

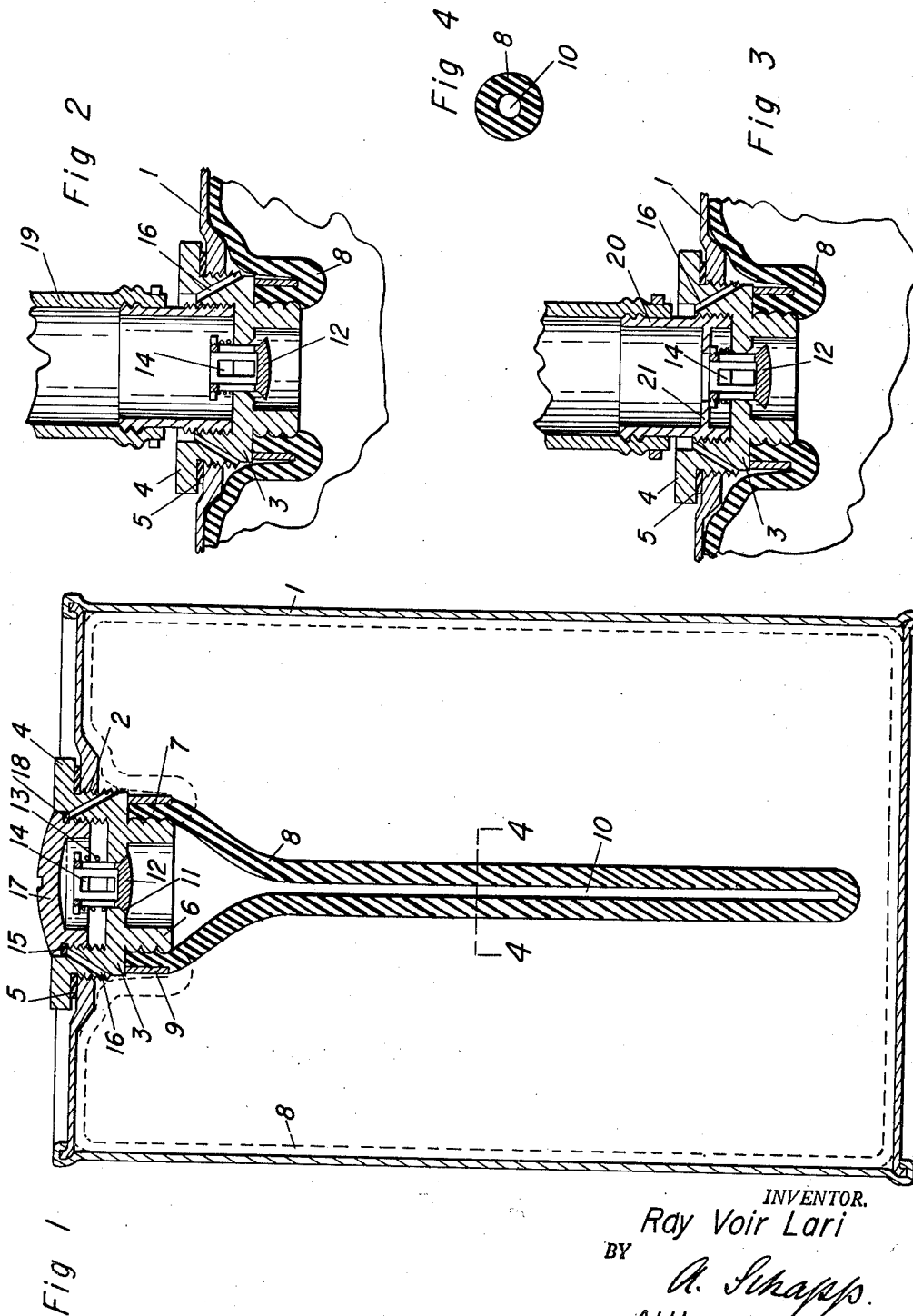
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PRESSURE PACKAGING SYSTEM FOR LIQUIDS

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PRESSURE PACKAGING SYSTEM FOR LIQUIDS

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The present invention relates to a pressure packaging system for liquids, and its principal object is to provide a system whereby the liquid, in the packaging process, builds up enough pressure in the container, holding the same for the eventual discharge of the liquid from the container under pressure when the latter has reached its point of destination.

Today the industry of transportation of liquids is an enormous one. For the purpose of discharging these liquids upon arrival, more efficient methods are continually sought. In this connection a long-standing practice consists of up-ending drums, for instance, inserting suitable dispensing devices, and providing a vent to facilitate discharging after again placing the drums in horizontal position. This is an expensive and time-consuming practice.

My new method is intended to eliminate the necessity for expensive hand pumps, which often have to be supplied in many variations to accommodate different kinds of liquids.

My process consists in fact of inner elastic cores of a length approximately equal to the length of the drum, and dimensioned to allow of their insertion into the drum through their conventional openings. They are preferably manufactured of vulcanized latex rubber or other synthetic materials, and they are so fabricated as to retain through their length a small coaxial space, into which liquids are filled under pressure, so that upon being released they will dispense the charged liquids even to an overhead level.

In practice this is done by pressing liquids into the cylindrical rubber cores, filling first their narrow coaxial cavities, after which their gradual expansion will extend finally to conform with the contour of the surrounding surfaces of the metal supporting containers, actually representing built-in pressure generators. This is one of the outstanding features of my new system.

It may be noted that, if for any remote reason, puncturing or rupturing of the inner-elastic expanding cores should occur while under pressure, or after filling, the liquid under pressure would safely transfer itself into the corresponding space of the retaining containers, while the elastic cores would again assume their original cylindrical candlelight shape, without any dangerous consequences. This is the outstanding feature of my new pressure packaging system for the purposes of dispensing and transporting liquids under pre-pressurized conditions.

By careful designing and by the accurate selection of thicknesses, elastic characteristics and chemical inertness of the rubber employed in the manufacturing of the cores, it is possible to charge them with liquids or semi-liquids under almost any desired pressure.

In the case of steel drums, as has already been mentioned, it is possible, for instance, to deliver liquids avoiding the use of expensive hand pumps or other means, used presently for liquid transferring.

By the use of this system contents from drums or other containers may be transferred into different containers, making possible the immediate return of the transporting

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drums for re-use. One valuable use for such method is the employment of these pre-pressurized containers for use by the Armed Forces where time and manpower is of the essence.

In the case of carboys, this pressurized method avoids necessity for exclusive use of glass containers and their recognized disadvantages. Metal drums filled with my elastic cores are always clean and therefore avoid expensive reconditioning, while, if a change should be necessary, the only operation involved would be the insertion of used elastic cores into other drums, the cores being the only units to be left for reconditioning or cleaning.

In some cases metal vessels, such as drums, for instance, can be manufactured with only one opening placed exactly in the middle of one of their ends and could be used exclusively to be fitted with my pressure cores.

It is understood that through the use of these cores another important advantage is derived by the fact that any liquid handled in this manner remains at all times under sterile conditions and protected from outside contamination. This is obviously not the case in any instance of known containers today, since after being punctured, these conventional containers can no longer protect their contents; the process of venting contributing to their contamination.

To the foregoing outlined characteristics and merits of my invention other important factors should be added, as the elimination by this new method of the difficulties concerning the ability of liquids to retain their sterile characteristics after expensive sterilization.

It is, in fact, more costly to keep, than to create sterile products. For this reason an important application of my new method lies in related fields, such as chemicals, petroleum, pharmaceuticals, liquid foods, dairy products, and others, where, because of the chemical nature of the liquids involved, a great deal of attention, economy, and careful handling is required.

Finally, it should be understood, that the use of elastic pressurizing cores and their related advantages are by no means limited to steel drums or any other large vessel, but also applicable to other smaller containers as well.

Further objects and advantages of my invention will appear as the specification proceeds, and the new and novel features of my system will be fully defined in the claims hereto added.

The preferred form of my invention is illustrated in the accompanying drawing, forming part of this application, in which:

Figure 1 shows a central vertical section through a drum having my invention incorporated therein, ready for shipment;

Figure 2, a fragmentary section illustrating the feeding operation;

Figure 3, a similar fragmentary section illustrating the discharging operation; and

Figure 4, a section taken along line 4—4 of Figure 1.

While I have shown only the preferred form of my invention, it should be understood that various changes or modifications may be made within the scope of the claims attached hereto, without departing from the spirit of the invention.

Referring to the drawing in detail, Figure 1 shows a conventional cylindrical drum 1 having a conventional, threaded central opening 2 in one end thereof. A gland 3 is threaded into the opening and has a flange 4 overlying the rim of the opening, with a suitable washer 5 interposed between the flange and the rim of the opening.

The lower end of the gland has a reduced extension 6 with a scalloped outer face to receive thereon the end 7 of my core 8, which may be locked in place by a suitable retaining ring 9.

The core 8, in the form shown, is presented as a straight tube of a length approximately equal to that of the drum, and of a diameter greatly less than that of the drum. It presents a relatively narrow passage 10 in its natural form, with a relatively heavy wall, made of elastic material such as natural or synthetic rubber, so that it resists high pressures and is capable of great expansion, sufficient to fill the entire drum, as shown in the dotted lines, when liquid is forced thereinto under pressure.

The material of the core should be chemically inert to resist corrosion, and should be made to resist sterilizing temperatures. It should be sufficiently elastic to build up counter-pressure in the act of filling, which causes it to contract to its normal size when opposing pressure is released and to eject the liquid in the course of contracting.

The gland 3 is formed with a valve seat 11 adapted to receive an intake valve 12 which is normally pressed upon the seat by means of a spring 13 as shown, and which is formed with lateral ports 14 adapted to discharge into the core when the valve is forced downward.

The upper end of the gland has an internal shoulder 15, and a number of vents 16 connect the inside of the drum with the shoulder. These vents may be closed by a cap 17 threaded into the upper end of the gland and carrying a washer 18, as shown.

For filling, the cap with its washer, is removed and any suitable conduit 19 (see Figure 2) is threaded into the upper end of the gland, leaving the vents 16 open.

For discharging, any suitable discharge conduit 20 may be threaded into the upper end of the gland, so as to leave the vents open, this conduit being provided with a suitable spider 21 to crowd the valve 12 off its seat for opening the ports 14.

In operation, with the cap removed and the feed conduit 19 substituted, liquid is forced through the conduit under pressure, opens the valve 12 and enters the core, first filling the same and then expanding the core until the latter makes all-around contact with the drum, as shown in dotted lines, and no further expansion is possible, at which time the flow of liquid will naturally stop. During the expanding operation, the air is forced out of the drum through the vents 16.

After the core has been filled to its capacity, the conduit 19 is disconnected and the valve 12 closes automatically. The cap 17 may then be applied, closing the vents 16, and the drum is ready for shipment.

When the drum has reached its destination, and it is desired to discharge the contents thereof, the cap is again removed and the conduit 20 is substituted, which latter in the process of applying, opens the valve 12, and also leaves the vents 21 open.

The expanded wall of the core holds the entire body of liquid under pressure and tends to contract to its normal condition. As soon as the valve 12 is unseated, the expanded wall will force the liquid through the valve opening under pressure, and will continue to do so until its tension is spent. It is apparent that the conduit 20 may be suitably controlled, by a valve or faucet, to regulate the flow of the liquid, and that the drum assembly may be drawn upon at timed intervals, as the need of the liquid arises.

During the withdrawal of the liquid, the vents 16 will allow air to enter into the drum, outside of the core to relieve any vacuum created by the shrinkage of the core. The inflow and outflow of air through the vents does not affect the liquid, since it does not come in contact therewith.

It will be noted that during both the filling and discharging operations the liquid remains out of contact with outside air and its contaminating influence, that the core becomes its own pressure generator and that it discharges

liquid under pressure in the absence of any pump or other instrumentality.

Various degrees of pressure may be obtained by proper selection of thickness and elasticity of the material, and it is apparent that the core does not necessarily have to be centrally located with respect to the drum, due to its natural characteristics.

I claim:

1. In a pressure packaging system for liquids, a container having a filler opening, a gland fitted upon the margin of the opening, an elastic core within the container having an intake fitted upon the gland, and a self-closing intake valve disposed in the gland, the gland having a cap for sealing the same and having vents for the container normally closed by the cap.

2. In a pressure-packaging system for a liquid, a core made of flexible and elastic material and comprising a straight tube with a heavy wall and a relatively narrow passage and having an enlarged neck, a gland secured upon then end of the neck, and a normally seated intake valve in the gland, the tube being expansible under the pressure of liquid fed thereinto through the gland under pressure and being adapted to discharge the liquid through its compressive force when the intake valve is opened, and a rigid cylindrical container for the core having an axial opening allowing the core to be introduced therethrough and having means for securing the gland thereto, the gland having a vent to allow air to escape from the container as the core expands toward the wall of the container.

3. In a pressure-packaging system for a liquid, a core made of flexible and elastic material and comprising a straight tube with a heavy wall and a relatively narrow passage and having an enlarged neck, a gland secured upon the end of the neck, and a normally seated intake valve in the cylindrical container the tube being expansible under the pressure of liquid fed thereinto through the gland under pressure and being adapted to discharge the liquid through its compressive force when the intake valve is opened, and a rigid cylindrical container for the core having an axial opening allowing the core to be introduced therethrough and having means for securing the gland thereto, the gland having a vent to allow air to escape from the container as the core expands toward the wall of the container, and the core being of substantially the same length as the container to allow the expanded core to completely fill the container.

4. In a pressure-packaging system for a liquid, a core made of flexible and elastic material and comprising a straight tube with a heavy wall and a relatively narrow passage and having an enlarged neck, a gland secured upon the end of the neck, and a normally seated intake valve in the gland, the tube being expansible under the pressure of liquid fed thereinto through the gland under pressure and being adapted to discharge the liquid through its compressive force when the intake valve is opened, a rigid cylindrical container for the core having an axial opening allowing the core to be introduced therethrough and having means for securing the gland thereto, the gland having a vent to allow air to pass therethrough as the core expands and contracts, and a cap securable upon the gland and serving to close the gland and the vent, the vent being located to remain unaffected by a feed conduit or a discharge conduit secured upon the gland and the valve being operable for opening by the application of liquid under pressure.

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