Nov. 2, 1943. G. J. MEYER 2,333,545

BOTTLE FILLING MACHINE

Original Filed July 20, 1940 2 Sheets-Sheet 1

FIG. 1

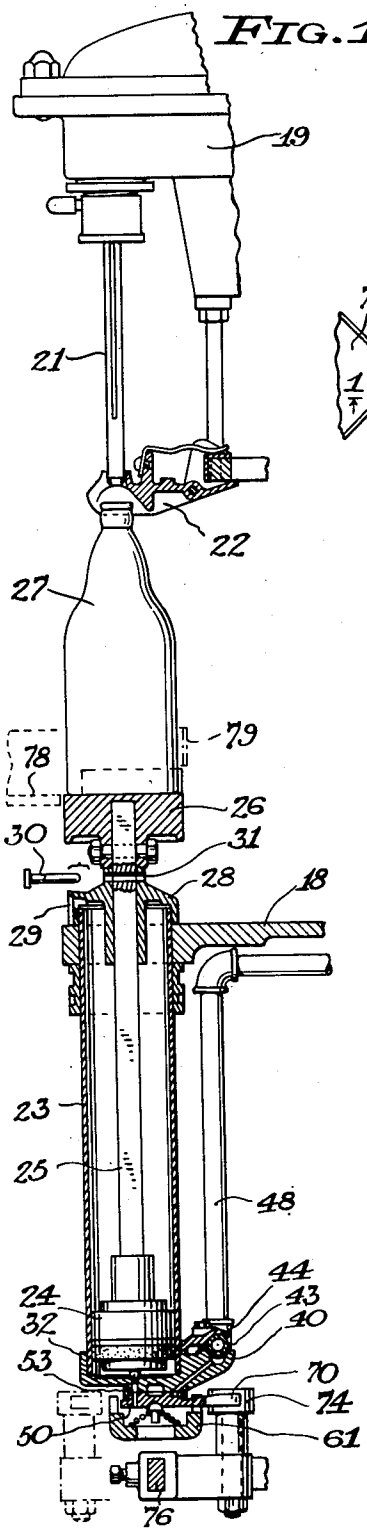



FIG. 2

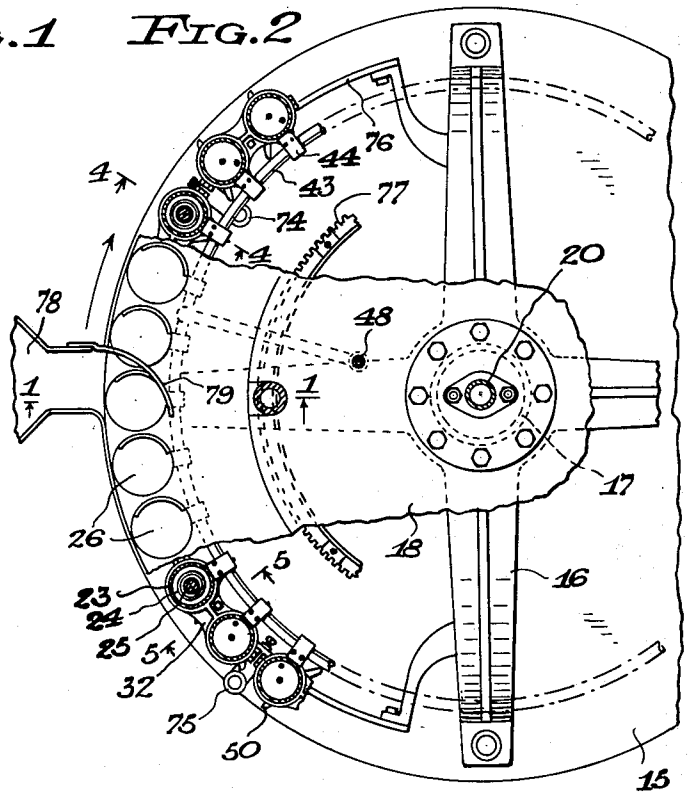
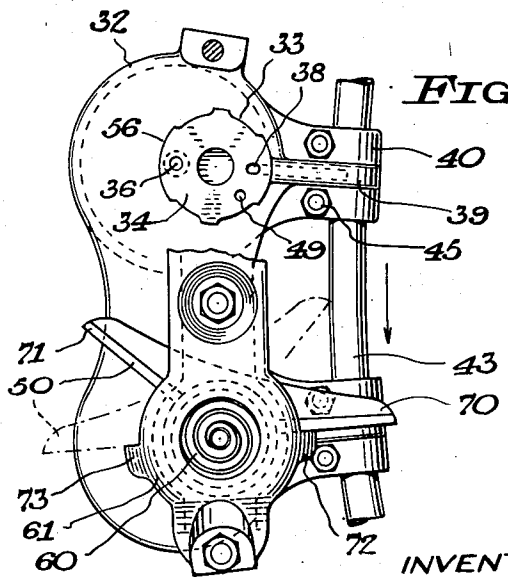



FIG. 3




INVENTOR
GEORGE J. MEYER
BY Christopher L. Waal
ATTORNEY

Nov. 2, 1943. G. J. MEYER 2,333,545

BOTTLE FILLING MACHINE

Original Filed July 20, 1940 2 Sheets-Sheet 2

FIG. 4

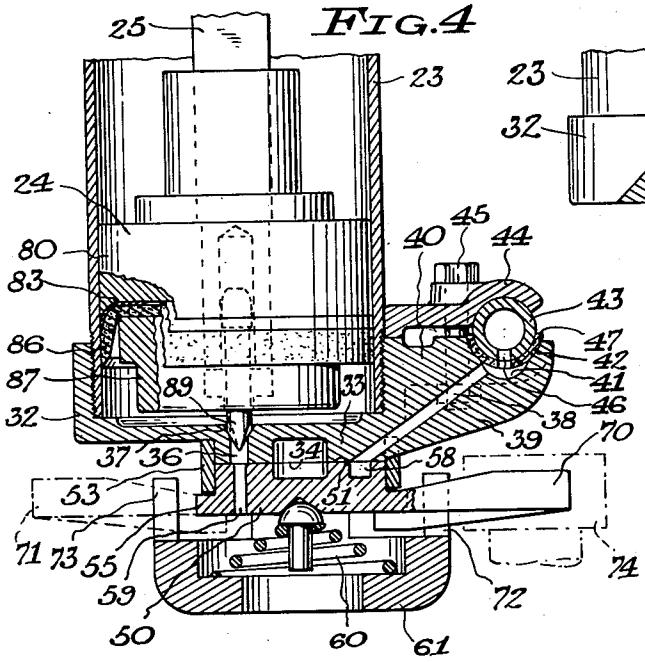



FIG. 5

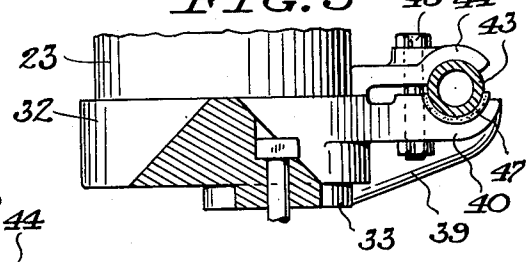



FIG. 7

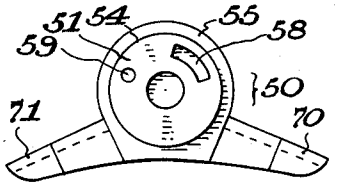



FIG. 8

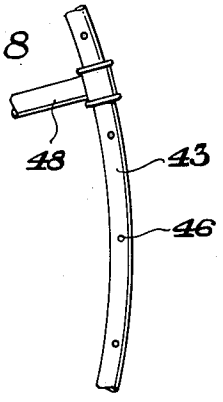
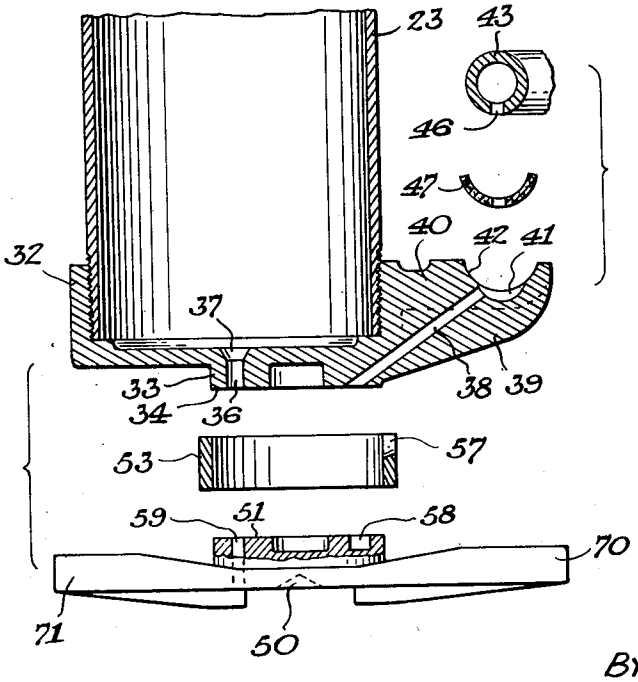



FIG. 6




INVENTOR
GEORGE J. MEYER
BY Christopher L. Waal
ATTORNEY

Patented Nov. 2, 1943

2,333,545

# UNITED STATES PATENT OFFICE

2,333,545

## BOTTLE FILLING MACHINE

George J. Meyer, Milwaukee, Wis., assignor to Geo. J. Meyer Manufacturing Company, Cudahy, Wis., a corporation of Wisconsin

Original application July 20, 1940, Serial No. 346,563. Divided and this application August 3, 1942, Serial No. 453,384

6 Claims. (Cl. 226—110)

The present invention relates to filling machines and the like, and more particularly to the type of machine in which bottles or other receptacles are lifted to filling position by fluid pressure.

An object of the invention is to provide a filling machine having improved and easily mounted means for supplying compressed air or other motive fluid to a group of receptacle-lifting cylinders.

Another object is to provide an improved cylinder construction for the machine to facilitate the formation and control of the fluid passages.

A further object is to provide simple and easily manipulated means for individually preventing operation of the receptacle-lifting means in case of one or more of the filling units becoming disabled.

Still another object is to perfect details of construction generally.

The invention further consists in the several features hereinafter described and claimed.

In the accompanying drawings,

Fig. 1 is a vertical sectional elevation of an outer portion of a bottle filling machine embodying the invention, the section being taken generally along the line 1—1 of Fig. 2;

Fig. 2 is a plan view of the machine, parts being shown in section;

Fig. 3 is a bottom view of a portion of an air cylinder assembly, parts being broken away, parts being shown in section, and parts being omitted;

Fig. 4 is a sectional elevation of the lower portion of one of the cylinders, taken generally along the line 4—4 of Fig. 2, a bottle-lifting piston for the cylinder being shown in its lowermost position;

Fig. 5 is a sectional elevation taken generally along the line 5—5 of Fig. 2, valve parts being omitted;

Fig. 6 is a sectional elevation of the lower portion of one of the cylinders, parts being disconnected;

Fig. 7 is a top view of a rocking valve member, and

Fig. 8 is a bottom view of a portion of an annular air-supply header or manifold.

In these drawings, 15 designates a base plate on which is mounted a legged stand 16, Fig. 2, having a tubular post or column 17, and 18 designates a wheel or carrier which is rotatably mounted on the tubular post. The usual tank or bowl 19 is suitably supported above the wheel 18 to rotate therewith, and is adapted to contain and distribute the liquid to be bottled, the tank being supplied with liquid through the usual pipe 20, Fig. 2, extending concentrically through the tubular post 17. The tank is provided with the usual downwardly projecting filling nozzles or siphon tubes 21, one being shown, and is further provided with pivoted bottle-centering guides 22, one being shown.

Below and in line with the siphon tubes 21, vertical cylinders 23 are rigidly secured near their upper ends on the apertured rim portion of the wheel 18, so as to turn with the wheel and tank. These cylinders are arranged in a circular series as usual and are provided with pistons designed generally by the numeral 24. The pistons are attached to piston rods 25 which are provided at their upper ends with supports or platforms 26 on which the bottles 27 are adapted to stand. Each piston rod is preferably of square or other non-circular cross-section and slidably extends through an upper cylinder head 28. This cylinder head has a relief port 29 which is open at all times to the space above the piston. In case of emergency, each piston may be individually locked in its lowermost position by means of a detachable pin 30, Fig. 1, adapted to pass through transversely extending apertures 31 in the piston rod and the upper cylinder head.

The lower ends of the cylinders 23 are secured to bottom cylinder heads 32 which also form valve bodies, there being a double cylinder head for each adjacent pair of cylinders. Formed on the underside of each cylinder head 32 are two generally circular valve seat embossments 33, one for each of the two cylinders, each embossment being eccentrically arranged with respect to the axis of the corresponding cylinder. These embossments present flat annular valve seats 34 which are disposed in a plane normal to the cylinder axes. A vertical bore 36 extends in each embossment coaxially of the cylinder and communicates with the cylinder space to form an exhaust port, the upper end of this bore presenting a conical valve seat 37, Figs. 4 and 6. A straight inclined bore 38 in the cylinder head has its lower end forming a port in the valve seat 34 at a point diametrically opposite the lower end of the bore 36. The inclined bore extends along a rib 39 of a projection or ear 40 formed at the inner side of the bottom cylinder head radially of the wheel and communicates with a pocket 41 in an upwardly opening semi-cylindrical header seat 42 formed transversely of the ear. Each rib 39 extends radially from the periphery of the corresponding valve seat embossment. A horizontal ring-like air supply tube 43 of cylindrical

cross-section forming a header or manifold is arranged concentrically of the wheel 18 and is secured to the channel-like seats 42 by respective clamps 44 which are fastened to the ears 40 by bolts 45, the cylindrical tube resting in the concave seats. The tubular header 43 is provided at its bottom with ports 46, Fig. 4, registering with the pockets 41, and apertured packing members 47 of leather or other suitable material are interposed between the cylindrical surface of the header tube and the semi-cylindrical seats 42. The concave upwardly opening header seats 42 permit the ring-like header tube 43 to be readily mounted in place on the lower cylinder heads of the assembled circularly grouped cylinders. The ports 46 extend downwardly in a direction generally parallel to the cylinder axes and the axis of the central column 17. Compressed air is conducted to the header 43 by a pipe 48, and the latter communicates with a source of compressed air through the usual swivel coupling, not shown. A vertical inlet port or bore 49, Fig. 3, is formed in each cylinder head embossment 33 at a distance from the supply port 38 and communicates with the cylinder space.

An oscillatory or rocking valve member 50, bearing against the valve seat 34 of each cylinder, controls the admission and release of air or other motive fluid under pressure to and from the cylinder, so as to effect the raising and lowering of the bottle with respect to the filling nozzle or siphon tube 21. Each valve member 50 is in the form of a disk and is provided with a flat annular valve seat 51 engageable with the valve seat 34. A ring 53 in the form of a short tube fits around the cylinder head embossment 33 and the registering circular portion or embossment 54 of the valve member to retain the valve member in a centered position with respect to the cylinder head embossment, and to form a pivot means, the ring being confined axially between the bottom of the cylinder head and a peripheral flange 55 formed on the valve member. The centering ring 53 is engageable with spaced lands 56, Fig. 3, formed on the periphery of the cylinder head embossment 33, and is provided with a notch 57, Fig. 6, which provides clearance for the cylinder head rib 39 and prevents rotation of the ring. The ring 53 also encloses the joint at the peripheries of the valve seat and the valve member face. The axial width of the ring 53 is somewhat shorter than the distance between the bottom of the cylinder end wall and the valve member flange 55, so as to allow for wear of the valve. An arcuate transfer port or pocket 58 is formed in the valve seat or face 51 of the valve member and is adapted to communicate with the air supply bore 38 and cylinder inlet port 49, so as to admit compressed air into the cylinder when the valve member is swung to one of its terminal positions. An exhaust port or passage 59 extends through the valve member and is adapted to communicate with the cylinder head exhaust port 36 when the valve member is swung to its other terminal position.

The rocking valve member 50 is urged upwardly against the flat face 34 of the valve seat embossment by a coiled spring 60 which is mounted in a bracket or cage 61 extending below and bolted to the cylinder head. Each rocking valve member 50 has formed thereon a pair of angularly related operating arms 70 and 71 which extend in generally opposite directions and are near the projected plane of the flat valve face, the sides of the bracket 61 being open to afford clearance for these arms. The bracket is provided at its opposite sides with upstanding stop abutments or lugs 72 and 73 which are adapted to be engaged by the arms of the valve members to limit the angular movement of the valve members and to determine the terminal positions of these members. The inwardly projecting arms 70 are engageable with the stop lugs 72, while the outwardly projecting arms 71 are engageable with the stop lugs 73. The arms are engageable alternately with trips 74 and 75 to turn the valve member first in one direction to admit air to the cylinder and then in the opposite direction to exhaust air from the cylinder. These trips are preferably in the form of rollers to reduce friction and wear and are adjustably mounted on a stationary curved bar 76 secured to the stand 16 and arranged concentrically of the wheel 18. The trip 74, which controls the raising of the pistons, is engageable with the inwardly projecting valve member arms 70, while the trip 75, which controls the lowering of the pistons, is engageable with the outwardly projecting valve member arms 71. The rocking valve members are suitably lubricated, as by admitting a small quantity of water into the air supply pipe 48. The water will drain out of the bottom ports 46 of the header 43 and down the inclined passages 38 to the valve members.

The bottle-carrying wheel 18 and the tank 19 are rotated in any suitable manner, as by means of gearing including a ring gear 77 secured to the underside of the wheel.

On one side of the machine between the trips 74 and 75 the filled bottles are discharged from the machine into a table 78, as by means of a curved diverting guide 79.

As shown in Fig. 4, each piston 24 includes a piston head member 80 and subjacent follower 87 secured to the lower end of the piston rod 25. A cupped packing member 86, such as a cup leather, and a soft metal retaining ring 83 therefor, are clamped between the piston head member and follower.

In order to cushion the movement of the piston at the lower end of its descending travel, a headed vertical needle valve 89 is slidably mounted and loosely confined in the piston rod and follower and has a flatted or fluted conical lower end projecting from the follower and adapted to engage the conical valve seat 37 at the upper end of the exhaust port 36, thus restricting the outflow of air. The headed upper end of the needle valve prevents the valve from dropping out when the piston is raised.

In operation, the bottle-carrying wheel 18 and liquid tank 19 rotate in the direction indicated by the arrow in Fig. 2. The bottle supports 26 in the vicinity of the discharge table 78 are in the lower positions, and empty bottles are placed on the supports as they pass between the discharge table and the trip 74. When the inwardly projecting arms 70 on the rocking valve members 50 pass the trip roller 74, they turn the valve members into the position shown by dotted lines in Fig. 3, thus closing the exhaust ports 36 in the lower cylinder heads and admitting air to the inlet ports 49 by way of the arcuate transfer ports or pockets 58, so as to force the pistons 24 upwardly, carrying the bottles on the supports 26 upwardly beyond the displaceable centering guides 22 and over the siphon tubes 21. The bottles on the lifted supports revolve with the

wheel or carrier and are filled with liquid in the manner characteristic of counter-pressure filling machines. After the bottles are filled the outwardly projecting arms **71** of the valve members are brought into engagement with the trip **75**, thus turning the valve member **50** to the position seen in Fig. 4 and shown by full lines in Fig. 3, shutting off the supply of compressed air to the cylinders and opening the cylinder exhaust ports **36**. The pistons **24** with the filled bottles carried by the supports **26** are thus allowed to descend by gravity, and the lower portion of their travel is cushioned by the operation of the cushioning valves **89**. The filled bottles finally reach the diverting guide **79** and pass onto the discharge table **78**.

In a filling machine, a bottle-lifting cylinder or its associated siphon may occasionally get out of order, and it may not be convenient to stop the machine for some time thereafter to permit adjustment. If such disarrangement should occur the piston is retained in its lowermost position by the detachable locking pin **30** shown in Fig. 1, this pin being insertible into the openings **31** during the rotation of the carrier.

While the invention is here shown to be embodied in a bottle filling machine, it is also applicable to other types of article handling machines.

This application constitutes a division of my copending application for Air cylinder apparatus for bottle filling machines, Serial No. 346,563, filed July 20, 1940.

What I claim as new and desire to secure by Letters Patent is:

1. In a bottle filling machine and the like having a plurality of filling units including fluid-operated cylinders with pistons therein for lifting the bottles to filling position, the combination with said pistons, of locking devices for individually and selectively locking said pistons in their retracted positions to prevent operation thereof in the case of a filling unit becoming disabled.

2. In a bottle filling machine and the like, the combination of a plurality of filling units including fluid-operated cylinders with respective pistons therein for lifting the bottles to filling position, each cylinder having a head and the associated piston having a rod passing through said head, each head and associated piston rod having transversely extending apertures disposed in adjacent relation when the piston is in its retracted position, and locking means insertible in said apertures for individually and selectively locking said pistons in their retracted position to prevent operation thereof in the case of a filling unit becoming disabled.

3. In a machine having a rotary carrier with a circular group of article-lifting cylinders, the combination, with seat members for said cylinders having concave ported tube seats of channel shape, and a ring-like header-forming fluid supply tube for said cylinders laterally extending into and secured to said seats and ported to communicate with said seats.

4. In combination, a rotary carrier having a circular group of article-lifting cylinders with concave ported tube seats of channel shape opening in a direction approximately parallel to the axis of the carrier, and a ring-like header-forming fluid supply tube for said cylinders laterally extending into and secured to said seats and ported to communicate with said seats.

5. In a machine having a plurality of cylinders with pistons therein, the combination of seat members for said cylinders having concave seats ported to communicate with the cylinder spaces, and a fluid-supplying header tube secured to said seat members and being ported at intervals to communicate with said ported seats, said tube having a rounded exterior extending laterally into said concave seats.

6. In a machine having a circular group of cylinders with pistons therein, the combination with seat members on said cylinders having concave tube seats ported to communicate with the cylinder spaces, of an annular fluid-supplying header tube having a rounded surface fitting into said seats and secured thereto, and being ported at intervals to communicate with said ported seats.

GEORGE J. MEYER.