Feb. 2, 1932. J. E. HENES 1,843,363

BOTTLE FILLING MACHINE

Filed Oct. 29, 1928 3 Sheets-Sheet 1

FIG. 1.

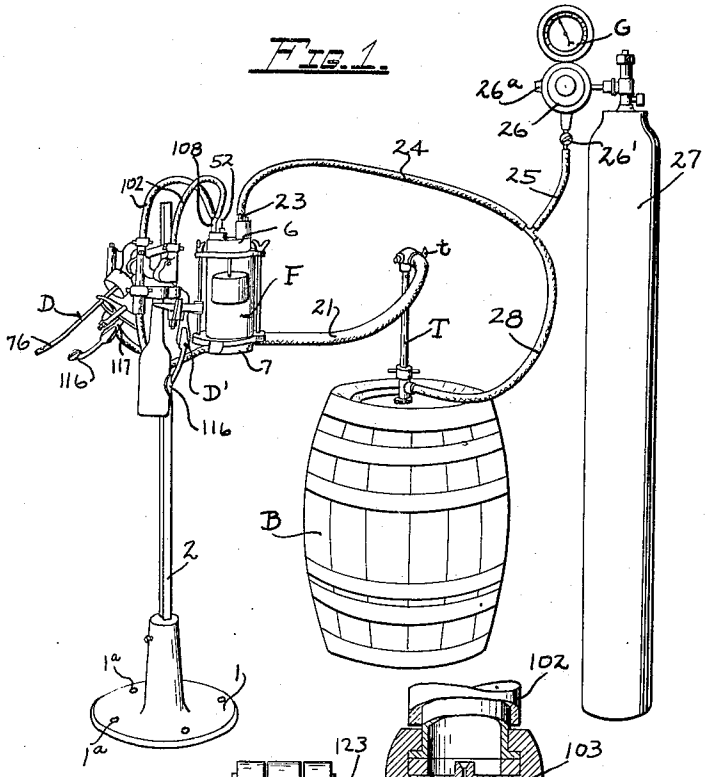
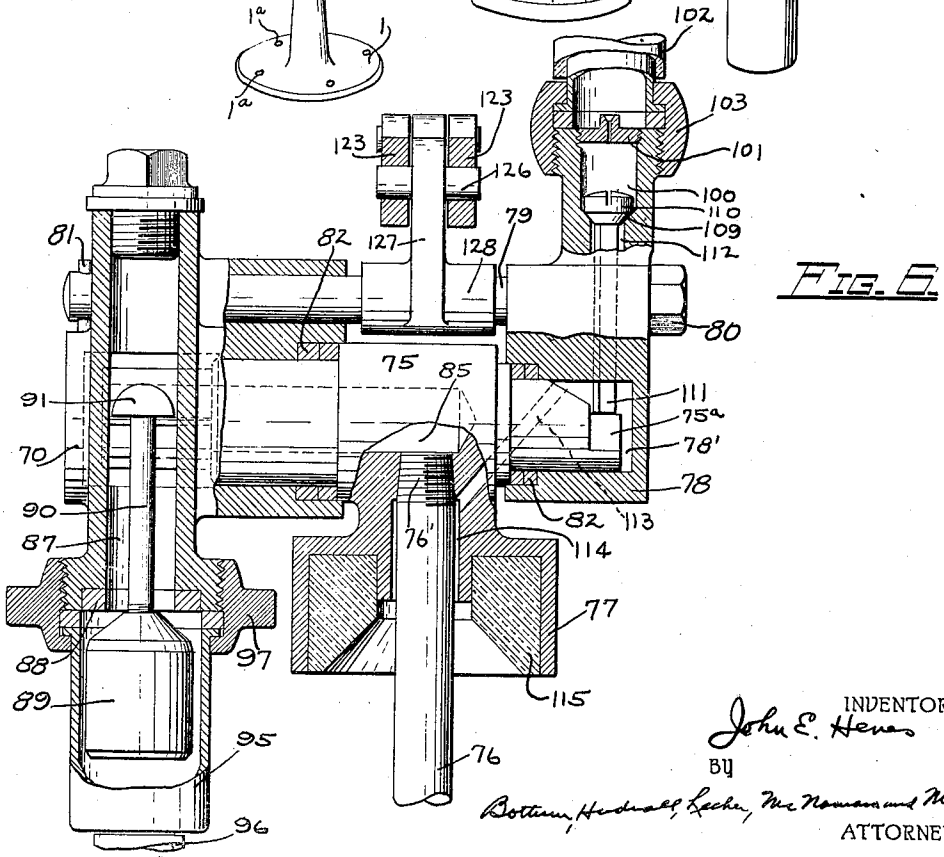


FIG. 6.



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Filed Oct. 29, 1928 3 Sheets-Sheet 2

FIG. 4.

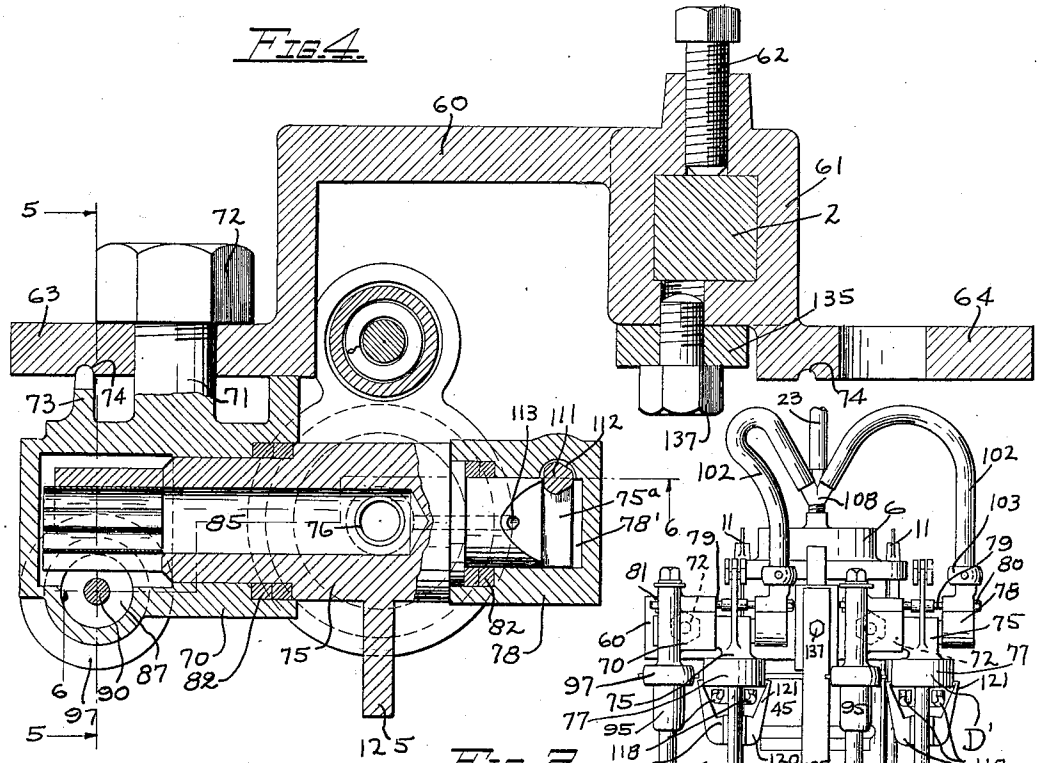


FIG. 2.

FIG. 3.

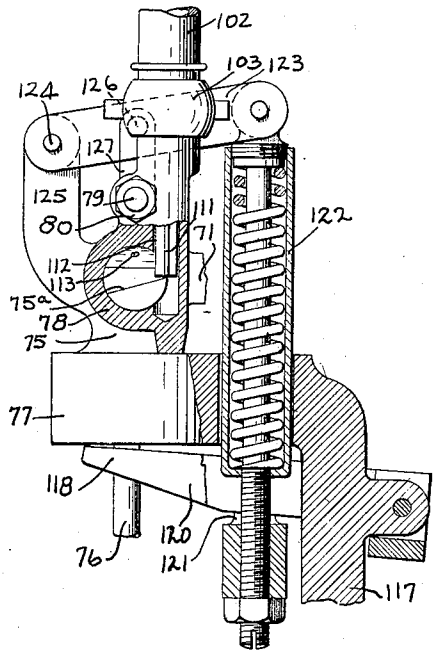
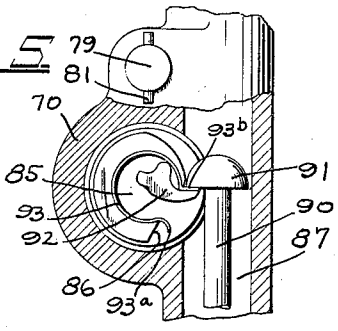


FIG. 5.



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Filed Oct. 29, 1928 3 Sheets-Sheet 3

FIG. 9.

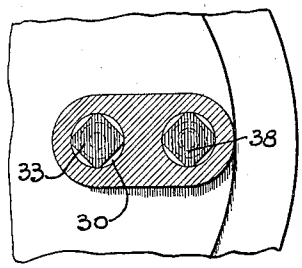


FIG. 8.

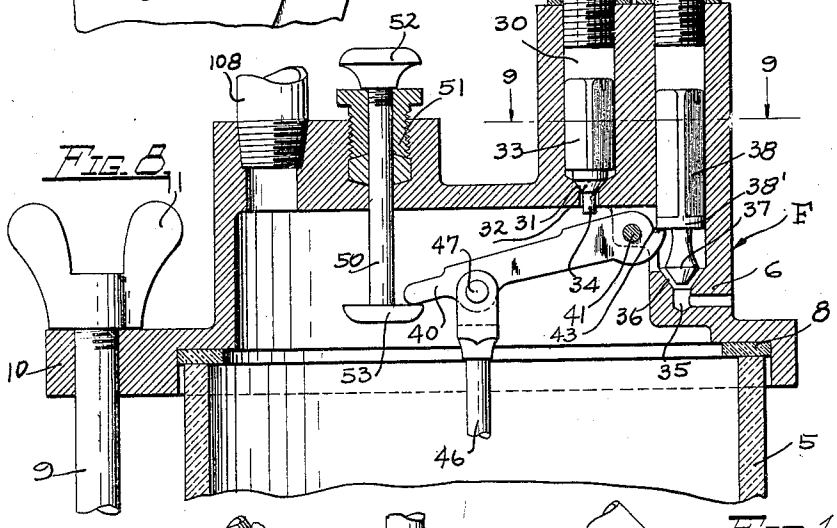


FIG. 7.

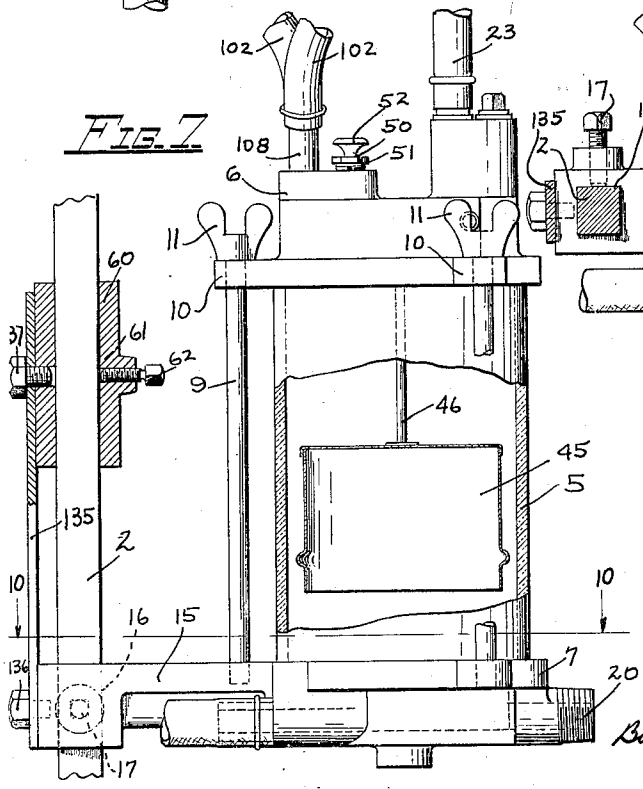
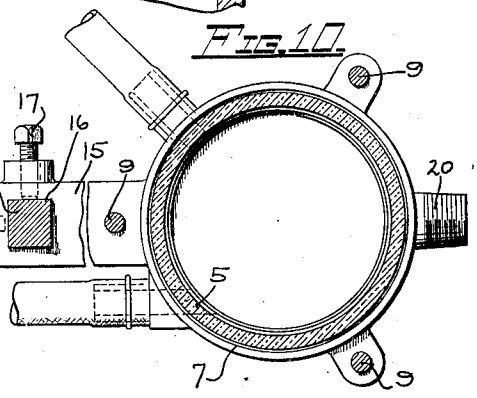


FIG. 10.



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UNITED STATES PATENT OFFICE

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BOTTLE FILLING MACHINE

Application filed October 29, 1928. Serial No. 315,606.

This invention relates to a bottling apparatus of the counterpressure type for bottling carbonated or effervescing beverages or liquids in such manner as to avoid foaming, loss of gas from the liquid, and loss of the liquid during the operation of bottling and the present invention relates more particularly to a machine of this character of simplified and light weight construction designed primarily for use in small bottling establishments.

One of the principal objects of the present invention is to provide a machine of this character which is of simple and light-weight though durable construction so as to be conveniently portable and which embodies means for facilitating the proper setting up and assembly of the parts of the machine and the adjustment or adaptation of these parts to satisfy the requirements of the varying conditions met in the small establishments in which a machine of this character is used. Due to its simplified construction a machine embodying the present invention may be manufactured and sold at a comparatively small cost.

Another object of the invention resides in the provision of a counterpressure bottle filling machine of this type which embodies means adapted to be quickly and easily associated with the source of carbonated liquid and with the source of gas pressure, and operable to supply these fluids to the filling head as and when the same are required for filling a bottle.

A machine embodying the present invention as to some of its features is of the type of Patents 582,285, granted May 11, 1897, to Henes and Keller for apparatus for bottling liquids; 655,443, granted August 7, 1900, to F. C. Keller for bottle filling machine; and 1,166,520, granted January 4, 1916, to J. E. Henes for bottle filling machine, but along with certain entirely new features involves a radical re-organization and reconstruction of the devices shown in these patents in order to provide a portable light-weight machine adapted for advantageous use in small establishments.

In carrying out the present invention a supporting means is provided and comprises a base adapted to be fastened to the floor or other suitable foundation and having a standard or post extending upwardly therefrom. A filling reservoir for the liquid to be bottled is carried by a bracket adjustably mounted on the standard. The filling reservoir has liquid supplying, gas supplying and gas venting connections, and valves controlling said gas connections and automatically opened and closed under the control of means responsive to maintain a proper level of liquid therein.

A number of filling heads, usually two, are also carried by a bracket mounted on the standard for vertical adjustment and adapted to be releasably secured in any adjusted position. Each liquid dispensing unit includes a filling siphon, preferably in the form of a tube adapted to project down into a bottle, and a gas supply cap surrounding the siphon and having a packing ring or other packing means adapted to engage the neck of the bottle to seal the joint between the bottle and the gas supply cap. The filling heads are mounted for oscillatory movement and each is provided with a yieldable clamping jaw arrangement designed to automatically engage the shoulder provided by the neck of the bottle and to force the bottle into proper engagement with the packing ring when the bottle is put in place in the filling head and both are rocked to bottle filling position. The liquid space of the filling reservoir and the gas space thereof have valve controlled connections with the filling siphon and gas supply cap respectively, and these valves are automatically operated by the rocking of the filling heads so that when a bottle is operatively engaged with a filling head and the filling head is moved to bottle filling position, the valves will be automatically opened first to permit pressure to build up in the bottle to a point equal to the pressure of the carbonated liquid and then, when the pressures are equalized, to permit the carbonated liquid to flow by gravity from the filling reservoir into the bottle. Flexible pipes connect the filling reservoir with the filling heads. In order to maintain the fill-

30 (see Figure 8) having, adjacent its point of communication with the interior of the cylinder 5, a valve seat 31 with which a valve 32 coacts; the valve has a guide 33. The weight of the guide and of the valve, as well as the pressure, operate to seat or close the valve. The valve also has a stem 34 which projects down into the filling reservoir. To one side of the gas supply connection a relief port or vent passage 35 is provided and one part of the vent passage is formed to provide a valve seat 36 with which a valve 37 is cooperable. The valve 37 also has a guide 38 and the weight of the guide and of the valve as well as the pressure in the filling reservoir F tends to seat the valve 37.

Means is provided for permitting of the convenient manual control as well as automatic control of these valves, although, for the most part, the position of the valves is automatically controlled by means responsive to the level in the filling reservoir. In carrying out these purposes a valve operating lever 40 is provided and is fulcrumed as at 41 on the head 6. The valve stem 34 lies in the vertical plane in which the valve lever 40 swings so that when the valve lever 40 swings upwardly to a predetermined extent it engages the stem 34 and lifts the valve 32 off of its seat. On the opposite side of the pivot or fulcrum 41 from the main portion of a lever a shoulder 43 is provided and is engageable with a flange 38′ formed in between the valve 37 and its guide 38. When the main portion of the lever 40 swings upwardly, the shoulder 43 swings downwardly and permits the valve 37 to close. Upon continued upward swinging of the upward portion of the lever 40, the lever 40 eventually engages the stem 32 of the pressure supply valve and lifts this valve from its seat to permit pressure to flow into the filling reservoir. For effecting this operation automatically a bell 45 is disposed in the cylinder 5 and is carried at the lower end of a rod 46 the upper end of which is pivoted as at 47 to the lever 40. The bell 45 is raised and lowered in accordance with level changes in the liquid in the cylinder 5 and its raising and lowering effects proper control of the valves 32 and 37 as will be hereinafter more fully described.

In starting the operation it is necessary to manipulate the valves 32 and 37 manually or independently of the bell and for this purpose a manually controllable operating rod 50 is provided and is slidably extended through a stuffing box 51 provided in the head 6. The upper end of the rod 50 is formed with a finger piece 52 to facilitate manipulation thereof and the lower end of the rod is flanged as at 53 to engage under the lever 40. When the finger piece 52 is gripped and the rod 50 pulled upwardly the flange 53 at the lower end of the rod lifts the outer extremity of the lever 40 and so swings the lever 40 as to cause it to permit the valve 37 to close and open the valve 32.

In the machine shown, two filling heads are employed and for the purpose of adjustably supporting both of these heads D and D′ on the standard 2, a single bracket 60 is provided (see Figure 4) and has a centrally disposed socket member 61 which telescopes over the standard 2 and which is releasably secured thereto in any vertical adjustment by means of a set screw 62. Integral with the bracket and extending from the opposite sides thereof are supporting wings 63 and 64. The filling heads D and D′, which are mounted on the wings 63 and 64, respectively, are of identical construction and so a single description will serve for both.

As shown in Figure 4, the wing 63 is of angular formation to provide the clearance necessary for its filling head. The wing 64 is shorter than the wing 63 and is straight as its filling head is located beyond the right hand side of the same.

Each filling head comprises a hollow body portion or bearing 70 having an integral rearwardly directed stud 71 passing through an opening provided in its wing of the bracket and secured in position on the bracket by means of a nut 72 threaded on the stud 71 and pulling the body toward the associated wing of the bracket. The bearing or body portion 70 also has a rearwardly directed lug 73 which interfits with a groove 74 provided in the associated wing of the bracket. In this way the bearing 70 is rigidly held in position on its bracket. A trunnion 75 is rotatably fitted in the bearing 70 and this trunnion 75 carries the liquid or filling siphon 76 and the gas supply cap or nozzle 77. The supporting of the trunnion is completed by means of a cap member 78 which fits over the opposite end of the trunnion and which is supported from the bearing 70 by means of a rod 79 passing through the alined apertured lugs formed on the body and on the cap and held in position by suitable fastening means such as a nut 80 and pin 81. At the points where the trunnion enters the bearing 70 and enters the cap 78 packing 82 is provided to seal the joint between these parts.

As clearly shown in the drawings, the filling siphon 76 is preferably in the form of a tube having one end threaded as at 76′ into the body of the trunnion located between the bearing 70 and the cap 78 and the inner end of this tube communicates with an axial passage 85 provided in the trunnion 75 and extending from a point adjacent to but spaced from one end of the trunnion out through the other end of the trunnion. The end of the trunnion through which the axial passage 85 extends is reduced and is not only hollow but has a slot 86 extending through one portion of its periphery. The slotted portion 86 of the trunnion is located in proximity to and is

in communication with a valve chamber 87 formed integral with the bearing 70 and having a valve seat 88 with which a liquid supply valve 89 is cooperable. The valve 89 has a stem 90 formed with a head 91 at its upper end and the head 91 is under the control of an operating member 92 positioned in the axial passage 85 and projecting through the slot 86 of the trunnion. The operating element 92 is yieldably held in position to engage the head 91 of the valve 89 by means of a spring 93 engaging the wall of the passage 85 and having one end 93^a engaging one wall of the slot 86 and having its other end 93^b secured to the operating element 92. The body of the valve 89 operates in a fitting 95 secured to one end of a flexible pipe 96 and coupled as at 97 to the valve chamber 87. The end of the pipe 96 opposite the fitting 95 is connected to a nipple provided therefor on the lower head 7 of the filling reservoir and has free and open communication with the liquid space of the filling reservoir whereby when the valve 89 is open liquid may flow from the filling reservoir to the filling siphon 76 and thence into the bottle.

The cap 78 of each filling unit has an integral valve chamber 100 communicating through the port of a suitable pressure reduction device 101 with one end of a flexible pipe 102 coupled as at 103 to the valve chamber and communicating through a suitable fitting 108 which is threaded into the head 6 of the filling reservoir and has open communication with the gas space of this reservoir. The valve chamber 100 is formed with an internal valve seat 109 with which a pressure supply valve 110 coacts. The valve 110 has a valve stem 111 which extends down through an opening 112 formed in the cap 78 and communicating with the main chamber or opening 78′ of the cap. The end of the trunnion which operates in the cap 78 is cut away and formed with a flat surface 75^a just below the valve stem 111. These parts are so proportioned that when the filling head is rocked to bottle filling position the flat surface 75^a will engage the stem 111 and lift the valve 110 from its seat thereby permitting the gas to flow past the valve 110, through the passage 112 into the chamber 78′ of the cap and thence through passages 113 and 114 formed in the trunnion and cap 77 into the interior of the cap and around the outside of the filling siphon 76. The cap 77 is provided with a packing ring or gasket 115 engageable with the neck of the bottle to seal the bottle to the cap (see Figure 6).

Each filling head carries a bottle holding and clamping arrangement designed to automatically engage the shoulder provided by the neck of the bottle and force the bottle into proper sealing engagement with the packing ring 115 when the filling head is rocked to bottle filling position. This holding or clamping arrangement is preferably of substantially the same construction as that shown in prior Patent Number 582,285, granted May 11, 1897, to Henes and Keller for apparatus for bottling liquids, and, as illustrated, includes a rest or shoe 116 provided at the lower end of the sectional supporting arm 117, the sections of the supporting arm 117 being adapted to be adjusted with respect to each other and to be clamped in adjusted position to vary the position and inclination of the shoe 116. The arm 117 has its upper section integrally formed with or rigidly connected to the trunnion 70 of its filling head. A pair of gripping jaws 118 is carried by the upper section of the arm 117 and the jaws are supported for rocking movement about vertical and horizontal axes. A closing or camming member 120 is provided and has inclined arms 121 embracing and coacting with the jaws 118. This closing member 120 is supported by an extensible link 122 on a rocker 123 having one end pivotally connected to the upper end of the link 122 and having its other end pivotally connected as at 124 to a lug 125 integral with the trunnion 75. The central portion of the rocker 123 is pivotally connected as at 126 to an arm 127 having a bearing sleeve 128 integral at one end and loosely fitted on the pin 79. With this arrangement, when a filling head is swung inwardly to bottle filling position the inner end of the rocker 123 swings upwardly thereby pulling link 122 and the closing member 121 upwardly and camming the gripping jaws 118 in engagement with the shoulder beneath the neck of the bottle and forcing the bottle up into sealing contact with the packing ring 115. On reverse movement of the filling head, that is, when it is swung outwardly, the closing member 121 is moved downwardly and the jaws 118 drop down onto a spreader such as shown as h4 in Patent 582,285 above referred to which opens to release the bottle. Since the liquid is transferred from the filling reservoir, through the filling head and into the bottle by a siphoning action the relative vertical positions of the filling reservoir and filling heads are critical. And once the proper relation has been established between these parts it is usually unnecessary to disturb it and it is undesirable that it should be disturbed. To permit of simultaneous vertical adjustment of the filling head and filling reservoir while maintaining their proper relative positions, a tie bar 135 is provided and is releasably secured at its opposite ends to the brackets 15 and 60 as by means of set screws 136 and 137. The bar 135 may be made up of adjustably connected sections or they may have a plurality of openings for the set screws 137 to permit of variation of the vertical spacing of the brackets which they connect. Usually, however, the brackets are tied together in proper

relation at the factory and it is not necessary to disturb this relation. By loosening the set screws 17 and 62 the filling reservoir and the filling heads may be freely adjusted along the standard 2 without disturbing the relative position of these elements.

In starting a bottle filling operation the filling heads D and D′ are swung forwardly to closed position. The cock *t* on the tapping rod T and the cock 26′ on the gas regulator is closed. By means of the usual hand screw 26ª on the gas regulator 26 the amount of pressure fed to the line 25 and consequently to the gauge G is adjusted until the gauge possesses the proper amount of pressure which is usually somewheres between five and twenty pounds. The gas cock 26′ is now opened which places the pressure on the liquid in the keg B. The operating rod 50 is then pulled upwardly as far as it will go to open the valve 32 and close the valve 37 thereby admitting the pressure to the cylinder 5 of the filling reservoir and establishing the same pressure therein as that previously placed on the liquid in the barrel B. The cock *t* is next opened but due to the equalization of the pressures on the liquid and in the filling reservoir no flow of liquid from the barrel B to the reservoir will occur until the rod 50 is lowered to close the valve 32 thereby shutting off the pressure and to open the valve 37 controlling the escape of the pressure from the cylinder 5 to the atmosphere. At this time the operator places his finger over the venting passage to restrict the escape of pressure. The pressure must be made to escape very slowly so that the liquid will rise within the filling reservoir slowly and without agitation. When the liquid has reached the proper level the bell 45 is raised thereby to cause the lever 40 to permit the valve 37 to close and to open the valve 32. The opening of the valve 32 and the closing of the valve 37 places the same pressure on the liquid in the filling reservoir as is acting on the liquid of the barrel B and consequently prevents further flow of the liquid at this time. The bottles to be filled are now placed in the filling heads and the bottles and filling heads are pushed inwardly until the filling heads are in filling position. This opens the valves 89 and 110 in the filling heads to establish the same proper pressure in the bottles as that acting on the liquid and to open the passages permitting flow of the liquid from the reservoir into the bottles. Siphon flow is now established by slightly pulling down on each bottle and allowing just a little pressure to escape from between the mouth of the bottle and its sealing or packing rubber ring 115. When the bottles are filled the operator pulls upwardly and outwardly on the shoes 116 with a steady motion which closes both valves 89 and 110. Filled bottles are immediately replaced by empty ones and the filling operation repeated.

As the level of the liquid in the filling reservoir lowers the bell 45 moves downwardly to open the valve 37 and close the valve 32 thereby reducing the pressure above the liquid in the filling reservoir and permitting the pressure acting on the liquid in the barrel B to force the liquid into the filling reservoir until the proper level in the filling reservoir has been established.

The invention claimed is:

1. A bottle filling machine including a standard, a filling reservoir, a filling head, and separate brackets carrying said filling reservoir and filling head and adjustably mounted on the standard.

2. A bottle filling machine comprising a filling reservoir, liquid supply, gas supply and gas venting connections therefor, valves controlling said gas connections, means cooperable with said valves for maintaining a predetermined level of liquid in said reservoir, a filling head including a filling siphon and a gas supply cap having valve controlled connections with the liquid and gas spaces, respectively, of the reservoir, a common supporting means, and individual adjustable mountings between the reservoir and filling head and the common supporting means.

3. A bottle filling machine comprising a filling reservoir, liquid supply, gas supply and gas venting connections therefor, valves controlling said gas connections, means responsive to level conditions in said filling reservoir and controlling said valves for maintaining the proper level of liquid therein, an adjustably supported bracket carrying said filling reservoir, a filling head having a filling siphon, a gas supply cap or nozzle, and means for clamping and sealing a bottle, valve controlled connections between said filling reservoir and said filling head, an adjustably supported bracket carrying said filling head, and means constraining said brackets against relative movement with respect to each other while permitting simultaneous adjustment thereof.

4. A bottle filling machine comprising a filling reservoir, a bracket carrying said reservoir and supported for vertical adjustment, a filling head, a bracket carrying said filling head and supported for vertical adjustment, and means for holding said brackets against movement relative to each other while permitting simultaneous adjustment thereof.

5. A bottle filling machine comprising a filling reservoir, a bracket carrying said reservoir and supported for vertical adjustment, a filling head, a bracket carrying said filling head and supported for vertical adjustment, and means for holding said brackets against movement relative to each other while permitting simultaneous adjustment thereof and comprising a tie bar releasably secured to said brackets.

6. A bottle filling machine comprising sup-

porting means including a standard, a filling reservoir having liquid supply, gas supply, and gas venting connections, valves controlling said connections, means responsive to level conditions in said reservoir for maintaining a proper level of liquid therein, a bracket carrying said filling reservoir, means for adjustably securing the bracket to the standard, a second bracket adjustably secured to the standard and having a pair of wings, means for adjustably securing said second bracket to the standard, an oscillatory filling head carried by each wing of the second bracket, and including a filling siphon and a gas cap or nozzle having connections with the liquid space and gas space, respectively, of said filling reservoir, and valves for said connections controlled by the oscillation of said head, and a tie bar for constraining the brackets to simultaneous adjustment.

7. A bottle filling machine comprising supporting means including a standard, a filling reservoir having liquid supply, gas supply, and gas venting connections, valves controlling said connections, means responsive to level conditions in said reservoir for maintaining a proper level of liquid therein, a bracket carrying said filling reservoir, means for adjustably securing the bracket to the standard, a second bracket adjustably secured to the standard and having a pair of wings, means for adjustably securing said second bracket to the standard, an oscillatory filling head carried by each wing of the second bracket and including a filling siphon and a gas cap or nozzle having connections with the liquid space and gas space, respectively, of said filling reservoir, and valves for said connections controlled by the oscillation of said head.

8. In a bottle filling machine, a filling reservoir having liquid supply, gas supply and gas venting connections, valves biased to closed position for controlling said gas connections, a lever associated with said valves and operable to permit one to close when opening the other, means responsive to level conditions in said filling reservoir and connected to said lever for controlling said valves so as to maintain a proper level of liquid in said reservoir, and a manually operable rod adapted to be actuated from the exterior of said reservoir and cooperable with the lever for controlling the same and both of the valves independently of the level responsive means.

9. In a bottle filling machine a filling reservoir having liquid supply, gas supply and gas venting connections, valves controlling said gas connections, float controlled operating mechanism connected to said valves and responsive to level conditions in the filling reservoir whereby to control said valves to maintain a proper level of liquid in said reservoir, and a manually controllable operating member adapted to be actuated from the exterior of the reservoir and provided with means cooperable with the valve operating mechanism for actuating said mechanism independently of level conditions in the reservoir.

In witness whereof, I hereto affix my signature.

JOHN E. HENES.