July 7, 1942. H. O. PARSONS 2,288,919

SAFETY COVER FOR CONTAINERS

Filed Oct. 14, 1939 2 Sheets-Sheet 1

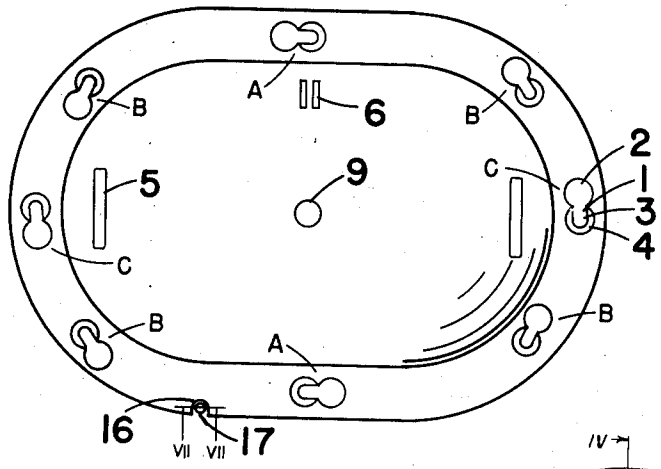


FIG. 6.

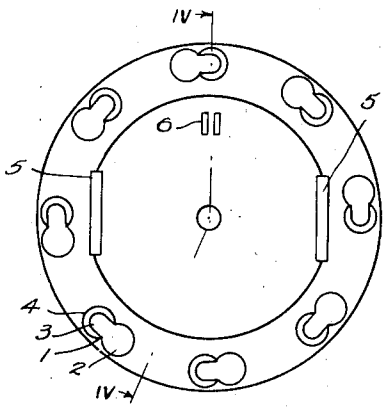


FIG. 1

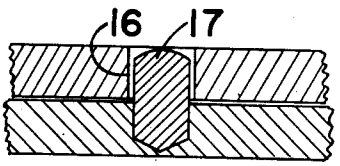


FIG. 7.

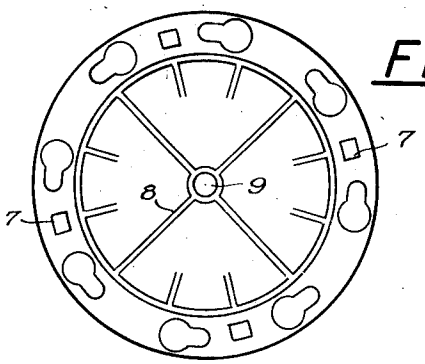


FIG. 2.

Harrison O. Parsons INVENTOR.

BY P. L. Young ATTORNEY.

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SAFETY COVER FOR CONTAINERS

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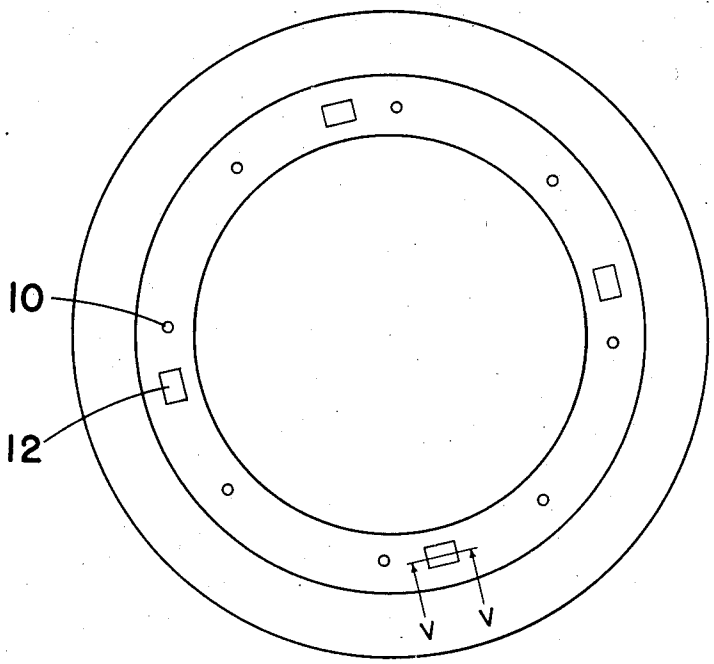


FIG. 3.

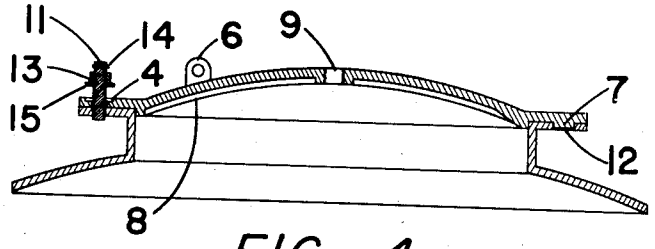


FIG. 4.

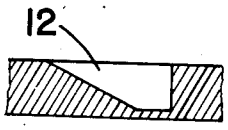


FIG. 5.

Harrison O. Parsons INVENTOR.

BY O. L. Young ATTORNEY.

Patented July 7, 1942 2,288,919

UNITED STATES PATENT OFFICE

2,288,919

SAFETY COVER FOR CONTAINERS

Harrison O. Parsons, Houston, Tex.

Application October 14, 1939, Serial No. 299,462

3 Claims. (Cl. 220—55)

The present invention relates to a safety cover for containers. More particularly, the invention is directed to a cover to be used on tank car domes or to cover the upper end of gauges, such as I have shown in my U. S. Patents 2,215,594, issued September 24, 1940, and 2,228,481, issued January 14, 1941, and co-pending application Serial No. 299,461.

The shipping of volatile liquids in closed containers, such, for example, as casinghead gasoline in tank cars, presents a considerable hazard. These containers are equipped with covers which must be removed from the container occasionally. If the workman is careless and removes a cover from a loaded container before first venting the contents of the container to the atmosphere, the contents are likely to boil over. This not only constitutes a hazard to the workers engaged in unloading the car, but may also cause a substantial monetary loss.

It is therefore an object of the present invention to produce a cover for containers which requires the contents of the container to be vented to the atmosphere before the cover can be completely removed.

It is a further object of the present invention to produce a cover for tank car gauges, such as are disclosed in my copending applications mentioned above which will prevent the escape of volatile materials to the atmosphere while the container is in transit, should the gauge leak, and which will prevent injury to the workmen in removing the cover in case such leakage allows a high pressure to build up under the cover.

Other objects and advantages will be seen from the description of the invention taken in conjunction with the drawings in which

Fig. 1 is a top view of a circular cover embodying the present invention;

Fig. 2 is a bottom view of the cover shown in Fig. 1;

Fig. 3 shows the rim of the manhole on which the cover shown in the preceding figures may be placed;

Fig. 4 is a cross sectional view of the cover as shown by Fig. 1 taken along line IV—IV and mounted on the manhole shown in Fig. 3;

Fig. 5 is a cross sectional view of the device shown in Fig. 3 taken along the line V—V;

Fig. 6 is another modification of the present invention showing an oblong manhole cover fitted with safety devices; and

Fig. 7 is a cross sectional view taken along the line VII—VII of Fig. 6.

Referring specifically to Fig. 1, the periphery of the cover is provided with spaced openings 1, one part of which consists of a circular opening 2 and another portion of which consists of slot 3. Countersunk around slot 3 is a segment of circle 4. The manhole cover is also provided with handles 5 and clevis 6.

As shown by Figs. 2 to 5, the bottom of the cover is equipped with spaced lugs 7 and reinforcing ribs 8. The center of the cover is also provided with circular opening 9 through which a sampling device or suitable pressure releasing device may be attached.

The manway ring or rim shown by the drawings is equipped with spaced holes 10 which correspond in spacing to the holes 1 of the cover and are tapped so that they may be provided with studs 11. The ring is also provided with cavities 12 which correspond to lugs 7 of the cover. One end of the bottom of each of cavities 12 is arranged so that it slopes as shown by Fig. 5. Studs 11 are provided with nuts 13 and pins 14 extending through an opening near their upper portion to keep the nuts 13 from being entirely removed from the studs. Made integral with nuts 13 are flanges 15 which are made of such a size that they fit snugly into the countersunk opening 4 with which the opening 1 is provided.

The manhole cover is attached to and removed from the manhole ring or rim in the following manner. Assuming that the cover is screwed tightly in place, the nuts 13 are loosened until their further movement is prevented by pin 14. The cover is then rotated in a clockwise direction. As the cover rotates, lugs 7 cooperating with sloping portion of groove 12 cause the cover to be raised from the manhole ring. This allows any vapor which may be in the tank to be exhausted from the tank through the space between the cover and ring before the cover is completely removed. After the cover is rotated so that washers 15 coincide with circular opening 2 of the cover, the manhole cover may be lifted directly from the ring.

Two safety measures are provided by the construction of the above described cover. In the first place the interior of the container must be vented to the atmosphere before the cover is completely removed. This is caused by the lugs cooperating with the slanting portion of slots 12 and forcing the cover away from the manway. Another safety feature resides in the countersunk slots 4 surrounding the opening 1. If after all the bolts have been loosened from the cover there is such a pressure on the cover that it is blown directly upwardly, the flanges 15 of the nuts fit

into the countersunk slots 4 and hold the cover so that it cannot be rotated. The cover thus remains under the control of the operator and he is able to tighten it down and prevent the contents of the tank from boiling out.

In the modification of the device shown by Figs. 6 and 7 the rim of the manhole cover is provided with a slot 16 and the manway is provided with pin 17. The length of the pin 17 is such that when the manhole cover is raised so that it will slide over the top of this pin the top of the cover is immediately below the flanges 15 when nuts 15 are up against pin 14. In this modification of the invention the operator in removing the cover from the manway must first loosen the nuts 13 to their fullest extent. The manhole cover must then be raised partially so as to allow the cover to be vented to the atmosphere before it may be rotated. If the cover has been stuck to the manway with pressure underneath, so that when it is loosened it is blown directly upwardly, it cannot be rotated because the countersunk slots 4 fit snugly around flange 15 of the nut. In this way the cover remains under the control of the operator during this critical period. If there is no excess pressure, the cover may be rotated in the same manner as the previously described modification after being lifted, so that it clears pin 17 and yet is not high enough that countersunk slots 4 fit around flanges 15. As the cover is rotated, flange 15 coincides with circular opening 2 at which point it may be removed from the manway. In placing the cover on the manway the reversed procedure is used.

In the modification shown by Fig. 6 the cover is made in an oblong shape. The openings 1 in the cover are placed around the periphery of the cover so that, when the cover is rotated, the flanges 15 will be directly above the circular openings 1 and will pass directly through them, when the cover is raised vertically. The axes of the openings 1 are placed on circles having the same center as the cover, openings A being placed on one circle, openings B being placed on another circle having a greater radius, and openings C being on a third circle of still greater radius. Other methods of positioning these openings are also available, for example, by selecting a flange of suitable width, openings B and C may be placed on the same circle.

It is obvious that changes in size and arrangement of parts may be made in the above described invention. It is also evident that the safety device of the present invention is useful for other purposes than those above referred to. For example, such a cover may be used for covering a gauge used in gauging liquid containers or for other suitable purposes where a cover for an opening in high pressure vessels is required. Such variations are within the purview of the skill of the worker in art and are intended to be embraced by the appended claims in which it is intended to claim the invention as broadly as the prior art permits.

I claim:

1. A closure for pressure vessels comprising, in combination, a manway rim formed integral with the pressure vessel, and a mating cover, said cover being provided with openings spaced at regular intervals around its periphery, each of said openings being in the shape of a slot attached to a circle of greater diameter than the width of the slot and being pointed in the same direction as adjacent openings, said openings being located at equal distances from the adjacent edge of the cover and said manway ring being provided with studs located at intervals corresponding with the spacing of the openings of said cover, said studs being provided with nuts having flanges, the studs having a diameter less than the width of the slot portions of the openings and the flanges having a diameter less than the diameter of the circular portions, but greater than the width of the slot portions of said openings, the outside of the cover containing countersunk portions around the slot end of each opening of such size and shape as to receive said flanges, and the inside of the cover provided with lugs, having their axis parallel with the adjacent edge of the cover, the manway ring having cavities to receive said lugs, a corresponding end of each of the cavities slanting up to the face of the ring so that the lugs force the face of the cover away from the face of the ring as the cover is given an angular motion.

2. A device as in claim 1 in which the cover and ring are circular in form.

3. A device as in claim 1 in which the cover and ring are oval in form.

HARRISON O. PARSONS.