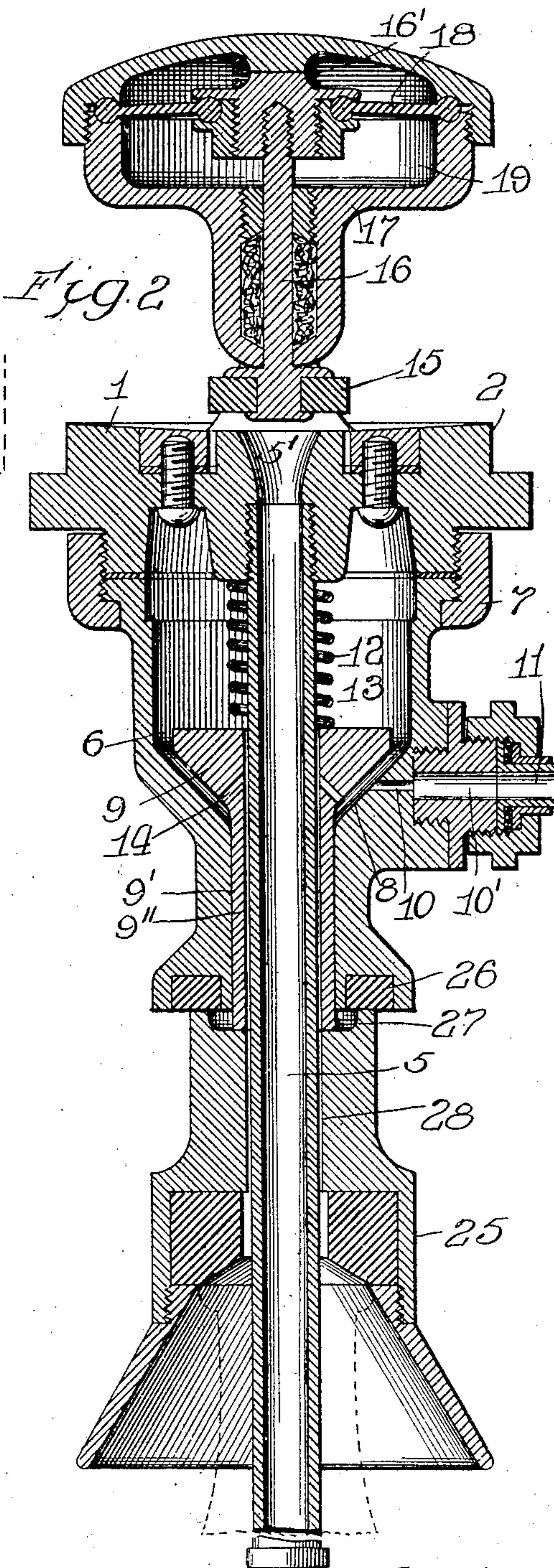
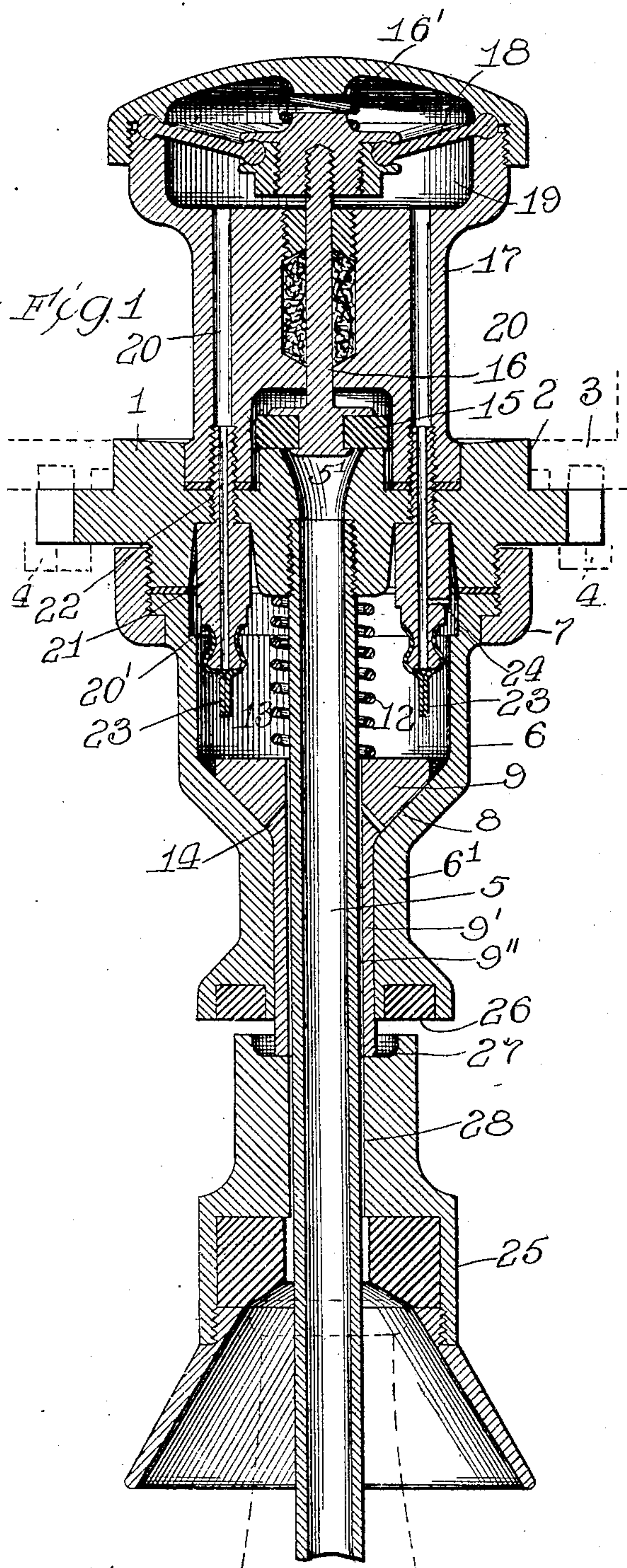


F. C. H. STRASBURGER.
FILLING MACHINE.
APPLICATION FILED AUG. 21, 1908.

948,462.

Patented Feb. 8, 1910.



Witnesses:
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UNITED STATES PATENT OFFICE.

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FILLING-MACHINE.

948,462.

Specification of Letters Patent.

Patented Feb. 8, 1910.

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To all whom it may concern:

Be it known that I, FRANK C. H. STRASBURGER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Filling-Machines, of which the following is a specification.

This invention relates to counter-pressure bottle filling machines and its object is, primarily, to insure the establishment of the counter-pressure in the bottle before the liquid valve is opened.

A further object of the invention is to open the liquid valve by the counter-pressure but not until the counter-pressure has been established in the bottle.

My invention has for its object further to prevent the liquid valve from being opened when a bottle is improperly sealed in filling position so that the air will escape therefrom, and this may be due to a chipped or irregularly formed mouth on the bottle, to wear of the sealing gasket or to other causes.

In the accompanying drawings Figures 1 and 2 are vertical sectional views of the filling mechanism taken at a right angle to each other.

In the embodiment of the invention illustrated in the drawings, 1 designates the body of the filling mechanism which is secured in an opening 2 in the bottom of the liquid tank 3 by bolts 4, as shown, or by any other suitable means. A depending filling tube 5 is secured to the body and communicates with the fluid passage 5' therein. A valve casing 6 is secured beneath the body 1 by a threaded ring 7 and in the construction illustrated in the drawings this valve casing is reduced in diameter at its lower part 6' and is provided above said reduced part with a conical seat 8 for the valve 9 which is adapted to move vertically on the filling tube 5. An air passage 10 in the casing extends from the seat 8 to a coupling 10' and an air pipe 11 is connected to said coupling and to a source of supply of an under pressure in any suitable manner. The air valve 9 is conical shaped and is provided with a downwardly extending sleeve 9' which fits loosely on the filling tube 5 and projects below the lower end of the valve casing 6. A spring 12 is arranged on the filling tube within the air chamber 13 and between the air valve 9 and the body

1 and it normally holds the air valve seated to close the air passage 10 (Fig. 1). The air valve is provided with a plurality of radial air passages 14 extending there-through and communicating with an air passage 9'' extending vertically through the air valve and its sleeve.

A liquid valve 15 is arranged to seat on the body 1 over the passage 5' and it is carried by a stem 16 which is guided in a casing 17 suitably mounted on the body and within the tank. The upper end of the stem 16 is connected to a diaphragm 18 which is arranged in a pressure chamber 19 in the casing 17 and a spring 16' is arranged between the top of the casing and the diaphragm to hold the liquid valve normally seated. One or more valved passages connect the chamber 19 and the air chamber 13 and in the drawings I have shown the casing 17 provided with two vertical passages 20 and nipples 21 arranged within the air chamber 13 and provided with elongated screw-threaded shanks 22 which extend through the body and into the casing 17 and serve to secure the casing 17 to the body. The nipples have longitudinal passages 20' which form a continuation of the passages 20 and vein valves 23 are arranged on the lower end of the nipples within the air chamber 13. A contracted port 24 is suitably located on one of the nipples to provide a constant communication between the air chamber 13 and the chamber 19.

A centering bell 25 is slidably arranged on the filling tube 5 to properly position the bottles thereon and this bell is arranged to engage a gasket 26 at the bottom of the casing 6. The bell has a recessed seat at its upper end to receive the lower end of the air valve sleeve 9' and it is provided with an air passage 28 to communicate with the air passage 9'' so that air may enter the bottle from the air supply when the air valve 9 is opened.

In practice the air valve 9 and the liquid valve 15 are held normally closed by their springs 12 and 16', respectively, and the vein valves 23 at all times prevent air from passing therethrough to the pressure chamber 19. When a bottle is moved up to filling position the centering bell first engages the lower end of the air valve sleeve and unseats the air valve, thereby permitting the air under pressure to flow from the sup-

ply in through the pipe 11, passage 10 and chamber 13 through the ports 14 and passages 9'' and 28 into the bottle to establish a counter-pressure in the bottle. At the
 5 same time some of the air flowing into chamber 13 from the supply will pass through the contracted port 24 and the air passages 20' and 20 into the pressure chamber 19 to eventually overcome the action of spring
 10 16' and operate the diaphragm to unseat the liquid valve. It will be observed that the port 24 is very small and hence the flow of air therethrough is so restricted that the counter-pressure will be fully established in
 15 the bottle before sufficient pressure has been produced in the chamber 19 to operate the diaphragm. This insures the establishment of the counter-pressure in the bottle before the liquid valve is opened.
 20 If the mouth of the bottle is chipped or unevenly formed or if the bottle is for any reason imperfectly sealed so that air is escaping and the counter-pressure is not established in the bottle, obviously sufficient
 25 pressure will not be produced in the chamber 19 to open the liquid valve and therefore my invention provides an absolute check against the liquid valve being opened until or unless the desired counter-pressure is pre-
 30 viously provided in the bottle.
 These counter-pressure filling machines are used for filling beer and other carbonated liquids, the supply of liquid to the filling mechanism being contained in a closed tank
 35 in which a suitable pressure is maintained to hold the gas in suspension in the liquid. The counter-pressure is established in the bottle by admitting pressure therein from the liquid tank or elsewhere so that the
 40 liquid will flow into the bottle by gravity and thereby prevent to a very large extent the agitation of the liquid and the escape of gas and the production of foam in the bottle. It has been customary to open the air
 45 valve first so that the counter-pressure may be established in the bottle and then to open the liquid valve, but heretofore these operations have always been timed to take place at a fixed interval and the
 50 beer valve would be opened at a certain time in the operation of the mechanism whether or not the counter-pressure had been established in the bottle. If the bottle mouth is chipped so that the air escapes
 55 from the bottle the counter-pressure would not be established and hence the liquid would flow into the bottle under pressure instead of by gravity and squirt out through the escape opening. My invention entirely
 60 overcomes this disadvantage of the other filling mechanisms referred to and prevents the liquid valve from being opened until the counter pressure is completely established in the bottle. After the bottle is filled it is
 65 lowered from filling position and the spring

12 closes the air valve and when the passage 9'' is opened to the atmosphere by the removal of the bottle or the lowering of the bell away from the air valve sleeve the pressure in the air chamber is relieved and the
 70 pressure in the chamber 19 escapes through the vein valves 23 to the air chamber and thence to the atmosphere. This relief of pressure in the chamber 19 takes place very quickly and the spring 16' closes the liquid
 75 valve to prevent the loss of liquid after the bottle is removed.

My invention enables the filling operation to be conducted under any desired pressure because the liquid valve will not be opened
 80 until the bottle is properly sealed and the counterpressure established in the bottle.

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

1. In a counter-pressure filling machine, 85
 the combination of a liquid tank, a liquid valve suspended from the tank, an inclosed pressure chamber within said tank, a spring-pressed diaphragm in said chamber connected to and normally holding said valve closed, 90
 and means for admitting pressure to said chamber to actuate said diaphragm against the pressure of its spring to open said valve.
2. In a counter-pressure filling machine, 95
 the combination of a liquid valve, a pressure chamber, a diaphragm in said chamber connected to and normally holding said valve closed, an air chamber connected with a pressure supply and said pressure chamber, and a normally closed valve in the connection 100
 with the pressure supply adapted to be opened to admit pressure to the air chamber and thence to the pressure chamber to actuate said diaphragm and open said valve.
3. In a counter-pressure filling machine, 105
 the combination of a liquid valve, a pressure chamber, a diaphragm in said chamber connected to and normally holding said valve closed, an air chamber connected with a pressure supply and said pressure chamber, 110
 a normally closed valve in the connection with the pressure supply adapted to be opened to admit pressure to the air chamber and thence to the pressure chamber to actuate said diaphragm and open said valve, the 115
 connection between said air and pressure chambers being contracted to admit pressure slowly to the pressure chamber, and means for releasing quickly the pressure in the pressure chamber to close the valve. 120
4. In a counter-pressure filling machine, the combination of a liquid valve, means for establishing a counter-pressure in the bottle before said liquid valve is opened, a diaphragm connected with said liquid valve, 125
 and means for admitting said pressure to the diaphragm at the same time it is admitted to the bottle for operating the diaphragm to open the liquid valve.
5. In a counter-pressure filling machine, 130

the combination of a liquid valve, a diaphragm connected to said liquid valve, means for establishing a counter-pressure in the bottle and admitting pressure to the diaphragm before said liquid valve is opened, and means for controlling the flow of pressure to the diaphragm to enable a counter-pressure to be established in the bottle before the pressure admitted to the diaphragm is sufficient to operate the diaphragm to open the liquid valve.

6. In a counter-pressure filling machine, the combination of a liquid valve, means for establishing a counter-pressure in the bottle before said liquid valve is opened, means for opening said liquid valve, and means for admitting said pressure to said opening means at the same time that it is admitted to the bottle but more slowly to operate said opening means but not until after the counter-pressure has been established in the bottle.

7. In a counter-pressure filling machine, the combination of a liquid valve, a pressure chamber, pressure means in said chamber for opening said valve, an air chamber communicating with said pressure chamber and adapted to receive air under pressure from a source of supply, and an air valve normally shutting off said pressure and adapted to be opened to admit pressure to said air chamber.

8. In a counter-pressure filling machine, the combination of a liquid valve, a pressure chamber, pressure means in said chamber for opening said valve, an air chamber communicating with said pressure chamber and adapted to receive air under pressure from a source of supply, an air valve normally shutting off said pressure from the air chamber, means for admitting pressure slowly from the air chamber to the pressure chamber when the air valve is opened to operate said pressure means, and means for releasing the pressure in the pressure chamber quickly.

9. In a counter-pressure filling machine, the combination of a liquid valve, pressure operated means for opening said valve, an air connection between a pressure supply and the bottle being filled, a normally closed air valve in said connection and adapted to be opened to establish a counter pressure in the bottle before the liquid valve is opened, and means for admitting pressure from the supply to said pressure means at the same time that it is admitted to the bottle but more slowly so that the liquid valve will not be opened until after the counter-pressure has been established in the bottle.

10. In a counter-pressure filling machine, the combination of a liquid valve, a pressure chamber, pressure means in said chamber for opening said valve, an air chamber communicating with a pressure supply and with said pressure chamber and with the bottle when the latter is arranged in filling

position, and an air valve in said chamber normally closing the communication with the pressure supply and adapted to be opened to admit air from the supply to said chamber.

11. In a counter-pressure filling machine, the combination of an air chamber connected with a pressure supply and also connected with the bottle when the latter is arranged in filling position, an air valve normally closing said connection with the pressure supply, a pressure chamber connected with the air chamber, a liquid valve, and pressure means in said pressure chamber to open said liquid valve.

12. In a counter-pressure filling machine, the combination of an air chamber connected with a pressure supply and also connected with the bottle when the latter is arranged in filling position, an air valve normally closing said connection with the pressure supply, a pressure chamber connected with the air chamber, a liquid valve, pressure means in said pressure chamber to open said liquid valve, and means for admitting pressure slowly from the air chamber to the pressure chamber when the air valve is opened and for releasing the pressure in the pressure chamber quickly when the air valve is closed.

13. The combination with the liquid tank of a counter-pressure filling machine, of a filling tube suspended from said tank, an air valve casing, an air chamber in said casing connected to a pressure supply, an air valve in the casing normally closing said connection and provided with an air passage between the air chamber and the atmosphere or with the bottle when arranged in filling position, a liquid valve, and means controlled by the pressure from the supply for opening the liquid valve after the air valve has been opened to establish counter-pressure in the bottle.

14. In a counter-pressure filling machine, the combination of an air chamber connected with a pressure supply, a pressure chamber connected with the air chamber, a liquid valve, pressure means in said pressure chamber for opening said liquid valve, and an air valve normally closing the connection between the air chamber and the pressure supply and provided with a passage to maintain said air chamber normally open to the atmosphere.

15. In a counter-pressure filling machine, the combination of an air chamber normally open to the atmosphere and connected to a pressure supply, a valve normally closing said connection, a pressure chamber, a liquid valve, pressure means in said pressure chamber for opening said liquid valve, a passage connecting the pressure chamber and the air chamber, a port connecting said passage with the air chamber to admit pressure slowly from the air chamber to the

pressure chamber, and a valve in said passage adapted to open to relieve the pressure in the pressure chamber quickly.

16. The combination with the liquid tank
5 of a counter-pressure filling machine, of a filling tube suspended from the tank, a casing surrounding the filling tube and provided with an air chamber, said chamber having a connection with a pressure supply
10 and being open to the atmosphere or to a bottle in filling position, a valve normally closing said connection, a liquid valve, a pressure chamber, pressure means in said chamber connected to said valve for opening
15 the same, a passage connecting the pressure chamber and the air chamber, said passage having a contracted port constantly open to the air chamber to admit pressure slowly to the pressure chamber, and a valve at the
20 end of said passage in the air chamber adapted to open to relieve the pressure in the pressure chamber quickly.

17. The combination with the liquid tank of a counter-pressure filling machine, of a filling tube suspended from the tank, a liquid valve, a pressure chamber, pressure means in said chamber for opening said valve, a casing surrounding the filling tube, an air chamber in said casing connected with a pressure supply, a valved passage connecting the air chamber with the pressure chamber and provided with a constantly open contracted port, and an air valve normally closing the connection between the air chamber and the pressure supply, said air valve comprising a sleeve projecting below the casing and there being an air passage through the valve and sleeve to connect the air chamber to the atmosphere.

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Witnesses:

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