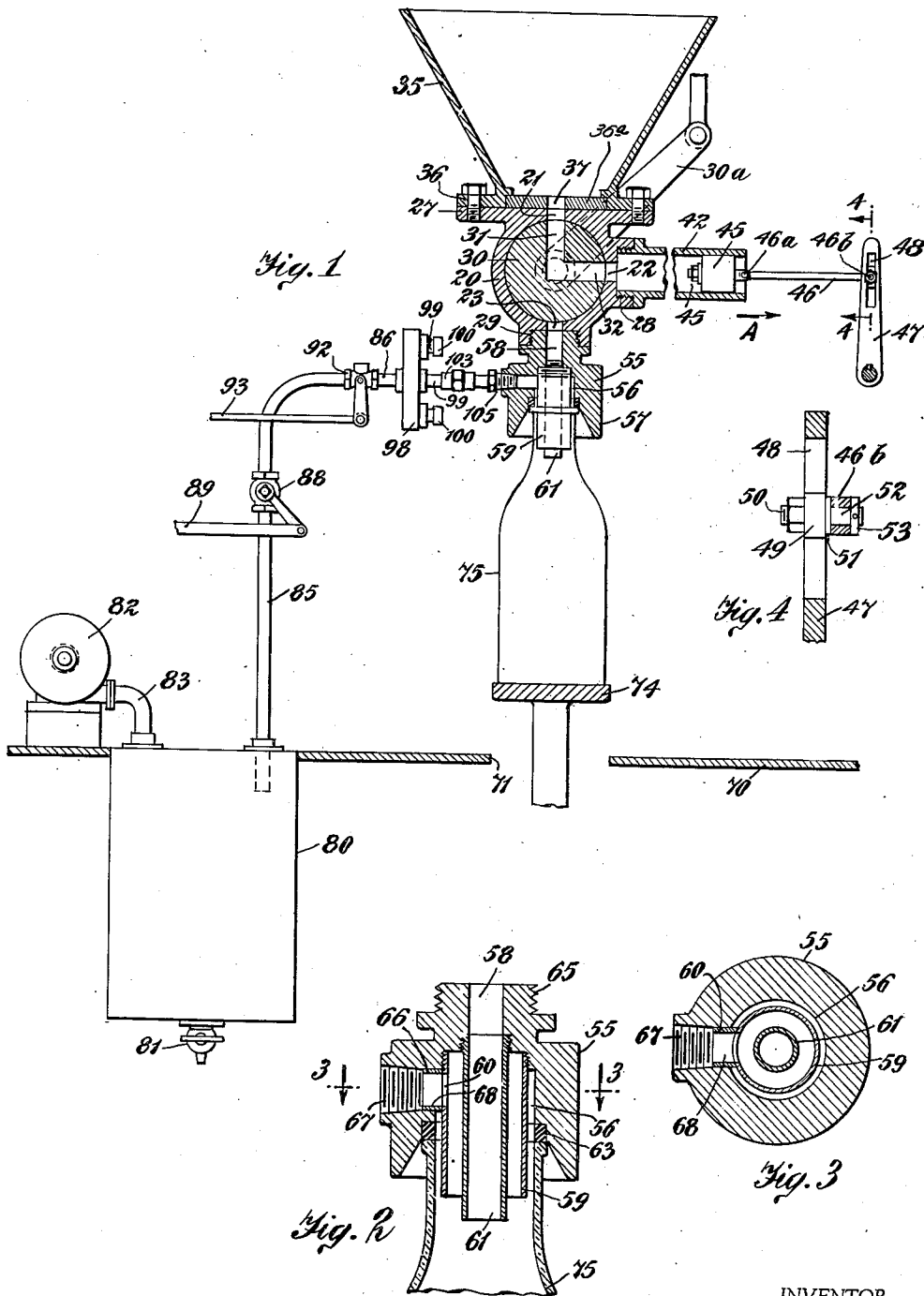


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VACUUM AND PRESSURE FILLING APPARATUS FOR FLUID,
PLASTIC, OR VARIOUS OTHER MATERIALS
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VACUUM AND PRESSURE FILLING APPARATUS FOR FLUID, PLASTIC, OR VARIOUS OTHER MATERIALS

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4 Claims. (Cl. 226—107)

This invention relates to a vacuum and pressure filling apparatus for fluid, plastic or various other materials and the method of filling containers therewith.

The essential object of the invention is the production of apparatus, by means of which a partial vacuum is produced in containers and by means of which a measured quantity of material is forced into the containers.

The second object of the invention is the production of apparatus, by means of which the productivity of filling containers with a material is greatly increased.

The third object of the invention is the production of filling apparatus for containers, by means of which the material charged into the containers is not hindered by the resistance of the air displaced from the containers.

The fourth object of the invention is the production of apparatus, by means of which viscous materials can be introduced into containers and at the same time obliterate air pockets in the containers.

The fifth object of the invention is the production of apparatus, by means of which containers of varying inside diameters can all be filled to a uniform height.

The sixth object of the invention is production of apparatus for filling containers, which can be easily applied to the various types of pressure filling machines now in use, such as piston displacement machines, compressed air operating machines, gravity filling machines and the like.

The seventh object of the invention is the production of apparatus, by means of which containers can be easily filled with charges of material, and which avoids splashing said material over the mouths of the containers when filling the same.

In the accompanying drawing, Fig. 1 represents an elevation partly in vertical section of an exemplification of the apparatus for filling containers, by a piston displacement system cooperating with a vacuum; Fig. 2 indicates an enlarged fragmentary of Fig. 1, Fig. 3 is a section of Fig. 2 on the line 3, 3 and Fig. 4 shows a section on the line 4, 4 of Fig. 1.

A valve casing is indicated at 20 having the ports 21, 22 and 23. The upper end of the casing 20 has integral therewith the flange 27. At one side of the casing 20 is shown the internally threaded sleeve 28 and at the lower end of said casing is indicated the internally threaded sleeve 29. A valve 30 having the connecting ports 31 and 32 at right angles to each other is rotatively sup-

ported in the casing. An arm 30a extends from the valve 30.

A supply hopper 35 is indicated with its supporting flange 36 having the port 37. The flange 36 and the latter is recessed for the disc 36a is supported upon and fastened to the flange 27, by means of bolts as shown, and the port 37 is in alignment with the port 21. A measuring cylinder 42 has one end thereof in threaded engagement with the sleeve 28 and is axially in line with the port 22. A reciprocating piston 45 is provided for the cylinder 42. A connecting rod 46 is shown with the ends 46a and 46b. The end 46a is pinned to the piston 45. An operating arm 47 is indicated with the longitudinal slot 48. A block 49 is positioned in the slot 48. The block 49 is shown with the threaded shank 50 with a nut as shown. A collar 51 is integral with the block 49 and from said collar 51 extends the journal hub 52 with the detachable collar 53. The end 46b of the connecting rod is supported on the journal hub 52. By varying the position of the block 49 in the slot 48 the operator can vary the stroke of the said piston 45.

A vacuum hood is indicated in its entirety by the numeral 55. The said hood is shown with the axial chamber 56 which has the flared lower end 57 and connects with the inlet opening 58. A vacuum tube 59 having the opening 60 in its upper portion is detachably positioned in the chamber 56 of the vacuum head 55. A detachable filling tube 61 in the vacuum head 55, extends from the opening 58 to below the lower end of the vacuum tube 59. A flexible seat 63 coaxial with the tube 61 is tightly positioned in place at the upper portion of the flared lower end 57 of the vacuum hood 55.

A threaded boss 65 at the upper end of the hood 55 is in threaded engagement with the sleeve 29. A port 66 having the tapered threaded portion 67 is shown in the upper portion of the hood 55. In the port 66 is positioned the sleeve 68, which is coaxial with the opening 60 and bears against the vacuum tube 59.

A platform 70 is positioned below the vacuum hood 55 and is indicated with the opening 71. A reciprocating table 74 extends through the opening 71 and is provided for supporting the containers, in the exemplification the bottles 75.

A vacuum reservoir 80 with the outlet valve 81 for an outlet opening is positioned below the platform 70. A vacuum pump 82 is shown with its inlet piping 83 and the latter leads from the reservoir 80. Vacuum piping 85 with the member 86 leads into the reservoir 80 and has connected

therewith a shut off valve 88, which is automatically operated by the lever 89.

In the member 86 is indicated the release valve 92, which is automatically operated by the lever 93. To the member 86 is attached the manifold 98 and from the later may extend a plurality of nipples 99 to be connected to a plurality of vacuum heads 55 and their appurtenances. In this instance only one of the nipples 99 and one of the heads 55 are indicated in operating position, and caps 100 are provided for the nipples not in use. In this instance one of the said nipples 99 is shown with the coupling 103 and from the latter extends the tapered plug 105 which is in threaded engagement with the threaded tapered portion 67 of the port 66.

To operate the vacuum and pressure filling apparatus, the material handled is charged into the supply hopper 35. The vacuum pump 82 is started and by means of which a vacuum is produced in the vacuum reservoir 80. The bottles 75 are positioned upon the reciprocating table 74, which seats the upper ends of said bottles against the flexible seat 63 to make them vacuum tight. At the same time the piston 45 is reciprocated, by means of the operating arm 47 and its appurtenances. When the piston 45 moves in the direction of the arrow A, a measured quantity of the material handled is drawn from the supply hopper 35, through the ports 37, 21, 31, 32 and 22, when the valve 30 is positioned as indicated in Fig. 1. At the same time the table 74 rises and locates the bottle 75 with its upper end in tight contact with the flexible seat 63. Slightly before locating the bottle 75 in place, the valve 88 is automatically opened and the valve 92 is maintained closed. By this means a partial vacuum is produced in the bottle 75. The valve 30 is now automatically turned by the arm 30a to connect the port 31 with the cylinder 42 and the port 32 with the port 23. The piston is now moved in a direction opposite to the arrow A, and ejects the measured quantity of material therein into the bottle 75 through the filling tube 61. The valve 88 is then automatically closed to cut off the vacuum from the bottle 75, and the valve 92 is opened to release the vacuum in the hood 55. Next the bottle 75 is lowered with the descent of the table 74.

In case the bottles 75 vary in their internal diameters, so that the upper levels of the charges of the material therein vary, the apparent surplus of the material above the lower end of the vacuum tube 59 will be drawn from the bottles in the annular space between the vacuum tube 59 and the filling tube 61 and will enter the vacuum reservoir 80. The material in the reservoir can be removed therefrom by opening the outlet valve 81.

Instead of the reciprocating table 74 to position the bottles 75 in place, the apparatus may be constructed to reciprocate the vacuum hood 55 and its appurtenances, to properly contact the upper ends of the bottles 75 with said hood.

Various modifications may be made in the invention and the present exemplification is to be

taken as illustrative and not limitative thereof.

Having described my invention, I claim:

1. In a vacuum and pressure filling apparatus the combination of a measuring and charging cylinder, a reciprocating piston in said cylinder, an operating arm having a longitudinal slot adjacent to the cylinder, a block having a journal hub extending therefrom positioned in said slot, means to fasten the block in various positions to adjust the stroke of said piston, a connecting rod having one end pinned to said piston and its other end supported on said journal hub, means to lead a material operated upon to said cylinder to be drawn into the same, said means also functioning to lead said material from the cylinder, said piston during each stroke moving equal amounts of material one after the other, a vacuum hood positioned in the apparatus to receive the discharge of said material from the cylinder, said hood having a chamber adapted to receive a container to be charged with said material, means to produce a partial vacuum in the chamber of said hood and means to release the vacuum.

2. In a vacuum and pressure filling apparatus, the combination of a measuring and charging cylinder, a reciprocating piston in said cylinder, means to lead a material to said cylinder to be drawn into the same, said means also functioning to lead the material from the cylinder, a vacuum hood positioned to receive the discharge of said material from the cylinder, a reciprocating table axially in line with said hood supporting a container to be filled with said material, said table at the upper end of its stroke locating said container in said hood in proper position, means to produce a partial vacuum in said hood and container and means to release the vacuum.

3. In a vacuum and pressure filling apparatus, the combination of a valve casing, a valve in said casing, means to swing the valve to different positions, a measuring and charging cylinder extending from the valve casing, a reciprocating piston in the cylinder, a hopper for the material to be handled, supported on the valve casing, a vacuum hood extending from the valve casing having a longitudinal chamber for the insertion of a container to be charged with said material, means to produce a partial vacuum in said chamber and means to release said vacuum.

4. In a vacuum and pressure filling apparatus, the combination of a valve casing, a valve in said casing, means to swing the valve to different positions, a measuring and charging cylinder extending from the valve casing, a reciprocating piston in the cylinder, means to vary the length of the stroke of said piston, a hopper for the material to be handled supported on the valve casing, a vacuum hood extending from the valve casing having a longitudinal chamber for the insertion of a container to be charged with said material, means to produce a partial vacuum in said chamber and means to release said vacuum.

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