Nov. 1, 1927. 1,647,219

W. M. FULTON

RECEPTACLE FOR DISCHARGING FLUIDS

Filed Oct. 16, 1922 3 Sheets-Sheet 1

Fig. 2.

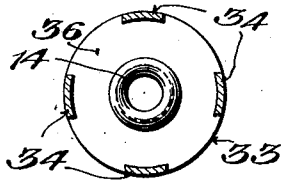


Fig. 3.

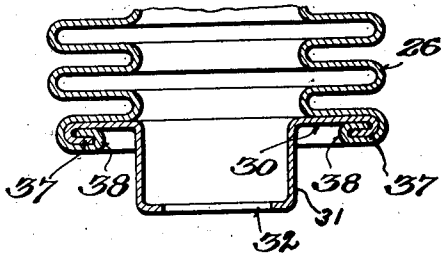
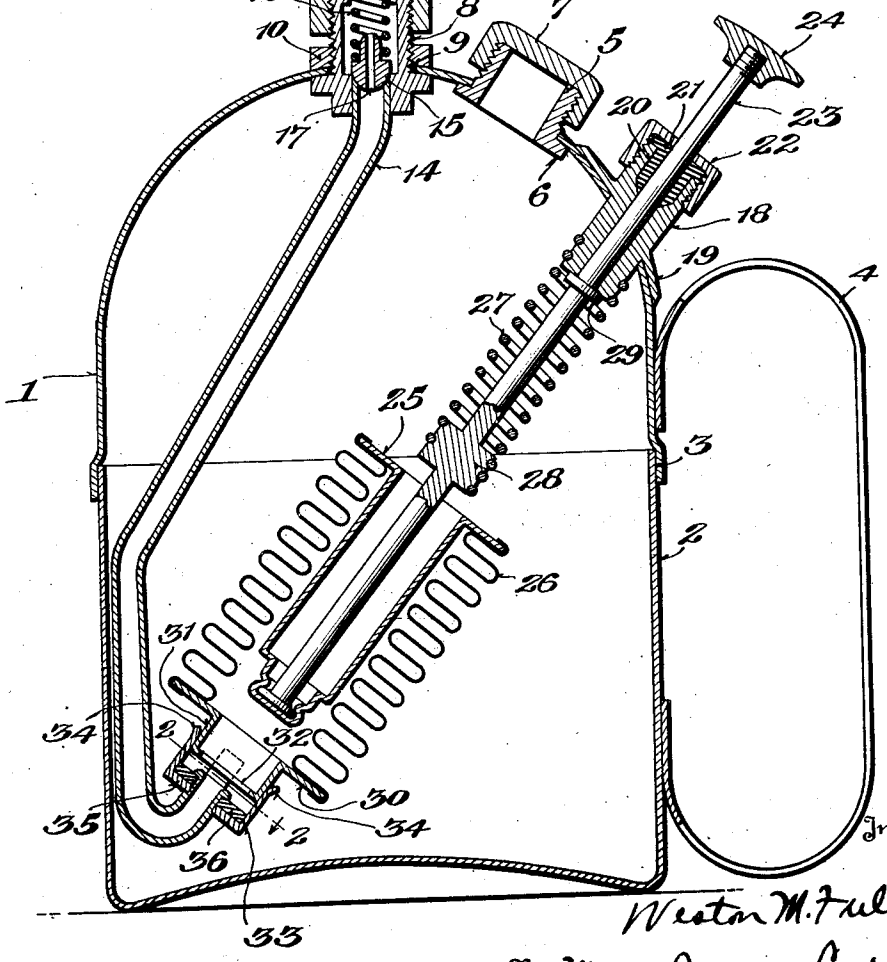


Fig. 1.



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RECEPTACLE FOR DISCHARGING FLUIDS

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Fig. 5.

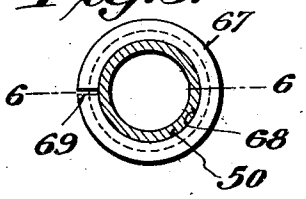


Fig. 6.

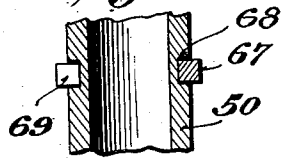


Fig. 4.

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RECEPTACLE FOR DISCHARGING FLUIDS

Filed Oct. 16, 1922 3 Sheets-Sheet 3.

Fig. 7.

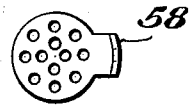


Fig. 8.

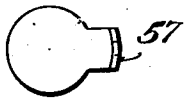


Fig. 11.

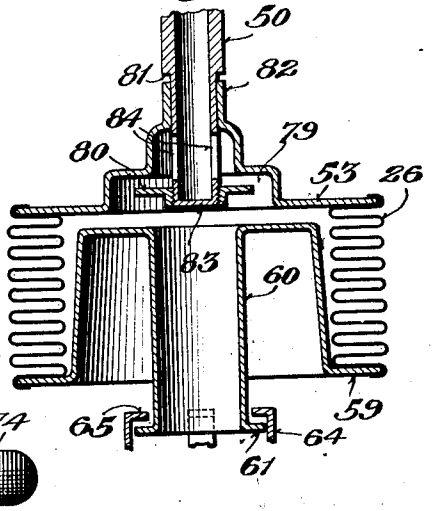


Fig. 9.

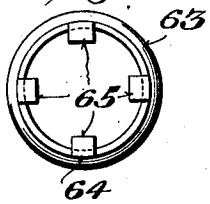


Fig. 10.

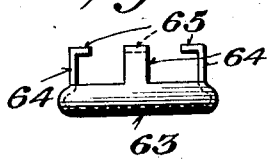
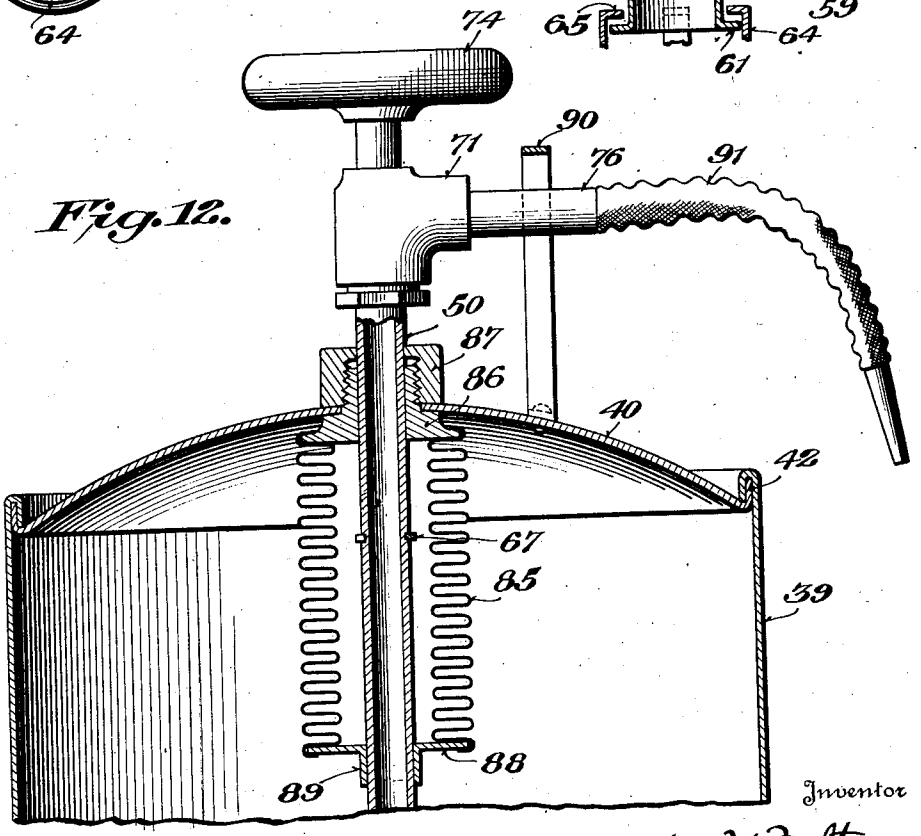


Fig. 12.



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Patented Nov. 1, 1927. 1,647,219

UNITED STATES PATENT OFFICE.

WESTON M. FULTON, OF KNOXVILLE, TENNESSEE, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE FULTON SYLPHON COMPANY, OF KNOXVILLE, TENNESSEE, A CORPORATION OF DELAWARE.

RECEPTACLE FOR DISCHARGING FLUIDS.

Application filed October 16, 1922. Serial No. 594,885.

This invention relates to receptacles for liquids and particularly to receptacles that are provided with means for positively discharging liquids therefrom.

Receptacles have heretofore been provided with means for positively ejecting the contained liquids, said means comprising a pump of the piston type or a collapsible and expansible diaphragm acting as a pump. In each of these instances, the intake valve to the pump has been operated by the pressure of the liquid rather than being positively moved to open and closed position by the operating mechanism of the pump, with the result that said valve has ceased to function after a relatively short period of use. Furthermore these types of discharge means have had a very limited capacity as regards the quantity of liquid that can be discharged at a single stroke, and have also been expensive to manufacture. These and other undesirable features have proven by experience to be so objectionable that the sale of receptacles of this character is decreasing although the demand for a satisfactory receptacle of this type is increasing.

One of the objects of the present invention is to provide a receptacle of the above type which has a positively actuated intake valve.

Another object of this invention is to provide pumping means comprising an expansible and collapsible vessel which may be reciprocated, whereby, through a portion of its movement, said vessel moves as a whole as distinguished from the previous practice of having one end wall of the vessel stationary while the other end wall alone is movable.

A further object of this invention is to provide novel means for attaching the end walls of the collapsible and expansible vessel to the flexible side wall thereof, whereby the necessity of solder for sealing this joint is avoided, and the cost of manufacture materially reduced. These and other objects will appear as the description proceeds.

The invention is capable of receiving a variety of mechanical expressions, several of which for purposes of illustration are shown in the accompanying drawings, but it is to be expressly understood that the drawings are for purposes of illustration only, and are not to be construed as definitive of the limits of the invention, reference being had to the appended claims for that purpose.

Referring to the drawings wherein similar reference numerals refer to similar parts throughout the several views,

Fig. 1 is an axial section of one embodiment of the present invention;

Fig. 2 is a detail sectional view, taken on line 2—2 of Fig. 1, of the guide member employed in the embodiment of Fig. 1;

Fig. 3 is a detail sectional view illustrating one manner of connecting the end walls of the expansible and collapsible vessel to the flexible side wall thereof;

Fig. 4 is an axial section of another embodiment of the present invention;

Fig. 5 is a detail, partly in section, taken on the line 5—5 of Fig. 4;

Fig. 6 is a sectional detail view taken on the line 6—6 of Fig. 5;

Fig. 7 is a detail plan view of a perforated metal guard that may be employed in the embodiment illustrated in Fig. 4;

Fig. 8 is a similar view of a flap valve used in the same embodiment;

Figs. 9 and 10 are detail plan and elevation views, respectively, of a guide which may also be employed in the last mentioned embodiment;

Fig. 11 is a sectional elevation of an embodiment of the pumping means wherein the outlet valve, as well as the intake valve, is positively actuated;

Fig. 12 is an elevation, partly in section, of another embodiment of the invention, the lower portions of the receptacle and pumping means being omitted.

In the form shown in Fig. 1, wherein is illustrated a receptacle or oil can of the type known in the art as "pump type oilers" used for oiling large machinery, shaft bearings, locomotives, etc., the main body portion or shell of the receptacle, which may be of any suitable construction, material, size, etc., comprises an upper portion 1 fitted and secured to a lower portion 2 by means of a joint 3, which joint may be sealed by solder or electric welding. A handle 4 of the usual type is attached to these portions in any suitable manner as by solder or spot welding. A ferrule 5 secured to upper por-

tion 1 by means of a soldered flange 6 and provided with a threaded cap 7 affords the usual filling aperture.

Any suitable means affording a discharge opening may be provided in upper portion 1. In the illustrated embodiment, a flanged and threaded member 8 extends through an opening 9 in portion 1, and is secured in place by means of a lock nut 10. A spout 11 of any desired length and provided at the lower end thereof with a flange 12 is secured to the upper end of member 8 by means of the interiorly-threaded flanged nut 13. Attached in any suitable manner to the lower end of member 8, and interiorly thereof, is the discharge pipe 14 which will be more fully described hereinafter. To ensure that oil or other contained liquid will not escape from the receptacle when the latter is in other than the upright position, a check valve 15 having a seat in the upper end of pipe 14, is preferably mounted within the recess in member 8. A compression spring 16, bearing at one end against member 8 and at its opposite end against a flange formed on valve 15, normally maintains the latter in seated position. In order that any surplus oil that remains in spout 11 after an oiling operation may drain back into the receptacle a small hole 17 is preferably provided in valve 15. The above discharge means need not be located in the center of portion 1, for if desired it can be placed in any other suitable position.

In order that the liquid contained in the receptacle may be positively discharged, I have provided the following means: Secured to portion 1 of the shell of the receptacle, adjacent the upper end of handle 4, is the interiorly extending bonnet 18 provided with the flanged portion 19 suitably secured to the shell as by solder. In the outer end of bonnet 18 is a stuffing gland 20 filled with a suitable packing material 21 held in place by the usual packing nut 22. Slidably mounted in bonnet 18 is the shaft 23, carrying on its outer end the usual thumb button 24, and suitably secured at its inner end to the upper, re-entrant end wall 25 of an expansible and collapsible member 26. A tension spring 27, surrounding shaft 23, preferably has its upper end screwed onto the lower threaded portion of bonnet 18 and its opposite end screwed onto an enlarged portion 28 of shaft 23, said spring normally maintaining the shaft in such a position that a collar 29 formed on the latter is abutting the lower end of bonnet 18.

The flexible corrugated member 26 preferably made of resilient metal is provided with a lower end wall 30, having a flanged portion 31 and an opening 32, said flanged portion extending into a guide piece or abutment member 33 suitably secured to the lower end of discharge pipe 14 to provide an intake valve. The detailed construction of guide 33 is shown more clearly in Fig. 2 where it will be seen that it comprises a suitable number of widely spaced prongs 34 extending substantially at right angles from the base portion 35 to telescopically receive and guide the reciprocating movement of the flanged portion 31 of end wall 30. Tube 14 preferably extends downward to, or near, the bottom of the receptacle and has its extremity upturned, and guide 33, carrying leather gasket or washer 36, is suitably held in position on the end of said tube as by flanging over the end of pipe 14.

The rigid end walls 25 and 30 are preferably secured to corrugated member 26 as illustrated in Fig. 3, wherein wall 30 is shown as provided with a return bend 37 around its outer periphery and flexible member 26 is curled at 38 around this return-bend, thereby forming a locked seam which is sufficiently fluid-tight to eliminate the necessity of solder or other cementing material. It has been found by experience that a very minute leakage through this seam is not objectionable, owing to the large displacement of the flexible expansible and collapsible member 26 when discharging a liquid, and by using this construction, the practice hitherto of sealing this joint with solder is done away with, thereby not only saving the cost of solder, which is a material item, but likewise the labor involved in applying it.

The operation of the above described embodiment of the invention is as follows: The receptacle having been filled with oil or other liquid through the opening provided in ferrule 5 and it being desired to discharge the oil from the container, handle 4 is securely held and by means of thumb pressure against button 24 shaft 23 is forced downwardly carrying with it end wall 25, flexible member 26 and end wall 30. This movement continues until the flanged portion 31 of end wall 30 comes into contact with leather gasket 36 at which time the escape of oil between the flanged portion and the gasket is positively prevented. Up to this time there has been no material collapse of flexible member 26 but further downward movement of the shaft 23 and wall 25 causes member 26 to collapse owing to the fact that the wall 30 cannot move further downward. The oil or contained liquid is thus forced into pipe 14 and check valve 15 is lifted allowing oil to pass out through the spout 11. Oil is thus continually ejected from spout 11 until shaft 23 and end wall 25 have been moved downwardly to the point where the lower portion of wall 25 contacts with lower end wall 30, whereupon thumb pressure is relieved from button 24. Spring 16 immediately seats valve 15 and prevents oil being redrawn from spout 11 and at the

same time spring 27 forces shaft 23 upward until collar 29 abuts against the bottom of bonnet 18. This movement of shaft 23, which results in the expansion of member 26, causes the pressure within the collapsible and expansible member to drop below the pressure surrounding it, and the area of end wall 30 parallel to the corrugations of member 26 being purposely made larger than the area of the flanged end 31 thereof, said wall will be lifted away from gasket 36 by the unbalanced pressure, so that oil can pass in between guide prongs 34 and upward through opening 32, thereby allowing flexible member 26 to expand by virtue of its resilience and to be refilled with oil drawn from the main reservoir of the receptacle. By again pressing thumb button 24 the operation is repeated.

When the oiling operation has been completed and the receptacle is set aside in a vertical position any oil which remains in spout 11 slowly drains back through small opening 17 in valve 15 to the main reservoir of the receptacle by passing through pipe 14 and out between guide prongs 34. Opening 17 is purposely made so small that oil can pass therethrough very slowly and when pressure is removed from button 24 there is no inrush of oil followed by air from spout 11 to prevent collapsible and expansible member 26 from becoming again filled with oil.

In Fig. 4 there is illustrated another embodiment of the inventive idea in which the receptacle is adapted to be used for the storage of oil, alcohol, turpentine and similar liquids. In the form shown, the body or shell portion 39 of this receptacle is closed at its upper end by wall 40 and its lower end by wall 41, the end walls being secured to the side walls by means of the seams 42, 43 in any usual and well known way. Upper wall 40 is provided with a filling aperture 44 similar to that previously described. Projecting through the upper wall 40 at any suitable point is the exteriorly threaded ferrule 45 provided with flange portion 46, the latter being suitably connected to wall 40 by rivets or solder. Ferrule 45 is provided with stuffing gland 47 carrying a suitable packing material 48 held in position by nut 49. Extending through ferrule 45 is the slidably mounted discharge pipe 50 carrying on its lower threaded end the cup-shaped member 51 having a bottom flanged portion 52 attached to the re-entrant wall 53 of the collapsible and expansible member 26[a] in any suitable way as by means of rivets 54. Wall 53 is provided with an opening 55 concentric with the pipe 50 and surrounding said opening there may be provided, if desired, an annular corrugation 56 which serves as the seat for a leather flap valve 57 secured to the lateral wall of the cup-shaped piece 51. Immediately above valve 57 and attached to the piece 51 is a perforated metal guard 58 for a purpose to be hereinafter described. The construction of the valve 57 and guard 58 are shown more fully in Figs. 7 and 8. The lower end of expansible and collapsible member 26[a] is closed by a wall 59 having a downwardly extending tubular portion 60 which terminates in the outwardly extending flange 61. Centrally located in bottom wall 41 directly below extension 60 is a circular depressed portion 62 in which is securely held guide member 63 having guide prongs 64 which terminate at their upper extremities in inwardly projecting arms 65. The construction of this guide is shown in detail in Figs. 9 and 10. In assembling this portion of the structure which constitutes the intake valve, prongs 64 are first made straight and then the flange 61 of tubular portion 60 on end wall 59 is inserted therein and the inwardly projecting arms 65 are then bent over into position so that flange portion 61 cannot thereafter be withdrawn from said guide. A gasket 66 of any suitable material is mounted in the lower portion of guide 63 to serve as a seat against which flange 61 will contact during the operation of the device.

Attached to discharge pipe 50 is a split ring 67 which serves as a stop to limit the upward movement of said pipe. The preferred construction of this ring is shown in detail in Figs. 5 and 6 where it will be seen that an annular groove 68 is formed in the outer surface of pipe 50 and into this groove is sprung ring 67 which, as illustrated, is rectangular in cross section, the ends thereof abutting as at 69. Threaded on to the upper end of pipe 50 is a bushing 70 which carries on its upper end an L 71. A conical valve 72 provided with a threaded stem 73 and hand wheel 74 is adapted to close the upper end of pipe 50 when engaged with the seat 75 formed in the upper end of bushing 70. A discharge nozzle 76 is threaded into the lateral arm of L 71. The operation of this embodiment of the invention is as follows:

When it is desired to discharge liquid from the receptacle, valve 72 is moved to the open position as illustrated in Fig. 4 by turning hand wheel 74 until the upper surface of said valve abuts against the interior surface of L 71 in which position it makes a fluid-tight joint with the inner surface of the L and prevents escape of fluid around the threaded stem 73. Hand wheel 74 is then pulled upward carrying with it discharge pipe 50, cup-shaped member 51, wall 53, collapsible and expansible member 26[a], and lower wall 59 until the flanged extension 61 of the latter contacts with the arms 65 of guide 63, whereupon lower wall 59 ceases to move upwardly. Wall 53 however is carried still further upward thereby expanding flexible member 26[a]

until split ring 67 contacts with the ferrule 45. During this movement oil or any other contained liquid is drawn into collapsible member 26ª through the openings between the prongs 64 and the tubular portion 60 of end wall 59. Also valve 57 is securely seated against corrugation 56 at the commencement of the upward movement of pipe 50 thereby effectively sealing opening 55. Hand wheel 74 having been moved to its extreme limit of upward travel, it is now pressed downward until flanged extension 61 comes in contact with washer 66 to prevent further flow of liquid between these elements, whereupon the end wall 59 cannot move downwardly any further, and further pressure on hand wheel 74 collapses the flexible member 26ª so that the liquid which has been drawn into this member 26ª, being unable to escape back into the interior of the receptacle, forces valve 57 off its seat, and passes up through discharge pipe 50 and discharge nozzle 76. Pressure on wheel 74 is continued until the lower part of the re-entrant wall 53 contacts with wall 59 whereupon wheel 74 is moved in the reverse direction and the operation repeated.

Guard 58 limits the amount of lift of valve 57; otherwise the latter might be opened so widely and its closing movement require so much time as to completely drain pipe 50 of liquid and allow air to enter the tank through opening 55. When there is liquid in the pipe 50 and wheel 74 is lifted liquid rushes through the perforations in guard 58 and immediately forces valve 57 back to its seat. After the required amount of liquid has been discharged from the receptacle, conical valve 72 is screwed back onto its seat 75 to insure against any accidental discharge from the tank. It will be noted that the construction provided in this embodiment of the invention is such that discharge nozzle 76 may be turned in azimuth 360° without impairing the operation of the pumping means. Walls 53 and 59 are preferably secured to collapsible member 26ª by means of a lock seam such as is illustrated in Fig. 3. A very small hole may be provided in the center of valve 57 to allow liquid which has accumulated in pipe 50 to drain back into the receptacle; however, this is not essential, and I prefer to omit it.

Experience has shown that when a receptacle is being filled with liquid for the first time there is a tendency for air to be trapped in the space 77 between re-entrant wall 53 and collapsible member 26ª. This space is reduced to a minimum in the illustrated embodiment by having wall 53 fit very closely inside of member 26ª and usually the small accumulation of air in this space is not objectionable, but when the kind of liquid being stored and the nature of service required makes it desirable to eliminate this air, an extremely small air hole 78 may be provided near the top of re-entrant wall 53 so that as the tank is being filled air will escape out through this small hole. It will be readily understood that hole 78 is so small that the amount of liquid which can escape therethrough during the pumping action is negligible.

In Fig. 11 there is illustrated another embodiment showing pumping means which may be employed, wherein the outlet valve as well as the intake valve is positively operated. In this embodiment upper wall 53 of the expansible and collapsible vessel is provided with a circular recess 79 in which is located a disk valve 80 carried on the lower threaded end of discharge pipe 50, said pipe, which is reduced in outside diameter near the lower end thereof as at 81, being slidably fitted into an opening 82 in the top of wall 53. The bottom end of pipe 50 is closed as at 83 and any suitable number of openings 84 are provided in the side walls thereof immediately above valve 80. Lower wall 59 of the collapsible and expansible vessel is preferably made re-entrant and the tubular inlet 60, provided with a flanged end 61, extends downwardly between the prongs 64 of a guide member such as has heretofore been described. It will be noted that in this embodiment of the invention the discharge valve 80 is positively actuated during the pumping operation and is not dependent upon liquid pressure. The construction of lower wall 59 of the collapsible and expansible vessel is such that no appreciable amount of air can collect in said vessel when the receptacle is being filled and any air that may collect therein will be quickly discharged during the first stroke of the pump.

In Fig. 12 is shown a still further embodiment of the inventive idea wherein the gland 47, packing 48 and nut 49 of Fig. 4 (or the corresponding elements of Fig. 1) are unnecessary in that a collapsible and expansible wall is employed to make this fluid-tight joint. In the form illustrated, the upper rigid wall 86 of a flexible member 85 is securely held in position in end member 40 by means of the interiorly threaded nut 87, thus forming a fluid-tight joint. Lower end wall 88 of member 85 is provided with a hub or flanged portion 89 through which passes pipe 50, said hub being securely fastened to said pipe in any suitable manner to form a liquid tight joint. It will be noted that this construction does not permit of discharge member 76 being turned in azimuth, and, in order to insure against undue torsional strain on flexible wall 85 when actuating hand wheel 74, guide 90 is provided in which nozzle 76 slides vertically. Guide 90 comprises a U-shaped member which is secured to wall 40 of the receptacle

in any suitable manner as by means of rivets. Since the use of guide 90 prevents movement of nozzle 76 in azimuth said nozzle is preferably made short and a flexible hose 91 may be attached thereto so that the end may be moved to any desired point in order to facilitate delivery of the liquid. It will be perceived that flexible wall 85 expands and collapses as pipe 50 is reciprocated in the pumping operation; otherwise the operation of this device is similar to that of the embodiment illustrated in Fig. 4.

It will be noted that the intake member of the various embodiments has been illustrated as having a greater inside diameter than the discharge or outlet pipe. This permits liquid to be taken into the collapsible and expansible vessel very quickly but it can be discharged only as fast as pressure is applied, thus giving the pump the "quick return stroke" feature. It is to be understood however that the intake and outlet members may be made the same size if desired.

While the several embodiments of the invention illustrated on the drawings have been described with considerable particularity it is to be expressly understood that the invention is not to be restricted to the forms there shown since it is capable of receiving a variety of mechanical expressions some of which will now readily suggest themselves to those skilled in the art, while certain features thereof are capable of use without other features thereof. Reference is therefore to be had to the claims hereto appended for a definition of the invention.

What is claimed is:—

1. In a receptacle for liquids, the combination of a casing, a member reciprocably mounted in said casing, and pumping means secured to said member, said means including a collapsible and expansible vessel adapted to reciprocate bodily with said member.

2. In a receptacle for discharging liquids, the combination of a casing, pumping means in said casing, said means including a collapsible and expansible vessel having rigid end walls attached thereto by means of a lock-seam joint, and means attached to said vessel and extending through said casing whereby said vessel may be reciprocated bodily.

3. In a receptacle for discharging liquids, the combination of a casing, pumping means in said casing including an expansible and collapsible vessel, an apertured wall secured to said vessel and having an annular flange, a member secured to said casing and positioned to telescopically engage said flange, and means for reciprocating said vessel whereby said flange may cooperate with said member to operate as an intake valve.

4. In a receptacle for discharging liquids, the combination of a casing, pumping means in said casing whereby liquid may be positively ejected from said casing, said means including an expansible and collapsible vessel, intake valve means controlling the flow of liquid from said casing to said vessel, and a member secured to said vessel and projecting through said casing whereby said vessel may be reciprocated bodily.

5. In a receptacle for discharging liquids, the combination of a casing, a member reciprocably mounted in said casing, and means whereby reciprocation of said member will eject liquid from said receptacle, said means including an expansible and collapsible vessel bodily movable with said member, and positively actuated valve means controlling the flow of liquid from said casing to said vessel.

6. In a receptacle for discharging liquids, the combination of a casing, a member reciprocably mounted in said casing and extending within the same, pumping means within said casing including an expansible and collapsible vessel secured to said member and bodily movable with the same through a portion of its range of operation, and a valve controlling the flow of liquid from said casing to said vessel.

7. In a receptacle for discharging liquids, the combination with a casing, of a member reciprocably mounted in said casing, an expansible and collapsible vessel within said casing adapted to be reciprocated bodily by said member, and positively actuated valve means operated by the reciprocation of said vessel and controlling the flow of liquid from said casing to said vessel.

8. A receptacle for discharging liquids comprising a casing, a member reciprocably mounted in said casing, an expansible and collapsible vessel bodily movable with said member, means for normally maintaining said vessel in extended position, and positively actuated means for collapsing said vessel and controlling the flow of liquid from said casing to said vessel.

9. In a receptacle for discharging liquids the combination of a casing, pumping means in said casing including an expansible and collapsible vessel having end walls, means operatively engaging one of said end walls whereby said vessel may be reciprocated bodily, and means engaging the other of said end walls for limiting the movement of said vessel.

10. A receptacle for discharging liquids comprising in combination, a casing, an expansible and collapsible vessel mounted in said casing having end walls, means operatively engaging one of said walls whereby said vessel may be reciprocated bodily, a stop secured to said means for limiting the movement of the latter in one direction, and means

engaging the other of said end walls for limiting the movement of said vessel in the opposite direction.

11. A receptacle for discharging liquids comprising, in combination, a casing, a member reciprocably mounted in said casing, an expansible and collapsible vessel having end walls, one of said end walls operatively engaging said member whereby said vessel may be reciprocated by said member, and means engaging the other of said end walls for limiting the movement thereof, the range of movement of said first-named end wall being greater than that of said last-named end wall.

12. A receptacle for discharging liquids comprising, in combination, a casing, an expansible and collapsible vessel in said casing provided with end walls, one of said end walls being apertured and having a flanged portion, means whereby said vessel may be reciprocated, and guide means engaging said flanged portion for limiting the movement thereof and constituting therewith an intake valve.

13. A receptacle for liquids comprising, in combination, a casing, a hollow expansible and collapsible vessel within said casing having an opening in one end wall thereof, means for reciprocating said vessel, means for limiting the reciprocation of said vessel in one direction and cooperating with said end wall to close communication between the interior of said vessel and said casing, and a conduit through which the liquid in said vessel may be forced by collapse thereof after engagement with said last-named means.

14. A receptacle for discharging liquids comprising, in combination, a casing, a hollow expansible and collapsible member in said casing having an aperture in its end wall, means for reciprocating said vessel, and a member into engagement with which said apertured end wall is moved by said reciprocating means and constituting an abutment whereby further operation of said reciprocating means effects a collapse of said vessel, said abutment member cooperating with said end wall to close communication between the interior of said vessel and said casing.

15. A receptacle for liquids comprising, in combination, a casing, a hollow expansible and collapsible member in said casing having an aperture in its end wall, an abutment into engagement with which said apertured end wall is adapted to move to close communication between the interior of said vessel and said casing, means for moving said vessel to engage said abutment and thereafter collapse said vessel, and a discharge conduit through which liquid is forced from said vessel by collapse of the same.

16. A receptacle for liquids comprising, in combination, a casing, a hollow expansible and collapsible vessel in said casing having an aperture in its end wall, an abutment adapted to cooperate with said apertured end wall to close communication between the interior of said vessel and said casing, means for reciprocating said vessel into engagement with said abutment member and thereafter collapsing said vessel, a discharge conduit through which liquid is forced by the collapse of said vessel, and resilient means for expanding said vessel.

17. A receptacle for liquids comprising, in combination, a casing, a hollow expansible and collapsible vessel in said casing having an aperture in its end wall, an abutment adapted to cooperate with said apertured end wall to close communication between the interior of said vessel and said casing, means for reciprocating said vessel to engage said apertured wall with said abutment and thereafter collapse said vessel, a discharge conduit through which liquid is forced by the collapse of said vessel, and a valve in said discharge conduit opened by the collapse of said vessel.

18. A receptacle for liquids comprising, in combination, a casing, a hollow expansible and collapsible vessel in said casing having an aperture in its end wall, an abutment adapted to cooperate with said apertured end wall to close communication between the interior of said vessel and said casing, means for reciprocating said vessel to engage said apertured wall with said abutment and thereafter collapse said vessel, a discharge conduit through which liquid is forced by the collapse of said vessel, and a valve in said discharge conduit positively opened and closed by the operation of said reciprocating means.

19. A receptacle for liquids comprising, in combination, a casing, a hollow expansible and collapsible vessel in said casing having an aperture in its end wall, means for reciprocating said vessel, an abutment into engagement with which said vessel is adapted to be reciprocated and cooperating with said apertured wall to close communication between the interior of said vessel and said casing, said reciprocating means adapted to collapse said vessel after the same has engaged said abutment member, and a discharge conduit through which liquid is forced by the collapse of said vessel.

20. A receptacle for liquids comprising, in combination, a casing, a hollow expansible and collapsible vessel in said casing, means for bodily reciprocating and collapsing and expanding said vessel, and means constituting an intake valve for said vessel opened and closed by the reciprocation of said vessel.

21. In a receptacle for liquids the combination of a casing, pumping means in said casing including an expansible and collapsible vessel having end walls, means operative-

ly engaging one of said end walls whereby said vessel may be reciprocated, means engaging the other of said end walls for limiting the movement of said vessel and cooperating therewith to provide a positively actuated intake valve for said vessel and discharge means communicating with said vessel.

22. In combination with a receptacle for liquids, a bodily movable pumping device in said receptacle, an abutment into engagement with which said pumping device is moved and cooperating therewith to provide an intake valve for said device, and means to move said pumping device into engagement with said abutment and then operating the same to discharge liquid from said receptacle.

In testimony whereof I have signed this specification.

WESTON M. FULTON.