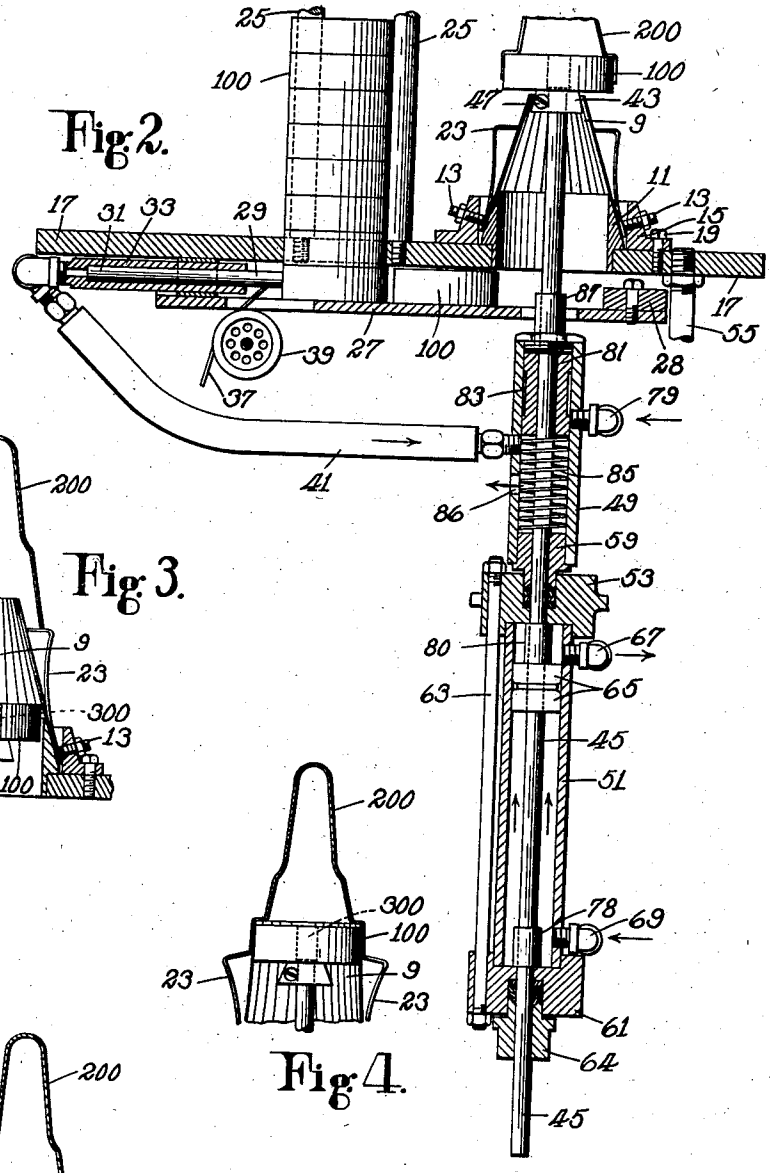


Fig. 3.

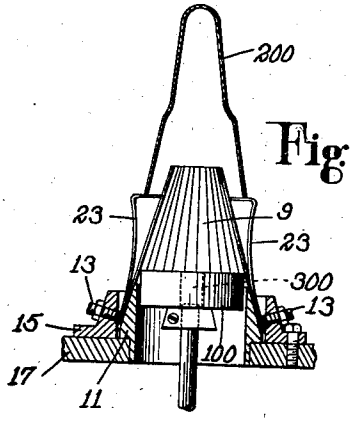


Fig. 4.

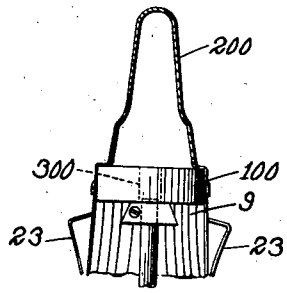


Fig. 5.

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Patented Sept. 29, 1942 2,296,964

UNITED STATES PATENT OFFICE

2,296,964

MACHINE FOR INSERTING BLOCKS IN HOLLOW ARTICLES

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Application April 21, 1941, Serial No. 389,571

10 Claims. (Cl. 12—49.1)

This invention relates to machines for inserting an element in a hollow article and is herein illustrated as embodied in a machine for inserting a block in the open end of a hollow blank of stretchable material which is to be used as the cover of the heel of a shoe.

In Letters Patent of the United States No. 2,236,552, granted April 1, 1941, upon an application filed in my name, there is disclosed a hollow heel-cover blank in the form of a swollen gel which is capable of stretching somewhat and will shrink by loss of liquid. There are described in said Letters Patent two methods of using such a blank in the covering of a heel. According to one method, referred to therein as the dry method, a block of circular outline is placed in the mouth of the cover blank while the blank is in swollen gel form, and the blank with the block in its mouth is put aside and allowed to shrink, the function of the block being to keep the mouth open. Later the block is removed; the blank is expanded to the desired shape by means of heat and pressure and frozen in its expanded shape; and finally a heel is placed in the blank, and the blank is heated to cause it to shrink while at the same time a partial vacuum is created in it so that the blank will conform exactly to the shape of the heel.

According to the present invention a machine is provided for inserting a block or similar element in a hollow article. In the illustrated machine a heel-cover blank is placed with its mouth or open end over the smaller end of a hollow, expansible, frusto-conical guiding member through which the block is pushed into the mouth of the blank.

This and other features of the invention, including certain details of construction and combinations of parts, will be described as embodied in an illustrated machine.

Referring now to the accompanying drawings,

Fig. 1 is a view principally in vertical longitudinal section of a machine for inserting blocks in hollow articles such as heel-cover blanks, the parts of the machine being shown in the positions which they occupy before the plunger starts its block-inserting stroke.

Fig. 2 is a view similar to Fig. 1 of a portion of the machine, the parts being shown in the positions which they occupy at the end of the block-inserting stroke of the plunger.

Figs. 3, 4 and 5 are details in vertical section showing three positions occupied successively by the block as it is being forced through the expansible guiding member and inserted in the mouth of the cover blank.

The expansible, hollow block-guiding member 9 normally has the outline of a frustum of a cone and is composed of thin, narrow strips of spring steel which overlap one another sidewise to a certain extent at the base of the guiding member and to a greater extent at the top. The lower ends of the strips are clamped to the conical face of a hollow base 11 by means of small screws 13 which are threaded through the surrounding upstanding portion of an annular member 15 and press the bases of the strip firmly against the conical face of the base 11, the annular member 15 being fastened to the top of a stationary horizontal plate 17 by screw bolts, one of which is shown at 19. The base 11 is held firmly in place by the screws 13 which also act to clamp the lower ends of the strips of the member 9 against it, and has extending through it an opening, the diameter of which is just slightly larger than that of the circular blocks 100 which are pushed up through it. These blocks have circular perforations 300 which are useful in the subsequent removal of the blocks from the mouths of the covers. In order to support a cover blank 200 in the position shown in Fig. 3, with the smaller end of the guiding member extending into it, in which position it is placed by the operator, a plurality of thin supporting fingers 23 of spring steel are provided. These supporting fingers have horizontal portions, upon which the edge of the mouth of a cover blank 200 rests, and downwardly extending portions which are clamped in place by certain of the screws 13 which serve also to clamp in place the lower ends of some of the strips which make up the expansible block-guiding member 9.

In the operation of the machine, a block 100 is delivered from a stack into position below and in register with the vertical opening in the member 11 as shown in Fig. 1. A cover blank 200 is placed upside down, as shown in Fig. 3, with the edge of its open end or mouth resting upon the horizontal portions of the supporting fingers 23; and the block 100, which is circular in cross section and of slightly greater diameter than that of the mouth of the cover blank, is pushed up. The upper edge of the block 100 encounters the thin sloping strips which constitute the wall of the frusto-conical guiding member 9 and spreads them apart. The upper end of the guiding member opens and presently engages the inside of the mouth of the cover 200, thereby centering it, stretching it somewhat and holding it while the

block is pushed up through the position shown in Figs. 4 and 5, in which the guiding member 9 is approximately cylindrical, to the position shown in Fig. 2 in which the block and cover blank have been pushed slightly above the level of the top of the guiding member, said member having resumed its normal frusto-conical shape. It will be noted by referring to Figs. 3, 4 and 5 that the expansible guiding member 9 first engages the inside of the mouth of the blank and is finally displaced, so to speak, by the block.

The mechanism for feeding the blocks one by one into position below and in register with the vertical opening in the base member 11 will now be described. The blocks 100 are stacked in a magazine which consists of a plurality of upright rods 25 having their lower ends screwed into the plate 17 around a circular opening in the plate, said plate forming the top of a metal cabinet 26 which contains the operating mechanism. Below the plate 17 and spaced from it a distance slightly greater than the thickness of a block is a thin plate 27 over which the blocks are pushed through a guideway of which the plate 27 forms the bottom, by the feed rod 29, there being a stop 28 at the right-hand end of the guideway. The feed rod is horizontally slidable in a bore 31 in a stationary member 33 and is continually urged into its retracted (left-hand) position by a tension spring 35 (Fig. 1), the lower end of which is fastened to the frame of the machine, and the upper end of which is fastened to the lower end of a flexible cord 37 which runs over a pulley 39 and has its upper end fastened to the right-hand end of the feed rod 29.

In the position of the parts shown in Fig. 1, compressed air flowing through a flexible pipe 41, in the direction indicated by the arrow, holds the feed rod 29 at the right-hand end of its stroke. The flow of air through this pipe is controlled by the mechanism for pushing a block up through the expansible member 9 into the heel-cover blank; and this latter mechanism will now be described. Formed in the thin horizontal plate 27 directly below the center of the guiding member 9 is an opening through which a pusher in the form of a plunger 43 may pass, said plunger being split and clamped to the upper end of a piston rod 45 by means of a pinch screw 47. The piston rod passes centrally through two vertically alined cylinders, an upper cylinder 49 and a lower cylinder 51, said cylinders being rigid with each other and with a supporting member 53 which is suspended from the plate 17 by rods 55. The supporting member has horizontal extensions or ears which are perforated to receive these rods, a pair of nuts 57 being threaded upon each rod, one above and one below the ear of the member 53. A packing gland 59 is fastened to the supporting member 53 by the usual bolts, not shown, which pass through ears, also not shown, on said gland and are threaded into the member 53. The lower cylinder 51 is clamped to the under side of the supporting member 53 by a block 61 and tie rods, one of which is shown at 53, a second packing gland 64 being provided which is fastened to the block 61. It will be noted that the pairs of nuts 57 provide means for adjusting the supporting member 53, and with it the cylinders 49 and 51, up and down, the purpose of this adjustment being to vary the location of the vertical path of reciprocation of the plunger 43. Located in the lower cylinder 51 is a piston, indicated as a whole at 65, which is fastened to the piston rod 45, said piston comprising the usual packing leathers held in place by nuts.

With this construction the rod 45, together with the plunger 43 at its upper end, may be reciprocated vertically. To this end, two flexible pipes 67 and 69 for compressed air connect respectively the upper and the lower ends of the cylinder 51 with a valve mechanism 71 of commercial form, the details of construction of which form no part of the present invention. This mechanism comprises a casing or container, to which compressed air is supplied continuously through a pipe 75, and suitable valves which are controlled by a treadle 77 normally held in raised position as shown in Fig. 1 by a spring, not shown. When the treadle is in this raised position, compressed air is flowing up through the pipe 67 to the top of the cylinder 51; the bottom of the cylinder is being exhausted through the pipe 69; and the rod 45 is in its lowermost position, which is determined by an abutment in the form of a small sleeve 78 surrounding the rod at the lower end of the cylinder 51. When the treadle is depressed, air flows up through the pipe 69 into the bottom of the cylinder 51, the upper end of the cylinder being exhausted through the pipe 67; and the rod 45 with its plunger 43 is moved into uppermost position as shown in Fig. 2, the upper limit of movement of the rod being determined by an abutment 80 in the form of a sleeve carried by the piston 65.

The function of the upper cylinder 49 is to control the flow of compressed air through the pipe 41 to the rod 29 which feeds the blocks 100 from the magazine, and to provide an exhaust for the pipe at the proper time. To this end a flexible pipe 79, to which compressed air is continuously supplied, leads into the cylinder; and the flow of compressed air through the pipe 79 to the pipe 41 is controlled by a valve 81 which is slidable in the cylinder 49 and is cut away on its periphery to form an annular passageway 83 which, in the position of parts shown in Fig. 1, connects the pipe 79 with the pipe 41. A compression spring 85 urges this valve at all times to move upward so as to disconnect the pipe 79 from the pipe 41 and to expose an exhaust port 86 in the wall of the cylinder, said valve being held in its lowermost position, as shown in Fig. 1, by the plunger 43 the under side of which has engaged the upper end of a small sleeve 87, which is slidable on the rod 45, and through this sleeve has pushed the valve 81 down. The compressed air enters from a source of supply through a pipe 89 and passes through a fitting 91 having connected with it a pressure gage 93. From the lower end of this fitting the air passes through a pipe 95 to a T 97. The lower end of the flexible pipe 79 is connected to one branch of the T while to another branch is connected the downwardly extending pipe 75 which leads to the control mechanism 71. Compressed air is thus supplied continuously to the pipes 75 and 79.

Assuming that the parts of the machine are in the positions shown in Fig. 1 and that a cover blank has been placed mouth down (Fig. 3) on the fingers 23, the operation of the machine is as follows. The treadle 77 is depressed against its spring, whereupon compressed air flows up through the pipe 69 to the bottom of the cylinder 51; and the top of the cylinder is exhausted

through the pipe 67. The rod 45 and the plunger 43 rise and force a block up through the positions shown in Figs. 3, 4 and 5 and finally entirely out of the frusto-conical, expansible guiding member 9, as shown in Fig. 2. As the plunger 43 rises, it permits the spring 85 to push up the valve 81 thereby cutting off the supply of compressed air from the pipe 79 to the pipe 41 and putting the pipe 41 into communication with the exhaust port 86 in the wall of the cylinder 49, whereupon the tension spring 35 pulls the feed rod 29 to the left, and the lowermost block 100 in the magazine descends upon the plate 17 in front of the feed rod 29, as shown in Fig. 2. The operator removes the cover 200 with the block 100 inserted in its mouth and releases the treadle. Whereupon the rod 45 and plunger 43 descend, and the feed rod 29 moves to the right, the parts being again in positions shown in Fig. 1 ready for another cycle of operation.

Although the invention has been set forth as embodied in a particular machine, it should be understood that the invention is not limited in the scope of its application to the particular machine which has been shown and described.

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

1. A machine for inserting blocks in the open ends of hollow articles said machine having in combination, a guiding member, a plunger for forcing blocks through the guiding member into the hollow article, a magazine for a stack of blocks, means for feeding blocks into the path of movement of the plunger, and means for operating the block-feeding means and the plunger in timed relation.

2. A machine for inserting blocks in the open ends of hollow articles said machine having in combination, a hollow, expansible guiding member through which a block may pass, said guiding member being adapted to extend into the open end of a hollow article, means for forcing a block through the guiding member into the hollow article, a magazine for a stack of blocks, and means for feeding blocks successively from the magazine into position to be engaged by the means for forcing the blocks through the guide member.

3. A machine for inserting blocks in the open ends of hollow articles said machine having in combination, a hollow, expansible guiding member through which a block may pass, said guiding member being adapted to extend into the open end of a hollow article, means for forcing a block through the guiding member into the hollow article, a magazine for a stack of blocks, means for feeding blocks successively from the magazine into position to be engaged by the means for forcing the blocks through the guide member, a source of fluid under pressure, and connections, including manually controlled valve mechanism, from said source to said block-feeding and block-forcing means for effecting operation of both said means.

4. A machine for inserting blocks in the open end of hollow articles said machine having in combination, a guiding member, a plunger for forcing blocks through the guiding member into the hollow article, fluid-operated means for moving the plunger, a magazine for a stack of blocks, a member for feeding blocks into the path of movement of the plunger, fluid-operated means for moving the feed member, and a valve the position of which depends upon the position of the plunger for controlling the supply of fluid to the feed member.

5. A machine for inserting blocks in the open ends of hollow articles said machine having in combination, a hollow, expansible guiding member through which a block may pass, said guiding member being adapted to extend into the open end of a hollow article, a plunger for forcing blocks through the guiding member into the hollow article, a piston connected with the plunger, a cylinder in which the piston is located, a magazine for a stack of blocks, a member for feeding the blocks successively into position to be engaged by the plunger, a spring for moving the feed member in one direction, a source of fluid under pressure, a pipe for conducting fluid into position to move the feeding member in the other direction, means for conducting fluid under pressure alternately to the top and to the bottom of the cylinder to reciprocate the piston, and a valve the position of which depends upon the position of the piston for controlling the flow of compressed fluid through said pipe to the feed member.

6. A machine for inserting blocks in the open ends of hollow articles, said machine having in combination, an expansible guiding member through which a block may pass, two cylinders alined with each other and with the passageway through the guiding member, a plunger for forcing blocks through said passageway, a rod on which the plunger is supported, a piston fast to the rod and located in one of the cylinders, a magazine for a stack of blocks, a member for feeding blocks one by one into the path of movement of the plunger, means for reciprocating the piston, fluid-operated means for moving the feed member, and a valve in the other cylinder, the position of which depends upon the position of the piston for controlling the operation of the feed member.

7. A machine for inserting blocks in the open ends of hollow articles, said machine having in combination, an expansible guiding member through which a block may pass, two cylinders alined with each other and with the passageway through the guiding member, a plunger for forcing blocks through said passageway, a rod on which the plunger is supported, a piston fast to the rod and located in one of the cylinders, a magazine for a stack of blocks, a member for feeding blocks one by one into the path of movement of the plunger, means for reciprocating the piston, fluid-operated means for moving the feed member, and a valve in the other cylinder, the position of which depends upon the position of the piston for controlling the operation of the feed member, the cylinders being mounted for adjustment in the direction of extent of their axis to vary the location of the path of reciprocation of the plunger.

8. A machine for inserting blocks in the open ends of hollow articles said machine having in combination, a hollow guiding member, a plunger for forcing blocks through said guiding member, means for reciprocating the plunger, and means whereby the location of the path of reciprocation of the plunger may be varied.

9. A machine for stretching the mouth of a thin-walled hollow article of stretchable material and inserting in said mouth a block the cross-section of which is larger than that of said mouth, said machine having in combination a hollow, expansible, block-guiding and mouth-

stretching member of frusto-conical shape, said member consisting of narrow strips of spring steel each of which overlaps the adjacent one throughout its length, and means for forcing the block through the expansible member to stretch the mouth of the hollow blank substantially uniformly at all points and thereafter to insert the block in said stretched mouth.

10. A machine for inserting blocks in the mouth of a hollow article, said machine having in combination a hollow, expansible guiding member of frusto-conical shape, a cylinder, a plunger in said cylinder for forcing blocks through said guiding member into the mouth of the hollow article, fluid-operated means for reciprocating the plunger, and means for varying the location of the cylinder with respect to the guiding member to vary the location of the path of reciprocation of the plunger.

ALEXIS E. USHAKOFF.