

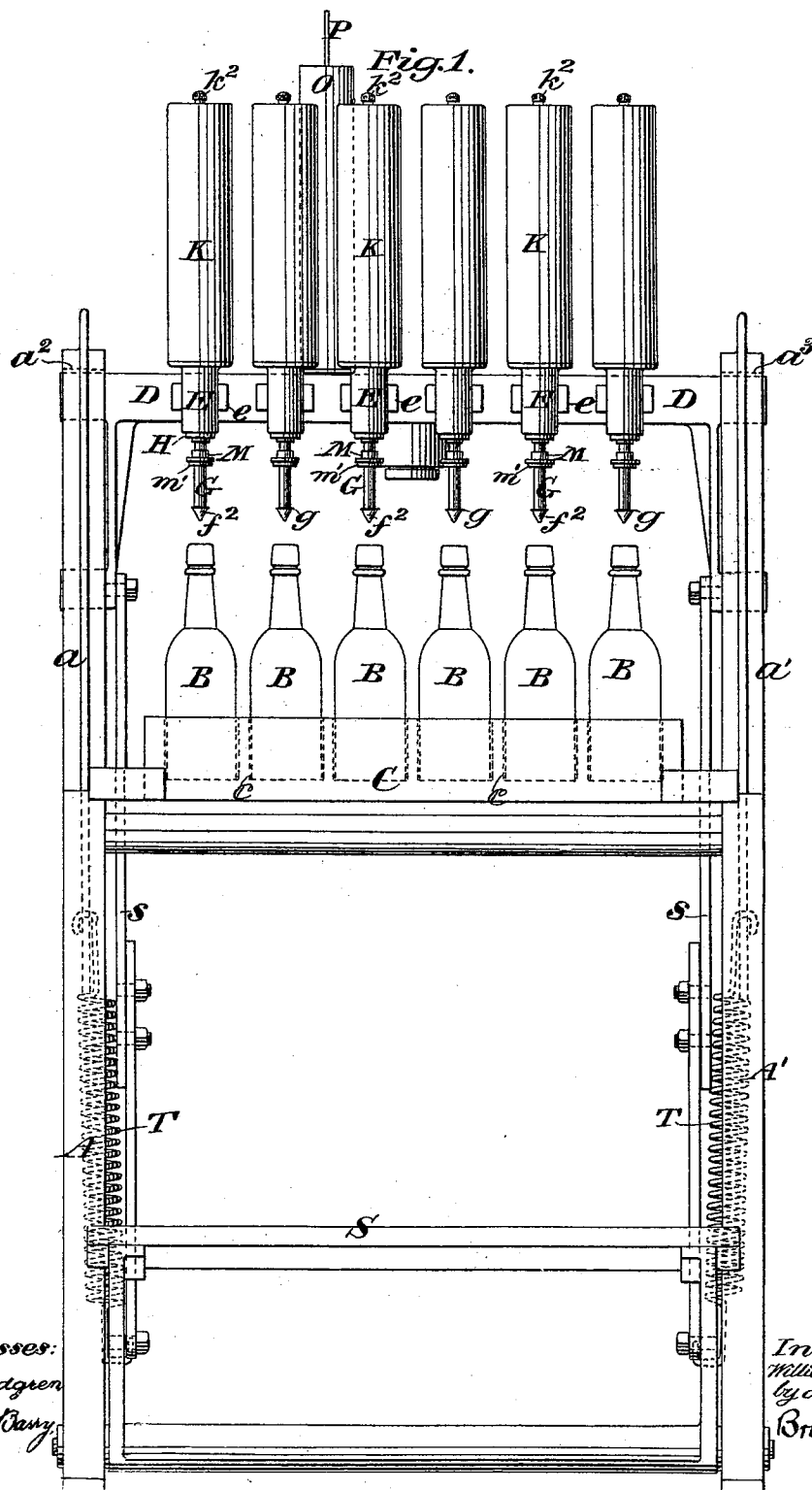
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4 Sheets—Sheet 1.

W. M. FOWLER.
BOTTLE FILLING MACHINE.

No. 554,923.

Patented Feb. 18, 1896.



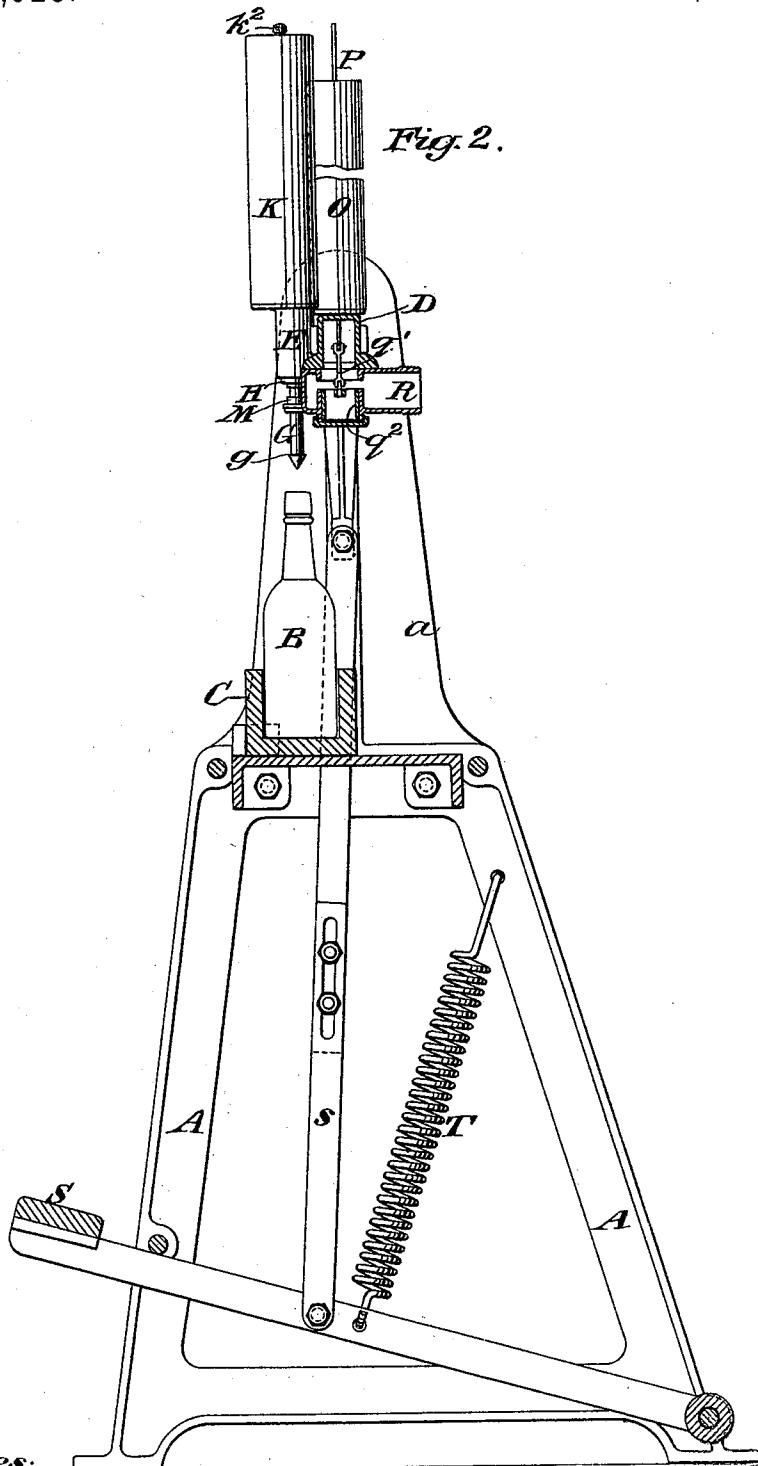
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Witnesses:

C. Sundgren
George Barry.

Inventor:
William M. Fowler
by attorneys
Brown & Ward

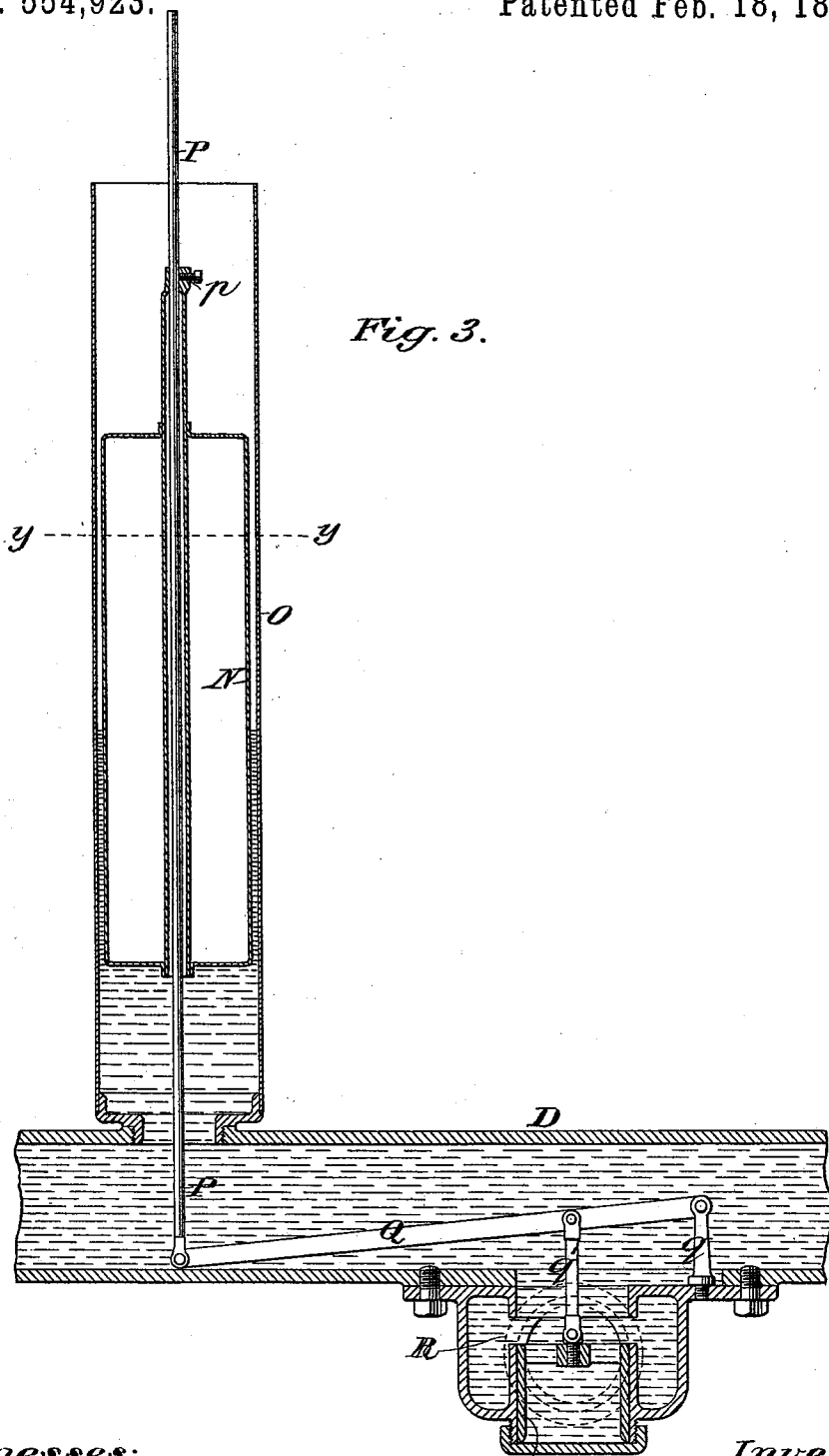
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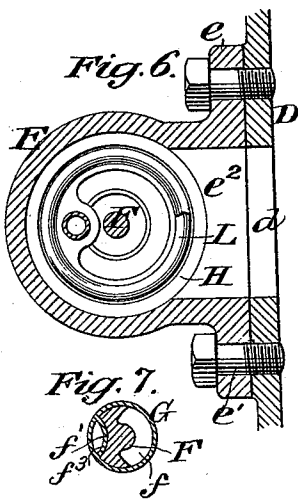
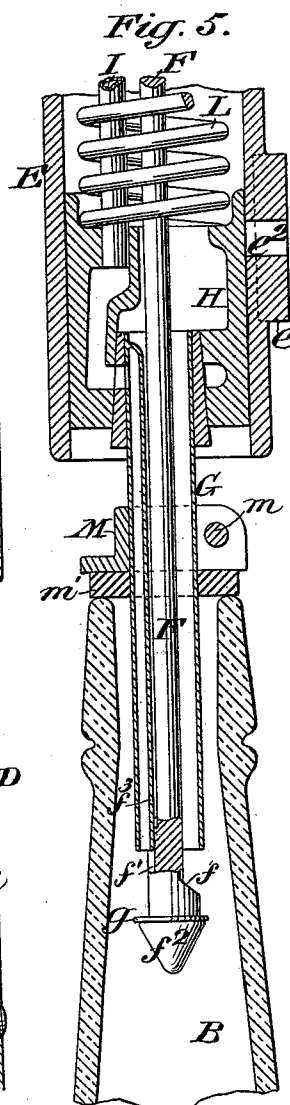
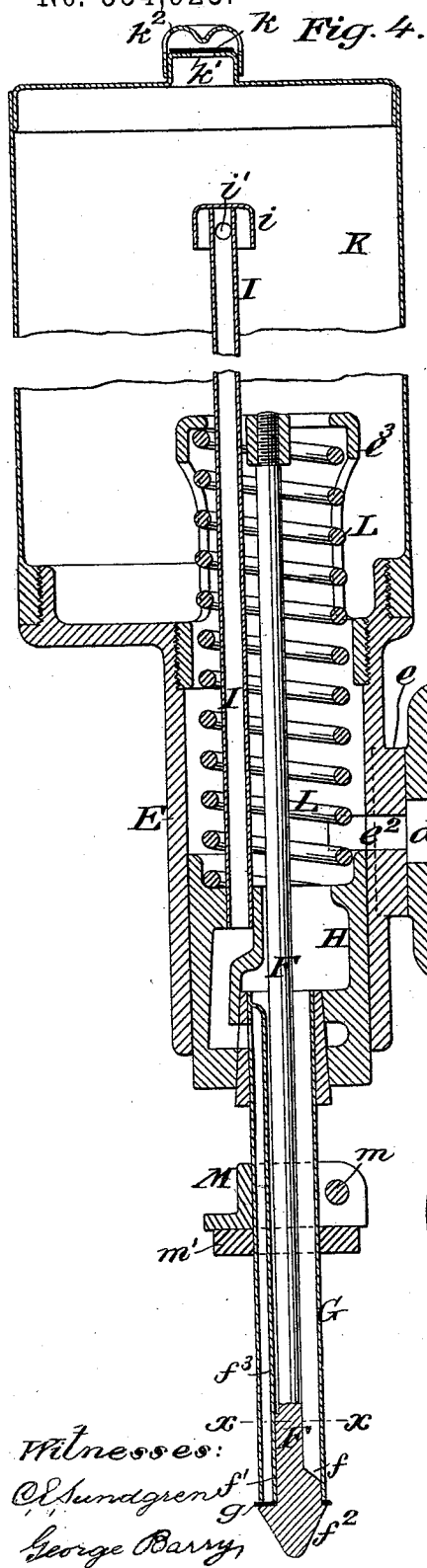
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4 Sheets—Sheet 4.

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Patented Feb. 18, 1896.



UNITED STATES PATENT OFFICE.

WILLIAM MILES FOWLER, OF STAMFORD, CONNECTICUT.

BOTTLE-FILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 554,923, dated February 18, 1896.

Application filed June 26, 1895. Serial No. 553,980. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM MILES FOWLER, of Stamford, in the county of Fairfield and State of Connecticut, have invented a new and useful Improvement in Bottle-Filling Machines, of which the following is a specification.

My invention relates to an improvement in bottle-filling machines in which provision is made for automatically cutting off the flow of liquid into the bottles when the liquid therein has reached a predetermined distance from the top of the nozzle, even though the bottles be of somewhat varying capacity, and no matter what the exterior shape of the nozzle may be, and to further provide against any drizzle from the spouts of the fillers when they are withdrawn from the bottles.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 is a front view of the machine, showing a bank of bottles in position to be filled. Fig. 2 is a vertical section from front to rear. Fig. 3 is a partial enlarged vertical section transversely of the machine and longitudinally through a portion of the transmitting-reservoir. Fig. 4 is a partial enlarged vertical section from front to rear through one of the filling cylinders and spouts, and through the transmitting-reservoir. Fig. 5 is a similar view through the transmitting-spout and neck of a bottle, showing the spout and movable parts connected therewith in the position which they assume while the liquid is being discharged into the bottle. Fig. 6 is a transverse horizontal section through the neck of the filler at the point where it is connected with the transmitting-reservoir, and Fig. 7 is a transverse horizontal section through the filling-spout on the line $x x$ of Fig. 4.

The framework of the machine consists conveniently of end castings $A A'$ surmounted by standards $a a'$, in which the movable transmitting-reservoir with the fillers attached is guided in a vertically-reciprocating movement toward and away from the bottles. The bottles (denoted by B) are supported in a bank (in the present instance six being shown in the bank) upon a rest C divided into compartments c for receiving the individual bottles and holding them in the proper position

relative to the fillers. The rest C is supported upon the end castings $A A'$.

The transmitting-reservoir (denoted by D) extends between the upright standards $a a'$, and is shown in the present instance rectangular in cross-section. To its front face are secured the several fillers by means of hollow necks E , provided with flanges e for receiving bolts or screws e' , the several necks being in communication, by ports e^2 in the necks and corresponding ports d in the transmitting-reservoir, with the interior of the reservoir. The ends of the transmitting-reservoir D are fitted to slide in ways $a^2 a^3$ in the adjacent faces of the uprights $a a'$.

The fillers consist of depending rods F , supported at the top of the neck E by a spider e^3 , in the central hub of which the depending rod F is screwed. The lower end of the rod F is enlarged and provided with longitudinal grooves or channels, a larger one, f , for the flow of the liquid into the bottle and a smaller one, f' , for the escape of the air.

The channels $f f'$ are located upon opposite sides of the rod F and the channel f terminates at its lower end at a point farther up from the lower end of the rod F than the point where the lower end of the air-escape channel f' terminates. The extreme lower end of the rod F is tapered, as shown at f^2 , to guide it into the nozzle of the bottle.

A vertically-sliding sleeve G , which, together with the channel f , forms the liquid-conduit, is fitted around the lower enlarged portion of the rod F over the channels $f f'$, and when in its lowermost or normal position, as shown in Fig. 4, completely closes the lower ends of the channels $f f'$. The sleeve G is also provided with an inner curved diaphragm f^3 , which forms the inner wall of the air-conduit and fits the channel f' in the rod F . The sleeve G is fixed to the lower end of a piston-valve H , through which valve the air-conduit communicates with an air-escape tube I , leading upwardly within the charging-cylinder K , fixed at its lower end to the top of the neck E . The charging-cylinder K also includes within it the spider e^3 . The piston-valve H is fitted to the interior bore of the neck E , and when in its lowermost position opens the port e^2 to the interior of the neck and charging-cylinder K .

The valve H is normally held in its lowermost position to leave the port e^2 open by means of a spring L inserted between the spider e^3 and the top of the valve H. The top of the air-tube I is provided with a cap i , which fits over the top of the tube and extends downwardly a short distance around the tube and is spaced from it, one or more openings i' being provided in the side of the tube within the cap i for the escape of the air. The top of the charging-cylinder K is provided with a check-valve k which covers a vent k' into the top of the charging-cylinder, and is prevented from displacement other than that of lifting from its seat by means of a cage k^2 .

The sleeve G is provided with an adjustable collar consisting in the present instance of a supply-collar M provided with a thumb-screw m for closing its parts snugly around the sleeve G to hold it in any desired elevation thereon, and the bottom of the collar M is provided with a disk or cushion m' , of gutta-percha or other suitable elastic material, for closing the mouth of the bottle air-tight to the outside air when the filler is extended down into the nozzle.

The transmitting-reservoir D is spaced to be in communication with the supply-reservoir under sufficient head or pressure to cause the liquid to flow into the transmitting-reservoir D whenever it is permitted to do so. The height to which the liquid is permitted to rise in the several charging-cylinders K by flowing therein from the transmitting-reservoir D is regulated by a float N located in an upright tube O, communicating at its bottom with the transmitting-reservoir D and made vertically adjustable upon an operating-rod P extending down through the tube O and into the transmitting-reservoir D by means of a set-screw p . The operating-rod P is loosely connected with one end of a lever Q, pivoted at the opposite end to a suitable support q within the transmitting-reservoir and intermediate of its ends. The lever Q is connected by a rod q' with a valve q^2 for shutting off and opening communication between the supply-pipe R, leading to a supply-reservoir, and the interior of the transmitting-reservoir D.

In operation suppose the charging-cylinders to have been filled up to a level indicated by the dotted lines $y y$ in Fig. 3 and the float N to have risen and cut off the further filling of the charging-cylinders by closing the valve q^2 . The bank of bottles B being in position beneath the fillers, the bank of fillers, together with the transmitting-reservoirs, is depressed by means of a treadle S, connected by suitable longitudinally-adjustable links s with the vertically-reciprocating transmitting-reservoir D and the ends of the rods F are thereby brought down into the nozzles of the bottles until the face of the adjustable collars M engage the rims of the mouths of the bottles, when the sleeves G, which the collars M are secured to, will be

arrested while the rods F are further depressed, the neck E being thereby slid downwardly against the tension of the spring L over the valve H, closing the filling-ports e^2 leading to the charging-cylinders and at the same time opening the channels $f f'$, the former leading from the charging-cylinders into the interior of the bottles and the latter leading from the interior of the bottles into the interior of the charging-cylinders above the surface of the liquid therein.

It will be observed that the moment the sleeve G has its end separated from its seat g near the end of the rod F the air will be permitted to escape from the interior of the holder into the interior of the charging-cylinder through the channel f' , but there will be a short space of time before the liquid is permitted to escape from the channel f into the bottle. This has a tendency to establish a very ready flow of the liquid from the charging-tank into the bottle and establishes the downward flow of the liquid and the upward flow of the air without any liability of the liquid which is being discharged being drawn upwardly in the air-passage, as the discharge of the liquid is against the interior of the neck of the bottle in an opposite direction from that in which the current of air passes upwardly into the channel f' . Furthermore, the lower end of the air-conduit will be elevated, together with the sleeve G, so as to form a perfect escape for the air from the interior of the bottle until the liquid reaches a height in the bottle corresponding to the position of the lower end of the sleeve G. The moment the liquid reaches such a level in the bottle it will cut off the escape of air from the bottle into the charging-cylinder K and the liquid will promptly cease to flow from said charging-cylinder into the bottle. As soon as the liquid has reached this level in the several bottles the bank of fillers may be permitted to lift under the impulse of the arresting-springs T attached to the treadle-lever S. As the fillers are withdrawn from the nozzles of the bottles the sleeves G will promptly be returned, under the impulse of the springs L, to their seats g , and will thereby cut off any tendency there may be to drizzle. Such return of the sleeves G, together with the valve H, will open again the ports e^2 and the charging-cylinders K will be refilled to the level of the dotted line $y y$, Fig. 3, the air from within the charging-cylinders in the meantime escaping through the check-valves k .

By adjusting the collars M upwardly and downwardly along the sleeves G the height to which the liquid shall be permitted to rise in the bank of bottles being filled will be varied as may be desired, but in any event the bottles will all be filled to exactly the same level no matter what the slight variation in their capacities may be, as there will always be a sufficient surplus of liquid in the charging-cylinders to supply any such variation in capacity.

What I claim is—

1. A bottle-filling machine comprising means for supporting a bank of bottles, a series of fillers located in position to simultaneously enter the nozzles of the bottles, closed charging-cylinders one for each filler, a transmitting-reservoir intermediate of the charging-cylinders and source of supply and independent of the charging-cylinders and means for automatically opening and closing the fillers as they enter and recede from the mouths of the bottles, substantially as set forth.

2. A bottle-filling machine comprising means for supporting a bank of bottles, a series of fillers located in position to simultaneously enter the nozzles of the bottles, closed charging-cylinders one for each filler, a transmitting-reservoir independent of the charging-cylinders and forming a support for them, means for moving the transmitting-reservoir and charging-cylinders and fillers carried thereby toward and away from the bottles, a float governed by the rise of liquid in the transmitting-reservoir to control the height of liquid in the several charging-cylinders and means for automatically opening and closing the fillers as they enter and recede from the mouths of the bottles, substantially as set forth.

3. The combination with the charging-cylinder and means for supplying liquid thereto,

of a filler depending from the charging-cylinder and provided with a liquid-conduit on one side and an air-conduit upon the opposite side and spaced from the liquid-conduit, the lower end of the air-conduit being normally nearer the lower end of the filler than the lower end of the liquid-conduit and means for reciprocating the parts for opening and closing the said air and liquid conduits as the filler enters and recedes from the mouth of the bottle, substantially as set forth.

4. The combination with the charging-cylinder and means for feeding liquid thereto, of a reciprocating valve for opening and closing the passage for the admission of the liquid to the charging-cylinder, a depending rod fixed to the cylinder, a liquid-conduit at one side of the rod, an air-conduit spaced therefrom, a sleeve fixed to said valve for opening and closing the said conduits, a collar carried by said sleeve to form a closure for the mouth of the bottle and a tube extending from said valve to a point above the surface of the liquid in the charging-cylinder and having a communication at its lower end with the aforesaid air-conduit, substantially as set forth.

WILLIAM MILES FOWLER.

Witnesses:

FREDK. HAYNES,
ROBERT B. SEWARD.