June 2, 1953 S. E. WINDER 2,640,298

GLASSWARE BLOWHEAD ARRANGEMENT

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Fig. 1.

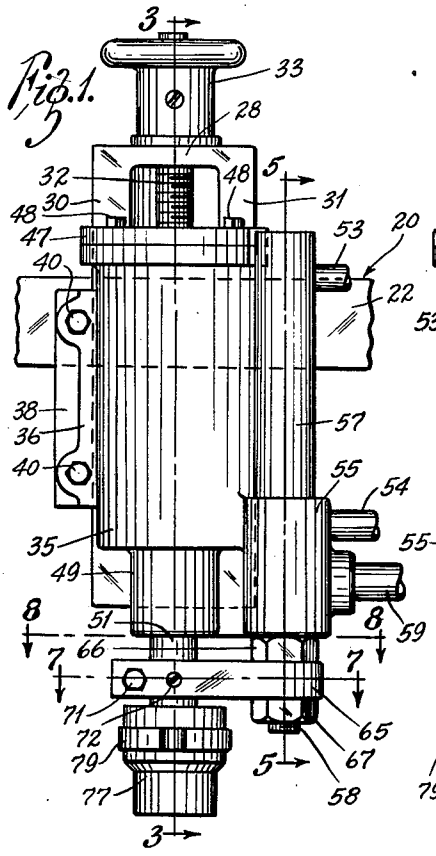


Fig. 2.

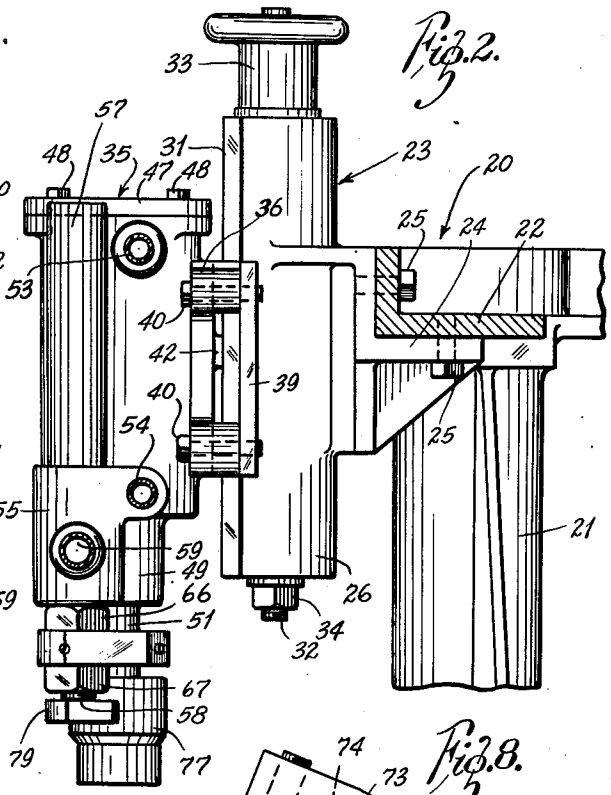


Fig. 8.

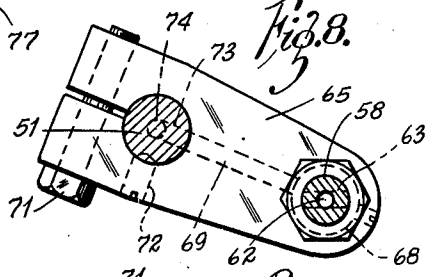


Fig. 10.

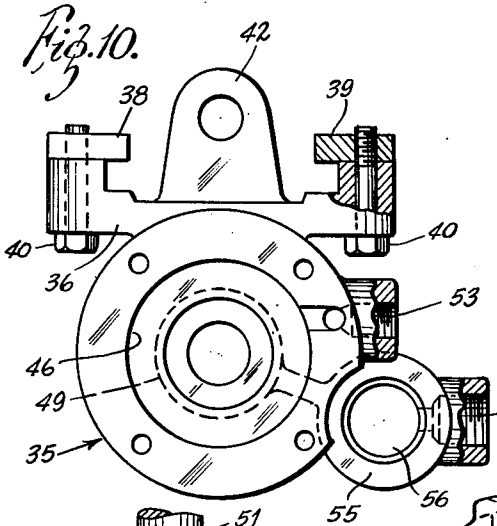


Fig. 7.

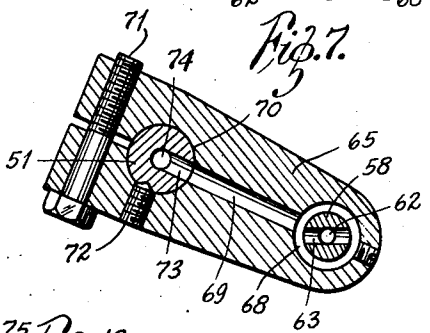


Fig. 12.

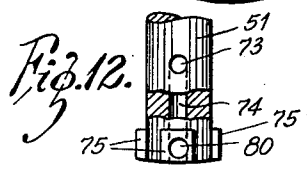
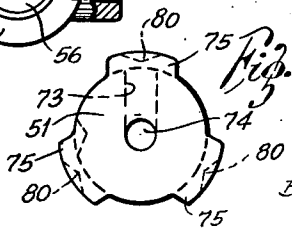


Fig. 13.



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Fig. 3.

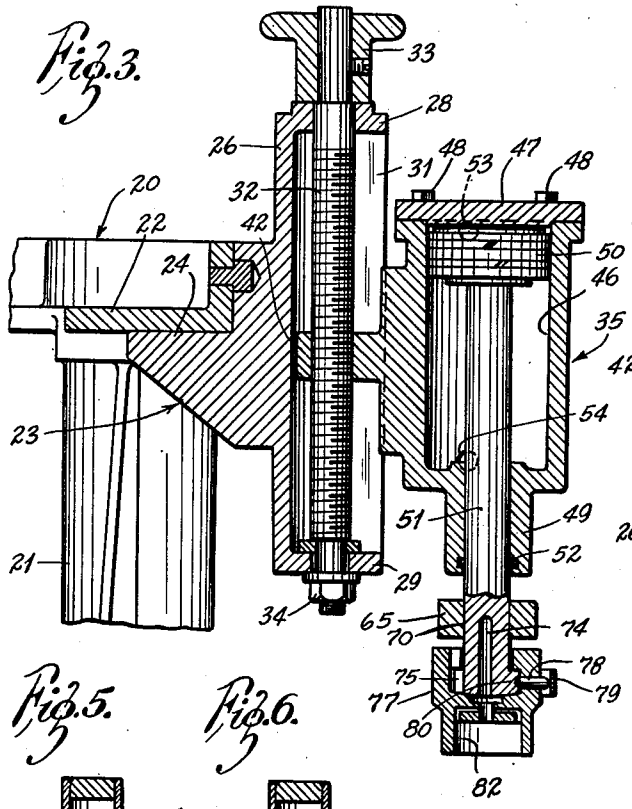


Fig. 4.

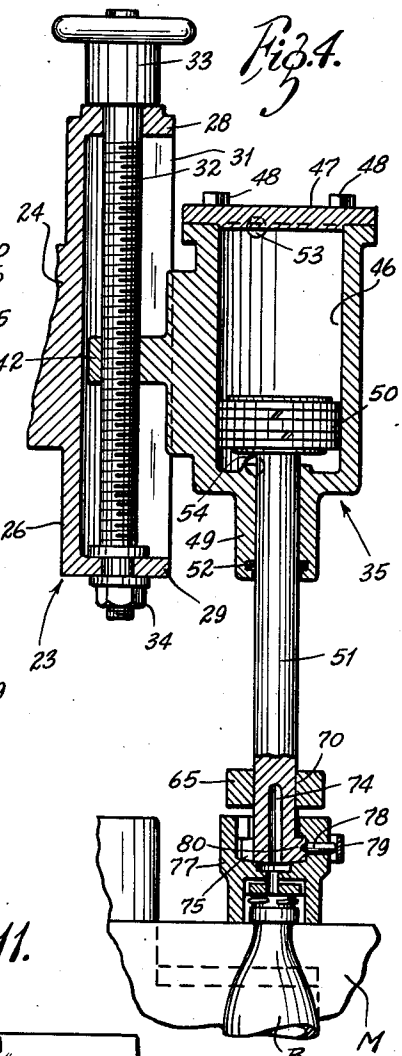


Fig. 5.

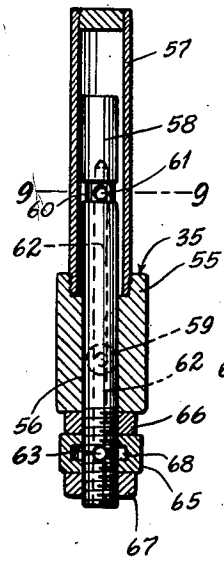


Fig. 6.

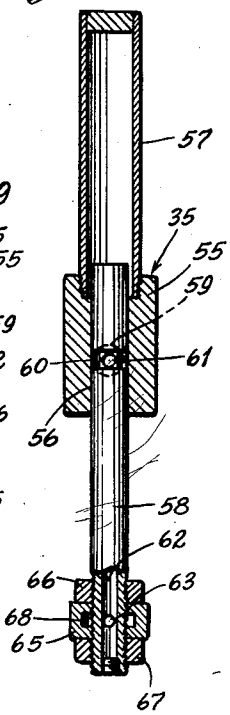


Fig. 11.

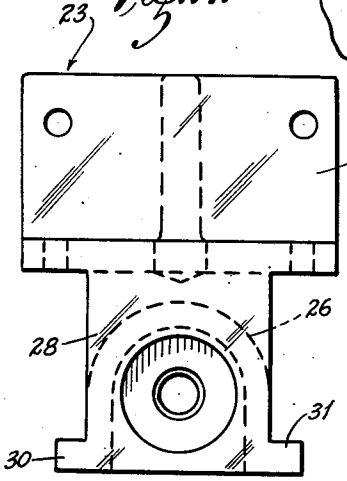
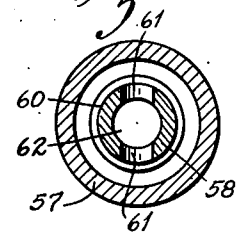


Fig. 9.



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GLASSWARE BLOWHEAD ARRANGEMENT

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Application August 2, 1950, Serial No. 177,163

7 Claims. (Cl. 49—18)

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The present invention relates to a glassware blowhead arrangement, and more particularly to one in which a blowhead is pneumatically actuated from an operating position to a retarded position, and also in which the blowhead conducts air under pressure to a mold so as to enlarge the product to be molded therein.

This invention relates especially to a blowhead device of the type exemplified by the finish mold blowhead in the application of Samuel E. Winder, Serial No. 688,470, filed August 5, 1946, for Bottle Forming Machine.

In that application, the blowhead embodiment there illustrated involves a support upon which are mounted a pneumatic motor and a blowhead moved into and out of operating position, with a manual means for adjusting the elevation of the support. The piston rod of the motor carries the blowhead itself, and the action of the piston is such as to elevate the blowhead or lower it onto the mold. In addition, the piston rod is there shown as operating within a sleeve that is formed as an integral part of the motor cylinder casting with additional air ports and passages in the sleeve in the piston rod for conducting air to the blowhead for action upon the glassware within the mold.

The present design of the blowhead is one that entirely separates the two air systems, namely, that for operating the pneumatic motor and that for delivering air to the mold. The cylinder and piston rod are sealed off at the end of the cylinder; and the blowhead air is introduced into the piston rod outside the cylinders, by a separate means.

The present arrangement thus seals off the lower end of the pneumatic motor piston and cylinder so that, when the lower end of the cylinder is charged with air under pressure to hold the blowhead away from the mold, there can be no escape of air through leakage into the blowhead air passages. This saves air, but more particularly it avoids the discharge of air from the blowhead onto the ware in the mold at irregular times, which may for example cause premature cooling of the ware. Also, a more stable construction is provided by virtue of having a parallel sliding rod assembly that reduces the turning and rocking tendency of the main piston.

In the drawings:

Figure 1 is a front elevation of the blowhead construction showing its mounting upon a glass machine;

Figure 2 is a side elevation thereof;

Figure 3 is a vertical medial section taken on

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the line 3—3 of Figure 1, with the piston and blowhead retracted;

Figure 4 is a similar vertical medial section to that of Figure 3 but with the piston and blowhead in advanced or operating position;

Figure 5 is a vertical section through the secondary slide rod and valve, taken on the line 5—5 to the right side of Figure 1, and with the rod up;

Figure 6 is a view similar to Figure 5 but with the rod down;

Figure 7 is an enlarged horizontal section through the crosshead connection, taken on the line 7—7 at the lower part of Figure 1;

Figure 8 is a similar horizontal section somewhat above Figure 7, taken on the line 8—8 of Figure 1;

Figure 9 is an enlarged horizontal section through the cap and secondary slide rod, taken on the line 9—9 of Figure 5;

Figure 10 is an enlarged plan view partly in section of the power motor cylinder and its extension;

Figure 11 is an enlarged plan view of the adjustment bracket upon which the blowhead and motor are supported for vertical adjustment;

Figure 12 is a partially sectional view of the lower end of the piston rod; and

Figure 13 is an enlarged bottom view of the piston rod.

A portion of a glass molding machine is shown at 20. While the present invention is not limited to a particular machine, reference to the Winder application, Serial No. 688,470, filed August 5, 1946, will show the machine for which these blowheads are especially adapted. In that machine, these blowheads are the ones used for blowing the parisons to final form. The fixed column 21 and top ring 22 of the present drawings find counterparts in the Winder machine.

A supporting bracket, generally indicated at 23, is attached to the ring 22. This bracket includes an attachment portion 24, having a vertical and a horizontal portion, by means of which it may be bolted to the ring 22 by bolts 25. It also includes a vertical, more or less semicircular, part 26 with upper and lower ledges 28 and 29. The outer vertical edges of the semicircular part 26 are outwardly turned to provide flanged tracks 30 and 31.

A jackscrew 32 extends between the two ledges 28 and 29, and is rotatably mounted therethrough. At its upper end, it receives a handle 33, and at its lower end it has a nut 34, by means

of which it may be tightened in any position of adjustment.

A cylinder member, generally designated 35, is mounted for vertical adjustment on the bracket 23. It has a slide 36 that fits over the outer surfaces and side edges of two tracks 30 and 31. It has also two track elements 38 and 39 bolted by bolts 40 to its opposite edges so that it can be fitted over the two tracks 30 and 31 and can be adjusted vertically therealong in a manner to securely mount the cylinder member 35 to the bracket 23. The cylinder member 35 has a projection 42 extending outwardly therefrom and fitting within the semi-cylindrical vertical part 26 of the bracket 23, and also threaded to receive the jackscrew 32. By this arrangement, the rotation of the jackscrew causes vertical movement of the cylindrical member 35.

The cylindrical member 35 has a pneumatic motor cylinder 46 in it which receives a cylinder head closure 47 attached by bolts 48. The lower end of the cylinder 46 is provided with a sleeve 49 extending downwardly.

A motor piston 50 operates vertically within the cylinder 46, and has a piston rod 51 extending downwardly therefrom and guided within the sleeve 49. A suitable packing 52 seals off the lower end of the sleeve 49. Fluid connections 53 and 54 lead into the top and bottom, respectively, of the cylinder 46.

The lower end of the main cylinder portion 35 has a lateral extension 55. This extension has a vertical bore 56 extending through it. A sealing cap 57 is secured into the upper end of the bore 56. A slide rod 58, that also acts as a valve, is adapted for vertical movement in the bore 56, and in the cap 57. An inlet 59 for compressed air connects into the side of the extension 55 and opens into the bore 56. The rod 56 normally seals off the inlet 59, but has a groove 60 around it, which in a lowered position of the rod 58 such as is shown in Figure 6, registers with the inlet 59. The groove 60 connects by cross ports 61 with an axial passage 62 through the rod 58 extending down to the bottom of the rod but plugged at its lower end. At the lower part of the rod, which lower part is externally threaded, there are cross passages 63.

A crosshead 65 fits over the lower threaded end of the rod 58, and is removably and adjustably clamped in accurate position by two nuts 66 and 67. This crosshead 65 has a circular opening 68 around the rod 58, and adapted to register with the cross passages 63 in the rod 58. It also registers with a passage 69 extending through the middle part of the crosshead and connecting with another opening 70 through the crosshead 65 parallel to the opening 68. This opening 70 is also part of a split sleeve clamping arrangement with a tightening screw 71, by means of which the crosshead may be tightly clamped around the lower end of the main piston rod 51. A setscrew 72 may also be used to aid in preventing movement of the crosshead relatively to the main piston rod 51. The crosshead 65 is mounted on the piston rod in such wise as to cause the passage 69 in the crosshead to register with a cross port 73 in the main piston rod 51. This cross port 73, in turn, connects into an axial passage 74 in the main piston rod that extends downwardly through the lower end of the piston rod. The passage 73 in the main piston is entirely outside of the cylinder 46 and its sleeve 49.

The lower end of the piston rod is provided with a head that is here conventional, with a plurality of radial projections 75 that interfit with complementary recesses on a blowhead 77, the arrangement being such that the blowhead can be readily removed or attached by twisting it and moving it axially. A plunger 78, spring pressed by a leaf spring 79, may be used to hold the blowhead 77 in place. The plunger 78 may engage in suitable notches 80 in the lower end of the piston rod 51 in a manner shown in the Winder application referred to.

The blowhead 77 has a recess 82 to receive the finish of a bottle B, as is illustrated in Figure 4. In the usual construction, the recess is slightly deeper than the projection of the bottle above the top of its mold M. There are the usual air passages for admitting air down into the parison from which the bottle B is formed, and also constricted passages so that the air can equalize pressure on the outer part of the finish of the parison.

Operation

This blowhead apparatus is mounted so that the reciprocation of the piston motor will cause the blowhead to move from its retracted, inoperative position to its blowing position and to return therefrom. During this retraction of the blowhead, the glass parison is inserted into the mold and is normally allowed to remain therein for an interval during which it reheats. After reheating of the parison, the blowhead advances to the position of Figure 4 for blowing out the parison. Upon completion of this blowing phase, the blowhead is retracted, so the mold can be opened and the ware removed. Subsequently the mold is recharged with another parison, and the cycle is repeated.

The stroke of the blowhead is determined by the stroke of the piston 50. Since the elevation of the top of the molds M may vary with different ware, the adjustment provided by the knob 33 is used. With the piston down, as shown in Figure 4, the knob 33 is adjusted with the nut 34 loose, until the head 77 is in proper engagement with the top of the mold M. Then the nut 34 is tightened to hold the adjustment thus made.

The two piston motor air lines 53 and 54 are connected to a typical four-way valve that is operated in a predetermined cycle related to the operation of the whole glass machine. By this four-way valve arrangement, such as is illustrated in detail in the Winder application, air under pressure is admitted to the top of the cylinder 46, while the space below the piston is exhausted to atmosphere, and the piston is driven down to the position of Figure 4. When the blowing is complete, the air connections just mentioned are reversed, air under pressure being delivered through the lower air line 54, and the upper air line 53 being connected to exhaust. The piston 50 is elevated back to the position of Figure 3.

Air under pressure is also connected to the line 59 that leads into the extension 55. As long as the piston is up, the rod 58 also is up, and with the groove 60 out of registry with the inlet 59 the air is cut off by the piston surface and cannot further enter the opening 56.

When the main piston 50 is caused to descend in the manner aforesaid to bring the head 77 over the glass to be blown into the bottle B, as soon as the piston reaches its operating position the groove 60 will register with the air inlet port 59 on the extension 55, and this air will then be delivered through the cross passages 61, the axial passage 62 within the rod 58, and the

cross ports 63 thereof into the circular opening 68 in the crosshead 65. From this opening, the air is delivered through the passage 69 to the main piston rod 51, where it enters through the port 73 to the axial passage 74, and is thereby delivered to the main blowhead 77 and to the glass to be blown into the bottle B.

When the blowing operation is completed, the pneumatic motor air connections are reversed and the piston 50 is elevated by air under pressure introduced into the lower end of the cylinder 46. As soon as the piston rises a short distance, carrying the crosshead 65 and the rod 56 with it, the port 59 will again be cut off, so that air is no longer admitted into the blowhead. The piston 50 will rise to the position of Figure 3, and will be held there by the pressure of air in the lower end of the cylinder 46 until a new cycle is required.

In the present construction, the main piston rod conducts the glass blowing air in a manner that is entirely disconnected from the operation of the piston. The blowhead air passage 74 and its cross port 73 do not have to come within the guide sleeve 49 of the cylinder 35 at all. Consequently, with suitable packing such as that shown at 52, a good working seal can be obtained for the piston rod 51 that will prevent the escape of air from the cylinder 46 when the piston is in the position of Figure 3.

In addition to the function of isolating the two air systems, the present construction also is more stable than that of the Winder application. The second rod 58 can perform the function of preventing the twisting of the main piston rod 51, and also by being in the nature of an outboard guide can reduce the twisting effect that increases wear on the sleeve bearing 49 for the piston 50.

The rod 58 operates within the dust cap 57 which keeps dirt and foreign matter from clogging the groove 60 and the associated ports. It will be seen that all of the ports are protected.

When the present invention is used on a multiple machine, such as that shown in the Winder application, a suitable number of the heads will be disposed around the supporting framework of the machine, so that they may be actuated during rotation of the frame. The construction lends itself to interchangeability of the parts which improves the facility of servicing the equipment.

What is claimed is:

1. In a blowhead construction, a fluid power motor having a cylinder and a piston operable in the cylinder with a main piston rod advanced and retracted by the piston, a second reciprocable rod in parallel spaced relation to the piston rod, fixed means in which the second rod advances and retracts, and a crosshead rigidly interconnecting the two rods outside the cylinder for constant positional relationship therebetween, there being air conducting passage means extending consecutively through the second rod, the crosshead and the main piston rod, and opening from the external part of the main piston rod; and there being also fluid passage means into opposite ends of the cylinder.

2. The combination of claim 1, wherein the fixed means is provided with an air conducting passage, said passage being positioned to communicate with the aforementioned air conducting passage means only upon advance of said second rod to a selected position relative to the fixed means.

3. The combination of claim 2, together with means for releasably securing the crosshead to each of the rods for relative adjustment therebetween.

4. The combination of claim 1, wherein the fixed means is provided with guiding means for slidably receiving the second rod and limiting movement of the same to parallelism with movement of the main piston rod, and wherein the fixed means is further provided with air conducting inlet means for selective communication with the aforementioned air conducting passage means.

5. The combination of claim 1, plus means on the end of the main piston rod for attachment and removal of a blowhead.

6. In a blowhead construction, a pneumatic motor comprising a cylinder, a piston and a piston rod, the piston rod including a portion extending continuously outside the cylinder, air line connections into the cylinder at its opposite ends, a blowhead on the extended portion of the piston rod to be moved thereby into and out of blowing association with a mold, first fluid passage means in the extended portion of the piston rod communicating at one end with the blowhead and terminating exteriorly of the piston rod at a point intermediate the blowhead and the cylinder, a movable rigid member connected with the piston rod to move therewith and having second fluid passage means communicating with said first fluid passage means, and a fixed rigid member in which the movable rigid member reciprocates, the fixed rigid member having a third fluid passage means for connection into said second fluid passage means.

7. In a blowhead construction, a fluid power motor having a cylinder and a piston operable in the cylinder with a main piston rod advanced and retracted by the piston, fluid passage means into opposite ends of the cylinder, means on one end of the piston rod for attachment and removal of a blowhead, a crosshead secured to the piston rod for reciprocation therewith, a second reciprocable rod disposed in parallel spaced relation relative to the piston rod and secured to the crosshead for reciprocation therewith, fixed guide means slidably receiving the second rod, air passage means extending consecutively through the second rod, the crosshead, and the piston rod, said air passage means having one terminus at the blowhead end of the piston rod and another terminus in the second rod, additional air passage means in the fixed guide means, and means for communicating the first and the last mentioned air passage means only at a predetermined position of the second rod relative to the fixed guide means.

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