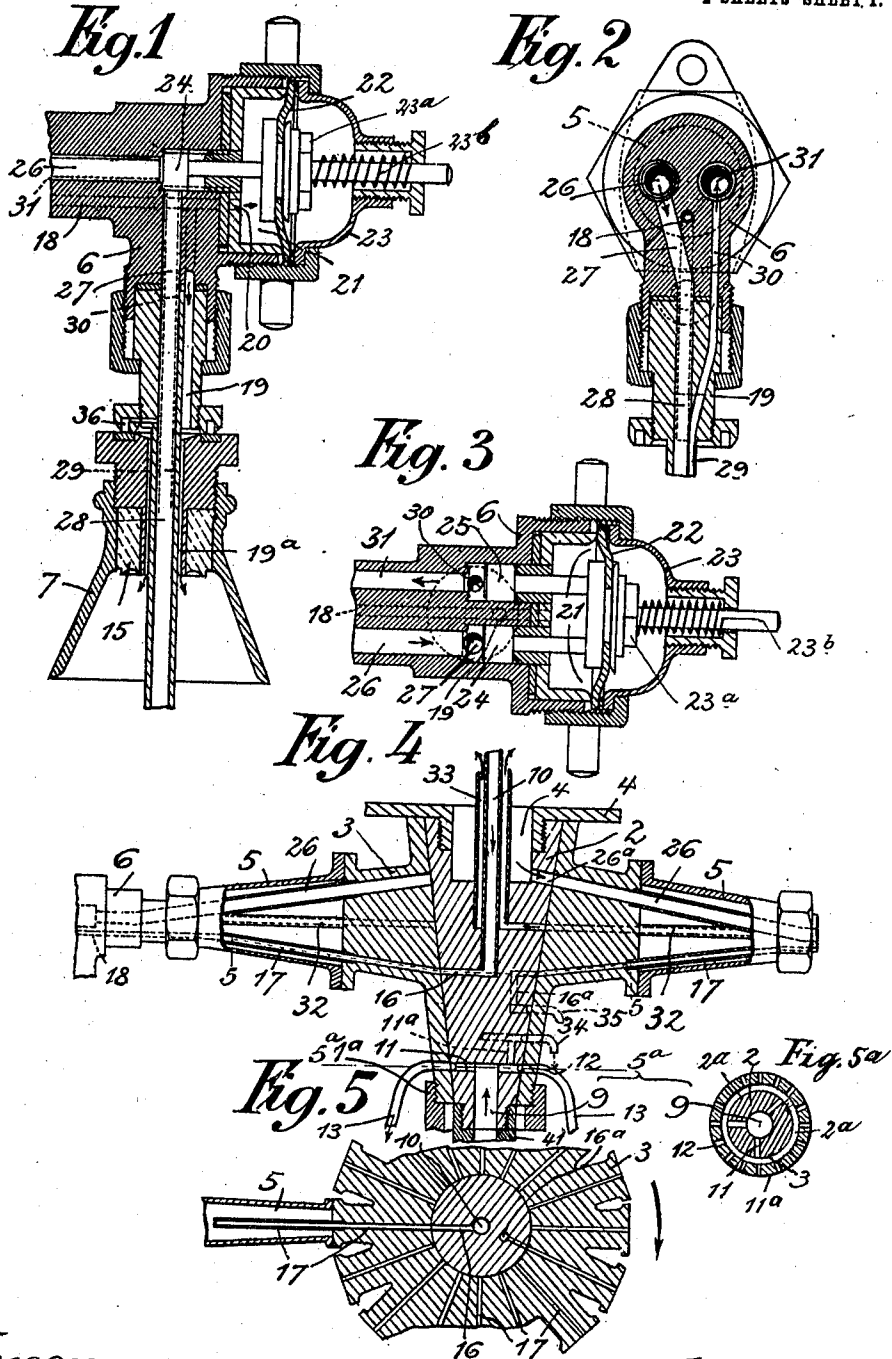


R. PFAFF & W. SUTER.
BOTTLE FILLING MACHINE.
APPLICATION FILED MAR. 15, 1909.

988,657.

Patented Apr. 4, 1911.

2 SHEETS—SHEET 1.



Witnesses
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2 SHEETS—SHEET 2.

Fig. 6

Fig. 7

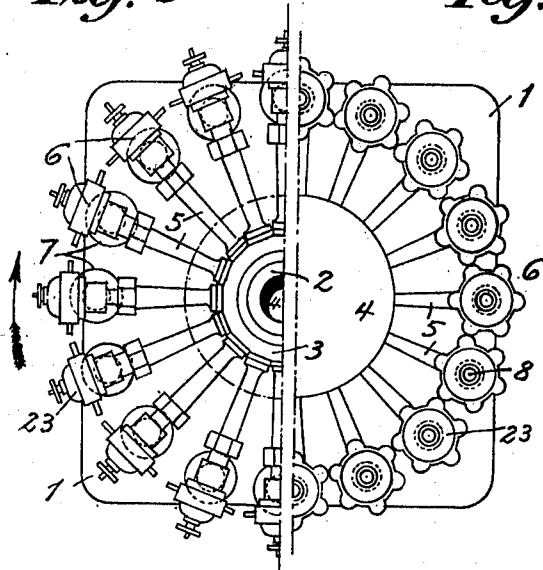
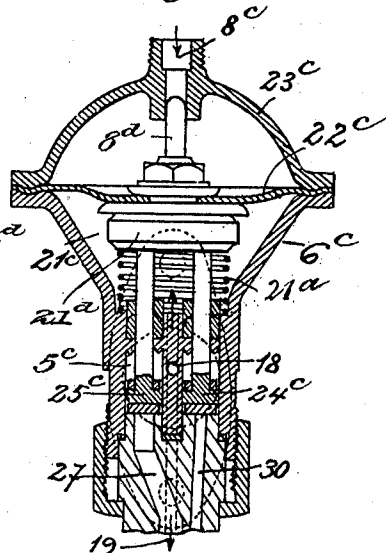
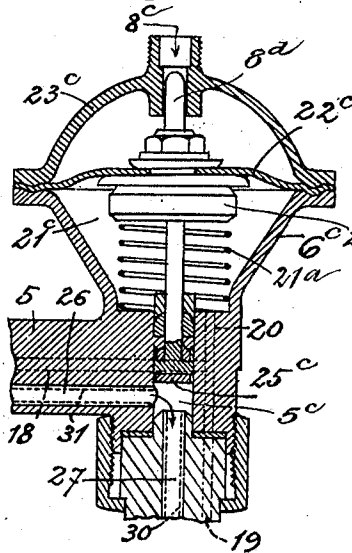


Fig. 8

Fig. 9



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UNITED STATES PATENT OFFICE

RICHARD PFAFF AND WERNER SUTER, OF ZURICH, SWITZERLAND.

BOTTLE-FILLING MACHINE.

988,657.

Specification of Letters Patent.

Patented Apr. 4, 1911.

Application filed March 15, 1909. Serial No. 483,581.

To all whom it may concern:

Be it known that we, RICHARD PFAFF, a subject of the German Emperor, and WERNER SUTER, a citizen of the Swiss Republic, residing at Zurich, in Switzerland, have invented certain new and useful Improvements in Bottle-Filling Machines, of which the following is a specification.

This invention relates to apparatus for filling receptacles, for example bottles, with liquid under pressure of that class in which the supports for the receptacles are fixed to a horizontal rotatable frame and are pressed against a charging nozzle by means of a fluid under pressure, such as compressed air.

The invention consists in providing the passage opened by rotation of the frame for the entrance of pressure fluid to the receptacle with a branch leading to a chamber in which the fluid can act on a movable member for example a membrane, piston or the like, in order to open the passages for the entrance of liquid to the receptacle and for the exhaust of air from the receptacle. After the filling of the receptacle these passages are automatically closed by the automatic cutting off of the pressure fluid. The passages for the entrance of the liquid and exhaust of the air are, therefore, only opened when the requisite air pressure exists in the receptacle. If the receptacle is broken or leaks these passages are not opened, or are immediately closed by the escape of pressure fluid, so that there is no loss of liquid. Similarly, loss of liquid is prevented if there is no receptacle on the support.

In previously known apparatus of a similar type, apart from the fact that a special device is required for closing the liquid passage after the filling of the receptacle, the passage for the exhausting air is closed by a valve which is not positively controlled. This valve is liable to fail to act by reason of liquid which accidentally enters the valve chamber and becomes thick or sticky therein for example beer.

Two embodiments of the invention are shown in the accompanying drawings.

The apparatus illustrated comprises a central cock with a fixed plug and a shell which rotates with the receptacle carrier. Instead of this, there may be a separate cock for each

of the sixteen fillers shown, and there may be more or fewer than sixteen fillers. The shell of the cock may be fixed, and the plug rotatable.

In the drawings Figures 1 and 2 are vertical sections at right angles to each other of one of the sixteen fillers. Fig. 3 is a horizontal section of the upper part of one of the fillers. Fig. 4 is a vertical section of the central cock. Fig. 5 a cross-section thereof, approximately on the line 5—5 of Fig. 4. Fig. 5^a is a cross-section on the line 5^a—5^a of Fig. 4. Fig. 6 is a plan view of half of the apparatus. Figs. 7 to 9 illustrate the second embodiment, Fig. 7 being a plan view of half of the apparatus, and Figs. 8 and 9 being vertical sections at right angles to one another of one of the fillers.

The machine-frame 1 has a pillar located below a chamber 4. To this pillar 41 is fixed the plug 2 of the central cock. The shell 3 is fixed to a hollow pillar 1^a and is rotatable about the plug. The bottle-carrier, which has sixteen hollow radial arms 5 is mounted on the shell. Each radial arm carries a valve box 6. The pressure fluid for opening the passages for the liquid and air-exhaust flows from the chamber 4 through the channels 10 and 16 of the plug 2, and thence through one of the sixteen channels 17 of the shell through an arm 5 to a channel 18, which divides into two branch-channels 19 and 20. The channel 19 leads to an annular channel 19^a passing to the filler-head 15, from which the fluid flows into the bottle. The channel 20 communicates with a chamber 21 (Fig. 1), one wall of which is formed by a membrane 22, dividing said chamber 21 from a chamber 23. To this membrane is attached a metallic member 23^a which is acted on by a spring 23^b at one side, and has fixed to its other side pistons 24 and 25 adapted to close the channels 26 and 31 provided for the passage of the liquid and the exhausting air respectively.

Rotation of the bottle-carrier brings the channel 17 into communication with a channel 16^a in the plug, and said latter channel communicates with an exhaust-channel 35.

The liquid flows from the chamber 4 through a channel 26^a in the plug 2 to a channel 26 in the shell and one of the arms

5. When the piston 24 is in its right-hand position the liquid flows from the channel 26 through a channel 27 and pipe 28 into the bottle.

5 The air expelled from the bottle being filled flows through a channel 29 to the channel 30 and thence to the chamber containing the piston 25. When the latter is moved to its right-hand position the air
10 flows through channels 31, 32 and 33 to the chamber 4.

Above the movable filler-head 15 there is a channel 36 communicating with the atmosphere. When the bottle is under pressure, displacement of the filler-head closes this channel. When the pressure is relaxed the said channel is opened by return of the filler-head to normal position, so that the pressure fluid exhausts through said
20 channel 36 and ceases to act on the filled bottle.

If the bottle is broken the pressure fluid in the chamber 21 escapes through the channel 19 into the atmosphere, so that the pistons 24 and 25 are thrust to the left by the
25 spring 23^b and close the passages for the liquid and exhaust air.

7 is a centering device for the bottle-mouth.

30 The bottle-holder is lifted, and the bottle pressed against the filler-head by means of air forced by an air-pump through the passage 9 in pillar 41 into the plug and through channels 11 and 12 and pipes 13
35 into a chamber below the bottle holder. From the said chamber the air flows through 13, 12 and 11 to a channel 11^a and pipe 34 into the atmosphere.

2^a designates a groove in the plug 2, to
40 facilitate the passage of the compressed air to the pipes 13.

Each of the fillers fills one bottle during one revolution of the shell.

The operation of filling is as follows:
45 When a bottle has been pressed against a filler-head the channel 16 is placed in communication with the respective channels 17, 18 etc. Pressure fluid flows through 17, 18, 19 and 19^a into the bottle, in which it produces the requisite pressure, and through 18
50 and 20 into the chamber 21. In this chamber it acts on the membrane 22 and displaces the pistons 24 and 25 from their normal left-hand end-position. The passages
55 from 26 to 27 and 30 to 31 for the liquid and for the escape of air from the bottle being filled are thus opened. The liquid flows through pipe 28 into the bottle, and air escapes through 29, 30, 31, 32 and 33 to the chamber 4. Simultaneously with the
60 opening of the valves the flow of pressure fluid from the chamber 4 to the bottle and chamber 21 is cut off, communication between 16 and 17 being broken. When the
65 bottle is full the channel 17 is placed in

communication with the channel 16^a in the plug 2, and pressure fluid escapes from 17, 18, 19, 19^a, 20 and 21 through the channel 35. The spring in the chamber 23 thereupon moves the pistons 24 and 25 toward
70 the left and closes the passages for the liquid and escaping air. Meanwhile the flow of pressure fluid to the chamber of the bottle-holder has also been cut off, and the fluid in said chamber exhausts through 13,
75 12, 11, 11^a and 34 into the atmosphere.

To secure the proper periods of communication between the channels in the plug 2 and shell 3 the plug 2 has circumferential grooves as shown in Fig. 5^a.
80

In the modification shown in Figs. 7 to 9, the pistons 24^c and 25^c are disposed in a vertical direction instead of horizontal and are arranged within chambers 5^c in the arm 5, said pistons being connected to a cross head
85 24^d secured to a membrane 22^c dividing the chamber 21^c in the valve box 6^c below the membrane from a chamber 23^c above same. The spring 23^b of the construction of Figs. 1 to 3, is here replaced by a duct 8^c through
90 which pressure fluid enters and acts on a piston 8^a connected to the membrane and on the opposite side of the membrane a coiled spring 21^d is interposed between the cross head 24^d and a shoulder in the chamber 21^c
95 to assist the pressure of the fluid. The arrangement and function of the channels 18, 19, 26, 31 and 27, 30 is the same as in the construction previously described and is considered to need no further description.
100

What we claim as our invention and desire to secure by Letters Patent of the United States is:—

1. In a bottle-filling machine, a filling-head having a liquid supply passage and an
105 air-exhaust passage disposed to open into a receptacle in engagement with said head, valves for closing each passage, a fluid-pressure actuator connected to said valves, and having means for normally holding said
110 valves in closed position, and means for simultaneously supplying fluid-pressure to said actuator and to said exhaust-passage between its said valve and the receptacle, to operate said actuator to open said valves
115 simultaneously when the pressure is raised in the receptacle to a predetermined point, substantially as described.

2. In a bottle-filling machine, a rotatably mounted frame having a series of filling-
120 heads thereon, each head having a liquid supply-passage and an air-exhaust passage disposed to open into a receptacle in engagement therewith, a pair of valves for closing the passage of each head, a fluid-pressure
125 actuator connected to each pair of valves and having means for normally holding said valves in closed position, said actuator having fluid connections with said exhaust passage, between the valve thereof and the re-
130

ceptacle, a source of fluid pressure supply, and a controlling valve therefor, about which said frame is adapted to be rotated, said valve having means for connecting said fluid pressure supply and said actuator, and for connecting said actuator to an exhaust, successively as said frame is rotated, substantially as described.

In witness whereof we have signed this specification in the presence of two witnesses. 10

RICHARD PFAFF.
WERNER SUTER.

Witnesses:

HERM. SCHILLING,
JOSEPH SIMON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
