No. 772,195. PATENTED OCT. 11, 1904.

O. VOGEL.

BOTTLING APPARATUS.

APPLICATION FILED OCT. 2, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

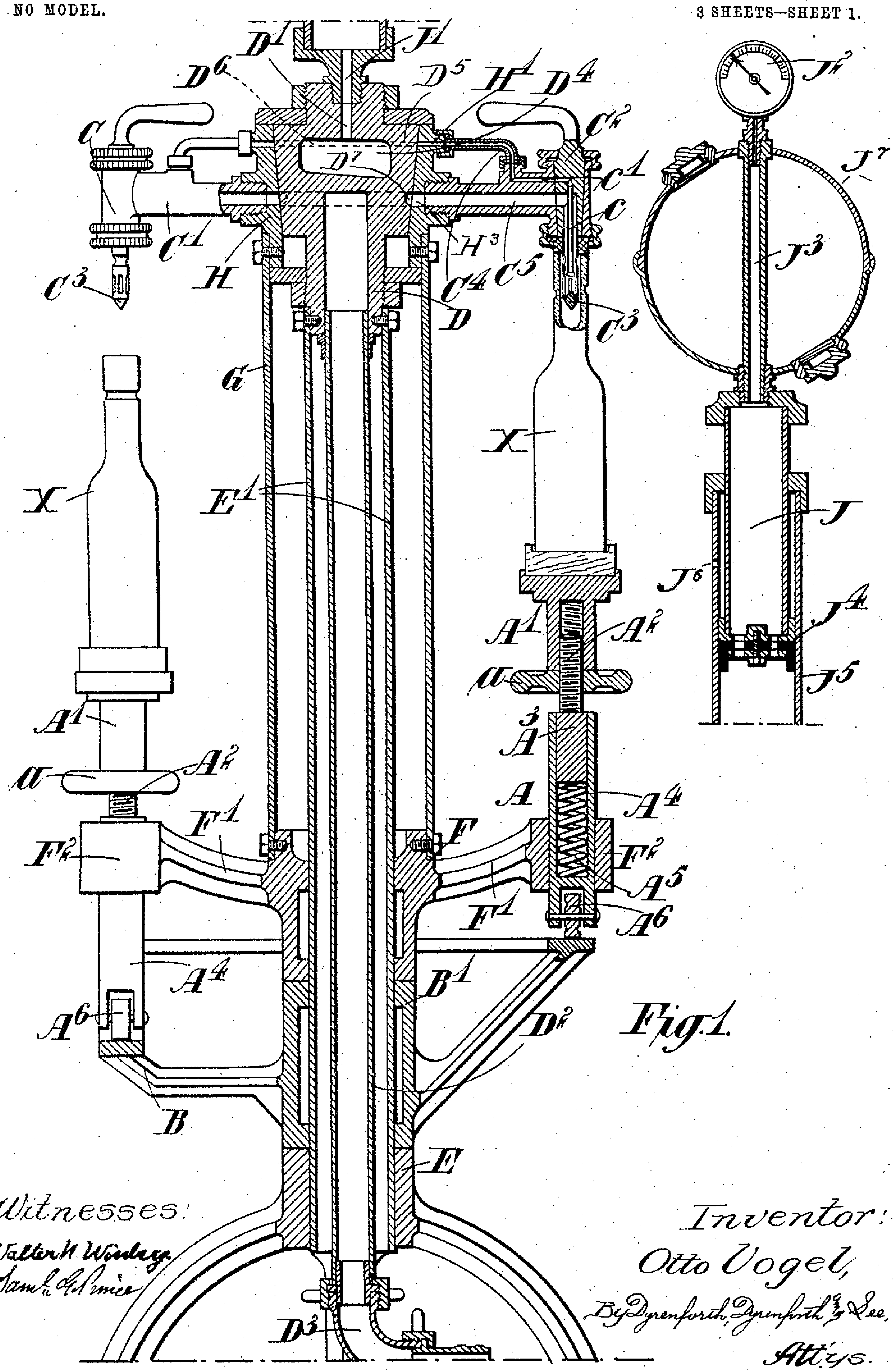

Fig.1.

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NO MODEL. 3 SHEETS—SHEET 2

Fig. 2.

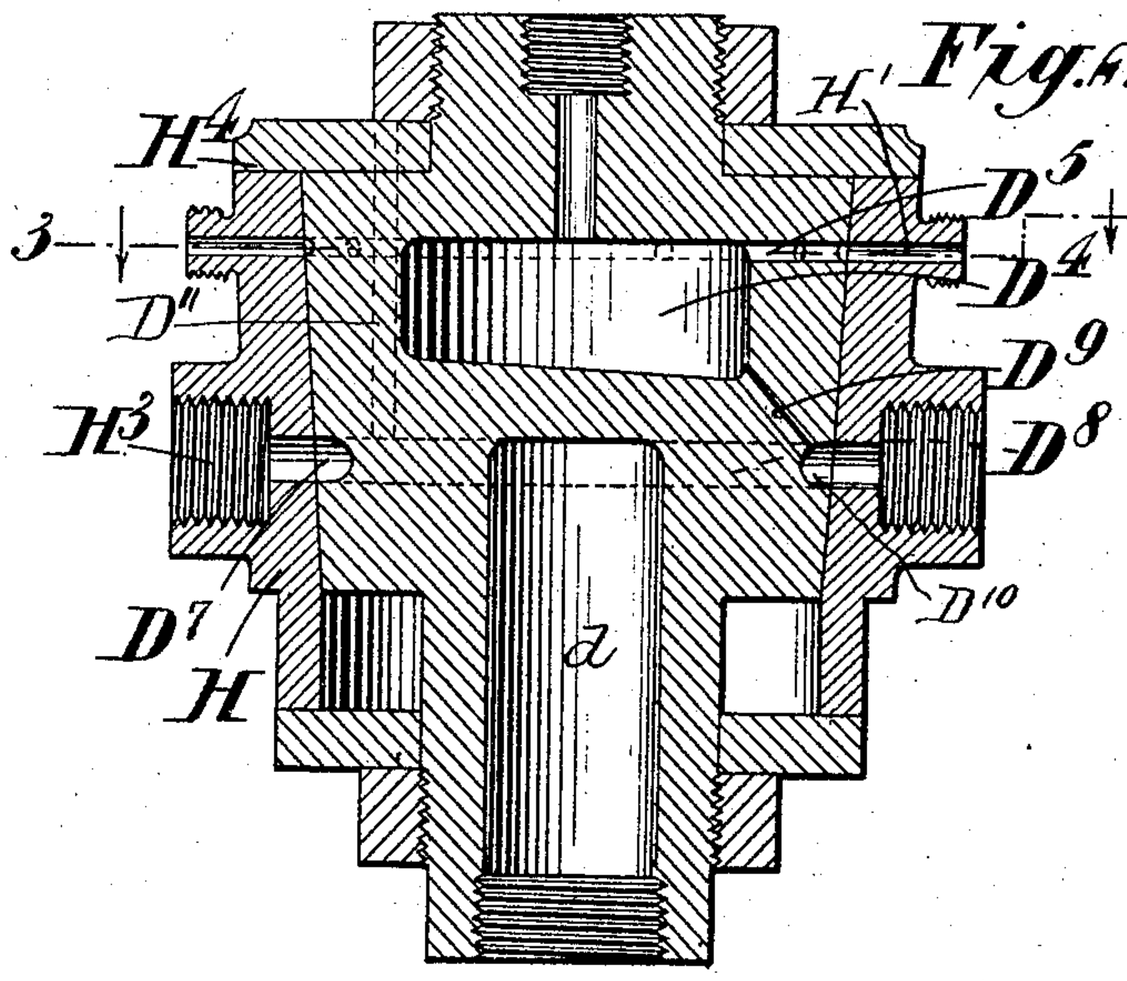


Fig. 3.

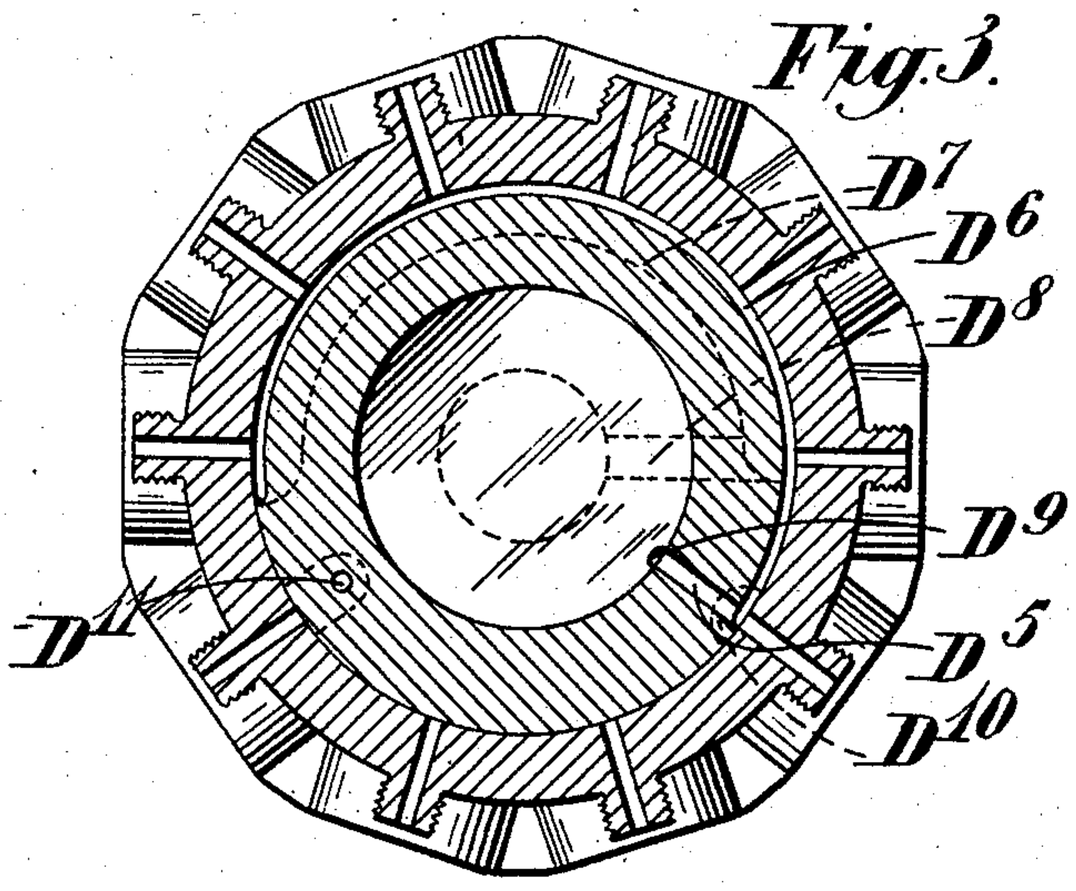
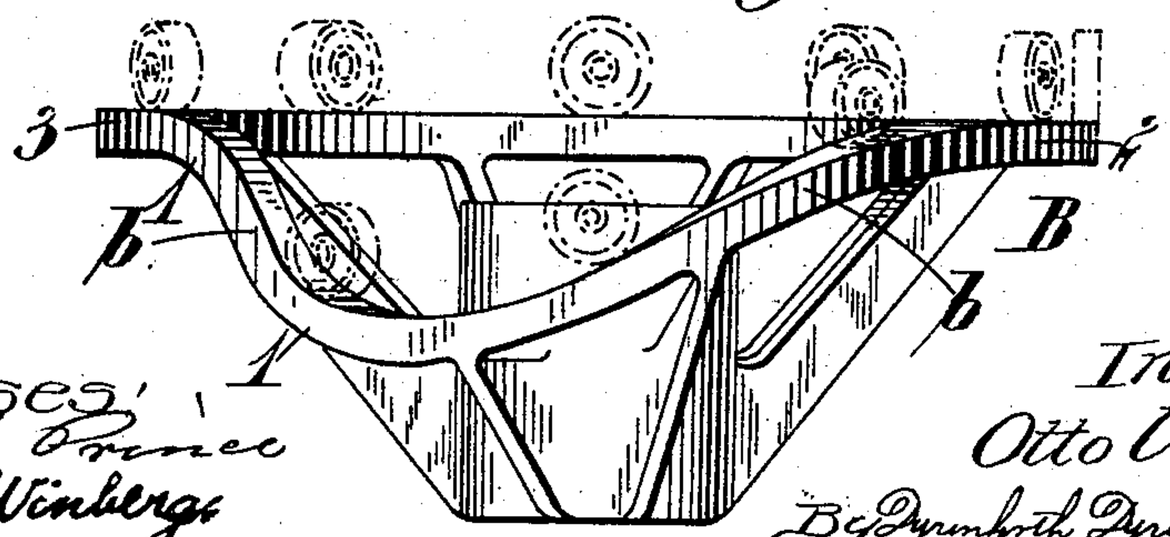


Fig. 4.



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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 5.

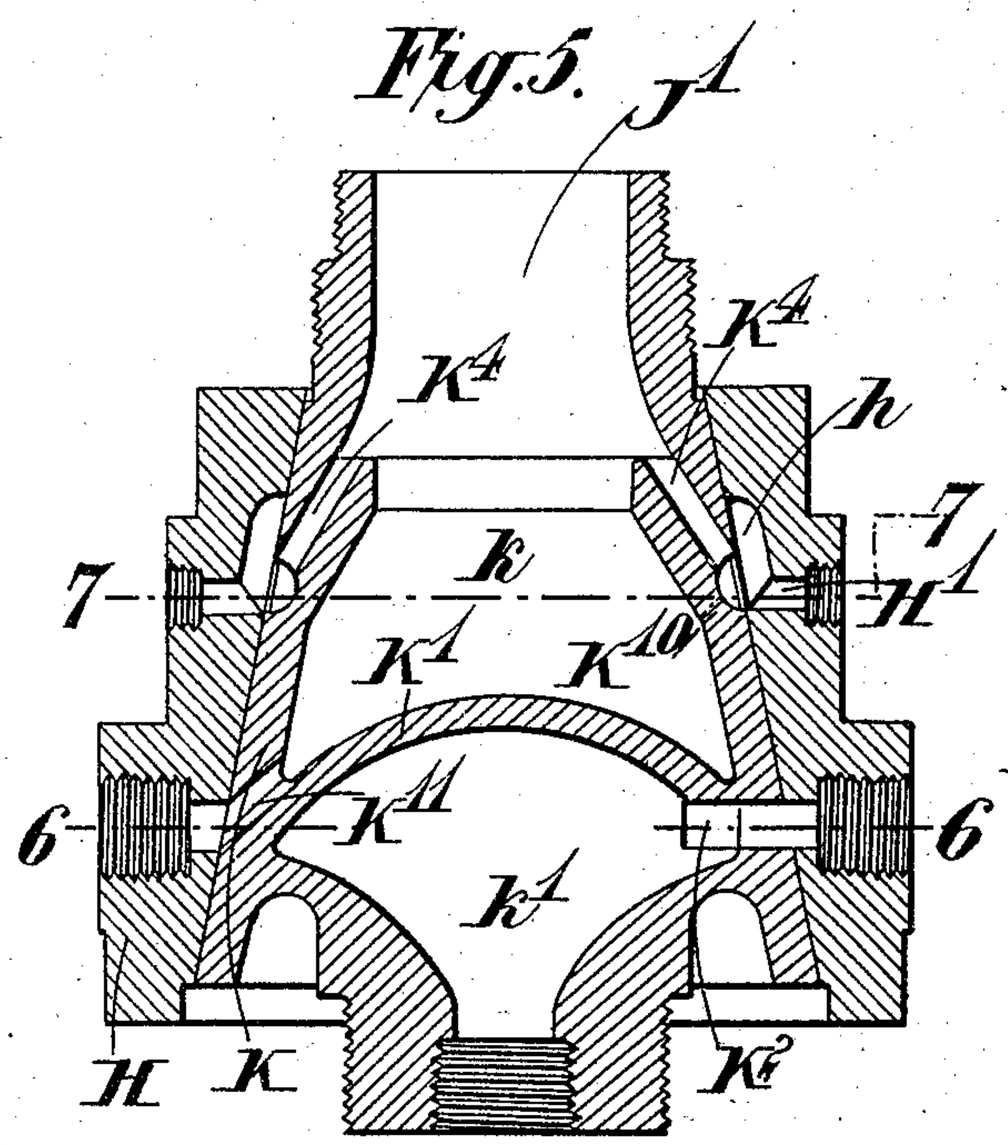


Fig. 8.

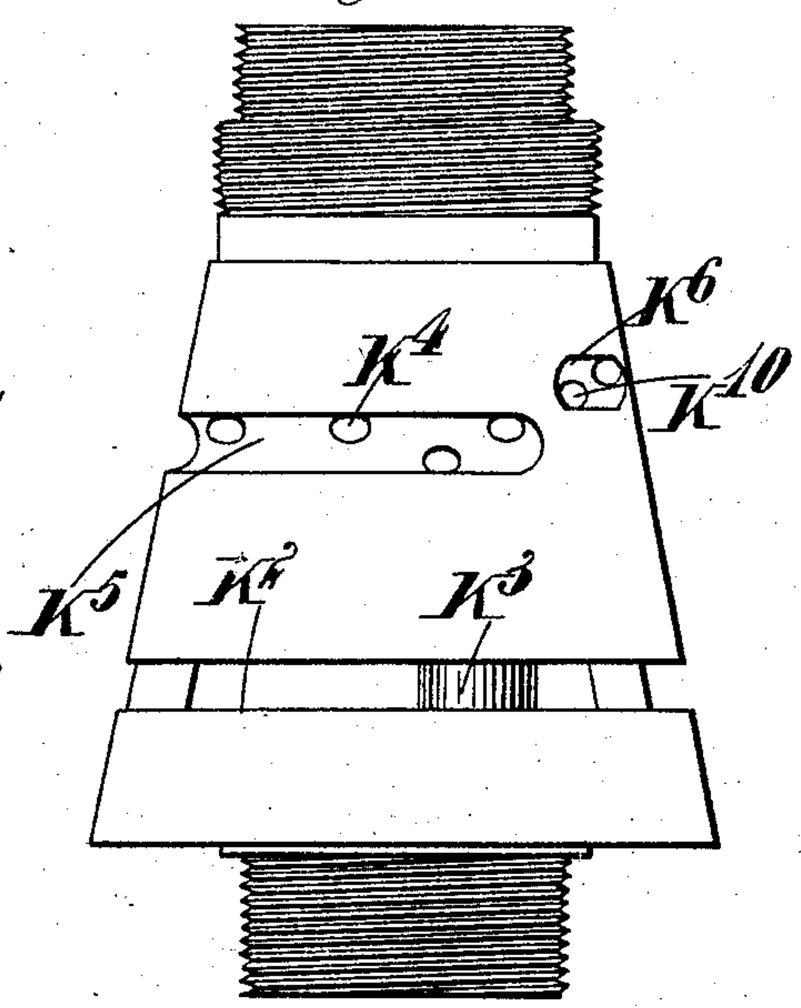


Fig. 6.

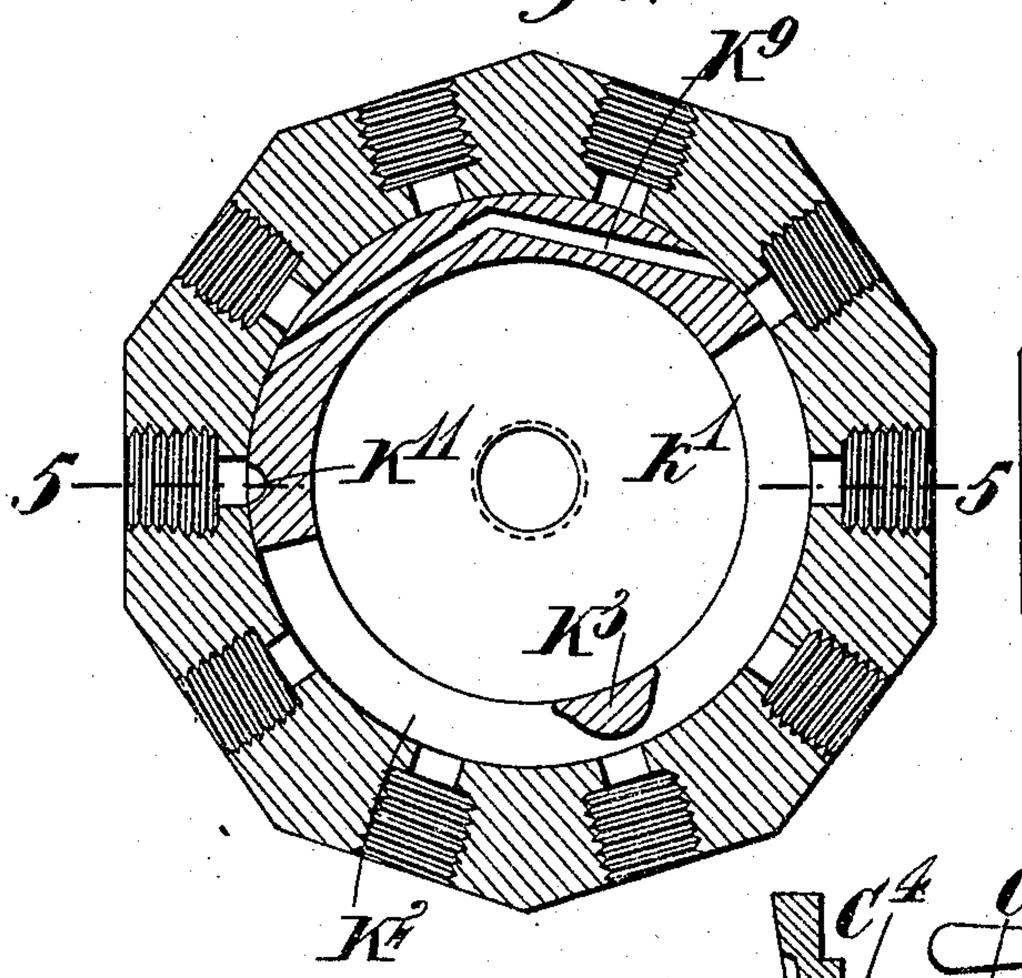


Fig. 7.

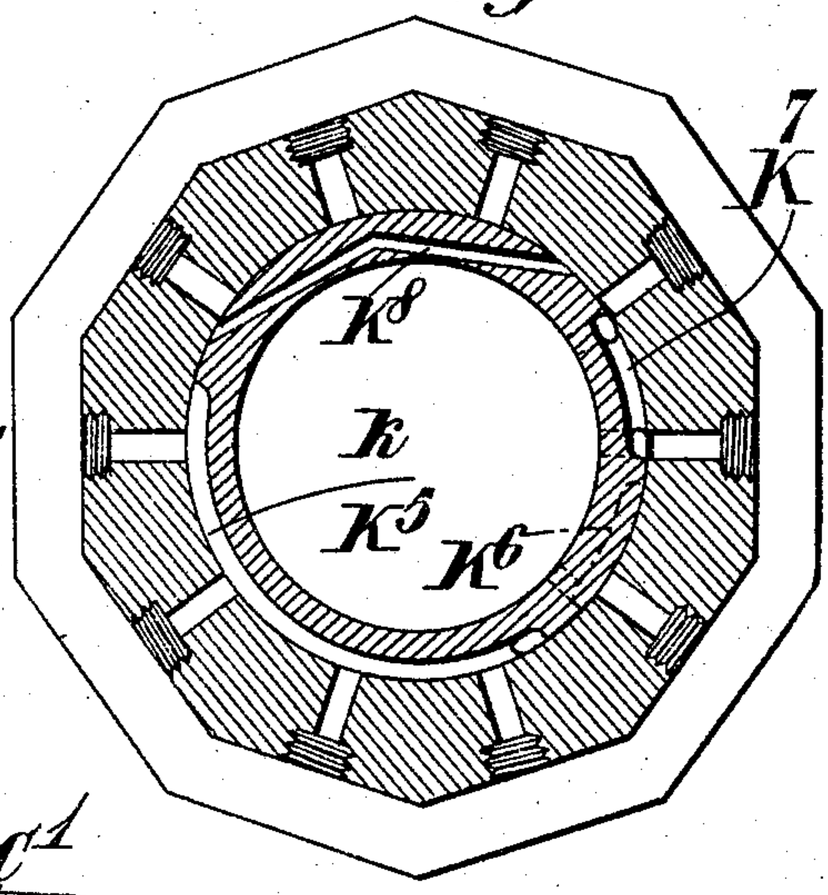
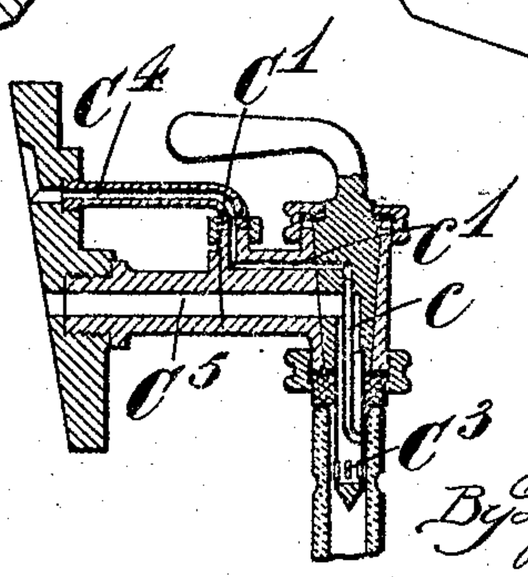


Fig. 9.



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No. 772,195. Patented October 11, 1904.

UNITED STATES PATENT OFFICE.

OTTO VOGEL, OF BERLIN, GERMANY, ASSIGNOR TO EUGENE GOLDMAN, OF CHICAGO, ILLINOIS.

BOTTLING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 772,195, dated October 11, 1904.

Application filed October 2, 1903. Serial No. 175,405. (No model.)

To all whom it may concern:

Be it known that I, OTTO VOGEL, a subject of the King of Prussia, Emperor of Germany, residing at Berlin, Germany, have invented certain new and useful Improvements in or Relating to Bottling Apparatus, of which the following is a specification.

This invention relates to bottle-filling and similar apparatus, and refers more particularly to machines which operate automatically.

According to this invention, as hereinafter more fully described with reference to the accompanying drawings, the bottles are raised automatically and pressed against the filling-nozzle, where they are held during the filling operation, and after filling are rapidly conveyed to the delivery part of the machine, where they are lowered or removed from the nozzle. Care is taken that the liquid which is filled with the present machine by way of counter-pressure does not suffer in quality.

Referring to the accompanying drawings, Figure 1 is a sectional elevation of a preferred embodiment of the present invention. Fig. 2 is a cross-section, to an enlarged scale, of the main valve. Fig. 3 is a section in the line 3 3 of Fig. 2, and Fig. 4 is a diagrammatic view showing the means for conveying the bottles toward and away from the filling-nozzle. Figs. 5, 6, 7, and 8 are detail views of a modified construction of valve mechanism. Fig. 9 is a sectional view of a tap-nozzle detached.

Referring more particularly to the construction illustrated in Figs. 1 to 4, the bottles X are carried on resilient holders A, which are caused to travel round on a circular path B. Any appropriate number of holders may be employed, and in the example shown there are eight arranged at convenient intervals, and a corresponding number of taps or delivery-nozzles C are employed. The tapping apparatus is stationary and comprises a plug-valve D, provided with openings which as the various delivery-nozzles move round coincide with openings in the nozzles themselves, so that the liquid is delivered. The inclined path B is arranged stationary upon the frame E of the machine, and upon the hub B′ of the path rests a cross-piece F, provided with any convenient number of arms F′. Each arm F′ terminates in a socket F^2, which has an opening wherein is movably mounted a holder A for a bottle X. The holder A comprises a support A′, on which the bottle rests and which is screw-threaded internally to engage with a screw A^2, carried by a sliding plunger A^3, so that the height of the bottle can be adjusted or the machine adapted to receive bottles of various sizes. The support A′ is locked in any desired position by a hand-wheel *a*. The plunger A^3 is disposed in a socket A^4, which is free to slide in the holder F^2, and between the end of the plunger and the inner end of the opening in the holder is disposed a spring A^5 or other resilient body. At the lower end of the cylindrical piece A^4 is carried a roller A^6 or the like, which rests upon the inclined surface B. Connected to the hub F by screws or in any other convenient manner is a tubular support G, which carries at its upper end a hollow tap-casing H or the like, provided with passages coinciding with several passages in the stationary tapping-plug D, and connected to the casing H or formed in one with it are arms C′, each of which carries at its outer end a tap-nozzle C. The plug D fits within the casing H and is prevented from rotating conveniently by being connected to the frame of the machine or other stationary support by a tubular pillar E′, which also serves as the axis for the cross-piece F. The plug D is connected on the one end with the source of supply for the liquid by a pipe D^2, which passes down the center of the pillar E′ and is connected to the supply-pipe by a junction-piece D^3. The pipe D^2 enters an opening *d* in the lower end of the plug D, and, on the other hand, communicates with the counter-pressure receptacle J, which is arranged in the manner of an air-buffer. From the counter-pressure receptacle J is a passage J′, which terminates in a conduit D′, leading to a recess or chamber D^4 within the plug D. From the chamber D^4 a passage D^5 (see Fig. 2) leads to the casing of the plug and terminates in an annular passage D^6, arranged horizontally around the greater part of the periphery of

the plug. The passage D^6 is arranged at the height of and so disposed that it coincides with passages H′, passing through the casing H and connected to the various filling-nozzles. As shown in Fig. 3, the passage D^6 in any position is in communication simultaneously with the majority of the filling-nozzles for the purpose hereinafter described. At a lower level in the casing H are arranged a number of passages H^3, which communicate with an annular passage D^7, which is in communication with the chamber *d* and the pipe D^2 by a cross-passage D^8. (See Figs. 2 and 3.) The plug C^2 of each tap or filling nozzle C is provided with a wide bore to which a filling-nozzle proper, C^3, is attached. Between the wide boring and the nozzle is a narrow conduit *c*, which terminates in an angular boring *c′*, arranged above the wide boring. These two borings are arranged in the casing so that the wide bore terminates in the filling-arm C′ and the narrow bore leads into a conduit or pipe C^4, that is in communication by a passage H′ with the annular passage D^6 in the plug D. Both these passages, therefore, are in connection with the casing H, which rotates around the stationary plug D. The cross-passages D^5 and D^8 are not situated in one plane, but above one another, so that during the counter-clockwise motion of the bottle-battery the passage D^5 lies in front of the passage D^8, whereby the bottles during their movement round the tapping apparatus are first connected with the chamber J through the passages above mentioned and then with the supply-pipe D^2 through the other set of passages. Leading from the collecting-chamber D^4 and extending in a downward direction is a passage or conduit D^9, terminating in a recess D^{10} (see Figs. 2 and 3) in the body of the plug. The recess D^{10} is situated in the plug at the same level as the annular passage D^7. Another passage, D^{11}, (see Fig. 3,) is also situated in the plug-body and terminates in a recess situated at the height of the passage D^7. The passage D^{11} leads to the atmosphere through an adjusting-disk H^4, disposed upon the plug.

The bottles X are placed on their respective holders or carriers at the lowest point 1 of the path B and travel along the inclined part *b* (see Fig. 4) until the bottle arrives at the highest position 2, in which it is pressed against its corresponding filling-nozzle C. The bottle then moves into another position, so that it is in communication with the counter-pressure conduit D^5, whereby the fluid in the chamber J passes into the bottle. At the same time the passage C^5 in the arm C′ of the filling-nozzle is brought into communication with the passage D^9, so that the liquid which flowed through the passage C^4 into the collecting-chamber D^4 flows back from the latter into the bottle without whirling or foaming, owing to the counter-pressure prevailing already in the bottle. When the bottle moves through another portion of its travel, connection is made with the passage D^7, while the passage D^6 is maintained in communication with the counter-pressure reservoir J, so that the filling operation up to a certain point—that is to say, when the bottle reaches position 3, Fig. 4—is effected with the counter-pressure. The air driven from the bottle flows through the passage H′ into the passage D^5 and finally into the chamber J. The length of the passage D^7 is such that with a certain speed and counter-pressure and with suitably-selected proportions of the cross-section at the ends of the passage D^7 the bottle is filled with safety at the point 3. (See Fig. 4.) Should, however, the bottle be filled before reaching this position, no reaction will influence the remaining bottles, as the liquid ascends through the conduit H′ and collects in the chamber D^4, and is so available at the beginning of the filling of a fresh bottle. From the position 3 the bottle rapidly descends to the position 1, at which it is removed. In order to prevent long contact of the contents of the bottle with the air, the path B is provided with a sharp inclined part *b′*, which extends from the position at which the filling is completed to the position where the bottle is removed. On the way from the filled position to its removal the relief of the pressure is effected through the passage D^{11}.

The counter-pressure reservoir J acts as a regulator and is weighted, preferably, with lead shots or the like deposited in a receptacle J^7 and conveniently is provided with a pressure-gage J^2, which communicates with the chamber J′ by a pipe J^3. The chamber J is provided at its lower end with a passage J^4, adapted to slide in an outer casing J^5, and should too much air pass from the bottle into the receptacle J the piston is raised and an opening J^6 uncovered, through which the excess gas passes to the atmosphere.

As several bottles are being filled at the same time, care must be taken that the various passages are so arranged that the bottles are not dependent on each other; otherwise if the filling process goes wrong with one bottle—which is a thing that can always happen—the filling of a whole series of bottles will be interfered with. The filling process is liable to go wrong now and then, chiefly on account of the beer from one prematurely-filled bottle getting into the pressure-supply conduit, and as this pressure-conduit is in simultaneous communication with a whole series of bottles the supply of pressure to these bottles would not be effected in a correct manner. Care must also be taken that the pressure-conduit is not shut off from the other bottles being filled should one bottle get filled prematurely. Of course premature filling of bottles can only take place during the second half of the filling process, and it is therefore not necessary to shut off from each other bottles which are just

beginning to be filled; but in the second half of the filling operation, which leads to complete filling, care must be taken that the bottles should be independent of each other, and a modified construction of the filling-plug for effecting this will now be described.

The tap-plug K (see Fig. 5, which is a longitudinal section on line 5 5 of Fig. 6) consists of a hollow body divided by a partition K′ into two chambers *k* and *k′*. The space *k′* communicates, by means of a slot K^2, with the passage C^5 of the filling-arm, so that beer continually supplied by the beer-pipe to the chamber *k′* enters the said passage and the bottle when the latter is in front of the slot K^2, which extends over a large portion of the tap-surface. In order to strengthen the tap, it is provided with a bridge K^3. (See Figs. 6 and 8.) Above the slot K^2 there is on the surface of the tap-plug the pressure ring conduit, communicating with the pressure-conduit J′ by means of holes K^4 in the tap-plug. This pressure ring conduit consists in the example illustrated of three sections—first, large section K^5, Figs. 7 and 8, next a shorter section K^6, which is arranged at a higher level than the section K^5, and a third section K^7, which is at the same level as the section K^5. As will be seen, the filling-arm C′ arrives with its counter-pressure pipe C^4 in front of the pressure-conduit K^5 before beer is admitted from the slot K^2 to the beer-pipe C^5 of the filling-tap. The beer therefore must enter against the pressure already existing. Then the bottle travels round the plug and at the end of the conduit K^5 the filling-arm comes in front of the section K^6, the passage from one to another taking place very quickly, owing to the alternate vertical position of the sections K^5 and K^6. In order that there should be communication between J′ and C^4 in spite of the section K^6 being at a higher level and in view of the hole in the plug always remaining at the same level, the holes H′ of the casing H are milled out at the top to form recesses *h*. The filling-arm continuing to travel arrives at the end of the filling period in front of the section K^7, under the end of which terminates the beer-slot. Then the bottle, which is still held pressed against its filling-arm, comes with the latter in front of two holes, the upper one, K^8, of which is on the same level on the tap-plug as the pressure ring conduit, while the lower one, K^9, is on the same level as the beer-slot K^2. Both horizontal holes go through the plug and merge at a point just in front of the beginning of the conduit *k*.

The filling with the tap-plug described is as follows: The bottle after having been pressed against its filling-arm arrives, together with the latter, in front of the mouth of the conduits K^8 and K^9 and equalizes its atmospheric pressure with the pressure of the full bottles passing in front of the beginning of the conduits. Beer rising from the full bottle, owing to the pressure having been reduced through the nozzle C^3 of the filling-arm, passes through the conduit K^9 into the fresh bottle at the same time as the pressure is equalized. Then only that bottle passes in front of the pressure-conduit K^5 and then in front of the beer-outlet K^2 and is filled under pressure.

It is obvious that when a bottle standing in front of the section K^6 has already been filled, and consequently beer escapes from it upward, the bottles in front of the sections K^5 and K^7 will not be affected. The beer passes into the section K^6 and through a hole K^{10}, Figs. 6 and 8, into the collecting-chamber *k* of the tap. From the said chamber branches off a conduit K^{11} toward the periphery of the tap-plug, as will be seen from Figs. 5 and 6, in such manner that it merges at the level of the beer-hole K^2, but between the mouth of the conduit K^9 and the beginning of the beer-slot, Fig. 2. The beer from the collecting-chamber J′ is therefore discharged into a new bottle, which, however, has already been placed under counter-pressure.

The conduit K^{10} is arranged in front of the section *l* and leads toward the chamber *k*, and it is advisable to arrange a similar conduit at the end of the conduit K^5. In case a small escape of beer upward takes place in front of the section K^6 it can escape through that conduit. The conduit K^7 must of course also be provided with a conduit leading to the chamber *k*. The number of holes K^4, by means of which the sections K^5, K^6, and K^7 are placed under pressure, depends on practical requirements.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a bottle-filling apparatus the combination with a plurality of continuously-rotating resilient bottle-holders, of a counter-pressure chamber automatically controlled in the movement of the holders, a stationary filling tap-plug communicating with the liquid-supply and with the counter-pressure chamber, a plurality of filling-nozzles, a casing rotating with the bottle-holders and carrying the filling-nozzles, means whereby the filling-nozzles communicate through the stationary plug with the liquid-supply and with the counter-pressure chamber, and means whereby the bottles are conveyed to and from the filling-nozzles at the proper time substantially as and for the purpose described.

2. In a bottle-filling apparatus the combination with a plurality of continuously-rotating resilient bottle-holders, of a counter-pressure chamber automatically controlled in the movement of the holders, a plurality of filling-nozzles, a stationary filling tap-plug communicating with the liquid-supply and by two separate series of passages with the filling-nozzles and also in communication with the counter-pressure chamber, a casing rotating with the bottle-holders and carrying the fill-

ing-nozzles and means whereby the bottles are successively raised and lowered to and from the filling-nozzles substantially as and for the purpose described.

3. In a bottle-filling apparatus the combination with a plurality of continuously-rotating resilient bottle-holders, of a plurality of filling-nozzles, a tap on each filling-nozzle, means connecting the filling-nozzles and holders to rotate together, a stationary filling tap-plug in communication with the liquid-supply, a counter-pressure chamber, in communication with the filling-nozzles through the plug and automatically controlled in the movement of the holders, arms supporting the filling-nozzles and having conduits establishing communication between the nozzles and the plug, a by-pass pipe between the filling-nozzles and the counter-pressure chamber, and means for raising and lowering the bottles successively to and from the filling-nozzles substantially as described.

4. In a bottle-filling apparatus the combination with a plurality of continuously-rotating resilient bottle-holders, of a plurality of filling-nozzles, a casing rotating with the bottle-holders and carrying the filling-nozzles and provided with passages communicating with the filling-nozzles, a counter-pressure chamber automatically controlled in the movement of the holders, a stationary filling tap-plug communicating with the liquid-supply, the counter-pressure chamber and the filling-nozzles by the passages in the revolving casing, an inclined circular path on which the bottle-holders rest and are conveyed to and from the filling-nozzles successively and at the proper time substantially as and for the purpose described.

5. In a bottle-filling apparatus the combination with a continuously-rotating carrier, of a plurality of holders slidingly mounted on the carrier, adjustable bottle-supports mounted in the holders, a resilient body disposed between the holders and the carriers, an inclined circular path, casters on the holders adapted to run on the path, a plurality of filling-nozzles, a casing rotating with the bottle-holders and carrying the filling-nozzles and provided with passages communicating with the filling-nozzles, a counter-pressure chamber, and a stationary filling tap-plug communicating with the liquid-supply, the counter-pressure chamber and the filling-nozzles by the passages in the revolving casing, substantially as and for the purpose described.

6. In a bottle-filling apparatus the combination with a continuously-rotating carrier, of a plurality of holders slidingly mounted in sockets in the carrier, pistons mounted in the holders, springs located between the pistons and the holders, bottle-supports carried by the pistons, means for adjusting the supports relatively to the pistons, an inclined circular path, casters on the holders adapted to run on the path, a plurality of filling-nozzles, a casing rotating with the bottle-holders and carrying the filling-nozzles and provided with passages communicating with the filling-nozzles, a counter-pressure chamber, and a stationary filling tap-plug communicating with the liquid-supply, the counter-pressure chamber and the filling-nozzles by the passages in the revolving casing, substantially as and for the purpose described.

7. In a bottle-filling apparatus the combination with a continuously-rotating carrier, of a plurality of holders slidingly mounted in sockets in the carrier, pistons mounted in the holders, springs located between the pistons and the holders, bottle-supports carried by the pistons, an adjusting-screw for moving the supports relatively to the pistons, an inclined circular path, casters on the holders adapted to run on the path, a series of filling-nozzles corresponding in number to the bottle-supports, a casing rotating with the bottle-holders and carrying the filling-nozzles and provided with two series of passages communicating with separate passages in the filling-nozzles, a counter-pressure chamber, a stationary filling tap-plug communicating with the liquid-supply, the counter-pressure chamber and by two series of passages with the two series of passages in the revolving casing, and means connecting the rotating casing with the rotating carrier substantially as and for the purpose described.

8. In a bottle-filling apparatus the combination with a continuously-rotating carrier of a plurality of holders slidingly mounted in sockets in the carrier, pistons mounted in the holders, springs located between the pistons and the holders, bottle-supports carried by the pistons, an adjusting-screw for moving the supports relatively to the pistons, an inclined circular path, casters on the holders adapted to run on the path, a series of filling-nozzles corresponding in number to the bottle-supports, a casing rotating with the bottle-holders and carrying the filling-nozzles, and provided with two series of passages communicating with separate passages in the filling-nozzles, a counter-pressure chamber, a stationary filling tap-plug communicating with the liquid-supply, the counter-pressure chamber and by two series of passages with the two series of passages in the revolving casing, and a separate tap on each filling-nozzle, substantially as and for the purpose described.

9. In a bottle-filling apparatus the combination with a continuously-rotating carrier of a plurality of holders slidingly mounted in sockets in the carrier, pistons mounted in the holders, springs located between the pistons and the holders, bottle-supports carried by the pistons, a screw-nut for moving the bottle-supports relatively to the pistons, an inclined circular path, casters on the holders adapted to run on the path, a series of filling-nozzles

corresponding with the number of bottle-supports, a tap on each filling-nozzle, a casing rotating with the bottle-holders and carrying the filling-nozzles, and provided with two series of passages communicating with separate conduits in the filling-nozzles, a counter-pressure chamber, a hollow piston sliding in the chamber, a pressure-gage and an escape-valve on the counter-pressure chamber, a stationary filling tap-plug communicating with the liquid-supply, the counter-pressure chamber and the filling-nozzles by separate passages in the revolving casing and means for connecting the rotating casing with the bottle-holders so that they rotate together substantially as and for the purpose described.

10. In a bottle-filling apparatus the combination with a continuously-rotating carrier of a plurality of holders slidingly mounted in sockets in the carrier, pistons mounted in the holders, springs located between the pistons and the holders, bottle-supports carried by the pistons, means for adjusting the supports relatively to the pistons, an inclined circular path, casters on the holders adapted to run on the path, a plurality of filling-nozzles, a casing rotating with the bottle-holders and carrying the filling-nozzles and provided with passages communicating with the filling-nozzles, a tap on each filling-nozzle, a counter-pressure chamber, a hollow piston sliding in the chamber, a pressure-gage on the chamber, an escape-valve on the chamber, a stationary filling tap-plug communicating with the liquid-supply and having a counter-pressure supply-conduit arranged above the liquid-conduit, the plug consisting of several sections arranged at alternate levels, each section being connected with the counter-pressure chamber so that when owing to a premature filling of one bottle the liquid from it is forced back into the counter-pressure chamber without interfering with the filling of the other bottles, substantially as described.

11. In a bottle-filling apparatus the combination with a continuously-rotating carrier of a plurality of holders slidingly mounted in sockets in the carrier, pistons mounted in the holders, springs located between the pistons and the holders, bottle-supports carried by the pistons, means for adjusting the supports relatively to the pistons, an inclined circular path, casters on the holders adapted to run on the path, a plurality of filling-nozzles, a casing rotating with the bottle-holders and carrying the filling-nozzles and provided with passages communicating with the filling-nozzles, a tap on each filling-nozzle, a counter-pressure chamber, a hollow piston sliding in the chamber, a pressure-gage on the chamber, an escape-valve on the chamber, a stationary filling tap-plug having two conduits K^8 and K^9, the former K^8 of which is arranged on the same level as the counter-pressure conduit K^5 K^6 K^7 and the latter K^9 at the same level as the liquid-supply opening K^2, the conduits K^8 and K^9 opening shortly after the closing of the supply and counter-pressure conduits and emerging just in front of the counter-pressure conduit K^5 for the purpose of establishing communication between the filled bottles and the fresh empty ones for equalizing the pressure and for the purpose of conducting any liquid spurting out of the filled bottles into the empty bottles substantially as described.

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

OTTO VOGEL.

Witnesses:
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