Dec. 4, 1928.

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J. S. PATTEN

BREATHER COVER FOR TANKS

Filed Sept. 2, 1926

Fig. 1.

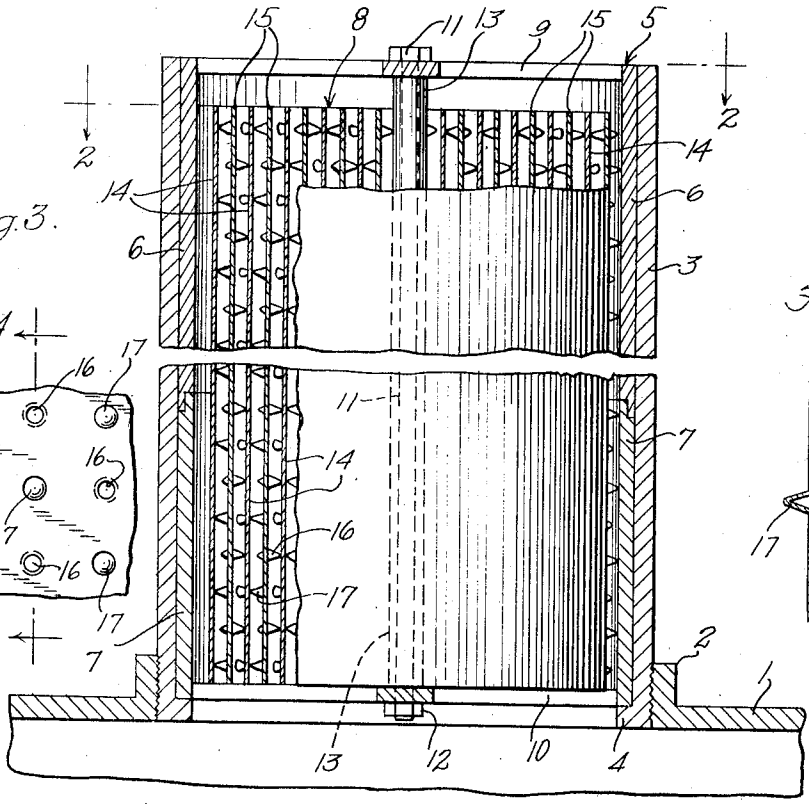



Fig. 3.




Fig. 4.

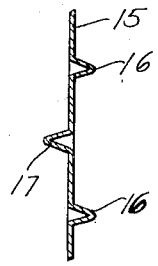
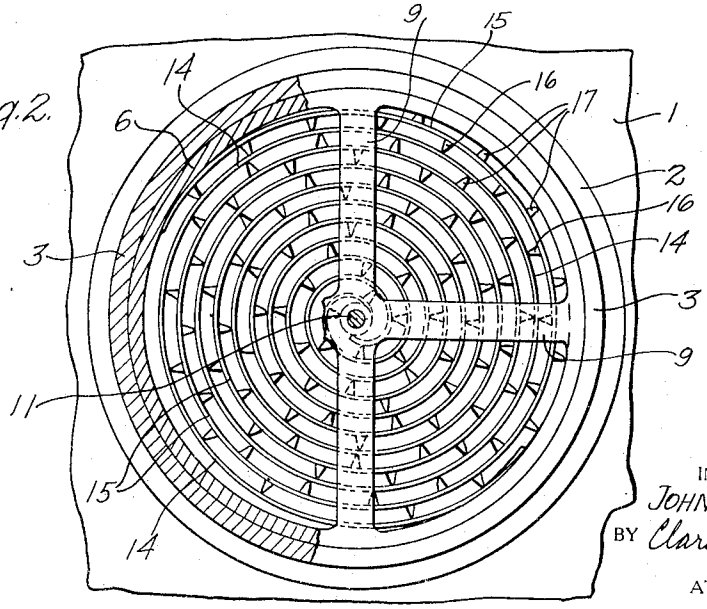



Fig. 2.




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# UNITED STATES PATENT OFFICE.

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## BREATHER COVER FOR TANKS.

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This invention relates to fire prevention means for tanks designed to carry or store material which gives off combustible or explosive gases.

In the storage of liquid fuel, for example, in oil refineries, tank transports, etc., it is necessary to vent the tank containing the fuel when the fuel is being drawn off in order to avoid creating a vacuum in the tank which would impede or prevent the withdrawal of the fuel. The provision of a vent opening, however, exposes the tank contents to danger of ignition from flying sparks or other sources of fire. The burning of such gases as may have escaped from the tank is unimportant, but the propagation of the flame to the interior of the tank is apt to cause an explosion resulting in injury or death and in serious property loss.

It is an object of the present invention to provide safety means for covering the vent openings of tanks which will prevent the propagation of a flame from the exterior to the interior of the tank.

It is a more specific object of the invention to provide a cover of this character which can be readily removed and which is light in construction, durable in use, cheap to manufacture, and more certain in operation than devices heretofore provided for like purposes.

Other objects and advantages will hereinafter appear.

In the drawings forming a part of this specification:

Figure 1 is a fragmentary, vertical section showing a cover embodying features of the present invention, applied to a tank;

Figure 2 is a horizontal section on the line 2—2 of Figure 1, parts being broken away for clearness of illustration;

Figure 3 is a fragmentary elevation of a metal sheet used in making the cover filler; and

Figure 4 is a sectional view taken on the line 4—4 of Figure 3.

The tank 1 may be of any usual construction and is provided with a vent opening in its top which is surrounded by an internally threaded, circular flange 2. In accordance with the present invention a pipe or neck 3 having an internal flange 4 at its lower end is threaded into the flange 2. The neck 3 may be of any suitable height, but is preferably about a foot and a half in height. This neck is provided as a support and holder for the safety cover to be described.

The safety cover comprises a sleeve 5 which snugly fits the neck 3 and rests on the flange 4 thereof. The sleeve 5 comprises upper and lower complementary sections 6 and 7 and contains a sheet metal filler 8. The sleeve 5 is made of a metal which is incapable of striking a spark when brought into contact with other metals, so that there is no danger of igniting the gases when the cover is being removed from the neck 3 or is being put in place thereon. Aluminum and bronze are examples of metals suitable for constructing the sleeve 5. The sections 6 and 7 of sleeve 5 are provided respectively with integral spiders 9 and 10 at their outer ends, and these spiders are connected by an axially extending bolt 11 and a nut 12 for holding the sleeve sections together. A sleeve 13 surrounds the bolt 11 and forms a core on which the sheet metal forming the filler 8 is spirally wound. The core sleeve is of sufficient diameter to obviate sharp bending of the filler sheets, so that inaccuracies which might arise from very sharp bending are avoided.

The construction and arrangement of this filler and the method of combining it with the other parts of the cover constitute very important features of the invention. As illustrated herein, the filler is made of two sheets 14 and 15 of aluminum, bronze, or other suitable material incapable of striking sparks. The sheet 14 is of plain sheet stock, whereas the sheet 15, which is illustrated in detail in Figures 3 and 4, is formed with spacing burrs or humps 16 and 17 projecting respectively from the inner and outer faces of said sheet. The burrs serve to space the sheets from one another, but are short enough so that the space between the sheets is quite narrow.

In manufacturing the cover, the flat and burred sheets 14 and 15 are first superposed, and are then wrapped together upon the sleeve 13 as a core to form a filler of the diameter required to snugly fit the sleeve 5. The sleeve sections 6 and 7 are then placed over the filler in interfitting relation, and are secured together by passing the bolt 11 through the spiders 9 and 10 and through the core sleeve 13, and by securing the nut 12 upon the threaded end of the bolt 11. The filler is slightly shorter than the sleeve

5, leaving room for the cover to be gripped by the arms of the upper spider 9 for lifting it.

The filler sheets are very accurately spaced by this method of construction and are held permanently in this relationship by the snugly fitting sleeve 5. They are not subject to disarrangement or damage of any kind which would impair their operation, because they are housed and protected by the sleeve 5 and because they do not depend upon soldering, welding, or other extraneous holding means for maintaining them in correctly assembled relationship.

The spiral space between the sheets is of substantially uniform width and the filler is of such length that a flame cannot be forced through even when considerable pressure is applied. In this connection it is a particular feature that the spaces between the sheets extend longitudinally of the sleeve 5, and that a flame must traverse these narrow spaces for substantially the entire length of the cover before it can enter the tank.

The manufacture of the cover is very simple, due to the fact that the filler consists only of the two metallic sheets, and due further to the fact that these sheets are self-positioning in the winding of the filler. There are not, therefore, a multiplicity of parts to be assembled, nor are there any operations in the assembly requiring extraordinary care or skill. The filler 10, in fact, can be completely manufactured by very simple automatic machinery.

Variations may be resorted to within the scope of the invention and parts of the improvements may be used without others.

I claim:

1. In a flame arresting breather cover for tanks, in combination, a core, a burred imperforate metallic sheet wrapped in volute spiral form thereon, and an imperforate sleeve surrounding and snugly fitting the outermost turn of said sheet.

2. In a flame arresting breather cover for tanks, in combination, a hollow core, a burred metallic sheet spirally wound thereon, complementary sleeve sections encasing said sheet, spiders at the outer ends of said sleeve section, and a bolt passed centrally through said spiders and through said hollow core for holding the parts in assembled relationship.

3. In a flame arresting breather cover for tanks, in combination, a core, a burred metallic sheet wrapped in volute spiral form thereon, imperforate sleeve sections surrounding and snugly fitting the outermost turn of said sheet, means forming a handle at the upper end af said cover, and means connecting the lower sleeve section to said handle.

4. In a flame arresting breather cover for tanks, in combination, a core, a plain metallic sheet wound in volute spiral form on the core, means spacing adjacent turns of said sheet uniformly from one another, and an imperforate sleeve surrounding the sheet and retaining it against unwinding or slackening.

5. In combination, a tank, an upstanding, cylindrical neck on said tank having an internal flange at its lower end and a removable flame arresting breather cover insertable in said neck, comprising a cylindrical shell formed to snugly fit the neck and rest upon the flange thereof, and a flame arresting filler in said shell.

6. In combination, a tank, an upstanding, cylindrical neck on said tank having an internal flange at its lower end and a removable flame arresting breather cover insertable in said neck, comprising a cylindrical shell formed to snugly fit the neck and rest upon the flange thereof, and a spirally wound sheet metal filler fitting said shell and providing long, narrow air passages extending longitudinally for substantially the entire length of the shell.

In testimony whereof I have affixed my signature to this specification.

JOHN S. PATTEN.