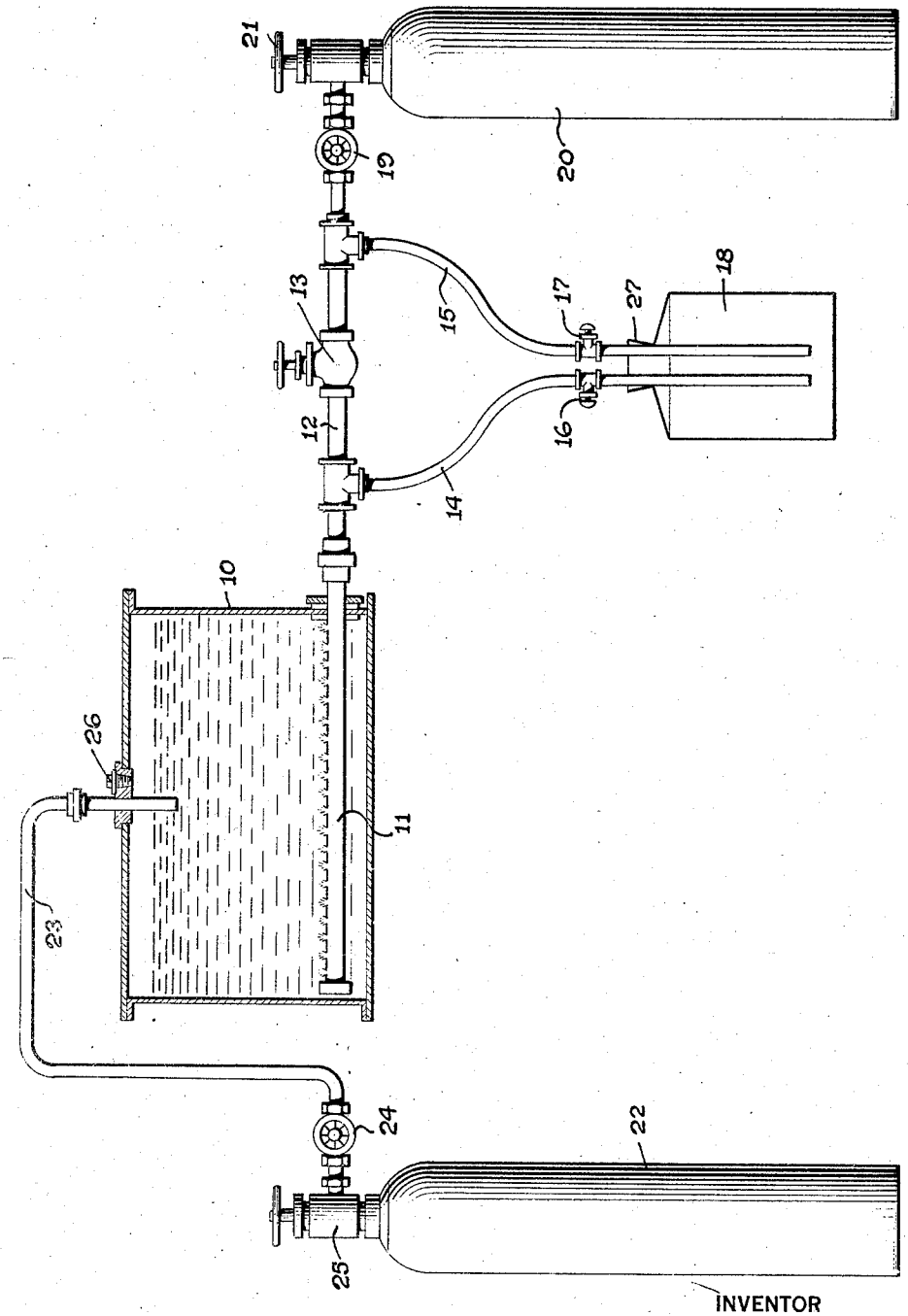
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PACKING ETHER FOR STORAGE, SHIPMENT, AND SALE

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PACKING ETHER FOR STORAGE, SHIPMENT, AND SALE

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This invention relates to the packing of anesthetics, such as ether and chloroform, for storage, shipment, and sale, and its chief object is to provide a method of packaging which will maintain the contents of the container in proper condition for use, preventing the formation (especially in the case of ether) of oxidation products which often result from contact with the oxygen of the air. To this end I fill the bottle, jar, drum, can, or other container, in an atmosphere composed of inert gas or gases, say carbon dioxide or nitrogen, or a mixture of the two, preferably the first named alone, and the space (in the container) unoccupied by liquid I fill with the same gas. In carrying out my method in the preferred manner I first expel from the ether any air or other gas that may be held therein, mechanically or otherwise, by bubbling carbon dioxide under pressure through the ether, thereby thoroughly agitating the ether and providing above it an air-free atmosphere; utilizing, later, the pressure of this atmosphere to permit or cause outflow of the ether into the containers in which it is to be stored, shipped, or sold.

With the above objects in view the invention comprises the novel method, apparatus and article hereinafter described.

A simple and convenient apparatus for practicing my method is illustrated diagrammatically in the accompanying drawing.

The tank or drum 10, containing the ether which is to be charged into the smaller vessels, is provided at the bottom with one or more perforated pipes 11, connected outside to a pipe 12 having a valve 13 between two filling pipes 14, 15 provided with trigger valves 16, 17 and extending down into the can 18 or other container which is to be filled with ether. These filling pipes extend into the can through the open mouth of the same.

Pipe 12 is detachably connected through a pressure reducing valve 19 to a cylinder 20, containing carbon dioxide or nitrogen under pressure and having an outlet valve 21.

The tank or drum 10 is also detachably connected to a cylinder 22 containing carbon dioxide or nitrogen, by means of a pipe 23, leading from the pressure reducing valve 24 to the top of the drum. The cylinder 22 has the usual outlet valve 25.

Valves 16 and 17 in the filling pipes being closed, the screw plug 26 is removed, so as to open the vent hole in the top of the drum 10, and valves 13 and 21 are opened, allowing the gas (preferably carbon dioxide) to be discharged at suitable pressure from pipe 11 into the body of ether. The latter is thus thoroughly agitated, and any other gas therein is driven out. At the same time air above the ether is expelled by the carbon dioxide gas through the vent. When all the air has been driven out, the plug 26 is replaced, valve 13 is closed, and valve 25 on cylinder 22 is opened, allowing carbon dioxide to enter the drum at the top, at preferably a slightly higher pressure, and gas is delivered by the pressure reducing valve 19 from cylinder 20.

Valve 17, on the filling pipe 15, is now opened, allowing gas from cylinder 20 to enter the can 18 at the bottom, so as to expel the air therefrom. The can is thus filled with carbon dioxide, which, being heavier than air, suffers no material contamination in the brief period during which the can is open. Valve 16, in filling pipe 14, is now opened, allowing ether to enter the can at the bottom from the drum 10, along with carbon dioxide from cylinder 20 by way of pipe 15, valve 17 being kept open for that purpose. When the desired amount of ether has been discharged into the can (making the latter about nine-tenths full, usually) the valves 16 and 17 are closed. The can is then removed and a metal disk (not shown) is soldered quickly on the neck 27 to seal the same hermetically. The next can is then placed over the pipes 14, 15, and is filled by the manipulation of valves 16, 17, as described above.

In another way of carrying out my method (with the apparatus illustrated) the cylinder 22 is not used and the vent in the top of the tank 10 is left open. The vessel 18 is then filled (by gravity) by opening the valve 16, after which the valve 19 is opened, allowing carbon dioxide from cylinder 20 to agitate the ether in the vessel, expelling the air and filling the space above the ether. I prefer the procedure first described, however, since

the closing of the vent and the pressure of the carbon dioxide on the ether in the tank minimizes loss by evaporation.

Experience has shown that if the can is sealed promptly after removal from the filling pipes the atmosphere of carbon dioxide above the ether is not sensibly contaminated by air, so that the can after sealing contains only ether, ether vapor, and carbon dioxide, with the result that there is no formation of peroxides or other oxidation products so long as the can remains sealed.

The specific method described is the preferred way of filling the containers, being more convenient and economical than other ways now known to me, including the use of carbon dioxide in solid or liquid form. In the latter case care should be taken to see that the solid or liquid carbon dioxide has all evaporated before the can is sealed. Otherwise evaporation after sealing my result in dangerous internal pressure.

As stated at the outset, nitrogen or other inert gas may be used instead of carbon dioxide but the latter is preferred.

I claim—

1. An apparatus for filling vessels with ether, comprising an ether tank, an apertured pipe in the tank arranged at the bottom thereof and adapted to be connected outside of the tank to a source of carbon dioxide under pressure, a valve in said pipe outside of the tank, a valved filling pipe connected with the first mentioned pipe between the valve therein and the tank for delivery of ether from the tank into the vessel which is to be filled, and a valved filling pipe connected with the first mentioned pipe between the valve therein and the source of carbon dioxide for delivery of carbon dioxide into said vessel, said filling pipes being adapted to permit their simultaneous insertion into the said vessel.

2. An apparatus for filling vessels with ether, comprising an ether tank, a pipe extending into the same for delivery of carbon dioxide thereinto and discharge of ether therefrom, a source of carbon dioxide connected to said pipe, a valve in the pipe, a valved pipe connected with the first pipe between the valve therein and the ether tank, and a valved pipe connected to the first pipe between the valve therein and the source of carbon dioxide, said valved pipes being adapted for simultaneous insertion into a vessel to be filled with ether.

3. An apparatus for filling vessels with ether, comprising an ether tank, means for delivering carbon dioxide under pressure at the top of said tank to displace air and discharge ether therefrom, a valved delivery pipe extending into said tank at the bottom thereof, a source of carbon dioxide connected with said pipe, thereby constituting a second means for delivering carbon dioxide into the tank to de-aerate the ether therein, and two valved filling pipes adapted to enter the vessel to be filled with ether and connected to the said delivery pipe between the tank and the source of carbon dioxide, one at either side of the valve in said pipe, for delivery of ether and carbon dioxide respectively to the said vessel.

In testimony whereof I hereto affix my signature.

JOHN TRUMAN GLEKLER.