

Dec. 15, 1936.

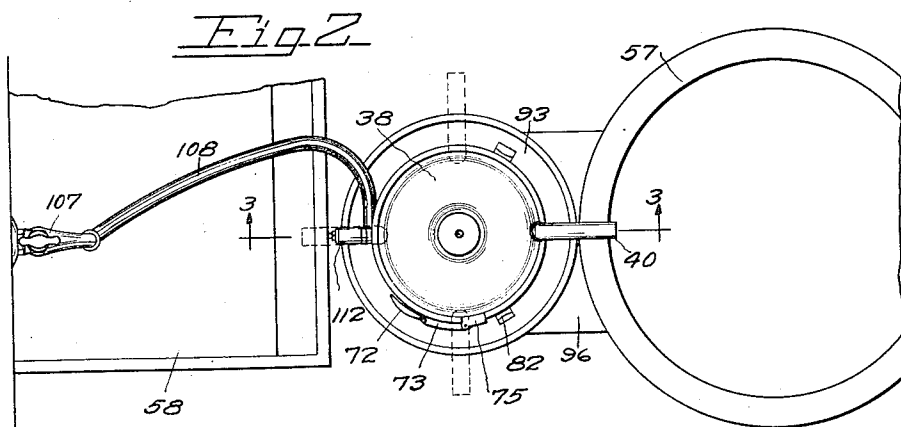
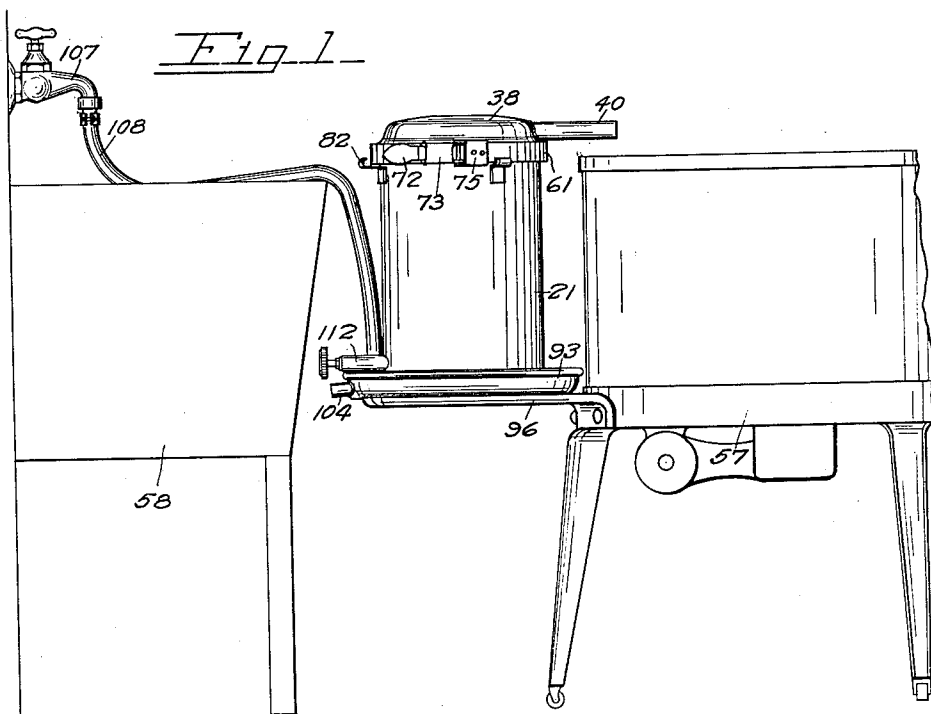
L. F. DUCKER

2,064,787

LIQUID EXPRESSER

Filed March 16, 1931

4 Sheets-Sheet 1



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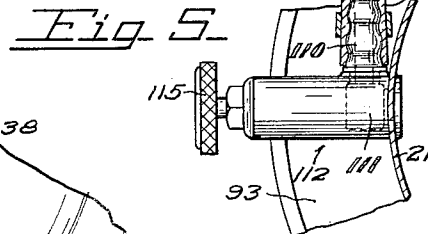
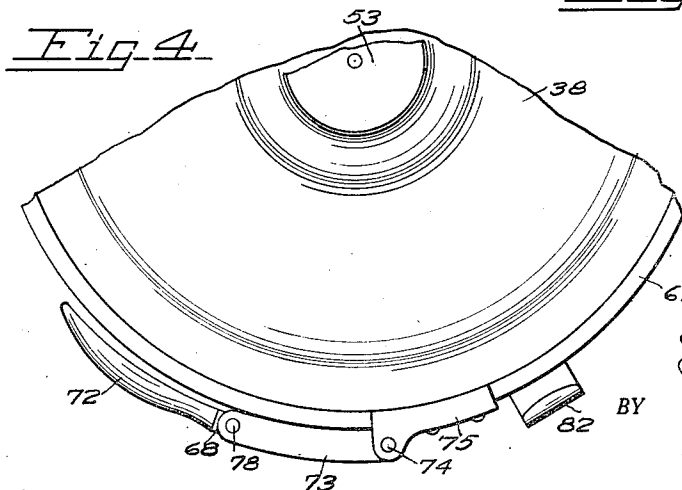
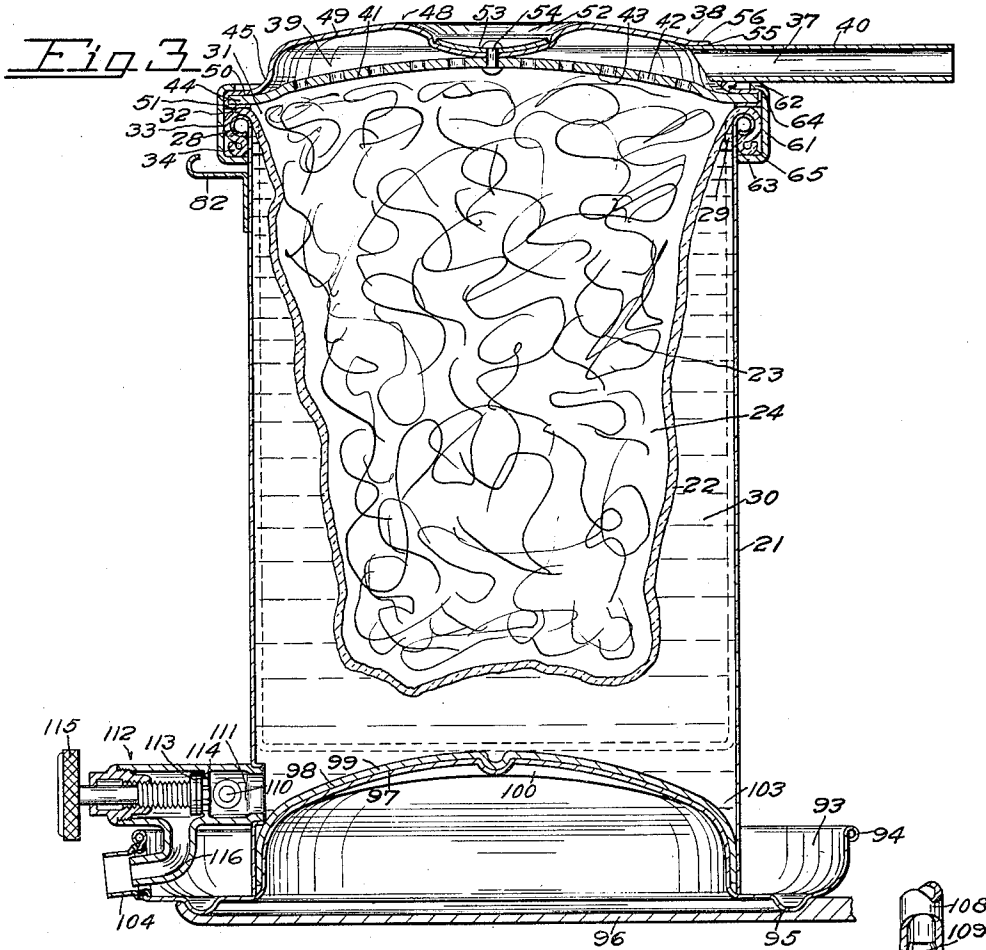
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L. F. DUCKER
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Filed March 16, 1931

4 Sheets-Sheet 2



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LIQUID EXPRESSER

Filed March 16, 1931

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Fig 8

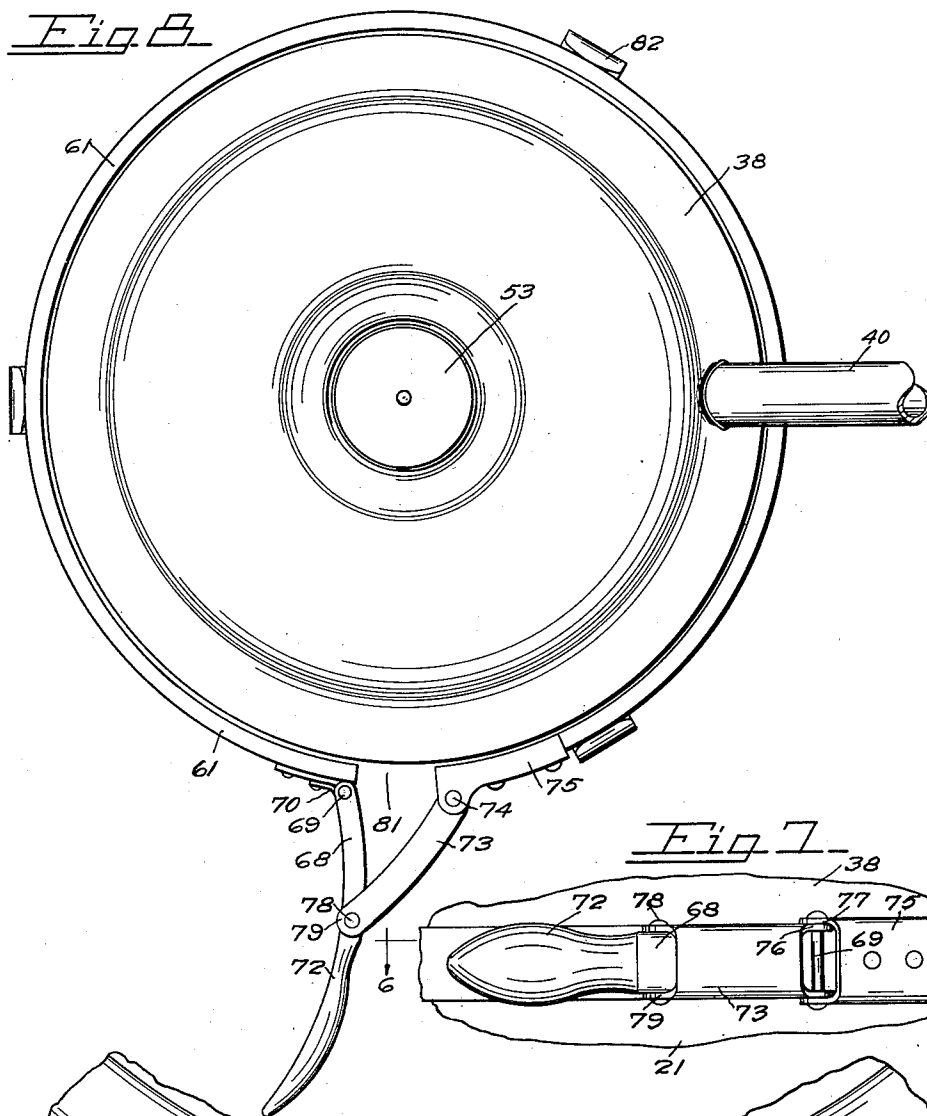


Fig 7

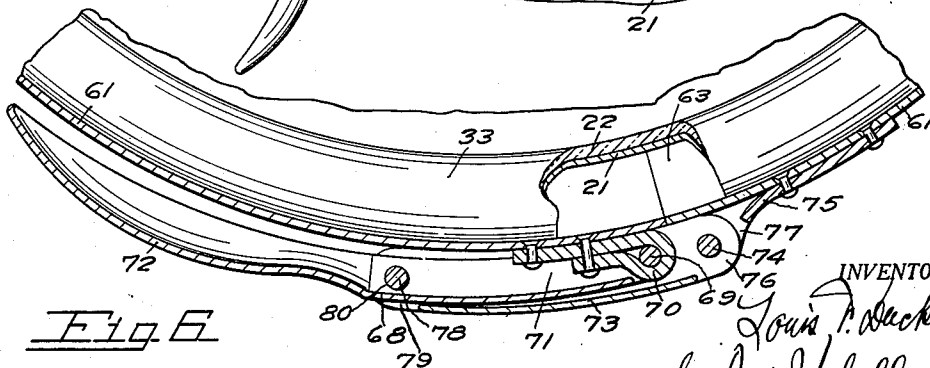
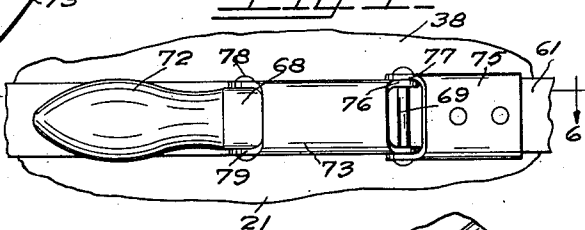


Fig 6

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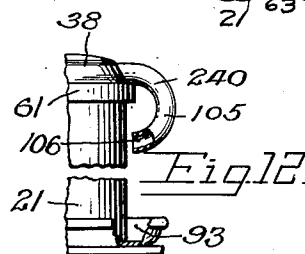
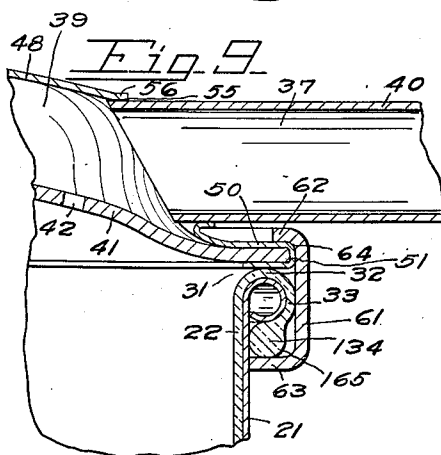
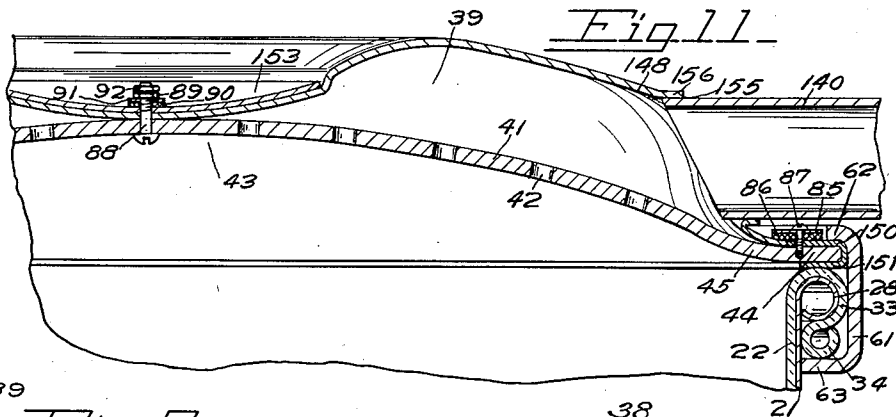
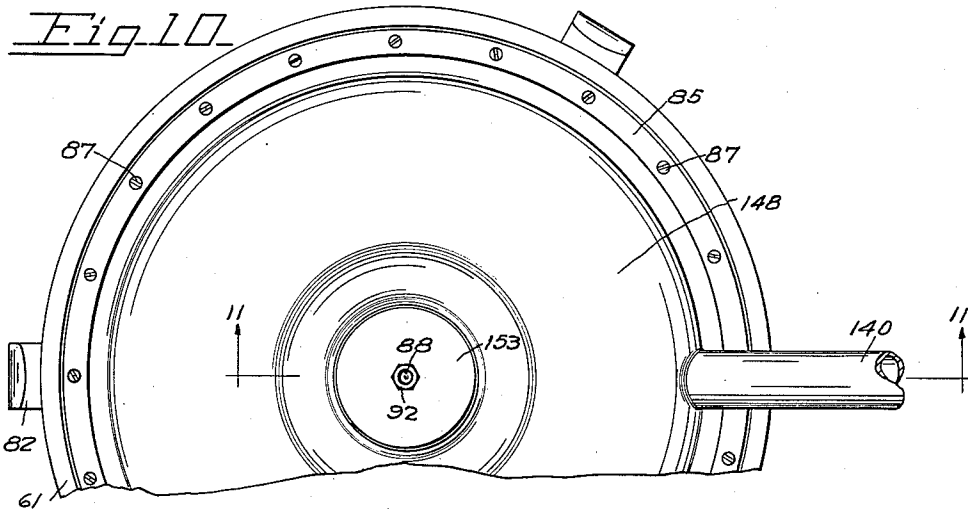
L. F. DUCKER

2,064,787

LIQUID EXPRESSER

Filed March 16, 1931

4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,064,787

LIQUID EXPRESSER

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

Application March 16, 1931, Serial No. 522,981

6 Claims. (Cl. 100—50)

My present invention is an elaboration of the invention 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, and Serial No. 484,418, filed in the United States Patent Office September 25, 1930, now matured into Patent No. 1,996,505, dated April 2, 1935.

Liquid expressers of this character are employed 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 at the mouths of the bag and of the tank for connecting the mouth ends of the bag and the tank; further, to provide a novel joint between the tank and the cover; and, further, to provide novel connecting means between the mouths of the tank and of the bag and the cover whereby to secure the cover in place.

It is the object of my invention further to provide novel connecting means between the mouth end of the tank and the cover in association with a cushioning part, and novel means for exerting pressure in the direction of the axis of the tank between the tank and the cover and said cushioning part; further, to provide a cushioning member at the mouth end of the tank and the cover for sealing a joint at said mouth and connecting the cover with the tank by means of a band about said parts arranged for pressing said parts toward each other for securing the same together; and, further, to provide said band with locking means for maintaining the connection between the tank and cover.

It is the object of my invention further, to provide the cover with novel discharge means for the expressed liquid; further, to provide means whereby to secure the cover or closure in place in selective angular positions for directing the discharge portion thereof in various directions; and, further, to provide the cover or closure with a shiftable section provided with a discharge portion for directing the discharge por-

tion in various directions for controlling the direction of discharge of the expressed liquid.

It is the object of my invention further to provide novel means for controlling the discharge of the expressed liquid; and, further, to provide novel relation of means for supplying the pressure fluid and discharging the expressed liquid.

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 power washing machine, partly broken away.

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

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

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

Fig. 5 is a plan view detail, partly broken away, and partly in section, showing the outlet valve and the hose connection for the pressure chamber.

Fig. 6 is a horizontal sectional detail view of the securing means between the cover and the tank, partly broken away, and partly in section on the line 6—6 of Fig. 7.

Fig. 7 is a side elevation of the same.

Fig. 8 is a plan view of my improved device, with the securing means shown in open relation.

Fig. 9 is a cross-sectional detail view, taken in a plane corresponding to the line 3—3 of Fig. 2, and showing a modification of the securing means of my improved device.

Fig. 10 is a plan view of my improved device, partly broken away, showing a modification of the cover.

Fig. 11 is a vertical section of the same, taken on the line 11—11 of Fig. 10, and partly broken away; and,

Fig. 12 is a side elevation of my improved device, partly broken away, showing a modification of the spout.

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 be-

ing 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 find support on the bottom of the tank, for instance as indicated in dotted lines in Fig. 3. The introduction of pressure fluid into the tank causes immediate spacing of the bag from the walls and bottom of the tank.

The tank, which may be formed of sheet metal and be annular in cross-section, is provided at its upper end with a bead 28. This bead is shown as an outwardly curled upper end of the tank at the mouth 29 of the tank.

The bag is a flexible bag. There is a pressure chamber 30 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 flowable 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, or material which has been dry cleaned, or treated in other manner. The 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 resistances 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 pressure fluid acts upon the sides of the bag to squeeze the same laterally inward and upon the bottom of the bag to squeeze the same upwardly. The bag and tank are shown of greater heights than diameters.

The bag is preferably rendered impervious to the pressure medium and to the liquid in the bag. It may be of soft pliable rubber similar to the rubber of an inner tube of an automobile tire and be formed at its mouth 31 to make connection with the tank. Thus the bag is at its mouth provided with an outwardly extending portion 32, which is continued outwardly and downwardly as indicated at 33, about the bead 28, and continued as a stiffening part 34, shown as a reversely bent bead. The outwardly and downwardly bent portion at the mouth of the bag may form a hollow bead received about the bead 28 at the mouth of the tank.

This stiffening part is shown as a reversely bent bead located under and of smaller diameter than the bead 33 in Fig. 3. The lower bead may, if desired, be a solid bead 134 as shown in Fig. 9, and be comparatively resistant to pressure.

There is a cover 38 for the tank, which is shown as a double walled cover, for forming a discharge chamber 39 communicating with the discharge passage 37 of a discharge spout 40. The cover is shown comprising a lower cross wall 41 provided with holes 42 communicating with the discharge chamber. The cross wall of the cover is shown upwardly dished at 43 and as having a comparatively flat margin 44, the inner portion of which meets the bowed portion of the cover by a reversely bent annular portion 45.

The cover is provided with an additional or upper wall 48, which forms a deflector plate for the discharge chamber 39 in the cover. The deflector plate has an annular bulge 49 above the perforated plate and an annular flat marginal

portion 50 surrounding the bulge, the portion 50 having a downwardly and inwardly extending annular flange 51 received under the edge of the cross wall for securing the deflector to said cross wall.

The deflector plate and the cross wall are suitably secured together at their margins for forming a sealed joint therebetween, as by spot welding. The middle portion of the deflector plate is provided with a depression 52, above which there is a dished washer 53, a rivet 54 connecting the parts together.

The discharge spout 40 extends from the cover and has communication with the discharge channel in the cover. It is shown as a hollow tube fixed to the cover, as in a hole 55 in the wall of the deflector, formed by a flange 56 surrounding said tube, the tube being suitably fixed to said flange, as by spot welding. This discharge spout may serve as a handle for manipulating the cover. A discharge spout of other form may also be provided.

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 into a power washing machine exemplified at 57, into a stationary tub exemplified at 58, or into other suitable receptacles or a drain. Four such positions are exemplified in Fig. 2, but other intermediate positions may also be obtained in the present exemplification if desired for directing the discharge spout into any desired direction.

The securing means which I have preferred to show for securing the cover to the tank comprises a band 61 having an upper flange 62 and lower flange 63 extending inwardly and acting upon the cover and tank respectively for holding the same together. The lower flange is instanced as received below the portion of the mouth of the bag extending to the outside of the mouth of the tank. Specifically, the lower flange of the band is received under the lower outer bead 34 of the mouth of the bag.

Pressure is exerted upon the laterally extending portion 32 of the mouth of the bag between the outer margin of the cover and the upper end or bead of the mouth of the tank for forming a tight joint between the cover and the mouths of the bag and tank, and pressure is furthermore exerted by coaction between the lower flange 63 and the bead 34 of the mouth of the bag, located between said lower flange and the bead 28 at the mouth of the tank, for forming a tight seal between the bead 28 of the tank and said lower flange.

Inward movement of the band toward the tank causes coaction between the inner edge of the flange 62 of the band and the sloping or rounded outer edge 64 of the margin of the cover, and coaction between the lower flange 63 and the rounded outer portion 65 of the bead 34 on the bag coacting with the bead 28 of the tank, for crowding these parts toward each other in the direction of the axis of the tank for further sealing the joints between the tank, the bag and the cover.

The band is exemplified as an annular band. It is preferably a resilient band having a normal curvature so that the cover may be readily moved axially out of the cover for separating the band from the tank. Such a relation is exemplified in Fig. 8.

Means are exemplified for clamping the band

about the joint. Thus a lever 68 is provided with a pivot pin 69 rotatable in a bearing 70 fixed to one end of the band and received in a recess 71 in the inner face of said lever. The lever is provided with an operating handle 72.

The lever is preferably of a curvature corresponding substantially to the curvature of the band. A link 73 is pivoted on a pivot pin 74 in a bearing piece 75 fixed to the other end of said band. This pivot pin is shown received through bearing lugs 76, 77, respectively on said link and said bearing piece. The other end of the link is pivoted to the lever 68 at an intermediate point in the length of the latter, as by a pivot pin 78 in bearing lugs 79 on the link and a bearing 80 in the lever.

When the handle 72 is moved outwardly for swinging the lever on its pivot, the inner ends of the lever and the link separate, the respective ends of the band separating for forming a space 81 between said ends, the band spreading for permitting removal of the cover from the tank. When the cover has been replaced, the band is again forced about the joint between the cover, the tank and the bag for reestablishing the sealing connection between said parts. The ends of the band preferably contact with each other in this relation for forming a closed band.

The band normally rests on brackets 82 fixed to the sides of the tank and extending outwardly therefrom when the band is not in use.

When the cover is replaced, the delivery spout thereof may be directed in any desired direction. The cover may be placed in any desired angular position at the top of the tank. When the delivery spout is fixed to the cover, the direction of its projection is located when the cover has been clamped in place.

It may be desirable to change the direction of projection of the delivery spout after the cover has been secured to the tank. For accomplishing this the delivery spout may be rotatable on the cover. Such an arrangement is exemplified in Figs. 10 and 11, in which the deflector plate having the discharge spout thereon is rotatable on the cover. Such a deflector plate is exemplified at 148 having the spout 140 fixed to the wall 156 of a hole 155 in the deflector plate.

An outer marginal annular strip 150 is provided with a downwardly and inwardly extending annular flange 151 received under the margin of the perforated plate for securing said marginal strip in place, the parts being fixed together, as by spot welding. The inner edge of this marginal strip coacts with the outer edge of the movable deflector plate 148, the outer margin of this deflector plate riding on the perforated plate. An annular retaining strip 85 has an annular packing 86 thereunder and is releasably fixed to the cover proper by screws 87. The packing spans the joint between the marginal outer edge of the rotatable deflector plate 148 and the marginal strip 150 for sealing the joint between the rotatable deflector plate 148 and the main portion of the cover.

A journal screw 88 is received through a central hole in the main portion of the cover, and passes through central holes in the deflector plate 148 and the dished washer 153. A nut 89 is received about the screw, a compressible washer 90 being between the dished washer and a washer 91 under the nut, a jam nut 92 being also screwed on the screw for locking the parts in adjusted position. The compressible washer forms a sealed joint about the screw. Rotation

of the deflector plate 148 is permitted on the cover.

Provision is made for taking care of any leakage there might be between the mouths of the tank and the cover. The band arrests any lateral discharge of such leakage and the leakage if any naturally gravitates along the sides of the tank.

I have therefore provided a trough under the joint between the mouths of the tank and bag and the cover. This trough is exemplified at 93 at the bottom of the tank, and is shown surrounding the tank. This trough is shown formed out of sheet metal with an outer marginal strengthening bead 94 and having bulges 95 formed downwardly therefrom for forming feet on which the tank may rest. The tank may be supported on a shelf 96 and be suitably secured thereto. The shelf extends from and is secured to the washing machine.

The middle portion of the metal of the trough structure is formed as an upward bulge 97 extending into the hollow 98 formed under the crown form of the bottom 99 of the tank. The upward bulge and the bottom may be provided with ribs 100 for further strengthening the same. The sheet metal structure, the bottom of the tank and the lower end of the side wall of the tank telescope each other at the bottom of the tank and are suitably secured together, as by spot welding.

A channel 103 is also thus formed in the tank about the bottom of the bag, forming part of the pressure chamber 30 in the tank between the wall of the tank and the flexible bag. This pressure chamber surrounds the sides of the bag and extends about the bottom of the bag when the bag is being squeezed for expressing the liquid from the material in the bag.

The trough has an outlet spout 104. The discharge from the outlet spout may be to a bucket or receptacle or drain under the tank or by means of suitable connections to any desirable point of discharge.

Means may also be provided for directing the discharge from the discharge chamber 39 in the cover to the trough. Such means are exemplified in Fig. 12, in which the discharge spout 240 is provided with a return bend 105 for directing the mouth 106 of the discharge spout toward the side wall of the tank. The side wall of the tank acts as a baffle for the discharging liquid, which flows down the side walls of the tank into the trough.

Fluid under pressure is arranged to be received between the tank and the bag for surrounding the bag with the flexible pressure element to squeeze the bag and its contents and expressing the liquid from the material in the bag. The pressure fluid may be liquid received from any suitable source of pressure. It may for instance be water from an ordinary water faucet 107 through a suitable hose 108 connecting with the pressure chamber, for instance by providing one end of the hose with leak-proof connection with a nipple 109 having a passage 110 communicating with the port 111 of the pressure chamber.

The pressure of water from the faucet when the faucet is open is admitted into the pressure chamber, and builds up pressure in said chamber, the water surrounding the bag and pressing upon the bag to squeeze the bag to express the liquid from the material through the cover, the discharge channel and the discharge spout.

The port 111 may also serve as an outlet port

for the pressure chamber. This port is shown located in a fitting 112 fixed to the tank. The inlet nipple is shown as part of this fitting. This fitting comprises a valve 113 coacting with the valve seat 114 and adjustable by means of a hand wheel 115 for opening and closing the valve. It also has an outlet spout 116, the outlet end of which is received in the outlet spout 104 of the chamber as well as from the trough to be discharged in similar direction and through the same discharge connections.

In employing my improved device, the cover is removed and the wet or saturated material is introduced into the bag which is supported in the tank. The material may be introduced into the bag from the washing machine or the laundry tub or other receptacle over a suitable drain board, not shown, for directing liquid dripping from the material during its transfer into the washing machine, the stationary tub or other receptacle, or into the bag.

The cover is then placed upon the tank with its drain spout directed in any suitable direction for controlling the outflow of the expressed liquid. When a rotatable cover section having a spout thereon is employed, this cover section may be rotated for angularly positioning the discharge spout in desired direction even after the cover is secured in place.

The securing band is placed about the peripheral edges of the cover and of the mouth of the tank for holding said cover across the mouth of the tank and preferably also for compressing a cushion, instanced as mouth parts of the bag, so as to seal the joint or joints at the mouth of the tank. The bag is instanced as extending laterally outward across the wall of the mouth of the tank for being located and squeezed between the cover and the tank, and the bag is also exemplified as having a cushioning bead between the band or clamp and the mouth of the tank, for providing an additional joint between the bag and the tank.

The cover and bead are provided with slanting or rounded peripheral edges arranged to be contacted by inwardly extending flanges of the band for aiding in compressive action between the cover, tank and bag. A comparatively stiff cushioning bead aids in providing a tight joint.

Pressure is then introduced between the tank and the bag, acting 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 pressure of this fluid and the consequent movement at the mouth end of the bag also serve to press the laterally extending portion of the mouth of the bag toward the resisting marginal portion of the cover for aiding in sealing the joint thereat, and any pressure or movement thus exerted also tends to tighten the joint between the outer bead at the mouth of the bag and the bead at the mouth of the tank for further sealing the pressure fluid in the tank.

The liquid being expressed flows through the holes or perforations in the lower cross wall of the cover into the discharge passage in the cover, and thence into the discharge spout, for being discharged in suitable direction, dependent on the angular position of the spout. If a cover with a movable section having the spout thereon is employed, this movable section may be moved after the cover is clamped in place so as to direct the spout into desired angular position. The joint between the movable section and the cover proper is a sealed joint for insuring passage of the liquid being expressed through the spout.

If there should be any leakage at the joint between the tank and the cover either of the pressure fluid or of the expressed liquid, such leakage will be received in the band and caused to flow downwardly along the side walls of the tank, and be received in the gutter about the tank, located below the joint between the tank and the cover. When a discharge spout provided with a mouth directed toward the tank is employed, the expressed liquid from this discharge mouth is also received in the gutter. Discharge from the gutter and from the pressure chamber in the tank is shown at coincident positions for readily directing both discharges in similar directions.

I do not herein claim the general arrangement of material chamber, pressure chamber and flexible wall or bag between said chambers; nor the relation of an elongated bag and an elongated tank; nor broadly means nor method for expressing the liquid by side pressure and by end pressure by a flowable pressure element acting upon the bag and the material therein, herein shown and described, having shown, described and claimed the same in my aforesaid copending applications Serial No. 476,892 and Serial No. 484,418, now matured into Patent No. 1,996,505, dated April 2, 1935; nor do I herein claim specifically the combination in an expresser of the character described of a rotatable cover and a spout fixed thereto to rotate therewith, herein shown and described, having shown, described and claimed the same in a copending application for Letters Patent on improvements in liquid expressers, filed in the United States Patent Office March 23, 1931, as Serial No. 524,619.

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 flexible bag therein, a cover for said tank, there being a joint between said tank and said cover, said flexible bag provided with a resilient margin between the margins on said tank and said cover, a band about said joint for clamping said cover to said tank, said band being releasable from said cover, and sup-

porting means on said tank located about said tank under said joint on which said band is loosely received for supporting said band when in release relation.

2. In apparatus of the character described, the combination of a tank having a mouth provided with a marginal bead, a flexible bag in said tank having a mouth provided with a hollow marginal bead received about said bead of said tank and with a resisting part under said bead of said tank, a cover for said mouths having a marginal portion, and connecting means between said marginal portion and said resisting part for attaching said cover to said tank.

3. In apparatus of the character described, the combination of a tank having a mouth provided with a marginal bead, a flexible bag in said tank having a mouth provided with a hollow bead about said bead of said tank and with a bead at the lower part of said hollow bead, said last-named bead located under said bead of said tank, a cover for said tank, and connecting means between said last-named bead and the margin of said cover for connecting said cover to said tank.

4. In apparatus of the character described, the combination of a tank having a mouth provided with a bead, a flexible bag in said tank having a mouth provided with a hollow bead and a bead thereunder, said hollow bead located about said first-named bead, and said third-named bead located under said first-named bead, a cover for said mouths provided with a margin, and a band provided with inwardly extending flanges between which said beads and said margin are located for securing said cover to said tank.

5. In apparatus of the character described, the combination of a tank, a flexible bag in said tank forming a material chamber having a mouth, a cover therefor, a discharge chamber in said cover communicating with said material chamber, a

pressure chamber between said tank and said bag for squeezing said bag and the material therein for expressing the liquid therein through said mouth of said material chamber into said discharge chamber, a discharge spout on said cover communicating with said discharge chamber, securing means between said cover and said tank and means whereby to position said spout in a plurality of angular positions about the axis of said tank for directing said discharge spout in a plurality of angular directions, said discharge spout having a discharge opening presented toward said tank, and a discharge channel about said tank receiving the discharge from said discharge spout.

6. In apparatus of the character described, the combination of a tank, a flexible bag in said tank forming a material chamber having a mouth, a cover therefor, a discharge chamber in said cover communicating with said material chamber, a pressure chamber between said tank and said bag for squeezing said bag and the material therein for expressing the liquid therein through said mouth of said material chamber into said discharge chamber, a discharge spout on said cover communicating with said discharge chamber, securing means between said cover and said tank and means whereby to position said spout in a plurality of angular positions about the axis of said tank for directing said discharge spout in a plurality of angular directions, said discharge spout having a discharge opening presented toward said tank, a discharge channel about said tank receiving the discharge from said discharge spout, said pressure compartment having an outlet, and a manually operated valve for said outlet, said outlet and said discharge channel having proximate discharge openings.

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