May 18, 1926. 1,585,372

C. L. BURNHAM

SAFETY LOCKING DEVICE FOR MANHOLE COVERS

Filed June 2, 1922

Fig. 3

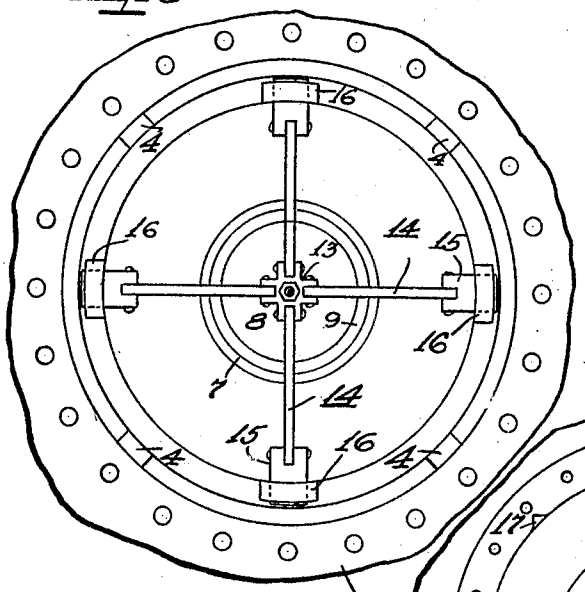


Fig. 1

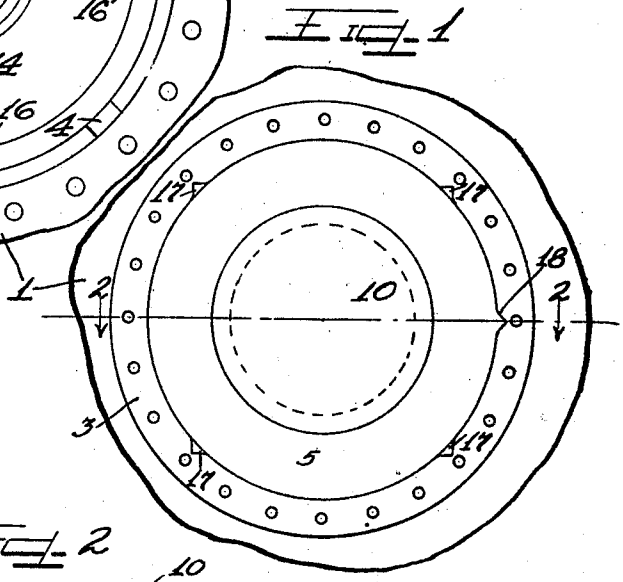
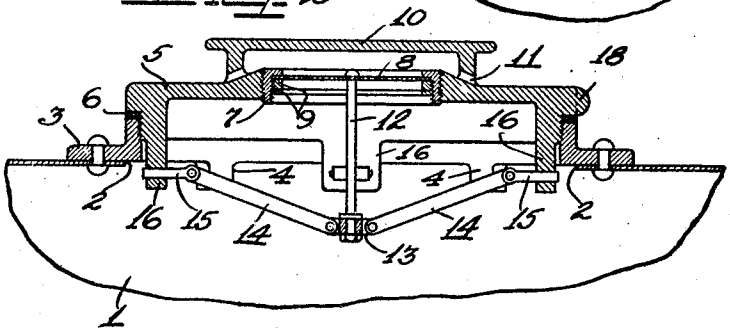


Fig. 2



Witnesses

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UNITED STATES PATENT OFFICE.

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SAFETY LOCKING DEVICE FOR MANHOLE COVERS.

Application filed June 2, 1922. Serial No. 565,376.

This invention relates to mechanism to prevent the removal of a tank manhole cover while any dangerous pressure exists within the tank. This device has particular reference to tanks intended to contain volatile fluids under atmospheric pressure which may from the nature of the fluid generate pressure within the tank due to external heat or agitation, etc. For example, a tank car containing gasoline may be heated to such an extent by the direct rays of the sun that a dangerous pressure is built up within the tank, and an attempt under such conditions to remove the manhole or dome cover for unloading would suddenly release this pressure with disastrous results.

It is an important object of this invention to provide a safety locking mechanism for container closures that is automatically locked by an increase in pressure in the tank and unlocked by releasing the pressure in the tank.

It is a further object of this invention not only to prevent actual removal of the cover under the conditions specified but to prevent unscrewing the cover sufficiently to release the tank pressure through the gasket under the cover.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawings.

The invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is a top plan view of a cover, embodying the device of my invention.

Figure 2 is a slightly enlarged sectional elevation on the line 2—2 of Figure 1.

Figure 3 is a bottom plan view of the cover drawn to the same scale as Figure 2.

As shown on the drawings:

The reference numeral 1 refers to a tank or container having an opening 2 surrounded by a collar 3 riveted to the tank. It is to be understood that a suitable collar can be attached to the dome commonly used with tank cars, and that the collar can be formed for attachment to the rounded top of a cylindrical or spherical tank. The collar 3 has equally spaced downwardly projecting lugs 4 adapted to be engaged by the locking mechanism to be described hereinafter. A cover member 5 is threaded to engage with similar threads in the collar 3 for securing the cover to the collar and in connection with a gasket 6 to make a tight joint thereof. As shown in Figure 2, the collar is apertured for a diaphragm holding member 7 engaged thereto by mating threads. A diaphragm 8 is securely held against a shoulder of the member 7 by the annular externally threaded lock nuts 9. The diaphragm 8 is protected by a housing 10, preferably an integral part of the cover 5, provided with air vents 11.

A rod 12 is secured at the center of the diaphragm 8 and leads to a yoke 13 to which are pivoted links 14 pivoted at their other ends to locking bars 15. The cover 5 is provided with equally spaced downwardly extending lugs 16 similar to the lugs 4 except that they are apertured for the locking bars 15. The collar 3 is provided with any suitable marking means such as the projections 17 intended to show the location of the lugs 4 when the cover 5 is in position. The cover also has one marking projection 18 to indicate the position of one of the lugs 16 thereon.

The operation of my device is dependent upon a displacement outwardly of the diaphragm 8 due to an increase in pressure within the tank. The degree of pressure required to buckle the diaphram is of course dependent on the material and gauge of the plate forming it; and any desired operating pressure differential is easily obtained by using a properly constructed diaphragm. The bulge in the diaphragm lifts the rod 12 and the yoke 13 attached thereto, thus straightening out the toggles formed by links 14, and so moving the bars 15 outwardly into a position beneath the edges of the collar 3 which would prevent removal of the cover. The lugs 4 on the collar prevent rotation of the cover when the bars 15 are extended as the bars would strike the lugs. The marking means on the outside of the collar and cover is provided to insure the cover being screwed into a position where the lugs 16 will not match the lugs 4 and thus prevent projection of the bars 15.

It will be evident that as the bars 15 are equally spaced around the cover the toggle mechanism has no unbalanced forces at the yoke so that the rod 12 would be subject to simple tension or compression without bending stresses.

My safety locking mechanism is equally suitable for other forms of sealed openings wherein a pressure might be developed within the container that would render removal of the closure a matter of danger to the workman.

The marking means 17 and 18 are provided to enable the workman who puts on the cover to screw it into a position where the lugs 4 and 16 are not in line, to prevent the locking bars from striking the lugs 4.

I am aware that numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I therefore do not purpose limiting the patent granted otherwise than necessitated by the prior art.

I claim as my invention:

1. A tank closure comprising a collar having a plurality of equally spaced downwardly projecting lugs adjacent the bottom of the opening therethrough, a cover adapted to be secured to said collar having an equal number of downwardly projecting lugs thereon corresponding in position with the lugs on said collar, a diaphragm in said cover, an operating rod attached to said diaphragm, a yoke on said rod, locking bars supported by the lugs on said cover, and links from said yoke to said locking bars.

2. A tank closure comprising a collar having a plurality of equally spaced downwardly projecting lugs adjacent the bottom of the opening therethrough, a cover adapted to be secured to said collar having an equal number of downwardly projecting lugs thereon corresponding in position with the lugs on said collar, a diaphragm in said cover, an operating rod attached to said diaphragm, a yoke on said rod, locking bars supported by the lugs on said cover, links from said yoke to said locking bars, and indicia on said collar and cover to show the relative positions of the lugs on said collar and cover.

3. A tank closure, comprising a cover adapted to be attached to the tank, a diaphragm in said cover, means on the inner side of said cover operated by said diaphragm engaging the tank to lock said cover to said tank, and a housing forming part of said cover and enclosing said diaphragm.

In testimony whereof I have hereunto subscribed my name.

CLIFFORD L. BURNHAM.