

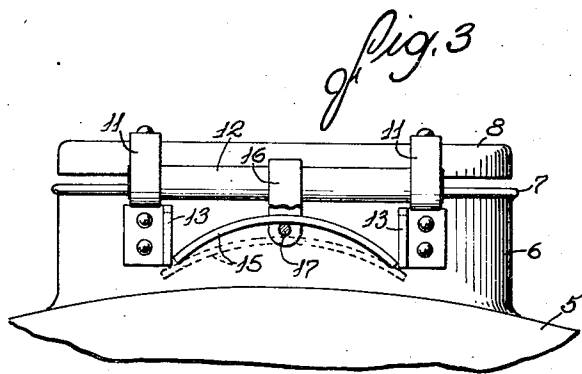
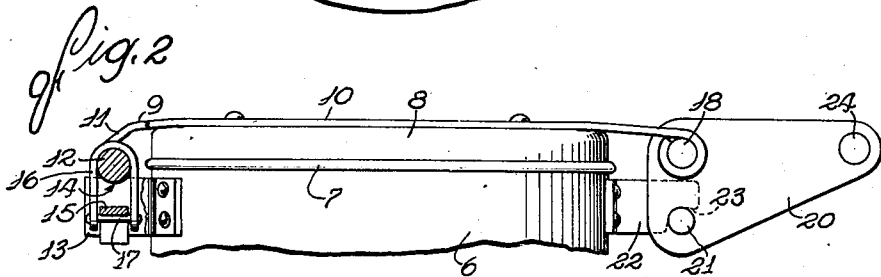
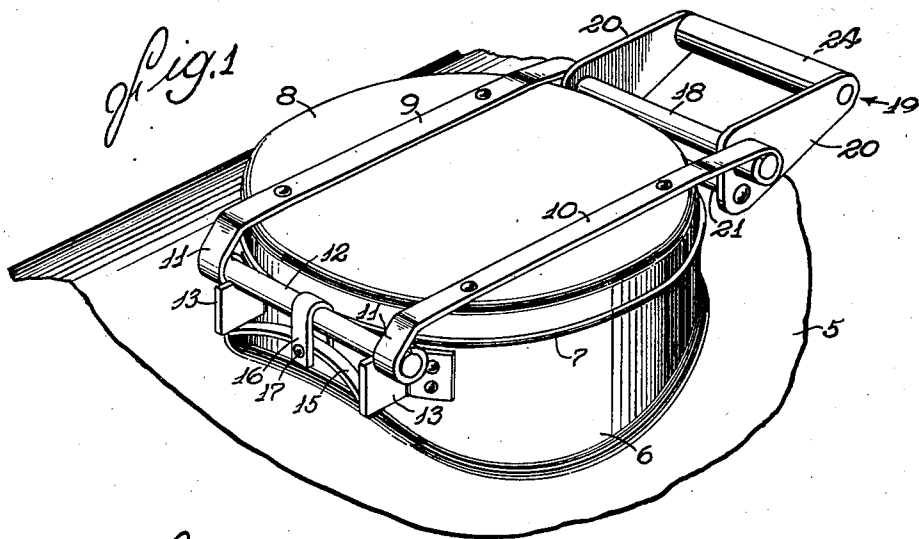
April 14, 1942.

S. R. ETNYRE

2,279,666

PRESSURE RELEASE CLOSURE DEVICE

Filed Aug. 4, 1940



INVENTOR
Samuel R. Etnyre
By Paul G. Gamm, Jr. & Richard
ATTORNEYS

UNITED STATES PATENT OFFICE

2,279,666

PRESSURE RELEASE CLOSURE DEVICE

Samuel R. Etnyre, Oregon, Ill., assignor to E. D. Etnyre & Company, Oregon, Ill., a corporation of Illinois

Application August 4, 1940, Serial No. 351,420

6 Claims. (Cl. 220-44)

The invention relates to closure devices generally, and more particularly to an improved safety closure device of the type suitable for closing manholes or the like, in tanks and other vessels which normally operate at relatively low pressures, but which are occasionally subjected to sudden increases in pressure.

One object of the invention is to provide an improved closure device of the above general character which can be securely latched in place to effectually seal the vessel as long as normal operating conditions are maintained and which is adapted to release automatically and open the vessel when the pressure therein exceeds a predetermined value.

Another object is to provide improved release mechanism for closure devices of the above general character which is efficient and reliable in operation and adapted to respond to relatively small increases in pressure.

It is also an object of the invention to provide a pressure release closure device of simple, rugged construction which is easy to manipulate and inexpensive to manufacture.

Other objects and advantages of the invention will become apparent from the following detailed description of the preferred embodiment illustrated in the accompanying drawing in which:

Figure 1 is a perspective view of a closure device embodying the features of the invention.

Fig. 2 is a partly sectioned side elevational view of the device.

Fig. 3 is an end elevational view of the device showing the relative positions of the parts as the automatic release is initiated.

While the invention is susceptible of various modifications and alternative constructions, I have shown in the drawing and will herein describe in detail the preferred embodiment, but it is to be understood that I do not thereby intend to limit the invention to the specific form disclosed, but intend to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

For purposes of illustration, the improved closure device has been shown as applied to a generally cylindrical sheet metal tank or drum 5 such as is commonly used in apparatus for applying heated asphalt or other bituminous material to road surfaces and the like. For filling and cleaning purposes, the tank is usually provided with an opening such as a manhole, in its upper side. As herein shown, the opening is

defined by an upstanding neck or flange 6 which terminates in a rolled bead 7. In order to conserve heat and to avoid loss of material and possible injury to workmen by splashing of the heated material, the manhole or opening is desirably closed by a closure which can be removed to provide convenient access to the interior of the tank.

In the exemplary embodiment, the closure includes a cover member 8 adapted to seat on the bead 7. The cover member is desirably hinged at one side on the tank structure so that it may be swung between open and closed positions and suitable latching means is provided at the other side for latching the member in closed position. Under normal conditions of use, the tanks for the above mentioned apparatus are ordinarily operated substantially at or slightly above atmospheric pressure. At times, however, there may be a sudden increase in pressure which might seriously damage the apparatus unless promptly relieved. Such relief is provided by the present invention by reason of the novel construction of the hinge means so that it is adapted to release automatically upon application of a predetermined pressure to the inner side of the cover member. This release allows the member to pivot about the latching means and swing to open position, thus venting the tank to the atmosphere.

The cover member 8 may be constructed of any suitable material and, of course, is shaped to fit the opening in the tank to which it is applied. As herein shown, the member is of circular, generally cup-shaped form dimensioned to fit snugly on the bead 7. Extending across the top of the member are spaced parallel strips 9 and 10 of sufficient length to extend substantially beyond the edges of the cover. The strips are preferably of steel or other resilient material and are riveted or otherwise rigidly secured to the cover member.

As will be seen by reference to Figs. 1 and 2, the ends of the strips at one side of the cover are bent downwardly as at 11 and the ends are rolled to form a pair of alined sockets for the reception of an elongated pivot bar 12 on which the cover is normally adapted to swing. Rigidly secured to the neck portion 6 of the tank are a pair of laterally projecting brackets 13, each formed with an upwardly opening recess 14 providing a fulcrum for the pivot bar 12.

The bar 12 is normally held in bearing engagement in the recesses 14 by a pressure release mechanism including a flat spring member 15

adapted to project beneath the spaced brackets 13. The spring member is operatively secured to the pivot bar 12 substantially at its mid-point by means of a U-shaped yoke 16 which straddles the bar and which carries a pin 17. Under normal operating conditions, the tension of the spring 15 acts to hold the pivot bar 12 in the recesses 14 so that the cover may be swung between open and closed positions.

The ends of the strips 9 and 10 opposite the pivot bar 12 are bent to form a pair of aligned sockets for an elongated cross bar 18 of a latch member indicated generally at 19. The latch member, as herein shown, comprises a pair of spaced, generally triangular side members 20 pivotally supported on the bar 18 in spaced relation. The side members carry between them an off-set latch pin 21 which, in this instance, is located just below the bar 18 and adapted to cooperate with a keeper 22 fixed to the neck 6 of the tank, the keeper being notched as at 23 to receive the latch pin. Due to the off-set location of the latch pin, the cover member is readily drawn into sealing relation to the opening and is effectually held there by the weight of the parts. A handle member 24 fixed to the outer ends of the side members provides convenient means by which the latch can be conveniently swung between latching and releasing positions.

The cover may be securely latched in closed position by simply rocking the latch device to a substantially horizontal position as shown in Fig. 2. The resilient character of the strips 9 and 10, insures accurate seating of the cover member on the head 7. Any increase in pressure in the tank tends to force the cover member upwardly whereby the spring 15 is additionally flexed so that its effective length is reduced sufficiently to allow the ends to slip between the brackets 13 as shown in Fig. 3. Under these conditions, the cover member pivots about the bar 18 and swings to open position, thus venting the tank to the atmosphere and relieving the pressure. The point at which the release occurs is dependent upon the resistance of the spring member 15 which, of course, can be constructed to provide for release of any desired predetermined pressure. It is found in practice that mechanism of this character will operate reliably upon pressure changes as low as three pounds per square inch. After such automatic release, the parts may be quickly and easily reassembled by simply inserting the spring 15 through the yoke and forcing its ends under the brackets 13.

It will be apparent from the foregoing that the invention provides an improved closure device for manholes and similar openings in tanks or other vessels which are occasionally subjected to sudden increases in pressure. The novel pressure release means provided by the invention allows the cover member of the closure device to release automatically when the pressure in the vessel reaches a predetermined value, thus effectually preventing damage to the vessel. This release mechanism is of simple and rugged construction, is very easy to manipulate and is exceedingly efficient and reliable in operation.

I claim as my invention:

1. A closure device for openings in tanks or the like comprising, in combination, a cover member shaped to fit the opening, a pair of spaced parallel strips secured to the cover member with their ends projecting over the edges of the cover,

the projecting ends of said strips being bent to form aligned pairs of sockets at opposite sides of the cover member, an elongated bar extending between each pair of sockets, a latch member mounted on one of said bars and cooperating with means on the tank structure to latch the cover member in closed position, a pair of spaced brackets mounted on the tank structure, each bracket having an upwardly opening notch for the reception of the other of said bars, a flat spring operatively secured at an intermediate point to said other bar and having its opposite ends engaged under the respective brackets to releasably hold the bar in said recesses whereby the cover is normally permitted to pivot on the bar and swing between open and closed positions, said spring flexing to slide between the brackets and thus release the cover for pivoting on the first mentioned bar when the pressure on the inner side of the cover reaches a predetermined value.

2. A closure device for openings in tanks or the like comprising, in combination, a cover member shaped to fit the opening, a pair of spaced parallel strips secured to the cover member with their ends projecting over the edges of the cover, a bar extending between the projecting ends of the strips on each side of the cover member, latch means mounted on one of the bars cooperating with means on the tank structure for disengageably latching the cover in closed position, a pair of spaced laterally projecting brackets mounted on the tank structure, upwardly opening notches in said brackets positioned to receive the other of the bars, a flat spring operatively connected at its mid-point to said other bar and having its opposite ends engaged under the respective brackets to yieldably hold the bar in said recesses so that the cover may pivot on the bar when the latch is disengaged, said spring flexing to slide between the brackets and allow the cover member to pivot on the first mentioned bar when the latch is engaged and the pressure applied to the inner side of the cover member exceeds a predetermined value.

3. A closure device for openings in tanks or the like comprising, in combination, a cover member shaped to fit the opening, a pair of bars mounted respectively at opposite sides of the cover member, a latch carried by one bar for disengageably latching the cover member in closed position, a pair of spaced, laterally projecting brackets mounted on the tank structure, upwardly opening recesses in said brackets positioned to receive the other of said bars and provide a fulcrum on which the cover may swing between open and closed positions, and spring means interposed between said other bar and said brackets for releasably holding the bar in said recesses, said spring means yielding to permit the cover to pivot on the first mentioned bar when the pressure in the tank exceeds a predetermined value with said latch means engaged.

4. A pressure release closure device for tanks or the like comprising, in combination, a cover member shaped to fit an opening in the tank, hinge means at one side of the cover member supporting the member on the tank structure for pivotal movement between open and closed position, latch means at the other side of the cover member cooperating with means on the tank structure for latching the cover in closed position, said hinge means including a trip mechanism for releasably supporting the hinge means on the tank, said mechanism being releasable

upon application of a predetermined pressure to the inner side of the cover member whereby the member is permitted to pivot about said latching means and swing to open position.

5 5. The combination with a cover member for an opening in a tank or the like, of a pressure release hinge structure comprising, a bar mounted on the member, a pair of spaced laterally projecting brackets mounted on the tank structure, upwardly opening recesses in said brackets positioned to receive said bar and provide a fulcrum for the member, an elongated spring member having its opposite ends engaged below the respective brackets, and a yoke operatively connecting the spring member to the bar substantially at the mid-point of the spring member 10 15

6. A closure device for openings in tanks or the like comprising, in combination, a cover member shaped to fit an opening in the tank, latch means mounted at one side of the cover member for latching the member in closed position, hinge means mounted at the other side of the cover member for pivotally supporting the member, a support for mounting said hinge means on the tank structure, and spring means interposed between said support and said hinge means, said spring means being yieldable to permit displacement of said cover member from said opening in the tank upon application of a predetermined pressure to the inner side of said cover member

SAMUEL R. ETNYRE.