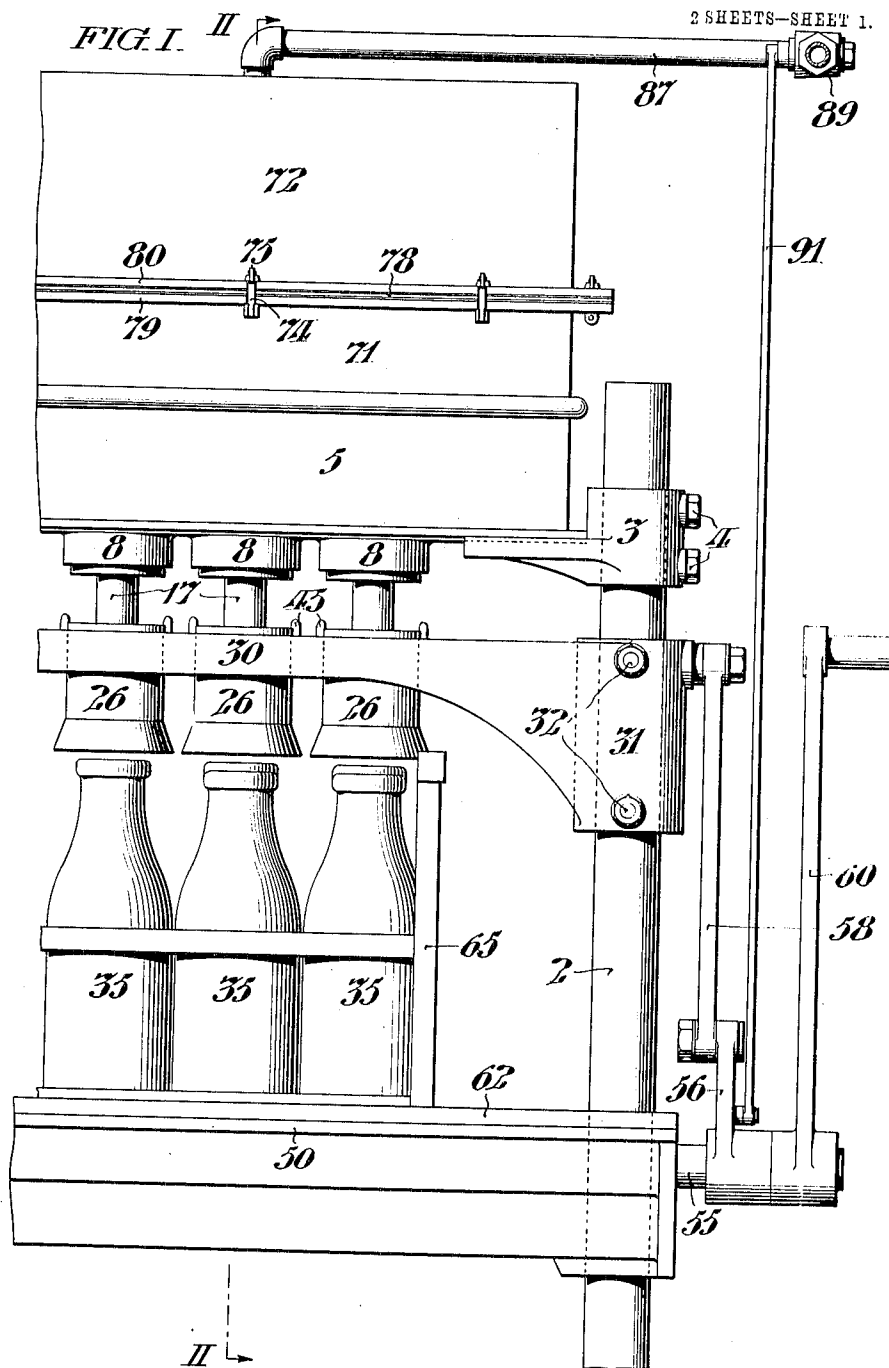


No. 849,735.

PATENTED APR. 9, 1907.

S. M. HEULINGS.
BOTTLE FILLING MACHINE.
APPLICATION FILED MAY 4, 1905.

2 SHEETS—SHEET 1.



WITNESSES:

Clifton C. Halliwell
John C. Bergner

INVENTOR:

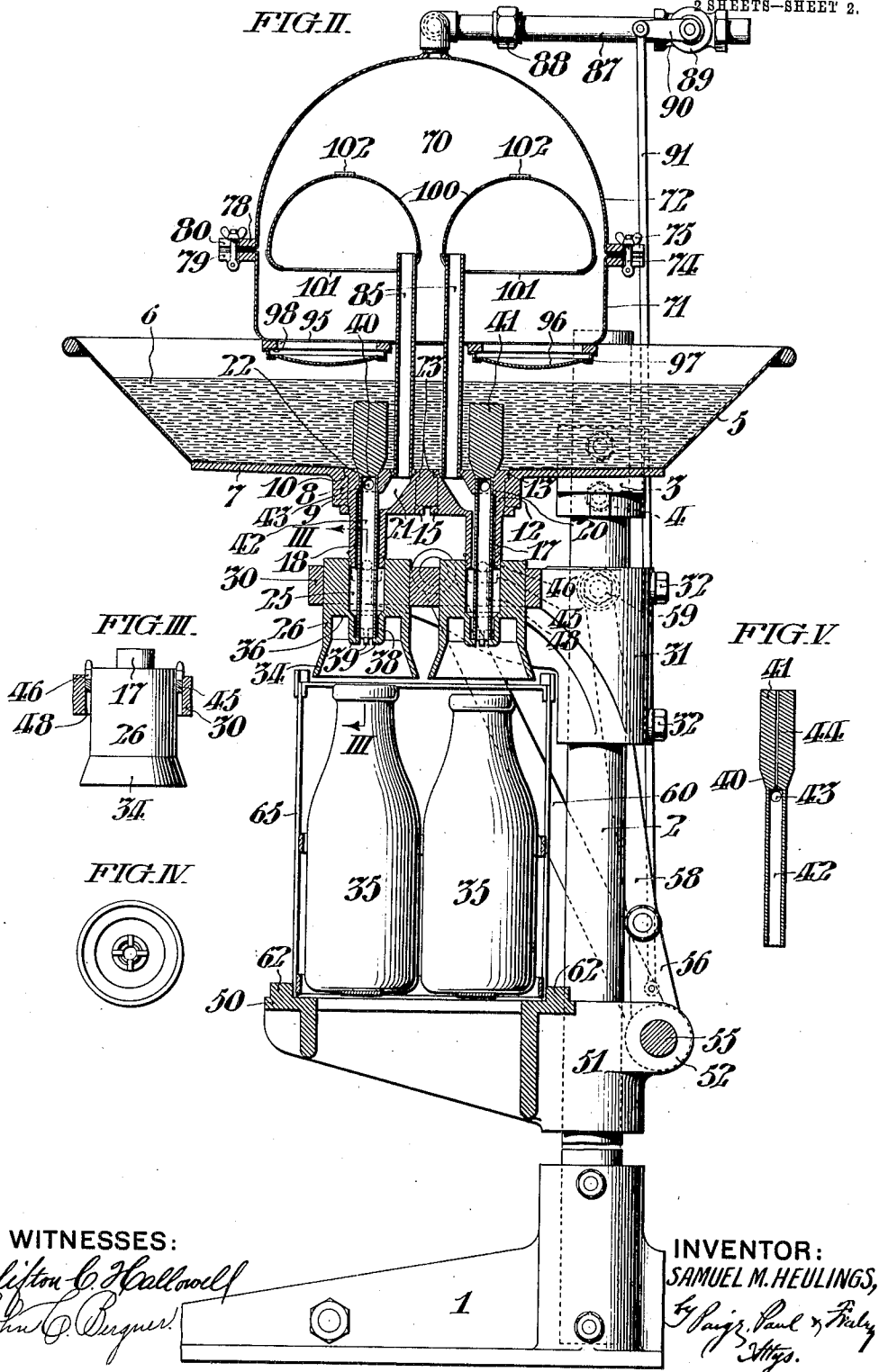
SAMUEL M. HEULINGS,
By Paige, Paul & Peck
Attys.

No. 849,735.

PATENTED APR. 9, 1907.

S. M. HEULINGS.
BOTTLE FILLING MACHINE.
APPLICATION FILED MAY 4, 1905.

2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

SAMUEL M. HEULINGS, OF HADDONFIELD, NEW JERSEY.

BOTTLE-FILLING MACHINE.

No. 849,735.

Specification of Letters Patent.

Patented April 9, 1907.

Application filed May 4, 1905. Serial No. 258,800.

To all whom it may concern:

Be it known that I, SAMUEL M. HEULINGS, of Haddonfield, in the State of New Jersey, have invented certain new and useful Improvements in Bottle-Filling Machines, whereof the following is a specification, reference being had to the accompanying drawings.

My invention relates to machines particularly applicable to the filling of bottles with liquids that form froth when poured, such as milk, beer, &c.

It is the object of my invention to provide a machine in which a battery of empty bottles may be placed and said bottles raised to automatically open individual controlling-valves to permit the liquid to flow into the bottles, and comprising means whereby the froth or surplus liquid may be exhausted therefrom by communication with a vacuum without the intervention of rubber or other resilient medium to prevent overflow, the exhausting action causing a partial vacuum in the bottles, which materially increases the rate of flow of the liquid therein.

The form of my invention hereinafter described comprises a reservoir, controlling-valves in said reservoir, a vacuum-chamber, means whereby said valves are opened by respective bottles when uplifted, means whereby said vacuum-chamber is connected with the interior of each of said bottles to exhaust the air therefrom and withdraw the surplus liquid or froth into said chamber, and means arranged to automatically permit said liquid and froth to flow back into said reservoir.

It has been found in practice that in machines of the character herein described, wherein valves or washers of rubber or similar resilient material have been used to form liquid-tight joints, such material disintegrates and forms interstices in which the liquid lodges and permits the development of bacteria which infect the liquid supplied by the machine. Therefore my invention comprehends such an arrangement of the elements of the machine that they may be readily assembled or taken apart to be cleansed, including joints and valves formed wholly of metal or other material impervious to the liquids employed, thereby obviating the use of rubber or other materials which are disintegrated by use.

In machines of the prior art the froth and surplus liquid are permitted to overflow and soil the exterior of the bottles, necessitating

the rewashing of the same and also the provision of means to remove said surplus from the supporting-table and return it to the reservoir. On the contrary, in the machine hereinafter described bottles of varying heights may be filled to their tops without overflowing and without the necessity of the separate operation of topping the taller ones, as is necessary with many machines of the prior art.

My invention comprehends the various novel features of construction and arrangement hereinafter more definitely specified and claimed.

In the accompanying drawings, Figure I is a side elevation of a machine conveniently embodying my improvements. Fig. II is a transverse vertical sectional view of said machine, taken on the line II II in Fig. I. Fig. III is a fragmentary sectional view taken on the line III III in Fig. II. Fig. IV is an inverted plan view of one of the bottle-neck-receiving bells. Fig. V is a central vertical sectional view of a modified form of valve.

In said figures the base 1 is provided with the vertical standards 2, having the brackets 3 adjustably secured thereon by the set-screws 4 and arranged to support the pan 5, which comprises the bottom plate 7, provided with elongated bosses 8, having apertures 9, with shoulders 10. The tube-heads 12 are inserted within the apertures 9, and being arranged to snugly fit with their flanges 13 in engagement with the shoulders 10 are secured by the nuts 15. Each of said tube-heads 12 comprises an eccentrically-disposed depending tube 17, whose channel 18 bifurcates into reduced channels 20 and 21, leading, respectively, to conical seats 22 and 23 in the top of the head.

The tubes 17 extend into the apertures 25 in the bottle-neck-receiving bells 26, which are arranged for respective vertical reciprocation in the bell-plate 30, the latter being supported by brackets 31, adjustably secured on the standards 2 by the set-screws 32. Said bells 26 comprise the outwardly-flared flanges 34, arranged to guide the bottles to their seats 36, within which the lugs 38 depend, having the horizontal extensions 39 arranged to uplift the valves 40 when the bells are raised by respective bottles 35.

It may be observed that when the bottles 35 are seated in the bells 26 the tops of the recesses between the lugs 38 are below the tops of the bottles and the liquid is drawn

therefrom to a level corresponding to the tops of said recesses, so as to afford room in the bottles for their stoppers without waste of the liquid.

5 The valves 40 comprise the respective weighted upper portions 41, arranged to insure their engagement with their seats when closed, and the tubes 42 having the apertures 43 adjacent to said valves depending into
10 contact with the horizontal extensions of the lugs 38. As shown in Fig. V, the weighted portions 41 may be sufficiently long to extend above the level of the liquid and be provided with vent-passages 44 in communication
15 with the interior of the tubes 42 to enable said tubes to quickly drain when the liquid is shut off. Said valves 40 may be readily removed by withdrawing them upward in a vertical direction, and the bells 26
20 may be removed by slightly raising them with respect to the bell-plate 30 and removing the keeper-pieces 45 from beneath the lugs 46 on said bells, which may then be withdrawn downward with their lugs in engagement with the grooves 48 in the bell-plate 30, as best shown in Fig. III.

It will be here noted that the ready removal of the parts as above described facilitates their frequent washing, which is essential to maintain the sanitary condition of the
30 machine.

The raising-plate 50 is provided with the brackets 51, arranged for vertical reciprocation on the standards 2, and said brackets have bearings 52, in which the rock-shaft 55 is journaled. Said shaft 55 carries the lever 56, which has the link 58 pivoted on the stationary stud 59 in the bracket 31, and said shaft is arranged to be rocked by the hand-lever 60, the downward movement of which
40 rocks the lever 56 to a substantially horizontal position and uplifts the plate 50. Said plate 50 also comprises the parallel guides 62, arranged to guide the bottle-rack 65, in which the bottles are arranged in parallel rows, conveniently two rows with eight bottles in each.

Above the pan 5 is mounted the vacuum-chamber 70, comprising the lower shell 71 and the upper shell 72, which latter is conveniently secured to said lower shell by the swing-bolts 74, having the wing-nuts 75. A resilient gasket 78, which does not come into contact with the liquid, is conveniently interposed between the flanges 79 and 80 of the
55 respective shells 71 and 72. However, the faces of said flanges may be machined and said gasket omitted.

The vertical tubes 85 extend through and are secured in the shell 71 and have their
60 lower conical ends arranged to fit the complementary conical seats 23 in the bottom plate 7 in liquid-tight relation to afford communication between the vacuum-chamber 70 and the bells 26. Said vacuum-chamber 70
65 is arranged to be exhausted when the raising-

plate 50 is uplifted and the bottles 35 are in position to be filled, said chamber being connected to any convenient exhausting means (not shown) by the pipe 87, having the union 88 and valve 89. Said valve 89 may be conveniently operated by having its controlling-lever 90 connected to the lever 56 by the link 91, so that when the hand-lever 60 is shifted to raise the plate 50 the valve 89 is opened and a vacuum is established in the chamber 70.

Although I have described the vacuum-chamber as being intermittently exhausted, it is to be understood that a substantially continuous vacuum may be maintained and only terminated when it is desired to discharge the liquid therefrom.

The lower shell 71 is provided with apertures 95, having the diaphragm-valves 96, which are normally supported by the angle-brackets 97. Said valves are arranged to be thrust against their seats 98 by atmospheric pressure when a vacuum is established in said chamber 70.

The deflecting-hoods 100 in the chamber 70 rest upon suitable supports 101, extending from the end walls of the lower shell 71, and said hoods are retained in position by the lugs 102 on the end walls of the upper shell 72.

The operation of the machine is as follows, the parts being normally in the position shown in the drawings, with the bottle-rack 65 resting upon the raising-plate 50, charged with empty bottles 35, and the reservoir 5 charged with the liquid 6. By depressing the handle 60 the raising-plate 50 is uplifted, carrying the bottles vertically upward into engagement with their respective seats 36 in the bells 26 and uplifting said bells, which carry the valves 40 from their seats 22 to permit the liquid 6 to flow through the apertures 43 and tubes 42 into said bottles. Simultaneously with the uplifting of said plate 50 the valve 89, controlling the pipe 87, is opened and the chamber 70 exhausted, which causes the diaphragm-valves 36 to be seated and closes the apertures 95 in the bottom of said chamber. As the bottles fill the surplus liquid and froth therein is sucked up by the vacuum through the apertures 25, channels 18 and 21, and tubes 85 and is discharged into the vacuum-chamber 70 against the deflecting-hoods 100, said deflecting-hoods 100 being for the purpose of preventing the fluid from spurting into the exhaust-pipe 87. Thus regardless of their heights all bottles 35 may be filled to their tops and the necessity of a second operation of topping obviated. When the bottles 35 have been filled, the plate 50 is again lowered and the parts automatically adjust themselves by gravity to their normal positions. The lowering of said plate closes the valve 89 and the vacuum is thus destroyed, permitting the diaphragm-valves 96 to drop on their angle-brackets 97, and thereby discharge from the

chamber 70 into the reservoir 5 the liquid which has been drawn from the bottles.

I do not desire to limit myself to the precise details of construction and arrangement herein described, as it is obvious that various modifications may be made therein without departing from the essential features of my invention.

I claim—

1. In a bottle-filling machine, the combination with a reservoir; of a vacuum-chamber; a valve in said reservoir arranged to be controlled by the movement of the bottle to be filled; and, means arranged to exhaust said vacuum-chamber in accordance with the opening of said valve, substantially as set forth.

2. In a bottle-filling machine; the combination, with a reservoir and a vacuum-chamber; of a movable conduit communicating with said reservoir, and having an adjacent but independent channel communicating with said vacuum-chamber; a valve controlling the communication between the reservoir and said movable conduit, and arranged to be actuated by movement of said conduit; means for exhausting said vacuum-chamber; and means, coöperating with the bottle, for effecting the movement of said conduit; substantially as set forth.

3. In a bottle-filling machine, the combination with a reservoir; of a valve in said reservoir arranged to be controlled by relative movement between said valve and the bottle to be filled; of a bell in contact with said valve arranged to receive the mouth of said bottle; and, a channel in said bell through which the surplus liquid or froth formed in said bottle may be withdrawn by communication with a vacuum, substantially as set forth.

4. In a bottle-filling machine, the combination with a reservoir; of a valve in said reservoir arranged to be opened by uplifting the bottle to be filled; a bell in contact with said valve arranged to receive the mouth of said bottle; a channel in said bell through which the surplus liquid or froth in said bottle may be withdrawn by communication with a vacuum; and, means arranged to uplift said bottle, substantially as set forth.

5. In a bottle-filling machine, the combination with a reservoir; of a valve in said reservoir arranged to be opened by uplifting, and closed by lowering, the bottle to be filled; a bell arranged for vertical reciprocation and arranged to receive the mouth of said bottle;

a vacuum-chamber; a channel in said bell in communication with said vacuum-chamber; and, means arranged to uplift said bottle and contemporaneously exhaust said vacuum-chamber to respectively admit liquid to said bottle and withdraw the surplus liquid or froth therefrom, substantially as set forth.

6. In a bottle-filling machine, the combination with a reservoir; of a tube-head comprising a bifurcated channel; a valve arranged to control one branch of said channel; a vacuum-chamber; a tube connecting the other branch of said channel with said vacuum-chamber; and, means whereby uplifting the bottle to be filled contemporaneously opens said valve and exhausts said chamber to respectively fill said bottle with liquid and withdraw the surplus liquid or froth therefrom into said chamber, substantially as set forth.

7. In a bottle-filling machine, the combination with a reservoir; of a tube-head comprising a bifurcated channel; a valve arranged to control one branch of said channel; a vacuum-chamber; a tube connecting the other branch of said channel with said vacuum-chamber; means whereby the uplifting of the bottle to be filled contemporaneously opens said valve and exhausts said chamber to respectively fill said bottle with liquid and withdraw the surplus liquid or froth therefrom into said chamber; and, a deflecting-hood arranged to deflect said froth as it enters said chamber, substantially as set forth.

8. In a bottle-filling machine, the combination with means arranged to fill a bottle with liquid; of a vacuum-chamber; a valve in said chamber arranged to automatically close or open when vacuum is respectively established or terminated; a bell arranged to receive the mouth of said bottle; a channel connecting said bell with said chamber; and, means arranged to alternately establish and terminate a vacuum within said chamber, to respectively withdraw the froth from said bottle into said chamber, and discharge said froth from said chamber, substantially as set forth.

In testimony whereof I have hereunto signed my name, at Philadelphia, Pennsylvania, this 2d day of May, 1905.

SAMUEL M. HEULINGS.

Witnesses:

CLIFTON C. HALLOWELL,
ARTHUR E. PAIGE.