Feb. 17, 1942. M. C. SNYDER 2,273,737

VENT DEVICE FOR GASOLINE CONTAINERS AND THE LIKE

Filed Dec. 30, 1939

Fig. 1.

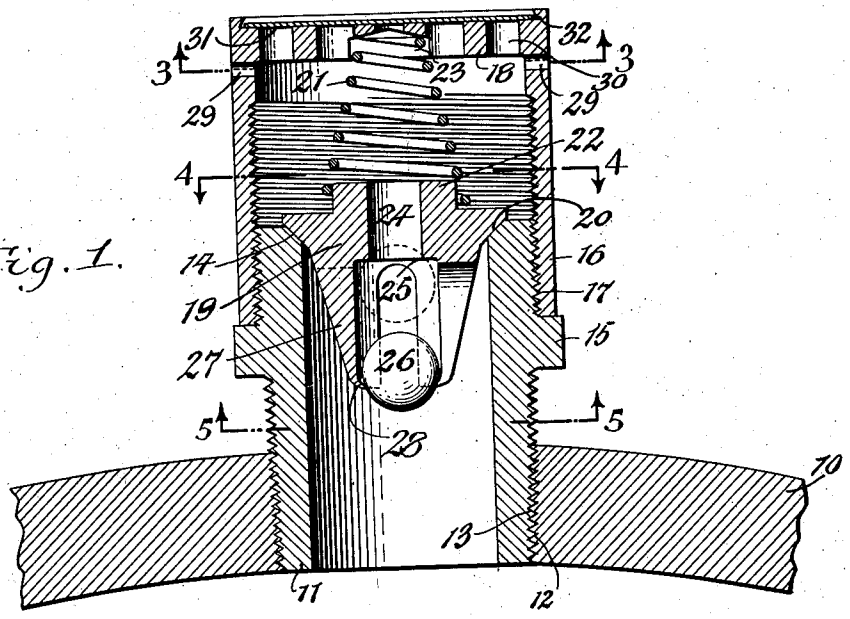


Fig. 2.

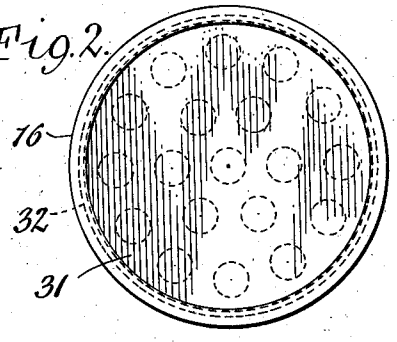


Fig. 3.

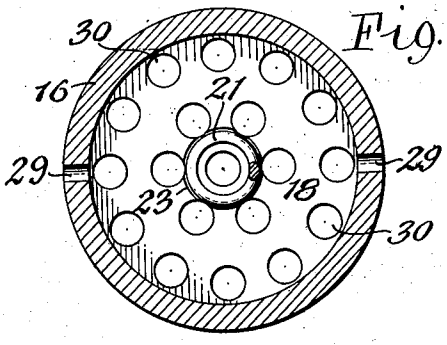


Fig. 4.

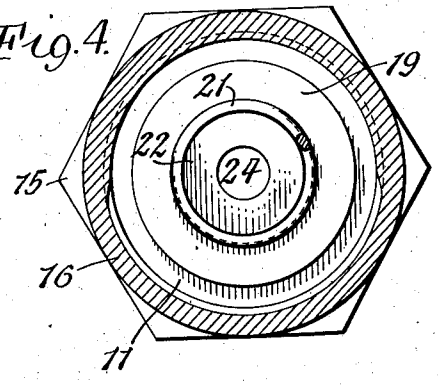
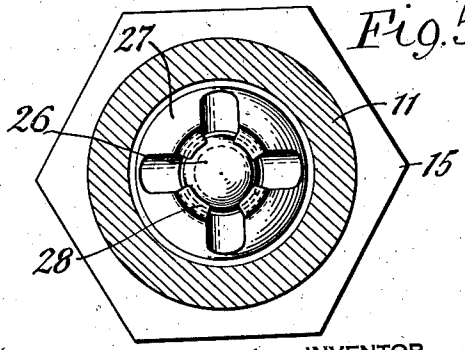


Fig. 5.



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Patented Feb. 17, 1942 2,273,737

UNITED STATES PATENT OFFICE

2,273,737

VENT DEVICE FOR GASOLINE CONTAINERS AND THE LIKE

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Application December 30, 1939, Serial No. 311,913

1 Claim. (Cl. 277—71)

This invention relates to a vent device which is more particularly intended for use in connection with gasoline containers although the same may also be used advantageously in connection with containers of other materials which are subject to similar conditions.

The tanks usually employed for storing gasoline on automobiles, trucks or the like are usually provided on the top with a vent opening or passage so as to permit the liquid level to rise and fall in the tank as the latter is filled and emptied during the operation of the car. It has been found by experience that when these tanks are tipped more or less in case of an accident to the cars that the contents of the containers is spilled and cause considerable damage in case this gasoline is ignited. When a fire results from such ignition of the gasoline there is the further danger of the container exploding when the same is heated by the flames of the fire, whereby the gasoline is spread while burning and often produces a hazardous and dangerous condition and the loss of much property.

It is the object of this invention to provide a vent device of simple, inexpensive and efficient construction for gasoline containers and the like whereby air can flow freely into and out of the container while drawing liquid therefrom and replenishing the same with liquid, which will automatically check or prevent the escape of gasoline or the like from the container in the event that the same is tipped and thus prevent fire and which provides additional relief in case unusual pressure is created in the container due to heat and thereby avoids exploding the container and scattering the gasoline.

In the accompanying drawing:

Fig. 1 is an enlarged vertical section of a satisfactory form of this invention.

Fig. 2 is a top plan view thereof.

Figs. 3, 4 and 5 are horizontal sections on the correspondingly numbered lines in Fig. 1 and looking in the direction of the arrows associated with the respective lines.

In the following description similar characters of reference indicate like parts in the several figures of the drawing.

The numeral 10 represents the wall of a container in which gasoline or any similar liquid is stored and in which the level of the same varies due to withdrawing liquid from the container and refilling the latter with liquid as occurs in the gasoline storage tank of an automobile which is in use.

On the upper part of this wall is mounted a vent device which embodies the present improvements and which is constructed as follows:

The numeral 11 represents the body of the vent device which has generally the form of an upright tube and has its lower end secured in an opening 12 in the container wall by means of an external screw thread 13 on the body. At its upper end the body is provided with an upwardly facing safety valve seat 14 which is preferably of conical form and between its lower and upper ends this body is provided with an external annular collar 15.

Above the body is arranged a cap or hollow dome comprising a cylindrical side wall 16 secured at its lower end to the upper end of the body by a screw joint 17 and provided at its upper end with a head or crown 18. Upon screwing the cap downwardly so that the same bears against the collar 15 of the body the head of the cap will be spaced the desired distance from the upper end of the body. The body 11 and the cap 16, 18 form the main part of the tubular housing of this vent device.

Within the cap is arranged a vertically movable valve disk 19 which is provided on its marginal part with a peripheral annular flange having a downwardly facing safety valve closure 20 which is adapted to engage with and disengage from the safety valve seat 14 on the body. Normally this safety valve closure is yieldingly held downwardly in engagement with the safety valve seat by spring means consisting preferably of a coil spring 21 arranged in the cap bearing at its lower end against the upper side of the valve disk 19 while its upper end engages the underside of the cap head or crown. This spring is maintained centrally within the cap by a central boss 22 arranged on the upper side of the valve disk and projecting into the lower coils of the spring 21 while the upper coils of this spring project into a central pocket 23 on the underside of the cap crown.

A check valve controlled vent port 24 extends vertically through the central part of the valve disk 19, the lower end of which port forms a downwardly facing check valve seat 25. The latter is adapted to be engaged by a vertically movable check valve 26 having preferably the form of a metal ball which normally drops by gravity away from the check valve seat so as to uncover the vent port 24. This check valve is guided to and from said check valve seat by a plurality of upright guide arms 27 depending from the underside of the valve disk around the vent port and provided at their lower ends with

inwardly projecting stops or fingers 28 which are engaged by the ball valve 26 in its lowermost position and prevent this valve leaving the space between these arms.

Adjacent to the upper end of the cap its side wall is provided on diametrically opposite sides with normal vent openings 29 of comparatively small size.

The head or crown of the cap is provided with a group of emergency relief openings 30 which are distributed over this head so that in effect it forms a screen. This screen normally is covered by a blow-off or relief disk 31 of relatively flexible or soft metal such as thin brass, copper or iron which is held on the cap so that the same can be readily displaced by pressure within the cap for uncovering said relief openings. The preferred means for thus fastening the blow-off or protecting disk to the cap which are shown in the drawing consist of an annular undercut groove 32 which receives the edge of the blow-off disk.

Under normal conditions the vent device is upright and its parts are in the positions shown by full lines in Fig. 1 in which the check valve 26 is lowered and unseated, the safety valve closure is lowered and seated, and the blow-off disk is held over the upper side of the relief openings.

Upon introducing liquid into the container or withdrawing liquid therefrom while the parts are in this position air passes into and out of the container in response to the falling and rising of the liquid level therein at which time the air moves through the open vent port 24, the vent openings 29 and the interior of the body and the cap.

If the container should be tipped more or less due to an accident to the car upon which the container is mounted, the check valve will automatically move against the seat 25 and close the port 24, whereby escape of gasoline from the container is prevented and the possibility of a fire is avoided.

If a pressure should be developed within the container due to heating of its contents from any cause, such for example as the effects of the fire to which the container may be exposed for a sufficient length of time, then this excess internal pressure will cause the valve disk 19 to be raised and disengage the emergency or safety valve from its seat and thus uncover the body to the full extent of its bore and permit the air and gases in the container to escape into the cap. Inasmuch as the normal vent openings 29 are of insufficient capacity to conduct the air and gases while under this abnormal pressure the latter by pressing against the inner side of the blow-off disk 31 disengages its edge from the undercut groove 32 of the cap and uncovers the relief or blow-off openings 30 whereby the excess pressure in the container is relieved and bursting of the latter is prevented.

The relief openings 30 in the cap are sufficiently fine and numerous that the same operate in the manner of a "Davy lamp" and prevent any flame which may exist on the outside of the container from entering the same through the vent device and thus prevent possible explosion of the container or tank if the same contained some explosible gas or liquid.

By locating the emergency relief openings on the upper side of the cap the main part of any flame produced by the burning of gas or liquid issuing from the container will be directed upward or away from the container so that the latter will not be unduly heated at such time and therefore not liable to explode. By utilizing a displaceable disk 31 as a covering for the emergency relief openings during normal conditions, water and dirt are prevented from entering the vent device and the container and possibly interfering with the proper functioning of the same. While at the same time this blow-off or protecting disk is fully exposed so that the same can be conveniently and readily wiped clean when necessary for maintaining the same in operative condition.

I claim as my invention:

A vent device for gasoline containers and the like comprising a tubular housing adapted to be connected at its inner end with a container and provided at its outer end with a vent opening and between its inner and outer ends with an outwardly facing intermediate safety valve seat, a single valve disk movable axially in said tubular housing and having a peripheral valve flange which is adapted to engage said intermediate valve seat upon moving said disk inwardly and also provided with a central port which is surrounded by an inwardly facing central check valve seat, a plurality of spaced guide arms arranged around said port and connected at their upper ends with said valve disk and forming passages between them and provided at their inner ends with stops, a ball valve arranged between the several guide arms and adapted to move outwardly into engagement with the inwardly facing valve seat surrounding said port and also adapted to move inwardly into engagement with said stops, and spring means interposed between said valve disk and the top of said housing.

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