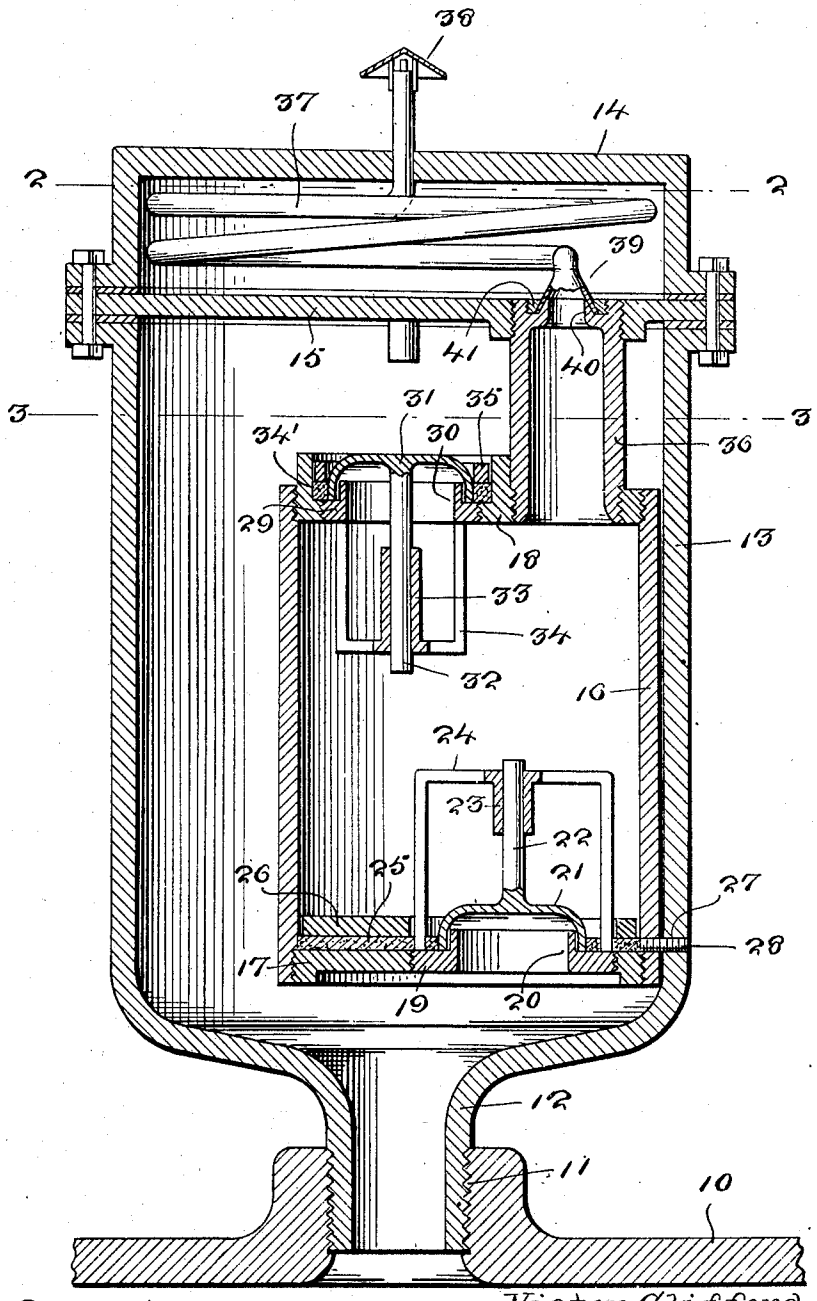
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V. CLIFFORD ET AL.

SAFETY APPLIANCE

Original Filed Jan. 27, 1923



E. R. Ruppert.

WITNESS:

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UNITED STATES PATENT OFFICE.

VICTOR CLIFFORD AND EUGENE KIBELE, OF TULSA, OKLAHOMA, ASSIGNORS, BY DIRECT AND MESNE ASSIGNMENTS, TO CLIFFORD MANUFACTURING COMPANY, OF TULSA, OKLAHOMA, A CORPORATION.

SAFETY APPLIANCE.

Application filed January 27, 1923, Serial No. 615,322. Renewed October 20, 1924.

To all whom it may concern:

Be it known that we, VICTOR CLIFFORD and EUGENE KIBELE, citizens of the United States, residing at Tulsa, in the county of Tulsa and State of Oklahoma, have invented new and useful Improvements in Safety Appliances, of which the following is a specification.

This invention relates to valves of the safety vent type and is especially designed for use upon tanks or containers for hydrocarbons.

Considerable loss is experienced from hydrocarbon containers due to evaporation and as this evaporation is greatest in fresh oil, the loss is heavy as it represents the most valuable oil product, namely light gasoline, which passes off in the form of vapor.

Various attempts have been made to conserve this vapor, but as it is necessary to provide a vent or escape valve for the container to relieve pressure and to prevent the formation of a vacuum, these attempts have been unsuccessful. In addition, these vent valves are subject to the corrosive action of the vapors and frequently become "frozen" and therefore inoperative.

The present invention aims to overcome the above and other disadvantages by the provision of a vent valve which will be at all times properly lubricated to insure its positive operation and which will automatically act to permit the escape of only sufficient vapor to relieve dangerous pressure, and which will also act to relieve a vacuum, so that oil may be pumped into the tank without danger of bursting said tank and drawn therefrom without danger of the tank collapsing.

Another object of the invention is the provision of means whereby the tank may be opened to the atmosphere to permit of the escape of excess vapor pressure without danger of fire from a "flash back".

With the above and other objects in view, the invention further includes the following novel features and details of construction, to be hereinafter more fully described, illustrated in the accompanying drawings and pointed out in the appended claims.

In the drawing, the figure shown represents a vertical sectional view of the valve and a fragmentary portion of a tank or container to which the valve is attached.

Referring in detail to the drawings, wherein like characters of reference denote corresponding parts, the reference character 10 indicates a portion of a tank or container such as is ordinarily used for holding hydrocarbons, such as crude oil and its products and may represent a flow tank, a storage tank, or a container of any description. The container is provided with a threaded opening 11 into which is screwed a reduced portion or nipple 12 which extends from a casing 13. This casing houses the improved vent valve and is provided with a cap 14 which is removably attached thereto. Clamped between the upper end of the casing 13 and its cap 14 is a plate 15 which provides a partition so as to divide the casing into separate compartments, suitable packing being interposed between the plate 15 and the casing and cap.

Located within the casing 13 is an inner valve casing 16 which is provided at its opposite ends with heads 17 and 18, the said heads being threadedly engaged with the casing 16. The head 17 is provided with a threaded opening which receives a disk 19 having a flanged opening 20 therein, the said disk providing a seat for a valve member 21. This valve member is cup-shaped and has extending therefrom a stem 22 which operates in a guide sleeve 23 carried by a spider or cage 24. The valve member 21 serves to normally close the opening 20 and is adapted to be automatically lifted by vapor pressure within the container 10 so as to permit of the escape of this pressure through this opening. The point at which the valve member operates may be regulated by the weight of the said member so that the valve member of a certain weight may be provided to permit of the escape of pressure when the latter reaches a predetermined degree.

In order to insure operation of the valve member 21 and to prevent its "freezing" through the action of the corrosive vapors, there is provided an absorbent member 25 which is supplied with a suitable lubricant and against which the valve member is adapted to rest. A weight 26 of suitable form rests upon the member 25, so that the lubricant will be slowly squeezed from the absorbent member to lubricate the valve member 21 and its seat. Additional lubri-

cant may be supplied to the member 25 through an opening 27 which is normally closed by a plug 28.

The head 18 at the opposite end of the inner valve casing 16 is also provided with a threaded opening which receives a disk 29. This disk is also provided with a flanged opening 30 and forms a seat for a cup-shaped valve member 31 which is adapted to open in the same direction as the valve member 21. The valve member 31 has a stem 32 extending therefrom which is guided in a sleeve 33 and the latter is carried by a spider or cage 34 which extends from the disk 29. An absorbent member 34′ surrounds the valve member 31 and supports a weight 35, so that lubricant will be supplied to the valve member 31 after the manner described in connection with the valve member 21. Fresh lubricant may be supplied to the absorbent member 34′, by removing the cap 14 and the partition 15.

Extending from the head 18 is a sleeve or thimble 36 which connects said head with the partition 15. This sleeve or thimble is open at each end and has one end in communication with a coil 37 positioned within one compartment of the casing 13, the opposite end of the said coil passing through the head 14 and being open to the atmosphere, while spaced from this open end is a cap or shield 38. The end of the coil 37 which connects with the sleeve or thimble 36 is flared as shown at 39 and engages around a beveled nipple 40, being secured in place by an internally beveled threaded clamping ring 41.

It will be apparent from the foregoing description and accompanying drawings that the invention provides a passage which establishes communication between the interior of the container 10 and the atmosphere, the said passage being normally closed by the valve members 21 and 31, the weight of the said members being regulated in accordance with the use for which they are intended, that is, in accordance with the degree of pressure and the amount of suction at which they will operate, so that the passage is normally closed. When pressure within the container reaches a predetermined degree, it will lift the valve member 21, so that excess pressure will escape through the passage and out through the end of the coil 37, the valve member 21 automatically seating by its own weight as soon as this excess pressure is relieved. Thus it will be impossible for sufficient vapor pressure to form within the tank to render the same dangerous. Conversely, oil may be drawn from the tank in any quantity and the formation of a vacuum within the tank prevented, the valve member 31 unseating against its own weight as soon as suction becomes sufficiently strong through the passage. Thus, danger of bursting the tank by excess pressure due to the formation of vapor or the pressure of pumping oil into the tank is avoided, or collapsing of the tank due to the formation of a vacuum. While an unobstructed passage between the valve member 31 and the atmosphere is provided, danger of a flash back and consequent fire from without is prevented by the coil arrangement at the outer end of the passage.

The invention is susceptible of various changes in its form, proportions and minor details of construction and the right is herein reserved to make such changes as properly fall within the scope of the appended claims.

Having described the invention what is claimed is:—

1. The combination with a container having a vent opening therein, of a casing secured over the opening and provided with a passage therethrough which is open to the atmosphere, spaced valves included in said casing and normally closing said passage, one of said valves being responsive to pressure and the other responsive to a vacuum within the casing and weight controlled means for supplying lubricant to the valves for preventing corrosion.

2. The combination with a container having a vent opening therein, of a casing secured over the opening and provided with a passage therethrough which is open to the atmosphere, spaced valves included in said casing and normally closing said passage, one of said valves being responsive to pressure and the other responsive to a vacuum within the casing and a coil included in the outer end of the passage to prevent a flash back.

3. The combination with a container having a vent opening therein, of a casing secured over the opening and provided with a passage therethrough which is open to the atmosphere, spaced valves included in said casing and normally closing said passage, one of said valves being responsive to pressure and the other responsive to a vacuum within the casing and an unobstructed coil included in said passage between the valves and the outer extremity of the passage.

In testimony whereof we affix our signatures.

VICTOR CLIFFORD.
EUGENE KIBELE.