

Aug. 23, 1938.

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2,128,091

FUSIBLE VENT

Filed April 1, 1935

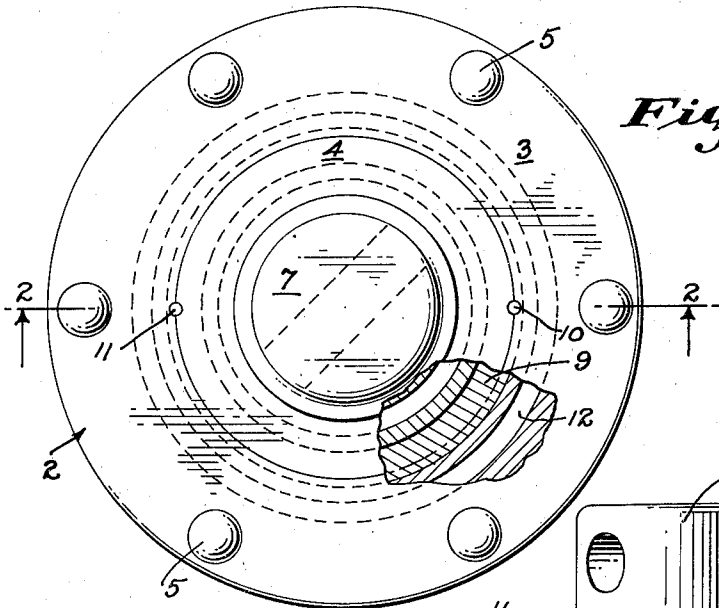


Fig. 1.

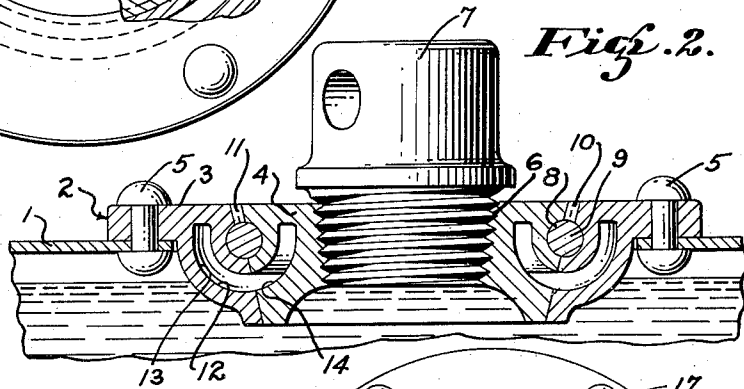


Fig. 2.

Fig. 5.

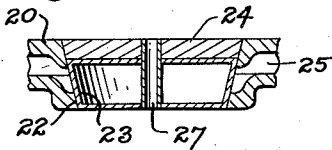


Fig. 3.

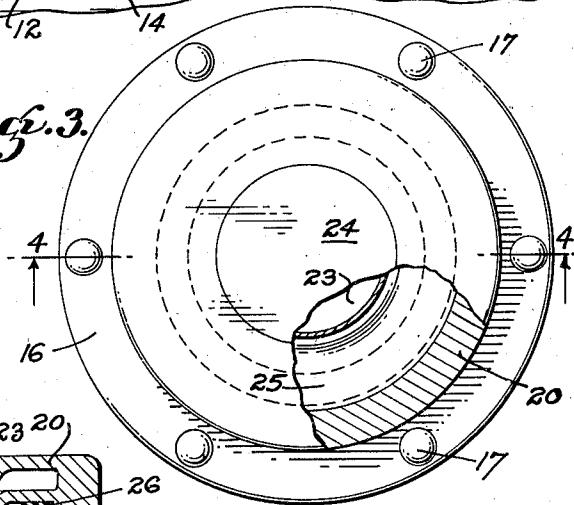
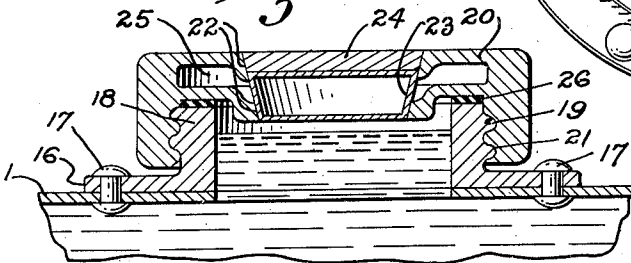


Fig. 4.



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2,128,091

FUSIBLE VENT

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Application April 1, 1935, Serial No. 14,102

12 Claims. (Cl. 220—89)

This invention relates to fusible vents for containers for flammable or expansible liquids, gases or solid substances.

More particularly the invention relates to fusible vents or valves for vessels, tanks, reservoirs, pipes or tubes containing liquids, gases or solid substances which have the properties of expansion when subjected to rising temperatures. A further object of the invention is the provision of a fusible vent or valve establishing a positive means of avoiding abnormal pressures within such containers as those hereinbefore mentioned, resulting from fire or being subjected to intense heat.

Another object of the invention is the provision of a fusible vent or valve in which an element is employed having the characteristic of melting or softening at predetermined temperatures less than that which would create an explosive pressure within the container.

More particularly, the invention relates to the provision of a fusible vent or valve in which the fusible element is insulated against the contents of the vessel, tank, reservoir, pipe or tube.

It is well known that in many States and municipalities laws and ordinances are in effect requiring that tanks and the like adapted to contain flammable materials shall be provided with venting facilities of such size and capacity as will safely relieve such internal pressure as may be created by exposure fires, and these rules also provide that if such venting facilities incorporate a fusible element, the fusing temperature of such element shall not exceed a certain number of degrees Fahrenheit. Rules such as these have been proposed by national associations, as for example, in a code of good practice in the construction and operation of tank trucks, etc. for the transportation of flammable liquids.

It has been our experience, however, that fusible vents complying with the aforementioned rules and regulations do not go far enough in providing positive venting means in emergencies, such as exposure fires. As for example, we have found, in a number of experiments, that if a filled container having the conventional vent is exposed to fire, the contents act as a heat conductor to such a considerable degree that the fusing of the fusible element employed is dangerously retarded. That is to say, when fire occurs in the region of the venting device, the contents tend to conduct the heat away from the fusible element and while retarding the fusing of the same, the pressure within the container rapidly climbs to the danger line.

This is especially true in cases where the tank or container is tilted from its normal position to a point where the substance contained thereby lays against the venting device, and we have found in our experiments that the fusing of the element is retarded in a measurable degree.

With the results of these experiments in mind, we set about finding some means of insuring the melting of the fusible element regardless of the level of the contents of the container, and it is believed that our invention accomplishes that end.

Referring now to the drawing forming a part of this specification:

Figure 1 is a top plan view of a fusible vent embodying our invention, a portion of the same being broken away to show relative position and arrangement of parts.

Figure 2 is a section taken along the line 2—2 of Figure 1.

Figure 3 is a top plan view of a different application of the principle of our invention.

Figure 4 is a section taken along the lines 4—4 of Figure 3.

Figure 5 is a sectional view of a portion of the vent shown in Figure 4 with a breather pipe indicated therein.

Like numerals being used herein to indicate corresponding parts illustrated in the drawing, the numeral 1 designates a portion of any conventional vessel, tank, reservoir, pipe or tube adapted to contain liquids, gases, or solid substances of an expansible or flammable nature.

Referring to the device shown in Figures 1 and 2, we provide a boss 2 consisting of two sectors or sections 3 and 4 fitted together and riveted or otherwise secured in position in an appropriate orifice in the container 1 by means such as the rivets 5. The inner section 4 of the boss 2 is threaded as at 6 to receive any conventional screw plug, as for example that indicated by the numeral 7. It will also be noted that the two sections 3 and 4 project into the container 1 (see Figure 2).

The two sections of the boss 3 and 4 have corresponding annular concave recesses 8 which when fitted together form an annular bore adapted to contain the fusible element 9. To facilitate the pouring of the fusible element into this bore, we have provided an intake 11 and a vent 10, both communicating with said bore through the parts 3 and 4.

An annular arcuate recess 12 is disposed in the boss between the fusible element 9 and the interior of the container 1, the same being formed

by complementary recesses 13 and 14 in the parts 3 and 4 respectively, to provide an air cell or chamber or as a space adapted to contain any known insulating material.

5 From the foregoing description it will be obvious that the fusible element of the vent shown in Figures 1 and 2 is completely insulated away from the contents of the container 1, as well as that portion of the boss 2 which projects into the
10 container 1. As a consequence of this the exposure of the vent, here illustrated and described, to fire or any intense heat will concentrate such heat on the fusible element and more quickly cause the softening or melting of same. In the
15 absence of such insulation, as heretofore explained, the heat is conducted away from the fusible element, retarding the desirable function of the latter while dangerous pressures are being built up within the container.

20 It will also be obvious that when the vent element is exposed to excessive heat and a temperature is reached such as will melt or soften the fusible element 9, the inner portion 4 of the boss 2 will be blown out by the increasing pressure
25 within the tank 1. Thus, an orifice sufficient in size to reduce the pressure within the container 1 to less than the exploding point will be expeditiously provided.

The venting device shown in Figures 3, 4 and
30 5 is such as can be employed in connection with fuel tanks for automobiles and other motor vehicles. In this instance we employ a boss 16, which is riveted or otherwise secured to the tank 1, as at 17, and extends outwardly to provide a
35 spout 18 having conventional threads 19, the latter being adapted to be engaged by a cap 20 through the means of the corresponding internal threads 21.

Here we provide a conical-shaped emergency
40 orifice 22 in the cap 20, to receive the sealed hollow inner plug or cap 23. The plug 23, being hollow, utilizes the air within for the purpose of insulating the fusible element 24 disposed there-
45 over, away from the contents of the tank, regardless of the position of the latter, whether it be in its normal position or an abnormal position as a result of accident or the like.

Additional insulation is furnished by providing the cap 20 with a horizontally disposed annular
50 recess 25, the inner part of which drops downwardly into the orifice 22.

In this adaptation of our invention, it will be appreciated, the internal pressure of the container 1 blows the plug 23 out through orifice 22
55 when the heat has melted or sufficiently softened the fusible element 24. Melting or softening of the said fusible element 24 is facilitated by the fact that the same is insulated with respect to not only the contents of the container 1 but the
60 greater portion of the cap 20 and all of the boss 16.

A conventional washer 26, of rubber or some other suitable material, is provided between the boss 16 and the cap 20.

Since it is customary to provide the removable
65 caps of fuel tanks of automobiles with a breather hole, we have made provision for the same in the adaptation shown in Figure 4, attention being invited to Figure 5 of the drawing. A breather
70 pipe 27 extends through the inner plug 23 and the fusible element 24. This pipe is of sufficient diameter to relieve normal pressure only.

While we have described recesses 12 and 25 of the two adaptations of our invention as air spaces, it should be appreciated that both of them may
75 be filled with known insulation materials if fur-

ther experimentation proves this advisable. The same is true of the interior of sealed plug 23, hence we do not wish to be understood as limiting ourselves to the use of air filled chambers only.

It is believed that our discoveries overcome the
5 urgent need existing in all industries which employ emergency vents of this general class, while at the same time providing an inexpensive means for a desired purpose. Having thus described our invention, what we claim and desire to secure by
10 grant of Letters Patent is:

1. In a fusible vent, a boss adapted to fit into the wall structure of the article to be sealed, said boss comprising inner and outer sectors, each
15 of said sectors having a plurality of complementary recesses, one pair of opposed recesses when fitted together defining an annular bore adapted to receive a fusible binding element, and the other pair of opposed recesses defining an air chamber.

2. In a fusible vent, a boss adapted to fit into the wall structure of a tank, said boss comprising inner and outer sectors, one of said sectors
20 having a plurality of complementary recesses, one pair of opposed recesses defining a bore adapted to receive a fusible binding element and the other pair of opposed recesses being adapted
25 to define a chamber between said bore and the interior of said tank.

3. In a fusible vent, a boss adapted to fit into the wall structure of a tank, said boss comprising inner and outer sectors, said sectors having
30 complementary recesses adapted to define a bore to receive a fusible binding element, and insulation means comprising an air chamber disposed in said sectors between said bore and the con-
35 tents of said tank.

4. In a fusible vent, a boss adapted to fit into the wall structure of a tank, said boss comprising inner and outer sectors, each of said sectors
40 having a plurality of complementary recesses, one pair of opposed recesses defining an annular bore adapted to receive a fusible binding element, other pairs of opposed recesses defining intake and outlet orifices in communication with the said
45 bore, and another pair of said recesses defining an air chamber between said bore and the interior of said tank.

5. In a fusible vent, a cap threaded interiorly and adapted to engage a threaded spout, a conical-shaped orifice in said cap, an annular recess
50 about said orifice, a sealed hollow plug adapted to seat itself in said orifice and close said recess, and a fusible element in said orifice above said plug.

6. In a fusible vent, a cap threaded interiorly
55 and adapted to engage a threaded spout, an orifice in said cap, an annular recess about said orifice, a hollow plug adapted to be seated in said orifice and close said recess, and a fusible element in said orifice above said plug.
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7. In a fusible vent, a cap threaded interiorly and adapted to engage a threaded spout, an orifice in said cap, an annular recess about said
65 orifice, a hollow plug adapted to be seated in said orifice and close said recess, a fusible element in said orifice above said plug, and a breather pipe extending through said fusible element and said plug.

8. In a fusible vent, a tank having an orifice therein, a closure for said orifice, an emergency
70 orifice in said closure, and closure means for said emergency orifice including a fusible element and a self-contained insulating air chamber between said fusible element and the interior of the tank.

9. In a fusible vent, a boss adapted to fit into
75

the wall structure of a tank, said boss comprising inner and outer sectors having a plurality of complementary recesses, the outermost complementary recesses defining a bore, a fusible element in the bore, the innermost complementary recesses defining an insulating air chamber lying between the fusible element in said bore and the contents of said tank.

10 In a device of the character described, a tank having an orifice therein, a closure for said orifice, an emergency orifice in said closure, and closure means for said emergency orifice including a fusible element insulated from the contents of the tank by a closed air chamber disposed between said fusible element and the interior of the tank.

11. In a device of the character described, a tank having an orifice therein, a closure for said orifice, an emergency orifice in said closure, and closure means for said emergency orifice including a fusible element insulated from the contents of the tank by a closed air chamber lying beneath the entire area of said fusible element.

12. In a device of the character described, a tank having an orifice therein, a closure for said orifice, an emergency orifice in said closure, and closure means for said emergency orifice including a fusible retainer therefor insulated against the contents of said tank by an underlying air cell.

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