No. 705,229. Patented July 22, 1902.

B. M. GLASGOW.

MACHINE FOR FILLING BOTTLES.

(Application filed Sept. 16, 1897.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.

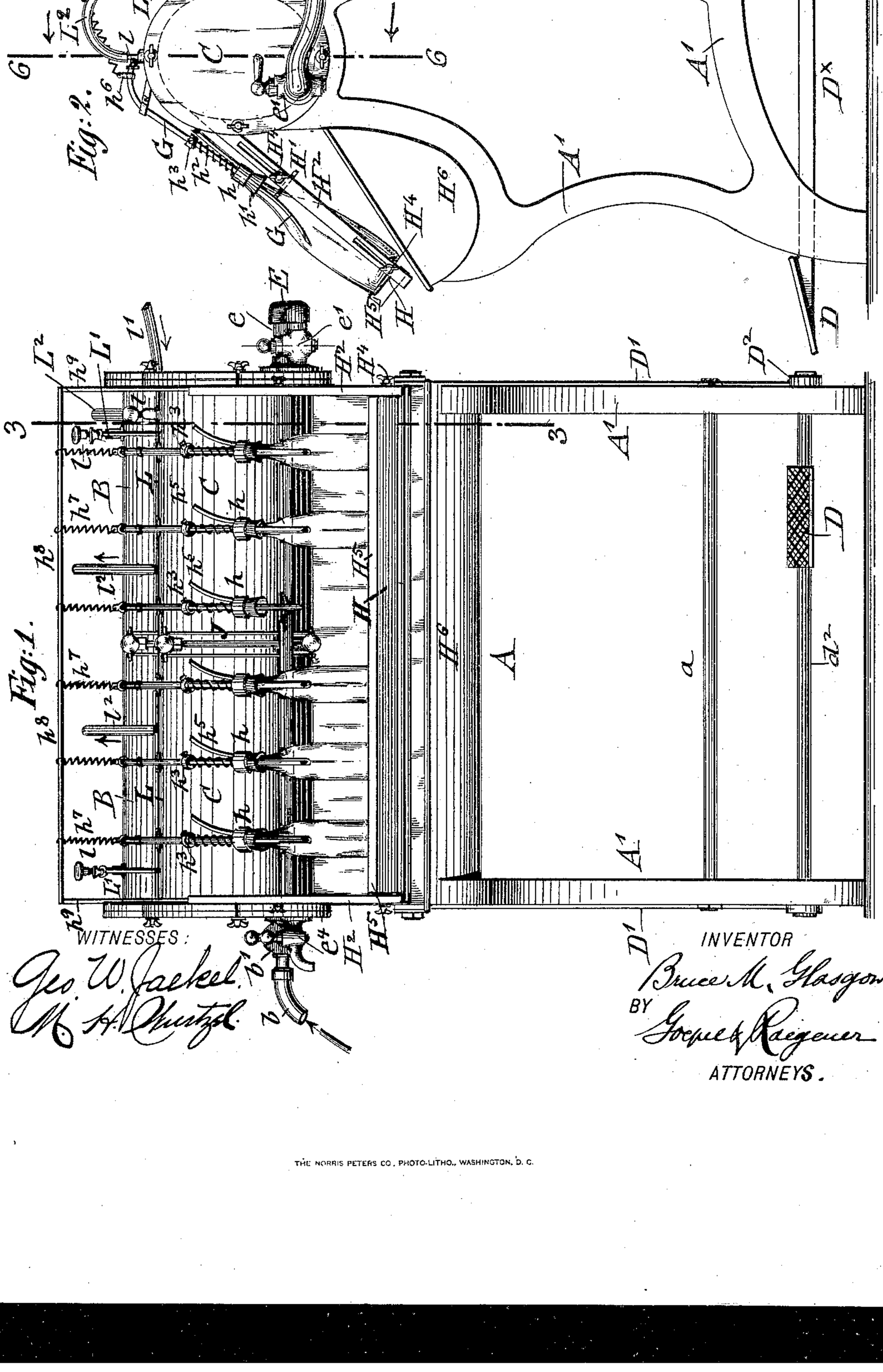

Fig. 2.

WITNESSES:

Geo. W. Jaekel.

M. H. Chuntzel.

INVENTOR

Bruce M. Glasgow

BY

Goepel & Weisenberger

ATTORNEYS.

No. 705,229 Patented July 22, 1902.

B. M. GLASGOW.

MACHINE FOR FILLING BOTTLES.

(Application filed Sept. 16, 1897.)

(No Model.) 3 Sheets—Sheet 2.

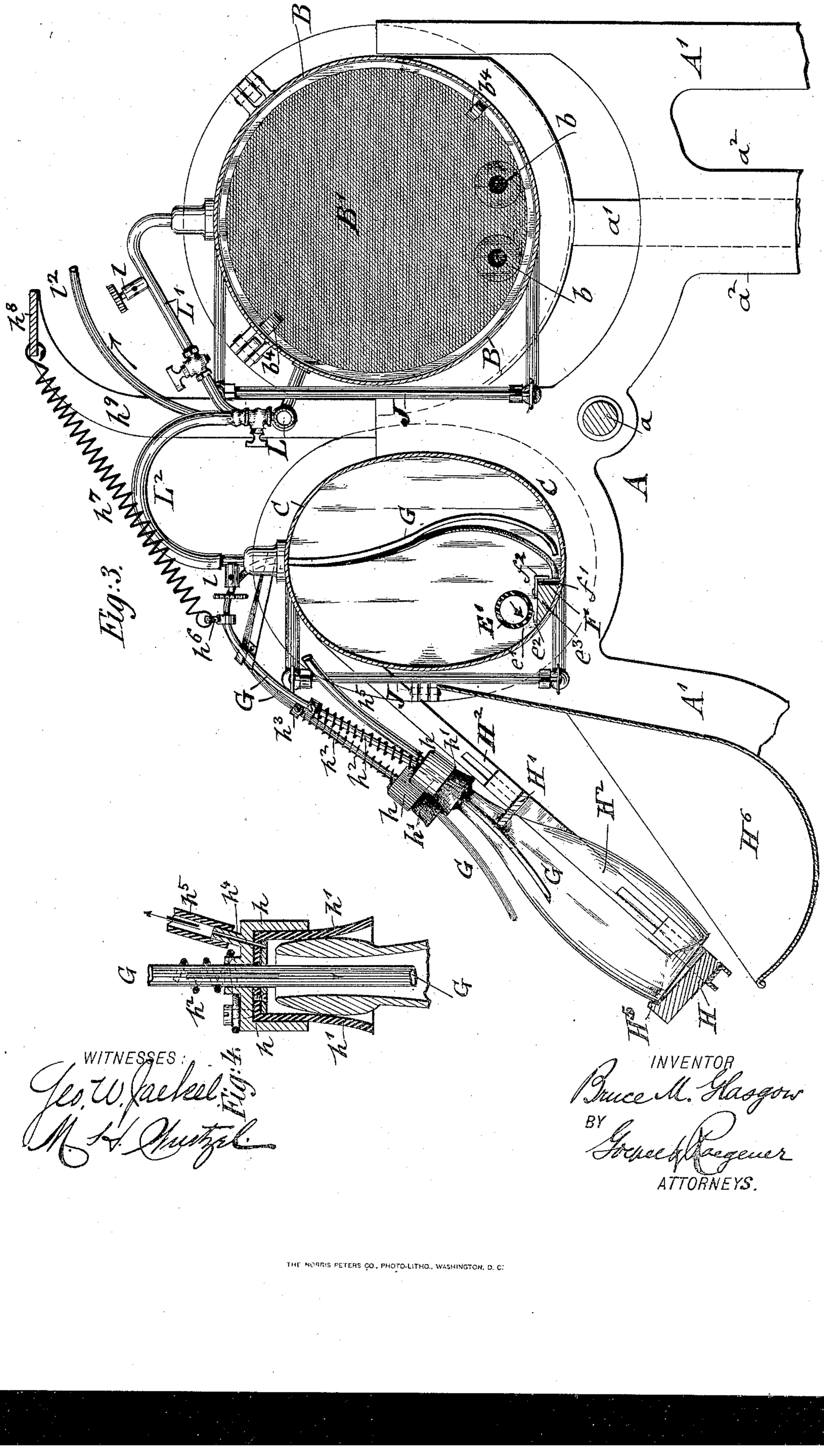

Fig. 3.

Fig. 4.

WITNESSES:
Geo. W. Jackel.
M. L. Chutzel.

INVENTOR
Bruce M. Glasgow
BY
Bruce & Baggener
ATTORNEYS.

No. 705,229. Patented July 22, 1902.

B. M. GLASGOW.

MACHINE FOR FILLING BOTTLES.

(Application filed Sept. 16, 1897.)

(No Model.) 3 Sheets—Sheet 3.

Fig: 7.

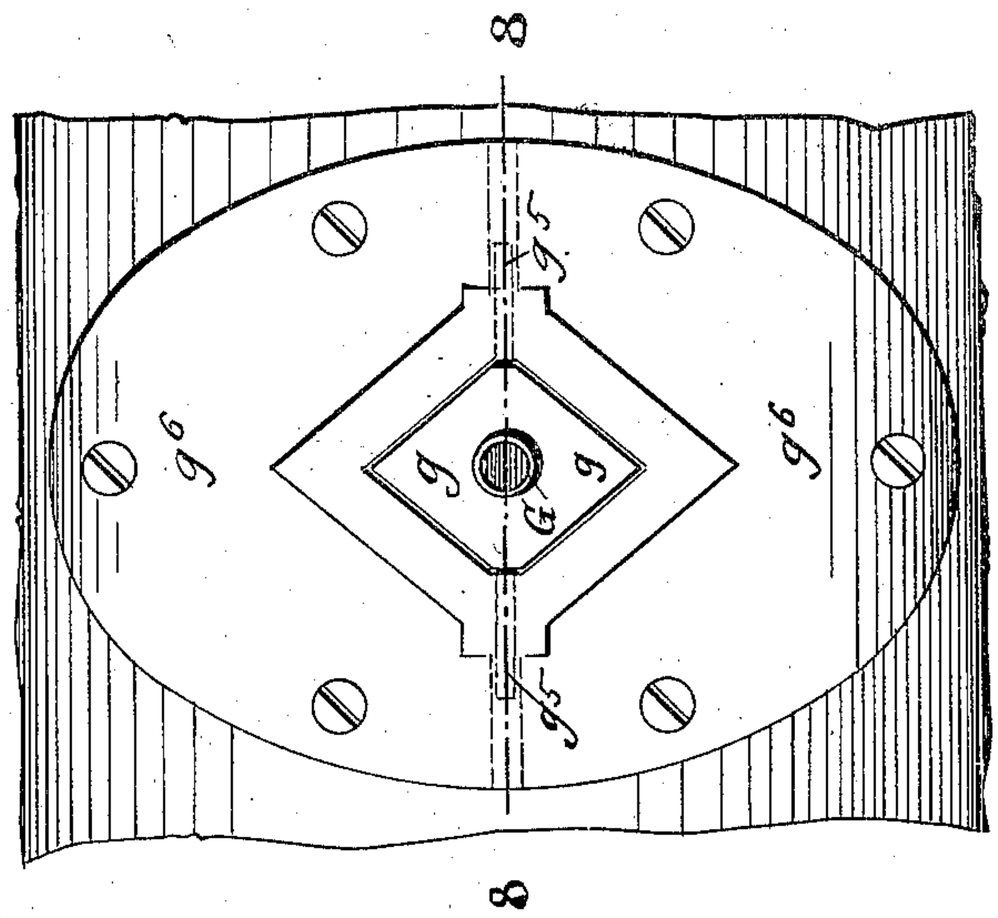

Fig: 8.

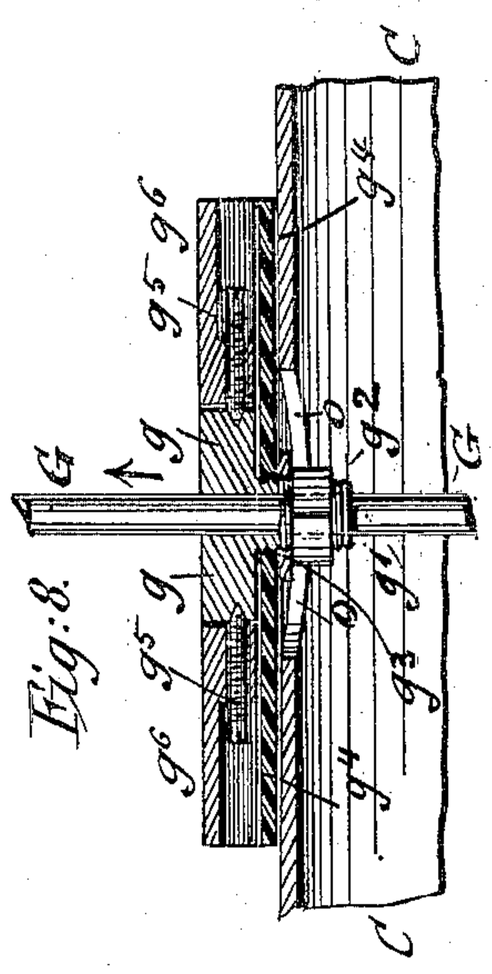

Fig: 5.

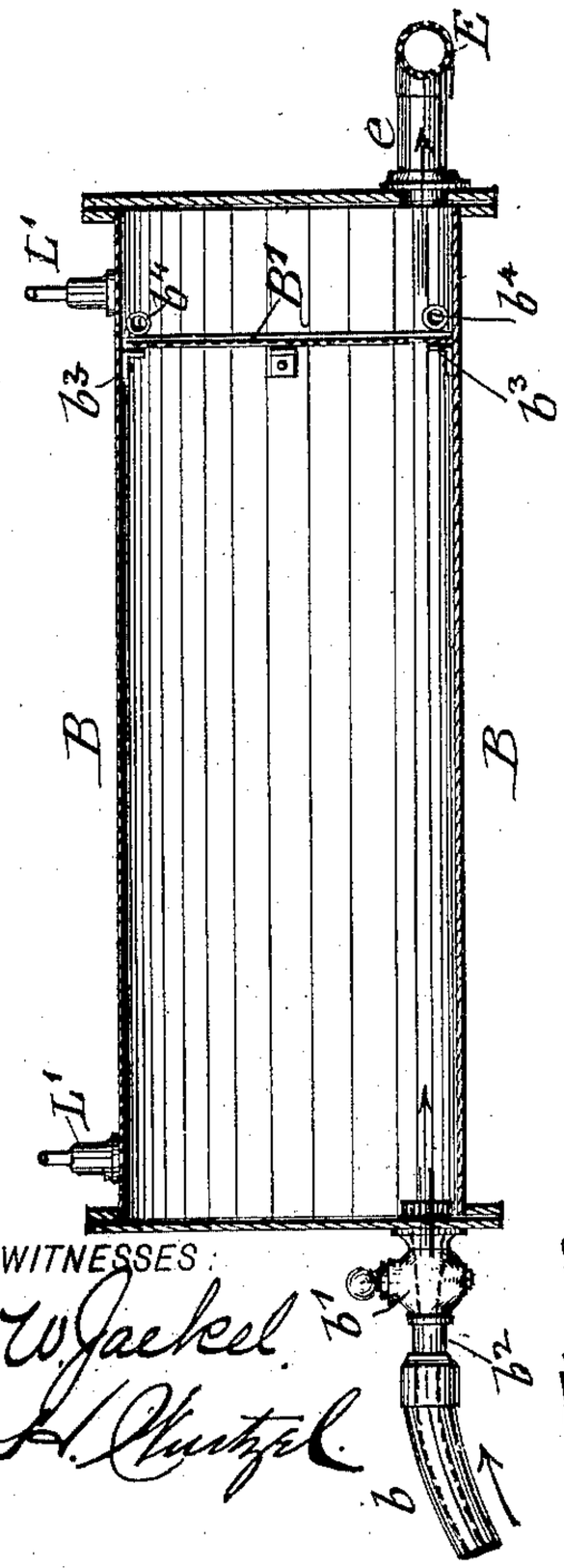

Fig: 6.

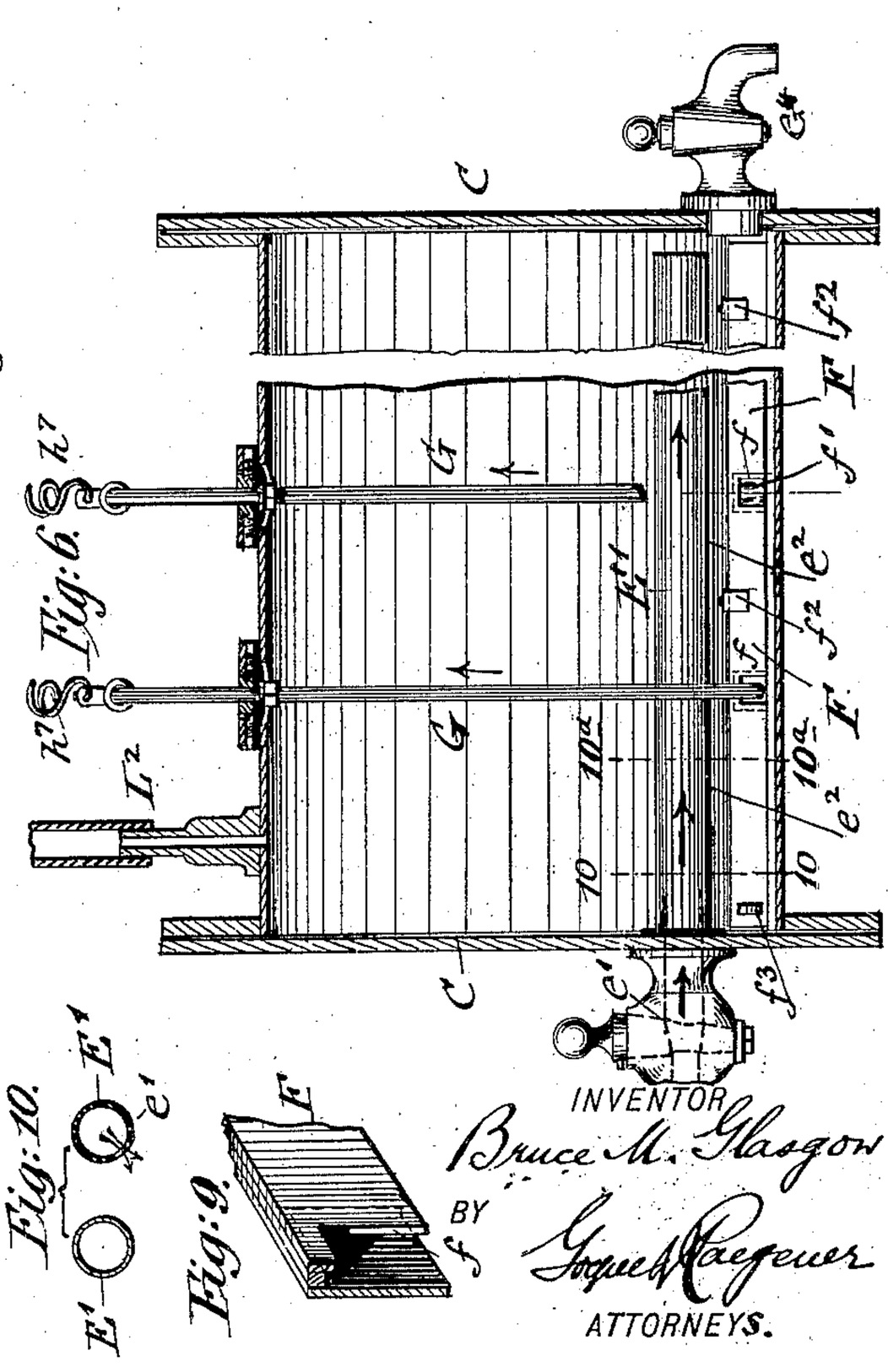

Fig: 10.

Fig: 9.

WITNESSES:

Geo. W. Jackel.

M. L. Huntzel.

INVENTOR

Bruce M. Glasgow

BY

Goepel & Weisenfeld

ATTORNEYS.

UNITED STATES PATENT OFFICE.

BRUCE M. GLASGOW, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO EMILE RIESER, OF NEW YORK, N. Y.

MACHINE FOR FILLING BOTTLES.

SPECIFICATION forming part of Letters Patent No. 705,229, dated July 22, 1902.

Application filed September 16, 1897. Serial No. 651,830. (No model.)

To all whom it may concern:

Be it known that I, BRUCE M. GLASGOW, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Machines for Filling Bottles, of which the following is a specification.

This invention relates to a bottle-filling machine for filling bottles with carbonated or effervescent liquids, and has for its object to provide a device of this character of improved construction, in which the operation of filling the bottles is facilitated.

The invention consists, therefore, of a bottle-filling machine which comprises a receiving-cylinder, means for raising or lowering the same, a delivery-cylinder in front of the receiving-cylinder, means for connecting the receiving-cylinder with the delivery-cylinder, a longitudinally-slitted supply-pipe in the delivery-cylinder, a number of oscillating siphons pivoted at the upper part of the delivery-cylinder, a source of gaseous or pneumatic pressure, and means for connecting the same either directly or indirectly with the barrel or barrels the contents of which are to be bottled and with said receiving and delivery cylinders.

The invention consists, further, of certain details of construction—such as the interchangeable cushion-blocks in the delivery-cylinder for the lower ends of the siphon-pipes, the yielding packing for the trunnioned portions of said pipes at the points where they pass through the upper part of the delivery-cylinder, and other details which will be fully described hereinafter and finally pointed out in the claims.

In the accompanying drawings, Figure 1 represents a front elevation of my improved machine for filling bottles according to my improved process. Fig. 2 is a side elevation of the same. Fig. 3 is a vertical transverse section on line 3 3, Fig. 1, drawn on a larger scale. Fig. 4 is a detail through the bottle-cap at the end of the siphon-pipes. Fig. 5 is a vertical longitudinal section through the receiving-cylinder on line 5 5, Fig. 2. Fig. 6 is a vertical longitudinal section through the delivery-cylinder on line 6 6, Fig. 2, taken in the direction of the arrows shown in Fig. 2 and with a portion broken away. Figs. 7 and 8 are respectively a detail top view and a vertical transverse section on line 8 8, Fig. 7, of the packing for the siphon-pipes. Fig. 9 is a detail perspective view of a portion of the shifting frame for the cushion-blocks for the lower ends of the siphon-pipes, and Fig. 10 shows two different vertical transverse sections through the supply-pipe of the delivery-cylinder respectively on lines 10 10 and 10^a 10^a, Fig. 6.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents an upright supporting-frame, which is composed of two upright side standards A′, that are connected by a number of horizontal brace-rods *a a*. On the upper part of the side standards A′ are supported a receiving tank or cylinder B and in front of the same a delivery-cylinder C. The receiving-cylinder B can be raised or lowered by vertical guides *a′* in ways a^2 of the side standards A′ by means of a treadle-operated lever mechanism, so as to be adjusted into higher or lower position relatively to a delivery-cylinder C. The vertical guides *a′* are provided with slots and connected at their lower ends with pivot-rods D′, the lower ends of which are pivoted to the rearwardly-extending crank-arms D^2, that are applied to a pivot-rod d^2, which turns in bearings at the lower part of the side standards A′, said pivot-rod being operated by a treadle D on the front end of a treadle-lever $D^\times$, that is attached to the pivot-rod d^2. By raising or lowering the receiving-cylinder B by the treadle and intermediate lever mechanism the liquid in the latter exerts a greater or smaller pressure on the liquid in the delivery-cylinder C, so that the quicker or slower filling of the bottles is accomplished and the delivery-cylinder entirely emptied of its contents at the end of the bottling operation. The receiving-cylinder B can be firmly held in any desired position to which the same is set by the treadle mechanism by means of clamping-screws a^3, that pass through the slots of the guides *a′* and into the guideways a^2 for the same. The raising of the receiving-cylinder B to a greater or less height above the delivery-cylinder C has the advantage that

the liquid can be placed in the bottles without pressure of carbonic acid or other fluid in case the same should not be available or in case the pressure of the same should have decreased below the useful pressure under which the bottle-filling apparatus is operated. One head of the receiving-cylinder B is provided with two supply-pipes *b b*, each of which is provided with a stop-cock *b'*, so that independent connection with one of two separate kegs or barrels can be made, and thereby the continuous working of the bottle-filling apparatus produced, one supply-cock *b'* being closed when the other is open until the barrel connected with the open cock is emptied. The second stop-cock is then opened and connection with the full barrel established, and so on alternately. Each supply-pipe *b* is provided with a glass sight-tube b^2, which shows the flow of the liquid and its condition during its passage to the receiver B. The sight-tube b^2 is of the same diameter as the supply-tube *b*, while the supply-cock *b'* is slightly enlarged or flared toward the receiving-cylinder.

At the interior of the receiving-cylinder B a screen B' is arranged in such a manner that it can be readily removed for cleaning, said screen being fitted tightly to the interior of the receiving-cylinder B, stopped by lugs b^3 and provided with handles b^4 for facilitating its removal and replacement.

The outlet-head of the receiving-cylinder B is provided with a stationary pipe *e* of slightly-larger diameter than the supply-pipes *b b*, the pipe *e* being connected by a flexible pipe E, which is slightly larger than pipe *e*, with the outer end of a delivery-pipe E', that passes through the head of the delivery-cylinder C and longitudinally through the same, said delivery-pipe being provided at its outer end with a stop-cock *e'*, so as to establish or interrupt the flow of the liquid from the receiving to the delivery cylinder. The bore of the stop-cock *e'* is made flaring toward the delivery-pipe E' and made slightly larger in size than the pipe *e* and flexible pipe E, the delivery-pipe E' being again somewhat larger than the bore of the stop-cock *e'*. The delivery-pipe E' terminates near the opposite head of the delivery-cylinder C, as shown in Fig. 6, and is provided with a longitudinal slit e^2 near its lowermost part, through which the liquid flows freely in a uniform sheet at an oblique angle against the curved or inclined side of the cylinder C, so that agitation and foaming are reduced to a minimum and almost entirely prevented. The delivery-pipe E' may be attached to and removed with the head of the delivery-cylinder for ease in cleaning. At the lower part of the opposite head of the delivery-cylinder C is arranged a drain-cock e^4, that permits the ready emptying of the delivery-cylinder when the apparatus is to be cleaned or for drawing off some of the liquid from the cylinder for the purpose of taking samples.

Below the delivery-pipe E' is arranged a ledge e^3, and on the side or face of the ledge e^3 is arranged a U-shaped guide-strip F, that is provided with a number of recesses *f*, in which cushion-blocks *f'*, of elastic material, are located. The recesses *f* and the elastic blocks *f'* are arranged at such distances from one another corresponding to the distances between the siphon-tubes arranged on the delivery-cylinder C that the inner ends of the siphons rest on the cushion-blocks *f'*. The guide-strip F has the advantage that on removing one of the heads of the delivery-cylinder it can be readily removed either for cleaning of for replacing the elastic blocks *f'* when worn out. The guide-strip F is retained in position by means of guide-lugs f^2 or by a longitudinal flange attached to the top of the ledge e^3, as shown clearly in Figs. 3 and 6, and is provided at its end with a suitable handle f^3 for conveniently pulling it out or replacing it in position in the delivery-cylinder C.

The siphon-tubes G pass through openings *o* in the top part of the delivery-cylinder C to the outside of the same, each siphon-tube being supported in the exteriorly-threaded hub *g'* of a gland *g* by a screw-nut g^2, which is tightly screwed home against a washer g^3, that presses against a flexible packing-plate or gasket g^4, preferably of rubber, which is placed below the gland *g*. The gland *g* has conical recesses for two adjustable pivot-pins or trunnions g^5, the conical ends of which engage the conical recesses of the gland *g*. The pivot-pins or trunnions g^5 are arranged in sockets of an oval plate g^6, which is attached by screws to the top part of the delivery-cylinder and which firmly holds the gasket g^4 in position, as shown clearly in Figs. 7 and 8. The packing-plate or gasket g^4, interposed between the top of the delivery-cylinder C and the plate g^6, and the clamping of the siphon-tube G against the gasket secure the tight connection of the siphon-tube with the delivery-cylinder, so that no carbonic-acid gas or other gas or air under pressure can escape.

The exterior leg of each siphon-tube G is provided in the customary manner with a cap *h*, which is shown in detail in Fig. 4, which is provided with a rubber cup *h'*, which fits over the bottle-mouth, said cap *h* being placed on the mouth of the bottle against the tension of a helical spring h^2, that is interposed between the cap *h* and an adjustable collar h^3 on the exterior leg of the siphon-tube, as shown in Fig. 3. The cap *h* is provided with a short small-bored vent-pipe h^4, to which a small rubber tube h^5 is applied, so as to permit the escape of the air from the bottle into the atmosphere as the filling of the bottle proceeds. Each siphon-tube G is further provided at its upper part, outside of the delivery-cylinder, with an eye h^6, which is clamped to the siphon-tube and which is connected by a helical spring h^7 with a sta-

tionary tension-bar h^8, that is supported on upwardly-extending arms h^9 of the side standards A′, as shown clearly in Fig. 3. The spring h^7 returns the inner leg of the siphon-tube G, as soon as the bottle is removed from its outer leg, against the cushion-block f' of the frame F so as to produce the tight closing of the lower end of the siphon-tube, and thereby any further ingress of liquid to the same. As soon as a bottle is applied to the outer leg of the siphon-tube the operator pushes the bottle past the ledge H^5 and depresses the siphon-tubes sufficiently to overcome the tension of spring h^7, and thus move the lower end of the inner leg of the siphon-tube away from its cushion-block, so that the flow of the liquid through the siphon-tube is reëstablished.

The bottles to be filled are supported in the usual manner at their bottom by a transverse bar H and below their necks by a bar H′, having neck-recesses, which bars are supported on inclined stationary straps H^2 and made adjustable in slots of the inclined straps H^2 by means of clamping thumb-nuts H^4, as shown in Figs. 2 and 3, so as to accommodate bottles of different sizes. The transverse bottom bar H may be formed with a lip or ledge H^5, which prevents the bottles from being thrown off the bar by the pull of the spring h^7 and which acts like a latch to hold the siphon-tube open against the pull of the spring h^7 till the operator removes the bottle. This enables the spring h^7 to be made much stronger than it could be if the weight of the bottle were alone relied on to counteract the pressure of the spring and open the siphon-tube, and hence gives a more reliable closure of the inner end of the siphon. Below the bottles is arranged a drip-pan H^6 for catching any accidental drip from the bottles.

The liquid in the receiving and delivery cylinders B and C is preferably kept under pressure of carbonic-acid gas, which may be supplied directly to the upper part of the keg or barrel or through a gas-distributing cylinder L, that is supported, by means of suitable arms, on the receiving-cylinder B, as shown in Fig. 3, or on the supporting-frame A. The gas-distributing cylinder L is connected by pipe l', Fig. 1, with a receiver containing compressed or liquid carbonic acid or compressed air in case that medium is employed for filling the receiving-cylinder B and with gas or air under pressure when starting the machine, said gas or air being displaced by the inflowing liquid or for driving out the remaining liquid at the end of the bottling operation. Valved gooseneck pipes L′ connect the gas-distributing cylinder L with the receiving-cylinder B and a valved gooseneck pipe L^2 the gas-distributing cylinder L with the delivery-cylinder C. Each gooseneck pipe L′ and L^2 is provided with a relief cock or vent l for permitting the escape of gas or air into the atmosphere from the receiving and delivery cylinders, respectively, when they are first filled with the liquid to be bottled, the latter pipe L^2 being flexible to permit the raising and lowering of the receiving-cylinder B, as hereinbefore described. The gas-distributing cylinder L is also connected by pipes l^2 l^2 with each barrel that supplies liquid to the bottle-filling machine, so that by the pressure of the gas on the liquid in the barrel the same is transferred first to the receiving-cylinder, from the same to the delivery-cylinder, and from the latter through the siphon-tubes to the bottles. As the gas or other fluid under pressure is supplied directly or indirectly to both the receiving and delivery cylinders, such a pressure is established in both cylinders that thereby the escape of carbonic-acid gas from the liquid and the consequent foaming of the same is almost entirely prevented. The receiving and delivery cylinders are provided with the usual glass gages J J and other accessories for indicating the level, pressure, and condition of the liquid in the cylinders. To reduce the friction of the liquid in its passage through the apparatus to a practical minimum, every successive pipe or conduit through which the liquid flows is made of greater cross-sectional area than the preceding one, while the cocks are provided with tapering passages increasing in the direction of the flow, the combined total capacity of the siphon-tubes G being greater than that of the delivery-pipe E′ in the delivery-cylinder, so that the free flow of the liquid from the initial point of supply to the point or points of delivery is not checked or impeded, while the speed of flow is diminished. The natural tendency of the gas incorporated in the liquid to escape is counteracted by subjecting the liquid to a sufficient gaseous or pneumatic pressure and retaining it under such pressure as long as the flow of liquid is continued during the drawing off or bottling operation.

The operation of my improved bottle-filling machine differs in various important particulars from the bottle-filling machine hereinbefore referred to. The liquid is supplied from the barrel under pressure into the receiving-cylinder, where any pitch from the barrel or other foreign substances in the liquid are retained by the strainer-screen. From the receiving-cylinder the liquid passes to the delivery-cylinder and from the same through the siphon-tubes into the bottles, which quickly fill up to a certain distance from their mouths, at which point the supply of liquid is interrupted, as the bottle-necks may be arranged on a level with the liquid in the delivery-cylinder, or the slight surface foam in the bottle may be relied upon to seal temporarily the small vent-pipe h^4, so that no loss of liquid by overflow or spilling is sustained. The heads of both the receiving and delivery cylinders are tightly packed and made easily removable by thumb screws and nuts, as shown in Figs. 1 and 2, so as to give ready access to the interior of the cylinders for

cleaning the apparatus. The cushion-blocks for the inner ends of the siphon-tubes can be readily replaced whenever required without inserting an entire packing-strip, as in the machines heretofore in use. The oscillation of the siphon-tubes by means of the trunnioned glands has the advantage that the movement of the siphon-tubes takes place exclusively in a plane at right angles to the axis of the delivery-cylinder, so that the inner ends of the siphon-tubes always return to the same position on their blocks, whereby the irregular motion or wabbling of the siphon-tubes heretofore in use is entirely prevented and the reliable closing of the inner ends of the siphon-tubes produced when the bottles are removed from the outer legs of the same. By the various means described the operation of my bottle-filling machine is rendered more reliable and effective, while by the alternating connection of the same with two barrels a continuous supply of liquid is obtained, so that a very large number of bottles can be filled within a given time without interruption for disconnection and reconnection and with less loss of gas and less drip than by the bottling-machines heretofore known.

Although for the sake of brevity I have used the word "bottles" herein, I do not intend to limit the application of my invention to the filling of bottles, as it is equally applicable to the process of filling out from any larger receptacle into a smaller receptacle—as, for instance, from a vat or tank into a keg or barrel. Similarly where I have mentioned "beer" herein I desire it to be understood that any fermented, carbonated, or effervescing liquor is to be covered thereby and that by "gas" I mean, broadly, air, carbonic-acid gas, or any other gas that may be used for the production of pressure.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, in a bottle-filling machine, of a supporting-frame, a receiving-cylinder, a delivery-cylinder, a flexible pipe for connecting the receiving and delivery cylinders, and means for raising or lowering the receiving-cylinder relatively to the delivery-cylinder, substantially as set forth.

2. The combination, in a bottle-filling machine, of a supporting-frame, a vertically-guided receiving-cylinder, a delivery-cylinder, a flexible connecting-pipe between the receiving and delivery cylinders, and a treadle-operated lever mechanism adapted for adjusting the receiving-cylinder relatively to the delivery-cylinder, for increasing or decreasing the pressure of the liquid in the receiving-cylinder on the liquid in the delivery-cylinder, substantially as set forth.

3. In a bottle-filling machine, the combination of a supporting-frame, of a vertically-guided receiving-cylinder, a delivery-cylinder in front of the same, a flexible pipe connecting the receiving and delivery cylinders, means for raising and lowering the receiving-cylinder relatively to the delivery-cylinder, and means for clamping the receiving-cylinder into the position to which it is adjusted, substantially as described.

4. In a bottle-filling machine, the combination of a receiving-cylinder and a delivery-cylinder, a valved pipe connecting the receiving-cylinder with the delivery-cylinder, and a delivery-pipe extending through the delivery-cylinder near the bottom of the same and provided with a longitudinal slit in its lower part for supplying the liquid freely and without foaming to the delivery-cylinder, substantially as set forth.

5. In a bottle-filling machine, the combination, with a delivery-cylinder having a ledge at the lower part of the same and an inlet-pipe connected with a suitable supply and arranged just above said ledge and discharging the liquid away from the edge of the ledge, of oscillating siphon-tubes passing through the upper part of said cylinder, and a guide-strip on said ledge provided with as many recesses and cushion-blocks as there are siphon-tubes, for closing the lower ends of the siphon-tubes when they are pressed against the same, substantially as set forth.

6. In a bottle-filling machine, the combination, with a delivery-cylinder, of a siphon-tube passing through an enlarged opening in the cylinder, a plate secured to the cylinder, a gland for the tube, pivot-pins or trunnions for said gland, said pivot-pins being mounted adjustably in said plate, and an elastic gasket confined between said plate and cylinder for yieldingly supporting the gland and siphon-tube, substantially as set forth.

7. In a bottle-filling machine, the combination, with the delivery-cylinder having openings in its upper part, of oscillating siphon-tubes extending through said openings, gaskets placed over said openings, glands extending over gaskets, means for tightly applying the siphon-tubes to said glands, covering-plates provided with sockets at diametrically opposite points, and pivot-pins or trunnions passing through said sockets into the glands, substantially as set forth.

8. The combination of a receiving-cylinder, a supply-pipe connecting said cylinder with a barrel or cask, a delivery-cylinder, a flexible pipe between the receiving and delivery cylinders, said flexible pipe being of larger cross-sectional area than the supply-pipe, siphon-tubes fitted to the delivery-cylinder, and cocks in said supply and flexible tubes having bores or openings flaring in the direction of the flow of liquid, substantially as set forth.

9. The combination, of a receiving-cylinder, a supply-pipe connecting the same with a barrel or cask, a delivery-cylinder, a flexible pipe between the receiving and delivery cylinders, said pipe being of larger diameter than the supply-pipe, and a longitudinally-

slotted delivery-pipe in said delivery-cylinder of larger size than the flexible pipe, substantially as set forth.

10. The combination, in a bottle-filling machine, of an upper receiving-cylinder, a lower delivery-cylinder provided with siphons, a valved connecting-pipe between the upper and lower cylinders, a gas-distributing cylinder connected with a source of carbonic-acid gas under pressure, a pipe connecting said gas-distributing cylinder with the keg or barrel the contents of which are to be bottled, valved pipes connecting the gas-distributing cylinder respectively with the receiving and delivery cylinders, and a vent device for each of said connecting-pipes, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

BRUCE M. GLASGOW.

Witnesses:

PAUL GOEPEL,

GEO. W. JAEKEL.