Nov. 23, 1937. L. F. DUCKER 2,100,026

LIQUID EXPRESSER

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Fig. 1

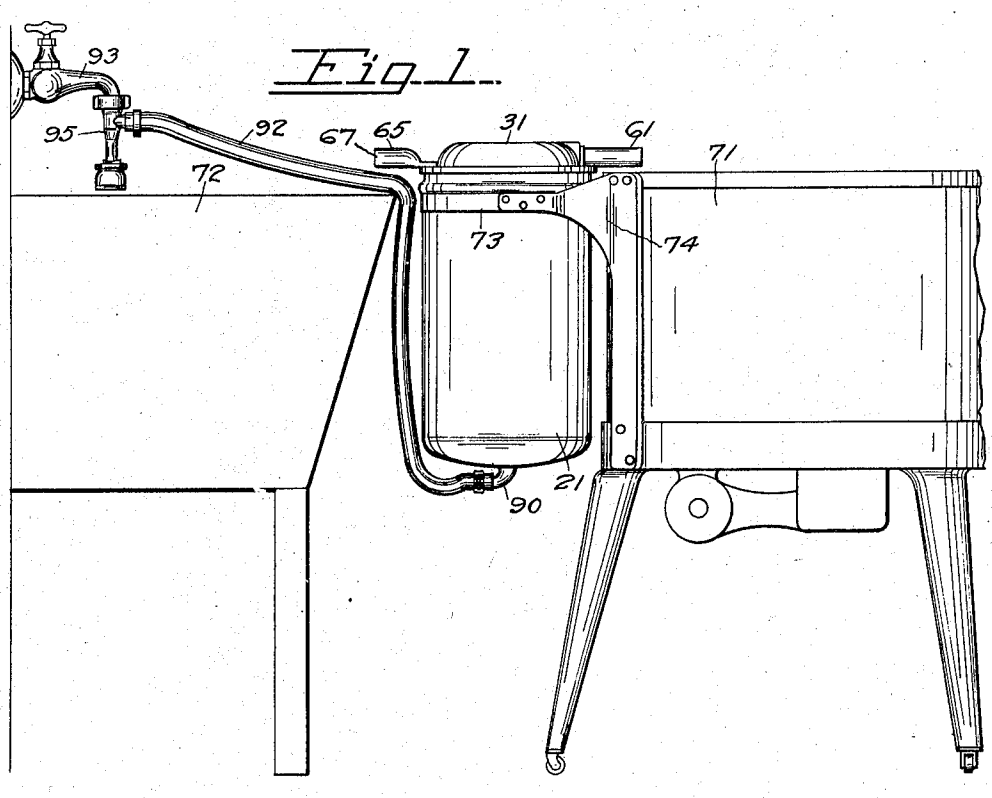
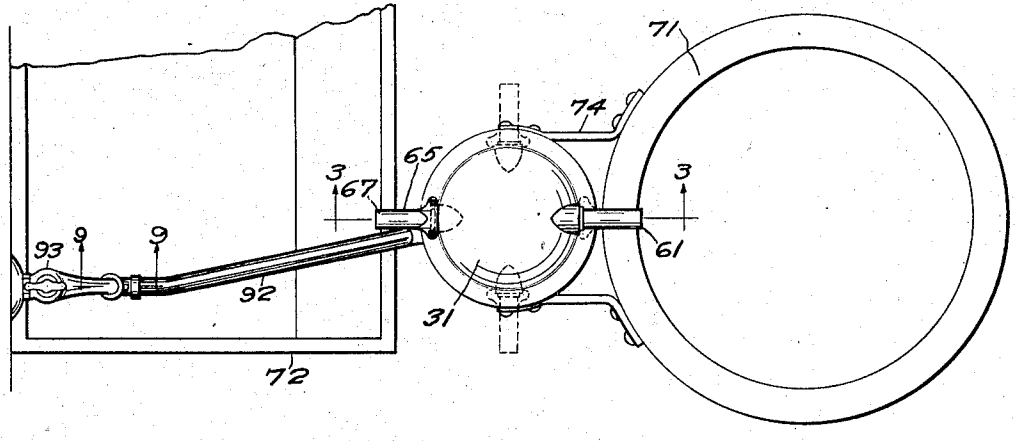


Fig. 2



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Fig. 3

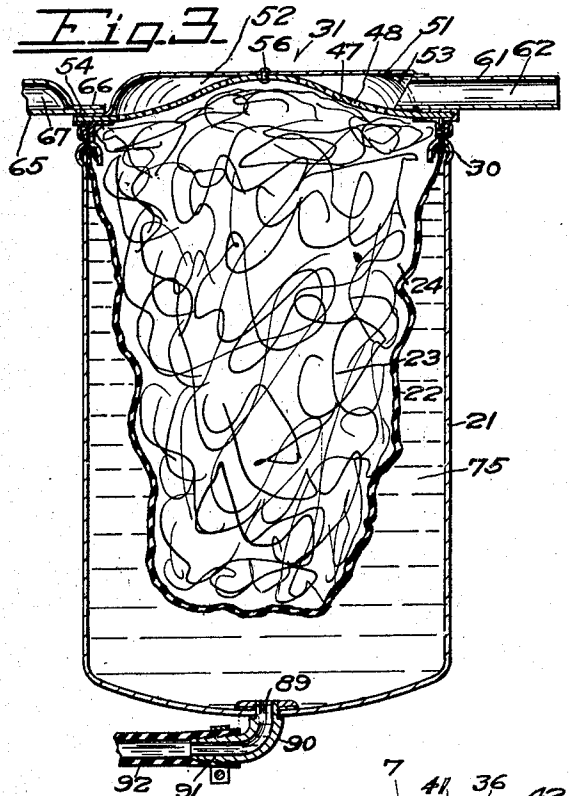


Fig. 5

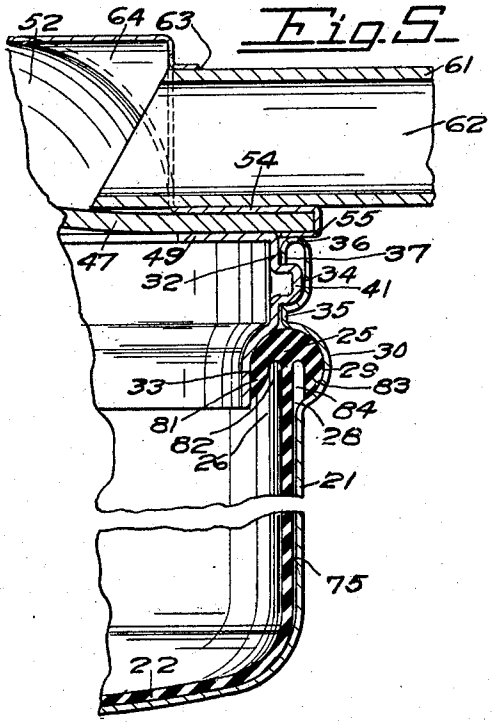
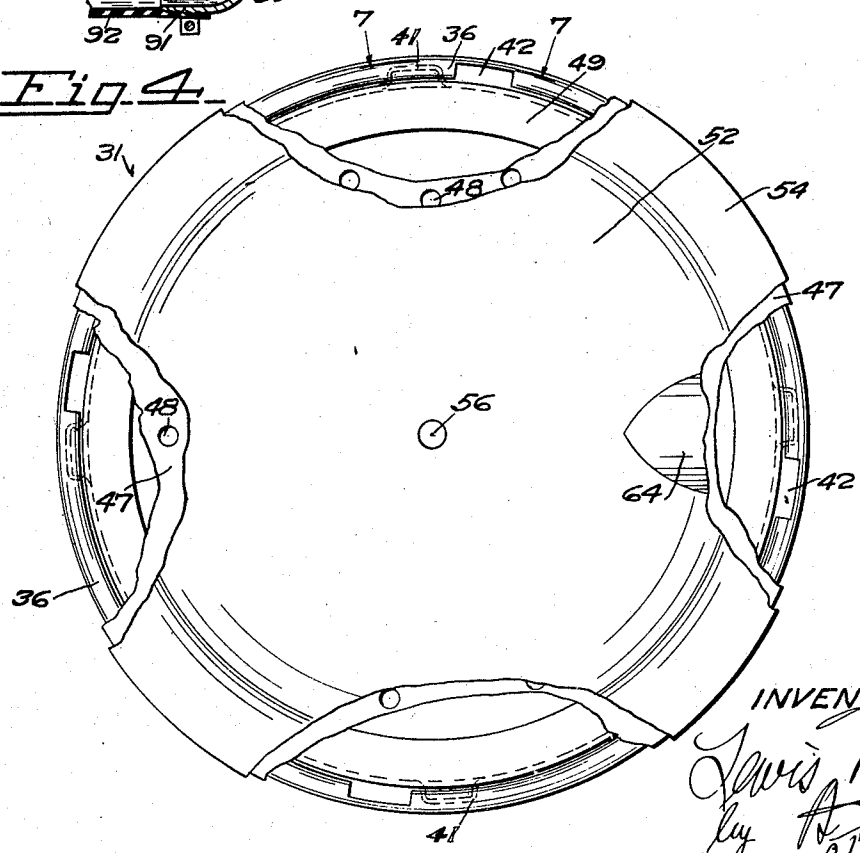


Fig. 4



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Fig. 6

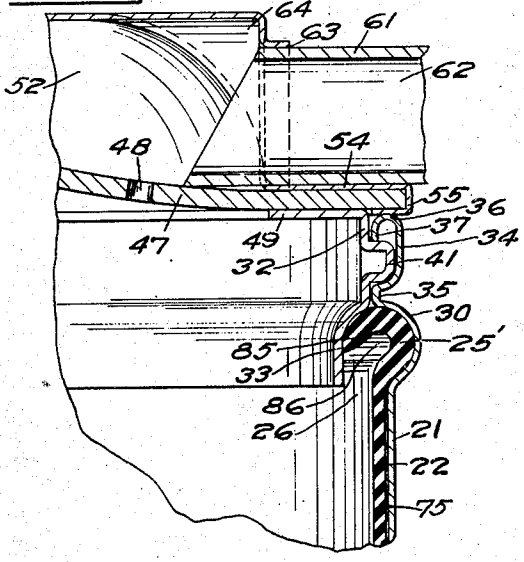


Fig. 8

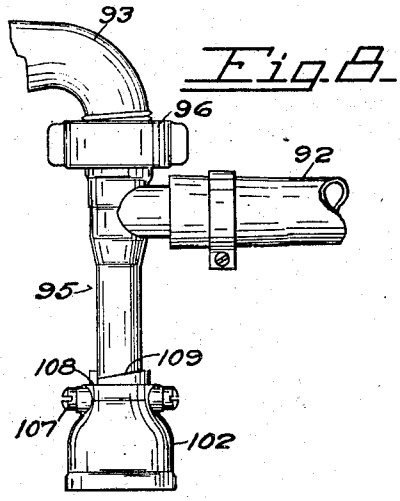


Fig. 9

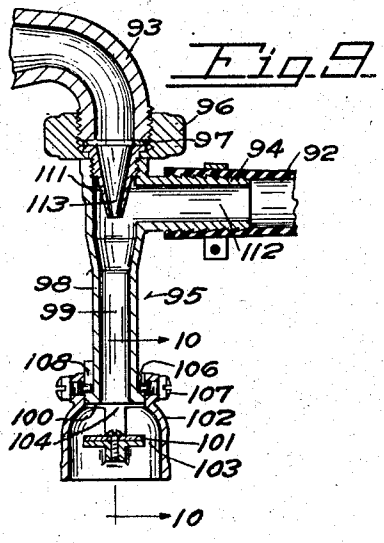


Fig. 7

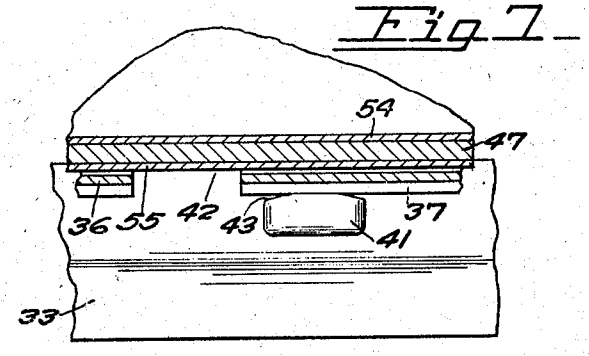
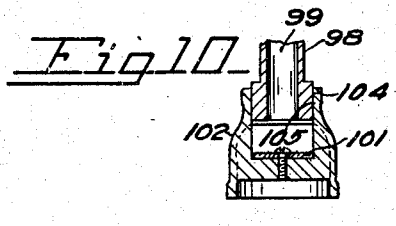


Fig. 10



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Patented Nov. 23, 1937 2,100,026

UNITED STATES PATENT OFFICE

2,100,026

LIQUID EXPRESSER

Louis F. Ducker, Mariemont, Ohio, assignor to Richard A. Kaps and Charles H. C. Van Pelt, both of Cincinnati, Ohio, and said Louis F. Ducker, trustees

Application March 23, 1931, Serial No. 524,619

4 Claims. (Cl. 100—50)

My present invention is an elaboration of the inventions shown, described and claimed in my applications for Letters Patent on Improvements in liquid expressers, Serial No. 476,892, filed in the United States Patent Office August 21, 1930; Serial No. 484,418, filed in the United States Patent Office September 25, 1930; which is now Patent No. 1,996,505, dated April 2, 1935, and Serial No. 522,981, filed in the United States Patent Office March 16, 1931.

Liquid expressers of this character are employable in expressing liquid from laundry and from material which has been dry cleaned and for other purposes.

The liquid expresser comprises a material chamber for receiving the material from which the liquid is to be expressed, and a pressure chamber for receiving the fluid agency by which the liquid is expressed, there being a flexible wall between said chambers, which wall may be in the form of a bag and is hereinafter referred to as a bag.

It is the object of the present invention to provide novel means whereby to secure the flexible bag in place; further, to provide novel means whereby to form a sealed joint between the mouth end of the bag and the part or parts associated therewith; further, to provide novel means for preventing leakage between the mouth end of the bag and the part in which it is received; and, further, to provide novel means whereby escape of fluid through the joint at the mouth end of the bag is prevented.

It is the object of my invention further to provide novel means for securing the closure or cover in place, and further to provide novel means whereby to secure the closure or cover in place selectively in various positions, for directing a discharge portion thereof in various directions in order to control the position of the discharge from the expresser.

It is the object of my invention further to provide novel means for controlling the inlet and the outlet of fluid into and from the pressure chamber.

The invention will be further readily understood from the following description and claims, and from the drawings, in which latter:

Fig. 1 is a side elevation of my improved device shown in association with a stationary tub and a washing machine.

Fig. 2 is a plan view of the same, partly broken away, with the cover shown in various positions in dotted lines for directing its spout in various directions.

Fig. 3 is a vertical axial section of my improved device taken on the line 3—3 of Fig. 2, and showing the bag and material in expressed relation.

Fig. 4 is a plan view of my improved device, partly broken away.

Fig. 5 is an enlarged vertical section, partly broken away, showing the joint between the upper end of the flexible bag, the tank and its cover, taken on the line 3—3 of Fig. 2.

Fig. 6 is a similar view of a modification of the same.

Fig. 7 is a cross-sectional detail view of the locking means for the cover, taken on the line 7—7 of Fig. 4.

Fig. 8 is a side elevation of the control means for controlling the feeding and discharge of the liquid in the tank, the connections being partly broken away.

Fig. 9 is an axial section of the same, taken on the line 9—9 of Fig. 2; and,

Fig. 10 is an axial section of the same, partly broken away, taken in the plane of the line 10—10 of Fig. 9.

In the present exemplification of my invention there is a tank 21 in which there is a bag 22. The bag is arranged to receive the clothes or other material from which the liquid is to be expressed, a body or batch of such material being shown at 23 in the bag. The bag encompasses a material chamber 24.

The bag normally depends in the tank. The sides of the bag may normally be close to the sides of the tank, and the bottom of the bag may normally be supported by the bottom of the tank, for instance as indicated in Fig. 5. The introduction of pressure fluid into the tank causes immediate spacing of the bag from the sides and bottom of the tank.

The bag is provided with a bead 25 about its mouth 26. The bag is exemplified of greater length than diameter.

Adjacent to the mouth 28 of the tank, the tank is provided with an inner annular groove 29, shown formed by an outwardly bent annular bead 30 in the metal of the tank. The bead 25 of the bag is shown located in this groove.

There is a cover 31 for the tank. The cover has an annular side wall 32 provided with an annular engaging face 33 to form an annular groove complemental to the annular groove 29 for receiving the bead 25 of the bag.

The tank, which may be formed of sheet metal, is provided with an upwardly extending annular wall 34 located above the bead 30 and connecting with the bead by an annular depressed connec-

tion 35 (Fig. 5). The upper end of this annular wall is provided with an inwardly turned flange 36 having an inward downward extension 37. This flange and the wall 34 preferably extend outside the cylindrical plane of the median line of the bead.

The cover is provided with lugs 41 received under the flange 36 for holding the closure to the tank. The lugs extend radially from the annular wall 32, and are received through recesses 42 in the flange 36. The ends of the lugs are preferably inclined, as at 43, for forming wedge faces for readily locating the cover on the tank and clamping the same in place with the grooves 29, 33, in proper relation. The cover is moved in axial direction into the mouth of the tank and is then rotated for connecting the lugs with the flange in any desired angular relation.

The cover is provided with a cross wall 47 provided with holes 48 (Figs. 3, 4 and 5). This cross wall is shown as a bent sheet metal structure secured to an inwardly extending flange 49 extending inwardly from the annular side wall 32 of the cover, and suitably secured thereto, as by spot welding or riveting for forming a sealed joint.

The cover is provided with a deflector plate 51 forming an outlet chamber 52 in the cover. The deflector plate has an annular bulge 53 extending above the perforated plate, an annular flat portion 54 surrounding said bulge, the portion 54 having a downwardly and inwardly extending annular flange 55 received under the edge of the cross wall, for securing the deflector to said cross-wall, the deflector plate and the cross-wall being at their margins suitably secured together for forming a sealed joint therebetween, as by spot welding. The middle portions of the deflector plate and the cross wall may be connected, as by a rivet 56.

A discharge spout 61 extends from the cover and is exemplified as a hollow tube fixed to the cover, and has a discharge passage 62 which connects with the outlet chamber 52. The spout is received through a hole 63 in the side wall of the deflector, which is bulged at 64 for permitting this to be done, the discharge spout being fixed to the cover, as by being spot welded thereto.

A handle 65 is also fixed to the cover, as by having a flattened portion 66 riveted to the cover, the handle including an outwardly extending tubular portion 67. The discharge spout also forms a handle. The discharge spout and the handle 65 are preferably secured to opposite sides of the cover, so that they may be readily grasped by both of the hands of the user, for rotating the closure and for moving the same axially into or out of the mouth of the tank.

The securing means between the cover and the tank are so arranged that the cover may be placed in various angular positions on the tank for directing the discharge spout thereof in various angular directions, so as to discharge the liquid being expressed from the material, for instance, either into a washing machine, exemplified at 71, or into a stationary tub, exemplified at 72, or into other suitable receptacles or drain.

In the present exemplification the cover is provided with four securing lugs and the mouth end of the tank is provided with four coacting recesses, and the discharge spout is exemplified in Fig. 2 as directed in four different directions, one in full lines and three in dotted lines. The discharge spout may, however, if desired, be directed into any desired angular positions by correspondingly rotating the cover.

The tank is suitably supported. It is shown supported in a ring 73 bracketed by a bracket 74 from the washing machine.

The bag 22 is a flexible bag. There is a pressure chamber 75 between the wall of the tank and the bag. Fluid under pressure is arranged to be received between the tank and the bag for surrounding the bag with a flexible pressure element for squeezing the bag and its contents and expressing the liquid from the material. This material is usually a saturated material, as clothes or other material received from a power washing machine in the washing operation, or material which has been dry cleaned, or treated in other manner.

The pressure fluid is preferably water or other liquid which is substantially non-compressible, but readily flowable in all directions, exerting its pressure in all directions, and is yieldable throughout to excess local resistance, for exerting uniform pressure upon all parts of the outside of the bag, and for exerting uniform pressure upon the material from the outside thereof to express the liquid therefrom.

The bag is preferably rendered impervious to the pressure medium and to the liquid in the bag. It may be made of soft pliable rubber, similar to the rubber of an inner tube of an automobile tire and have a bead formed at its mouth.

The pressure fluid exerts pressure between the tank and the bag, causing flow of the fluid toward the joint between the mouth of the bag and the mouth of the tank, and there is also flow of the liquid from the material and a pressure of liquid in the bag or material chamber which act upon the joint between the mouth of the flexible bag and the cover. It is desirable that these joints be tight joints to prevent the flow of any fluid therethrough to the outside of the tank, while at the same time it is desirable to avoid the necessity of a great amount of clamping pressure upon the mouth of the bag. The tendency for the fluid or liquid to pass the joint at the mouth of the bag is especially evident at the beginning of the expressing operation where a solid bead is employed at the mouth of the bag.

I have provided means for avoiding such leakage in the form of a flexible flap at said joint, upon which the flow of fluid or liquid acts for sealing the joint. The initial portion of the flow of fluid or liquid is arranged to act upon the flexible flap for sealing the joint as soon as the flow or the pressure begins.

For accomplishing this, I have provided a flexible flap 81, at the inside of the bag arranged to coact with the coacting face 33 (Fig. 5). This flap and this face are shown annular, with an annular space or groove 82 under the flap between the flap and the body of the bag. It is shown as part of the bead 25. When flow of fluid or pressure in the bag begins it will be received in the annular groove 82 and thereby press the flexible flap toward its coacting face for sealing the joint at the mouth end of the bag.

A flexible flap is also preferably provided at the outside of the mouth of the bag for sealing the joint between the mouth of the bag and the tank. Thus the bag 22 is provided with a flexible flap 83 under which there is a space or cavity, shown as a groove 84. The flexible flap 83 is shown on the bead 25. These parts are preferably annular. At the beginning of the flow of fluid or of the pressure of the fluid between the bag and the tank, flow or pressure is received in the space 84 for forcing the flap 83 outwardly toward the wall of its groove for seal-

ing the joint at the outside of the mouth of the bag.

Flow of fluid or liquid is thereby prevented past the joint between the mouth end of the bag and its holding means, so as to prevent leakage past the joint between the mouth of the tank and its cover and compel all of the fluid between the tank and the flexible bag to remain in the pressure chamber during the squeezing operation, and to cause the flow of liquid out of the material chamber through the cover and its discharging means.

A modification is exemplified in Fig. 6 in which a flap is located only at the inside of the mouth of the bag, the body of the bead being received in the inner annular groove at the mouth end of the tank. This has been found to be very effective where the leakage occurs from the material chamber rather than from the pressure chamber, the initial pressure in the material chamber forcing the bead to its seat in the tank.

In the modification the inner portion of the bead 25' is provided with an annular flexible lip 85 under which there is an annular groove 86 in which the flow of liquid in the material compartment is received for forcing the lip or flap against its coacting face and sealing the joint, and also forcing the bead against its seat in the tank for sealing the joint between the bead and the tank.

Means are provided for admitting flow of fluid into the pressure chamber and of exhausting the fluid therefrom. Thus the bottom of the tank is provided with a port 89 formed in a fitting 90 suitably secured to said bottom. The fitting is provided with a nipple 91. A conduit 92, which may be a flexible hose, is fixed to said nipple so as to form a sealed joint therewith. The other end of the hose has connection with a suitable source of fluid under pressure, for instance a usual water faucet 93, being shown fixed to a nipple 94 of a fixture 95 secured to the nozzle, as by a coupling 96, clamping a washer 97 between the fixture and the end of the faucet.

The fixture comprises a tube 98 having a passage 99. The end of the tube has a valve seat 100 with which a valve 101 is arranged to coact. This valve is on a thimble 102 received about the lower end of the tube and provided with passages 103 at the respective sides of the valve through which the liquid passes when the valve is open. The thimble has a slide face 104 coacting with a guide face 105 on the tube, and is provided with lugs 106 shown on screws 107. The lugs are normally received in slots 108 on the tube, and are arranged to move along wedge faces 109 on said tube when the thimble has been raised and is being turned, for clampingly closing the valve.

An ejector nozzle 111 coacts with a passage 112 in the nipple 94 and discharges into the tube 98. The ejector nozzle has a downwardly tapered passage 113. When the valve 101 is closed, the water from the hydrant passes through the ejector nozzle 111, fills the passage 99 in the tube 98 and flows through the passage 112, the hose 92 and the port 89, into the pressure chamber for exerting squeezing pressure upon the bag and the material therein.

When this material has been squeezed and the liquid expressed therefrom, the valve 101 may be opened, whereupon the flow from the faucet is through said tube and past the valve 101, acting as an ejector for drawing the water through the passage 112, the hose 92 and the port 89, from the pressure chamber for emptying the pressure chamber.

In operation, the cover is released from the tank and the saturated material is placed in the bag. The cover is then replaced and fastened to the tank in such position that the delivery spout thereof extends in the desired direction with relation to the tank for discharging the expressed liquid in desired direction.

The means provided for securing the cover to the tank are such that the cover is easily put in place in any desired angular position and definitely located with relation to the mouth end of the tank, the flange 55 on the deflector plate 51 resting upon the top of the tank for locating the groove at the lower end of the cover in proper relation to the groove in the mouth end of the tank, to receive and hug the bead at the mouth end of the bag, and form proper coacting resistance faces to movements of the flexible flaps on the respective sides of the mouth end of the bag.

The faucet 93 being opened and the valve 101 being closed, water is forced through the ejector nozzle 111 into the passage 99, through the passage 112, the hose 92 and the port 89 into the pressure chamber, for exerting squeezing pressure upon the bag and the material therein.

The pressure thus introduced between the tank and the bag acts with side pressure upon the elongated sides of the bag and with end pressure upon the end of the bag. This action of the pressing fluid upon the bag and the material therein is in simulation of the squeezing of saturated material between the human hands, but with a cushioning fluid, and is a squeezing action upon the material without relative distortion between the portions of the material or twisting of the material.

The action of the compressing fluid upon the bag is to contract the bag and thereby close any punctures, holes or leaks there may be in the bag, and to avoid the formation of any such holes, punctures or leaks during the pressing operation. Any hard objects among the material, such as buttons, buckles or the like are cushioned against the material and if they should contact the bag, there is no danger of puncturing the bag because the squeezing action is to compress the constituent parts of the bag against each other, rather than to expand the same, and to crowd the constituent parts of the bag about any such hard object for cushioning the hard object, as distinguished from a stretching of the portion of the bag about a hard object.

These actions are more fully described and the relations of parts accomplishing the same more broadly claimed in my aforesaid copending applications hereinbefore mentioned.

The initial portion of the flow or pressure of the liquid in the material causes movement of the inner flexible flap at the mouth of the bag for sealing the joint at said mouth. The flow of liquid or pressure in the groove thereunder forces the mouth end of the bag into intimate contact with the coacting portion of the wall of the cover for sealing the joint therebetween. When the outer flexible flap is employed the initial portion of the flow or pressure in the pressure chamber arriving at the outer flexible flap causes outward movement of said flexible flap to seal the joint between the mouth of the flexible bag and the tank.

The flow from the hydrant continues for exerting and building up pressure in the pressure compartment for squeezing the bag and the material therein and expressing the liquid therefrom.

The liquid is forced through the perforations in the cover into the discharge space or channel in said cover and through the discharge spout.

When the fluid has been sufficiently expressed from the material, the valve 101 is opened, whereby the fluid from the faucet passes through said valve, creating a vacuum in the passage 112, and drawing the water out of said passage, the hose 92, the nipple 91, through the port 89, and out of the pressure chamber, for emptying the pressure chamber.

The cover is removed for emptying the bag, or fresh water or bluing or other treating liquid may be repeatedly introduced into the bag, and expressed, for rinsing, bluing or otherwise treating the material.

I do not herein claim the general arrangement of material chamber, pressure chamber and flexible wall or bag between said chambers, nor the relations and forms of the same nor the relation of an elongated bag and an elongated tank; nor broadly means nor method for expressing the liquid or rinsing the material; nor broadly shifting the spout into various radial positions; nor broadly providing an expansible member at the mouth of said bag, herein shown and described, having shown, described and claimed the same in my aforesaid copending applications.

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

1. In apparatus of the character described, the combination of a tank, a cover therefor, a flexible bag having a mouth, a material chamber at one side of said bag, a pressure chamber at the other side of said bag, said tank and said cover having opposite walls between which said mouth is located, and flexible flaps between said walls and said mouth flexed by the flow of fluid from said material chamber and said pressure chamber for sealing the joints between said walls and said mouth.

2. In an expresser, the combination of a receptacle including a cover, the receptacle having an annular recessed seat and the cover having an annular seat opposed to the recessed seat; and a flexible wall in the receptacle having an annular rib at its periphery provided with an annular lip initially seating on the seat of the cover, said annular rib being resilient and expanding into said recess initially and under the action of fluid pressure, having its seating pressure increased on said seats as the pressure in the receptacle increases, thereby sealing the wall relative to the receptacle.

3. In a linen wringing machine, the combination with an inflexible outer casing being internally enlarged at its upper end to form an annular channel; of a flexible bag within the casing, its bottom normally contacting the bottom of the casing, said bag being open at the top and the material of the bag at its upper edge forming an annular cuff spaced from the body of the bag and engaged into said annular channel, the space between the body of said bag and the cuff forming a pressure channel closed at its upper end whereby, when fluid under pressure is admitted to the casing around the bag said cuff is forced outwardly to prevent leakage between the cuff and casing, and means to admit fluid under pressure to said casing.

4. In a linen wringing machine, the combination with an inflexible outer casing and a removable cover therefor, said casing being internally enlarged at its upper end to form an annular channel; of a flexible bag within the casing, its bottom normally contacting the bottom of the casing, said bag being open at the top and the material of the bag at its upper edge forming an annular cuff spaced from the body of the bag and engaged into said annular channel, said cuff being thickened to form a reinforcement, the space between the body of said bag and the cuff forming a pressure channel closed at its upper end whereby when fluid under pressure is admitted to the casing around the bag said cuff is forced outwardly to prevent leakage between the cuff and casing, and means to admit fluid under pressure to the casing.

LOUIS F. DUCKER.