

W. E. SHARP.
SAFETY VENT FOR TANK CARS.
APPLICATION FILED JUNE 16, 190..

1,056,842.

Patented Mar. 25, 1913.

2 SHEETS—SHEET 1.

Fig. 1

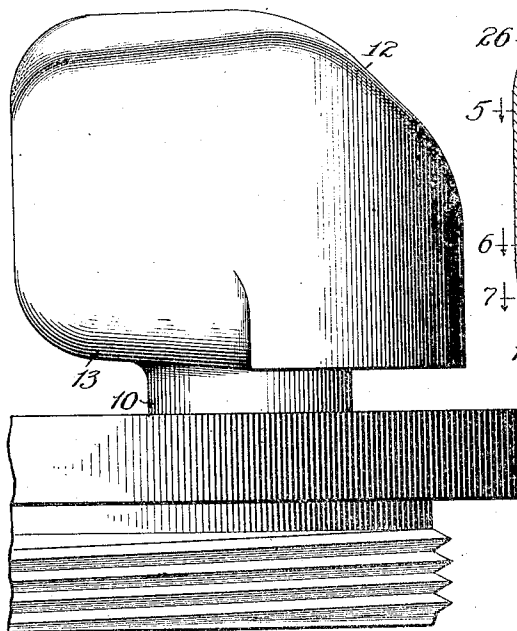


Fig. 2.

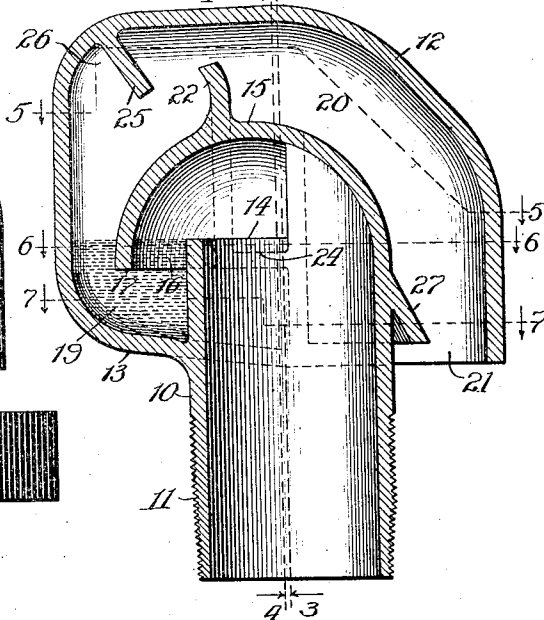


Fig. 3.

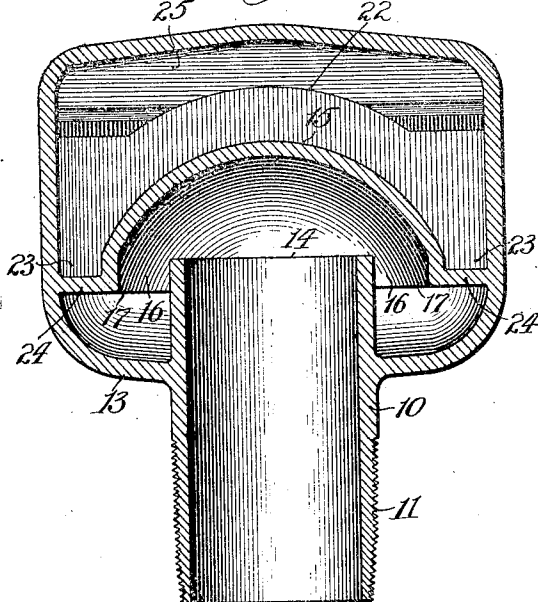
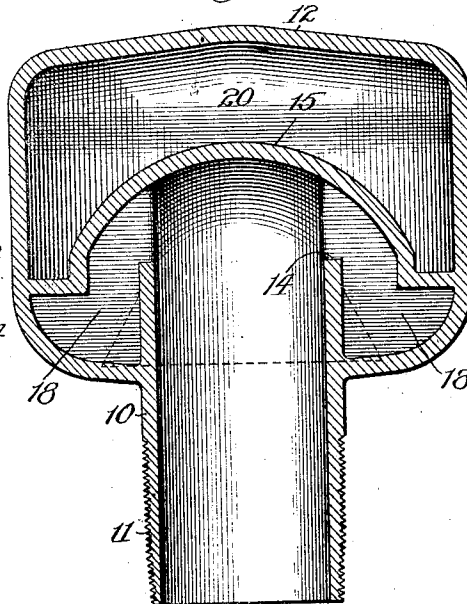


Fig. 4.



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Fig 5

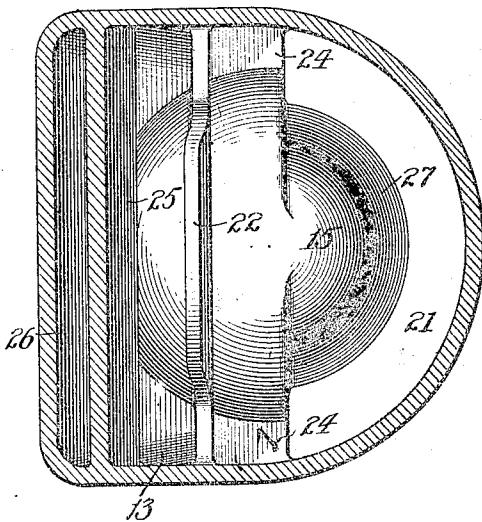


Fig 6

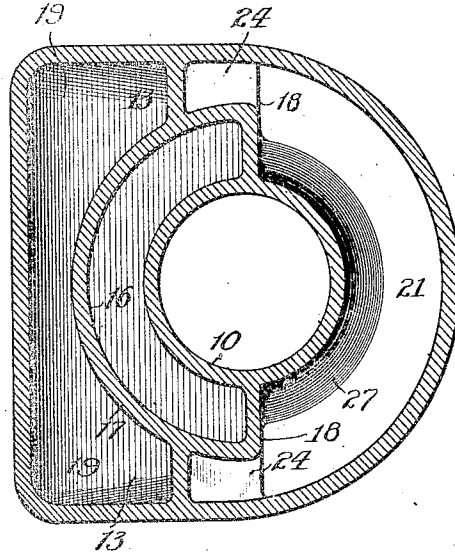
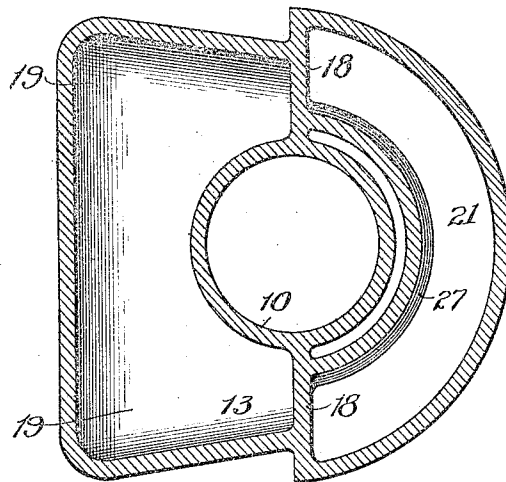


Fig 7



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UNITED STATES PATENT OFFICE.

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SAFETY-VENT FOR TANK-CARS.

1,056,842.

Specification of Letters Patent.

Patented Mar. 25, 1913.

Application filed June 16, 1909. Serial No. 502,595.

To all whom it may concern:

Be it known that I, WILLIAM E. SHARP, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Safety-Vents for Tank-Cars, of which the following is a specification.

My invention relates to vents or safety appliances, especially, though not exclusively, adapted for employment in connection with railway tank cars carrying oil, volatile and inflammable liquids or the like, one aim and object of the invention being the provision of a device of this general character which, because of its construction, will not require frequent inspection; which can be economically manufactured; which will not permit the liquid to splash or slop out of the tank; which will exclude dust, dirt, cinders and the like; and which will relieve any excessive internal pressure and yet not cause any spilling, or occasion the loss of any of the liquid due to the sudden stopping or starting of the car.

In the preferred embodiment of the invention the appliance has a substantially-central hollow threaded neck adapted for connection with the dome of the tank, and will, therefore, when applied to the car, be in communication with the vent opening. Integral with this hollow neck is an enlarged hollow head open to the atmosphere at one side and provided with a passage communicating with such neck, a liquid seal, and a plurality of baffles or deflectors. Owing to the peculiar construction of this device, when the oil or other liquid surges up the hollow neck due to the sudden stopping or starting of the car, the liquid, because it would have to reverse its direction of travel so many times before it could escape, does not have time to do so before the wave or momentary rise of the liquid passes. Consequently, by employing a construction of this kind communication with the atmosphere is maintained and efficient and effective means employed for preventing splashing and loss of the tank liquid.

In the accompanying drawings I have illustrated a desirable embodiment of this invention, and throughout the various views of the same like reference characters refer to the same parts.

In these drawings—Figure 1 is a side ele-

vation of my improved safety vent applied to the dome of the tank; Fig. 2 is a central vertical section through the appliance; Fig. 3 is a section on line 3—3 of Fig. 2, the parts being viewed in the direction indicated by the arrows; Fig. 4 is a section on line 4—4 of Fig. 2 as the parts are viewed in the direction shown by the arrows; Fig. 5 is a section on the broken line 5—5 of Fig. 2; Fig. 6 is a horizontal section on line 6—6 of Fig. 2; and Fig. 7 is a section on line 7—7 of Fig. 2.

Referring to the drawings, it may be noted that this safety vent is cast in a single unitary piece, the structure including a substantially-central hollow neck or pipe 10, externally screw-threaded at 11 for application to the vent opening of the tank dome. Extended over such neck is an enlarged hollow head 12, the structure also having a substantially-horizontal bottom wall or floor 13 extending approximately half way around the neck and connecting the outer curved surface of the latter some distance below its top edge 14 with the bottom edge of a part of the side walls of head 12. The top open end of pipe 10 is equipped with a substantially-hemispherical dome 15 arranged eccentric to the axis of pipe 10 so that a part of such dome on the side of the neck having the bottom wall 13 overhangs the neck and is spaced outwardly therefrom to provide a curved mouth 16, it being understood, as is clearly shown in Fig. 2, that the bottom edge 17 of this overhanging part of the dome is below the top edge 14 of the pipe or hollow neck. The other side or half of the pipe or hollow neck, as is indicated in Fig. 2, is closed by the dome.

Extended transversely of the structure and connecting the edges of the floor or bottom wall 13 between the outer wall of the casting or head and the pipe or neck 10 with such outer wall and neck is a partition composed of two parts 18, which, in conjunction with the other parts of the structure, forms a liquid seal or pocket around approximately one-half of the neck at 18.

The dome 15, as is clearly indicated, is spaced inwardly away from the outer walls of the enlarged head forming a curved exit passage 20 communicating at the bottom of the head with a mouth 21 on the side of the neck opposite the bottom wall 13 or pocket 19. The mouth 21, shown in Figs. 2, 5, 6

and 7, is of substantially semicylindrical shape as indicated. Extending upwardly and outwardly from the dome 15, and reaching from one outer side wall of the head to the other, the safety vent is supplied with a baffle or deflector 22, upwardly curved somewhat, as indicated in Fig. 2, toward that portion of the head or hood supplied with the pocket 19. This baffle at the two sides of the dome extends downwardly at 23 to the bottom edge of the latter, the two lower margins of such baffle being connected to the top edges of the divided partition 18 by horizontal connecting walls 24 which prevent the liquid from flowing out of the pocket 19 over the top edges of the partition to the curved discharge mouth 21. Above the pocket 19 in the upper angle of the hollow head this hood or cowl-like structure is supplied with an inclined baffle 25 projecting inwardly toward the dome 15 and forming between itself and one wall of the head an upper pocket or recess 26. In the mouth 21 the exterior surface of the neck 10 or pipe 10 has a downwardly-inclined flange or rib 27 extending around the pipe or neck between the two parts of the partition 18 and acting as a dust and cinder deflector to prevent the entrance of foreign substances through the vent to the tank.

The operation of a structure of this kind when applied to a tank car is substantially as follows: In the first place, it maintains connection between the interior of the tank and the external atmosphere through a baffled passage having three bends in addition to those formed by the baffles themselves, the first of which is over the top edge 14 of the neck 10, the second being around the bottom edge 17 of the dome 15, and the third being that around the dome itself down to the mouth 21. In order that the oil or other liquid of the tank might escape through this vent it is necessary for the same to rise above the top edge of the baffle 22. It will be observed that in following this course the liquid at first flows vertically downward, then vertically upward, and finally downward again. In other words, the liquid is compelled to double back upon itself three times before it can escape from the mouth 21. If the tank car is suddenly started or stopped so as to occasion a violent surging or rise of the liquid in the hollow neck or pipe 10, the liquid can not escape through this vent without first completely reversing its direction three times, as above pointed out, and the time consumed in its attempt to do this is sufficient to permit the wave or upward flow to cease or subside sufficiently so that the liquid is prevented from flowing over the baffle 22. Under ordinary circumstances the pocket or seal 19 would be filled with liquid up to the edge 14 of the neck. If the liquid splashes up

the pipe it strikes the dome and is either deflected back into the pipe or over into the pocket 19 from which it may flow back into the pipe over the edge 14. If, however, the splashing or slopping is violent so that the liquid not only reaches the pocket 19 but travels upwardly therefrom, it will enter the pocket 26 and be deflected downwardly again on to the dome by the inclined baffle 25, which, as will be readily understood, assists in preventing the escape of any of the liquid over the baffle 22. If, on the other hand, any of this moving liquid should rise and engage the concave side of baffle 22, the latter would direct the same to the top wall of the hood and on to the other side of the inclined baffle or deflector 25, again bringing the liquid down on to the dome, from which it would flow back into the pocket 19, and provided such pocket is filled the liquid will flow over the edge 14 back into the tank.

The deflector 27, as will be readily understood, turns downwardly any cinders, dirt, or the like striking the outer surface of the neck 10 and tending to follow the same upwardly into the vent. If, however, any such particles do enter the curved passage 20, they will in their movement strike the deflector 22, which will assist in preventing their entrance into the pocket 19 or the tank proper.

Whereas I have herein illustrated and described in detail one particular embodiment of this invention, it is to be understood that the invention is susceptible of a variety of embodiments, and that the structural features of the device herein set forth may be modified within wide limits without departure from the substance of the invention, and without the sacrifice of any substantial benefits and advantages. In this particular construction the part of the head having mouth 21 is substantially semicylindrical in conformation, while the other portion of the head is of more rectangular formation, but of course these are features which may be changed to a considerable extent without materially affecting the operation of the vent. In addition it is desirable, for the sake of economy in metal, to make the cross-section of the bent baffled passage substantially equal to that of the hollow neck or pipe. In cases where a vent of this character is used in connection with a tank filled with a volatile or inflammable liquid or oil, such vent may be used as a safety valve to relieve the internal pressure by filling the seal pocket 19 with a heavy oil or composition of greases insoluble in the liquid carried in the tank whereby evaporation of the contents of the tank is prevented. Such a composition would be employed that would be solid at ordinary temperatures and melt or become liquid at a slightly higher temperature, for example 212° Fahrenheit. If,

therefore, the tank becomes heated or its contents take fire the composition is melted and permits the liquid of the tank to escape rather than explode and burst the tank. In some cases it would be desirable to fill such pocket with a low fusible metal which would perform substantially the same function as the composition of greases referred to. In Fig. 2 the employment of such a pocket filling and sealing material is illustrated.

I claim:

1. A safety vent for tank cars comprising a hood-like structure having a hollow neck adapted to be mounted in communication with a vent opening, said structure having a mouth open to the atmosphere and a tubular passage connecting said hollow neck and mouth and extending from the former first downwardly, then upwardly, and again downwardly to said mouth, substantially as described.

2. A safety vent for tank cars comprising a hood-like structure having a hollow neck adapted to be mounted in communication with a vent opening, said structure having a mouth open to the atmosphere and a tubular passage connecting said hollow neck and mouth and supplied with a plurality of bends, each of which completely reverses the direction of flow through said vent, substantially as described.

3. A safety vent for tank cars comprising a hood-like structure having a hollow neck adapted to be mounted in communication with a vent opening, said structure having a mouth open to the atmosphere and a tubular passage connecting said hollow neck and mouth and having three flow reversing bends, substantially as described.

4. A safety vent for tank cars comprising a hood-like structure having a hollow neck adapted to be mounted in communication with a vent opening, said structure having a mouth open to the atmosphere and a tubular passage connecting said hollow neck and mouth and formed with three flow reversing bends between the same, the structure also having one or more baffles in said passage, substantially as described.

5. A safety vent for tank cars having a hollow neck adapted to be mounted in communication with a vent opening, an enlarged hollow head over the top of said neck, a head bottom wall extending part way around said neck and connecting the latter below its top end to a part of the side walls of said head, a transverse partition leading from one side of the neck and connecting the inner face of the head side walls with said bottom wall, thereby forming a pocket extending part way around said neck, a dome over the open top end of said neck and spaced inwardly away from the outer walls of said hollow head, the wall of

said dome on the same side of said neck as said bottom wall being spaced outwardly away from the neck and having its lower edge below the top edge of said neck, the passage between the head outer walls and said dome having communication with the atmosphere on the side of the neck opposite said bottom wall, substantially as described.

6. A safety vent for tank cars having a hollow neck adapted to be mounted in communication with a vent opening, an enlarged hollow head over the top of said neck, a head bottom wall extending part way around said neck and connecting the latter below its top end to a part of the side walls of said head, a transverse partition leading from one side of the neck and connecting the inner face of the head side walls with said bottom wall, thereby forming with the other parts of the structure a pocket extending part way around said neck, a dome over the top open end of said neck and spaced inwardly away from the outer walls of said hollow head, the wall of said dome on the same side of said neck as said bottom wall being spaced outwardly away from the neck and having its lower edge below the top edge of said neck, the space between the head outer walls and said dome having communication with the atmosphere on the side of the neck opposite said bottom wall, and a transverse baffle or deflector over said dome connecting opposite side walls of said head, substantially as described.

7. A safety vent for tank cars having a hollow neck adapted to be mounted in communication with a vent opening, an enlarged hollow head over the top of said neck, a head bottom wall extending part way around said neck and connecting the latter below its top end to a part of the side walls of said head, a transverse partition leading from one side of the neck and connecting the inner face of the head side walls with said bottom wall, thereby forming with such parts a pocket extending part way around said neck, a dome over the top open end of said neck closing the same on one side and spaced away from the outer walls of said hollow head, the wall of said dome on the same side of said neck as said bottom wall being spaced outwardly away from the neck and having its lower edge below the top edge of said neck, the passage between the head outer walls and said dome having communication with the atmosphere on the side of the neck opposite said bottom wall, the top wall of said head having an inwardly-extended baffle-plate to deflect downwardly on to the dome any liquid tending to splash out of the device, substantially as described.

8. A safety vent for tank cars having a hollow neck adapted to be mounted in communication with a vent opening, an enlarged hollow head over the top of said neck, a

head bottom wall extending part way around said neck and connecting the latter below its top end to a part of the side walls of said head, a transverse partition connecting the neck, the head side walls, and said bottom wall and forming with these parts a pocket extending part way around said neck, a dome over the top end of and closing one side of said neck and spaced away from the outer walls of said hollow head, the wall of said dome on the same side of said neck as said bottom wall being spaced outwardly away from the neck and having its lower edge below the top edge of said neck, the passage between the head outer walls and said dome having communication with the atmosphere on the side of the neck opposite said bottom wall, said structure having a transverse baffle extended over the dome and a baffle inclined toward said dome and extended inwardly from the outer wall of said hollow head, substantially as described.

9. A safety vent for tank cars having a hollow neck adapted to be mounted in communication with a vent opening, an enlarged hollow head over the top of said neck, a hollow bottom wall extending part way around said neck and connecting the latter below its top end to a part of the side walls of said head, an upright transverse partition connecting the neck, the head side walls, and said bottom wall and forming therewith a pocket extending part way around the neck, a dome over the top open end of and closing one side of said neck and spaced away from the outer walls of said hollow head, the wall of said dome on the same side of said neck as said bottom wall being spaced outwardly away from the neck and having its lower edge below the top edge of said neck,

the passage between the head outer walls and said dome having communication with the atmosphere on the side of the neck opposite said bottom wall, a baffle extending over said dome and connecting opposite side walls of said head, said baffle being connected by walls with said partition to prevent flow of the liquid directly over the latter, substantially as described.

10. A safety vent for tank cars consisting of a hood having a hollow neck adapted to be mounted in communication with a vent opening, said hood having a mouth open to the atmosphere and a tubular passage connecting said neck and mouth, said passage having a seal pocket, substantially as described.

11. A safety vent for tank cars consisting of a hood having a hollow neck adapted to be mounted in communication with a vent opening, said hood having a mouth open to the atmosphere and a tubular passage connecting said neck and mouth and equipped with means to prevent evaporation of the contents of the tank, substantially as described.

12. A safety vent for tank cars consisting of a hood having a hollow neck adapted to be mounted in communication with a vent opening, said hood having a mouth open to the atmosphere and a passage connecting said neck and mouth, said passage having a seal pocket filled with a material solid at normal temperature, insoluble in the liquid carried in the tank, and of low melting point, substantially as described.

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Witnesses:

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