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Boud

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[54] **FLUID CONTAINERS**

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[52] **U.S. Cl.** ..... **169/28,** 220/47, 220/89 A

[51] **Int. Cl.** **A62c 35/02**

[58] **Field of Search** ..... 220/47, 89 A; 169/28; 137/70, 797; 200/386.5

[56] **References Cited**

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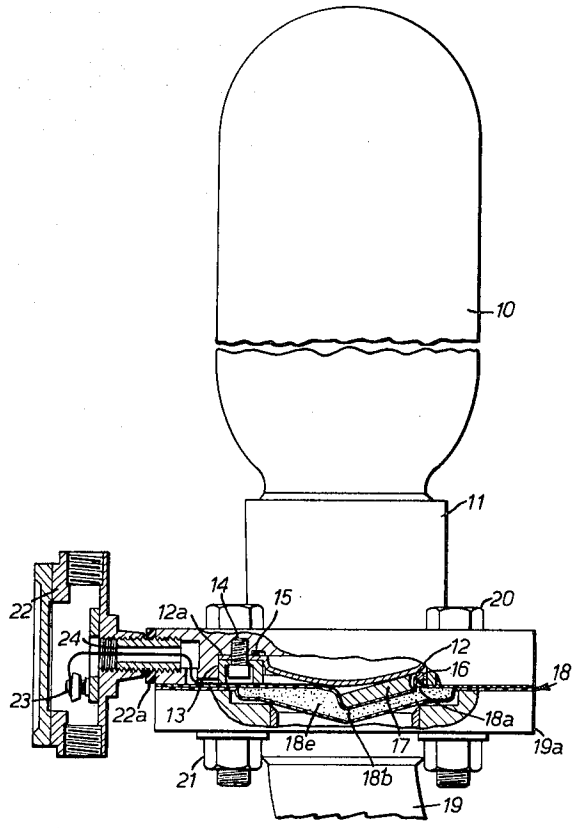
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[57] **ABSTRACT**

A sealed vessel, containing a fire extinguishant or explosive suppressant, has, clamped to the outside of a frangible wall portion of the vessel, a cap-shaped member supporting an explosive line charge arranged around part of a circle and held against the vessel. An electrically actuated detonator is also carried by the cap member for detonating the charge and opening the frangible opening to release the vessel contents into an exit pipe. A layer of explosive suppressant is carried by the cap member to overlie the explosive charge and to suppress the advance of its explosive along the exit pipe.

9 Claims, 3 Drawing Figures



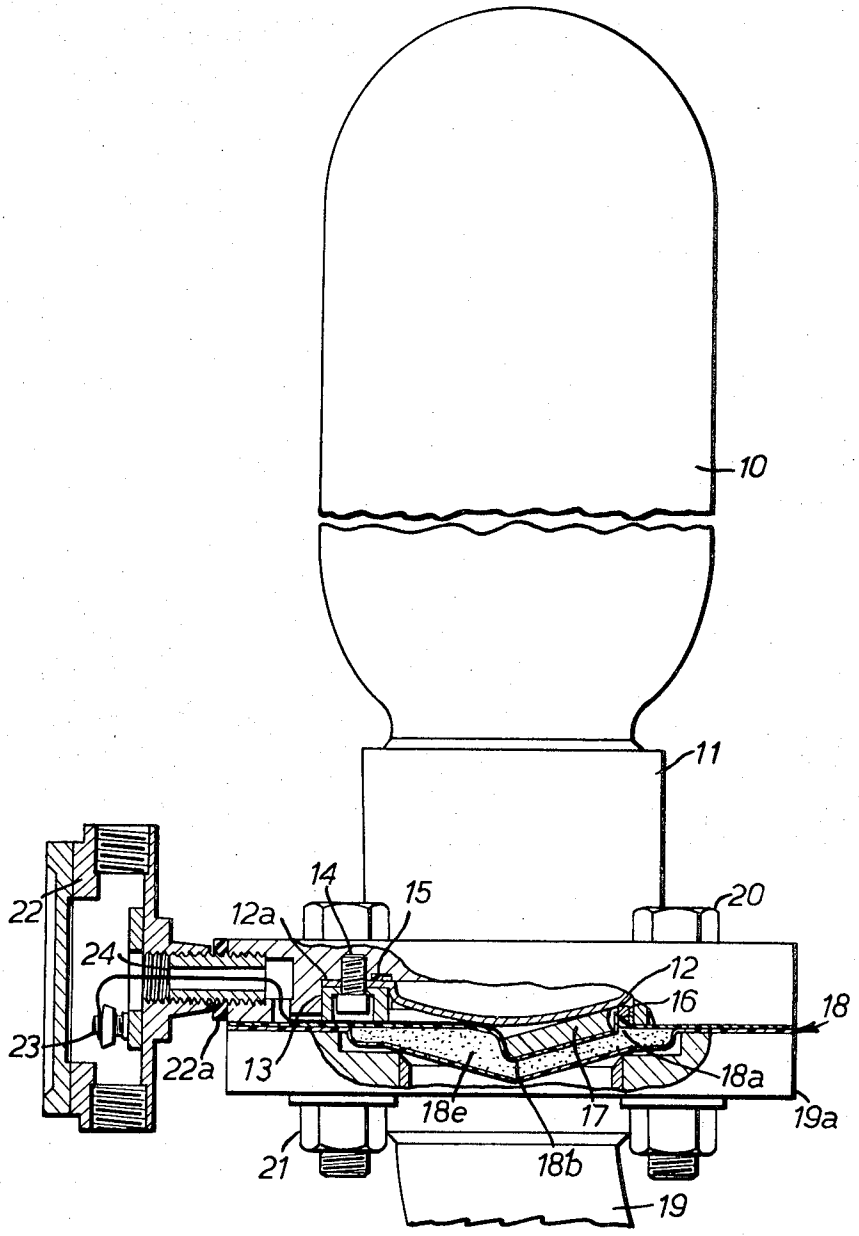


FIG. 1.

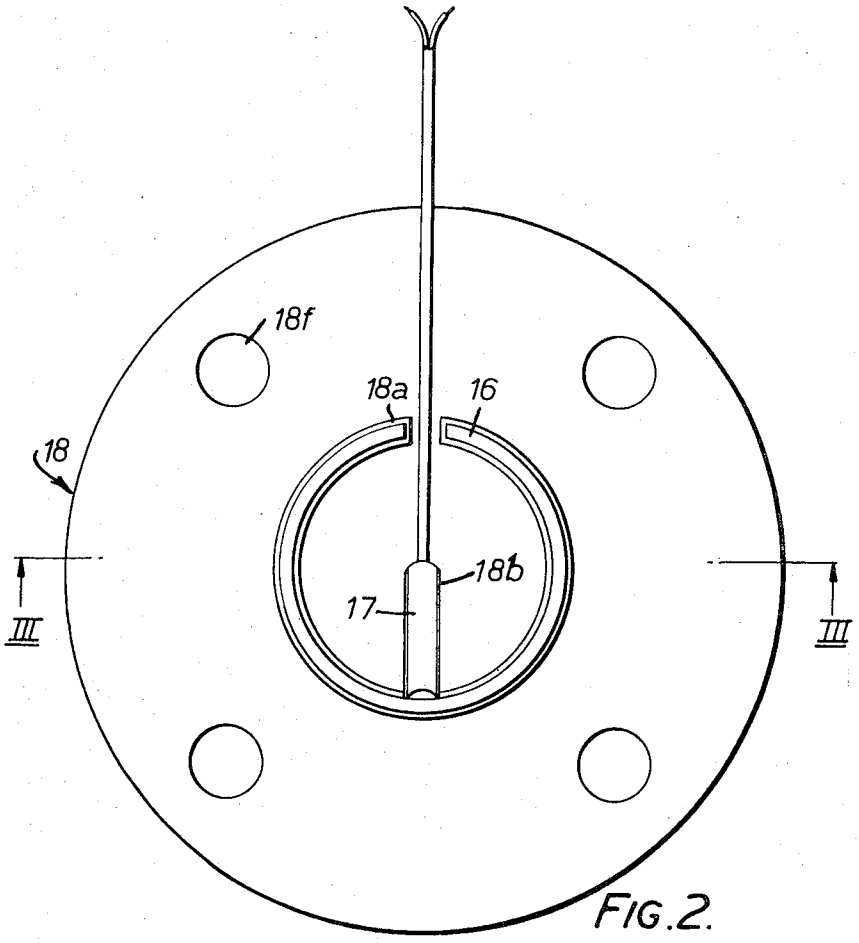


FIG. 2.

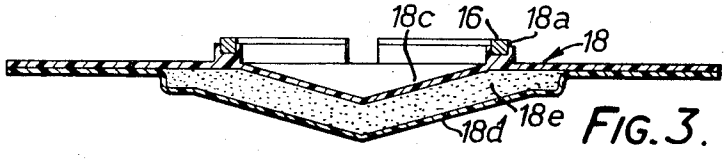


FIG. 3.

FLUID CONTAINERS

This invention relates to fluid container apparatus and to devices for opening fluid containers when their contents are to be discharged.

Examples of such fluid containers are those in which liquids or dry powders are stored under pressure and are released for the purposes of extinguishing a fire or preventing, suppressing or mitigating an explosion.

According to the invention, there is provided fluid container apparatus, comprising a vessel having a normally closed discharge opening, means outside the vessel for locating an explosive charge along a line partially encompassing the discharge opening, means outside the vessel for locating an explosive detonator in close relationship with the explosive charge for detonating the charge and opening the discharge opening, and means for holding a layer of explosive suppressant over the explosive charge to suppress advance of the explosion thereof outwardly of the vessel.

According to the invention, there is also provided explosive protection apparatus, comprising a pressure vessel containing an explosive suppressant under pressure and having a normally closed discharge opening, a removable cap member securable over the discharge opening externally of the vessel and carrying a linear explosive charge which when the cap member is in position is located adjacent a frangible line partially encompassing the discharge opening, the cap member also carrying an electrically actuatable detonator for detonating the explosive charge to open the discharge opening and allow release of the explosive suppressant from the vessel, and means on the cap member supporting a layer of explosive suppressant over the explosive charge for suppressing advance of the explosion thereof outwardly of the vessel.

According to the invention, there is further provided apparatus for opening a sealed container, comprising a support which holds a linear explosive charge, arranged to partially enclose an area, and which also holds an electrically actuatable detonator for exploding the charge with a layer of explosive suppressant supported on one side of the charge and the detonator, and means on the support for attaching the support externally of the sealed container with the opposite side of the charge adjacent the container to open a frangible opening in the container wall when the charge is detonated.

Fluid container apparatus embodying the invention and designed to store powder under pressure for fire or explosion protection, will now be described by way of example only with reference to the accompanying drawings in which:

FIG. 1 is a part-sectional side elevation of the container assembled with an opening device;

FIG. 2 is a plan view of the opening device; and

FIG. 3 is a section on the line III—III of FIG. 2.

The container comprises a bottle-like metal reservoir **10** having a flanged member **11** sealed to the neck of the reservoir **10** with the mouth of the flanged member closed by a frangible domed diaphragm **12.** The periphery **12***a* of the diaphragm **12** is secured in a recess in the member **11** by a clamping ring **13** secured to the flanged member **11** by bolts **14,** only one of which is seen in the drawing. A sealing ring **15** is trapped between the periphery **12***a* of the diaphragm **12** and the member **11** to ensure a fluid-tight seal.

The diaphragm **12** is fractured to release the contents of the container by ignition of an explosive cord **16** ignition of which is initiated by firing of a detonator or matchhead fuse **17.** The explosive cord **16** and detonator **17** are mounted in a plastic holder **18,** the holder **18** having a flange of the same diameter as that of the flanged member **11.** The central portion of the holder **18** is cap-shaped and has a circular groove **18***a* in which the cord **16** is positioned and a radial groove **18***b* in which the detonator **17** is positioned. The holder **18** has inner and outer walls **18***c* and **18***d* (FIG. 3), the groove **18***a* being carried by the inner wall **18***c* which explosive suppressant material **18***e* (for a purpose to be described) is held between the inner and outer walls **18***c* and **18***d*. The cord **16** extends over a segment of approximately 330° and abuts the edge of the dome of the diaphragm **12.**

The contents of the container may be discharged down a pipeline and in the construction shown the initial portion of the pipeline takes the form of an elbow **19** having a flanged end **19***a* through which bolts **20** extend, the bolts **20** passing through holes **18***f* in the holder **18** and then through holes in the flanged member **11,** nuts **21** being screwed onto the bolts **20** to assemble the respective members. A terminal housing **22** is mounted on an extension of the holder **18,** being sealed to it by a seal **22***a*, and carries two terminals **23** (only one visible) from which wires extend respectively to the detonator **17.**

When the contents of the container are to be discharged, a source of electrical current is connected across the terminals **23** to ignite the detonator **17** and in turn ignite the explosive cord **16** thereby cutting the diaphragm **12** over a 330° segment. Under the pressure of the contents within the container, the diaphragm **12** hinges back on its uncut section against the inner surface of the elbow **19** to allow free discharge of the contents of the container through the pipeline. The layer of explosive suppressant material **18***e* suppresses advance of the explosion of the cord **16** along the elbow **19** into the space to be protected.

An advantage of this construction is that the container can be filled and pressurised and, because the container itself carries no means for releasing the contents, it can be safely stored and handled without fear of premature discharge of its contents. Only when the container is required to be installed in its operational position need it be assembled with the holder **18.** In its installed position the holder **18** shields the detonator **17** and explosive cord **16** from materials in the space to be protected.

The suppressant **18***e* may be in liquid or powder form.

What is claimed is:

1. Fluid container apparatus comprising,

a vessel defining a normally closed discharge opening,

means supported on the outside of the vessel and locating an explosive charge along a line partially encompassing the discharge opening,

means supported on the outside of the vessel and locating an explosive detonator in close relationship with the explosive charge for detonating the charge and opening the discharge opening, and

means supported on the vessel for holding a layer of explosive suppressant over the explosive charge to

suppress advance of the explosive thereof outwardly of the vessel.

2. Apparatus according to claim 1, in which the normally closed discharge opening takes the form of a frangible dome.

3. Apparatus according to claim 1, in which the means for locating the explosive charge and the means for locating the detonator comprise a cap-shaped member which is securable over the said discharge opening.

4. Apparatus according to claim 3, in which the means for holding the explosive suppressant comprises a further cap-shaped member which is fixed over the first-mentioned cap-shaped member.

5. Apparatus according to claim 1, in which the vessel contains an explosive suppressant under pressure, the said support comprising a removable cap member securable over the discharge opening externally of the vessel, the cap member also carrying the detonator which is electrically actuatable for detonating the explosive charge to open the discharge opening and allow release of the explosive suppressant from the vessel.

6. Apparatus according to claim 5, in which the cap member has inner and outer walls, the explosive charge being supported on the inside of the inner wall, and the layer of explosive suppressant being held between the two walls.

7. Apparatus for opening a sealed container, comprising

a support which holds a linear explosive charge, arranged to partially enclose an area, and which also holds an electrically actuatable detonator for exploding the charge with a layer of explosive suppressant supported on one side of the charge and the detonator, and

means for attaching the support externally of the sealed container with the opposite side of the charge adjacent the container to open a frangible opening in the container wall when the charge is detonated.

8. Apparatus according to claim 7, in which the support is cap-shaped having inner and outer walls, the explosive charge being mounted on the inner wall and the layer of explosive suppressant being held between the inner and outer walls.

9. Apparatus according to claim 8, in which the cap member is made of plastics material.

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