

Sept. 15, 1925.

1,553,395

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SAFETY FILLING TUBE

Filed Feb. 21, 1924

Fig. 1.

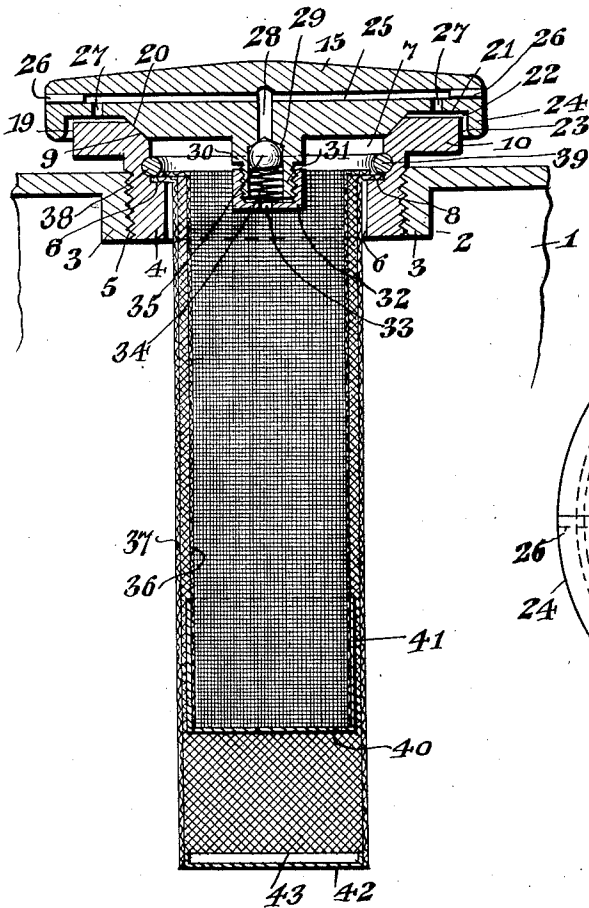
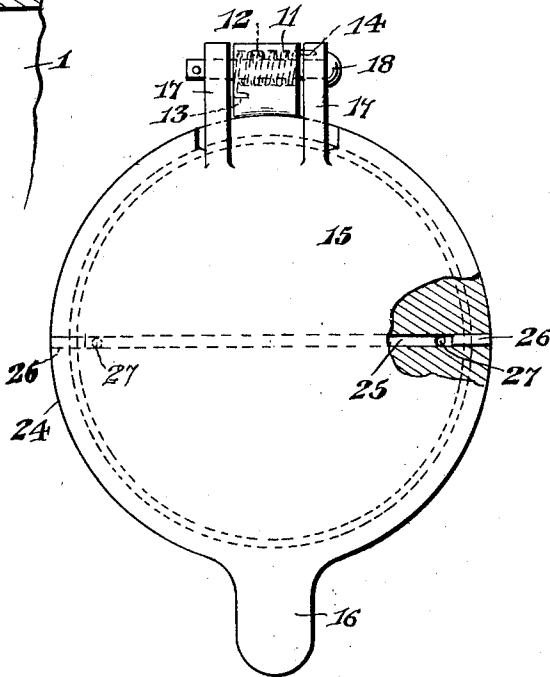


Fig. 2.



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Patented Sept. 15, 1925.

1,553,395

UNITED STATES PATENT OFFICE.

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SAFETY FILLING TUBE.

Application filed February 21, 1924. Serial No. 694,299.

To all whom it may concern:

Be it known that we, NICHOLAS D. RESSLER and JOHN M. CALDWELL, citizens of the United States, residing at Corry, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Safety Filling Tubes, of which the following is a specification.

This invention relates to safety filling tubes for use in receptacles used to store gasoline, benzine, naptha and other highly inflammable liquid.

The primary object of this invention is the provision, in a manner as hereinafter set forth, of a safety filling tube adapted to be inserted through the filling opening of tanks containing inflammable liquid, having means for preventing the gases from the fluid from becoming ignited and passing into the tank to ignite the fluid and cause the container to explode.

A further object of this invention is the provision, in a manner as hereinafter set forth, of a safety tube for use in connection with tanks containing highly inflammable liquid, having a cap so constructed that the vapor of the fluid in the tank will be prevented from escaping when the cap is closed and having further means whereby air will be automatically admitted to the tank when the internal air pressure of the tank falls below the external atmospheric pressure.

A still further object of the invention is the provision, in a manner as hereinafter set forth, of a safety filling tube for use in tanks containing highly inflammable fluid, the top of which is constructed to automatically admit air to the tank and to prevent the escape of the vapor from the tank and is further designed in such a manner that it is impossible for water or other foreign matter to enter the tank through the air inlet.

A still further object of the invention is the provision, in a manner as hereinafter set forth, of a safety filling tube for use in connection with tanks containing highly inflammable liquid, having means whereby any water, which might find its way into the filling tube when the top is open, will be trapped and prevented from entering into the tank and mixing with the fluid therein and also has means for preventing scale, lint or other foreign substance from entering the tank when the cap of the tube is open.

The final object of the invention is the provision, in a manner as hereinafter set forth, of a safety tube for tanks containing inflammable liquid, which may be easily and readily applied to any tank having the ordinary filling opening, which has few movable parts, is a unitary structure, neat, efficient, and inexpensive to manufacture.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming part of this specification, with the understanding that the invention is not confined to any strict conformity with the showing of the drawings, but may be changed and modified so long as such changes and modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawings:

Figure 1 is a longitudinal sectional view of the device embodying this invention, shown as positioned in the filling opening of a container.

Figure 2 is a top plan view of the device, a portion thereof being broken away to show certain interior construction.

Referring now to the drawings in detail wherein like numerals of reference indicate corresponding parts in the views shown, numeral 1 indicates a portion of a tank shown in section, the section being taken through the depending annular flange 2 which is provided with screw threads 3 upon its inner face and which forms the filling opening of the tank. This construction indicates generally any form of tank and filling opening.

The device embodying this invention comprises an annular body portion 4 peripherally screw threaded as at 5. This body 4 is open through its center, the internal diameter of the body at the lower portion 6 is less than the diameter of the upper portion 7 and there is formed between the vertical walls of the upper and lower portions 6 and 7 the annular ledge 8. The top edge of the upper portion 7 is bevelled outwardly to form the seat 9, and the body 4 has extending at right angles therefrom and at the top the outstanding annular flange 10.

Formed integral with the annular flange 10 of the body 4 is a lateral extension 11 having an aperture extending transversely therethrough, in which aperture there is po-

sitioned a helical spring 12 having one end 13 fixed in the extension 11 and the other end 14 secured in a manner hereinafter to be described.

Adapted to be fitted over the top of the body 4 and the flange 10 is a circular cap 15 having extending from one side edge a finger hold 16 and at the other side diametrically opposite from the finger hold 16 is a pair of spaced laterally extended ears 17, which ears 17 are formed in such a manner that they will be positioned one on either side of the extension 11 carried by the body flange 10. Each of these extensions has an aperture therethrough which when the cap 15 is in place is in alinement with the passage in the extension 11 in which the spring 12 is placed. A pivot pin 18 is passed through the ears 17 and the extension 11 to form a pivotal bearing between the two members. The other end 14 of the spring 12 is fixedly secured in one of the ears 17 as is clearly shown in Figure 2 so that, when the cap 15 is raised the spring will be twisted and placed under tension, and when the cap is released the spring will force the cap down into position over the top of the body 4.

As is clearly shown in Figure 1 the cap 15 is of substantial thickness and there is formed in the under surface of the cap the annular channel 19, the inner wall of this channel being bevelled downwardly and inwardly as at 20 at an angle equal to the angle of the bevelled surface 9 formed in the body 4. This bevelled surface of the inner wall of the channel 19 is adapted to seat upon the seat formed by the bevelled surface 9 in the body of the cap. However, this surface 20 is not cut in far enough to allow the top 21 of the channel 19 to seat upon the surface of the flange 10. There is, therefore, formed a space 22 between the top of the channel and the surface of the flange 10. There is also formed a space 23 between the periphery of the flange 10 and the inner side of the flange 24 which is formed around the edge of the cap 15. The purpose of these spaces will shortly become apparent.

Extending transversely through the diametrical center of the body of the cap there is formed a passage 25 each end of which is closed by means of a plug 26. This passage, by means of the short connecting passages 27 located one near the inner end of each plug 26, communicates or opens through the top of the channel 19 into the passage 22 formed between the top of this channel and the top of the flange 10 when the cap is down. The central part of the passage 25 also communicates with a centrally positioned passage 28 which opens into a larger passage 29 through a depending extension 30 formed at the center of the under side of the cap 15. This depend-

ing extension 30 has a reduced terminal portion 31 which is screw threaded peripherally as shown to receive thereover a cap 32 having a central aperture 33 therethrough, this cap acting to retain in the passage 29 a spring 34 which in turn supports a ball 35 seating against the shoulder formed between the passages 28 and 29 and acting as a ball valve to close the passage 28 against the escape of any substance from the under side of the cover, but allowing air to enter through the passages 23, 22, 27, 25 and 28 into the container in which the body 4 is threaded.

Depending from within the body 4 is a pair of nested wire gauze cylinders of substantial length as indicated at 36 and 37, and as shown, the gauze of the cylinder 36 is of finer mesh than the gauze of the cylinder 37. The upper end of each of the cylinders 36 and 37, is turned outwardly at right angles to form an annular wire flange about the top edge of each cylinder, the flange of the cylinder 37 resting upon the ledge 8 in the body of the device and the flange of the cylinder 36 resting upon the flange of the cylinder 37. Thus the cylinders one within the other are suspended from the ledge 8 through the lower portion 6 of the body 4, into the container in which the body is threaded. The wall of the portion 7 has formed therein an annular recess 38 positioned slightly above the ledge 8 and in this recess there is sprung a resilient spring 39 which acts to prevent the lower cylinder from becoming displaced.

Surrounding the lower open end of the inner cylinder 36 is a metal cap having the bottom 40 and the side 41 which extends upwardly a substantial distance about the outer surface of the cylinder 36. Positioned within the lower end of the cylinder 37 and closing the same, is a shallow metal body having the bottom 42 and the upstanding wall 43 which is positioned inside of the cylinder 37 instead of enclosing the cylinder as does the wall 41 the cap 40. This cap 42 is much shallower than the cap 40 as is shown. In the use of this device the usual cap which is threaded into the filling opening of the receptacle is removed and the body 4 carrying with it the cylinders 36 and 37 and the cap 15 is screwed into the opening as is shown. The spring 12 normally acts to keep the cap down causing the inclined surface 20 to seat upon the seat 9 of the body of the device. When the cap is in this closed position the receptacle is tightly closed. The ball valve 35 pressing upwardly against the seat formed between the passages 28 and 29 effectually prevents any gases from escaping from the cylinder, but as the contents of the cylinder is drawn therefrom a vacuum is gradually formed and when the pressure within the tank falls below the atmospheric

pressure on the outside of the tank the air from the outside will pass through the passages 22, 23, 27, 25 and 28 and force the ball valve downwardly and allow air to enter through the passage 29 and the aperture 33 in the cap 32 to balance the pressure between the inside and the outside of the tank. This is the only time in which the outside air can get into the tank, and then only air passes in, none of the gases in the tank escaping therefrom.

When the tank is to be filled, the device is not removed from the filling opening, but the cap 15 is raised and the discharge nozzle of the delivery tube which is to deliver the liquid to the tank is directed into the gauze cylinder 36. The liquid as it enters the tank is strained through these cylinders, the first cylinder being of fine mesh stopping all foreign substance from entering the tank. The caps 40 and 42 will naturally be filled with the fluid and any foreign substance and any water which may be in the liquid being directed into the tank will be caught in these caps.

Beside the straining action performed by these cylinders 36 and 37, they also act to prevent any explosion of gases which will be escaping from the tank at the time that the tank is being filled. These gauze cylinders act upon the same principle as do the Davey safety lamps, and should the vapor upon the outside of the tank become ignited, the flame will not pass through the gauze for the heat will be dissipated so rapidly by the gauze cylinders that the vapor within the tank will not be raised to ignition point and therefore an explosion of the tank will be averted.

From the foregoing description it may be seen that a safety tube is provided which has many other advantageous features beside the primary feature of preventing explosion of the tank contents.

Having thus described our invention, what we claim is:

1. A safety filling device for containers of inflammable liquids, comprising a tubular body member of greater internal diameter at the upper portion than at the lower portion and peripherally threaded about the lower portion for insertion into the filling opening of the container, an annular ledge formed within the body between said upper and lower portions, the wall of said upper portion being bevelled to form a closure seat, a cap provided with air inlet ports, connected to said body member, said cap having an annular recess in the under surface to fit over the top of said body, the inner wall of said recess being bevelled to rest upon said seat and close said body member, valve means carried by said cap and connected with said ports for controlling the supply of air to said container, and nested spaced

foraminous tubes suspended from said ledge and acting to prevent accidental ignition of the gases in the container.

2. A safety filling device for containers of inflammable liquids comprising, a tubular body member peripherally threaded for insertion into the filling opening of the container, means to provide a closure seat at the top of said body, a flanged cap provided with air inlet ports and connected to and overlapping said body member and further provided on its inner face with a closure means for engaging said seat, valve means carried by said cap for controlling the supply of air to the container, and nested spaced foraminous tubes carried by said body member for preventing accidental ignition of the gases in the container, said air inlet ports opening out upon the under side of said cap outwardly of said seat to prevent accidental entrance of undesired matter.

3. A safety filling device for containers of inflammable liquids comprising, a tubular member of greater internal diameter at the upper portion than at the lower portion and peripherally threaded for insertion into the filling opening of the container, an annular ledge formed within the body between said upper and lower portions, the wall of said upper portion being bevelled to form a closure seat, a cap provided with air inlet ports connected to said body member, said cap having an annular recess in the under surface to fit over the top of said body, the inner wall of said recess being bevelled to rest upon said seat and close said body member, valve means carried by said cap and connected with said ports for controlling the supply of air to said container, and nested spaced foraminous tubes suspended from said ledge and acting to prevent accidental ignition of the gases in the container, said air inlet ports opening out upon the underside of said cap outwardly of said seat to prevent accidental entrance of undesired matter.

4. A safety filling device for containers of inflammable liquids comprising, a tubular body member peripherally threaded for insertion into the filling opening of the container, means to provide a closure seat at the top of said body, a flanged cap connected to and overlapping said body, said cap having a bore formed transversely through the diametrical center thereof and terminating at each end inwardly of the side edge of the cap and having a vertical bore communicating with each end of said transverse bore and opening upon the under side of the cap and further having a central vertical bore communicating with said transverse bore and opening through the center of the under side of the cap, said cap further being provided on its inner

face with a closure means, located between said first mentioned vertical bores, for engaging said seat, a valve means carried by said cap for controlling the supply of air to the container through said central vertical bore, and nested spaced foraminous tubes carried by said body member for preventing accidental ignition of the gases in the container.

5 5. A safety filling device for containers of inflammable liquids, comprising a tubular body member peripherally threaded for insertion into the filling opening of the container, means to provide a closure seat at the top of said body, a flanged cap connected to and overlapping said body member, said cap having a bore formed transversely through the diametrical center thereof and terminating at each end inwardly of the side edge of the cap, and a vertical bore communicating with each end of said transverse bore and opening upon the under side of the cap and further having a central vertical bore communicating with said transverse bore and opening through the center of the under side of the cap, said cap further being provided on its inner face with a closure means, located between said first mentioned vertical bores, for engaging said seat, an inwardly opening check valve removably carried by said cap for controlling the supply of air to the container through said central vertical bore, and nested spaced foraminous tubes carried by said body member for preventing accidental ignition of the gases in the container.

6. A safety filling device for containers

of inflammable liquids comprising, a tubular body member peripherally threaded for insertion into the filling opening of the container, means to provide a closure seat at the top of said body, a flanged cap connected to and overlapping said body, said cap having a bore formed transversely through the diametrical center thereof and terminating at each end inwardly of the side edge of the cap and having a vertical bore communicating with each end of said transverse bore and opening upon the under side of the cap and further having a central vertical bore communicating with said transverse bore and opening through the center of the under side of the cap, said cap further being provided on its inner face with a closure means, located between said first mentioned vertical bores, for engaging said seat, a valve means carried by said cap for controlling the supply of air to the container through said central vertical bore, and nested spaced foraminous tubes carried by said body member for preventing accidental ignition of the gases in the container, said closure means further acting to maintain that portion of the inner face lying between the flange and the seat engaging means, from contact with the top of the body member to allow for entrance of the air through the under side of the cap, through said end vertical bores and into the horizontal bore.

In testimony whereof, we affix our signatures hereto.

NICHOLAS D. RESSLER.
JOHN M. CALDWELL.