

July 14, 1964

F. W. LAWSON

3,140,793

CONTAINER

Filed March 6, 1961

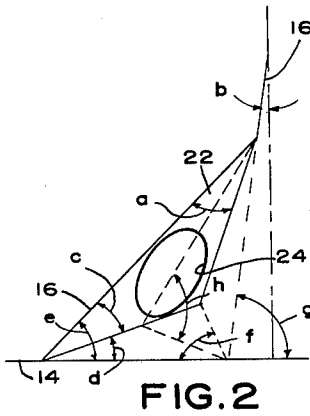


FIG. 2

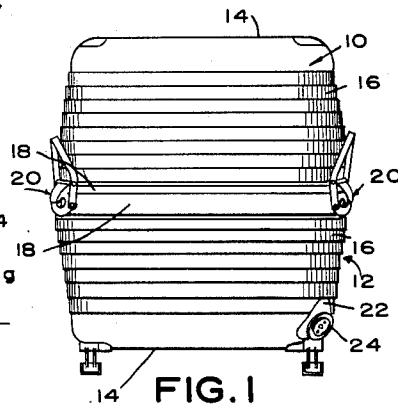


FIG. 1

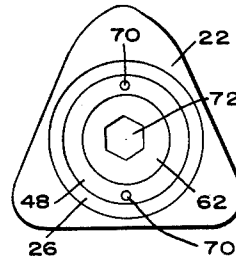


FIG. 3

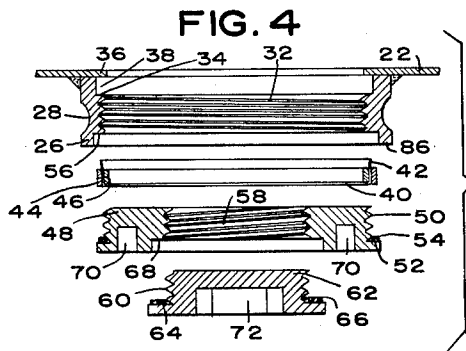
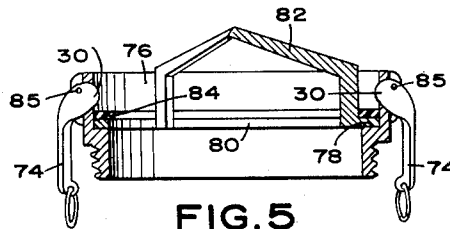


FIG. 4



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14 Claims. (Cl. 220—39)

This invention relates to a container and particularly to the discharge port construction of a container intended to handle fluid material whether they be liquid or solid in nature. The invention is eminently suited for use with containers of the nestable type disclosed for example, in copending application Serial No. 93,512, filed March 6, 1961.

It is among the objects of this invention to provide reusable containers which avoid the need for valved fittings, provide an increased spatial efficiency, and afford protection to their discharge ports. In this way, the costs of construction, maintenance and shipping space are reduced appreciably, and all portions of the discharge port are disposed within a space bounded by projections of the side and end wall.

A container conforming to the present invention comprises intersecting side, end and corner walls, the corner wall forming an obtuse angle with each of the side and end walls and containing a discharge port, means lying within a space bounded by projections of the side and end walls carried by the corner wall and defining a seat, and a closure supported on the seat in port closing relationship. This construction is particularly well suited for use with containers of polygonal, and more specifically, rectangular, cross section. The closure is preferably a flexible, frangible diaphragm mounted on a radially flexible and resilient annular frame made up of two frame members between which the diaphragm is clamped. The frame members can be sprung in a radial direction sufficiently to be received in a groove or seat of substantially the size of the frame in its normal condition to deformation. Then when the frame and diaphragm have been moved to the proper position relative to the seat, the frame is again extended to its initial form so as to occupy and substantially fill the seat so as to close the port against escape of material within the container. The corner wall preferably carries a flange extending beyond the diaphragm to receive a supplemental closure to protect against the loss of material within the container should the diaphragm be omitted or become fractured.

Containers also conforming to the present invention comprise a wall providing a coupling member containing a discharge passage having an axis, the coupling member providing a seat surrounding the passage, a flexible frangible diaphragm supported on the seat and closing the passage, and means restraining the diaphragm against axial movement relative to the coupling member. A cover is preferably secured to the coupling member by threaded engagement therewith and preferably contains a threaded aperture to receive a similarly threaded plug or a discharging fitting. The diaphragm is preferably so pliable that upon rupture it will conform closely to the walls of the passage so as to obstruct the passage to a minimum degree during discharge of the contents.

A more complete understanding of the invention will follow from a description of the accompanying drawings wherein:

FIG. 1 is an end elevation of a container of the type disclosed in the copending application previously mentioned, incorporating the present invention;

FIG. 2 is a diagrammatic representation depicting a preferred design arrangement for a portion of a container in which the discharge port is formed;

FIG. 3 is a view of the discharge port in its closed

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condition looking along the axis of the port on a somewhat enlarged scale;

FIG. 4 is a fragmentary sectional elevation on an enlarged scale showing the components contemplated for the discharge port and its closures in somewhat separated condition;

FIG. 5 is an enlarged sectional elevation depicting a discharge coupler provided with means for rupturing the closure;

FIG. 6 is a top plan view of the assembly of FIG. 5;

FIG. 7 is a fragmentary sectional elevation depicting another coupler provided with means for fracturing the diaphragm;

FIG. 8 is a diagrammatic perspective view depicting the manner in which the fracturing elements cut the diaphragm;

FIG. 9 is a fragmentary sectional elevation similar to FIG. 4 but showing the components in their assembled relationship; and

FIG. 10 is a section on a horizontal plane extending through one of the lower members immediately above its discharge port.

The container depicted in FIG. 1 comprises somewhat similar nestable members including an upper member 10 and a lower member 12 each having closed end walls 14 and stepped side walls 16. The side walls 16 diverge from the closed ends 14 to open ends fitted with flanges 18 at the four corners of which are provided clamping members 20 for securing the flanges together in fluid tight relationship. As disclosed in the copending application referred to, the cross section of each of these members 10 and 12 is preferably polygonal and more specifically rectangular.

At the lower right hand corner, as depicted in FIG. 1, the lower container member 12 is truncated to define a corner wall 22 forming an obtuse angle with each of the side walls 16 and the end wall 14 so that the discharge port 24 formed therethrough and the closure assembly provided therefor will lie entirely within the space defined by projections of the side and end walls.

Merely for purposes of example, the angular relationships of the design shown in FIG. 2 capable of satisfying the requirements have been depicted as follows:

a=49°	d=45°	g=81.9°
b=8.1°	e=45°	h=54.5°
c=65.5°	f=90°	

The physical appearance of the corner wall with all of the closure components assembled appears in FIG. 3 wherein the flange 26 is welded to the corner wall 22 and contains an arcuate external groove 28 for the reception of coupling cams 30 of the type depicted in FIG. 5. The flange 26 is provided with internal threads 32 which terminate at an upper shoulder 34 defining with the projecting portion 36 of the corner wall an annular groove or seat 38 for the reception of a flexible frangible diaphragm 40 having a peripheral portion 42 clamped between a pair of concentric hoops or frames 44 and 46 which are radially yieldable so that the entire assembly of these frames and the diaphragm can be contracted so as to pass through and beyond the threads 32 so that upon extension of the frame, the assembly will substantially fill the groove or seat 38 to prevent discharge of the contents of the container. A cover member 48 is provided with external threads 50 for cooperation with the threads 32 and has a shoulder 52 receiving an annular gasket 54 which will bear on a shoulder 56 provided by the flange 26 under assembled conditions. The cover member 48 is also provided with internal threads 58 to receive the external threads 60 formed on a plug 62 having a shoulder 64 supporting a gasket

66 engageable with a shoulder 68 formed on the cover member 48. The cover member 48 is provided with spanner openings 79 and the plug 62 is provided with a hexagonal socket 72 to facilitate assembly and disassembly.

When a large discharge passage is required, the cover member 48 can be removed and a coupler of the type depicted in FIG. 5 can be advanced over the outer surface of the flange 26 with the cams 30 retracted by means of their operating handles 74. This coupler 76 provides an internal shoulder 78 to receive the annular base 80 of a cutter 82 over which a gasket 84 is disposed for sealing engagement with a shoulder 86 provided on the flange 26. Then as the cams 30 are rotated about their pivots 85 the cutter 82 will be moved towards the diaphragm 40 so that after the seal has been established by the gasket 84, the cutter will penetrate the diaphragm so that the contents of the container can be discharged. As will be evident from FIG. 6 the cutter is provided with at least three blades 86 displaced by equal angles. After the diaphragm has been severed, as depicted in FIG. 8, due to its pliability, it will conform to the passage walls so as to obstruct the flow of the contents to a minimum degree.

Where a smaller discharge passage is sufficient, the cover member 48 can be retained in its position within the flange 26 and only the plug 72 removed. Then an adaptor 88 having external threads 90 can be coupled to the threads 58 and a seal established by a gasket 92 between a shoulder 94 provided by the adaptor and the shoulder 68 formed on the cover member 48. The adaptor is provided with external threads 96 engaged by the internal threads 98 of a thimble 100 having an internal flange 102 engaging an external flange 104 of a discharge line 106. A cutter 108 having an annular base 110 interposed between gaskets 112 and 114 respectively engaging the adaptor 88 and the discharge line 106 will move towards the diaphragm 40 as the thimble 100 is advanced on its threads so that after a seal has been produced, the cutter knives, similar to those of FIG. 6 will penetrate the diaphragm which will again, due to its pliable composition, conform to the walls and retard discharge to a minimum degree.

Whereas only one form of the invention has been described with reference to the accompanying drawings to serve as an example of the invention, such variations as will be suggested to those skilled in the art are contemplated as falling within the scope of the appended claims.

I claim:

1. A container comprising intersecting side, end and corner walls, one of said corner walls forming an obtuse

angle with each of said side and end walls and containing a discharge port, means lying within a space bounded by projections of said side and end walls carried by said corner wall and defining a seat disposed externally of said corner wall, and a closure supported on said seat in port closing relationship.

2. A container according to claim 1 wherein said container is substantially polygonal in cross section.

3. A container according to claim 1 wherein said container is substantially rectangular in cross section.

4. A container according to claim 1 wherein said closure is a replaceable flexible frangible diaphragm.

5. A container according to claim 4 wherein said seat includes radial flanges limiting axial movement of said closure.

6. A container according to claim 4 wherein said diaphragm is mounted on a radially flexible and resilient annular frame.

7. A container according to claim 4 wherein said diaphragm is secured between a pair of radially flexible and resilient annular frames.

8. A container according to claim 4 wherein said diaphragm is secured between a pair of concentric coextensive radially flexible and resilient annular frames.

9. A container according to claim 4 wherein said corner wall carries a flange extending beyond said diaphragm and a supplemental closure is secured to said flange.

10. A container comprising a wall providing a coupling member containing a discharge passage having an axis, said coupling member providing a seat internally thereof surrounding said passage, a flexible frangible diaphragm replaceably supported on said seat and closing said passage, and means restraining said diaphragm against axial movement relative to said coupling member.

11. A container according to claim 10 wherein a cover is secured to said coupling member for protecting said diaphragm.

12. A container according to claim 11 wherein said cover is threadedly secured to said coupling member.

13. A container according to claim 11 wherein said cover contains a threaded aperture and a threaded plug closes said aperture.

14. A container according to claim 10 wherein said diaphragm is pliable whereby upon rupture it conforms closely to the walls of said passage.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,140,793

July 14, 1964

Frank W. Lawson

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 38, before "to" insert -- prior --; column 2, line 51, for "the", first occurrence, read -- a --.

Signed and sealed this 17th day of November 1964.

(SEAL)

Attest:

ERNEST W. SWIDER
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents