No. 648,864. Patented May 1, 1900.

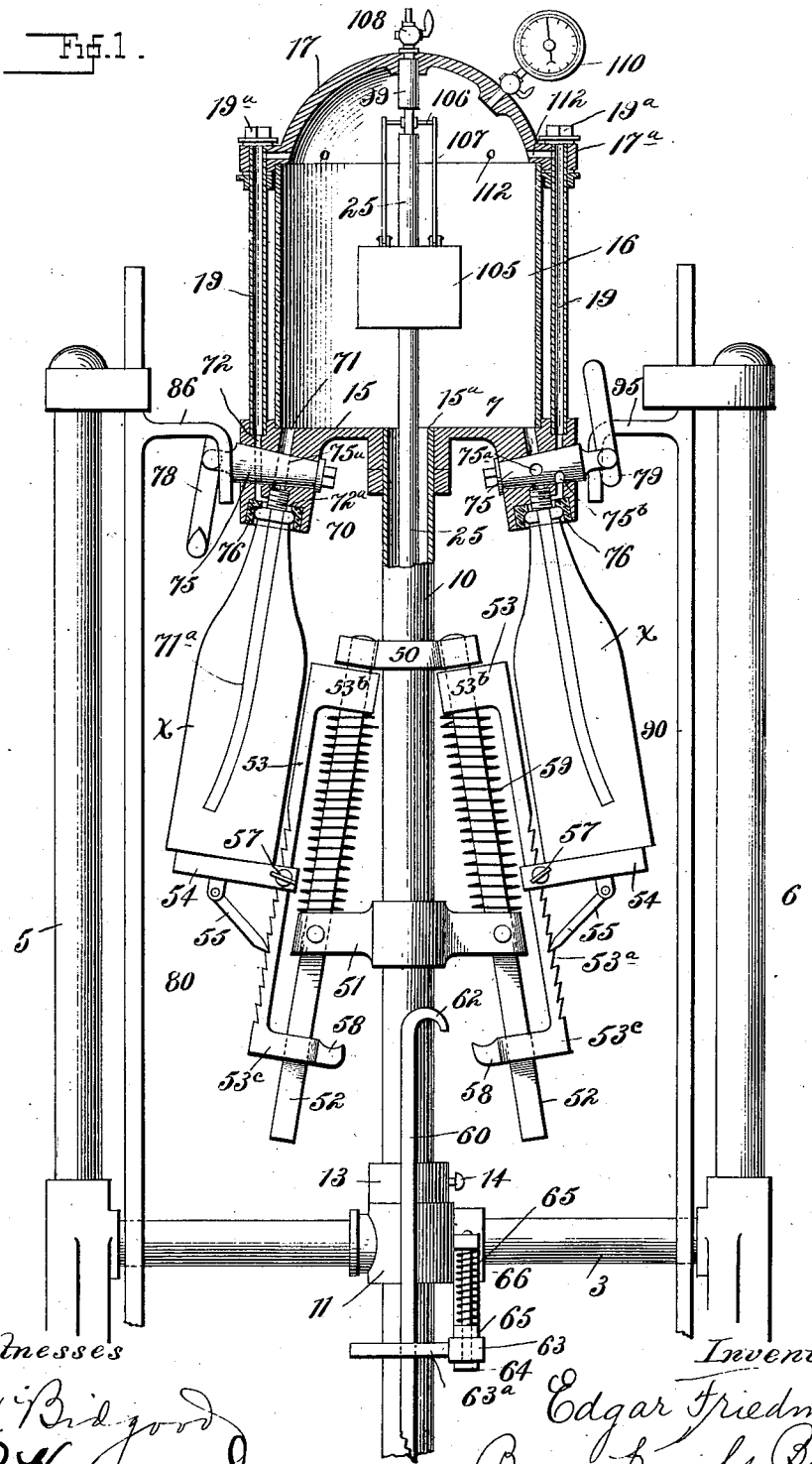
E. FRIEDMAN.

BOTTLE FILLING MACHINE.

(Application filed May 5, 1899.)

(No Model.) 6 Sheets—Sheet 1.

Fig. 1.



Witnesses

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Fig. 2.

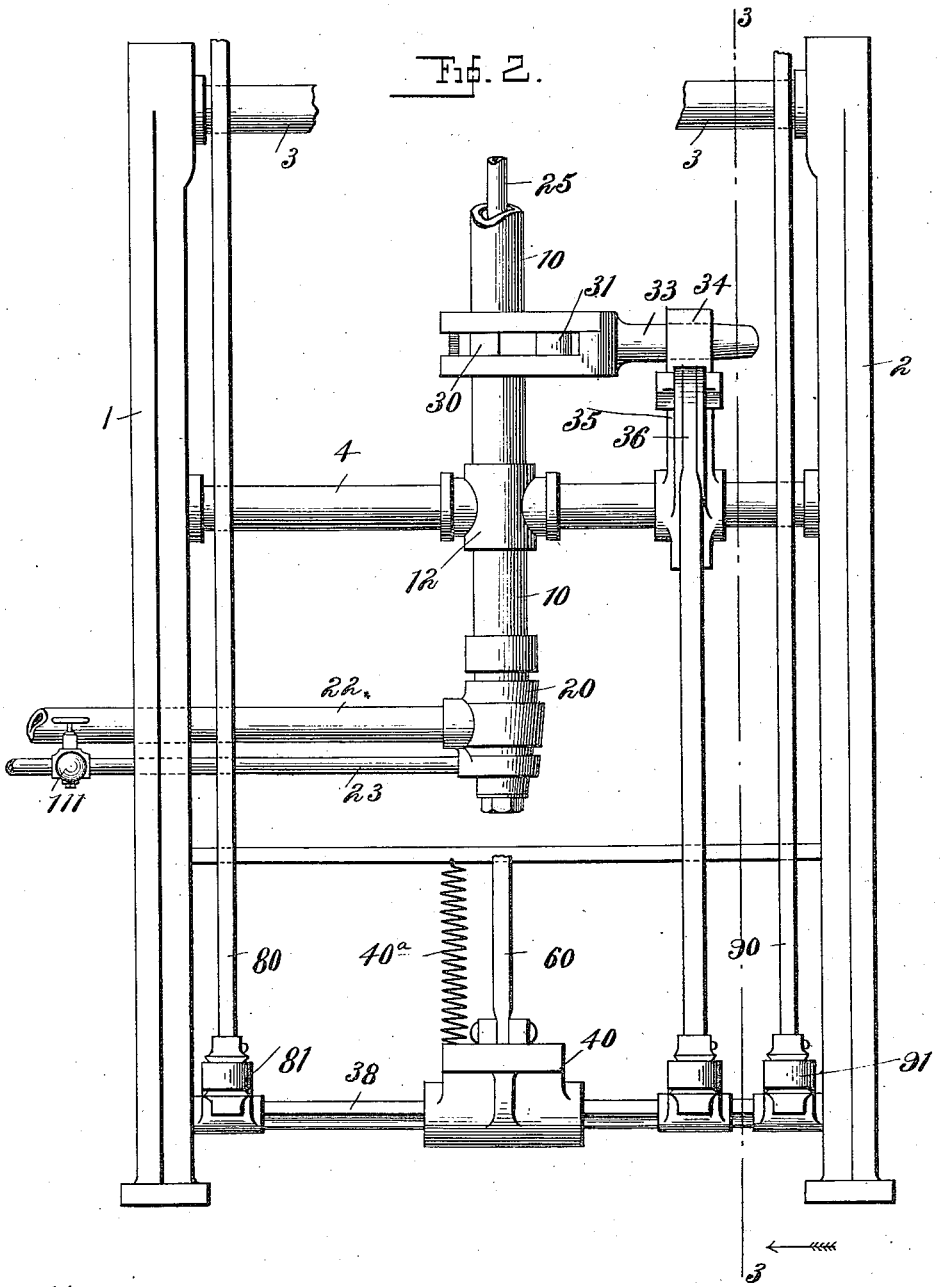

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Fig. 3.

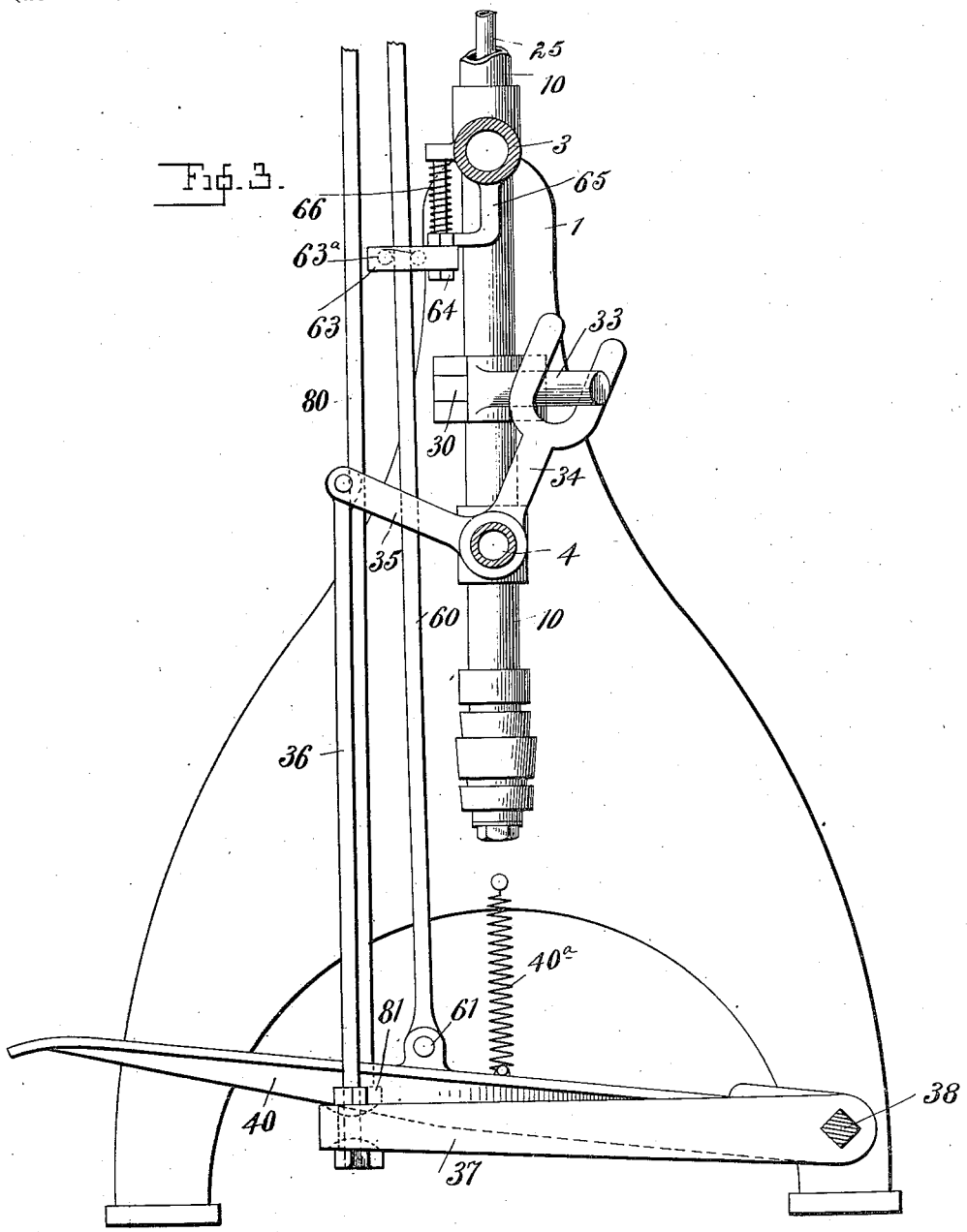

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Fig. 4.

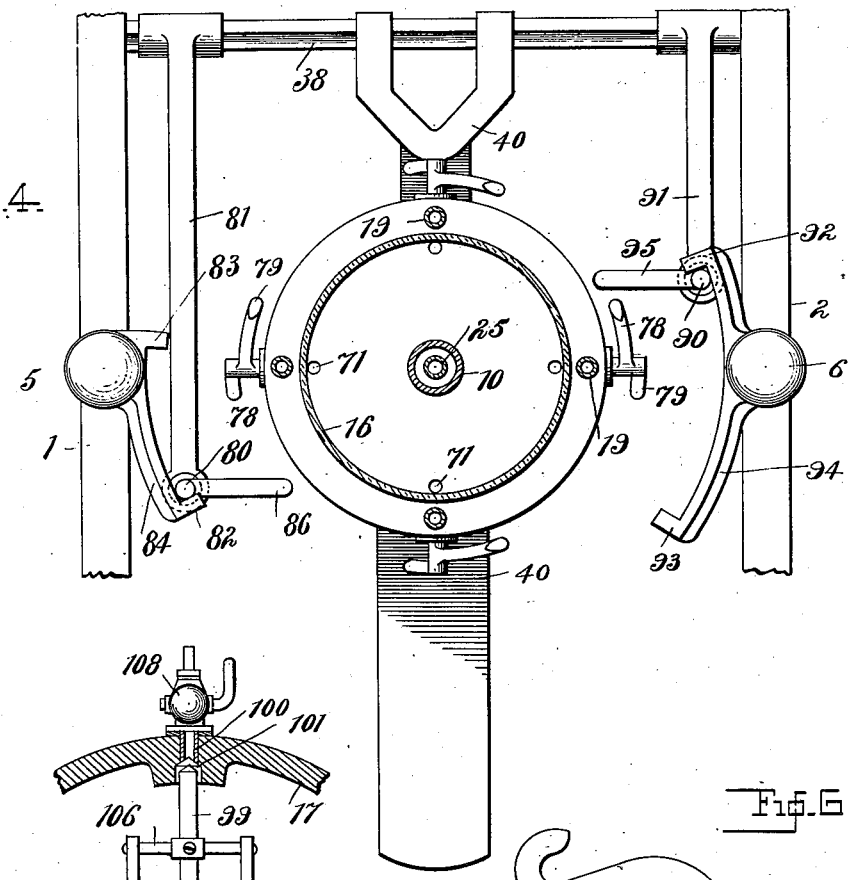


Fig. 5.

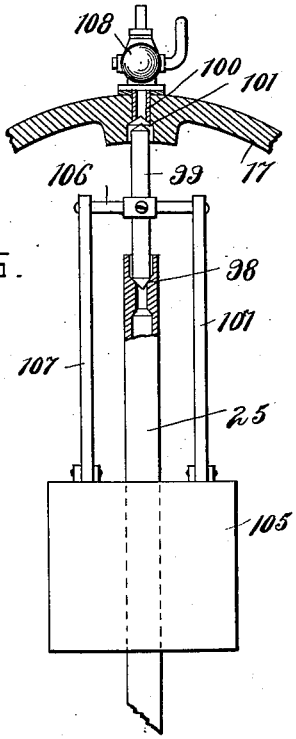
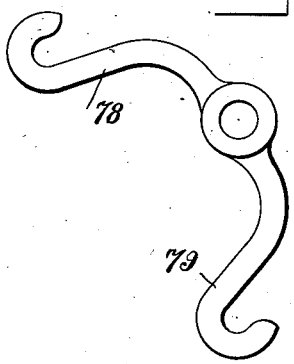


Fig. 6.



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(No Model.) 6 Sheets—Sheet 5.

Fig. 7.

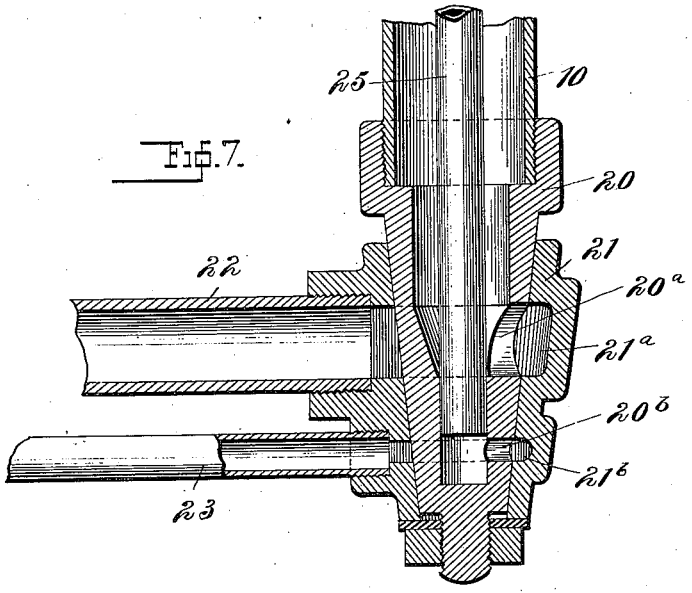

Fig. 8.

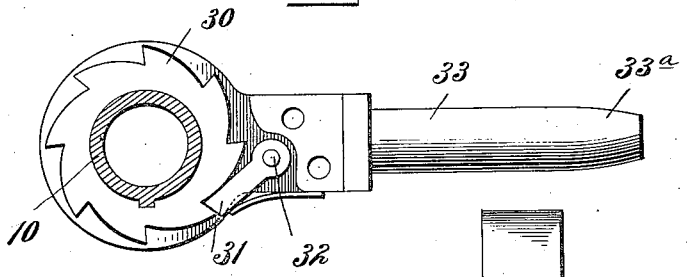

Fig. 9.

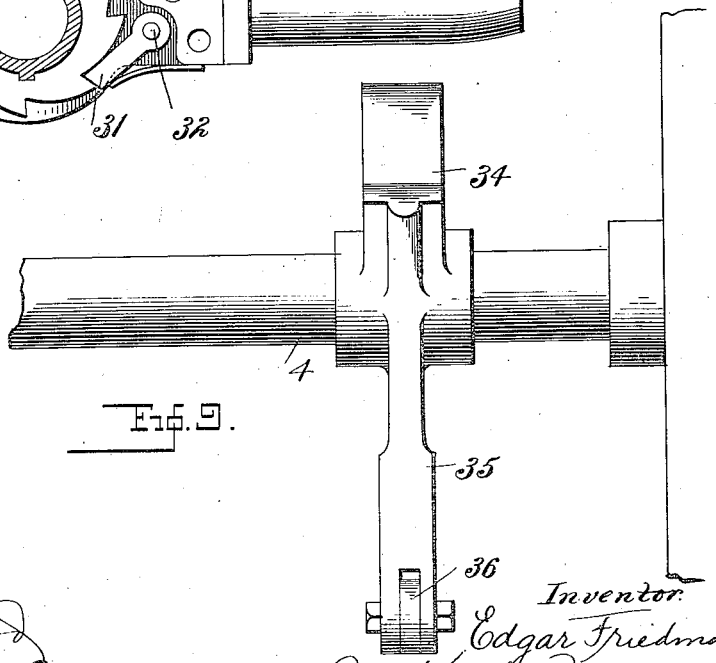

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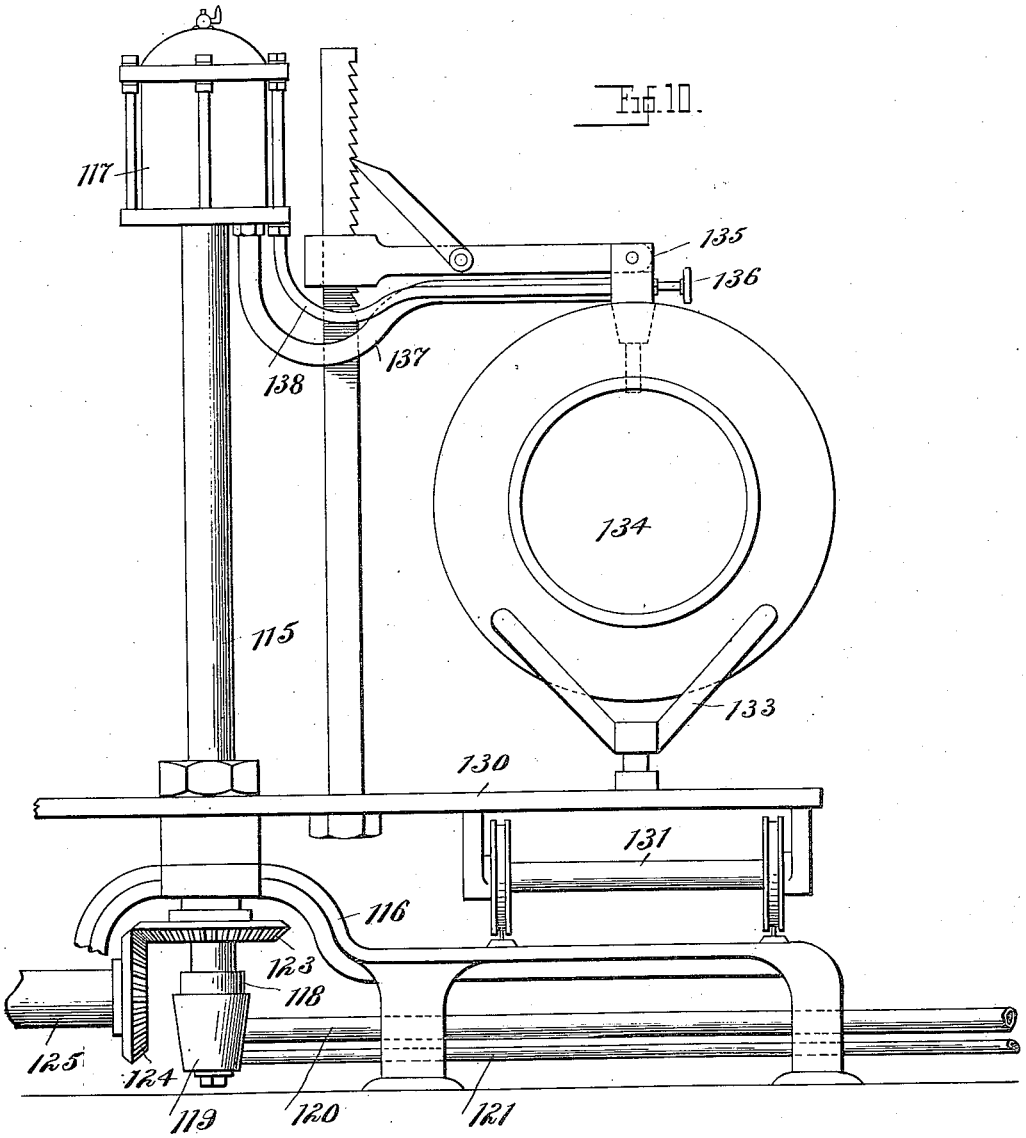
Fig. 10.



Witnesses.

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Attys

UNITED STATES PATENT OFFICE.

EDGAR FRIEDMAN, OF DOBBS FERRY, NEW YORK.

BOTTLE-FILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 648,864, dated May 1, 1900.

Application filed May 5, 1899. Serial No. 715,753. (No model.)

To all whom it may concern:

Be it known that I, EDGAR FRIEDMAN, a citizen of the United States, residing at Dobbs Ferry, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Bottle-Filling Machines, of which the following is a specification.

The object of my invention is to produce an economical and rapidly-operating package-filling apparatus for bottling beer or other carbonated or effervescing beverages without the objectionable foaming and loss of the liquid.

To this end my invention comprises a rotating frame supporting a series of independently-operated bottle racks or supports, a supply or charging chamber having suitable communications with a liquid-supply and with an air or gas pressure supply, a series of filling-heads arranged above the series of bottle racks or supports and having communications with the charging-chamber for the passage of compressed air or gas and liquid, respectively, a series of cocks in the filling-heads having liquid and air ports controlling communication through said passages, means for automatically and successively opening and closing said cocks for supplying the bottles with air or gas pressure and with the liquid from the charging-chamber, and suitable means for engaging the bottle supports or racks independently and successively for moving them downwardly to permit the removal and insertion of the bottles. In addition to the above-recited elements I provide a foot-lever which is suitably connected with the valve opening and closing devices and the bottle-support-operating device and also with suitable mechanism for rotating the frame step by step to bring the bottle-supports successively into engagement with their operating device and the cocks successively into engagement with the opening and closing devices. The charging-chamber is preferably provided with a float attached to a double valve which automatically controls the supply of air or gas under pressure from the pressure-reservoir and also the exhaust of compressed air or gas from the charging-chamber into the open air, said float-valve being regulated by the level of the liquid in the charging-chamber and the level of the liquid being in turn regulated by the pressure of air or gas in said chamber.

My improved machine comprises, in addition to the above-recited main elements, many novel features of construction, and in order that the invention may be fully understood I will first describe the same with reference to the accompanying drawings and afterward point out the novelty with more particularity in the annexed claims.

In said drawings, Figure 1 is a front elevation, partly in section, of the upper portion of my improved bottle-filling machine, some of the duplicated parts being omitted for clearness. Fig. 2 is a similar view of the lower part of the machine. Figs. 1 and 2 taken together represent the whole machine. Fig. 3 is a detail sectional elevation of the lower part of the machine, taken on the line 3 3 of Fig. 2, showing the operating foot-lever and means for rotating the frame and parts of the means for operating the bottle-supports and for opening the cocks. Fig. 4 is a detail plan view representing the base of the charging-chamber, the cocks, and opening and closing mechanism, parts being omitted. Fig. 5 is a detail elevation, partly in section, showing the double float-valve of the charging-chamber. Fig. 6 is a detail elevation of one of the double-armed operating-levers of the cocks. Fig. 7 is a detail vertical sectional view of the main supply-valve for the liquid and compressed air or gas. Fig. 8 is a detail sectional view illustrating the ratchet mechanism for rotating the frame. Fig. 9 is a detail plan view of part of the lever mechanism for operating the ratchet. Fig. 10 is a detail elevation of a modified form of machine adapted for filling barrels.

The machine may be constructed upon any suitable framework—such, for instance, as shown, consisting of the side standards 1 2, connected and braced by the main cross-bars 3 4 and suitable strengthening tie-rods, said standards supporting the upwardly-projecting side bars 5 6. 10 is a central rotating hollow shaft or standard journaled in bearings 11 12 upon cross-bars 3 and 4 and having keyed to it a bearing-collar 13 just above the bearing 11 for supporting it vertically. The bearing-collar 13 is adjustably secured

to the shaft 10 by means of set-screw 14, and by the adjustment of collar 13 the height of shaft 10 and supported parts in the main frame may be regulated to correspond with the operating devices upon the main frame.

15 is the base-plate of the charging chamber or reservoir, which is formed with a central opening 15^a, into which the upper end of the hollow shaft 10 is snugly fitted, the charging-reservoir being mounted upon and supported by the shaft to rotate with it. 16 is the cylindrical glass wall of the charging chamber or reservoir, and 17 is the hemispherical dome of said chamber. The parts 15, 16, and 17 are fitted together with suitable rubber gaskets 18 to form hermetically-tight joints. Hollow posts or tie-rods 19 are threaded into the base-plate 15 and passed up through tap-holes in the flange 17^a of the dome 17, the dome being confined thereon by cap-nuts 19^a, which also tightly close the openings in the ends of posts 19.

At the lower end of the hollow shaft 10 is secured a hollow valve-plug 20, formed with ports 20^a 20^b. The valve-plug 20 is adapted to rotate with the shaft in the valve-casing 21, which communicates with the beer-supply pipe 22 and the compressed-air or gas supply pipe 23. The valve-casing 21 is formed with an annular groove or port 21^a, insuring constant communication between the port 20^a and beer-supply pipe 22, and an annular groove or port 21^b, insuring constant communication between the port 20^b and the compressed-air or gas supply pipe 23. The valve-plug 20 is of conical form, and its interior bore is contracted at the lower end to receive a snugly-fitting pipe 25, which passes centrally through the hollow shaft 10 up into the bottle-charging chamber for supplying compressed air or gas.

The pipe 22 communicates with the beer-supply barrel or settling-cask, in which the beer is maintained under the proper pressure. The pipe 23 communicates with a reservoir of compressed air or gas, which is maintained at the required pressure. The beer passes through the port 21^a of casing 21 and port 20^a of plug 20 up through hollow shaft 10 (around pipe 25) into the charging-chamber. The compressed air or gas passes through port 21^b of casing 21 into port 20^b of plug 20 and up through central pipe 25 to a point above the beer-level in the charging-chamber.

Keyed to the hollow shaft 10 above bearing 12 is a ratchet-wheel 30, with which engages a spring pawl or click 31, journaled at 32 upon an oscillating arm 33. The arm 33 is journaled upon shaft 10, and its outer reduced end 33^a rests in a forked lever 34, journaled upon the cross-bar 4 and formed integral with an arm 35. The lever 34 and arm 35 form a bell-crank rock-lever, which is operated by means of a pitman 36, journaled to the end of arm 35 at its upper end and to a rock-arm 37 at its lower end, the rock-arm 37 being mounted upon a square shaft 38, which is formed with rounded ends journaled in the side frames 1 and 2 of the machine.

40 is the operating foot-lever, which is also keyed to the square shaft 38. Every time the foot-lever 40 is depressed the shaft 10 and supported parts are rotated one step, and simultaneously with this step-by-step rotation the other parts of the mechanism, hereinafter referred to, are successively thrown into operation, all of the parts being operated from the single foot-lever.

40^a is a strong spring which sustains foot-lever 40 and connected parts normally in elevated position.

Keyed to the shaft 10 below the base 15 of the charging-chamber is a spider 50, and below the spider 50 is a larger spider 51. Mounted rigidly in the radial arms of spiders 50 51 are the inclined bars 52, upon which are mounted the sliding bottle-supporting frames 53. Each of the sliding frames 53 comprises a rack-bar 53^a and integral guide-arms 53^b 53^c, formed with guide-openings, through which the bar 52 extends. By this means the frames 53 slide up and down upon bars 52.

59 is a spiral spring surrounding bar 52 and engaging at its upper end the guide-arm 53^b and at its lower end a radial arm of spider 51. An independent spring 59 is provided for each sliding frame 53, and all of the frames are thereby normally supported in elevated position.

54 is one of a series of bottle supports or racks, each of which is provided with a pivoted pawl 55, adapted to engage rack-bar 53^a of one of the sliding frames 53. Each of the bottle-supports 54 straddles the rack-bar of one of the sliding frames 53 and is provided with a clamp-screw 57, adapted to engage rack-bar 53^a and secure the bottle-support in any desired adjusted position upon the sliding frame.

At the lower end of each of the sliding frames 53, upon guide-arm 53^c, is formed a hook 58, adapted to be engaged by the mechanism for drawing the bottle-supports into lowered position for the insertion and removal of the bottles, as hereinafter explained.

60 is a rod pivoted at 61 to the foot-lever 40 and extending up to a point adjacent to the normally-elevated position of the hooks 58 of the sliding bottle-supporting frames 53. The upper end of the rod 60 is formed with a hook 62, projecting to the right.

63 is a lever carrying two pins 63^a, which straddle and engage the rod 60. The lever 63 is keyed to a pin 64, which is journaled in a bracket 65, secured to the frame-bar 3.

66 is a tension-spring surrounding the pin 64 and engaging the pin at one end and the bracket at the other for giving the lever 63 an inward spring tendency. As the series of bottle-supporting frames are rotated one of the hooks 58 will be engaged by hook 62, and under the downward movement of rod 60 the bottle-supporting frame so engaged will be drawn downwardly simultaneously with its

rotary motion. The bottle-supporting frames being mounted on the bars which are inclined with relation to shaft 10 will move outwardly from the shaft as they are drawn down. The outward movement of rod 60 when in engagement with a downwardly-moving rotating bottle-supporting frame is allowed by the pivoted connection with foot-lever 40, the spring-lever 63 yielding upon its journal-pin, and the slight movement in the rotary direction is allowed by the springiness of rod 60 and its free movement laterally between pins 63^a. When the bottle-supporting frame has been drawn to its lowest position for the removal and insertion of a bottle, the rod 60 is strained laterally and outwardly from its normal position, and when the foot-lever 40 is released its spring 40^a immediately returns it to elevated position, the hook 62 springing inwardly to release itself from hook 58 and return to normal position in readiness to engage the hook 58 of the succeeding bottle-supporting frame upon the next downward movement of foot-lever 40. The instant the hook 62 releases hook 58 the spring of the released bottle-supporting frame returns it to elevated position, as and for the purpose hereinafter explained.

The base 15 of the charging-reservoir is formed of a casting with a series of bottle-filling heads 70 projecting downwardly from it. Each of the heads 70 is formed with a liquid port or passage 71 in direct communication with the bottom of the charging-reservoir and with the filling-tube 71^a and a passage 72, which is in communication with the hollow posts or tie-rods 19, which secure the dome 17 to the base 15, and with a port 72^a in the rubber gasket 76 to place the bottle in communication with air or gas pressure supply of the charging-chamber, as hereinafter explained. The filling-tube 71^a is of sufficient length to extend nearly to the bottom of the bottle X when the latter is in position, and the lower end of the tube is curved outwardly slightly to facilitate its insertion in the bottle when the bottle is put in position upon the filling-support. Each of the charging-heads is also bored transversely with a conical bore for the reception of conical plug 75, which is formed with transverse ports 75^a and 75^b, adapted to open communication through the passages 71 and 72. The port 75^b is arranged to open up communication in the passage 72 a little prior to the opening of passage 71 for the purpose of supplying compressed air or gas to the bottle a little prior to the flow of liquid thereto. The charging-heads are bored out in their lower face concentric to the filling-tubes for the reception of rubber gaskets 76, against which the heads of the bottles are pressed during the filling operation. Each of the valve-plugs 75 is provided with oppositely-extending hooked arms 78 and 79 for the engagement of the devices which open and close the cocks.

At the left-hand side of the machine, as shown in Fig. 1, is a vertically-extending spring-rod 80, which is secured at its lower end to a rock-arm 81, keyed to the square shaft 38. The rod 80 extends slightly above the upper end of frame-bar 5, where it is confined between the lugs 82 and 83 of the bracket-arm 84. Projecting from the rod 80 is an annular finger 86, which is supported in the path of the hook-arms 78 of the cocks 75. As the frame is rotated the arm 86 will engage the hook of arm 78 and rotate it downwardly, the springy rod 80 (carrying arm 86) at the same time yielding laterally to the rotating movement of the frame. This movement, which opens the cock 75, occurs during the depression of the foot-lever 40. When the foot-lever 40 is released, its spring restores the parts to normal position, the rod 80 moving upwardly out of engagement with hook 78 and springing back in its normal position in readiness to engage the hook-arm 78 of the succeeding cock 75.

At the right-hand side of the machine, as shown in Fig. 1, a yielding rod 90, similar to rod 80, extends vertically from the rock-arm 91, to which it is secured. The rod 90 projects above the frame-bar 6 and is confined between the lugs 92 and 93 of the bracket 94. 95 is an angular finger upon the rod 90, which engages the hook-arm 79 of the cock for operating the cock in reverse direction and closing the ports of the liquid and air supply after the bottle has been filled.

At the upper end of the compressed-air or gas supply pipe 25, within the charging-reservoir, is formed a valve-seat 98.

99 is a pin-valve rod formed with pointed ends, one of which engages with the valve-seat 98. In the dome 17 of the charging-chamber is formed an air-escape port 100, having a valve-seat 101, with which the opposite end of the pin-valve rod 99 is adapted to engage.

105 is a float surrounding and vertically movable upon the air-pipe 25. The float 105 is attached to a yoke 106 by means of vertical rods 107, the yoke 106 being adjustably secured to the rod 99.

108 is a cock controlling the air-outlet 100.

110 is a pressure-gage.

111 is a cock in the compressed-air or gas supply pipe for regulating the supply of air or gas.

The ports 112 are drilled through the dome 17 into the hollow posts 19 for forming communication between the air or gas space in the charging-chamber above the beer and the posts 19.

The operation of my improved filling device, as illustrated in Figs. 1 to 9 of the drawings, may be briefly described as follows: Assuming the machine to be in operative position, with a bottle X held in filling position upon each of the bottle-supporting frames, the foot-lever 40 will be depressed to draw one of the bottle-supporting frames downwardly and outwardly, releasing the neck of

the bottle from the gasket of the filling-head and allowing the removal of a filled bottle and the placing of another bottle upon the vacated support. In placing the bottle in position the filling-tube is inserted in the mouth of the bottle and the bottle placed upon the rack 54. The foot-lever 40 is then released and its spring 40^a immediately returns it to its normal elevated position, throwing the hook 62 out of engagement with the hook 58 of the bottle-supporting frame and allowing the resiliency of rod 60 and the spring device 63 to return the hook-rod 60 to its normal position in readiness to engage the succeeding bottle-supporting frame. At the same time the spring of the bottle-supporting frame forces the frame upwardly to cause the neck of the bottle to be pressed firmly against the rubber gasket in the filling-head. The foot-lever 40 is then again depressed, throwing down the succeeding bottle-supporting frame carrying a filled bottle and simultaneously causing the rotation of the shaft 10 and supported parts and the opening of the cock in the filling-head to the left and the closing of the cock in the filling-head to the right.

The operation of the resilient rods 80 and 90 in opening and closing the cocks has already been explained.

The bottle-supporting racks 54 are adjusted upon the rack-bars 56 in the manner explained to support the bottle of the desired size in proper relation to the filling-head. The supply of beer in the barrel or cask, which is in communication with feed-pipe 22, is maintained at the required pressure to cause it to flow through the vertical pipe 10 into the charging-chamber. The beer will flow into the charging-chamber until the float 105 is elevated sufficiently to open the port 98 in the upper end of the compressed-air or gas supply pipe 25 and close port 100, leading to the open air, when air or gas under pressure will flow through pipe 23 into pipe 25 to the top of the charging-chamber until the pressure above the beer is sufficient to counteract the flow of the beer.

During the operation of the machine the cock 108, controlling port 100, is left open. By reason of the double pin-valve 99, operated by float 105 and controlling ports 98 and 101, the pressure of the compressed air or gas and the beer in the charging-chamber balance each other. Any tendency of the air or gas pressure to become too great will immediately be checked by reason of the falling of the level of the beer, causing the lowering of float 105, which immediately opens port 100 by moving stem 99 away from valve-seat 101 and closes port 98 by seating the valve-stem therein. This action is instantly followed by the reduction of pressure in the charging-chamber by reason of the exhaust through port 100, and immediately following the reduction of pressure the beer rises in the chamber to be checked by the opening of port 98 and closing of port 100 through the action of the double float-valve, allowing the air or gas pressure to again accumulate and balance the beer. By this mechanism the level and pressure of the beer in the charging-chamber are maintained uniform.

In the filling of the bottles the plug 75 of the charging-cock is rotated to first open up communication between the compressed-air or gas space of the charging-reservoir and the bottle through the passage 72 and hollow post 19, and immediately after communication is opened through the filling-port 71. As the beer flows into the bottle through the filling-tube the air or gas under pressure will flow out through the neck of the bottle into passage 72, hollow post 19, and port 112 and back into the air or gas space of the charging-chamber, the beer flowing into the charging-chamber through pipe 10 to take the place of the beer that has filled the bottle. The bottle is given ample time to fill during the rotation from the cock-opening device 80 to the cock-closing device 90, or one-half a revolution of the machine. In this manner the bottles are continuously filled and removed in readiness for corking.

In the modification shown in Fig. 10 the machine is essentially the same, but differs in details of construction which are necessary to adapt the invention to a barrel-filling machine. The central hollow shaft 115 is journaled in suitable bearings 116 and supports at its upper end the charging-chamber 117, constructed exactly as described in connection with the preferred form of the invention. At the lower end of the hollow shaft 115 is the rotatable valve-plug 118, operating in the valve-casing 119, through which are supplied the beer and compressed air or gas which pass through the pipes 120 and 121. Keyed to the shaft 115 is a bevel-gear 123, meshing with a similar gear 124 upon transverse power-driven shaft 125, by which the shaft 115 and supported parts may be intermittently operated under the control of a suitable foot-operated clutch mechanism, which is not shown.

130 is a frame or rotatable table supported upon trucks 131 and connected with the vertical shaft 115 to rotate with it.

133 is one of a series of cradles for supporting barrels 134 in position beneath the series of barrel-filling heads 135, (only one of which is shown,) which are provided with cocks 136, controlling the communications with the charging-chamber through the beer-supply pipes 137 and air-supply pipes 138. This part of the mechanism may be of any suitable construction and is not described in detail.

The features in common between the preferred form of my machine and this modified form are covered in my present application; but the features which are peculiar to a barrel-filler will be covered in a later application to be filed by me.

By the term "bottle-supporting frame" I intend to cover any supporting-frame adapt-

ed to hold a bottle, barrel, or other package to be filled.

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

1. In a filling-machine, the combination of a charging-chamber, filling devices having liquid and air or gas communications with said charging-chamber, a cock controlling said communications, a liquid-supply pipe leading to said charging-chamber, a compressed-air or gas supply pipe also leading to said charging-chamber, an exhaust-port leading from said charging-chamber to the open air, a combination-valve adapted to alternately close the compressed-air or gas supply pipe and said exhaust-pipe, and a float connected with and controlling the operation of said valve, substantially as set forth.

2. In a filling-machine, the combination of a charging-chamber, filling devices having liquid and air or gas communications with said charging-chamber, a cock controlling said communications, a liquid-supply pipe leading to said charging-chamber, a compressed-air or gas supply pipe also leading to said charging-chamber, an exhaust-port leading from said charging-chamber to the open air, valve-seats formed in the compressed-air or gas supply pipe and exhaust-port, a double pin-valve adapted to engage the seats of said supply-pipe and exhaust-port, and a float connected with said double pin-valve, substantially as set forth.

3. In a filling-machine, the combination of a charging-chamber having automatically-controlled compressed-air or gas and liquid supplies, a series of filling-heads having liquid and gas passages communicating with the charging-chamber, cocks in said filling-heads adapted to close the liquid and gas passages, means for supporting the bottles or other packages in filling relation to the filling-heads, means for rotating the series of filling-heads and package-supporting means, an operating device, and automatic devices, operated by said operating device and simultaneously with said rotating filling-heads and package-supporting means, adapted to independently and automatically open and close the cocks of the filling-heads as they are successively brought into position by the rotation of the filling-heads, substantially as set forth.

4. In a filling-machine, the combination of a rotating frame supporting a charging-chamber, a series of filling-heads carried by said frame and communicating with the charging-chamber, rotary cocks in the filling-heads, vertically-movable operating devices thrown into engagement with the cocks by the rotation of the filling-heads, and a rotating series of bottle-supports, substantially as set forth.

5. In a filling-machine, the combination of a rotating frame supporting a charging-chamber, a series of filling-heads carried by said frame and communicating with the charging-chamber, cocks in the filling-heads, a rotating series of vertically-movable bottle-supporting frames, and a vertically-movable operating device thrown into and out of engagement with the bottle-supporting frames successively by the rotation of the same, substantially as set forth.

6. In a filling-machine, the combination of a rotating series of filling-heads in communication with a charging-chamber, a rotating series of vertically-movable bottle-supports mounted beneath the charging-heads, means for rotating the bottle-supports and filling-heads, a vertically-movable hook-rod adapted to engage the bottle-supports successively, and means for simultaneously operating said rod and rotating the bottle-supports and filling-heads, substantially as set forth.

7. In a filling-machine, the combination of a rotating series of filling-heads communicating with the charging-chamber, a rotating series of vertically-movable bottle-supports mounted beneath the filling-heads, a vertically-movable yielding hook-rod adapted to successively engage the vertically-movable bottle-supports, means for simultaneously rotating the filling-heads and bottle-supports and operating the hook-rod, whereby one of the bottle-supports will be engaged by the hook-rod and drawn into lowered position and the hook-rod will spring back into normal position when released, substantially as set forth.

8. In a filling-machine, the combination of a rotating series of filling-heads, a rotating series of vertically-movable spring-supported bottle-supports, a yielding vertically-movable hook-rod adapted to successively engage the bottle-supports, and means for simultaneously operating the hook-rod and rotating the series of bottle-supports, substantially as set forth.

9. In a filling-machine, the combination of a rotating series of filling-heads, a rotating shaft upon which said filling-heads are mounted, a series of inclined bars mounted upon said shaft, a series of vertically-movable spring-supported bottle-supports mounted upon said inclined bars, means for rotating said series of bottle-supports, a yielding hook-rod adapted to successively engage the bottle-supports, and means for operating the hook-rod simultaneously with the rotation of the bottle-supports, substantially as set forth.

10. In a filling-machine, the combination of a rotating series of filling-heads in communication with the charging-chamber, a rotating series of bottle-supports, a vertically-movable hook-rod adapted to successively engage the bottle-supports, a spring-actuated lever 63 engaging the hook-rod, a foot-lever to which the rod is connected, and means for rotating the bottle-supports and filling-heads from said foot-lever, substantially as set forth.

11. In a filling-machine, the combination of a rotating series of filling-heads in communication with the charging-chamber, a series of bottle-supports mounted beneath the filling-

heads, cocks in the filling-heads, operating-arms upon the cocks, a vertically-movable yielding rod adapted to successively engage the operating-arms of said cocks, and means for simultaneously operating said rod and rotating the series of filling-heads, substantially as set forth.

12. In a filling-machine, the combination of a rotating series of filling-heads communicating with the charging-chamber, a series of bottle-supports mounted beneath the filling-heads, cocks in said filling-heads provided with hook-operating arms, a vertically-movable yielding rod formed with an operating-finger adapted to successively engage the operating-arms of said cocks, and means for simultaneously rotating the series of filling-heads and operating said yielding operating-rod, substantially as set forth.

13. In a filling-machine, the combination of a rotating series of filling-heads communicating with the charging-chamber, a series of bottle-supports mounted beneath the filling-heads, cocks in said filling-heads provided with hook-operating arms, a vertically-movable yielding rod formed with an operating-finger adapted to successively engage the operating-arms of said cocks, a suitable bracket laterally confining said yielding vertically-movable rod, and means for simultaneously rotating the series of filling-heads and operating said yielding operating-rod, substantially as set forth.

14. In a filling-machine, the combination of a rotating series of filling-heads communicating with a charging-chamber, a series of bottle-supports mounted beneath the filling-heads, cocks in the filling-heads formed with double hook arms or levers, and two vertically-movable laterally-yielding operating-rods adapted to simultaneously engage the hook-arms of the successive cocks, and means for simultaneously rotating the filling-heads and bottle-supports and operating said vertically-movable rods, substantially as set forth.

15. In a filling-machine, the combination of a rotatable hollow shaft 10, a charging-chamber mounted upon said shaft, a series of filling-heads upon said charging-chamber, a series of bottle-supports mounted upon said shaft, a compressed-air or gas supply pipe mounted within the hollow shaft 10 and projecting up into the charging-chamber, a valve-plug 20 secured to the lower end of the hollow shaft 10, a port 20^a in communication with the shaft 10, a port 20^b in communication with the air or gas supply pipe, and liquid and air or gas supply pipes in constant communication with said ports 20^a and 20^b respectively, substantially as set forth.

16. In a filling-machine, the combination of a rotary shaft 10, a charging-chamber mounted upon said shaft, a series of charging-heads upon said charging-chamber, a series of bottle-supports mounted upon said shaft beneath the charging-head, a ratchet keyed to said shaft, an oscillatory arm 33 formed with contracted end 33^a, a pawl 31 mounted upon said arm 33 and engaging the ratchet, a forked lever engaging the end 33^a of said arm, and a foot-lever connected with said forked lever, substantially as set forth.

EDGAR FRIEDMAN.

Witnesses:
WM. E. KNIGHT,
M. V. BIDGOOD.