No. 860,076. PATENTED JULY 16, 1907.

C. L. BASTIAN.

FILLING MACHINE.

APPLICATION FILED JAN. 11, 1907.

2 SHEETS—SHEET 1.

Fig. 1

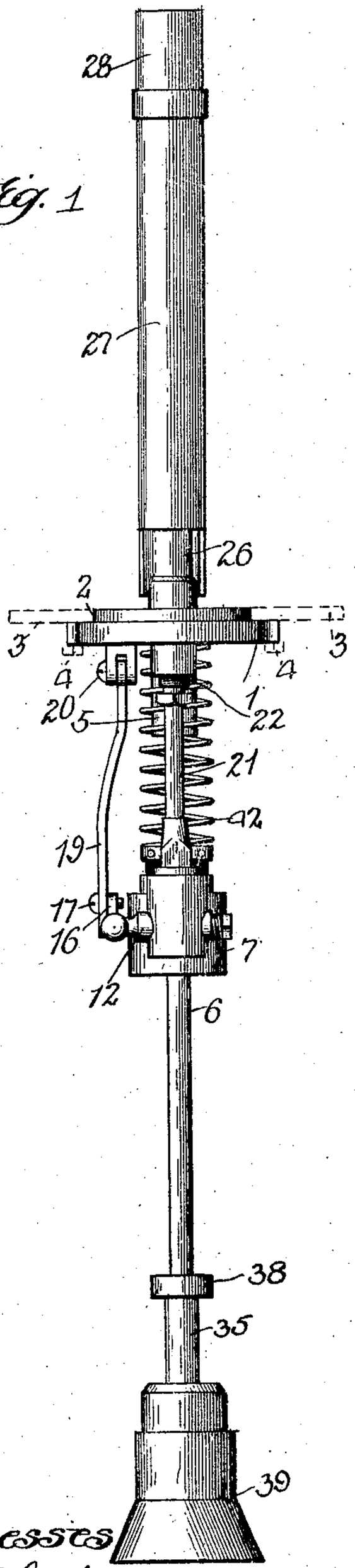
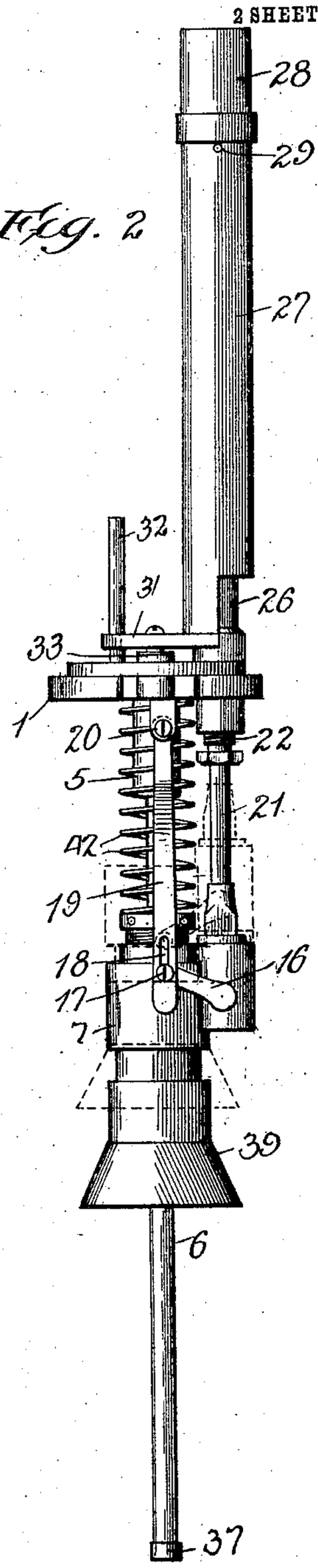


Fig. 2



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2 SHEETS—SHEET 2.

Fig. 3

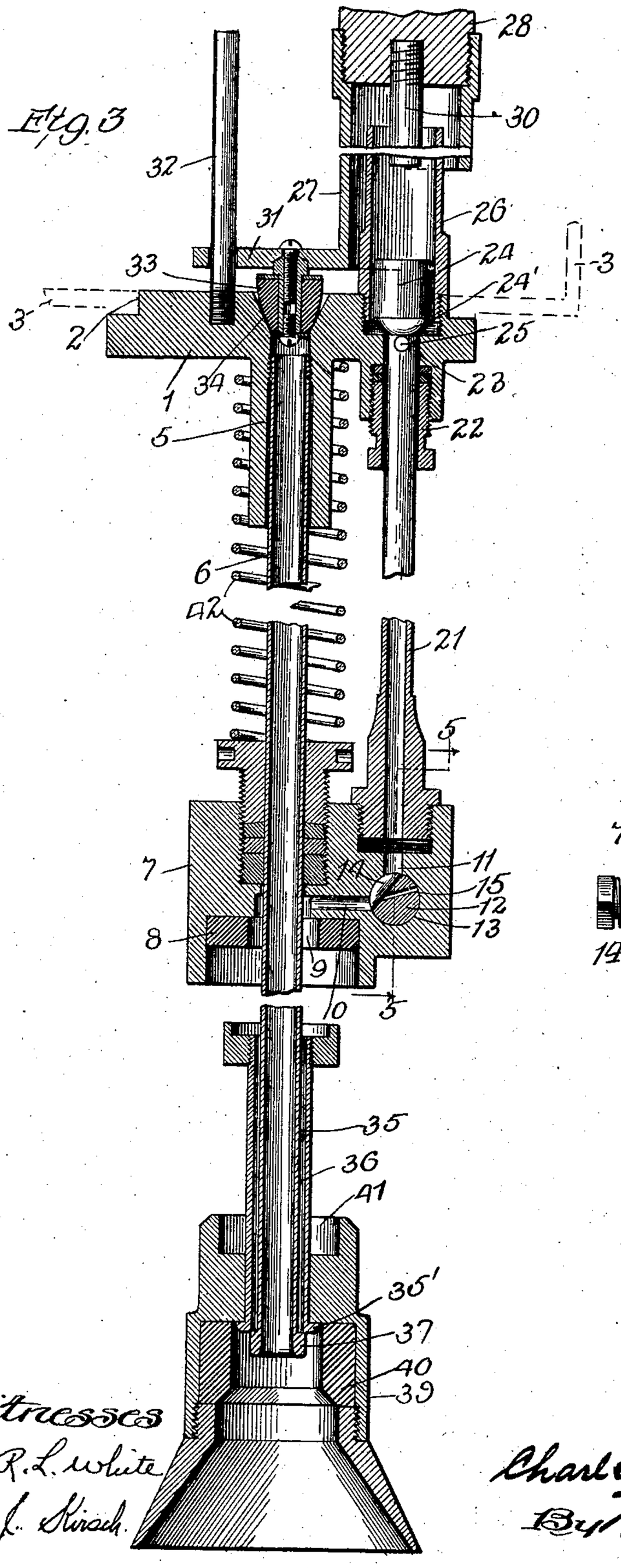


Fig. 4

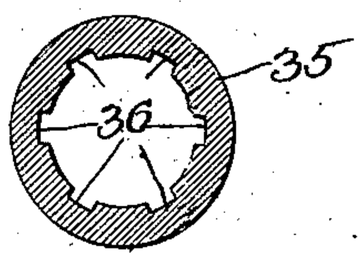
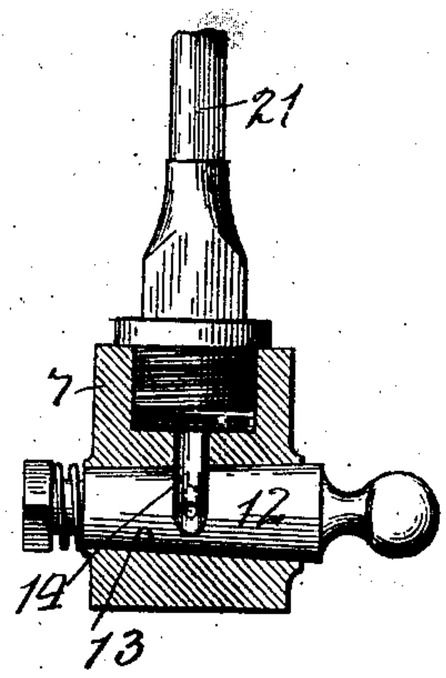


Fig. 5



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FILLING-MACHINE.

No. 860,076. Specification of Letters Patent. Patented July 16, 1907.

Application filed January 11, 1907. Serial No. 351,762.

To all whom it may concern:

Be it known that I, CHARLES L. BASTIAN, 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 more particularly to that class of filling machines which are employed for filling bottles with beer or other carbonated liquids and it comprises certain improvements in this art, which, for convenience, I have shown embodied in a valve of the general construction disclosed in the application of Frank C. H. Strasburger, No. 336,929, filed October 1, 1906, although it will be readily understood, by those familiar with the art, that the invention can be embodied with equally satisfactory results in other filling machines, especially those which have been patented heretofore by myself and Mr. Strasburger.

In the filling machine described in the Strasburger application and in a number of the patents above referred to a check valve is employed in the air connection between the tank and the bottle which permits a flow of air or gas from the tank to the bottle but closes to prevent the flow of air or gas from the bottle to the tank, this latter flow being conducted through a contracted port instead of through the check valve to retard the outflow of air or gas from the bottle and thereby control the inflow of the liquid to the bottle to prevent foaming. It has been customary in the past to make these check valves of rubber and what is known commercially as the "Thomas valve" has been generally employed, although not exclusively of course. The carbonic acid gas in the liquid seems to have an injurious effect on some of these rubber valves in course of time which makes them hard and ineffective for the purposes intended. This may be due largely to the character or composition of the rubber or to purely local conditions for a large number of these machines with these rubber valves are now in successful practical use. It also happens sometimes that the foam or the liquid will work up through the filling mechanism into contact with this valve and if the machine is not looked after in a careful and proper manner and washed out at regular intervals it will become stuck or gummed and fail to operate properly when the machine is started. This sometimes happens over night or over Sunday while the machine is not working, especially if the operator fails to wash the machine by flushing it with water just before it is shut down for the night, as should be done under all conditions.

It is the object of my present invention to enable the filling operation to be performed without causing the liquid to foam or lose its gas, and more particularly to provide a check valve in the air connection which will be free from the objections heretofore noted.

A further object of the invention is to provide a check valve in the air connection with a large port for the flow of air or gas from the filling tank to the bottle and a contracted port for the flow of air or gas from the bottle to the tank, and cause this valve to be automatically and positively operated when the bottle is brought to filling position.

In the accompanying drawings: Figures 1 and 2 are elevations, at a right angle to each other, of a filling machine embodying the invention. Fig. 3 is a central sectional view of the filling machine. Fig. 4 is a transverse sectional view of the sleeve on the filling tube. Fig. 5 is a sectional view on the line 5—5 of Fig. 3.

Referring to the drawings 1 designates the body of the filling valve which may be fastened in an opening 2 in the bottom of the liquid tank 3 by bolts 4, as shown, or by any other suitable means. The body of the valve has a central bore 5 into which the filling tube is screwed or otherwise secured. The head 7 is arranged on the filling tube and has a seat 8 in its lower face. An enlarged bore 9 is provided in this seat and in a part of the head and it communicates by a lateral passage 10 with an upright passage 11 in the head. A check valve is located at the juncture of the lateral passage 10 with the upright passage 11 and this valve (Figs. 3, 5) comprises a plug 12 which is seated in a bore 13 in the head and is provided with a large port 14 and a contracted port 15, these ports being adapted to connect the passages 10 and 11 at different times for the purposes hereafter pointed out.

The ports may be variously arranged within the purview of my invention but in the construction illustrated in the drawings the contracted port 15 branches off from the larger port 14 and at such an angle thereto that communication through the larger port will be closed when the contracted port is in position and conversely communication through the contracted port will be closed when the larger port is in position to form this communication. A lever arm 16 is fastened at one end to one end of the plug 12 and this arm carries a pin 17 at its outer end which is arranged in a slot 18 at the lower end of a link 19 which is pivotally connected at its upper end 20 to the body (Figs. 1, 2). An air tube 21 is screwed into the head 7 and projects upward through a stuffing box 22 and an opening 23 in the body 1 and carries on its upper end a head 24 and a rubber gasket 24′. The air tube is provided with one or more lateral ports 25 which are closed by the side walls of the opening 23

in the body 1 when the machine is at rest and are opened when the bottle is in filling position and the air tube is raised as herein described. The upper end of the air tube is located within a tube 26 which is arranged within the tank and secured to the body 1 over the head 24 and the upper end of the air tube. A sleeve 27 is arranged to slide freely on the tube 26 and it is provided with a weighted head 28 and one or more lateral ports 29 beneath the head (Fig. 2). A rod or stem 30 is fastened to the head 28 and projects downward in the tube 26 to be engaged by the head 24 of the air tube as will be described hereafter. The sleeve has a lateral projection or foot 31 which is guided on a post 32 fixed in the body 1 and carries the liquid valve 33 to and from its seat 34 in the body at the upper end of the bore 5 (Fig. 3).

The filling tube is provided with means for centering the bottle automatically so that the tube will enter the bottle properly without encountering the edge of its mouth and I have illustrated in the drawings the centering means and also the means for regulating the quantity of liquid to be put in the bottle which form the subject matter of a companion application filed by me of even date herewith. A sleeve 35 provided interiorly with grooves 36 is held in place on the filling tube 6 by a collar 7 at the lower end of said tube. This sleeve carries a removable collar 38 at its upper end which engages the seat 8. A guide-bell 39 is held loosely in place on the sleeve 35 by a peripheral flange 35′ at the lower end of said sleeve. This guide-bell is provided with a rubber seat 40 for the mouth of the bottle and it has a recess 41 in its upper end to receive the collar 38.

A spring 42 incloses the filling tube and operates between the body 1 and the head 7 and presses said head away from the body and the gasket 24′ against the body to close the air tube. This gasket 24′ and the lateral openings 25 in the air tube constitute with the adjacent portion of the body 1 an air valve whereby communication is established between the interior of the tank and the bottle.

In practice the air valve, which I will refer to generally by the numeral 24′, and which of course may vary in details of construction, like the other details of the several parts, from those specifically illustrated and described herein, is held normally closed by the spring 42, the large port 14 is normally open, and the liquid valve 33 is also normally closed, being held in its seat by gravity. A bottle is moved up against the guide-bell and on the filling tube, the guide-bell being carried up first against the collar 38 and then against the head 7 and on the filling tube. On the continued upward movement of the bottle the head is carried upward on the filling tube against the pressure of spring 42 and the air tube 24 moving with the head opens the air valve 24′ while communication between the passages 10 and 11 is established through the larger port 14 of the check valve, as shown in Fig. 3.

The filling operation is usually conducted under pressure, that is to say, a pressure of from 3 to 20 pounds is maintained in the liquid tank, and when communication is established through the ports 25, tube 21, passage 11, port 14, passage 10, bore 9, and grooves 36 with the bottle, an opportunity is afforded for the equalization of pressure in the bottle and the liquid tank before the liquid valve is opened. On the continued upward movement of the bottle and head 7, the head 24 on the upper end of the air tube engages and pushes upward the rod or stem 30 thereby lifting the sleeve 27 and unseating the liquid valve 33. The position of the check valve and its lever arm does not change relatively to the head while the head is being raised to open the air valve and until the pressure in the bottle has been equalized with the pressure in the tank, for during this initial movement of the head the pin 17 travels in the slot 18 to the upper end of said slot. On the continued upward movement of the head to open the liquid valve, as just described, the pin 17 having reached the limit of its movement in the slot, is held, and as the head moves upward the lever arm 16 is swung as indicated in broken lines in Fig. 2, to turn the plug 12 and carry the larger port 14 out of register with the passages 10 and 11 and bring the contracted port 15 into register with said passages, whereby the outflow of air or gas from the bottle due to the inflowing liquid is retarded by reason of the contracted port 15 and this retardation of the outflow of air or gas from the bottle prevents the liquid from foaming in the bottle.

The sleeve 35 regulates and controls the quantity of liquid in the bottle because the liquid will stop flowing into the bottle when the level of the liquid in the bottle reaches and submerges the lower end of the sleeve and prevents the escape of air or gas from the bottle through the grooves 36. By changing the length of the sleeve 35 bottles can be filled to any height desired as more particularly shown in my companion application heretofore referred to. After the bottle is filled it is removed from the filling tube, the guide-bell and sleeve following the bottle to the end of the tube by gravity and the head 7 being returned to its normal position by the spring 42 thereby closing the air valve 24′ and bringing the larger port 14 into register with the passages 10 and 11. The liquid valve closes by gravity.

The operation of the check valve is automatically and positively controlled by the bottle and the check valve is made entirely of metal and will not be affected like the rubber "Thomas valve" by the beer when it becomes stale and dry as heretofore described, although it is not to be understood that this invention is intended to relieve the operator of the necessity for washing and flushing the machine when the filling operation is concluded for the day, because for sanitary reasons this should be done under any and all conditions.

Another important object of this invention consists in the provision of the large port 14 to permit the pressure in the bottle to be equalized quickly with the pressure in the tank, and the arrangement whereby only one of the ports 14, 15 is opened at any time. The construction is such that port 14 may be left open until immediately before the liquid valve is opened for it is not desired, as a general rule, to open the contracted port 15 until the liquid begins to flow and then it is used to retard the outflow of air or gas from the bottle.

While I have referred in the foregoing description to the use of my invention more particularly in connec-

tion with bottling beer it will be understood, of course, that it is also available with equivalent results in bottling other carbonated liquids.

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

1. The combination with a liquid tank, of a liquid valve, a movable head, an air connection between the tank and the bottle to be filled, said connection comprising an air valve and a two-port check valve, means adapted to be operated to raise the head and open the air and liquid valves successively, and means to adjust the check valve as the head rises to shift one port into closed position and the other port into open position.

2. The combination with a liquid tank, of a liquid valve, an air connection between the tank and the bottle to be filled, said connection comprising an air valve and a two-port check valve, one of said ports being normally open while the air valve is closed, means adapted to be operated to open the air and liquid valves successively, and means to adjust the check valve to shift one port into closed position and the other port into open position while the air valve remains open and at the time the liquid valve is opened.

3. The combination with a liquid tank, of a liquid valve, an air connection between the tank and the bottle to be filled, said connection comprising an air valve and a check valve, the latter having a large port normally open and a contracted port normally closed, and means adapted to be operated to open the air valve while said large port remains open to permit an equalization of pressure in the tank and bottle and then while the air valve remains open to open the liquid valve and shift the check valve to close the large port and open the contracted port to retard the outflow of air or gas from the bottle while the bottle is being filled.

4. The combination with a liquid tank, of a liquid valve, a movable head, an air connection between the tank and the bottle to be filled, said connection comprising an air valve and a lateral and an upright passage in the head, a check valve located where said passages join and having two ports, and means adapted to be operated to open the air and liquid valves successively and to adjust the check valve to shift one port into closed position and the other port into open position.

5. The combination with a liquid tank, of a liquid valve, a movable head, an air connection through the head between the tank and the bottle to be filled, said connection comprising an air valve and a two-port check valve, the latter being located in the head, a lever arm connected to said check valve, and means adapted to be operated to raise the head and open the air and liquid valves successively, said lever arm remaining fixed relatively to the head while the air valve is being opened and then being shifted to move one port to closed position and the other port to open position.

6. The combination with a liquid tank, of a filling mechanism comprising a body, a liquid valve, an air connection between the tank and the bottle to be filled, said connection comprising an air valve and a two port check valve, a movable head adapted to be raised to operate said valves, a lever arm connected to said check valve, a link carried by the body and provided with a slot, a pin carried by the lever arm in said slot, whereby the lever arm remains fixed relatively to the head when the latter is raised to open the air valve and is then shifted to close one port and open the other when the head is raised further to open the liquid valve.

7. The combination with a liquid tank, of a filling mechanism comprising a body, a liquid valve an air connection between the tank and the bottle to be filled, said connection comprising an air valve and a check valve having a large port normally open and a contracted port normally closed, a head adapted to be raised to operate said valves, said head having a lateral passage and an upright passage constituting a part of said air connection and said check valve being located in the head where said passages join, a lever arm connected to said check valve, a link carried by the body and provided with a slot, and a pin carried by the lever arm in said slot, whereby the lever arm remains fixed relatively to the head when the latter is raised to open the air valve and is then shifted to close the large port and open the contracted port when the head is raised further to open the liquid valve.

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