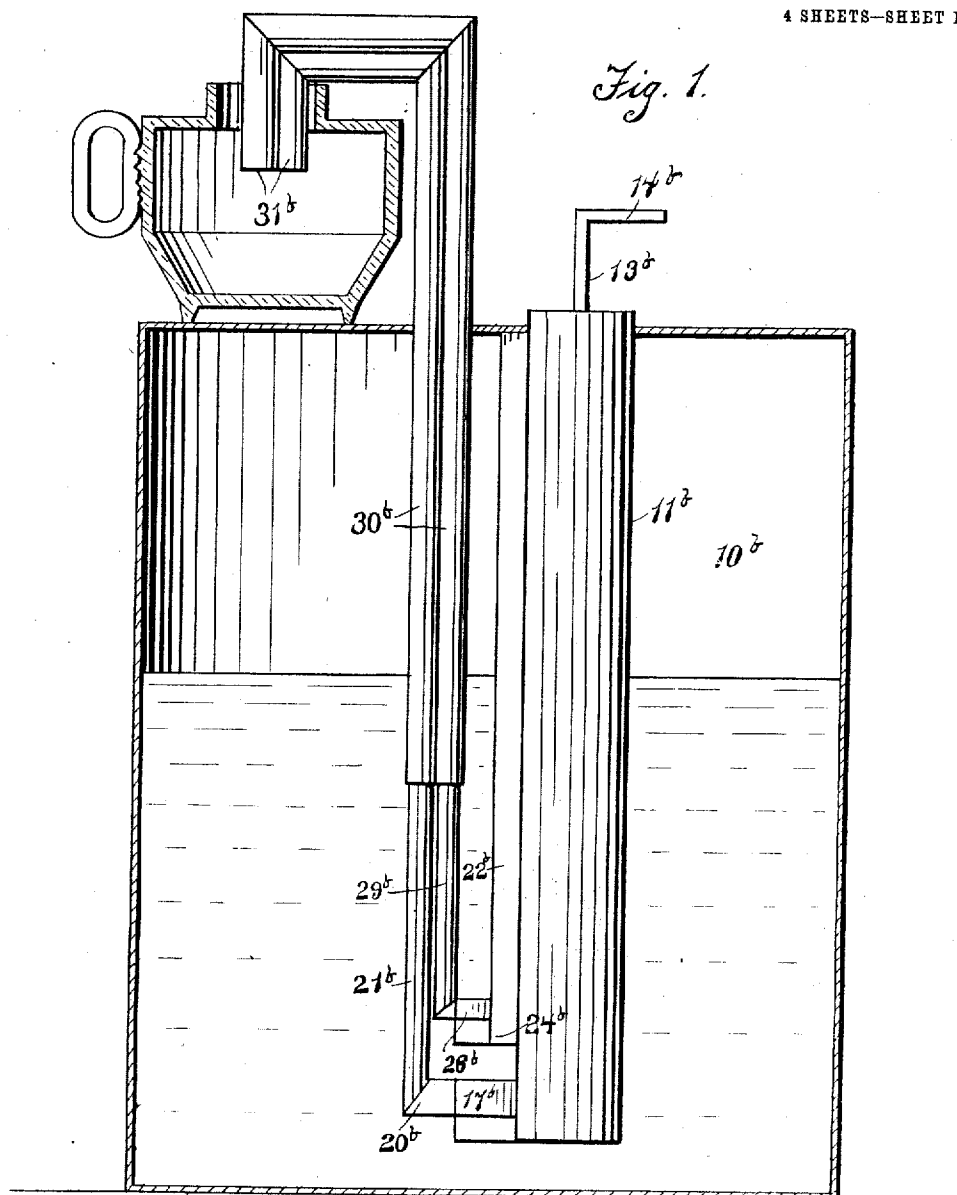


No. 844,445.

PATENTED FEB. 19, 1907.

B. G. FOSTER.
NON-OVERFLOW PUMP.
APPLICATION FILED APR. 17, 1906.

4 SHEETS—SHEET 1.



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No. 844,445.

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4 SHEETS—SHEET 2.

Fig. 2.

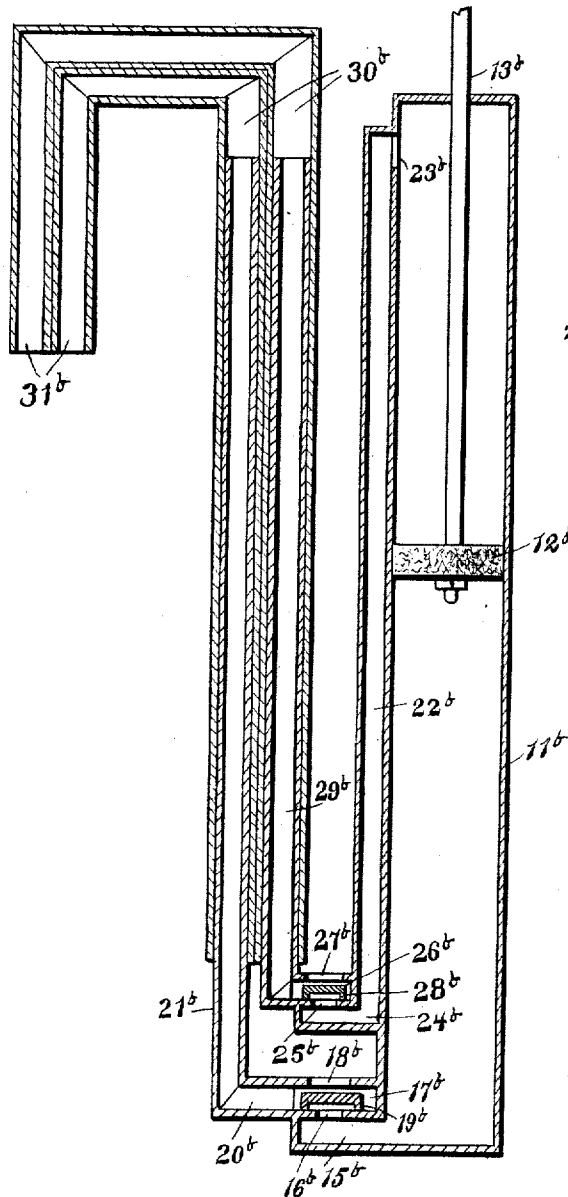
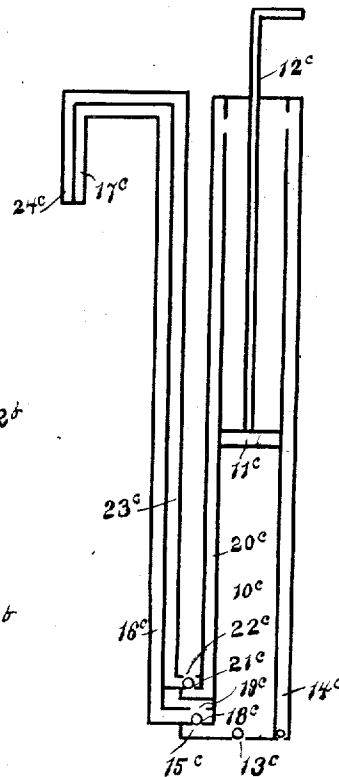


Fig. 3.



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4 SHEETS—SHEET 3.

Fig. 4.

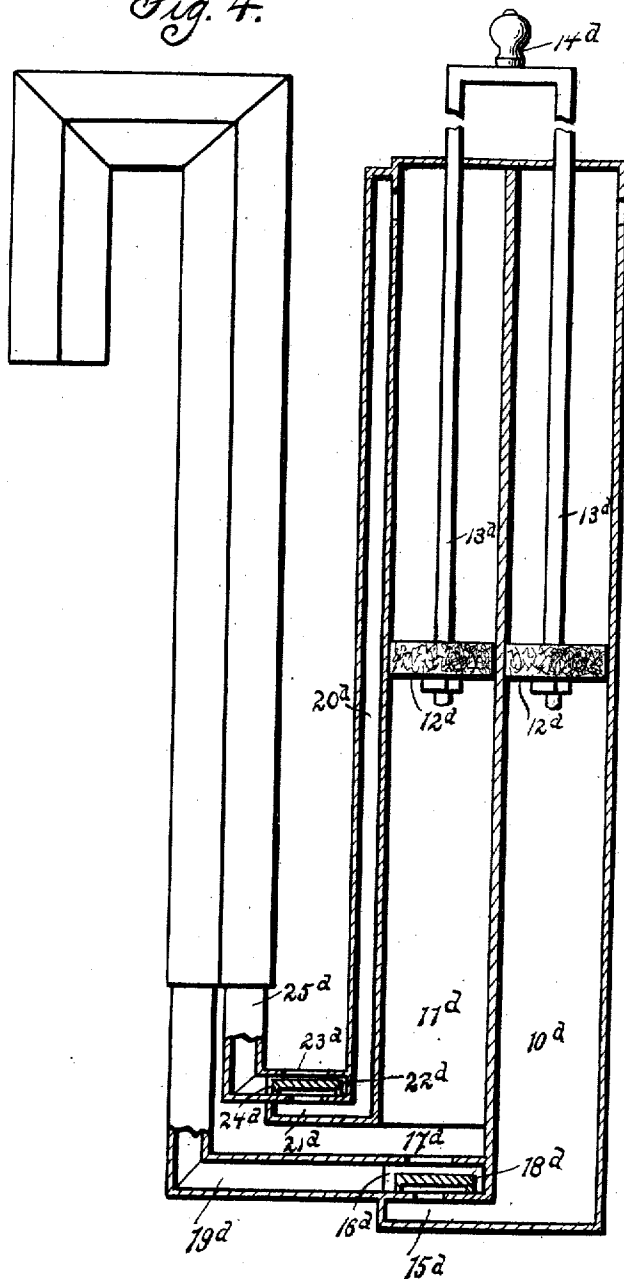


Fig. 8.

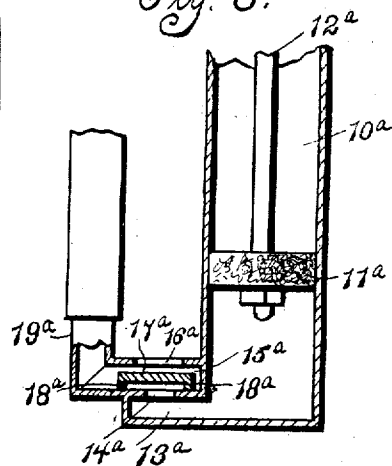
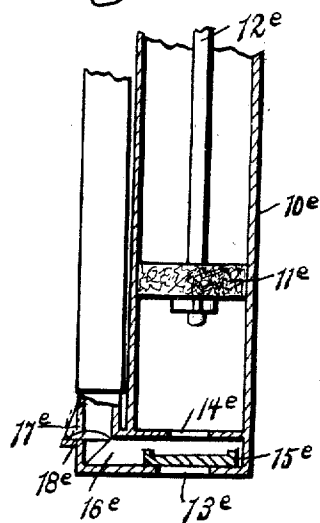


Fig. 9.



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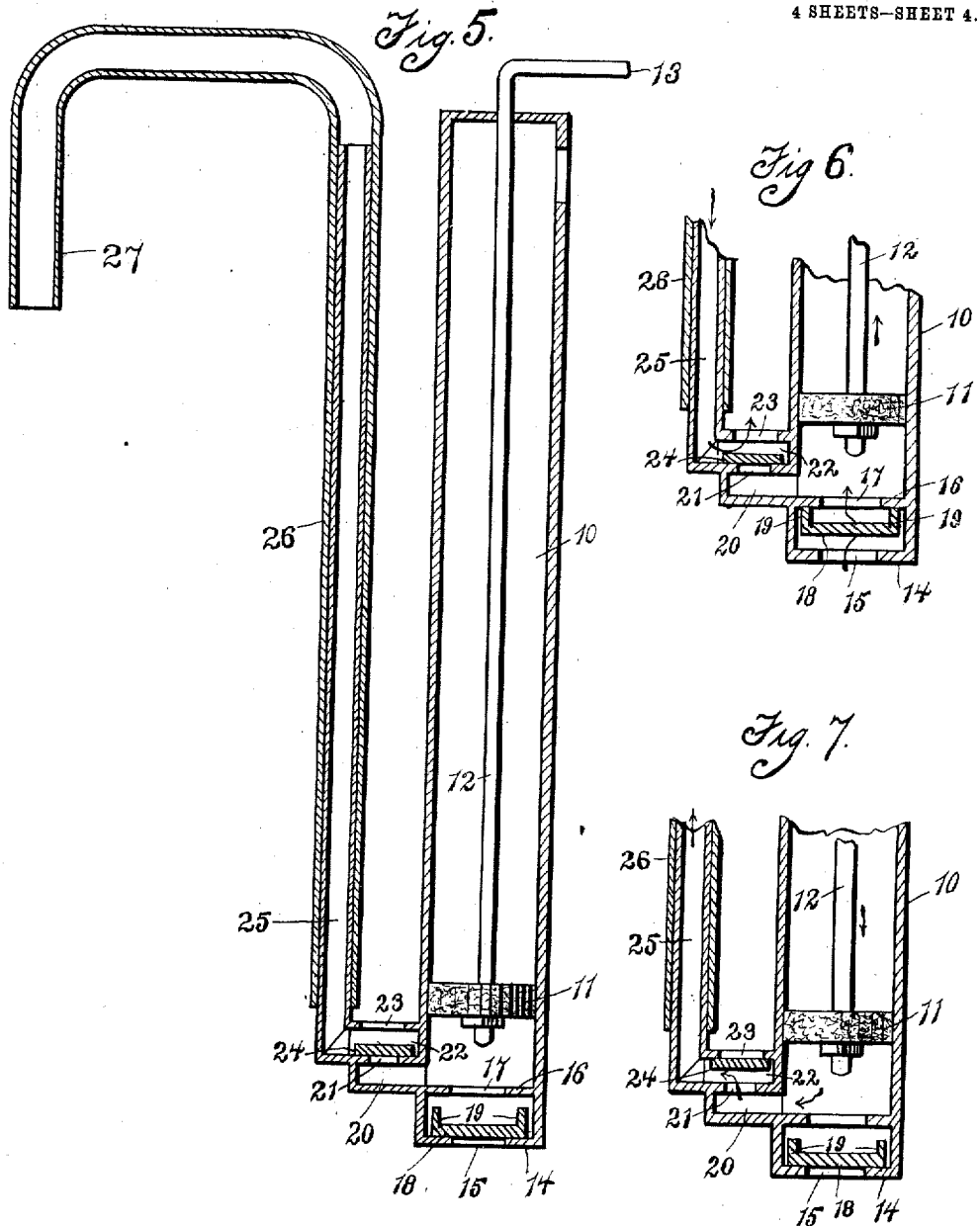
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UNITED STATES PATENT OFFICE.

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NON-OVERFLOW PUMP.

No. 844,445.

Specification of Letters Patent.

Patented Feb. 19, 1907.

Application filed April 17, 1906. Serial No. 312,243.

To all whom it may concern:

Be it known that I, BERTRAM G. FOSTER, a citizen of the United States, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Non-Overflow Pumps, of which the following is a specification.

This invention relates to improvements in cans or reservoirs particularly intended for household purposes and for filling lamps without overflowing the same, though the invention is not restricted to such use, as will be evident to those skilled in the art to which said invention appertains.

More especially, the invention has relation to that type of can in which a pump or pumps are employed for discharging liquid; and the prime object is to provide simple means of a novel nature whereby surplus liquid will be returned to the can or reservoir from the receiving vessel and the overfilling of the latter, with its resultant disagreeable features, thereby avoided.

It is believed to be unnecessary to more particularly set forth the objects at this time, as the same will be clearly realized when the nature and operation of the invention is understood. For such an understanding attention is invited to the accompanying drawings, wherein several embodiments of said invention are illustrated, and to the following description of the same.

Notwithstanding the several forms of the construction shown the said invention is not limited to the same, but is open to further changes and modifications within the scope of the claims hereto appended.

In the said drawings, Figure 1 is a vertical sectional view through a can, showing a pump in elevation therein. Fig. 2 is a vertical sectional view through the pump. Fig. 3 is a sectional view in outline, showing a slight modification of Fig. 2. Fig. 4 is a vertical sectional view of another modification. Fig. 5 is a vertical sectional view of a simple form of pump. Figs. 6 and 7 are detail sectional views through the same, indicating the operation thereof. Fig. 8 is another detail sectional view of a still simpler form, and Fig. 9 is another detail sectional view of still another modification.

While the probably preferred form is illustrated in Figs. 1 and 2, in order that the nature of the invention may be more clearly un-

derstood attention is invited to the embodiment illustrated in Figs. 5, 6, and 7. As therein shown, a pump-barrel 10 is employed, within which operates the usual piston or plunger 11, suitably attached to the lower end of a piston-rod 12, that operates longitudinally in the barrel and is provided at its upper end with a handle 13. The lower end of the barrel 10 has a bottom 14, provided with a central opening 15, and above said bottom is located a partition 16, having another opening 17 therethrough. In the compartment formed by the bottom and the partition is arranged a valve 18, having upstanding legs 19. This valve will thus close the opening 15 of the bottom, but cannot close the opening 17. The result is a valved inlet to the pump cylinder or barrel. The discharge from the pump is through an offset outlet 20, having an opening 21 in its top, which opening communicates with the interior of a valve-casing 22, located directly over the outlet 20. The top of the casing 22 has what may be termed a "siphon-outlet" 23. A valve 24, located in the casing 22, is adapted to alternately close the discharge-opening 21 and the siphon-outlet 23, the latter being preferably of greater diameter than the former, for the reasons hereinafter given. From the valve-casing, preferably at one side, leads a combined discharge and siphon return pipe comprising a lower section 25, rigidly attached to the casing 22, and an upper section 26, slidably telescoped over the section 25 and having a downturned spout 27 at its upper end that constitutes the short arm of a siphon. The operation of this pump will, it is thought, be clearly apparent by referring to Figs. 6 and 7. Assuming the same within an oil-can, it will be apparent that when the plunger is elevated, as indicated in Fig. 6, the lower valve 18 will be raised and the liquid will pass through the inlet into the barrel below the plunger. This upward movement of the plunger will at the same time cause the valve 24 to cover the outlet-opening 21, prohibiting the suction of air downwardly through the discharge-pipe. After the plunger has reached the upper end of its stroke it is forced downwardly. This, as indicated in Fig. 7, will cause the lower valve 18 to close the inlet-opening 15 in the bottom of the barrel, and the liquid will thereupon find an escape through the outlet 20

and opening 21, forcing the valve 24 over the siphon-outlet 23. Consequently the said liquid will pass through the discharge-pipe into a receiving vessel into which the spout 27 has been introduced. A continued reciprocation of the plunger will thus cause an intermittent flow from the spout; but as soon as the level of the liquid in the receiving vessel reaches the lower end of said spout a siphon action will take place while the plunger is being elevated. This, it is thought, will be clearly apparent, for upon the said upward movement the valve 24 will close the opening 21, thereby leaving the larger outlet 23 open. The long arm of the discharge-tube will of course be filled with liquid from the previous discharge of the pump, and thus overbalancing the shorter arm or spout, which is also filled, will cause the return of the liquid until the siphon is broken by the lowering of the level in the receiving vessel below the lower end of said spout. The opening 23 is therefore made of considerable size, so that the return-flow may be comparatively rapid and all surplus liquid returned prior to the succeeding discharge of the pump.

A still simpler form of the invention is illustrated in Fig. 8. The portion of the pump-cylinder shown is designated 10^a, the reciprocating plunger or piston working therein 11^a, and the piston-rod which carries said piston is designated 12^a. The lower end of the barrel in this instance is closed and liquid is introduced as well as expelled therefrom through an offset passage-way 13^a, having an opening 14^a in its top, which opening constitutes the means of communication between the passage-way 13^a and the interior of a valve-casing 15^a, located directly above said passage-way. This valve-casing 15^a has the siphon-discharge opening 16^a in its top, which opening, as in the former instance, is greater in diameter than the lower opening 14^a. A valve 17^a, located in the casing 15^a, is provided with depending legs 18^a. Said valve is of sufficient size to close the opening 16^a; but the legs prevent its stopping the passage of liquid through the opening 14^a. From one side of the valve-casing leads the discharge and siphon return-pipe 19^a, constructed the same as that already described. In this form of construction the upward movement of the plunger will draw the liquid through the openings 16^a and 14^a into the passage-way 13^a, and thus to the interior of the barrel. Upon the downward movement of the plunger, however, the valve 17^a is elevated, thereby closing the siphon-opening, so that the expelled liquid must of necessity pass through the discharge-pipe to the receiving vessel. This action is continued until the level of the liquid reaches the spout of the discharge-pipe, whereupon for the reasons already given in connection with the first-described structure upon the elevation of the

plunger the liquid will be siphoned back to the interior of the can or reservoir, and this siphon action will, in fact, be assisted to some extent by the passage of the liquid that is drawn into the barrel through the valve-casing. In this connection the enlarged siphon-opening 16^a is considered of importance, for while the liquid must pass with considerable force through the opening 14^a there will be but a sluggish movement through the larger opening. This will, to a great extent, avoid the danger of air being drawn down the discharge-pipe 19^a when the plunger is elevated, as sufficient liquid can pass through the opening 16^a to avoid abnormal suction in the valve-casing.

With this understanding of the simpler forms of the invention the construction which at present is considered preferable—namely, that illustrated in Figs. 1 and 2—will be described.

The usual can or reservoir 10^b is employed, and therein is suspended a single pump-barrel 11^b. Within this pump-barrel is slidably mounted a solid piston 12^b, secured to the lower end of a piston-rod 13^b, that extends through the upper end of the pump and has an offset handle 14^b, disposed exteriorly of the can or reservoir. The lower end of the barrel 11^b has an offset passage-way 15^b, through the top of which is formed an opening 16^b, communicating with the interior of a valve-casing 17^b, which casing has in its top a siphon-outlet and liquid-inlet opening 18^b of greater diameter than the opening 16^b. A valve 19^b, located within the casing 17^b, is arranged to close the opening 18^b upon the outward passage of the liquid through the opening 16^b, but has depending legs which prevent its closing said opening 16^b. To the side of the casing 17^b is attached an elbow 20^b, terminating in an upright stationary section 21^b of a liquid-discharge and siphon return pipe. At one side of the barrel 11^b is located a conduit 22^b, extending from a point a slight distance above the lower valve-casing 17^b to a point contiguous to the top of the barrel, an opening 23^b being formed in one wall of the barrel and constituting the means of communication between the conduit 22^b and the interior of the barrel above the plunger 12^b. The lower end of the conduit 22^b is provided with an offset elbow 24^b, having an opening 25^b in its top, which opening communicates with the interior of another valve-casing 26^b. The top wall of said casing 26^b has therethrough a siphon-outlet opening and liquid-inlet opening 27^b, which opening, as in the previous instances, is of greater diameter than the opening in the bottom of the casing. A valve 28^b, located in the casing 26^b, is adapted to close the opening 27^b, but not the opening 25^b. From the side of this casing 26^b extends the upright section 29^b of another discharge and siphon return

pipe. Simultaneously movable but independent sliding sections 30^b are telescoped over the sections 21^b and 29^b, said sections 30^b terminating in independent depending spouts 31^b. With this structure a simultaneous return is obtained with each discharge, and at the same time a double-acted discharge-pump is also secured. Thus assuming the nozzles introduced into a receiving vessel, as shown in Fig. 1, it will be seen that when the piston is elevated liquid will be drawn through the openings 18^b and 16^b into the lower portion of the barrel. When said piston descends, this liquid will be expelled through the pipe 21^b into the receiving vessel, the opening 18^b being closed by the valve 19^b. The downward stroke of the piston at the same time effects the induction of oil to the barrel above the same through the openings 27^b and 25^b to the conduit 22^b. Upon the succeeding elevation of the piston the latter liquid will in turn be forced through the other discharge-pipe into the receiving vessel, while the lower portion of the barrel is once more being filled. The result is an almost continuous discharge of liquid from the nozzle of the pump; but as soon as the liquid reaches the level of the lower end of the same a return siphon action will be occurring through one pipe while the other pipe is discharging, this alternate action therefore amounting, in effect, to a continuous discharge and return, as will be evident. Therefore not only is a quick-action pump secured, but a more desirable return of the liquid is also obtained, as the vessel being filled does not have to receive practically the entire discharge of the pump before the return siphon action begins. Practically the same effect is obtained in the modification shown diagrammatically in Fig. 3, the only difference being that inlets independent of the siphon-outlets are employed. The barrel is shown at 10^c, the plunger 11^c operating therein in the usual manner and being carried by a plunger-rod 12^c. A valved inlet 13^c is formed in the bottom of the barrel, and a valved inlet-conduit 14^c leads from the lower end of said barrel to the top of the same, where it has communication therewith. An outlet 15^c communicates with a discharge-pipe 16^c, which pipe terminates in the usual downturned spout 17^c. The outlet is controlled by a downwardly-opening valve 18^c, which valve also controls the siphon-discharge opening 19^c, formed above the same. A discharge-conduit 20^c leads from the top of the barrel to the lower portion of the same, where a downwardly-opening valve 21^c is located, this valve also controlling a siphon-outlet 22^c, arranged above the same, which outlet, as well as the conduit 20^c, is in communication with another discharge-pipe 23^c, leading to another spout 24^c, arranged alongside the spout 17^c. In this case the liquid is

drawn by the plunger through the inlets 13^c and 14^c; but the discharge, as well as the siphon action, is substantially the same as that described in Fig. 2, so a detailed description thereof is therefore thought to be unnecessary, as the same will be clearly apparent.

Referring now to still another embodiment—namely, that illustrated in Fig. 4—it will be seen that the same idea is still involved as that described before, and particularly with relation to the embodiment illustrated in Figs. 1 and 2. In this instance, however, two separate barrels 10^d and 11^d are employed, within which operate pistons 12^d, secured to the lower ends of rods 13^d, which rods are joined at their upper ends and have secured thereto a common handle 14^d, so that the pistons will be simultaneously operated. The lower end of the barrel 10^d has an offset discharge 15^d, leading to a valve-casing 16^d, having the siphon-discharge 17^d in its top. The siphon-discharge is controlled by a valve 18^d. The discharge and siphon pipe is shown generally at 19^d and is of the usual construction. The other barrel 11^d has communication at its upper end with a conduit 20^d, extending to the lower end of said barrel, and having an offset 21^d communicating with the valve-casing 22^d, which casing is provided in its top with the siphon-outlet and liquid-inlet opening 23^d, said opening being controlled by a valve 24^d. From the casing 22^d leads another discharge and siphon return pipe 25^d. The action of this pump is similar to that of the pump illustrated in Figs. 1 and 2, and a reiteration thereof is consequently thought to be unnecessary. The same advantageous results are secured. It also constitutes a double-acted pump, effecting substantially a simultaneous flow, and at the same time a substantially simultaneous return. In view of the fact, however, that two pump-barrels and pistons are necessary the structure is not as simple as that illustrated in Figs. 1 and 2.

Finally, attention is asked to still another modification—namely, that shown in Fig. 9. The portion of the barrel illustrated is designated 10^e, and operating therein is the plunger 11^e, connected to a piston or plunger-rod 12^e. The bottom of the barrel has an inlet-opening 13^e, and a partition located above the same has also an inlet and discharge opening 14^e. An inwardly-opening valve 15^e, located in the compartment formed by the partition and bottom, is arranged to close the opening 13^e upon the expulsion of the liquid, but permits the ready ingress of said liquid. The discharge and siphon return pipe leads from the said valve-compartment, and at the lower end of its upright portion it has a lateral siphon-discharge opening 17^e. A valve 18^e, located at said lower end, is so arranged that it will swing upwardly and

outwardly upon the discharge of the liquid through the pipe to close the opening 17"; but when the piston is being elevated and the lower portion of the barrel filled with liquid said valve will be drawn downwardly, and thereby the siphon-opening will be uncovered, while the return of liquid through the pipe into the pump will be prevented.

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

1. The combination with a pump, of a combined discharge and siphon return pipe connected thereto, said pipe having a siphon-discharge opening, and a valve controlling said siphon-discharge opening.

2. The combination with a pump, of a combined discharge and siphon return pipe connected thereto and having a plurality of discharge-openings, one of which is lower than the other, and means for controlling said lower discharge-opening.

3. The combination with a pump, of a combined discharge and siphon return pipe connected thereto and having a plurality of discharge-openings, one of which is lower than the other, and an automatically-operated valve controlling said lower discharge-opening.

4. The combination with a pump, of a combined discharge and siphon return pipe connected thereto and having a plurality of discharge-openings, one of which is lower than the other, and a valve located in the path of the discharge from the pump and operated thereby to close the lower opening.

5. The combination with a pump, of a combined discharge and return pipe connected thereto, said pipe having a siphon-discharge opening between its ends, and means for controlling the passage of liquid therethrough.

6. The combination with a pump, of a combined discharge and return pipe connected thereto, said pipe having a depending discharge end and also having an opening located below the plane of the discharge end, and means for closing the opening.

7. The combination with a pump, of a combined discharge and return pipe connected thereto, said pipe having a depending discharge end and also having an opening located below the plane of the discharge end, and an automatic valve for closing the opening.

8. The combination with a pump including a cylinder, of a discharge and return pipe connected to the cylinder, said cylinder having a discharge-opening communicating with the pipe and said pipe having a discharge-opening substantially alined with the cylinder discharge-opening, and a valve interposed between the openings.

9. The combination with a pump including a cylinder, of a discharge and return pipe

connected to the cylinder and having an opening contiguous to its connection with the cylinder, and a valve controlling said opening.

10. The combination with a pump, of a combined discharge and return siphon pipe connected thereto and having a siphon-discharge, and means for closing the siphon-discharge during the discharge of liquid from the pump through said pipe.

11. The combination with a pump, of a combined discharge and return siphon pipe connected thereto and having a siphon-discharge, and an automatic valve for closing the siphon-discharge during the discharge of liquid from the pump into the said pipe, said valve being operated by said discharge of liquid.

12. The combination with a pump, of a combined discharge and return pipe connected thereto and comprising sections, one of said sections being fixed to the pump and having a siphon-discharge opening, the other being slidable on the first-mentioned section and having a discharge-opening.

13. The combination with a pump, of a combined discharge and return pipe connected thereto and comprising sections, one of said sections being fixed to the pump and having a siphon-discharge opening contiguous to the juncture with the pump, the other being slidable on the first-mentioned section and having a depending discharge end, and an automatic valve disposed in the path of movement of the discharge from the pump and operating across the opening in the first-mentioned section.

14. The combination with a reservoir, of a pump located therein and having a discharge, a combined discharge and return pipe connected to the pump and having communication with the discharge thereof, said pipe having an opening disposed in substantial alinement with said discharge, and a valve interposed between the discharge and opening and automatically operating to close the latter upon the discharge of liquid from the pump, said pipe having a depending discharge end disposed exteriorly of the reservoir.

15. A pump, comprising a cylinder, a piston, a tube leading from the cylinder and having an opening intermediate its ends for the discharge of returned oil, and a valve controlling such opening.

16. A pump, comprising a cylinder, a plunger, a tube leading therefrom through which both an emission and siphoning of liquid is alternately effected during an operation of the pump, said tube having an opening intermediate its ends for the discharge of siphoned liquid, and means for controlling said opening.

17. In a pump, a cylinder, a plunger, a tube leading therefrom having a valve-cham-

ber intermediate its ends provided with a discharge-opening for siphoned liquid, and means for controlling the communication between the chamber and cylinder and the discharge through said opening.

18. The combination with a pump-cylinder, of a plunger operating therein, and a plurality of pipes connected to the cylinder on opposite sides of the plunger, each of said pipes comprising a combined discharge and return pipe and having a plurality of discharge-openings, one of which is lower than the other and constitutes a siphon-discharge.

19. The combination with a pump-cylinder, of a plunger operating therein, and a plurality of pipes connected to the cylinder on opposite sides of the plunger, each of said pipes comprising a combined discharge and return pipe and having a plurality of discharge-openings, one of which is lower than

the other and constitutes a siphon-discharge, and valves controlling said siphon-discharge openings.

20. The combination with a reservoir, of a pump-cylinder located therein, a reciprocatory plunger operating in the cylinder, a plurality of pipes connected to the cylinder on opposite sides of the plunger, said pipes having depending discharge ends located exteriorly of the reservoir and having siphon-discharge openings communicating with the interior of said reservoir, and automatic valves controlling said siphon-discharge openings.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

BERTRAM G. FOSTER.

Witnesses:

LOUIS G. JULIHN,

JAS. K. McCATHRAN.