United States Patent [19]

Stich

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[54] **CONTAINER FOR STORING AND TRANSPORTING SMALL GAS VOLUMES**

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Related U.S. Application Data

[63] Continuation of Ser. No. 284,400, Aug. 28, 1972, abandoned.

[52] **U.S. Cl.** **222/3**; 222/92; 222/541

[51] **Int. Cl.²** **B67B 7/24**

[58] **Field of Search** 222/3, 5, 92, 107, 465, 222/572, 574, 541, 527, 528

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[57] **ABSTRACT**

A flattenable container for the transport and/or storage of small amounts of gas consists of flexible sheet material, e.g., a stack of several layers of metallized plastic foil, closed along the edges by cementing or heat sealing. A portion of the container body is formed into a reduced spout which, after having been cut open at its end, can be temporarily reclosed by folding or rolling up. A small area of the container wall may be reinforced by a self-sealing patch which can be penetrated by a probe for extracting a sample of the stored gas.

5 Claims, 4 Drawing Figures

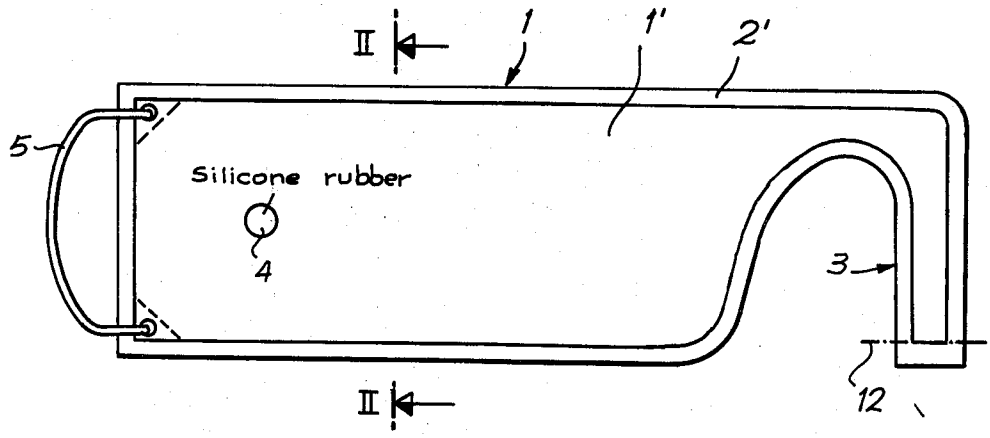


FIG. 1

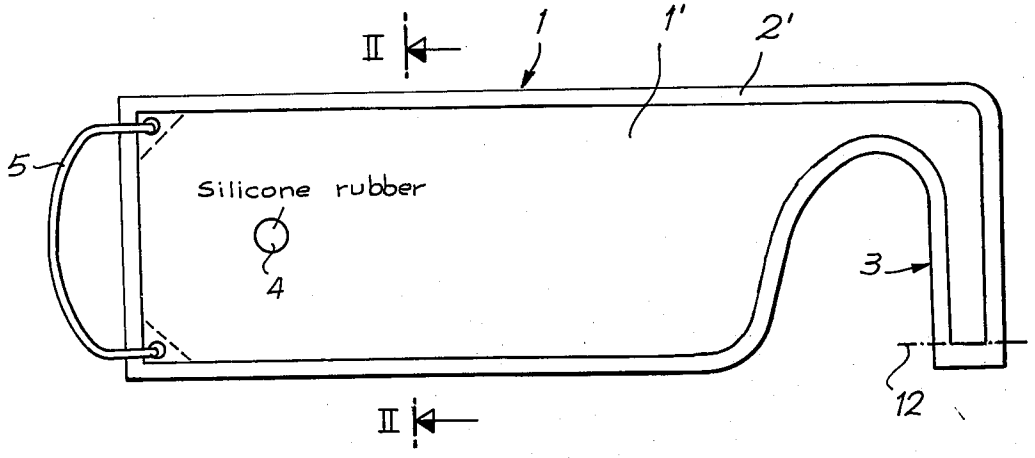
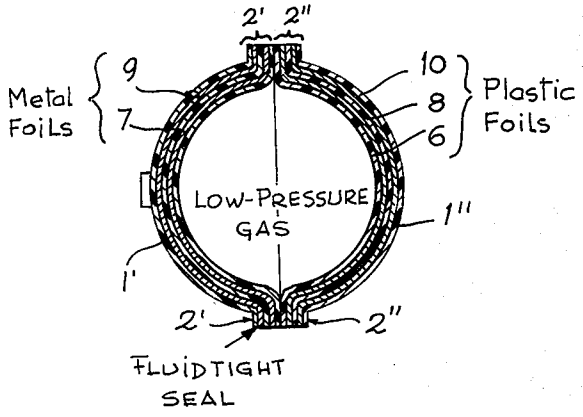


FIG. 2



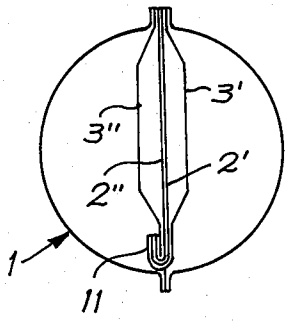


FIG. 3

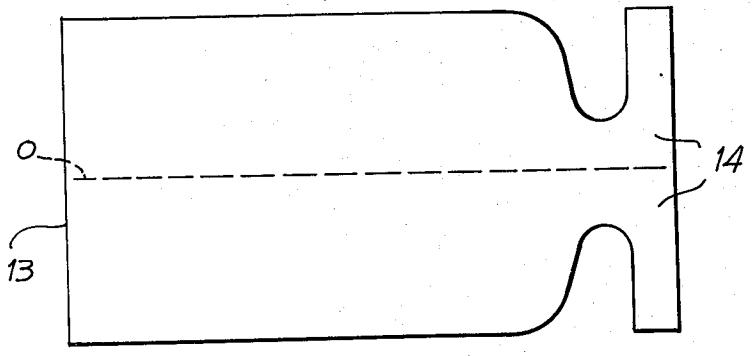


FIG. 4

CONTAINER FOR STORING AND TRANSPORTING SMALL GAS VOLUMES

This is a continuation of application Ser. No. 284,400, filed Aug. 28, 1972 now abandoned.

My present invention relates to a container for the storage and/or transportation of small amounts of gaseous fluids at low pressure.

Such small amounts of gas are required, for example, to test the operation of gas analyzers, to demonstrate the effect of various gases in a classroom, or to investigate the suitability of certain fluids for a desired chemical or physical process. In many instances it is necessary to draw precisely measured quantities of the gas from the container.

Rigid containers conventionally used for this purpose, e.g., of metal or of glass, have the drawback that they cannot be completely emptied of their contents without the aid of special equipment such as vacuum pumps. Thus, if the gas is stored at low pressure, a substantial proportion of it cannot be conveniently extracted. Storage at higher pressures, e.g., upwards of 1 atmosphere gauge, is more economical but requires safety measures in order to prevent explosion or leakage. In either case it is difficult to expel the residual gas volume in order to avoid contamination of a subsequent filling.

The general object of my invention is to provide an improved container for the purpose set forth which avoids these drawbacks and enables the withdrawal of precisely dosed quantities of the stored fluid.

A more particular object is to provide a container of this description which, being hermetically sealed initially, can be temporarily resealed with good fluidtightness upon the fracture of the original seal to discharge some of its contents.

These objects are realized, pursuant to my present invention, by the provision of a container whose flattenable body has two coextensive walls of flexible sheet material, preferably a stack of laminated layers such as metallized plastic foils which are joined together along their edges in a fluidtight manner, as by cementing or by heat sealing. For example, the plastic foils consist of polyester, polyethylene or polyamides, metallized with aluminum.

Advantageously, according to another feature of my invention, the container is formed with a reduced spout for the discharge of the stored fluid, this spout having a frangible sealed end and being resealable in a simple manner by being folded or rolled back upon itself after its end has been severed preparatorily to a first discharge. Such a spout consists, preferably, of marginally interconnected integral extensions of the two container walls.

In order to permit the withdrawal of small samples of the stored gas, the body of a container according to my invention may be provided with a patch of self-sealing plastic material such as silicone rubber adhering to a limited area of one of its walls. Such a patch, even when present on the inner wall surface, does not materially impede the flattening of the container to expel residual fluid.

The above and other features of my invention will be described in detail hereinafter with reference to the accompanying drawing in which:

FIG. 1 is a side view of a container embodying my invention;

FIG. 2 is a cross-sectional view of the filled container taken on the line II — II of FIG. 1;

FIG. 3 is an end view of the container as seen from the right in FIG. 1; and

FIG. 4 is a plan view, drawn to a smaller scale, of a blank for making a container generally similar to that of FIGS. 1 – 3.

In FIGS. 1 – 3 I have shown a container 1 for the storage of low-pressure gases which consists of two walls 1′, 1″ of flexible sheet material sealed to each other along their contacting edges 2′, 2″. The walls 1′, 1″ are multilayer stacks of plastic foils 6, 8, 10 of polyester, polyethylene or polyamides alternating with aluminum foils 7 and 9. The foils 6, 8, 10, which have a certain elasticity, could also be individually metallized on one or both surfaces with omission of the intervening layers 7 and 9. Such a stack is impervious to low-pressure gas but is sufficiently flexible to permit the inflation of the originally flat container 1 to a substantially cylindrical form as illustrated in FIG. 2.

For filling and emptying the container, a spout 3 of reduced dimensions is formed by integral extension 3′, 3″ of the walls 1′, 1″, with continuation of the marginal seal 2′, 2″ around the periphery of the spout. The free end of spout 3, originally sealed in this manner after the container has been filled, can be cut off along a line 12 to permit the discharge of some or all of the stored fluid. Thereafter, as illustrated in FIG. 3, the forshortened end can be folded back upon itself to form a temporary seal 11; this temporary seal may be maintained with the aid of simple means such as adhesive strips or paper clips.

The container 1 shown in FIGS. 1 – 3 is formed from two symmetrical blanks but, with slight modification, could also be made from a single blank 13 as illustrated in FIG. 4. Blank 13 is simply folded about its centerline 0 and is then sealed along the edges, with its spout portion 14 again left open at the free end thereof until the container has been filled.

In FIGS. 1 and 2 I have illustrated at 4 the outline of a small patch adhering to its wall 1′, this patch consisting of a self-sealing material such as silicone rubber which permits the insertion of a probe for the extraction of a sample of the stored fluid. The patch 4, which also acts as a local reinforcement of the container wall at the point of penetration, need not be present on the original blank but could be pasted onto the container surface either before or after filling.

A handle 5 has been shown attached to the container body, at its end remote from spout 4, to facilitate carrying or to allow the container to be suspended from a hook in a laboratory.

In practice, the diameter of the inflated container may range between 10 and 20 cm for an overall length of about 50 to 80 cm; the diameter of the spout 3 should be a small fraction of the container diameter, e.g., on the order of one-tenth thereof so as to range between 1 and 2 cm. Naturally, these dimensions are not critical and may be modified in specific instances.

The stored gas may have a gauge pressure not more than a fraction of an atmosphere above ambient, e.g. of 0.5 atmosphere when the container is completely filled. The maximum pressure, of course, is limited by the inherent elasticity of the container material.

A container according to my invention, as above disclosed, can be readily shipped by rail, postal trucks and other vehicles, advantageously in cardboard mailing

tubes. It is inexpensive to produce and can be discharged, with or without resealing, by untrained personnel.

As clearly shown in the drawing, the spout **3** extends along a minor edge of the rectangular outline of the container **1** and is separated from the body of the container by a cutout forming a constricted neck just ahead of the spout. It will also be seen that the spout, before being cut along line **12**, terminates at the lower major edge of the rectangle (as viewed in FIG. **1**) and that the neck lies at the opposite, upper major edge so that a substantial spout length is available for cutting and folding as described above.

I claim:

1. A container for a small volume of a gaseous fluid releasably stored therein under low pressure, comprising a flattenable body of generally rectangular outline with two coextensive walls joined together along their edges in a fluidtight manner, said walls being cut away along part of a first major edge of the rectangle in the vicinity of a minor edge thereof with formation of a constricted neck along a second major edge opposite the cut-away part of said first edge and a reduced spout adjoining said neck, said spout extending along said minor edge and terminating at said first major edge in a frangible sealed end, said spout being temporarily resealable upon fracture of the seal thereof by folding back upon itself along said minor edge, and a patch of self-sealing plastic material adhering to a limited area of one of its walls at a location separated from said spout by said neck.

2. A container as defined in claim **1** wherein said walls are composed of alternating metallic and plastic foils.

3. A container as defined in claim **1** wherein said body is provided with a handle secured thereto at corners remote from said spout.

4. A container as defined in claim **1** wherein said patch consists of silicone rubber.

5. A container as defined in claim **1** wherein said walls are part of a single sheet folded about said second major edge.

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