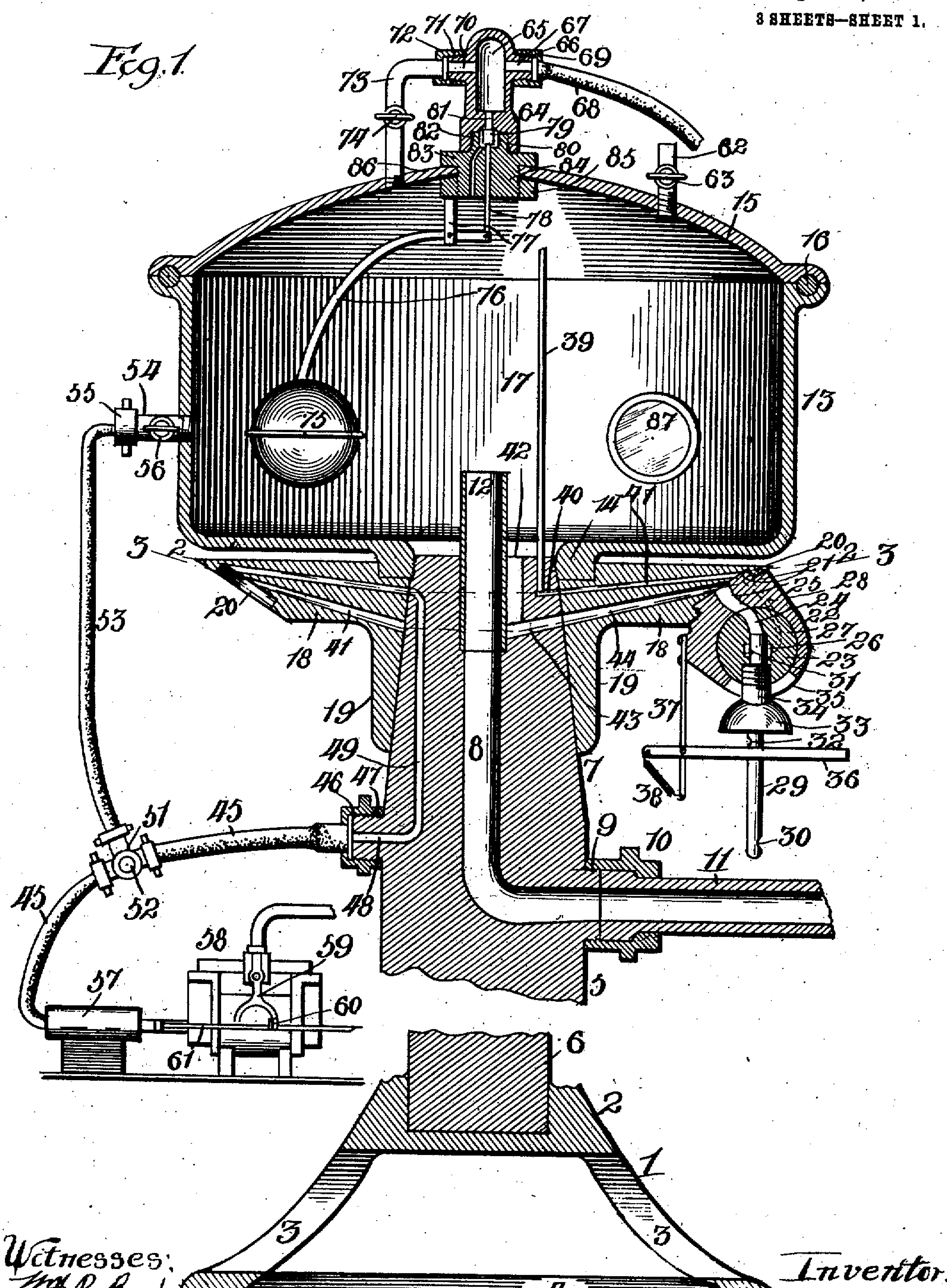
A. SCHNEIDER.
BOTTLING MACHINE.
APPLICATION FILED SEPT. 22, 1906.

954,824. Patented Apr. 12, 1910.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
Wm. P. Bond
[illegible]

Inventor:
[illegible]
By [illegible] Attys.

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3 SHEETS—SHEET 2.

Fig. 2.

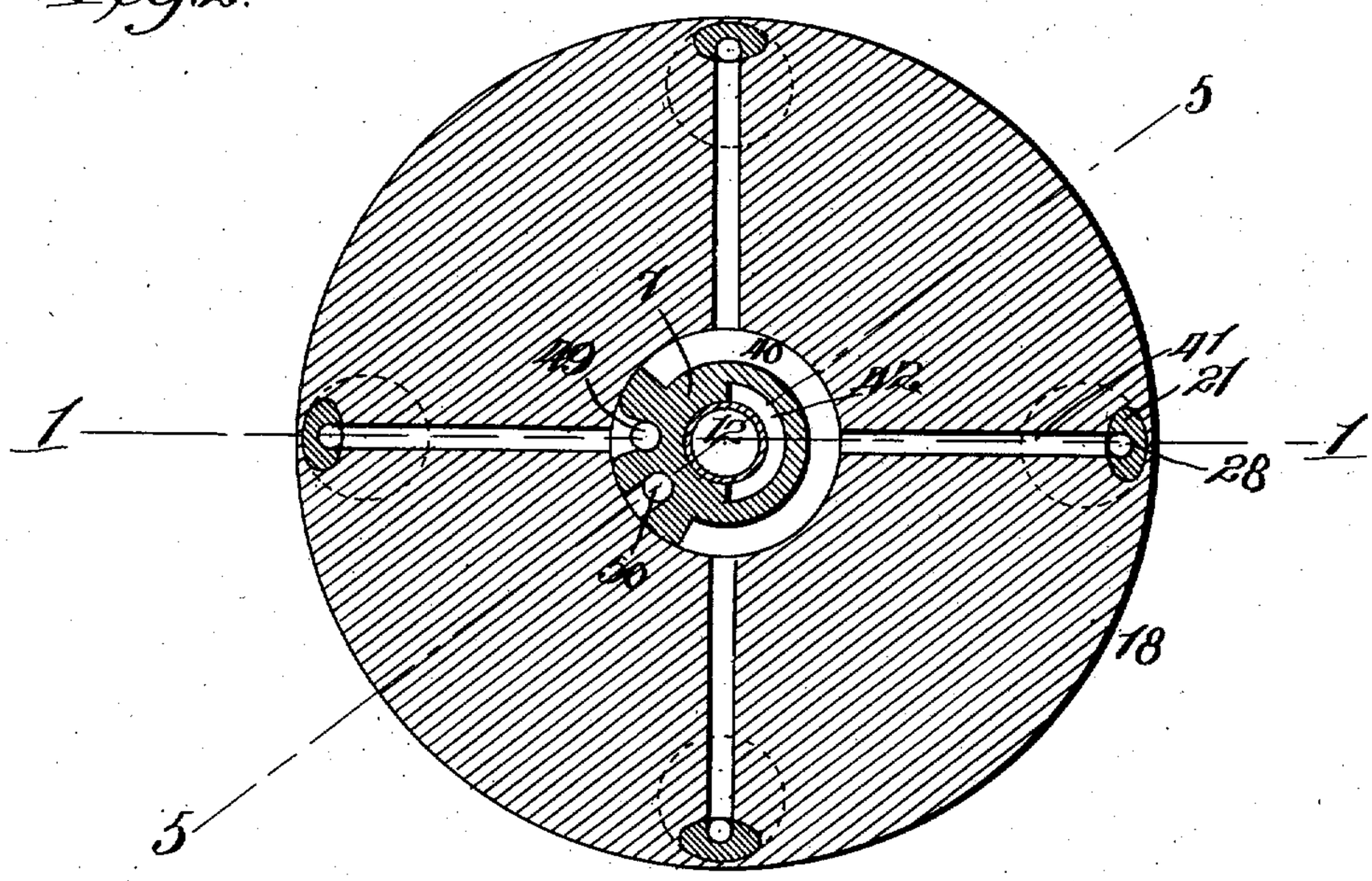
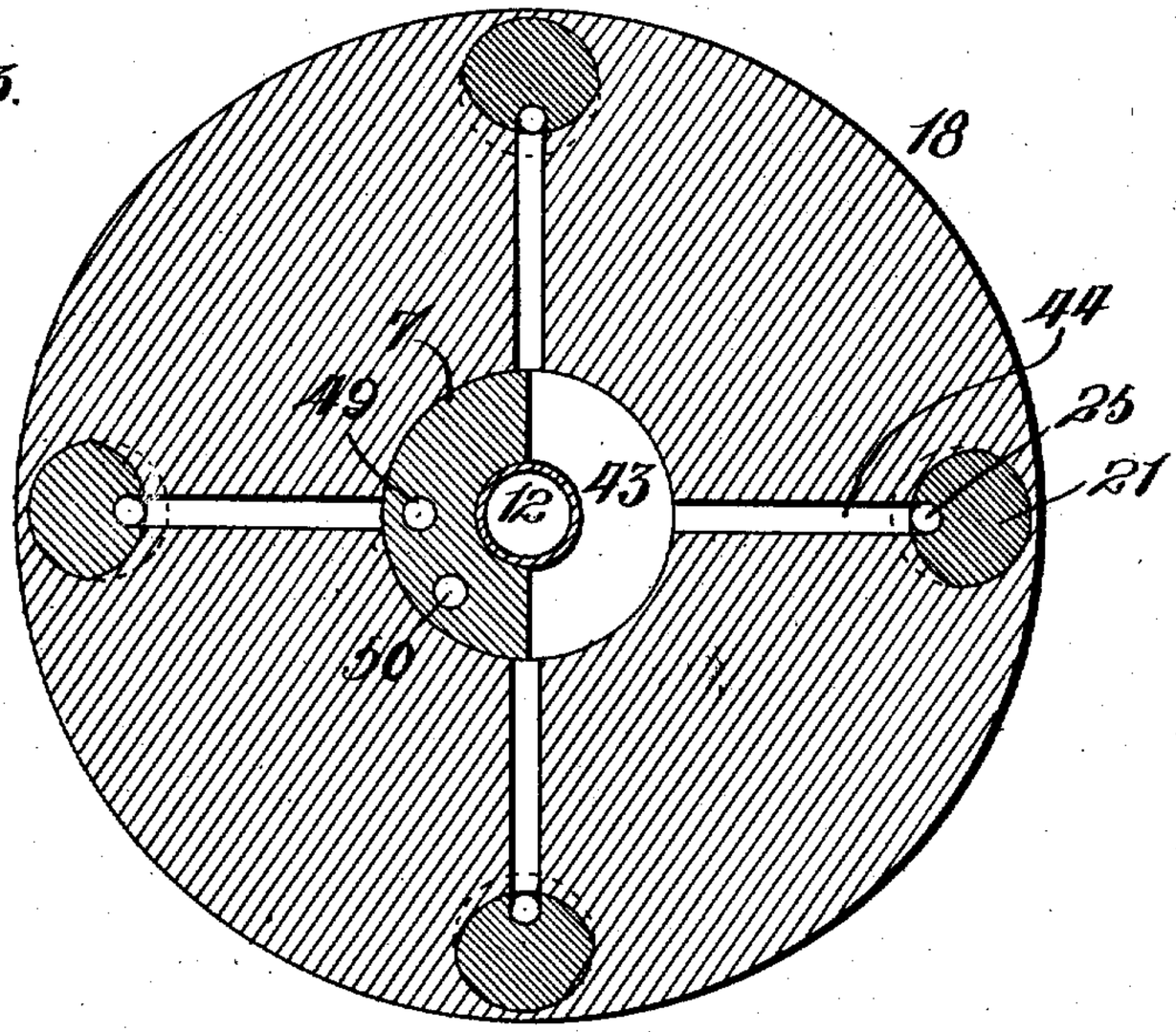


Fig. 3.



Witnesses:
Wm. P. Bond
C. F. Burke.

Inventor:
By Adolph Schneider
Fenning & Fenning
Attys.

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3 SHEETS—SHEET 3.

Fig. 4.

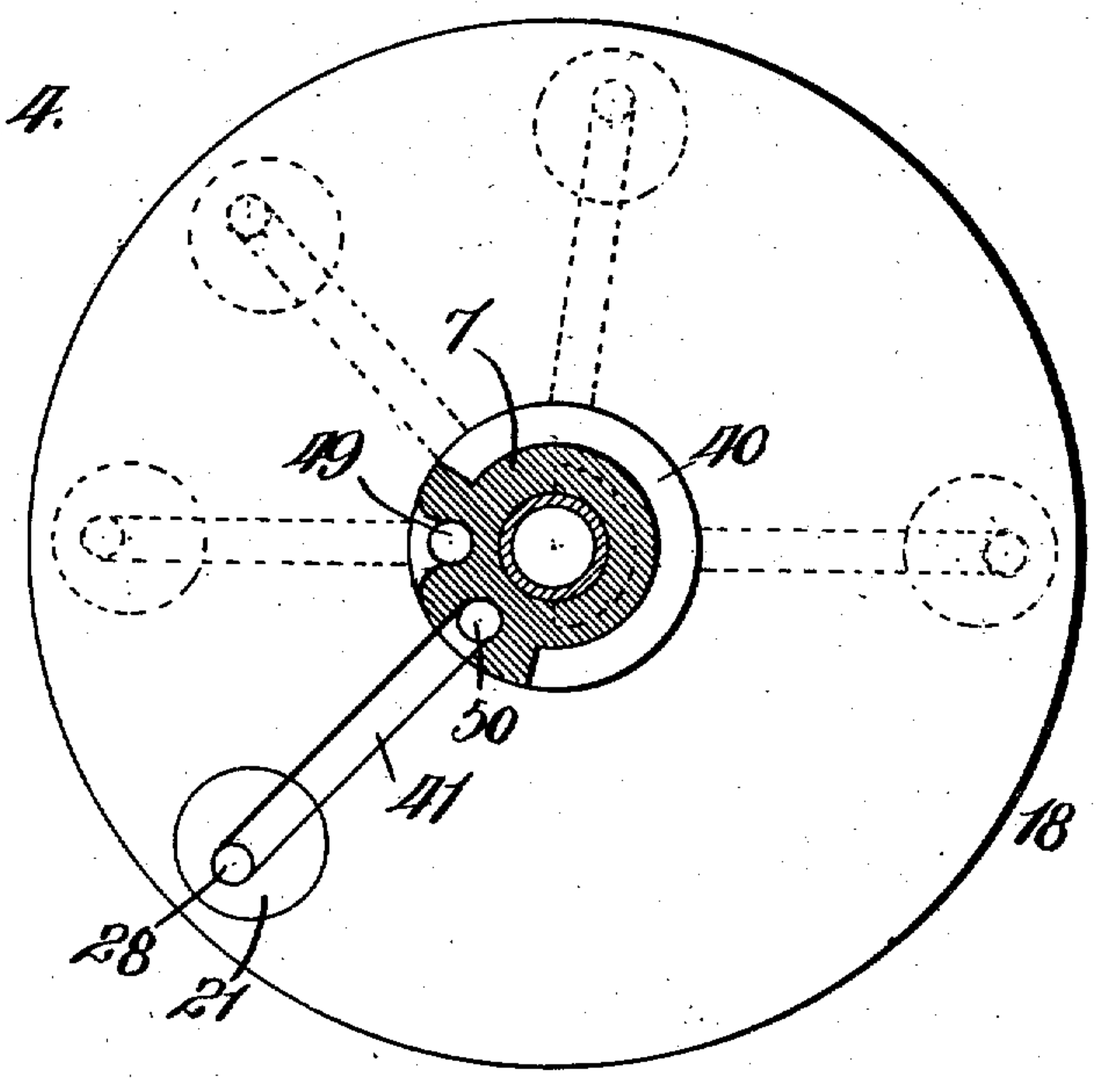


Fig. 5.

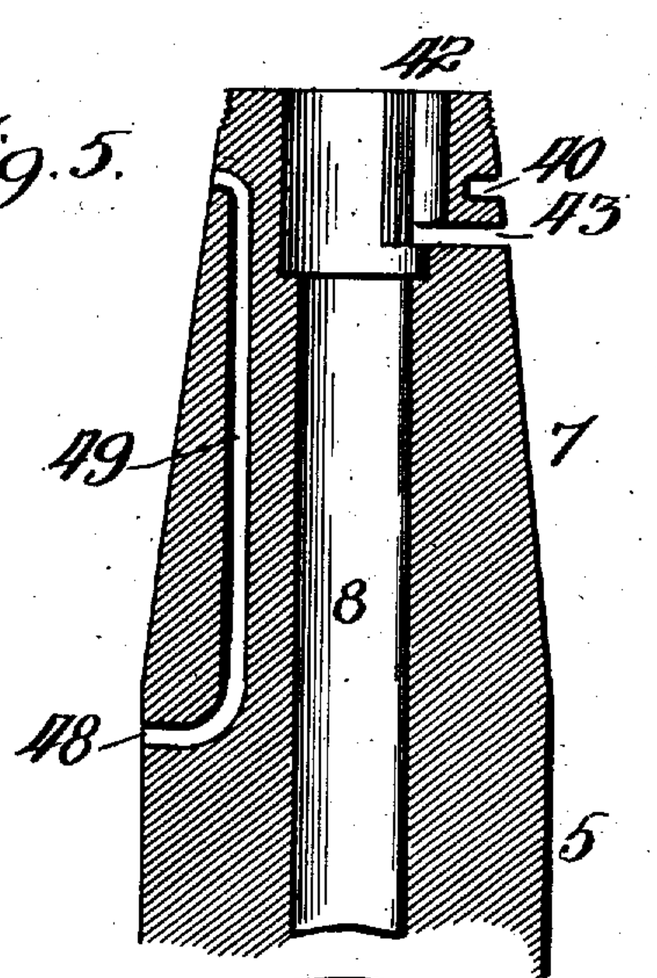
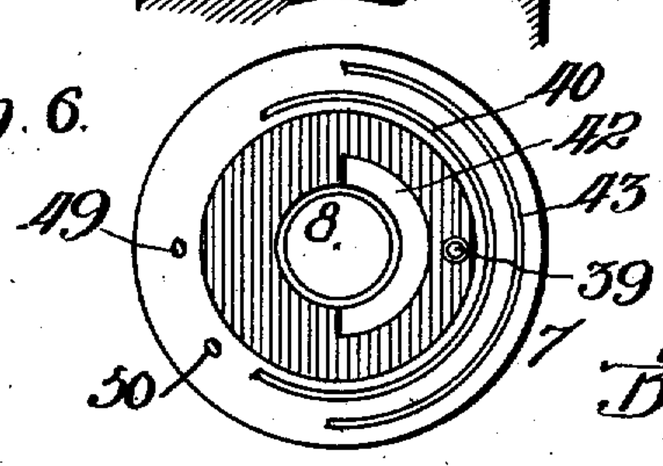


Fig. 6.



Witnesses:
Wm. P. Bond
C. F. Cooke.

Inventor:
Adolph Schneider
By Fleming & Fleming
Attys:

UNITED STATES PATENT OFFICE.

ADOLPH SCHNEIDER, OF CHICAGO, ILLINOIS.

BOTTLING-MACHINE.

954,824. Specification of Letters Patent. **Patented Apr. 12, 1910.**

Application filed September 22, 1906. Serial No. 335,737.

To all whom it may concern:

Be it known that I, ADOLPH SCHNEIDER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Bottling-Machines, of which the following is a specification.

It is desirable, in bottling or packaging liquids of a foaming nature, that foaming should be prevented, and in the bottling of aerated liquids generally the full charge of carbonic acid gas should be maintained and retained in the liquid after being bottled, so that the liquid, when used, will be under the influence of the gas.

The object of the present invention is to construct a machine by the use of which the foaming of charged liquids will be prevented practically, and the liquid will receive and retain the full charge of carbonic acid gas; to construct a machine for bottling liquids having a fixed tank for the liquids and carbonic acid gas, and a revoluble carrier located and operating below the liquid tank, and having a plurality of passages for escaping carbonic acid gas into the bottle or package and for filling the bottle or package with liquid after the admission of carbonic acid gas to the bottle or package; to create a vacuum in the bottle or package prior to the admission thereinto of the carbonic acid gas and liquid; to furnish a revoluble carrier supporting a plurality of filling devices and bottle or package supports, and having a passage for carbonic acid gas and a passage for liquid, both in communication with the bottle filling device; to furnish a standard carrying a fixed supply tank for the liquid at its upper end and supporting a revoluble carrier with a plurality of bottle filling devices thereon, said standard having a passage in communication with a passage in the carrier for creating a vacuum in the bottle or package; to furnish a supporting standard having a liquid-containing tank fixed on its upper end and having a passage for supplying liquid to the tank and supporting below the tank a revoluble carrier with bottle- or package-filling devices thereon; to furnish a regulator for the pressure controlled by the height of the liquid in the filling-tank through the medium of a float; to improve the construction and operation of the regulator for the pressure, in the filling tank; and to improve generally the construction, arrangement and operation of the several elements entering into the bottling machine as a whole. The invention consists in the features of construction and combination of parts hereinafter described and claimed.

In the drawings Figure 1 is a sectional elevation of the machine or apparatus as a whole; Fig. 2 a cross section on line 2 of Fig. 1 showing the liquid supply tube, the upper end of the standard carrying the tank or receptacle, and the revoluble carrier for the filling valves, with the passages in the end of the standard for the carbonic acid gas and liquid and with the passages in the carrier for effecting a vacuum in and supplying carbonic acid gas to the bottle or package; Fig. 3 a cross section on line 3 of Fig. 1, showing the upper end of the standard supporting the liquid tank or receptacle, and the revoluble carrier, with the supply tube for the liquid, and the passages in the standard for discharging the liquid, and the passages in the carrier for admitting liquid to the bottle or package; Fig. 4 a cross section also on line 2 of Fig. 1, showing the discharge pipe and the passages around the pipe in the standard supporting the liquid tank or receptacle, and showing also a circular outline for the revoluble carrier, and in dotted lines the several positions of the passage for creating a vacuum in the bottle or package and admitting carbonic acid gas to the bottle; Fig. 5 a vertical sectional elevation of the upper end of the standard showing the passage for carbonic acid gas, the passage for the liquid, and the vent passage for an excess of carbonic acid gas in the bottle or package; and Fig. 6 a top or plan view of the standard on which the tank or receptacle is fixedly mounted, and on which the bottle carrier is revolubly mounted, showing the various ports and passages for creating a vacuum, supplying carbonic acid gas, discharging liquid and venting carbonic acid gas.

The apparatus or machine, in the construction shown, has a base 1, consisting of a head 2, legs 3, and a rim 4 at the bottom which connects the lower ends of the legs. A standard 5 has its lower end 6 inserted and fixedly held in the head 2 of the base, and the upper end of this standard is cylindrically tapered. The standard at the upper end thereof has a passage 8, which opens through a nipple 9 on the exterior of the standard, which nipple receives a coupling 10 for attaching a liquid supply pipe 11, leading from

a suitable source of liquid supply not shown. The upper end of the passage 8 is in communication with a short tube 12 entered into the end of the standard and having its delivery end projected into the chamber of the liquid tank or receptacle for supplying liquid to the chamber of the tank or receptacle. The liquid tank or receptacle 13 on its bottom has a rim or flange 14, which screw threads onto the upper end 7 of the standard, fixedly mounting and supporting the liquid tank or receptacle 13 in place on the upper end of the standard. A cover 15 is hinged or otherwise fastened to the tank or receptacle; and, as shown, between the abutting faces of the tank or receptacle and the cover is a packing 16, so as to make an air- and gas-tight joint for the chamber 17 formed by the tank or receptacle and cover, into which chamber the liquid and carbonic acid gas are discharged.

A carrier 18, having a hub or bearing 19 with a tapered opening corresponding to the taper of the upper end 7 of the standard, is mounted on the tapered end of the standard so as to be free to revolve. The under face of the revoluble carrier 18 has therein a plurality of screw threaded holes 20, each of which receives a screw-threaded boss or wall 21 on a shell or casing 22 for attaching the shells or casings to the revoluble carrier. Each shell or casing, in the construction shown, carries a valve plug 23 in which is a liquid passage 24 communicating with a liquid passage 25 in the wall of the shell or casing, and the plug has an annular passage 26 which communicates with a passage 27 in the body of the plug, and the latter passage communicates with a passage 28 in the wall of the shell or casing.

The valve plug 23 carries a filling tube 29, the upper end of which is in communication with the liquid passage 24 of the plug, and the lower end of which has a discharge port or opening 30; and at the upper end of the filling tube is a port or opening 31 which is in communication with a passage in the filling tube not shown, which last named passage opens through the filling tube by a port or opening 32 so that carbonic acid gas from the annular passage 24 can pass through the ports or openings 31 and 32 and enter the bottle, when the filling tube is within the bottle. A closing cap 33 for the upper end of the bottle is carried by the filling tube, and this cap has a stem 34 which screw threads into the valve plug and passes through a slot 35 in the shell or casing 22 of the valve, so as to permit a limited swing of the filling tube in entering the bottle thereon and withdrawing the bottle therefrom. The bottle to be filled is carried by a fork 36, pivotally supported by a bar 37 attached to the shell or casing of the filling valve, in the construction shown, and the fork is held under a tension by a spring 38 between the rear end of the fork and the lower end of the supporting bar, so that when a bottle is inserted in the fork its neck end will be forced and held tightly against a packing in the closing cap so as to effectually seal the bottle or package.

A pipe 39 projects upward within the chamber 17 of the tank or receptacle, and has its lower end entered into the end 7 of the standard or upright; and, as shown, the upper end of the pipe 39 projects above the plane of the top edge of the liquid tank or receptacle. The lower end of the pipe 39 is in communication with a passage 40 in the upper end of the standard and laterally extending to the periphery of the standard, as shown in Figs. 1, 2 and 4; and this passage 40 is in alinement with a plurality of radial passages 41 in the revoluble carrier 18. A radial passage 41 is provided for each filling valve, and at its outer end each radial passage 40 is in communication with the passage 28 in the wall of the shell or casing 22 of the filling valve, as shown in Figs. 1 and 2, so that carbonic acid gas from the upper section of the chamber 17 of the liquid tank or receptacle can flow into a bottle or package, when the passage 41 of the infilling valve is in position to be in communication with the passage 40 of the standard, and the valve plug 23 of the filling valve is turned so that the passage 27 therein will be in communication with the passage 28 in the wall of the shell or casing of the valve.

The end 7 of the standard or upright around the tube 12 has a passage or chamber 42, which, as shown, extends one-half around the circumference of the tube, and this passage or chamber 42 extends downwardly within the end 7 of the standard or upright and is in communication with a passage 43 extending laterally to the periphery of the standard or upright; and with this passage 43 a plurality of radial passages 44 in the revoluble carrier 18 are successively brought into communication, as the carrier is revolved. A radial passage 44 is provided for each filling valve, and each passage 44 is in communication with the passage 25 in the shell or casing of its filling valve. The liquid supplied to the tank or receptacle, in the chamber 17 thereof, by the supply tube 12 from the passage 8 and lead pipe 11, enters the passage or chamber 42, and when a radial passage 44 is brought into communication with the lateral passage 43 and the plug 23 of a filling valve is turned to establish communication between the passages 24 and 25, as shown in Fig. 1, liquid will discharge from the tank or receptacle into the bottle or passage through the filling tube 29, gradually filling the bottle or package with the liquid, for

the liquid to be impregnated with the carbonic acid gas previously supplied to the bottle or package; and the filling of the bottle with the liquid will drive the carbonic acid gas back into the tank or receptacle through the pipe 39, which thus becomes an induction and eduction pipe for the carbonic acid gas.

A hose or pipe 45 is attached by a coupling 46 to a nipple or boss 47 on the standard 5, and through the nipple or boss and extending laterally into the standard or upright is a passage 48, which communicates with the lower end of a vertical passage 49 in the standard or upright, the upper end of which passage 49 opens to the periphery of the standard or upright, as shown in Fig. 1, so as to have the radial passages 41 successively brought into communication with the passage 49, as the carrier 18 is revolved. The end 7 of the standard or upright 5 has therein a vertical passage 50, the lower end of which opens to the atmosphere at the periphery of the standard or upright, and the upper end of which opens to the periphery of the standard or upright in the plane of the passages 41, so that as the carrier 18 is revolved the passages 41 will be successively brought into communication with the passage 50 and vent any excess of carbonic acid gas, remaining in the filled bottle or package, to the atmosphere.

The pipe or hose 45, as shown, is in two sections, and the adjoining ends of the sections are connected together by a T coupling 51 having a controlling valve 52 therein. The T coupling has attached thereto a hose or tube 53, the upper end of which is attached to a pipe or tube 54 by a coupling 55, and the inner end of the tube or pipe 54 is entered through the wall of the tank or receptacle 13, so as to be in communication with the chamber 17, and, as shown, the communication is controlled by a valve 56 in the tube 54 or in any other suitable manner. The plug of the valve 52 of the T coupling 51 has a two-way plug by which communication can be established direct between the two sections of the hose or pipe 45 and shut off from the hose or pipe 53, or communication can be shut off between the two sections of the pipe 45 and communication established between the outer section of the hose or pipe 45, and the hose or pipe 53, as may be required in the operation of the apparatus or machine.

The outer section of the pipe 45 leads to and is in communication with a vacuum pump 57, and, as shown, the vacuum pump is operated from a suitable motor 58, such, for instance, as a compressed air motor, which motor operates a vibratable arm 59 engaging a collar or stop 60 on the piston rod 61 of the vacuum pump, so that the vibrations or movements of the arm 59 will reciprocate the piston rod and operate the vacuum pump so as to create a vacuum either in the bottle or package or in the liquid tank or receptacle according as to whether the pipe 45 has a direct communication with the vacuum pump or the pipe 53 has communication with the vacuum pump.

The cover 15 of the liquid tank or receptacle has entered thereonto to be in communication with the chamber 17, a venting pipe 62 having a valve 63 by which the communication is controlled, and the pipe 60 furnishes the means for venting carbonic acid gas from the chamber 17 of the liquid tank or receptacle 13, when the apparatus or machine is not in use for filling bottles or packages.

A regulating valve is mounted on the cover 15 of the tank or receptacle. This valve has a shell or casing 64 inclosing a chamber 65, from which leads a passage 66 through a nipple 67, to which nipple is connected a hose or pipe 68 by a coupling 69, and the hose or pipe 68 leads from a suitable source of carbonic acid gas supply not shown, so that carbonic acid gas from the source of supply can enter the chamber 65 of the regulating valve. A passage 70 leads from the chamber 65 through a nipple 71, and a coupling 72 on the nipple connects a tube or pipe 73 with the passage 70, and the tube or pipe 73 is entered through the wall of the cover so as to be in communication with the chamber 17 of the liquid tank or receptacle; and, as shown, communication through the pipe 73 is controlled by a valve 74 in the pipe, which valve controls communication between the regulating valve and the tank or receptacle.

A float 75 is located in the chamber 17 of the tank or receptacle and is carried by a stem 76 pivotally supported from a pendant 77 and having its upper end pivotally connected with a valve stem 78, at the end of which valve stem is a valve 79 located and operating in a chamber 80 which is in communication by a port or passage 81 with the chamber 65 of the regulating valve. The chamber 80 is formed in a boss or wall 82 onto which the lower end of the casing 64 of the regulating valve screw-threads, and the wall or boss 82 is formed on a plug 83 having a screw-threaded neck 84 which is entered through the wall of the cover and receives a ring nut 85 by means of which the regulating valve, as a whole, is attached to the cover, and, as shown, the ring nut 85 carries the pendant 77 which supports the stem of the float. The chamber 80 has direct communication with the chamber 17 of the tank or receptacle by a passage 86 in the plug 83, as shown in Fig. 1, allowing of the escape or passage of carbonic acid gas into the chamber 80 and out therefrom when the valve 79 opens the port or passage

81, and shutting off the flow of carbonic acid gas from the chamber 65 through the passage 81 when the valve 79 is closed, as shown in Fig. 1. The construction shown has a sight glass 87 for inspecting the chamber 17 of the tank or receptacle when necessary.

The operation is as follows: Air is exhausted from the tank or receptacle preliminarily to the admission of carbonic acid gas and liquid into the tank or receptacle, and this vacuum for the tank or receptacle is created by establishing communication between the chamber 17 of the liquid tank or receptacle, with the cover 15 down and tightly closed, which communication is established by means of the outer section of the pipe 45 and the pipe 53, with the valve of the coupling closed against direct communication between the two sections of the pipe 45; and when this communication is established the vacuum pump 57 is started and air exhausted from the chamber 17 of the tank or receptacle, creating a vacuum therein. After the vacuum is established in the chamber 17 the vacuum pump is stopped and communication through the pipe 53 is closed, between the pump and the chamber 17, for the purpose of admitting carbonic acid gas into the chamber, with the chamber in a condition of *vacuo*. The admission of carbonic acid gas into the chamber is continued until the desired pressure is reached, which pressure is lower than the pressure of the admitted liquid, and when the chamber 17 is charged with carbonic acid gas to the required pressure, liquid is admitted to the chamber 17 of the tank or receptacle against the pressure of the carbonic acid gas. The liquid is discharged into the chamber 17 of the tank or receptacle and fills such chamber to the limit of the compression of the carbonic acid gas therein against the pressure of the liquid, thereby producing an equilibrium of pressure in the chamber 17 with that of the pressure in the source of supply for the liquid, as the pressure of the gas initially is insufficient to operate and arrest the flow of the liquid from the source of supply into the chamber. It will thus be seen that an equalization of pressure is provided between the source of liquid supply and the filling tank or receptacle.

A bottle or package is entered onto one of the filling tubes and is suspended in position by the fork 36, with its inner end tightly pressed against the packing of the closing cap on the filling tube, at which time the receptacle carrier or table, carrying the filling valves and their filling tubes, is in position for the vent passage 50 to be in communication with the bottle and the external air, when the filling valve is in the position shown on the right hand side of Fig. 1. The carrier 18, as it is revolved, carries the filling valve, the filling tube and the bottle, around for the passage 41 to be brought into communication with the passage 49 and establish connection between the bottle and the vacuum pump through the tube or hose 45 and the valve 52 which is turned for direct communication through the pipe or hose 45 and the vacuum pump. The vacuum pump, by its operation, will create a vacuum in the bottle or package so that the bottle or package is free, practically, from air. The further revolving of the carrier 18 carries the bottle around and brings the passage 41, which is in communication with the bottle by means of the annular passage 26, passages 27 and 28, and ports 31 and 32 of the filling tube into communication with the lateral passage 31, so that carbonic acid gas will flow through the tube 39 from the upper section of the chamber 17 into the bottle, charging the bottle with a supply of carbonic acid gas under an equal pressure with the gas in the chamber 17, and the admitted carbonic acid gas will furnish the charge of gas to be taken up by the liquid so as to impregnate the liquid with the required amount of carbonic acid gas. The further revolving of the carrier 18 maintains the passages for admitting carbonic acid gas into the bottle into communication with the pipe 39, and also brings the chamber or passage 40 with its lateral passage 43 into communication with the passage 44 of the filling valve having the bottle or package thereon, and into communication with the passage 25 of the filling valve, so that liquid will flow from the chamber 17 of the tank or receptacle through the filling tube 29 into the bottle. The admitted liquid will take up or absorb the requisite amount of carbonic acid gas for impregnating the liquid, and in addition the gradual filling of the bottle or package with the liquid will drive off any excess of carbonic acid gas through the passages into the pipe 39 for return to the upper section of the chamber 17 of the tank or receptacle.

The inflow of the liquid into the bottle or package will continue until the passage 44 of the filling valve having the bottle thereon is carried out of communication with the lateral passage 43, shutting off the supply of liquid to the bottle or package. The further revolving of the carrier 18 carries the passage 41 out of communication with the lateral passage 40, shutting off communication with the pipe 39 and the consequent venting of carbonic acid gas back into the chamber 17 of the tank or receptacle, and bringing the passage 41 having communication with the filling valve into communication with the vent passage 50 so as to vent any excess of carbonic acid gas over what is required, and which remains in the bottle, to the atmosphere. The bottle is then re-

moved from the filling valve and tube and sealed, so that the bottle or package will be completely filled with the liquid and the liquid will be fully charged with the carbonic acid gas.

After a bottle has been filled and removed, a new bottle is placed in position, taking the place of the removed bottle, and the operation continued. It is to be understood that in operation a bottle or package is to be placed on a filling tube that is empty, and each filling tube as its filling valve is brought into communication with the carbonic acid gas, charges the bottle on the filling tube with carbonic acid gas first, and this charging of the bottle with carbonic acid gas takes place after a vacuum has been established in the bottle or package. The liquid flows into the bottle against the pressure of the carbonic acid gas therein, and this liquid, as it gradually fills the bottle, will force the excess of carbonic acid gas back into the tank. It will thus be seen that bottles or packages, by means of this machine or apparatus, are successively brought into a condition of vacuum, charged with carbonic acid gas, filled with the liquid and removed successively until the required number of bottles or packages have been filled.

The various operations of creating a vacuum and charging carbonic acid gas into the bottle, filling the liquid into the bottle, escaping carbonic acid gas back into the tank or receptacle, and venting excess of carbonic acid gas from the bottle or package, are automatically performed as the carrier supporting the bottles or packages is revolved. The bottles will be successively charged with carbonic acid gas, filled with the liquid which becomes impregnated to the degree required with carbonic acid gas, and the bottle will be sealed against any admission of air thereinto during this filling operation, thus preventing ill effects from the air on the liquid in the bottle or package, and also effecting a filling of the bottles or packages under an equalized pressure of carbonic acid gas by which foaming and waste of the liquid will be prevented.

When the pressure of the carbonic acid gas in the chamber 17 of the tank or receptacle falls below the required amount for maintaining the liquid in the chamber at a predetermined height coincident with the pressure on the liquid, the liquid will rise in the chamber above the predetermined height, raising the float for the stem of the float to open the valve 79 and allow carbonic acid gas to enter the chamber through the port 81 and passage 86, reëstablishing the normal pressure of the carbonic acid gas in the chamber 17 and restoring the equilibrium of pressure between the carbonic acid gas and the pressure of the liquid supply; and with the liquid in the chamber of the tank or receptacle at normal height the float will be in position to cause its stem to raise the valve 79 and close the port 81 against the outflow of carbonic acid gas from the chamber 65 of the regulating valve into the chamber of the tank or receptacle.

The machine or apparatus of the present invention enables bottles or packages to be filled with liquid under conditions of the established vacuum in the bottle or package, admitting carbonic acid gas under a predetermined pressure into the bottle or package after the vacuum is established, admitting liquid into the bottle to be charged or impregnated with carbonic acid gas and drive back any excess of carbonic acid gas into the chamber of the tank or receptacle and vent any excess of carbonic acid gas remaining in the bottle or package after filling, with the result that when finally removed the sealed bottles will contain a sparkling beverage fully charged with carbonic acid gas and which will keep in perfect condition until the seal is broken; and in addition, foaming and waste of the liquid is prevented. The term bottle is used in the sense of including packages of all kinds, designed or adapted to contain liquid of aerated or carbonated character.

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

1. In a bottle filling machine, the combination of a fixed standard having a bearing upper end, a filling tank fixedly attached to the upper end of the standard, means for creating a vacuum in the chamber of the tank, means for supplying carbonic acid gas to the chamber of the tank after the vacuum is established therein, means for supplying liquid to the chamber of the tank after the admission of the carbonic acid gas, and means for filling a bottle with liquid, said means mounted on the bearing end of the standard and located and operating below the filling tank, the bearing end of the standard and the bottle filling means having passages establishing communication with the vacuum creating means and the tank, for first creating a vacuum in the to-be filled bottle, then admitting carbonic acid gas and then admitting liquid to the to-be filled bottle, substantially as described.

2. In a bottle filling machine, the combination of a fixed standard having a bearing upper end and having in its upper end a liquid supply passage, a filling tank for liquid fixedly attached to the upper end of the standard, and having a chamber for containing liquid and carbonic acid gas, and receiving thereinto liquid from the supply passage of the standard, means for filling a bottle with liquid, such means located and operating below the filling tank, means for creating a vacuum in the tank and in the to-be filled bottle, means for supplying car-

bonic acid gas under pressure to the tank and to the to-be filled bottle after the creation of the vacuum in the tank and in the bottle, and means for supplying liquid from the tank to the to-be filled bottle after the admission of carbonic acid gas to the bottle from the tank, substantially as described.

3. In a bottle filling machine, the combination of a fixed standard having a bearing upper end and having in its upper end a liquid supply passage, a filling tank fixedly attached to the upper end of the standard and having a chamber for containing liquid and carbonic acid gas, a tube establishing communication between the liquid supply passage of the standard and the chamber of the filling tank for supplying liquid to the chamber, means for filling a bottle with liquid, said means located and operating below the filling tank, means for first creating a vacuum in the tank and in the to-be filled bottle, means for supplying carbonic acid gas under pressure to the tank after creating the vacuum therein, means for supplying carbonic acid gas from the tank to the to-be filled bottle after creating the vacuum in the bottle, and means for supplying liquid from the tank to the to-be filled bottle after admitting carbonic acid gas to the bottle, substantially as described.

4. In a bottle filling machine, the combination of a fixed standard having a bearing upper end and having in the upper end a liquid supply passage and a passage open at both ends to the periphery of the standard, a filling tank fixedly attached to the upper end of the standard and having a chamber for containing liquid and carbonic acid gas, means for supplying carbonic acid gas to the chamber of the tank, means for supplying liquid under pressure to the chamber of the tank through the liquid supply passage of the standard, a vacuum pump, a valve controlled pipe connecting the vacuum pump with the chamber of the tank, for creating a vacuum in the tank before first supplying carbonic acid gas and then supplying liquid to the chamber of the tank, means for filling a bottle with the liquid from the tank, said means mounted on the bearing end of the standard and located below the filling tank and having therein a passage adapted to be brought into communication with the open-ended passage in the standard, and a valve controlled pipe leading from the vacuum pump to the open-ended passage in the standard for creating a vacuum in the to-be filled bottle, substantially as described.

5. In a bottle filling machine, the combination of a fixed standard having a bearing upper end and having in its upper end a liquid supply passage, a filling tank fixedly attached to the upper end of the standard and having a chamber for containing liquid and carbonic acid gas and receiving thereinto liquid from the supply passage of the standard, means for filling a bottle with liquid from the tank, said means mounted on the bearing end of the standard and located and operating below the filling tank, the standard having a passage in the upper end opening at each end to the periphery of the standard and the bottle filling means having a passage adapted to be brought into communication with the open-ended passage of the standard, a vacuum pump and a valve controlled three-way pipe having communication with the chamber of the tank and with the open-ended passage in the standard and connected with the vacuum pump for creating a vacuum in the chamber of the tank and in the to-be filled bottle, substantially as described.

6. In a bottle filling machine, the combination of a fixed standard having a bearing upper end, a filling tank fixedly attached to the upper end of the standard and having a chamber for containing liquid and carbonic acid gas, means for supplying carbonic acid gas to the chamber of the tank, means for filling a bottle with liquid from the tank, said means mounted on the bearing end of the standard and located and operating below the filling tank, the standard having a longitudinal passage discharging liquid into the chamber of the tank and having also in the upper end a discharge passage for liquid from the tank and a combined eduction and induction passage for carbonic acid gas, and having also a vacuum creating passage open at both ends to the periphery of the standard, and the bottle filling means having a discharge passage for liquid, a combined eduction and induction passage for carbonic acid gas, and a vacuum creating passage, said several passages in the bottle filling means adapted to be brought into communication with the corresponding passages of the standard, and a vacuum creating pump in communication with the chamber of the tank and with the open-ended vacuum creating passage of the standard, substantially as described.

7. In a bottle filling machine, the combination of a fixed standard having a bearing upper end, a filling tank fixedly attached to the upper end of the standard and having a chamber for containing liquid and carbonic acid gas, means for supplying carbonic acid gas to the chamber of the tank, means for filling a bottle with liquid from the tank, said means mounted on the bearing end of the standard and located and operating below the filling tank, the standard having a longitudinal passage discharging liquid into the chamber of the tank and having also in the upper end a discharge passage for liquid from the tank and a combined eduction and induction pas-

sage for carbonic acid gas and having also a vacuum creating passage open at both ends to the periphery of the standard, and the bottle filling means having a discharge passage for liquid, a combined eduction and induction passage for carbonic acid gas and a vacuum creating passage, said several passages in the bottle filling means adapted to be brought into communication with the corresponding passages of the standard, a vacuum creating pump in communication with the chamber of the tank and with the open-ended vacuum creating passage of the standard, a vent pipe entered into the tank, and a pressure regulator on the tank for controlling the admission of carbonic acid gas to the chamber of the tank, substantially as described.

8. In a bottle filling machine, the combination of a tank having a chamber for containing liquid and carbonic acid gas, a plug entered into the cover of the tank, a casing carried by the plug and having a chamber, with ports therefor in the wall of the casing, a tube for supplying carbonic acid gas to the chamber of the casing through one of the ports, a valved pipe for supplying carbonic acid gas from the chamber of the casing to the chamber of the tank through the other port, the plug having a valve chamber in communication with a port leading from the chamber of the casing, a valve in the valve chamber of the plug controlling the port, a passage in the plug leading from the valve chamber, a vent pipe entered into the tank, and means actuated by the rise and fall of the liquid in the chamber of the tank for operating the valve, substantially as described.

9. In a bottle filling machine, the combination of a tank having a chamber for containing liquid and carbonic acid gas, a plug entered into the cover of the tank, a casing carried by the plug and having a chamber with ports therefor in the wall of the casing, a tube for supplying carbonic acid gas to the chamber of the casing through one of the ports, a valved pipe for supplying carbonic acid gas from the chamber of the casing to the chamber of the tank through the other port, the plug having a valve chamber in communication with a port leading from the chamber of the casing, a valve in the valve chamber of the plug controlling the port, a passage in the plug leading from the valve chamber, a float located and operating in the chamber of the tank, and a stem for the float connected with the valve, for automatically operating the valve by the rise and fall of the liquid in the chamber of the tank, substantially as described.

ADOLPH SCHNEIDER.

Witnesses:
OSCAR W. BOND,
C. F. COOKE.