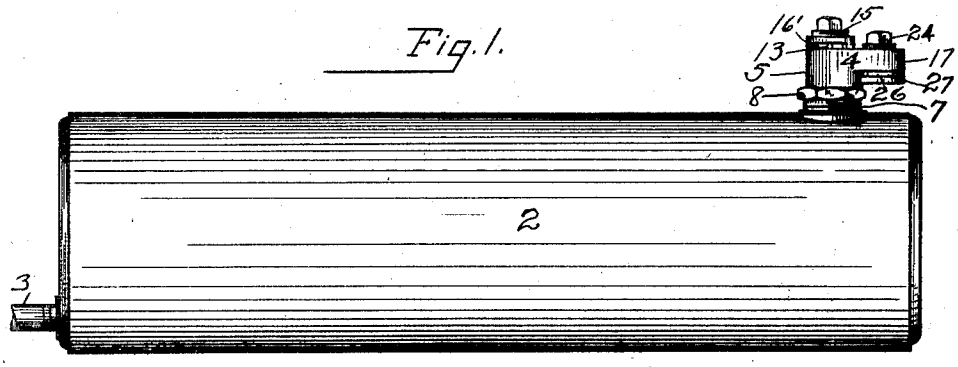
C. E. MISER.

AUTOMATIC RELIEF VALVE.

APPLICATION FILED JULY 3, 1911.

1,019,511. Patented Mar. 5, 1912.

Fig. 1.



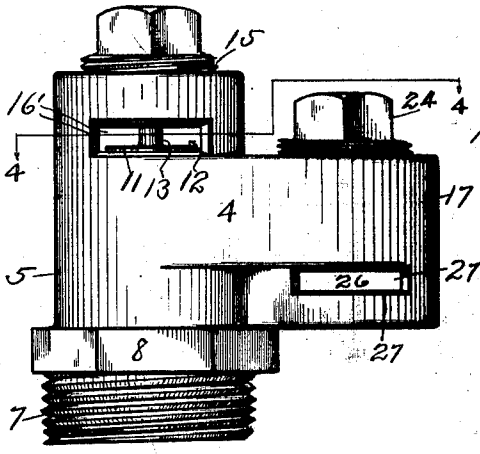


Fig. 2.

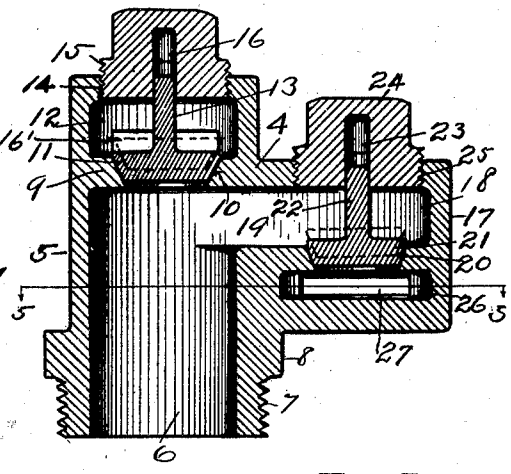


Fig. 3.

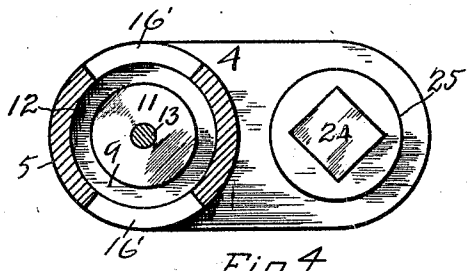


Fig. 4.

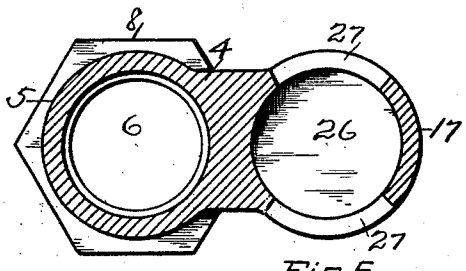


Fig. 5.

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AUTOMATIC RELIEF-VALVE.

1,019,511. Specification of Letters Patent. Patented Mar. 5, 1912.

Application filed July 3, 1911. Serial No. 636,747.

To all whom it may concern:

Be it known that I, CHARLES E. MISER, a citizen of the United States, residing at Watertown, in the county of Jefferson and State of New York, have invented certain new and useful Improvements in Automatic Relief-Valves, of which the following is a specification.

This invention relates to improvements in relief valves, designed for use in connection with tanks employed for holding and storing liquids of various kinds, and the invention relates particularly to a device adapted for automatically controlling the filling and emptying of such tanks.

The object of the invention is to provide a novel, simple, effective and inexpensive device of the class, which is capable of being connected to the top of a tank, for automatically relieving the pressure due to the confining of the atmospheric pressure contained in the tank, during the interval the tank is being filled, and a further object is to provide independent means for breaking or relieving the vacuum which is produced in the tank by the drawing off of the liquid.

The various features and parts of the device will be readily understood from the detailed description which follows, and by reference to the accompanying drawing, which forms a part of this specification, and in which—

Figure 1 is a view of a tank having my automatic relief valves applied ready for service. Fig. 2 is an enlarged side elevation of the complete device. Fig. 3 is a central vertical longitudinal section; showing the construction, arrangement and operation of the several parts of the device. Fig. 4 is a part plan and part horizontal section, taken on line 4—4 of Fig. 2. Fig. 5 is a horizontal section, taken on line 5—5 of Fig. 3.

Similar characters of reference are assigned to corresponding parts throughout the several views.

In the drawing, 2 represents a tank for containing liquid, which may be constructed in any suitable manner, and 3 represents a pipe which may be employed for filling, as well as, for drawing off the liquid from the tank. The pipe 3 may be disposed at any convenient point, but is preferably located at or near the bottom of the tank.

As a rule, tanks employed for storing liquids, when empty, are charged with atmospheric pressure, which enters the tanks and replaces the contents previously drawn off. To refill the empty tanks, it is necessary to displace or draw off the air which is confined in the tanks, otherwise the tanks can only be partially filled. Heretofore, hand-operated valves or cocks have been connected to the tops of the tanks for relieving or drawing off the atmospheric pressure, and where tanks are frequently filled and emptied, considerable time and labor are consumed in the operation of the said valves. After a tank is filled, the usual practice is to close the valves and all other vents to prevent the escape or loss of the contents. When the contents of a tank are drawn off, the said valves or other suitable vents must be opened, in order to permit the liquid to freely gravitate or flow from the tank. If no vents or openings are provided, at or near the top of the tank, the drawing off of the liquid creates a vacuum in the upper portion of the tank, which invariably retards, and sometimes entirely stops the flow of the liquid from the tank. Under the old practice referred to, whether the tanks are being filled or emptied, an attendant must open and close the valves, in order to relieve the tank of the pressure and vacuum, for permitting the complete refilling and emptying of the tanks. To remedy these defects and to save the time and labor aforesaid, it is an object of the present invention to provide a novel and simple automatic device, which will now be described.

4 represents a one-part casing or body, having a vertically disposed cylindrical portion 5, which incloses a relatively large pressure receiving chamber 6. The lower end of the casing is preferably externally threaded at 7 for screwing the same into a suitably threaded opening in the top of the tank. Above the threaded portion 7 is a ledge or shoulder 8, which is preferably formed hexagonal to receive a wrench for applying the fitting to the tank. Near the upper end of the cylindrical portion 5, inside the casing, is disposed a horizontal floor or wall 9, having a beveled or countersunk perforation or port 10, arranged concentric to the chamber 6, to provide a seat for a cone-shaped valve 11, which is disposed in an exhaust chamber 12 positioned directly above the floor 9. Valve 11 has a stem 13 arranged concentric to its body.

The extreme upper end of the part 5 has a threaded opening 14, communicating with the chamber 12, to receive a screw-plug 15. The inner end of the plug 15 has a concentric socket 16, to receive the free end of the stem 13 of valve 11, the said socket being large enough to permit the free reciprocal playing of the valve stem, during the automatic working of the valve 11. The valve 11 is raised by the compression of the air which is confined in the tank, during the filling operations, and after the said pressure is relieved, or exhausted, from the chamber 6 and the tank, by the opening of the valve 11, the said valve gravitates into its seat 10, and closes the said vent. In case the tanks contain liquid which readily evaporates, it is essential that the valve 11 be held tightly in the closed position, excepting when operated for exhausting the pressure, as described. To that end the valve 11 should be made heavy enough to effect a positive seating and closing of the opening 10 by gravity. After the air pressure in the tank passes through the port or opening 10, it enters the chamber 12, and from there it escapes to the atmosphere through oppositely-facing slotted openings 16′—16′, which are formed in the side walls of the chamber 12. During the interval in which the liquid is being drawn from the tank, the valve 11 remains closed, and if there is any suction created by the drawing-off of the liquid, it will tend to draw and hold the valve 11 more tightly in its seat 10.

17 represents a laterally disposed cylindrical portion formed integrally with the main casing, which has an auxiliary chamber 18, the axis of which is parallel to the chamber 6. The auxiliary chamber 18 connects with the common receiving chamber 6, by means of a horizontal passage or port 19. The bottom of the chamber 18, which corresponds to the floor 9, has a similar beveled or counter-sunk circular opening 20, which forms an annular seat for a valve 21. The valve 21 has a concentric upwardly extending stem 22, which is received in and guided by a socket 23 formed in a plug 24, which is screwed into a threaded opening 25 arranged in the top of the part 17 concentric to the port 20. The openings 14 and 25 are provided for facilitating the insertion of valves 11 and 21.

26 represents a relatively small intake chamber disposed directly beneath and concentric to the valve 21, and this chamber communicates with the atmosphere by means of oppositely arranged slots 27—27.

The valve 21 is normally seated in the opening 20 in the bottom of the chamber 18, and is not disturbed by the compression of the air during the filling of the tank, the said pressure during the filling operation incidentally exerting its power for holding the valve 21 in closed position, while at the same time it exerts its full power for raising the valve 11 for relieving the imprisoned air. When, however, the liquid in the tank is drawn off, the suction or vacuum created by the lowering of the level of the liquid, pulls downwardly on the valve 11, seating it more tightly, and at the same time it lifts the valve 21 and opens the port 20 for admitting atmospheric pressure through the slots 27, intake chamber 26 and the port 20. The admission of the air into the top portion of the tank, breaks or destroys the vacuum and allows the liquid to flow freely from the tank.

For convenience and economy in the manufacture of the parts, the valves 11 and 21 are preferably made the same size and weight, and the plugs 15 and 24 are also preferably made alike, and the respective parts are therefore interchangeable.

The dotted lines in Fig. 3 indicate the open positions of the valves 11 and 21 for relieving the pressure during the filling, and also for breaking or preventing a vacuum during the drawing-off of the liquid from the tank.

The operation of my device is entirely automatic, and after it has been installed upon a tank, it requires no attention or care. The operation of the valves is positive, and when properly constructed and applied, there is no danger of any of the parts getting out of order, or requiring any repairs.

It is obvious that my improved relief valves may be applied to any make or style of tanks; that the device will work with the same efficiency and perform all of their functions, no matter what kind of liquid is stored in the tanks, and that some changes or modifications may be made in the parts of the device within the scope defined by the appended claims, without departing from the spirit of my invention.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is—

1. In a relief valve, the combination of a main casing and a lateral casing, said main casing having a receiving chamber and an exhaust chamber disposed above said receiving chamber, said lateral casing having an auxiliary chamber and an intake chamber disposed below the auxiliary chamber, the exhaust chamber communicating with the open air, and the intake chamber communicating with the open air, a valve disposed in the exhaust chamber, adapted to relieve the said casings of air pressure derived from a tank, and a valve disposed in the auxiliary chamber adapted to supply atmospheric pressure to the said casings, when acted upon by a vacuum or suction in the tank.

2. In combination, a main casing having a vertically arranged cylindrical portion,

inclosing a common receiving chamber and having a laterally arranged portion communicating with the receiving chamber its lowermost end comprising an intake chamber, the main casing having an exhaust chamber disposed above the receiving chamber, the lateral portion having an auxiliary chamber disposed above an intake chamber, a valve seat disposed between the receiving chamber and the exhaust chamber, a valve seat disposed between the auxiliary and the intake chambers, a valve in the exhaust chamber adapted to relieve the air pressure from the receiving and auxiliary chambers, and a valve in the auxiliary chamber adapted to relieve or destroy a vacuum in the receiving and auxiliary chambers.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES E. MISER.

Witnesses:
FREDK. G. PLORK,
GEO. W. ADAMS.