

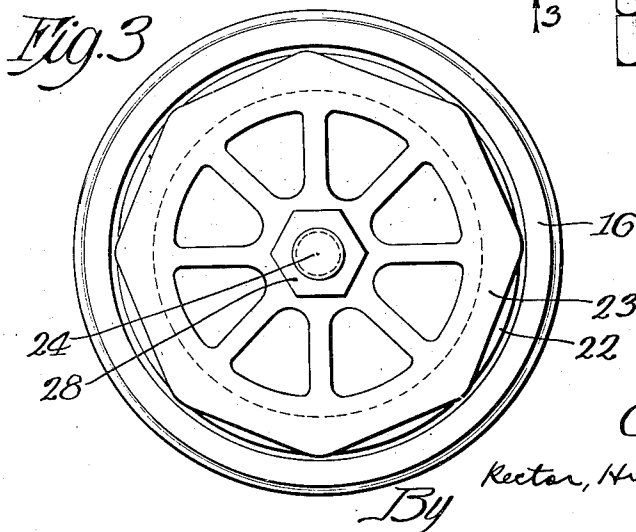
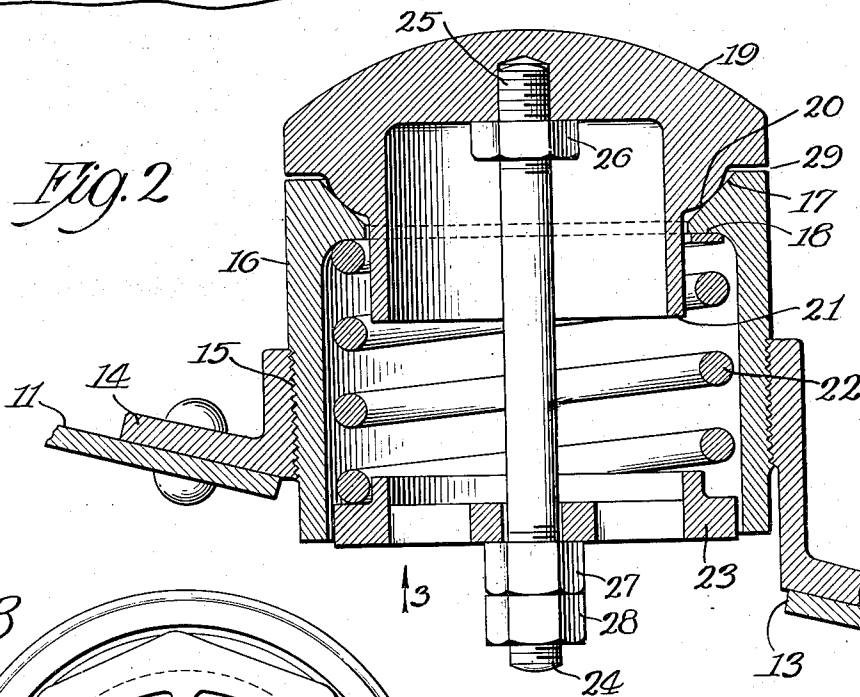
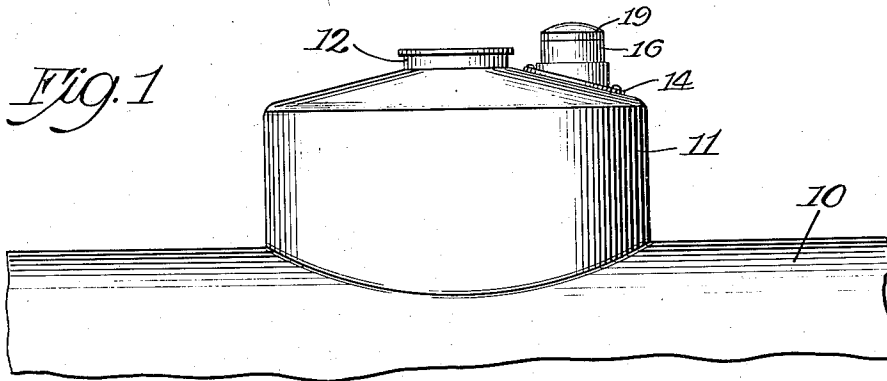
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SAFETY VALVE FOR TANKS

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SAFETY VALVE FOR TANKS

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3 Claims. (Cl. 137—53)

My invention relates to safety valves for tanks and pertains more particularly to a structure of this type which embodies several operating advantages over those now in common use.

One object of my invention is to devise a safety valve which is constructed and arranged to inhibit an accumulation of ice, snow, frost, dirt, cinders and foreign matter in general that might otherwise affect the free movement of the valve, and which is also designed to prevent the entrance of water through the valve into the tank.

A further object is to provide a valve of the character indicated which is totally free of any pocket or trap formations and which substantially presents a smooth, deflecting exterior to matter that might clog the valve.

A further object is to devise a safety valve which cannot be opened with an ordinary wrench from the outside of the valve, and which is readily interchangeable with valves of the present type.

For the purpose of illustration, my improved valve will be described in connection with a tank car, although it will be understood that the device is susceptible of wider adaptation to tanks in general and regardless of size, condition, place or character of use.

In the railway transportation of volatile, inflammable vapors and liquids, it is required that the tank car be provided with some type of a safety valve which will operate to relieve the internal pressure within the tank when this pressure rises above a predetermined setting of the valve. The present type of valve comprises a cup-like formation surrounding the valve opening which has a tendency to become clogged with dirt and cinders, or to accumulate snow and frost formations, or water which might eventually become frozen and affect the movement of the valve. Occasionally, such valves will not open at the pressure for which they are set because of such accumulations, or they may be maintained in an open position owing to the lodging of interfering matter on the valve seat, so that rain may be driven into the contents within the tank. The cup around the valve also provides a fire hazard in that it provides a receptacle for holding inflammable liquids. Another objection to the present standard type of valve is that it may be readily removed by a simple wrench in the hands of an unauthorized person, resulting in the loss of a part of the contents of the car by theft. The present invention is designed to provide a valve which positively overcomes the foregoing disadvantages as will presently appear.

These and further objects of my invention will

be set forth in the following specification, reference being had to the accompanying drawing, and the novel means by which said objects are effected will be definitely pointed out in the claims.

In the drawing:

Figure 1 is an elevation showing the dome portion of a railway tank car with my improved valve structure in position thereon.

Fig. 2 is an enlarged sectional elevation of the valve structure shown in Fig. 1.

Fig. 3 is a view of the underside of the valve structure, looking in the direction of the arrow 3 in Fig. 2.

Referring to the drawing, the numeral 10 designates a portion of a tank which is provided with the usual dome 11 having a filler cap 12. The top of the dome 11 has formed therein an opening 13 which is encircled by a flange 14 riveted to the dome 11. The flange 14 has an annular, upstanding wall which is internally threaded as at 15 to receive the valve structure as will now be described.

A cylindrical valve casing 16 is threaded in the flange 14 and is provided at its upper end with a frusto-conical valve seat 17. Beneath the valve seat 17, the casing 16 is provided with an internal shoulder 18 for a purpose presently explained. A valve 19 is mounted on the casing 16 and is provided with a valve face 20 having a convex shape and which is intended to cooperate with the valve seat 17 to close the opening into the dome 11. Preferably, the top of the valve 19 is dome-shaped, as shown in Fig. 2, and, below the valve face 20, the valve 19 may embody a depending apron 21 which serves to guide the valve 19 during its vertical movement.

The valve 19 is yieldingly held in engagement with the seat 17 by means of a helical spring 22 whose upper end abuts against the shoulder 18 and whose lower end against a follower 23 which slides freely within the casing 16. In order to maintain the follower in abutting position to the spring 22, a stud 24 passes freely through the follower 23 and its upper end is threaded as at 25 in the valve 19, a lock nut 26 serving to maintain the threaded engagement of the stud 24 with said valve. Beneath the follower 23, an adjusting nut 27 and a lock nut 28 are threaded on the stud 24, whereby any desired tension may be set up in the spring 22 in order to establish the pressure at which the valve 19 will rise and relieve the internal pressure within the tank.

My improved safety valve operates in precisely the same manner as do the safety valves now in

standard use, the valve 19 opening and closing in compliance with pressure conditions obtaining within the tank 10 and the setting of the spring 22. Its particular advantages over the present practice reside in the fact that, in the first place, the casing 16 and the valve 19 present substantially a smooth, external surface, since both these parts have the same diameter and are placed in close juxtaposition to each other. This relation of the indicated parts effectually prevents the accumulation of any foreign material in the region of the valve seat, for the surfaces of these parts operate to deflect any particles, whether of a liquid or of a solid nature, away from the valve structure. When the valve 19 is closed, as shown in Fig. 2, the abutting faces of said valve and the casing 16 are separated by an extremely narrow, annular opening 29 whose width is insufficient to permit the passage therethrough of particles having a size that would interfere with the normal operation of the valve, as well as preventing the accumulation and building up of snow, frost and ice formations within the opening.

As an additional advantage, it may be noted that, externally of the valve, there are not any parts which may be conveniently engaged by a wrench for the purpose of removing the valve structure and permitting unauthorized tampering with the contents of the tank 10. The valve is therefore largely theft-proof, as well as leak-proof against the passage of liquids either into or out of the tank. The curved nature of the valve face 20 insures the proper seating of the valve 19 at all times, regardless of any misalignment of parts arising by reason of irregularities in fit or wear.

While I have shown one set of elements and combinations thereof for effectuating my improved safety valve, it will be understood that the same is intended for purpose of illustration only and in no wise to restrict my device to the exact forms and structures shown, for many changes may be made therein without departing from the spirit of my invention.

I claim:

1. A safety valve for a tank comprising in combination, a casing having an internal shoulder extending therearound, the upper surface of said shoulder forming a valve seat and the under surface a spring seat, a valve having a face for cooperating with said seat and extending substantially to the edge of said casing, the lateral sur-

faces of the casing and valve being smooth and rounded and the top surface of the valve being smooth and dome-shaped to thereby provide a valve exterior free from pocket formations, the portions of said casing and valve outwardly from said seat and face being slightly spaced from each other in the closed position of the valve, a shouldered extension on the valve projecting into the casing beyond the internal shoulder, and a spring encircling the extension between the shoulder thereof and the spring seat for yieldingly maintaining the valve in closed position.

2. A safety valve for a tank comprising in combination, a casing having an internal shoulder extending therearound, the upper surface of said shoulder being formed as a frusto-conical valve seat and the under surface a spring seat, a valve having a convex face for cooperating with said seat and extending substantially to the outer edge of said casing, the lateral surfaces of the casing and valve being smooth and rounded and the top surface of the valve being smooth and dome-shaped to thereby provide a valve exterior free from pocket formations, the portions of said casing and valve outwardly from said seat and face being slightly spaced from each other in the closed position of the valve, a shouldered extension on the valve projecting into the casing beyond the internal shoulder, and a spring encircling the extension between the shoulder thereof and the spring seat for yieldingly maintaining the valve in closed position.

3. A safety valve for a tank comprising in combination, a casing having an internal shoulder extending therearound, the upper surface of said shoulder forming a valve seat and the under surface a spring seat, a valve having a face for cooperating with said seat and extending substantially to the outer edge of said casing, the lateral surfaces of the casing and valve being smooth and rounded and the top surface of the valve being smooth and dome-shaped to thereby provide a valve exterior free from pocket formations, the portions of said casing and valve outwardly from said seat and face being slightly spaced from each other in the closed position of the valve, a stem mounted at its upper end in said valve and having a follower plate at its lower end, and a spring encircling said stem between said plate and spring seat for yieldingly maintaining said valve in closed position.

GEORGE W. KING.