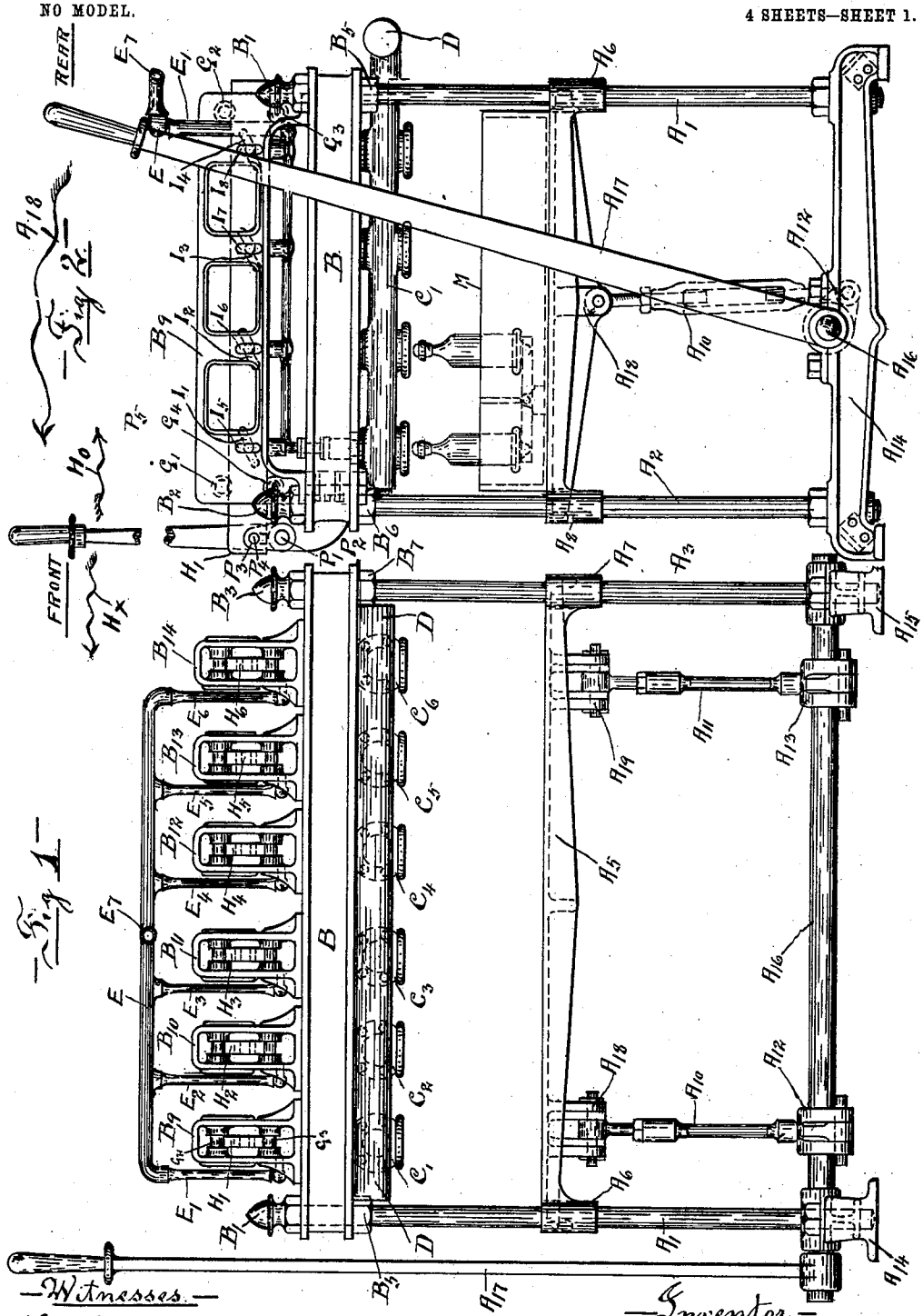
No. 732,678. PATENTED JUNE 30, 1903.

E. E. FORD.

BOTTLING APPARATUS.

APPLICATION FILED AUG. 28, 1900.

NO MODEL. 4 SHEETS—SHEET 1.



Witnesses.
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Henry Johnson

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NO MODEL. 4 SHEETS—SHEET 2.

Fig 5.

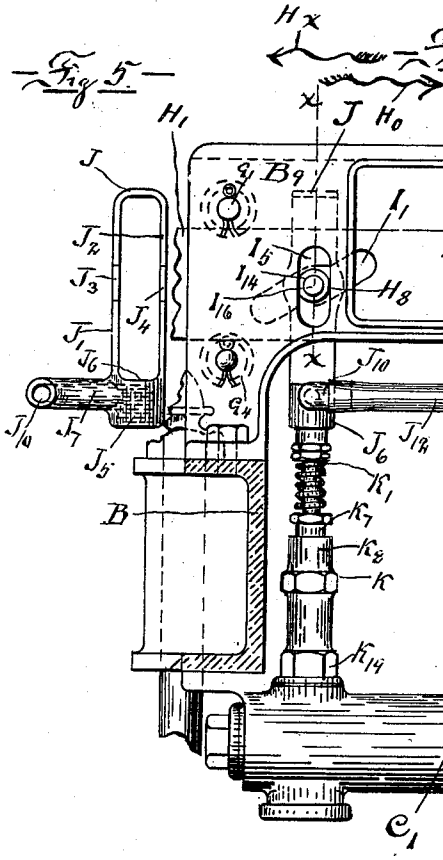


Fig 3.

Fig 4.

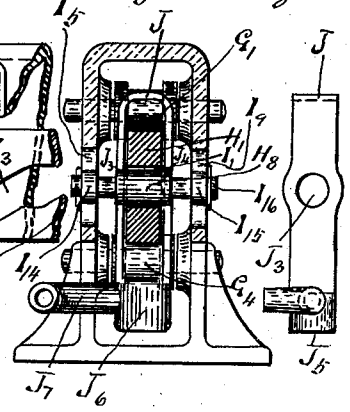


Fig 6.

Fig 7.

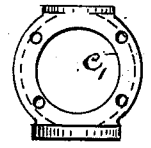
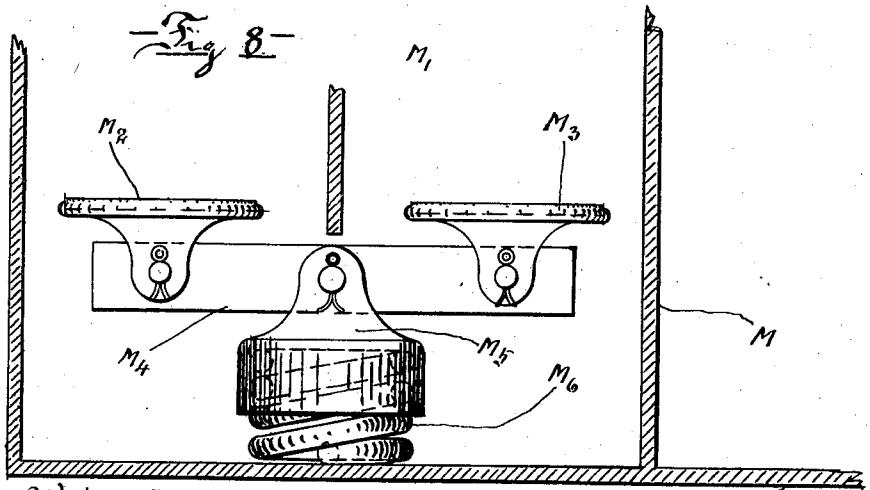


Fig 8.



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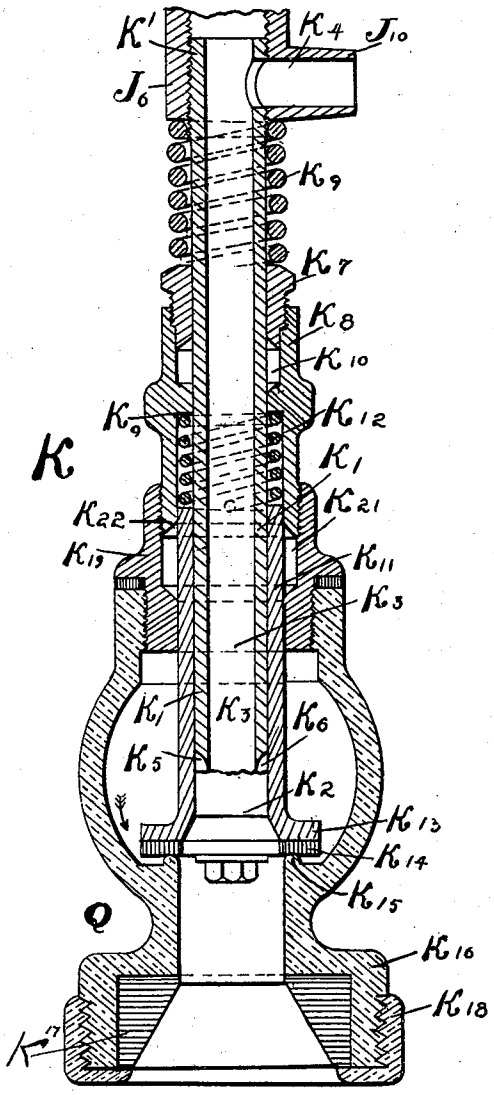
NO MODEL. 4 SHEETS--SHEET 3.

Fig 9.



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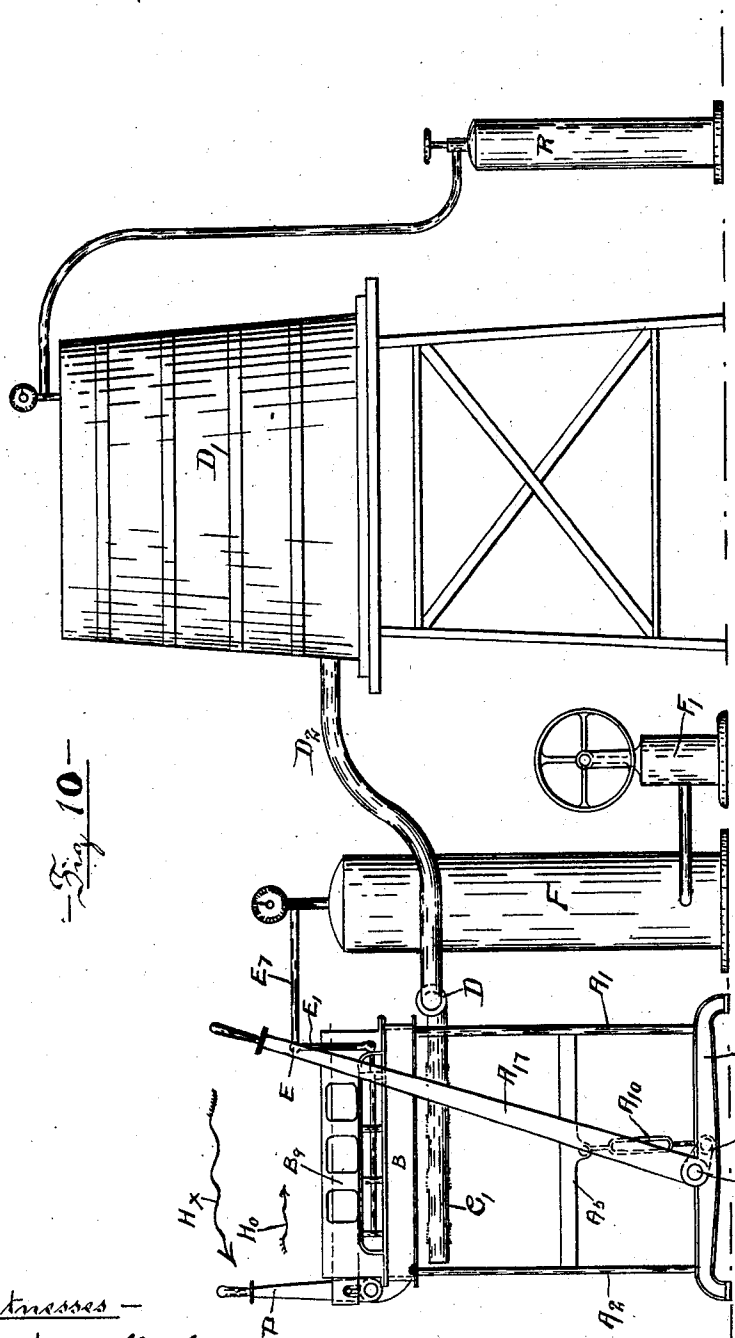
APPLICATION FILED AUG. 28, 1900.

NO MODEL. 4 SHEETS—SHEET 4.

Fig. 10.



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by his Attorney —

Alex. M. Andrews

No. 732,678. Patented June 30, 1903.

UNITED STATES PATENT OFFICE.

ELIOT E. FORD, OF RAHWAY, NEW JERSEY.

BOTTLING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 732,678, dated June 30, 1903.

Application filed August 28, 1900. Serial No. 28,278. (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 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 thereon, which form a part of this specification.

My invention relates to the art of bottling effervescent or non-effervescent liquids, as the case may be, and is classified under what is known as "bottling apparatus."

My invention has for its object a simplified and novel method of charging a suitable number of bottles—for instance, as illustrated in the drawings, twenty-four—with any kind of effervescent or non-effervescent liquids.

To obtain a clear understanding of where my improvements reside in this apparatus, I can enumerate them in the following order: first, in the improved valve, which discharges the air from the bottle and fills it in two movements; secondly, in the means by which the said valves are operated, consisting of a series of frames having my improved valve-operating sliding bar secured in each of the said frames; thirdly, in the special construction of liquid-filling pipes having the valve-seats located therein; fourthly, in the improved bottle-receptacle for adjusting the bottles in relation to their respective nozzles, and, lastly, in the general construction of the machine, which naturally will be novel in several of its details, caused by the coöperation of these my above-mentioned means with each other.

In describing my improved bottling apparatus I shall call attention to the accompanying drawings, wherein a preferable embodiment of the invention is illustrated.

Like letters of reference indicate corresponding parts in the different views.

Figure 1 shows an elevation of the apparatus; Fig. 2, an end view of the apparatus as shown in Fig. 1. Fig. 3 is a view observed from the same point of view as Fig. 2, drawn to a larger scale, of broken parts of the frame, showing the sliding bar in its relation to the valves. Fig. 4 is a sectional view of the sliding-bar frame through a line X X in Fig. 3. Fig. 5 is an end view of what I term the "valve-yoke," which forms the operative means between the sliding bar and the valve. Fig. 6 is a side view of said yoke turned at an angle of ninety degrees from the position it is in in Fig. 5. Fig. 7 is an end view of the filling-pipe as it is seen in Fig. 3. Fig. 8 is an elevation of my improved device for holding the bottles. Fig. 9 is a full-sized sectional detail view of my improved valve, and Fig. 10 is a diagram of my improved apparatus shown in working order with the filling-tank and the vacuum-pipe.

In the figures, A', A^2, and A^3 indicate the visible standards, supporting the bottle or vessel filling apparatus.

A^5 is a platform on which the receptacle containing the bottles will be placed, the said platform A^5 being slidably attached to the standards by bushes A^6, A^7, and A^8, the invisible bush being secured around the invisible standard.

A^{10} and A^{11} indicate connecting-rods, said rods pivoted to the platform A^5 and to the cranks A^{12} and A^{13}. The standards are secured in respectively the pedestals A^{14} and A^{15}, and further supported in said pedestals is the crank-shaft A^{16}, which shaft has keyed to it the cranks A^{12} and A^{13}. Keyed on this shaft A^{16} is a handle-bar A^{17}, which handle-bar when moved in the direction of the arrow A^{18} will by the action of the cranks A^{12} and A^{13}, having the connecting-rods A^{10} and A^{11} pivoted to them, move the platform A^5 upward or downward by reason of said connecting-rods A^{10} and A^{11} being pivoted in the lugs A^{18} and A^{19}, forming parts of the said platform A^5. The upper part of this apparatus has a double T-shaped frame B, secured to the top of each standard by nuts B', B^2, and B^3 and counter-nuts B^5, B^6, and B^7, the fourth invisible nut and counter-nut being attached to the corresponding invisible standard. Bolted on the upper frame B are six sliding-bar frames B^9, B^{10}, B^{11}, B^{12}, B^{13}, and B^{14}, called by this appellation "sliding-bar frames" in this application for the reason that they each contain one of the sliding bars, which sliding

bar will be seen to be an essential element in the operation of opening and closing the valves, as will be understood more clearly as the description proceeds. Inasmuch as all these sliding-bar frames are constructed exactly alike—that is to say, contain the same number of elements and are operated in precisely the same manner—the description of one of these will be sufficient. Before proceeding to this detail description of the sliding-bar frames I will continue the description of the apparatus as a whole, as that will render more lucid at a later point the description and operation of the sliding-bar frames and their accessories. It may be as well to point out here that in the inventive conception and construction of these frames and their accessories—the valves—the nucleus of my inventive idea may be said to reside. Bolted to the under side of the frame B is a series of pipes C′, C², C³, C⁴, C⁵, and C⁶, one pipe corresponding to each sliding-bar frame. Bolted to the end of each of these pipes at what might be called the "rear" end of the machine, meaning thereby the end opposite to the one on which the manipulator of the handle-bars stands, as indicated in Fig. 2, is a pipe D, which pipe D connects with the filling-tank D, as seen in Fig. 10. Further, a series of pipes or tubes E′, E², E³, E⁴, E⁵, and E⁶, made of some resilient flexible material, are attached to a certain mouthpiece located in each of the frames B⁹ to B¹⁴, as will be better understood in the detailed description of the individual frame later on in the description of this invention, which tubes connect with a main pipe E, which pipe E leads to the vacuum apparatus F by means of a pipe E⁷. (See Fig. 10.)

Proceeding now to the detail description of one of the sliding-bar frames, Fig. 3 gives an enlarged view of a part of one of such frames—for instance, of the frame B⁹. Said frame B⁹ is attached to the frame B, as shown at one end of the frame B⁹ in Fig. 3, by means of bolts. The shell of this frame as observed in the end view in Fig. 4 is U-formed, but as attached to the frame turned upside down. Sliding between two sets of rollers, (indicated by reference-letters G′, G², G³, and G⁴,) as seen in Fig. 2, one set of which rollers G′ and G⁴ is shown in Figs. 3 and 4, is the sliding bar H′, of which sliding bars there are six, (6,) one for each frame. Said sliding bar H′ as observed in the sectional view, Fig. 4, is rectangular in section and is furnished with four (4) slots I′, I², I³, and I⁴. These slots have an upward and a downward slanting direction, as plainly seen in Fig. 3. The frame B⁹ has furnished in its sides eight slots, four on each side, of which I⁵ and I⁶ can be seen in Fig. 3, I⁵ and I⁹ in Fig. 4. In these slots I⁵ and I⁹ as relating to the frame B⁹ the rollers I¹⁴ and I¹⁵ operate, the roller H⁸ operating in the slot I′ of the sliding bar H′ simultaneously with the rollers I¹⁴ and I¹⁵, operating in the slots I⁵ and I⁹. The rollers I¹⁴ and I¹⁵ and the roller H⁸ are mounted on a pin I¹⁶, the roller H⁸ consequently passing through the slot I′ and projecting out to either side passes also through the holes J³ and J⁴ of the arms J′ and J² of a yoke J. This yoke J, as shown in detail in Figs. 5 and 6, will be seen to be furnished at the bottom with a screw-cut aperture J⁵, into which aperture, as will be explained more fully later on, the valve-rod K′ of the valve K is fitted. Projecting from the bush J⁶ having said screw-cut aperture J⁵, and consequently forming the bottom of the yoke J, is a pipe J⁷, having in every instance except in that of the end yoke J (illustrated in Figs. 5 and 6) two mouthpieces—as, for instance, in the case of the yoke J in Fig. 3—said mouthpieces indicated by reference-letters J⁸ and J⁹. The yoke J being an end yoke has only one mouthpiece J¹⁰. The said mouthpieces are connected with each other by means of rubber tubes—as, for instance, J¹² and J¹³ in Fig. 3—or tubes made of any adequate material suitable for such purpose, the reason for such tubes being of a resilient matter being this, that when said yokes are being moved up and down there might be a slight deviation in their alinement. The last yoke appertaining to the sliding-bar frame has one of its mouthpieces turned vertically upward, and to this upturned mouthpiece in the instance of each yoke (see Figs. 1 and 2) are attached vertical tubes E′, E², E³, E⁴, E⁵, and E⁶, which tubes, as has already been described, connect with the main pipe E, which finally leads to the vacuum apparatus F. Attached, as previously stated, to each of the screw-cut apertures at the bottom of the yokes is a valve-rod, and for the sake of clearness in description the enlarged view of the valve K is appended in Fig. 9, which view I shall now describe. The said valve K consists of the following parts: K′ indicates a hollow valve-rod, whose upper screw-cut part is secured in the similarly screw-cut part of the bush J⁶, forming the bottom part of a yoke. This hollow rod runs smoothly and loose through the interior of the valve and has at its lower end a valve K², which closes the internal passage K³ from communication had by means of the apertures K⁵ and K⁶ in the valve-rod K′ with the the interior of any bottle or vessel that may be attached to it. The said passage K³ has by means of an aperture K⁴ furnished in the valve-rod K′ communication through the mouthpiece J¹⁰ and through the tube attached thereto with the vacuum apparatus F. Compressed between the lower flange of the bush J⁶ and a nut K⁷, that closes the stuffing-box K⁸, is a coiled spring K⁹. The stuffing-box K⁸ has the customary space K¹⁰ for inserting adequate stuffing material, so as to make an air-tight connection. In the lower part of the stuffing-box K⁸ there is formed an inside flange K⁰, between which flange and the upper edge of a second hollow valve-rod K¹¹, embracing the first valve-rod K′, there is com-

pressed a second coiled spring K^{12}. This second valve-rod K^{11} has at its lower end a valve K^{13}, the flange forming said valve having a disk K^{14}, of resilient material, attached, which disk K^{14} rests on the valve-seat K^{15}. This valve K^{13} establishes connection between the pipe C′ and the interior of the bottle or vessel attached. Forming a part of or otherwise attached to the bottom circumference of the pipe C′ is a nozzle K^{16}, having the customary air tightening-disk K^{17}, inclosed by means of the screw-cut cap K^{18}, said cap secured to the screw-cut bottom of the nozzle. On the top circumference of the pipe C′, diametrically opposite to the said nozzle, is an aperture screw-cut at the top, into which screw-cut aperture a cap K^{19} is fitted, a disk K^{20}, made of rubber or other resilient material, being inserted between the said cap K^{19} and the upper edge of the screw-cut aperture. In this cap K^{19} there is located a stuffing-box consisting of the space K^{21}, filled with the proper material compressed between the flange in the cap K^{19} and the lower edge K^{22} of the box K^8, which thus maintains the second valve-rod K^{11} air-tight.

I will now give a résumé of the elements previously described and their mode of operation. This résumé will only embrace the sliding bar and the operation of one of its slots, taken in connection with one valve, inasmuch as that will be descriptive of the entire apparatus. To understand this action, only Figs. 2, 3, 4, and 9 are needed. Observing Fig. 3, it will be seen that if a push were exercised on the sliding bar H′ in the direction of the arrow H^0 such movement would on account of the downward slant of the slot I′ result in a forcing down of the yoke J by reason of the roller H^8 (see Fig. 4) being located with both of its ends in the holes J^3 and J^4 of the yoke J, resulting in a downward movement of the valve-rod K′, thus opening the valve K^2 and through the holes K^5 and K^6 opening communication between the passage K^3 and the interior of the bottle or vessel, terminating in the exercise of the functions of the vacuum apparatus. The bottle or vessel thus being emptied of air and ready for the filling process, the sliding bar H′ is moved in the opposite direction—that is, in the direction of the arrow $H^\times$—whereby the roller H^8, exercising the same function as before, forces the yoke J upward and in so doing elevates the second valve-rod K^{11}, thereby elevating the valve K^{13}, and lifting this valve K^{13} from its seat K^{15} admits the fluid contained in the pipe C′ into the bottle or vessel already emptied of its air. The functions of the two springs K^9 and K^{12} will readily be understood under these circumstances. K^9 primarily when the action of the sliding bar is to open the valve K^2 will aid said valve K^2 in closing itself in addition to the relax on the power that has forced it down, and additionally said spring will keep said valve K^2 closed when the sliding bar H′ acts according to arrow $H^\times$—that is, in the opposite direction. The spring K^{12} has, on the other hand, only one function to perform and that is of aiding in the closing of the valve K^{13}.

Referring at this place in the description to the bottles, it can be understood that various different means can be devised to contain the bottles while on the platform during the process of filling. As an example of such means the device illustrated in Fig. 8 is furnished. The main point to overcome in such a device is to have a resilient stand for the bottles to rest upon possessing the faculty of equalizing the bottles having different lengths in their relation to their respective nozzles. This necessity will be apparent when it is taken in consideration that no two bottles will be of the same precise length, which difference if not equalized would give rise to a great deal of waste, more especially in the case of effervescent liquids. Said device in Fig. 8 consists of a box M, where M′ indicates one chamber showing two bottles placed therein on my improved equalizing-rest. This rest or pedestal has two plates M^2 and M^3, both pivoted to a lever M^4, which lever is pivoted in its center of gravity to a hollow cap M^5. This cap M^5 has lying inside of it a coiled spring M^6, which coiled spring rests on the bottom of the box and can of course, if required, be attached to the bottom by very simple means. If now two bottles be placed on this rest, one on each of the plates M^2 and M^3, it will be evident that if there should be a difference in their lengths the lever M^4 would yield on the side having the highest bottle and correspondingly elevate the shorter bottle.

Alluding now to the diagrammatical view shown in Fig. 10, said view shows my improved bottling apparatus connected with a filling-tank D′ and with a vacuum apparatus consisting of a reservoir F and a pump F′ and a pressure-charging device R. Reviewing at large my apparatus, the lever A^{17} will be swung over in the direction of the arrow $H^\times$, so as to elevate the bottle-cages within operative reach of their respective nozzles with the effect of opening the bottle-stoppers, whereupon the lever P is manipulated in the direction of the arrow H^0, so as to bring about the first of the desired results—viz., making the sliding bars H′ to H^6 empty the bottles of air, and, secondly, by a movement of the lever P in the opposite direction, that of the arrow $H^\times$, closing the vacuum device and opening the valve K, so as to fill the bottles or vessels from the series of filling-pipes C′ to C^6.

Taking now a comprehensive review of these enumerated details as invented by me and set forth here, I will first state a few mechanical details in connection with the motion of the hand-lever P. Said lever is keyed to a shaft P′, (see Fig. 2,) which same shaft has two cranks, of which one, P^3, is seen in Fig. 2, the other one lying directly behind it in this view,

and it can then be easily understood that if a rod P^4 is passed through the upper arms of said cranks and at the same time through slots cut in the sliding bars in alinement with the holes in the said upper arms of the cranks all the sliding bars H′ to H^6 will be in operative unison with the motions of the lever P. Consequently a manipulation of the lever P in the alternate directions (indicated by the arrows H^X and H^0) will have the effect of alternately opening and closing the valves K^2 and K^{13}.

The entire operative method of the bottling apparatus is as follows: After the bottles (twenty-four in number) have been placed in some kind of receptacle by any adequate means and been so adjusted as to insure the mouth of each bottle coming directly under its corresponding nozzle the lever A^{17} is manipulated, which will have the effect of raising the platform A^5 until the nozzles contact with the bottle-heads. The operator thereupon grasps the handle of the lever P and by pushing said handle slightly in the direction of the arrow H^0 (see Fig. 2) moves the six sliding bars H′ to H^6 in the same direction, whereby each downward slanting part of the slots forces the pins having the rollers mounted on them downward, and as the said movement is guided by the pins being movably inclosed in the vertical slots furnished in the sliding-bar frames the movement will be vertically downward, thereby pushing all the inner valve-rods downward and opening up communication between the inside of the bottles or vessels and the vacuum apparatus. If now the lever P be reversed—that is to say, pulled in the direction of the arrow H^X—then the valves K^2 will be closed and the second and external valve-rod K^{11} will by means of the first valve-rod K′ be elevated, thus securely closing the valve K^2 and establishing communication between the filling-pipes C′ to C^6 and the interior of the bottle or vessel. When the bottles or vessels thus have been filled, the lever A^{17} is reversed, and the bottles or vessels on the platform A^5 having been filled are removed and a new series of twenty-four bottles or vessels take their place, and the above operative methods are repeated.

In conclusion, Fig. 10 gives a diagrammatical sketch showing my bottling apparatus as it is connected with a filling-tank D′ by a pipe D^2. A pressure-pump R is attached to the tank D′, and a vacuum apparatus, consisting of a reservoir F and a pump F′, is by the pipe E^7 connected with each individual set of valves as they are located in their respective sliding-bar frames.

It can of course be realized that in an apparatus of this nature several mechanical details can be altered and improved upon; but what I specifically claim as novel and as forming the main parts of my invention are, first, the valve, its combination with a pipe system; secondly, the sliding bars and their operative combination with the said valves; thirdly, the sliding-bar frames and their general construction and arrangement bringing them into operative harmony with the rest of the means, such as the sliding platform, which of course I lay no claim to, the same being old in the state of the art.

It is to be understood that many changes in the construction and operation of the several parts of the apparatus may be made without departing from the spirit of the invention.

I also wish it to be understood that the number of bottles or vessels can be either increased or decreased, according to local demands and circumstances, and that, furthermore, the size or individual construction of the vessels or bottles is immaterial, for this reason, that these machines can be built and are being built to suit any number or sizes of bottles or vessels. As an illustration I might say that one sliding bar, for instance, inclosed in its corresponding frame with all the necessary accessories, having either one or more valves operated therefrom, can be built, the number of sliding bars and the number of bottles filled merely depending on local circumstances.

The inventive principle embodied in the construction of this machine will further operate with equal facility and be equally useful whatever the nature of the liquid may be—that is to say, whether it be effervescent or non-effervescent.

What I claim, and desire to secure protection for by Letters Patent, is—

1. The combination with a bottling apparatus of a series of valves, each valve having two valve-rods, and a slotted sliding member for successively operating all of said valves, substantially as and for the purposes described.

2. The combination with a bottling apparatus, of a series of valves each provided with independent stems and one stem working within the other, a series of sliding bars in engagement with the valve-stems for successively operating the valves, and means for bringing a series of bottles or vessels in cooperative relation with said valves, substantially as described.

3. The combination with a bottling apparatus, of a main frame, a series of frames secured to the main frame, sliding bars supported in the frames, antifriction-bearings for the sliding bars, and bottle-engaging means operated by the sliding bars; substantially as described.

4. A bottling apparatus provided with a frame, a sliding bar, having one or more slots substantially as described, moving in said frame, a stud having antifriction means furnished in each of said slots and means guiding said stud located in the said frame.

5. The combination in a bottling apparatus of a series of frames attached to said apparatus, a sliding bar moving in each of said frames, antifriction means supporting and guiding said sliding bar in the frames, means

connecting each sliding bar with a series of valves and operating the same substantially as described.

6. The combination in a bottling apparatus of a series of frames, a sliding bar operated between antifriction means attached to each of said frames and moving therein, a series of yokes connecting a series of valves operatively with the said sliding bars substantially as described.

7. The combination in a bottling apparatus of a series of frames, a sliding bar operating in each of said frames, antifriction-bearings for supporting the sliding bars, a series of yokes attached intermediate the said sliding bars and a series of valves corresponding in number to the yokes, each yoke having a passage-way substantially as and for the purposes described.

8. A bottling apparatus provided with a frame, a sliding bar having one or more slots as described, operated in said frame, a yoke furnished for each slot with means of attachment at its lower end, a stud corresponding to each slot having antifriction means attached, connecting operatively the said sliding bar by passing through a slot, with the yoke corresponding to said slot substantially as described.

9. A bottling apparatus provided with a valve having one internal hollow valve-rod with passage-ways, a coiled spring lying around its upper part, one external hollow valve-rod embracing the said internal valve-rod, a second coiled spring lying around said external valve-rod, a seat formed at the bottom of the external valve-rod coöperating with the valve of the internal rod substantially as described.

10. In the combination of a reservoir having one or more seats, with one or more corresponding valves coöperating with said seats, each valve having an internal hollow valve-rod furnished with passage-ways, a coiled spring lying around said valve-rod, an external valve-rod embracing said internal valve-rod, a second coiled spring acting on the external valve-rod, a seat formed at the lower end of the external valve-rod coöperating with the valve of the internal valve-rod and a valve-flange furnished on the said external valve-rod coöperating with the said seats of the reservoir substantially as described.

11. The combination in a bottling apparatus of a series of pipes secured to the frame of said bottling apparatus, valve-seats provided in said pipes, a series of valves corresponding to and coöperating with said valve-seats, a liquid-filling pipe attached to, and by vents furnished therein communicating with each pipe having the valve-seats substantially as described.

12. The combination in a bottling apparatus of one or more frames, a sliding bar moving operatively in each frame, one or more up-and-down obliquely-slanting slots furnished in each sliding bar, a series of valves corresponding to the slots coöperating with each sliding bar, a yoke corresponding to each slot in the sliding bar connecting operatively the sliding bar and the valve, a stud or pin guided in the sliding-bar frame, having antifriction means, connecting the sliding bar and the yoke substantially as and for the purposes described.

13. The combination in a bottling apparatus of one or more frames secured to the main frame of the bottling apparatus, a sliding bar moving operatively in each frame, a series of valves operated by the said sliding bars, one or more liquid-filling reservoirs having valve-seats corresponding to and coöperating with said valves, a series of yokes having vents or passage-ways provided therein connecting operatively the valves and the sliding bars, means for operating simultaneously all the sliding bars substantially as described.

14. The combination with a bottling apparatus, of a vacuum means and a filling means, a sliding member adapted by its movement in one direction to operate the vacuum means and by its movement in another direction to operate the filling means; substantially as described.

15. The combination with a bottling apparatus, of a sliding member, a valve operated by said member, a yoke connecting the valve with the sliding member, a reservoir having a seat therein for the valve, and means for bringing a vessel against the bottom of the reservoir; substantially as described.

16. The combination with a bottling apparatus, of a sliding member provided with an irregular slot, and a valve connected with said slot, said valve being reciprocated by its movement in the irregular slot; substantially as described.

17. The combination with a bottling apparatus, of a sliding member provided with an irregular oblique slot, and a valve connected with said slot, said valve being reciprocated by the sliding member, and means for moving the sliding member; substantially as described.

18. The combination with a bottling apparatus, of a sliding member provided with a slot, means for moving said member, a yoke straddling the sliding member, means working in the slot for reciprocating the yoke, and a valve carried by the yoke; substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand this 14th day of August, A. D. 1900.

ELIOT E. FORD.

Witnesses:
HENRY JOHNSON,
AUGUST M. TRESCHOW.