No. 658,210. Patented Sept. 18, 1900.

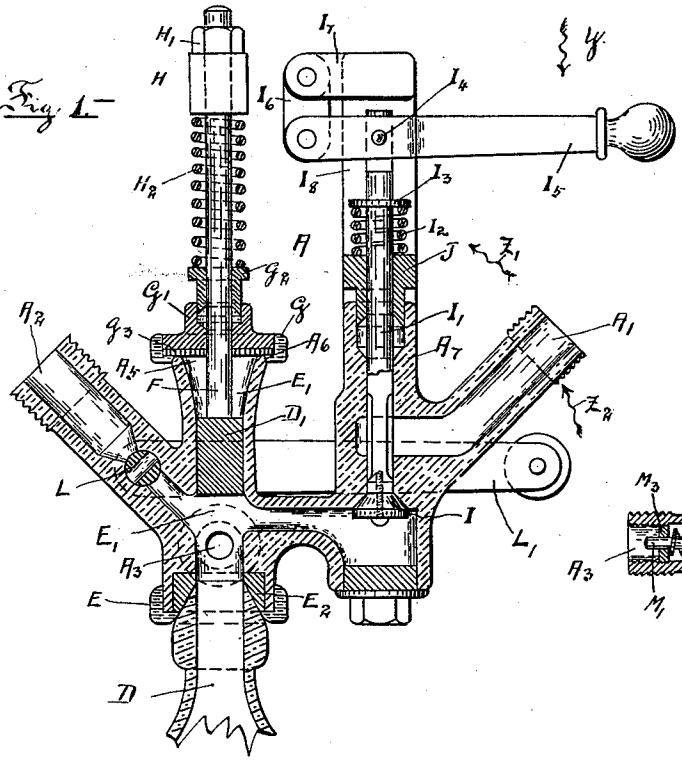
E. E. FORD.

FILLING HEAD FOR BOTTLING APPARATUS.

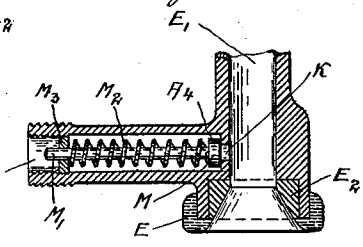
(Application filed Mar. 19, 1900.)

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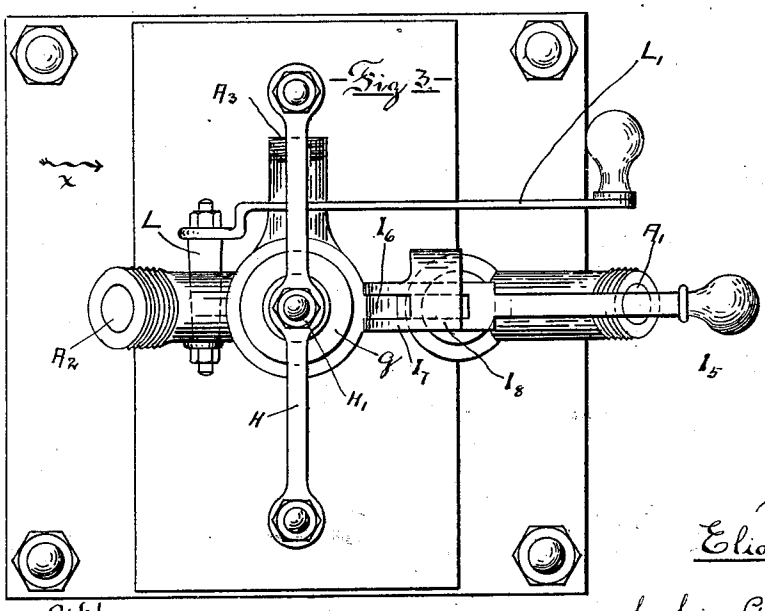
—Fig. 1.—



—Fig. 2.—



—Fig. 3.—



Witnesses
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— by his Attorney —
August M. Frischmuth

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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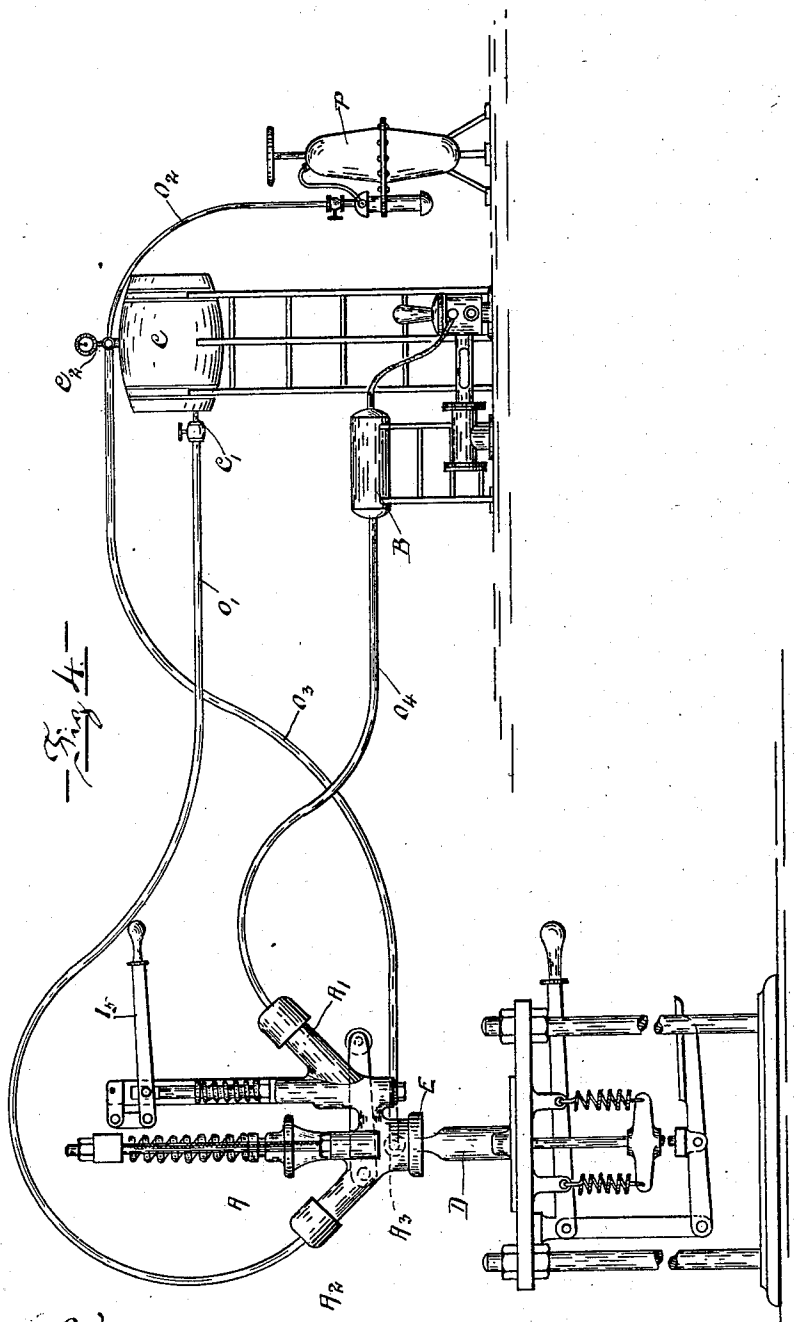
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(Application filed Mar. 19, 1900.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 4.



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UNITED STATES PATENT OFFICE.

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FILLING-HEAD FOR BOTTLING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 658,210, dated September 18, 1900.

Application filed March 19, 1900. Serial No. 9,200. (No model.)

To all whom it may concern:

Be it known that I, ELIOT E. FORD, a citizen of the United States, residing in Rahway, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Filling-Heads for Bottling Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked therein, which form a part of this specification.

My invention relates to the means used in filling bottles or other liquid receptacles, the liquid of which bottles or receptacles contains more or less carbonic acid or, more generally speaking, gases of an effervescing nature.

My invention will not attempt to cover broadly any of the principles involved in any bottling or liquid-receiving system, inasmuch as such principles have already been covered by previous patent rights, but simply to claim a particular construction of filling-head furnished with some improvements whereby I have practically demonstrated that it is possible to fill a bottle or receptacle with effervescent liquid under pressure without generating the same into foam by means of an automatic valve which for present purposes forms an integral part of the filling-head.

A further object of my invention is to embody in my improved filling-head certain means whereby the cork or stopper of the bottle is prevented from being sucked down into the neck of the passage by the action of the vacuum-pump.

As previously stated, among the principles governing the art of bottle-filling there are three that have already been protected and which are necessary in any process of this nature—namely, first, to empty the bottle of air, this being best accomplished by means of a vacuum-pump sucking the air out; secondly, to fill the bottle with the desired liquid by the aid of a charging apparatus which exercises a certain pressure upon the liquid, and, thirdly, to provide an escape for the gases which cause the bottle to be filled with more foam generated from the force of the inpouring of the liquid than with the liquid itself. In other words, there ought to be provided a self-acting source of communication with the liquid-supply reservoir so constructed that during the filling of the bottle an equal pressure can be maintained continuously in a combined air or gas and liquid circuit commencing in the liquid-reservoir and going back to it through the bottle as an intermediate passage. This important point of furnishing a "self-acting" means for the regulation of this pressure, with a consequent avoidance of the generation of foam, I have provided for in my invention by aiding these gases to escape by their own exertion when their pressure during the filling of the bottle becomes so active as to fill the bottle with foam instead of liquid. This is an advantage over former inventions, where all such valves were manipulated by the operator, resulting in the apparent great disadvantage that in the first place it was impossible for any operator to know at just what precise moment the valve ought to be opened, and in the second place how great the pressure was at such moment or for that matter at any time during the filling process. This difficulty I have overcome in my improved filling-head by furnishing a valve which will remain closed so long as the pressure is equal on both sides of it; but the moment the inpouring of the liquid should cause a sudden generation of gas the valve will open and lead such gas surplusage back to the liquid-reservoir. It is in the placing of this automatic escape or equalizing valve in the position it occupies in my improved filling-head, in combination with the air-exhaust outlet and the liquid-filling inlet, that this part of my invention resides, resulting in the bottle being filled with a foamless liquid.

In describing my improved filling-head it will from the foregoing be readily understood that the operative means for raising and lowering the filling-head, placing and removing the bottle, and minor details in connection therewith form no part of my invention and is, further, not necessary for the understanding of the functions of my improved filling-head, for which reason I shall not encumber the description with such details, merely indicating in the drawings a stand which can

have my improved filling-head attached and that can be of any construction found suitable to the circumstances and that can be operated in any desirable manner.

In describing my invention I shall call attention to the accompanying drawings, wherein like letters of reference indicate corresponding parts in the different views.

Figure 1 shows a vertical side view sectioned through the central axis of the filling-head; Fig. 2, a sectional detail view of the automatic equalizing-valve as seen when looking at Fig. 3 in the direction of the arrow X; Fig. 3, a top view of parts as they are shown in Fig. 1, and Fig. 4 a diagrammatical view of an entire bottle-filling system.

In Fig. 1, A indicates the filling-head proper. Said filling-head has three vents—A′ to establish connection with the vacuum-chamber B, A^2 to establish connection with the filling-cask C at C′, and A^3 a gas-return vent so constructed as to contain an automatic valve embodied in the spring-actuated valve A^4, which will permit a return of the gases back to the filling-cask C at C^2 when an overpressure of such gases should arise during the filling of the bottle D. The filling-head A has a mouthpiece or nozzle E, which mouthpiece fits over the aperture of the bottle D. In alinement with and leading vertically and directly down to the bottle-aperture is a passage-way E′, which is funnel-shaped at the top and constructed to contain the cork D′. Resting on this cork is a plunger F, said plunger passing through a cap G, resting on top of the orifice A^5, the upper part G′ of the cap G formed as a stuffing-box, having to that effect a collar G^2 fitted snugly into the part G′. The plunger further passes up through a yoke H, and being screw-cut at the top protruding through the yoke is secured there by a nut H′. An expansion-spring H^2 is coiled around the plunger, exercising its expansive power between the yoke H and the stuffing-collar G^2. The cap G has on its under side, where it contacts with the lip or circular edge A^6 of the orifice A^5, a disk G^3 of some soft resilient matter, such as rubber, so as to make an air-tight connection. Taking for an example the position in which these parts are shown in Fig. 1, the filling-head A has by well-known adequate means been adjusted over the bottle D, the interior of the mouthpiece E being fitted similar to the interior part of the cap G and for the same purpose with a disk E^2 of soft resilient air-tight material, and the cap G has, after the cork D′ has been inserted, been adjusted over the orifice A^5. The part of the passage-way E′ lying between the cork D^1 and the cap G is consequently air-tight, so that when the vacuum-pump is applied to exhaust the air from the bottle it will not suck the cork down into the neck of the passage, the cork being held in its place by reason of said part of E′ being maintained air-tight by means of the above-described means.

Proceeding now to the description of the vacuum-vent A′, it will be seen that its communication with the passage-way E′ is controlled by a valve I, said valve secured to the end of a rod I′. The shell A^7 of this part of the filling-head A is constructed with a stuffing-box, the collar J forming the upper part of such stuffing box. Lying on top of this collar J is a coiled expansion-spring operating between the stuffing-collar J and a collar I^3, secured firmly to or forming an integral part of the rod I′. The top part of the rod I′ is by a pin I^4 pivoted to a lever-arm I^5, said lever-arm being pivoted to a link I^6, which in turn is pivoted in a lug I^7, forming part of a vertical arm I^8, lying in prolongation of the pipe A^7. A depression on the lever-arm I^5 in the direction of the arrow Y will open the valve I downward, and consequently establish connection with the vacuum-chamber B, while the removal of the operator's hand from the lever-arm I^5, aided by the action of the expansion-spring I^2, will bring the valve I back to its seat, and consequently shut off connection with the vacuum-chamber B. The connection with the filling-cask C is by means of the stop-cock L fitted into the vent A^2. This stop-cock L is operated by elevating a lever-arm L′ from the horizontal position it is in in Fig. 1 to a vertical position in the direction of the arrows Z′ and Z^2.

There remains now to be described the third vent A^3, having the automatic escape-valve fixed in it to relieve an overpressure of the gases. As this lies on the rear side of the filling-head A, as said head is observed in Fig. 1, a detached detail view looking at the filling-head in the direction of the arrow X in Fig. 3 is given. It will be seen in examining said figure that communication with the main passage-way E′ is through an opening K, such opening being closed by the valve-head M. This is effected by an expansion-spring M^2, coiled around the valve-rod M′, exercising its expansive power between a disk M^3, fitted firmly into the pipe-vent A^3 and the valve-head proper. It will thus be seen that the main point lies in the fact of this valve operating automatically, and I attribute my success in filling the bottle with liquid not generated into foam to the fact that as it is impossible for any manipulator of a filling-head to know precisely when and what amount of gas will be generated in the bottle a manipulated valve is useless. If, on the contrary, a valve is constructed self-acting, then the gases will escape at accurately the exact fraction of a second and in just the necessary volume to relieve the inflowing liquid of its overpressure.

Reviewing now the entire operative method of a bottle-filling apparatus as illustrated in Fig. 4, where a bottle-filling stand having my improved filling-head attached has been illustrated in the left-hand side of the illustration, it will be seen that if a cask C containing some effervescent kind of liquid is attached by a pipe O′ to the filling-vent A^2 and a charging

pressure apparatus P is connected by a pipe O^2 with the top of the cask and a pipe O^3 connects the pressure-escape-valve vent A^3 with the top of the cask C, and finally a pipe O^4 connects the vacuum-cylinder B with the vacuum-vent A′, then if the position in which the elements are delineated in Fig. 1 be assumed to correspond with the position of the filling-head and bottle as seen in Fig. 4 the cork will have been inserted, and the space between the cork and the cap G being air-tight the vacuum-pump B can with safety be applied by pressing down the handle I^5, and after the closing of the vacuum-valve the lever-arm L′ is manipulated, permitting the influx of the liquid, aided by the charging apparatus P. If now, as happens in seven out of ten fillings, the gases which permeate the liquid rush down into the bottle and are permitted to remain there, the liquid will be converted into more foam than solid liquid and a manipulated escape-valve may or may not relieve the pressure at the right time and for the right length of time, whereas if an automatic valve, as the one furnished by me, is placed at some point in the filling-head, wherever it may be found most practical to have it, such over-pressure will immediately relieve itself and permit a continuous flow of solid liquid.

In conclusion, I do not wish to be understood as claiming, broadly, an escape or relief valve for bottling apparatus as manipulated by hand in various of the bottling apparatus of the present day; but what I will claim, and believe I can claim with my present knowledge of the state of the art, is a self-acting or automatic relief and escape valve in combination with any ordinary filling-head, and, secondly, the means for preventing the sucking down of a cork during the process of emptying the bottle of its air preparatory to filling it.

What I as a consequence in harmony with the above description and statement claim, and desire to secure protection for by Letters Patent, is—

1. In a filling-head for a bottling or liquid-filling apparatus having a cushioned nozzle for the aperture of the bottle or apparatus, a valve-controlled vacuum-vent, a valve-controlled liquid-filling vent; the combination of an automatic escape and relief valve with said filling-head, substantially as and for the purposes described.

2. The combination with the filling-head of a bottling or liquid-filling apparatus, of the passage receiving the cork with an adjustable air-tight-fitting cap provided substantially as and for the purposes described.

3. In a filling-head for a bottling apparatus having a valve-controlled vacuum-vent, a valve-controlled liquid-filling vent and an automatic escape and relief valve adjacent to the nozzle of the filling-head; the combination of the mouth of the passage containing the cork with an adjustable cushioned cap coöperating with said mouth of the passage substantially as and for the purposes described.

4. In a filling-head for bottling apparatus having a cushioned nozzle for the aperture of the bottle, a valve-controlled vacuum-vent, a valve-controlled liquid-filling vent and a passage-way for the insertion of a cork furnished with an adjustable air-tight-fitting cap; the combination of an automatic escape and relief valve with the said filling-head substantially as and for the purposes described.

In testimony that I claim the foregoing I have hereunto set my hand this 29th day of January, A. D. 1900.

ELIOT E. FORD.

Witnesses:
JOHN DABNEY,
AUGUST M. TRESCHOW.