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PROCESS AND DEVICES FOR THE SUBMITTING SUCCESSIVELY  
OF BOTTLES AND OTHER RECEPTACLES TO  
EXHAUSTION AND PRESSURE

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2 Sheets-Sheet 1

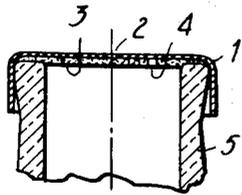


Fig. 1

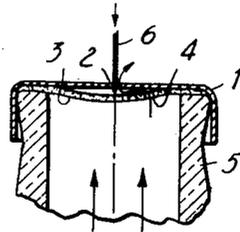


Fig. 2

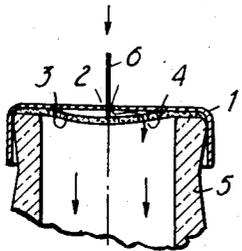


Fig. 3

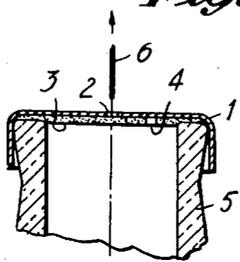


Fig. 4

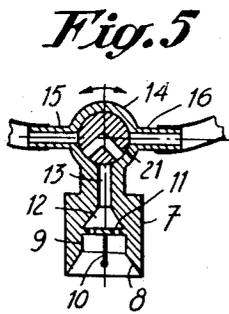


Fig. 5

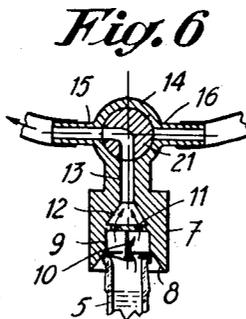


Fig. 6

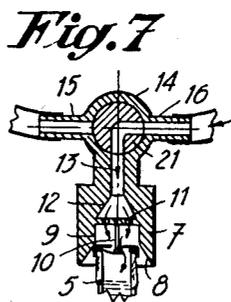


Fig. 7

Fig. 10

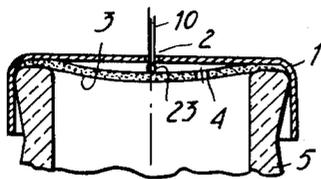
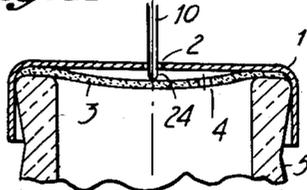


Fig. 11



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2 Sheets-Sheet 2

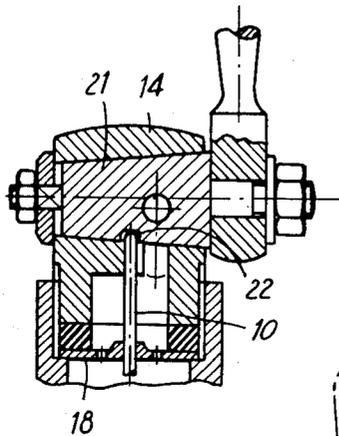


Fig. 9

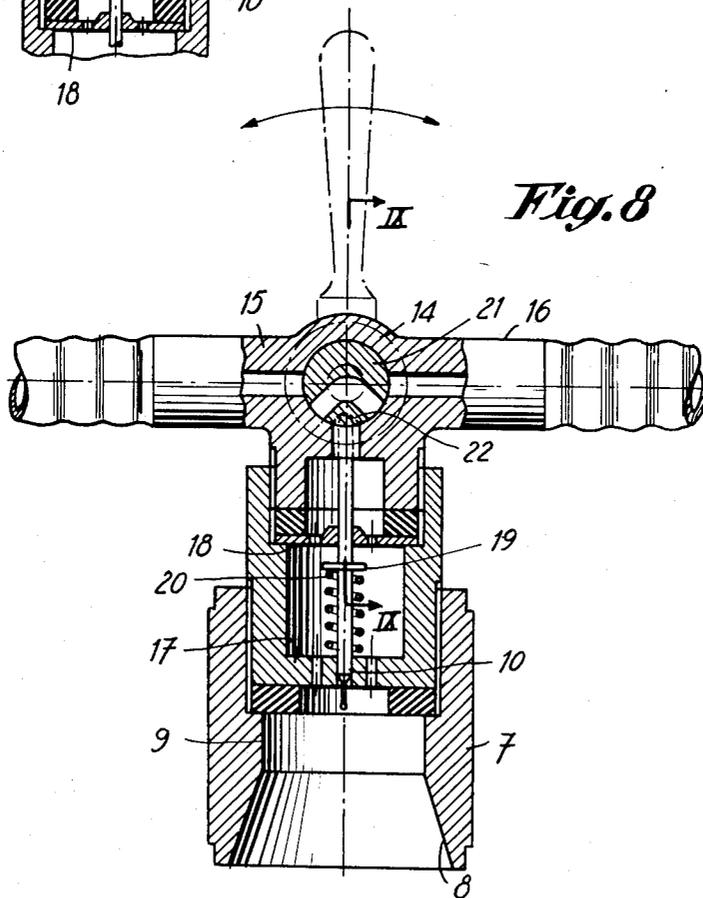


Fig. 8

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**PROCESS AND DEVICES FOR THE SUBMITTING SUCCESSIVELY OF BOTTLES AND OTHER RECEPTACLES TO EXHAUSTION AND PRESSURE**

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6 Claims. (Cl. 226—116)

The invention relates to a process for submitting, with the help of a known type of closure or obturator and by the use of a suitable device, a receptacle successively to exhaustion and to pressure. The type of closure permitting the application of such a said process principally consists of a cap of rigid material which has at least one orifice and a diaphragm in said cap having at least one orifice remote from said first named orifice. The cap is preferably of the "crown" type and the diaphragm made of an element of natural or synthetic rubber.

The object of the process is above all the ability to draw out of the receptacles into which e. g. carbonic acid is to be introduced, the air confined in the free space between the liquid and the closure. It may, in fact, be judged essential to protect completely the liquid from any contact with the air, especially with a view to improving its conservation.

In a general way, closures permitting the lowering or increasing of the pressure of the receptacle are such that only one of these two operations can be taken into account, the second being excluded by reason of the very structure of the closure.

On the contrary, the process of this invention, admits of the successive application of the two operations.

The process and characteristic devices are described more particularly below, with references to the annexed drawings, in which

Figures 1 to 4 diagrammatize the successive phases of the process, object of the invention;

Figures 5, 6 and 7 show, in a vertical section, the three characteristic positions of a device according to the invention;

Figure 8 represents, in a vertical section, a variant of the device, object of the invention;

Figure 9 is a section according to the line IX—IX of the Figure 8;

Figures 10 and 11 show, in a vertical section, forms of execution of the pusher rod.

As illustrated in Figures 1 to 4, the process consists in employing a closure formed by the combination of a cap 1 having, for example, a central hole 2 and a diaphragm 3 with, for example, an eccentric hole 4. The closure thus arranged is applied, for example, to a receptacle 5 in the usual way. The first phase of the process consists, as shown in Figure 2, in mechanically urging the elastic diaphragm 3, for example by the action of a needle 6 passed through the central orifice 2 of the cap 1, and thus separating the said cap from the said diaphragm, which opens holes 2 and 4. The second phase of the process consists in bringing the receptacle in communication with an exhaust pump, the air confined in the receptacle being able to escape normally through the said holes 4 and 2. The third phase illustrated in Figure 3 consists in bringing the receptacle into relation with a source of fluid under pressure, while the mechanical urging of the diaphragm 3 is or is not maintained. Finally, the last phase consists in completely releasing the receptacle so that, owing to the interior pressure in the receptacle, the diaphragm 3 is

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firmly pressed against the cap 1 properly so called, and a perfect closing of the receptacle thus is attained.

This process may be applied by a simple device, for example, of the type shown in Figures 5, 6, 7, in which the first phase of the process is effected by the mere placing of the device on the receptacle. Indeed, this device, which is particularly simple, is principally formed by a hood 7, which has a conical mouth 8, extended by a cylindrical chamber 9 in which the upper part of the receptacle and closure therefor are received.

In the axis of the head 7 a thin rod 10 is placed, the length of which is such that, when the device is in position, the free end of the said rod pushes back the elastic diaphragm of the closure. The bottom of the cylindrical chamber 9 shows orifices 11 which terminate in a chamber 12, which itself is extended by a channel 13 in a three-ways-valve 14. In the body of this valve end are two conduits, one of which, 15 is connected with an exhaust-pump (not shown) and the other 16 communicates with a source of fluid under pressure (not shown).

In normal position, the device is as is represented in Figure 5, that is to say, the valve properly so called shuts the two conduits 15—16. When this device is placed on the receptacle, the pusher rod 10 automatically and gently pushes back the elastic diaphragm 3. It is therefore enough to work the valve 14 in order to bring it to the position represented in Figure 6, which puts the receptacle into direct communication with the exhaust pump. Then, without displacing the device, but by working the same valve 14, the pumping is interrupted and the receptacle is brought into connection with the source of the fluid under pressure, the valve being then in the position shown in Figure 7. When the submission to pressure is ended, it is enough either to remove the device or to take away the receptacle.

In this execution, the pusher rod 10 is fixed. It may be deemed useful, in certain applications, to shield the thin rod 10, and to have it ready to be placed into the active position during the phases of the submission of the receptacle to a decrease and increase of the pressure.

Figures 8 and 9 show such an arrangement, the active position of the rod 10 being determined by the placing into the active position of the valve 14. In this execution, the rod 10 is positively guided in the axis of the bottom 17 and of a second bottom 18 and terminates in the body of the valve 14. This rod 10 is provided with a transversal stop 19 and is urged into the inactive position by a return spring 20. The chest 21 of the valve has a groove 22 of suitable profile, into which the corresponding end of the said thin rod 10 may penetrate. This groove 22 is arranged in such a way that when the said valve is in the closed position, the said rod 10 is normally shielded. The result is that when the device is not in use, the rod 10 is completely shielded, as shown in Figure 8. In this position, the device may be normally applied to the receptacle. Thus, on the valve being turned to bring it into the position that puts the receptacle into communication with the exhaust-pump by means of the conduit 15, the chest 21 pushes the rod 10 back, by acting against the return-spring 20, and, during this manoeuvre, the said rod progressively penetrates the cap 1 while pushing back the elastic diaphragm 3. When the valve is quite open in this position, the rod 10 is exactly in place. In a way, the first and second phases have been realized at the same time. When the valve is manoeuvred to interrupt the exhaust-pump and to connect the receptacle with the feeder of the fluid under pressure, by means of the conduit 16, the rod 10 remains stationary. It will immediately be shielded when the valve is again in the closed position, the groove 22 then placing itself in front of the corresponding end of the rod 10, which, acted upon by

the return-spring 20, will show a rapid backward movement.

The withdrawal of the rod 10 might also be allowed immediately after the closing of the passage towards the exhaust-pump, since the mechanical urging of the elastic diaphragm 3 is superfluous during the phase of submission to pressure.

Still other numerous variants may be adopted within the range of the present invention, and, in a general way, the invention extends to all the devices generally of any sort, capable of urging mechanically and temporarily the elastic diaphragm of a closure with a view to freeing the orifices, respectively of the cap and of the said elastic diaphragm and to putting the receptacle into communication, successively, with an exhaust-pump and a generator or a source of fluid under pressure.

The pusher rod may have the form of a simple spindle of a hard substance or, as shown in Figure 10, the end of the rod 10 may be a spherical mass 23, the diameter of which is slightly less than the diameter of the orifice 2 of the cap 1. By this arrangement a minimum diameter is given to the rod 10 properly so called, thus leaving a maximum annular passage in the orifice 2. Figure 11 diagrammatizes an execution of a pusher rod 10, of which only the end 24 is rounded; this arrangement can be adopted, when the orifice 2 has a diameter large enough to assure an adequate annular passage.

Needless to say that the different phases of the process of the invention might be applied by independent devices used in succession, the diaphragm being, for example, temporarily removed by an individual means separate from the device for the connection of the receptacle with the exhaust-pump, or the source of the fluid under pressure.

What I claim is:

1. A process for the submitting successively to exhaustion and pressure of receptacles closed by a closure of the type that comprises a cap the bottom of which has at least one orifice and against this bottom an elastic diaphragm having at least one orifice not juxtaposed to the orifice of the said cap, said process comprising the steps of: applying a force by which the elastic diaphragm is mechanically urged so that the orifice of the cap is temporarily freed and the orifice of the diaphragm is temporarily opened, connecting the interior of the receptacle with a source of vacuum while said mechanical urging of the diaphragm is maintained, then connecting the interior of said receptacle to a source of a fluid under pressure.

2. A process for the submitting successively to exhaustion and pressure of receptacles closed by a closure of the type that comprises a cap the bottom of which has at least one orifice and against this bottom an elastic diaphragm having at least one orifice not juxtaposed to the orifice of the said cap, said process comprising the steps of: applying a force by which the elastic diaphragm is mechanically urged by a pushing effect in such a way that the said diaphragm is slightly removed from the cap so that the orifice of the cap is temporarily freed and the orifice of the diaphragm is temporarily opened, connecting the interior of the receptacle with a source of vacuum while the said mechanical urging of the diaphragm is maintained, and then connecting the interior of said receptacle to a source of a fluid under pressure.

3. A process for the submitting successively to exhaustion and pressure of receptacles closed by a closure of the type that comprises a cap the bottom of which has at least one orifice and against this bottom an elastic diaphragm having at least one orifice not juxtaposed to the orifice of the said cap, said process comprising the steps of: applying a force by which the elastic diaphragm is pushed back by a pusher that goes through the cap so that the orifice of the cap is temporarily freed and the orifice of the diaphragm is temporarily opened, connecting the interior of the receptacle with a source of vacuum while the said mechanical urging of the diaphragm is maintained, and then connecting the interior of said receptacle with a source of a fluid under pressure.

4. A device for successively exhausting and filling under pressure within a receptacle, in combination with an apertured closure having an elastic diaphragm therein for said receptacle, said device comprising a hood capable of being placed on the apertured closure of the receptacle; at least one pusher in said hood capable of going through the cap and of pushing back the elastic diaphragm when the said hood is placed on the said cap; means in said hood affording a controlled communication with an exhaust apparatus and means affording a controlled communication with a source of fluid under pressure.

5. A device for successively exhausting and filling under pressure within a receptacle, in combination with a closure having an elastic diaphragm for said receptacle, said device comprising a hood having a conical mouth extended by a chamber fitting the form and the dimensions of the closure for said receptacle, a pusher in the axis of said chamber capable of going through the closure and of pushing back the elastic diaphragm therein, the said hood having controllable means for communication, on the one hand, with an exhaust apparatus and, on the other hand, with a source of fluid under pressure.

6. Apparatus for the submitting successively to exhaustion and pressure filling of receptacles, in combination with a closure for said receptacles of the type that comprises a cap, the bottom of which has at least one orifice and against this bottom an elastic diaphragm having at least one orifice not juxtaposed to the orifice of said cap, said apparatus comprising a hood capable of being applied to the closure of the receptacle, a pusher in said hood fixed with regard to the hood but of such form and of such dimensions that by the mere placing of the said hood on the closure, the said pusher goes through the said orifice of the closure and pushes the elastic diaphragm back to a predetermined extent, means in said hood providing a controlled connection with an exhaust apparatus and a controlled connection with a source of fluid under pressure.

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