Nov. 16, 1948. R. PAUL ET AL 2,453,930

SHIPPING CONTAINER

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Fig. 1.

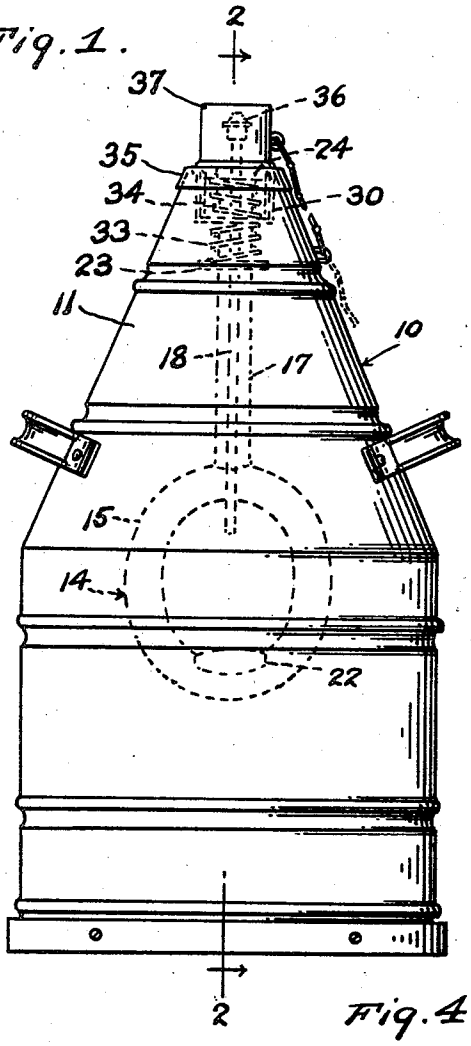


Fig. 3.

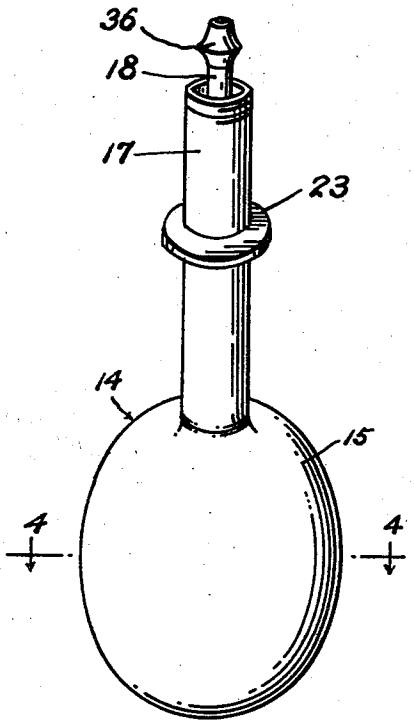
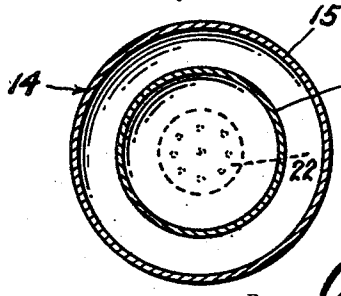


Fig. 4.



Inventors

Richard Paul &

Gerard F. Sulfrian

By Clarence A. O'Brien and Harvey B. Jacobson

Attorneys

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Fig. 2.

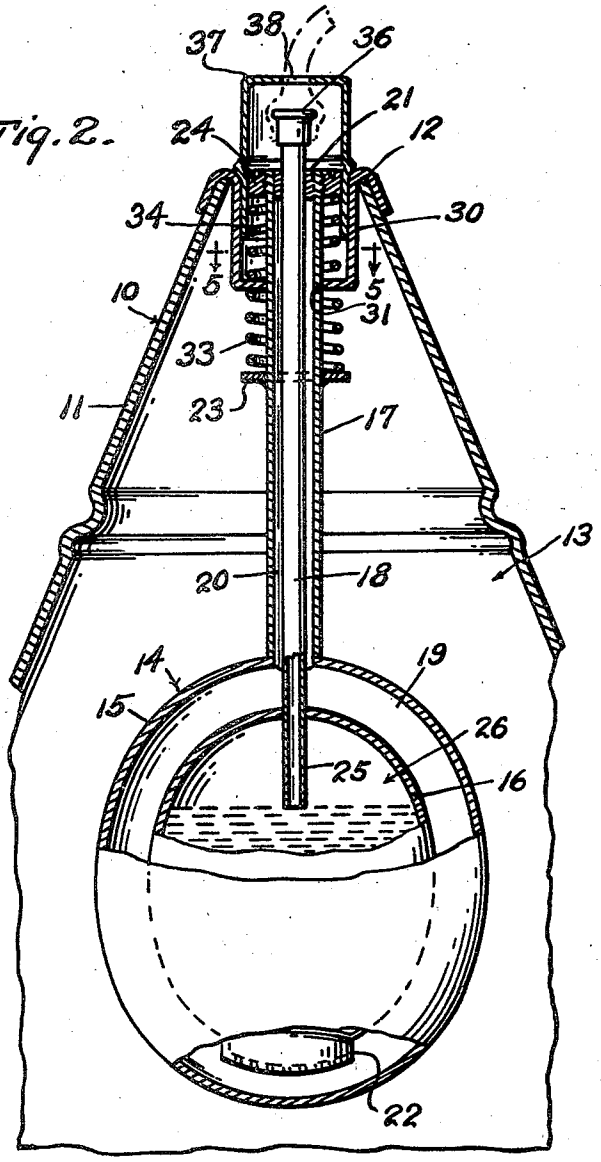


Fig. 5.

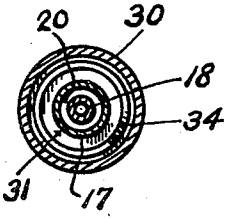
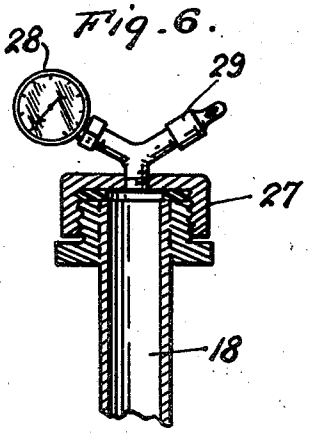


Fig. 6.



Inventors

Richard Paul &
Gerard F. Sulfrian

By Clarence A. O'Brien
and Harvey B. Jackson
Attorneys

Patented Nov. 16, 1948

2,453,930

UNITED STATES PATENT OFFICE

2,453,930

SHIPPING CONTAINER

Richard Paul and Gerard F. Sulfrian,
Newark, N. J.

Application April 1, 1946, Serial No. 658,771

2 Claims. (Cl. 220—3)

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This invention relates to improvements in shipping containers particularly for use in transporting gas in liquid form.

The primary object of the invention is to safely transport liquified gases such as oxygen, nitrogen, argon, or any similar normally gaseous substance which has been condensed to liquid form and must be held at temperatures of from 175° C. to 350° C. below zero.

Among its features my invention embodies an outer casing having a reduced neck and defining a closed chamber, an apertured closure for closing the reduced neck and yielding means to suspend a Dewar-type flask within the closed chamber and out of contact with the walls thereof.

Other features include means to prevent the complete filling of the inner container of the Dewar-type flask so as to provide a chamber above the liquid level forming a cushion which will serve in a measure to absorb some of the pressure normally generated when gases are condensed to liquified form.

In the transportation of liquified gases in Dewar-type flasks it has been customary to leave the mouth of the neck of the flask open to prevent the generation of pressure within the flask of sufficient magnitude to cause disruption thereof, as in spite of all precautions that can be employed such liquified gases tend to return to the gaseous, and consequently expanded state, so that to attempt to transport or store liquified gases in a closed container would be highly dangerous, and would in order successfully to accomplish such an end demand that the walls of the container be of such strength and thickness as to render impractical, the construction of containers of such nature.

A further object of the present invention is to permit the sealing of such containers by employing a pressure relief valve in conjunction with the chamber in the top of the container so that the sealing of a container of normal and practicable wall thickness, may be rendered feasible.

In the drawings:

Figure 1 is a side view of a shipping or storage container for liquified gases embodying the features of this invention,

Figure 2 is an enlarged fragmentary vertical sectional view taken substantially on the line 2—2 of Figure 1,

Figure 3 is a perspective view of a Dewar-type flask modified in accordance with the features of this invention,

Figure 4 is a transverse sectional view taken substantially on the line 4—4 of Figure 3,

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Figure 5 is a transverse sectional view taken substantially on the line 5—5 of Figure 2, and

Figure 6 is a fragmentary enlarged sectional view through the upper end of the inner neck member of the Dewar flask showing the same equipped with a pressure gage, and pressure relief valve.

Referring to the drawings in detail, an outer container designated generally 10, of the type disclosed in design Patent No. Des. 138,409, issued August 1, 1944 to R. Paul as illustrated is provided with a conical portion 11 terminating at its upper end in a neck 12. The container 10 defines a closed chamber 13 in which is suspended a Dewar-type flask designated generally 14. As illustrated the flask 14 comprises an outer bulbous member 15 which encloses an inner bulbous member 16 each of which is respectively formed with an elongated neck portion 17 and 18. As illustrated in Figure 2 the bulbous portions 16 are spaced from one another to form a closed chamber 19 which communicates with a similar chamber 20 between the tubular neck portions 17 and 18. At the extreme outer end of the tubular neck portion 17 is a sealing gasket 21 and the chambers 19 and 20 are adapted to be evacuated so as to reduce the pressure therebetween to a point where thermal-conductivity between the walls is substantially nil. In order to preserve the evacuation of the space between the walls of the chambers a suitable cage 22 is affixed to the outer side of the inner container 16 and is adapted to contain a "getter," such as finely divided charcoal which serves as an absorbent for any stray gases that may be left in the chambers 19 and 20 after their evacuation. Carried by the outer neck portion 17 is an annular flange 23 which serves as a stop for a compression coil spring to be more fully hereinafter explained. A similar stop 24 is threaded on the extreme outer end of the outer neck portion 17, and projecting inwardly into the inner flask 16 in axial alignment with the neck portion 18 is a tubular extension 25 through which communication between the neck portion 18 and the interior of the inner flask 16 is established. This tubular extension serves to prevent the complete filling of the inner flask member 16 with the liquified gas to be transported or stored so as to form a chamber 26 between the surface of the liquid and the upper end of the flask 16 which serves as a container for an air cushion on the upper surface of the liquid. Under normal service conditions this cushion helps to prevent the loss of liquid through the neck portion 18, when the latter is left open, but when the neck portion

is sealed as suggested in Figure 6 by a cap 27 carrying a Y-coupling to which a pressure gage 28 and a pressure relief valve 29 is attached, the chamber 26 serves as a pressure reservoir and cushions the liquid contained in the inner flask 16.

In order to suspend the Dewar-type flask 14 within the chamber 13 I provide a cup-shaped closure 30 provided in its bottom wall with an opening 31 through which the tubular neck portion 17 extends as will readily be seen upon reference to Figure 2. A compression coil spring 33 is fitted around the elongated neck portion 17 between the stop 23 and the under side of the bottom of the cup-shaped closure 30. A similar compression coil spring 34 rests on the upper side of the bottom of the cup-shaped closure 30 and engages the under side of the stop 24 so that the flask 14 will be yieldingly suspended with relation to the closure 30. An outwardly and downwardly extending flange 35 is carried by the cup-shaped closure 30 and is adapted to overlie the neck portion 12 of the container 10 so that the entire unit may readily be suspended in place within the container. Under ordinary conditions, the upper free end of the inner neck portion 18 is provided with a fitting 36 over which a rubber hose may be attached as suggested by the dotted lines in Figure 2. It is to be understood however, that any other suitable attaching means may be provided so that the contents of the inner flask 16 may be directed as desired when the latter is being emptied. A suitable cap 37 is adapted to close the outer exposed end of the neck portion 18 though it is preferably provided with a suitable vent opening 38.

While in the foregoing there has been shown and described the preferred embodiment of this invention it is to be understood that minor changes in the details of construction, combination, and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as claimed.

What we claim is:

1. The combination with a Dewar-type flask having an elongated neck, of a suspension device therefor which includes an apertured cup-shaped container closure through which the neck of the flask is adapted to extend, a stop intermediate the ends of the neck, a spring surrounding the neck between the inner end of the closure and the stop, a spring surrounding the neck within the cup-shaped closure, a stop adjacent the outer end of the neck and an outwardly extending retaining flange on the closure whereby when the closure is in place on a container the flask will be yieldingly suspended by the springs.

2. A shipping container for transporting gas in liquid form which includes an outer casing having a conical neck defining a closed chamber, a cup-shaped closure inserted into the reduced end of the neck, said closure having an aperture therein the axis of which aligns with the longitudinal axis of the casing, a Dewar-type flask having an elongated neck extending through the aperture in the closure, an outstanding annular flange on the neck adjacent the end remote from the flask, a compression coil spring seated on the bottom of the cup-shaped end closure and engaging the flange yieldingly to suspend the flask in spaced relation to the conical neck of the outer casing, a flange on the neck intermediate its end, a compression coil spring surrounding the neck and abutting the last named flange and the under side of the cup-shaped end closure yieldingly to hold the flask in proper place within the outer casing and a cap adapted to enter the upper open end of the cup-shaped end closure to enclose the end of the neck remote from the flask.

RICHARD PAUL.
GERARD F. SULFRIAN.

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The following references are of record in the file of this patent:

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Number	Name	Date
646,459	Place	Apr. 3, 1900

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Number	Country	Date
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