No. 841,442. PATENTED JAN. 15, 1907.

J. RAMSEY.

BOTTLE FILLING MACHINE.

APPLICATION FILED DEC. 26, 1903.

2 SHEETS—SHEET 1.

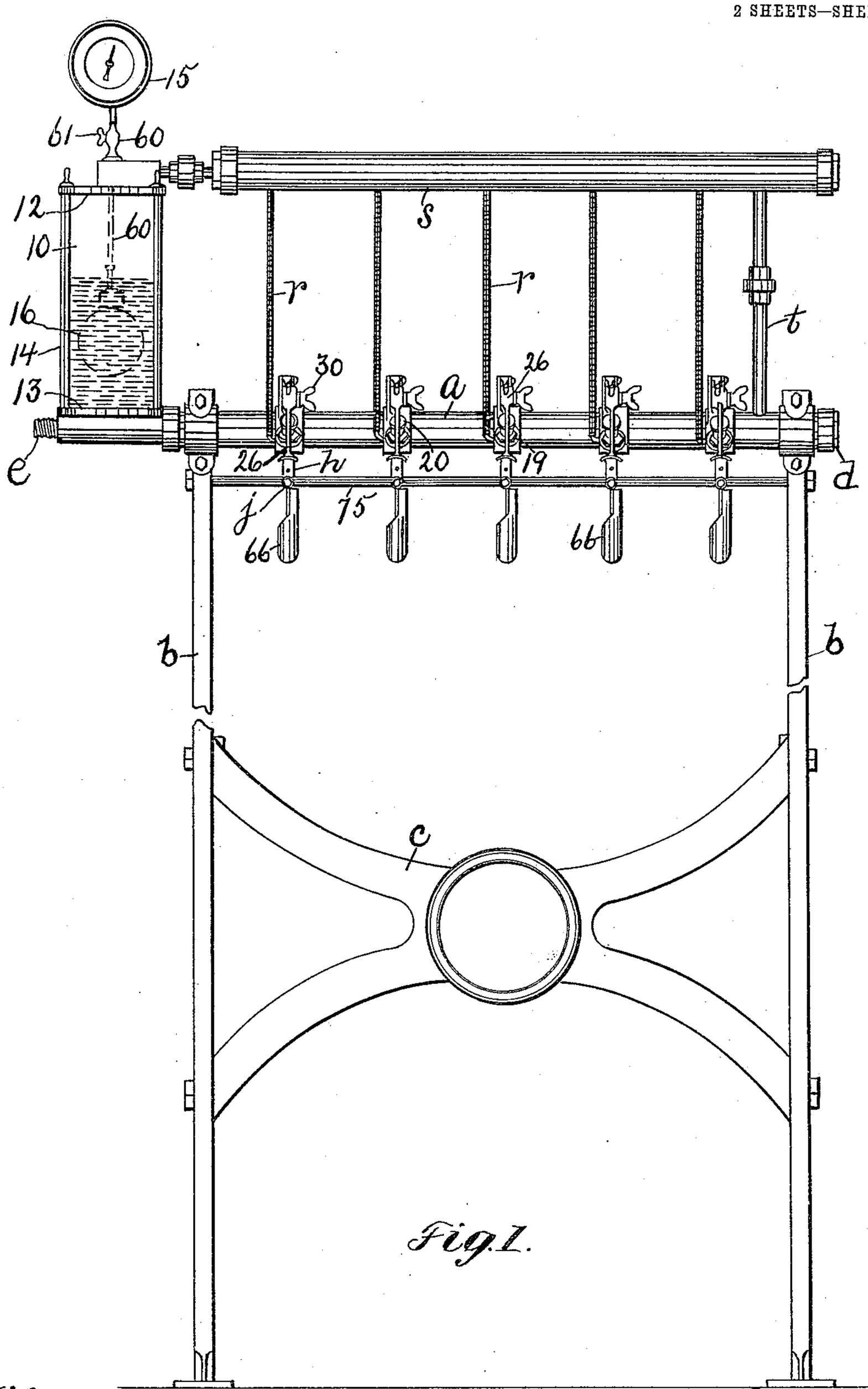

Fig. 1.

Witnesses.
C. H. Garnett
J. Murphy.

Inventor:
John Ramsey
by Jas. H. Churchill
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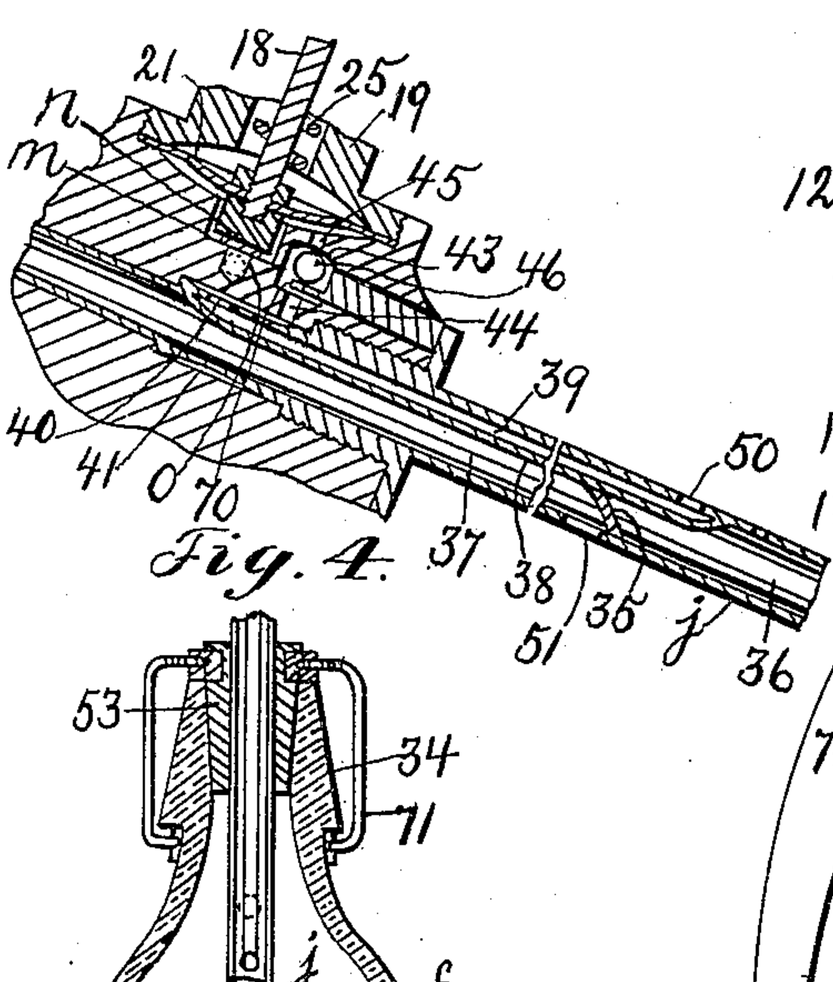

Fig. 4.

Fig. 6.

Fig. 5.

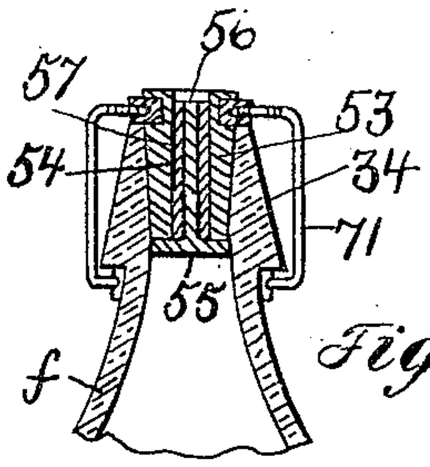

Fig. 7.

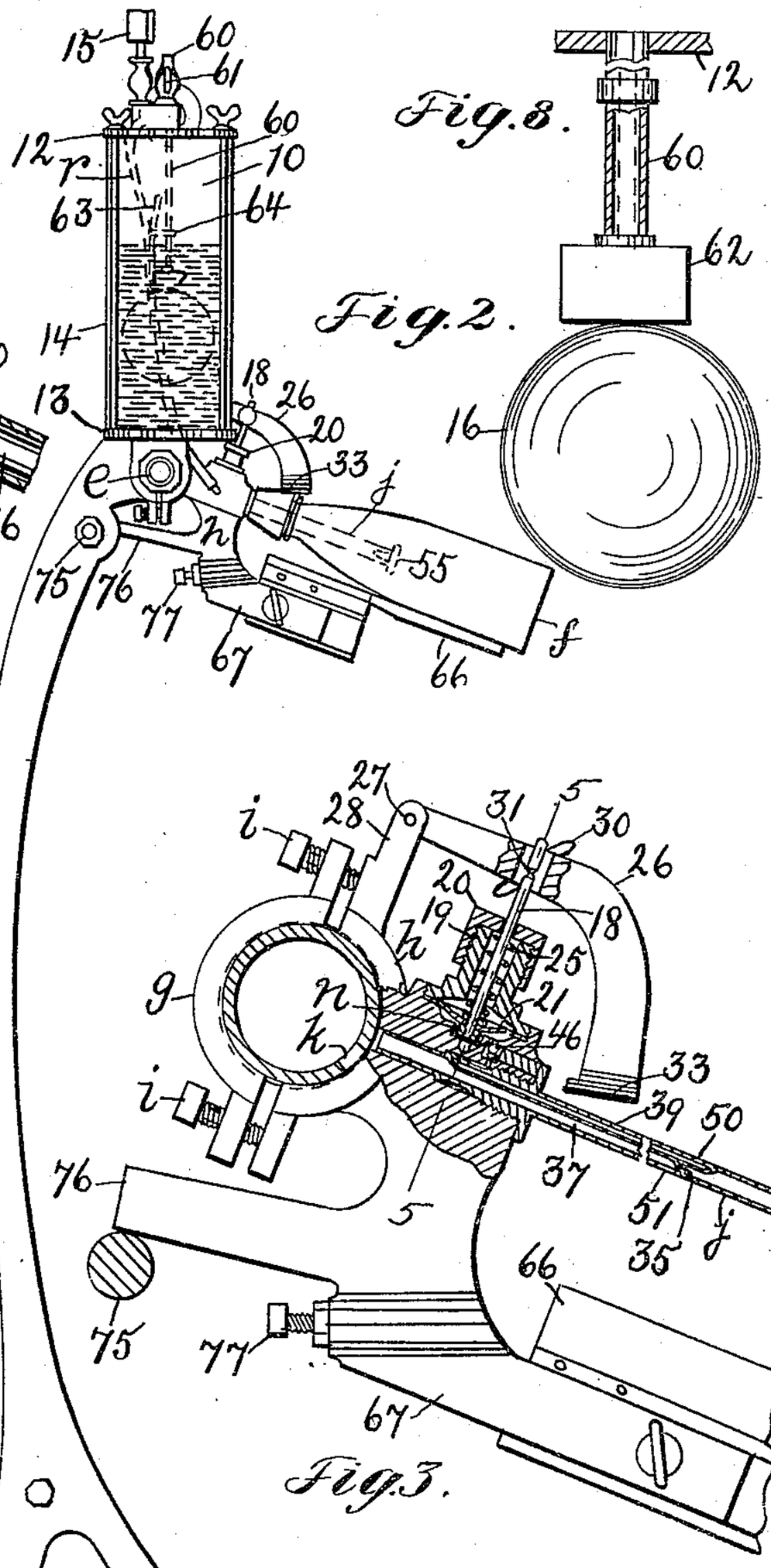

Fig. 8.

Fig. 2.

Fig. 3.

Witnesses.
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UNITED STATES PATENT OFFICE.

JOHN RAMSEY, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO RAMSEY MANUFACTURING COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

BOTTLE-FILLING MACHINE.

No. 841,442. Specification of Letters Patent. Patented Jan. 15, 1907.

Application filed December 26, 1903. Serial No. 186,534.

To all whom it may concern:

Be it known that I, JOHN RAMSEY, a citizen of the United States, residing in New York, county of New York, and State of New York, have invented an Improvement in Bottle-Filling Machines, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to a machine or apparatus for filling bottles and like receptacles with liquid under pressure, and especially beer, soda-water, and other liquids charged with a gas.

One feature of the present invention consists in providing means for insuring the bottle being filled with gas or air under pressure without retarding the operation of filling the bottle with the charged liquid.

Another feature consists in providing a simple and efficient machine for this purpose.

These and other features of this invention will be pointed out in the claims at the end of this specification.

Figure 1 is a front elevation of a machine embodying this invention; Fig. 2, a side elevation of the machine shown in Fig. 1; Fig. 3, a sectional detail, on an enlarged scale, to be referred to; Figs. 4 and 5, enlarged sectional details to be referred to, Fig. 5 being taken on the line 5 5, Fig. 3; Figs. 6 and 7, sectional details of the bottle and its stopper to be referred to, and Fig. 8 a detail to be referred to.

In the machine herein shown as embodying this invention, *a* represents the liquid-supply tube or pipe, which is supported in a suitable framework, herein shown as comprising the sides *b* and cross-bar *c*.

The tube or pipe *a* is closed at its rear end by a suitable cap *d* or otherwise, and at its front or opposite end said tube or pipe is provided with a threaded nipple *e*, by which the said tube or pipe may be connected with a suitable source of supply for the liquid under pressure with which the bottles or other receptacles *f* are to be filled. The liquid-supply tube *a* has mounted to turn on it one or more tube-carrying devices, which may be made as herein shown (see Fig. 3) and consists of a split ring or collar, the parts *g h* of which are secured together by the set-screws *i*, one part or half of the said collar, as *h*, having secured to it a filler-tube *j*, which is open at its opposite ends and is adapted to communicate with a port *k* in the supply tube or pipe *a*.

The filler-tube *j* is adapted to have fitted over it the receptacle to be filled, which is herein shown as the bottle *f*, and provision is made for insuring the bottle being filled with gas or air under pressure substantially in an instant prior to the admission of liquid therein and before the filler-tube carrier is moved from its normal or starting position. This result may be effected as herein shown, and for this purpose the filler-tube carrier is provided with a recess *m*, (see Fig. 4,) which constitutes a valve-chamber in which is located a valve *n*, which coöperates with a port or opening *o* (see Figs. 4 and 5) in communication with a passage *p*, extended laterally through the carrier and which is connected by a nipple *q* and flexible tube or pipe *r* with a supply-tube *s* for gas or air under pressure, the said supply-tube being herein shown as supported above the liquid-supply tube *a* by a tube *t* and by a cylinder 10, preferably composed of a glass body and metal end pieces 12 13, connected together by suitable tie-rods 14.

The cylinder 10 communicates at its upper end with the air-supply tube *s* and also with a pressure indicator or gage 15. The cylinder 10 also communicates, through a suitable port or opening in the bottom cap or end piece 13, with the liquid-supply tube *a*, which port or opening is not herein shown.

The supply of gas or air under pressure to the bottle *f* is controlled by the valve *n*, which may and preferably will be automatically opened by the bottle. This result may be effected as herein shown and as will now be described.

The valve *n* (see Figs. 4 and 5) has secured to it a stem 18, which is extended through a sleeve or removable portion 19 of the valve-casing, said sleeve having a screw-threaded cap 20, (see Fig. 3,) through which the valve-stem is extended. The valve-stem 18 has secured to it a diaphragm 21, which is clamped at its outer edge between the valve-casing and the sleeve 19 to form two chambers 23 24 within said casing. The valve *n*

is normally seated by a helical spring 25, encircling the stem, and is opened by a lever 26, pivoted at 27 to an arm 28 on the part *h* of the filler-tube carrier and to which the valve-stem is pivotally connected, as by a thumb-screw 30, entering a groove 31 in the said stem.

The lever 26 is shaped to have its free end extended into the path of movement of the bottle, and the free end of said lever may and preferably will have an inclined flange or finger 33, (see Fig. 3,) which is adapted to be engaged by the beveled or inclined neck portion 34 of the bottle when the latter is slipped over the filler-tube *j*, as represented in Fig. 2. The filler-tube *j* may be made as herein shown, (see Fig. 4,) and is provided with a transverse partition 35, which separates the tube into two parts 36 37, and has a longitudinally-extended partition 38, which forms a passage 39. The upper part 37 constitutes a liquid-passage within the tube *j*. The filler-tube *j* is provided with a port 40, which connects the passage 37 with an annular chamber or space 41 around the filler-tube, which chamber is connected with the chamber 23 in the valve-casing. In the present instance the valve-casing is provided with a second chamber 43, which is connected by a port or passage 44 with the annular space 41 and which is connected by the port or passage 45 with the valve-chamber 23. The chamber 43 contains a float-valve 46 for a purpose as will be described. The longitudinally-extended passage 39 in the filler-tube is provided with a port or opening 50, formed in the filler-tube, and the passage 37 in the filler-tube is provided with a port or opening 51, formed in the filler-tube. The port or opening 50 may be designated the "gas-port," and the port or opening 51 the "liquid-port" of the filler-tube.

The apparatus is especially applicable for filling bottles which are designed to be automatically sealed, which bottles, as herein shown, are provided with a stopper 53, (see Figs. 6 and 7,) having an aperture or opening 54 through it, with which coöperates a valve 55, preferably of glass, porcelain, celluloid, or other material unaffected by beer or other liquids and which is located within the bottle and forms part of the stopper when the bottle is withdrawn from the filler-tube.

The valve 55 is provided with a stem 56, which may have a rubber or other yielding sleeve 57 and which is adapted to fit into the lower end of the filler-tube when the bottle is placed in position to be filled.

The cylinder 10 has extended down through its upper head 12 a vent tube or pipe 60 (see Figs. 1 and 8) open at its lower end and provided above the head 12 with a cock or valve 61. The open lower end of the vent-tube has coöperating with it a valve 62 which may be a disk of rubber or other suitable material and which is supported by a lever 63, (see Fig. 2,) pivoted to a collar 64, attached to the vent-tube.

It will be understood that communication is established between the liquid-supply tube *a* and the gas or air tube *s* through the cylinder 10 and through the pipe *t* and that equilibrium is established and maintained by the valve 62 and float 16, as will be described.

The operation of the apparatus herein shown may be briefly described as follows: Assume the apparatus empty and the filler-tubes in the position represented in Fig. 3. The liquid under pressure from a barrel or other suitable source (not herein shown) is admitted into the cylinder 10 through the nipple *e*. The liquid fills the tube or pipe *a* and the liberated gas or air ascends into the pipe *s*. The liquid ascends in the cylinder and lifts the float 16, which in turn lifts the valve 62 and seals the vent-tube 60. The liquid continues to ascend in the cylinder 10 until the gas-pressure above it equals the pressure in the source of supply, whereupon the flow of liquid into the cylinder is stopped, which may be supposed to be the condition represented in Figs. 1 and 2. The bottle to be filled is slipped over the filler-tube *j*, as represented in Fig. 2, and may be supported by a shelf 66, attached to the arm 67 of the tube-carrier. As the bottle *f* is slipped over the filler-tube into the position represented in Fig. 2 the beveled neck portion or end 34 of the bottle engages the lever 26 and turns the same on its pivot, thereby through the stem 18 moving the valve *n* from its seat and placing the interior of the bottle in communication with the gas or air supply tube *s*. The gas or air under pressure immediately flows into the bottle and fills the same, so that when the bottle is subsequently placed in communication with the liquid-supply tube it contains air or gas under the same pressure as the liquid in the supply-tube *a*. The course of the gas or air from the supply-tube *s* is as follows: through the pipe *r*, passage *p*, and port *o* into the valve-chamber 23, thence through the port 45 into the chamber 43, and thence through the port 44, space 41, port 40, passage 39, and port 50 into the bottle.

It will be observed that the bottle is filled with gas or air under pressure substantially as soon as the bottle has been placed in position on the filler-tube and before any liquid is admitted therein, and the ports and the chambers through which the gas and air flow are capable of being made of sufficient size to enable the bottle to be filled substantially in an instant and without movement of the carrier. In the present instance the filling of the bottle with gas or air under pressure is automatically controlled by the bottle itself. After the bottle has been filled with

gas or air under pressure, as described, the carrier is turned on the supply-tube *a* until the inner mouth of the filler-tube registers with the port *k*, whereupon the beer or other liquid flows by gravity into the bottle, the said liquid passing from the tube *a* through the port *k* into the passage 37 of the filler-tube, from whence it passes through the port 51 into the bottle *f*. The liquid thus admitted into the bottle displaces the gas or air therein, which is forced back into the supply-tube *s*, the said gas passing from the bottle through the port 50, passage 39, port 40, passage 41, port 44, chamber 43, port 45, chamber 23, port *o*, passage *p*, and pipe *r*. The valve 46 is of sufficient weight to remain away from the port 45 when gas is passing through the chamber 43, but will be carried up so as to close the port 45 by any liquid which may find its way into the chamber 43. The valve 46 normally rests on a finger or projection 70, (see Fig. 4,) which serves to prevent the valve closing the port 44 when gas is being admitted into the bottle.

When the bottle has been filled or substantially filled with the liquid, the carrier is turned back to its starting position, (represented in the drawings) and the bottle is then withdrawn from the filler-tube, carrying with it the valve 55, which closes the port or opening 54 in the stopper, thereby automatically sealing the bottle. The valve is guided to its seat by its stem, which enters the opening in the stopper. The bottle may be opened by turning back the clamps 71, which are pivotally attached to the neck of the bottle in a manner well understood, or the bottle may be opened by forcing in the valve 55.

The withdrawal of liquid from the supply-tube *a* lowers said liquid in the cylinder 10, which removes the float 16 from engagement with the valve 62, thereby permitting the latter to open the vent and afford an escape for the gas, which reduces the pressure of gas in the cylinder 10 below the pressure in the main supply and enables the liquid to flow into the said cylinder, which it does, until the pressures are again balanced.

It is to be observed that with the apparatus herein shown the bottle is filled with gas or air under pressure before any liquid can flow into the bottle and that when the tube-carrier is turned to connect the filler-tube with the port *k* in the liquid-supply tube the bottle contains gas under the same pressure as is in the liquid-supply tube, and as a result a very considerable saving in time required to fill the bottles is effected and danger of foaming of the liquid prevented. The rotary movement of the filler-tube carrier may be limited in opposite directions by a cross-rod 75, with which coöperates an extension or arm 76 on the said carrier to limit the outward movement and an adjustable stop or set-screw 77 on said carrier to limit the inward movement of said carrier.

I have herein shown one construction of apparatus which I may prefer; but I do not desire to limit my invention to the particular construction shown.

I claim—

1. In an apparatus of the class described, in combination, a liquid-supply tube provided with a port, a filler-tube, a carrier for said filler-tube rotatably mounted on said liquid-supply tube and adapted to be turned to connect said filler-tube with said port, a valve-chamber movable with said carrier, a source of supply of gas or air under pressure communicating with said valve-chamber, a valve in said chamber, and means for operating said valve, said means being actuated to open said valve by the bottle to be filled when the latter is being placed on said filler-tube, substantially as described.

2. In an apparatus of the class described, in combination, a filler-tube, a valve-chamber communicating therewith, a valve in said chamber controlling the admission of gas into said filler-tube, and means separate from the filler-tube for operating said valve, said means being automatically operated by the bottle to open said valve when the bottle is being placed upon said filler-tube, substantially as described.

3. In an apparatus of the class described, in combination, a gas-supply, a tube in communication therewith, a valve controlling the passage of gas from said supply into said tube, and means separate from the filler-tube and actuated by movement of the bottle to be filled longitudinally on said tube for opening said valve, substantially as described.

4. In an apparatus of the class described, in combination, a liquid-supply tube provided with an outlet-port, a filler-tube adapted to register with said port and normally disconnected therefrom, a carrier for said filler-tube rotatable on said liquid-supply tube, a gas-supply in communication with said filler-tube to admit gas into the bottle through said tube, a valve controlling communication between said gas-supply and said tube, and means for opening said valve while the said filler-tube is disconnected from the port in said liquid-supply tube, substantially as described.

5. In an apparatus of the class described, in combination, a liquid-supply tube provided with a fluid-outlet port, a filler-tube normally disconnected from the said outlet-port and adapted to have passed over it the bottle to be filled with liquid from said liquid-supply, a carrier for said filler-tube rotatably mounted on said liquid-supply tube, a gas-supply, means for connecting said gas-supply with the filler-tube to admit gas into said bottle through said filler-tube, and means for controlling the supply of gas to said bot-

tle to admit gas therein through the filler-tube while the latter is disconnected from the said liquid-outlet port, substantially as described.

6. In an apparatus of the class described, in combination, a liquid-supply, a filler-tube adapted to have passed over it the bottle to be filled with liquid from said liquid-supply, a gas-supply, means for connecting said gas-supply with the filler-tube, and means separate from the filler-tube for controlling the supply of gas to the bottle, said means being actuated by the bottle when the latter is being placed on the filler-tube, substantially as described.

7. In an apparatus of the class described, in combination, a filler-tube provided with a gas-inlet, a rotatable carrier for said tube, a valve-chamber in said carrier having a port in communication with the gas-inlet of said filler-tube, a valve in said chamber to control the passage of gas from said chamber into said filler-tube through said port, a second port or passage to connect said chamber with said filler-tube, and a second valve controlling the passage of liquid from the filler-tube into said valve-chamber, substantially as described.

8. In an apparatus of the class described, in combination, a filler-tube provided with a gas-inlet, a gas-supply in communication with said gas-inlet, a valve controlling said supply, and a lever connected to said valve and extended to near the filler-tube to be actuated by the bottle while being placed on said filler-tube, for the purpose specified.

9. In an apparatus of the class described, in combination, a filler-tube provided with a transverse partition and with a longitudinal partition forming chambers in said tube, which is provided with ports leading to said chambers, a gas-supply in communication with one of said chambers, a valve controlling said supply, and means for operating said valve independent of said filler-tube, substantially as described.

10. In an apparatus of the class described, in combination, a liquid-supply tube provided with an outlet-port, a filler-tube provided within it with a gas-supply passage having an inlet and an outlet port and having a liquid-passage provided with an outlet-port, a carrier for said tube rotatably mounted on said liquid-supply tube to connect and disconnect the liquid-passage of said filler-tube with the outlet-port in said liquid-supply tube, a gas-supply, a valve controlling the admission of gas into the gas-passage of said filler-tube, a lever connected to said valve and actuated by the bottle placed upon said filler-tube to open said valve and supply gas to the bottle through the gas-passage in said filler-tube, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN RAMSEY.

Witnesses:
JAS. H. CHURCHILL,
J. MURPHY.