

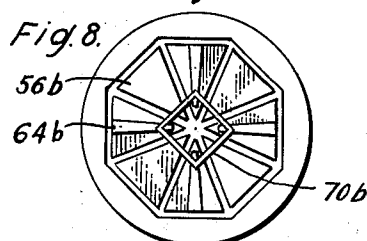
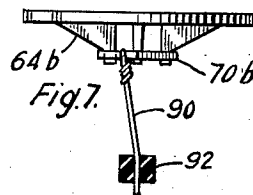
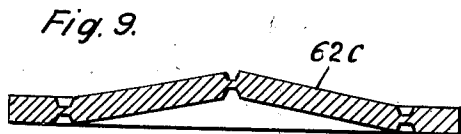
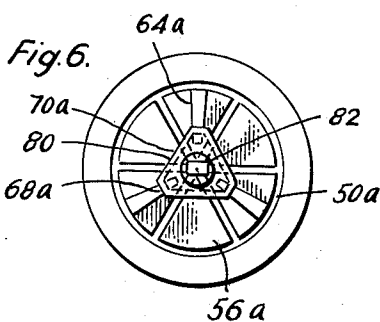
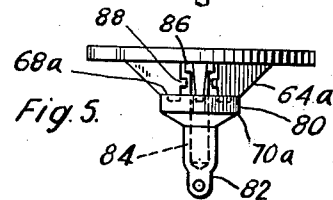
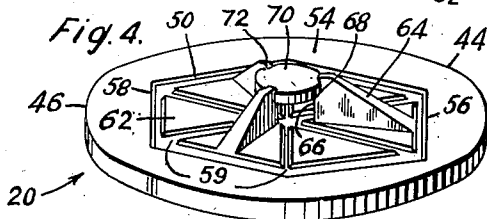
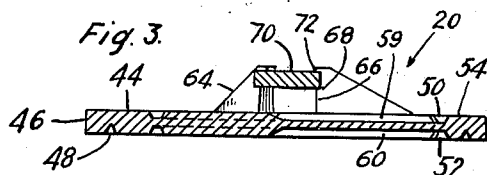
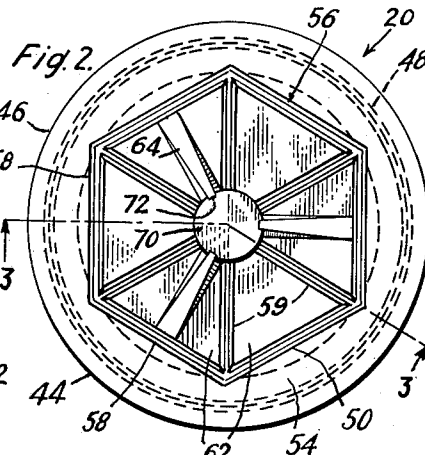
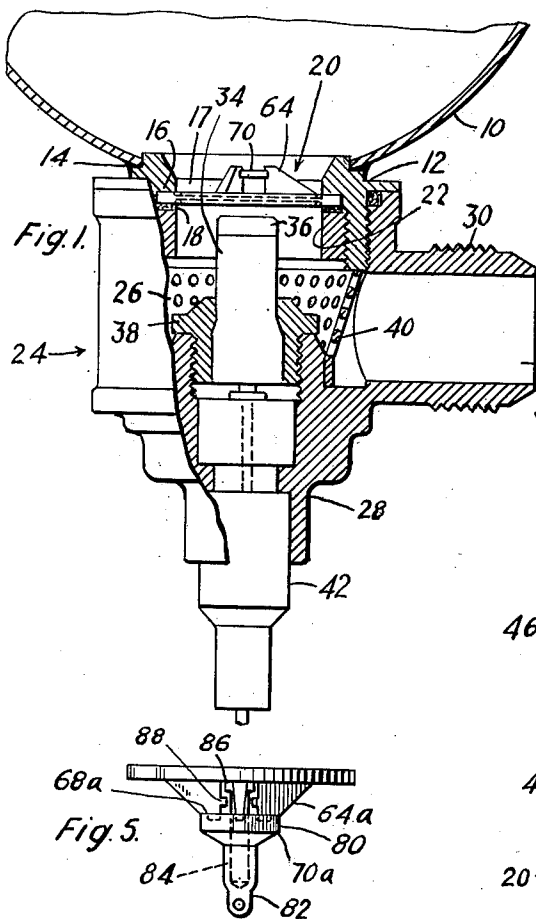
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RUPTURABLE SEALING MEANS FOR PRESSURE FLUIDS

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RUPTURABLE SEALING MEANS FOR
PRESSURE FLUIDS

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This invention relates to improvements in rupturable sealing means for containers of fluid media under pressure, and particularly to rupturable discs for releasing fire-extinguishing fluid, such as methyl bromide, carbon tetrachloride and carbon dioxide, from a discharge port.

It is among the objects of the present invention to increase the resistance of the disc to the pressure of the fluid medium at one side and to facilitate its rupture by force applied at the other side.

Another object of the invention is to provide the disc with an inner area that will separate more readily from a marginal edge of the disc, and in which the inner perimeter of the marginal edge substantially coincides with the periphery of the discharge port.

Another object of the invention is to provide shattering inner area which will break up into defined fragments of such size as not to interfere with the full free discharge of the medium.

Further objects, not specifically enumerated above, will be apparent as the invention is described in greater detail in connection with the accompanying drawing, wherein

Fig. 1 is a fragmentary view, in elevation, of apparatus which employs the rupturable disc structure of the present invention, with certain of the parts broken away and shown in section.

Fig. 2 is an enlarged top plan view of the disc structure.

Fig. 3 is a sectional view taken along the line 3-3 of Fig. 2.

Fig. 4 is a perspective view of the disc structure of Fig. 2.

Fig. 5 is a side elevational view of a modified form of disc.

Fig. 6 is a bottom plan view of the disc structure of Fig. 5.

Fig. 7 is a side elevational view of another modified form of disc structure, showing pulling means connected therewith.

Fig. 8 is a bottom plan view of the disc structure of Fig. 7.

Fig. 9 is an enlarged cross-sectional view of still another modified form of disc.

The apparatus of Fig. 1 comprises, in general, a container or cylinder 10 adapted to contain a fluid medium, such as methyl bromide, under pressure. A neck member 12 is secured to the container 10 within an opening therein, by a welded joint 14, and has a shoulder 16 defining a circular bore 17. A yieldable sealing gasket 18 and a rupturable sealing element, such as a disc 20 of the present invention, are retained against the shoulder 16 by a screw ring 22. A discharge

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head body 24 is threadedly connected to the neck member 12 and has a discharge chamber 26, a bonnet portion 28, and a laterally-extending outlet nipple 30 having an outlet passage 32. A cartridge 34 with a slug 36, is secured to the head 24 by a threaded coupling 38. A perforated basket 40 is located in the chamber 26 and around the cartridge 34 for preventing fragments of the disc 20 from entering the discharge passage 32. An electrical connector 42 enters the head through the bonnet 28 for firing the cartridge 34.

Referring to Figs. 1, 2, 3 and 4, the disc 20 has a flat body 44 with a circular edge 46, and a groove 48 into which portions of gasket 18 are pressed to effect a better seal.

Axially-registering top and bottom grooves 50 and 52 define a rim or marginal edge portion 54 and a polygonal inner area 56 having sides 58.

When the inner area 56 is knocked out of the rim 54 by the slug 36, the bore 17 is left substantially fully open.

Radially-extending axially registering top and bottom side grooves 59 and 60, the grooves of each side of which intersect each other at the center of the disc, and intersect the marginal grooves 50 and 52, at the outer ends, divide the area 56 into defined fragmenting areas or sectors 62, each subtended by a side of the polygonal figure. The latter sides form, in effect, straight hinge or fulcrum axes about which the sectors 62 may pivot, out of the plane of the rim 54 during rupture, more readily than with these sides formed on arcs of a circle.

Radially-extending webs 64, in this case respectively bisect every other sector 62 at the top side of the disc, and have inner ends 66 provided with shoulders 68 thereon spaced axially from the disc. A key plug 70 is nested within the webs 64 on the shoulders 68, and is held in place by small portions 72 peened over the plug, or the portions 72 may be omitted and the plug staked or otherwise held in place. It is sufficient to merely hold the plug 70 securely in position for handling, since, when pressure is applied to the top of the disc, it will be more securely held under compression by the web elements 64 with which it forms a truss, bridging the disc body and rendering the latter more highly resistant to rupture from forces at one side, in this case the top, than from the other or bottom side.

When force is applied to the bottom side, as by the impact of the slug 36, the slight backing afforded to the plug 70 by the small portions 72, or the staking mentioned, allow this force to readily displace the plug 70 from the arch or

truss against the static pressure of the fluid medium in the container 10, so that the disc is ruptured readily along the sides of the polygonal figure and breaks up into fragments at least as small as the sectors 62, no combination or spreading of which can clog the basket 40 to impede a full, entirely free flow of the released fluid medium.

Referring to Figs. 5 and 6, in which corresponding parts are indicated by corresponding reference numerals having the subscript *a*, the structure is similar to that previously described, with the exception that the truss is on the bottom of the disc body, and a groove 50*a* is circular whereby an inner area 56*a* may be equal to the cross section of the bore 17. In this case, shoulders 68*a* extend radially outwardly on the elements 64*a*. A member 70*a* surrounds the elements 64*a* and has sides 80 normally under straight tension between the corresponding elements 64*a*.

An eye nut 82 is mounted on a screw 84 in the member 70*a* to attach the disc to a cable. A head 86 of the screw 84 is spaced above inward projections 88 of the webs 64*a*.

When the member 70*a* is pulled from the webs 64*a*, the disc is weakened for outward displacement. The space between the screw head 86 and the projections 88 provides the head with lost motion, whereby it may impact the projections 88 when pulled and assist the fluid pressure in rupturing the disc.

Referring to Figs. 7 and 8, the structure is similar to that of Figs. 5 and 6, with the exception that the central area 56*b* is an octagon instead of a hexagon, also there are four webs 64*b* instead of three, and the element 70*b* is a rectangular ring under straight side tension. A pull wire 90 is secured at the perimetral point of the ring 70*b*, and extends through packing means 92 in a bonnet similar to the bonnet 28. The operation of this device is similar to that of the device of Figs. 5 and 6.

Referring to Fig. 9, the truss structure of the above-described figures is omitted, and instead, the sectors 62*c* are arched or trussed against the fluid pressure and weakened against the force of slug or pulling means for rupturing the disc.

Although registering top and bottom grooves are shown, it is to be understood that such grooves may be otherwise arranged, alternately at the top and bottom, or at one side only. Also, the fragmenting areas 62 may be of any desired shape.

From the foregoing description, it is apparent that a rupturable sealing disc element, of the character set forth, is provided, which is substantially stronger and ruptures with greater facility than prior discs, provides for greater latitude in the selection of fluid pressures to be employed, and is an improvement generally in its field.

As various changes may be made in the form, construction and arrangement of the parts herein, without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in any limiting sense.

It is also to be understood that the following claims are intended to cover all the generic and specific features of the invention herein described, and all statements of the scope of the invention, which, as a matter of language, might be said to fall therebetween.

I claim:

1. In sealing means for a container of fluid me-

dium under pressure, a rupturable sealing element, a plurality of substantially arch sections formed on said element rendering the same more resistant to rupture from force at one side than from the other, and displaceable compression means associated with said sections normally preventing movement of the sections under the pressure of the fluid medium in a direction to rupture the element.

2. In sealing means for a container of fluid medium under pressure, a rupturable sealing element having means projecting from one side operating substantially as a truss bridged over said side for rendering the element more highly resistant to rupture from force at one side than from the other, and including means normally maintaining said truss effective but displaceable to disrupt the same.

3. In sealing means for a container of fluid medium under pressure, a rupturable sealing element having a groove disposed inwardly from the periphery thereof and defining a peripheral rim about an inner area separable from the rim, grooves dividing said inner area into defined fragmenting areas, and means projecting axially from one side of said element operating substantially as a truss bridging said inner area between a plurality of points about and adjacent to said first groove, and including means normally maintaining said truss effective but displaceable to disrupt the same.

4. In sealing means for a container of fluid medium under pressure, a rupturable disc body having groove means disposed inwardly from the perimeter thereof defining a disc peripheral rim, radial grooves between said rim and the center of the disc forming defined fragmenting areas of the disc, webs on certain of said areas at one side of the disc body extending between said rim and the center of the disc and defining one of the elements of a substantially plug and socket device spaced axially from the disc body, and displaceable means constituting the other element of said device interfitting said one element.

5. In sealing means for a container of fluid medium under pressure, a rupturable sealing disc, and reinforcing means at the outer side of said disc rendering the disc more highly resistant to rupture from force at its inner side than from said outer side and including displaceable means normally maintaining said reinforcing means effective to resist the fluid pressure, said displaceable means being adapted to be pulled from said outer side to render the reinforcing means ineffective and including means having lost motion relative to a portion of the disc whereby the pull assists the fluid pressure in rupturing the disc.

6. In sealing means for a container of fluid medium under pressure, a rupturable disc body having weakening means disposed inwardly from the perimeter thereof defining a rim about an inner area, weakening means extending between the rim and the center of the disc and forming defined fragmenting portions, webs on certain of said portions extending between the rim and the center of said area, and ring-like means cooperating with the webs to form a truss-like structure for reinforcing the disc body at one side thereof, and said ring-like means being displaceable to disrupt the effect of the truss.

7. In sealing means for a container of fluid medium under pressure, a rupturable sealing disc comprising a one-piece shatterable body including opposite-side registering groove means defining a disc margin and a polygonal central disc

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area, opposite-side registering radial grooves, the grooves at each side of which intersect each other and said first groove means and divide said area into defined fragmentating sectors each subtended by a side of the area, and radial webs bisecting certain of said sectors at one side of the disc including inner ends spaced radially from the center of the disc having holding means spaced axially from the disc; and displaceable means co-operating laterally between said holding means and held thereby to normally prevent lateral displacement thereof and rupture of the disc by a force substantially normal thereto.

8. A rupturable sealing disc having radially spaced ribs on one side thereof constructed and arranged to provide a space between their inner ends at the center of the disc, and a reinforcing member disposed in said space and engaged by the inner ends of said ribs.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
342,225	Roberts	May 18, 1886
1,584,523	Egbert	May 11, 1926
1,697,199	McKenzie-Martyn	Jan. 1, 1929
1,959,822	Greve	May 22, 1934
2,242,547	Raymond	May 20, 1941
2,372,331	Lo Vico	Mar. 27, 1945
2,461,557	Lo Vico	Feb. 15, 1949

FOREIGN PATENTS

Number	Country	Date
129,460	Great Britain	July 17, 1919