April 7, 1931. J. F. PATTERSON 1,799,565

VENT AND FLAME ARRESTER

Filed Oct. 21, 1927

Fig. 1.

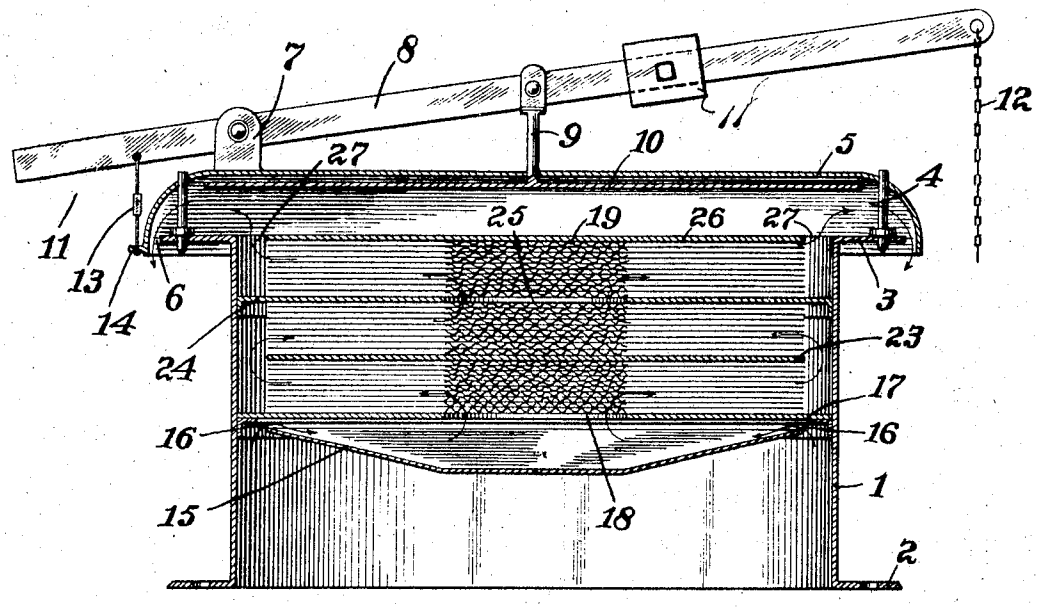


Fig. 2.

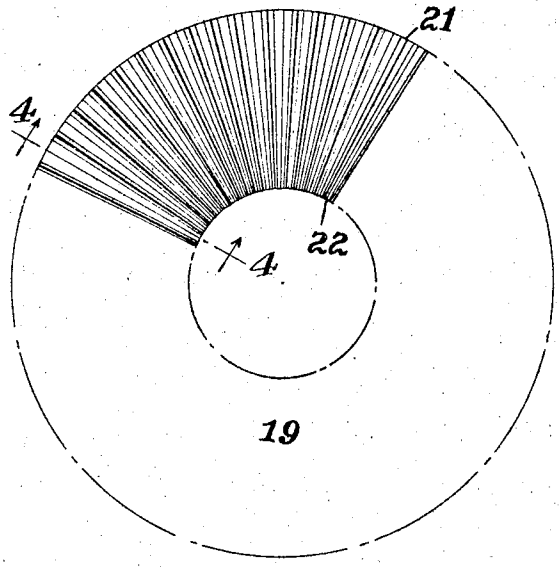


Fig. 3.



Fig. 4.



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UNITED STATES PATENT OFFICE

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VENT AND FLAME ARRESTER

Application filed October 21, 1927. Serial No. 227,830.

My invention relates to new and useful improvements in vents and more particularly to a vent for large tanks wherein there is to be stored a more or less combustible liquid.

The present vent is one that is particularly adapted for use with the form of oil tanks shown in several companion cases filed by me of even date herewith.

One of the principal objects of the invention is to provide a vent that is to be located at the top of the dome or cover of the storage tank so that when the tank is filled and emptied the air will have a free passage in and out of the tank, thereby preventing a building up of the pressure either internally or externally of the tank.

Still another object of the invention is to provide a vent that will act as a flame arrester preventing any fire from without the tank from passing within the tank.

Still another object of the invention is to provide a vent whereby the air may pass either from within the tank to the outside or from the outside of the tank to within the tank thru a tortuous passage to thereby prevent any flames from passing to within the tank.

Still another object of the invention is to provide a vent and flame arrester with a movable cover or snuffer so that should the air and gas ignite at or around the top outlet of the vent, the cover or snuffer may be either manually or automatically operated to tightly close the peripheral opening about the vent.

With these and other objects in view, the invention consists in certain new and novel arrangements and combination of parts, as will be hereinafter more fully described and pointed out in the claims.

In the drawings showing a preferred embodiment of the invention,

Fig. 1 is a sectional view of the vent or flame arrester showing the moveable snuffer in its open position,

Fig. 2 is a fragmentary detail showing a corrugated disc,

Fig. 3 is a plan view of a plain disc.

Fig. 4 is a section taken on line 4/4 of Fig. 2 with the addition of two plain discs and another corrugated disc.

Referring now more particularly to the several views, there is shown a vent consisting of an outer shell 1 which is preferably circular, this shell being formed of steel and provided with a flange 2 at its bottom so that the same may be conveniently riveted or bolted to the top of a storage tank (not shown). The upper edge of this shell is also provided with the rim or flange 3 on which is secured small supports 4 that in turn hold the fixed outer shell or cover 5 that is slightly larger in diameter than the shell 1 and its flange 3, so that there will be a space or peripherial opening 6 between the outer edge of the flange 3 and the inner surface of this cover 5.

Secured on this cover or shell 5 is the upstanding lug 7 in which is pivotally mounted the arm 8. Also pivotally secured to this arm 8 is the forked rod 9 which passes thru the cover 5 and is secured to a plate 10 which I call a "snuffer". The diameter of this plate 10 is such that when lowered, it will rest across the entire top of the shell 1 and on the flange 3, heretofore mentioned.

As shown in Fig. 1, I may provide a weight 11 on the inner end of the arm 8 so that normally the lever will be in the position shown in Fig. 1 to hold the snuffer in its open position, as also shown in Fig. 1.

A chain 12 may then be fastened to the end of the rod 8 so that in case of fire this chain may be manually operated to thus pull the snuffer or plate 10 down on its seat, for the purpose shortly to be described.

If I want the lowering of the snuffer to be automatic, I can dispense with the weight 11 at the inner end and place it on the arm 8 beyond the fulcrum point 7 and provide a fusible link 13 and connect the same to the arm 8 and to a lug 14 formed on the cover 5.

In this instance, in case of fire around the vent, the fusible link 14 will melt and the weight 11 on the arm 8, in position shown on the dotted lines, will automatically cause the snuffer 10 to descend and cover the upper surface of the shell 1.

Now to provide a tortuous passage thru

the vent and thus prevent any flames from reaching the interior of the tank and at the same time to let the air and gas pass within the tank or escape therefrom, I provide first a conical shaped disc 15 so positioned as to form a thin annular space 16 thru which the air may flow to and from the tank and which disc acts of course as a baffle plate. Above this disc is arranged a circular plate 17 provided with a central opening 18 and stacked on this plate 17 are a plurality of perforate corrugated discs 19, interposed between which are the plain perforate discs 20, as may be understood from Fig. 1 and Fig. 4. The corrugations of these discs 19 are wider at their peripherial edge 21 than they are at their inner edge 22, as may be seen from Fig. 2.

As may be seen in Fig. 1 after stacking a plurality of plain and corrugated discs, on the plate 17, I then place another plate 23 on top of this stack, so that any air or gas passing thru the peripherial opening 16 and thru the opening 18 in the plate must pass out thru the corrugations below the plate 23 as they are here baffled and pass around the peripherial edge of the plain and corrugated discs and around this plate and again travel inwardly thru a second series of similar plain and corrugated discs.

It will be understood of course that the diameter of these discs, both the plain and corrugated, and the plate 23, is less than the diameter of the shell 1 so that there will be a space for the gases to pass between the sides of the shell 1 and the peripherial edge of the baffle plate and the disc.

After placing a second series of plain and corrugated discs above the baffle 23, I then provide another baffle plate 24 which is secured about its periphery to the shell, this plate extending completely across the shell as does plate 17. This plate is provided with a central opening 25 as was the plate 17 so that the air and gases passing inwardly from the side may pass thru the corrugations in the plain and corrugated discs and then thru this opening 25 and centrally of the plain and corrugated discs where the gases must again flow thru the corrugations, as there is another baffle plate 26 at the very top of the last stack of plates.

This plate is less in diameter than the shell 1 to provide a peripherial opening 27 as may be seen in Fig. 1. As heretofore mentioned the snuffer or plate 10 when lowered, will close this peripherial opening 27.

I have indicated by arrows the tortuous paths of the air and gas thru the corrugated plates and around the several baffles so that the relationship and position of these plates will be readily understood.

The operation of the device may be either manual or automatic as heretofore pointed out. so that should any fire occur about the upper edge of the vent, the chain 12 may be pulled to close the peripherial opening 27 so that there will be no way in which the flames can even pass as far as the first stack of corrugated plates.

Also I may provide the fusible link as shown so that if for any reason the inflammable gases should ignite, the heat will melt the link and automatically cause the snuffer or plate 10 to drop and close the opening.

From the foregoing it will be seen that I have provided a vent and flame arrester that is made up of but a few parts, whereby the air and gases may normally pass thru a tortuous passage thru the vent to prevent any internal or external pressure about the tank and at the same time prevent any flames from passing thru the vent to the interior of the tank.

Finally, in case of fire, about the vent, the same may be either manually or automatically closed to thus absolutely prevent the flames from finding their way thru the flame arrester.

It will also be understood that although I have shown three series of corrugated and plain discs, a greater number might be used if desired, and additional baffle plates added between the series in the same manner as those already shown.

I am aware that it is old to form vents and flame arresters for storage tanks and do not claim my invention broadly as such.

What I do claim however and desire to secure by Letters Patent is:

1. A vent for storage tanks comprising a shell, a cover over said shell and having a peripherial opening between the shell and the cover, a plurality of discs within the shell, and baffle plates interposed between said discs to provide a tortuous passage for air thru and about said discs and baffle plates, and means in said cover for automatically closing the said tortuous passageways about said discs and baffle plates to thereby let the air pass under the cover, but not down through said baffle plates.

2. A vent for oil storage tanks comprising a shell, a plurality of corrugated and plain discs within said shell, and baffle plates interposed within the shell to provide a tortuous passage of the air thru said shell and about and thru said discs and means on top of the shell for automatically closing said passageways by cutting off the air to said baffle plates and discs.

3. A vent for oil storage tanks comprising a shell, a plurality of corrugated and plain discs within said shell, baffle plates interposed within the shell to provide a tortuous passage of the air thru said shell and escape around the peripherial upper edge of the shell and plate means for closing the passageways and the peripheral opening at the upper edge of the passageways.

4. A vent and flame arrester for oil storage tanks comprising a shell, discs and baffle plates within said shell to provide a tortuous passageway, a snuffer plate normally held in open position in said shell, and means for lowering said snuffer plate to close said tortuous passageway, a cover over said shell and supporting said snuffer plate and the snuffer plate when lowered cutting off the air from the baffle plate.

5. A vent and flame arrester for oil storage tanks comprising a shell, a series of plain and corrugated discs within the shell, a baffle plate and further series of plain and corrugated discs and a further baffle plate to provide tortuous passageways for the air thru said vent, a snuffer plate normally held in said shell and above said discs and baffle plates, and automatic means whereby said snuffer plate may be lowered to cover the top of the vent and close the said tortuous passageways at their tops.

6. A vent and flame arrester for oil storage tanks comprising a shell, series of perforate corrugated and plain discs arranged within the shell, and baffle plates interposed between the series to provide tortuous passageways for the air thru the shell, the said discs being smaller in diameter than the shell to thereby form an annular space, a plate suspended in the shell and above said discs and means whereby the same may be lowered to close said annular passageway and a cover over said shell and housing said plate and also supporting said plate whereby the same may be normally held just above said annular passageway.

7. A vent and flame arrester for oil storage tanks comprising a shell, a centrally perforate support in said shell, a stack of alternate plain and corrugated discs each having a central opening, an imperforate baffle plate interposed between said discs and a further imperforate baffle plate on the top of the stack of discs, a perforate baffle plate located in the stack below said top mentioned baffle plate, the diameters of the perforate discs and the imperforate plates being less than the diameter of the shell to provide a tangential passageway for the air thru said vent, a snuffer plate on said shell, a fulcrum lever supporting said plate, means for holding the snuffer plate normally raised and automatic means for releasing the same at the top.

8. A vent and flame arrester for oil storage tanks comprising a shell, an inwardly deposed deflector plate arranged in said shell, a series of centrally perforate plain and corrugated discs stacked within the shell, and the diameter of the discs being slightly less than the diameter of the shell to provide an annular space within the shell, imperforate baffle plates in said shell and of the same diameter as the discs, and further perforate baffle plates of greater diameter than the discs whereby the air is forced to travel thru the series of discs and about said imperforate baffle plates and thru said perforate baffle plates and means in the form of a snuffer plate extending over the top of the shell for closing the annular passageway about said series of discs and a spaced cover over said shell and supporting the means for closing the annular passageway about the said series of discs.

9. A vent and flame-arrester for oil storage tanks comprising a plurality of series of alternate disposed plain and corrugated discs, said discs being centrally perforate, a plurality of alternately arranged perforate and imperforate baffle plates, alternately disposed between the series of discs whereby passageways thru and about said discs and baffle plates are provided, a snuffer plate pivotally mounted, normally held above said discs and baffle plates and automatic means for permitting the lowering of said plate when the temperature about said vent rises above a certain degree.

10. A vent and flame arrester for oil storage tanks comprising a shell and an overlapping cover, the diameter being such as to provide an annular outlet between the cover and shell, a stack of alternately disposed plain and corrugated discs, the corrugations widening as they approach their peripherial extremity, the diameter of the discs being less than the diameter of the shell to provide an annular passageway between the disc and the shell, said disc being centrally perforate, two imperforate plates of the same diameter as the discs arranged in said stack, two baffle plates having a central opening, the diameter of the plates being the diameter of the shell, a deflector plate arranged below said disc, whereby the air is caused to flow inwardly and outwardly as it rises thru said flame arrester and means arranged under the overlapping cover for closing the top of the shell.

11. A vent and flame arrester for oil storage tanks comprising a shell with a peripherial flange at its top, a cover extending over said peripherial flange and leaving an annular passageway about said flange, an arm pivoted on said cover, a plate under said cover connected with said arm and the said plate adapted to seat on said flange when said arm is lowered, means for lowering said arm, a series of plain and corrugated discs arranged in said arrester and baffle plates interposed between certain of said discs, whereby the air is caused to flow outwardly thru some of the corrugated plates and inwardly thru the others and about said baffle plates when said snuffer plate is in its normal position.

12. A vent and flame arrester for oil storage tanks provided with discs and baffle plates whereby the air in passing thru said flame arrester must flow inwardly and out-

wardly thru the discs to escape from the vent, the said vent provided with a peripherial opening at its top, a cover extending over the discs and baffle plates and spaced therefrom, a movable plate within the cover and means mounted on the cover and extending within said cover for supporting said plate, and a lowering of the plate stopping the air from passing through said disc by closing the peripherial opening about said disc.

In testimony whereof I affix my signature.

JOHN F. PATTERSON.