E. BURGESS.

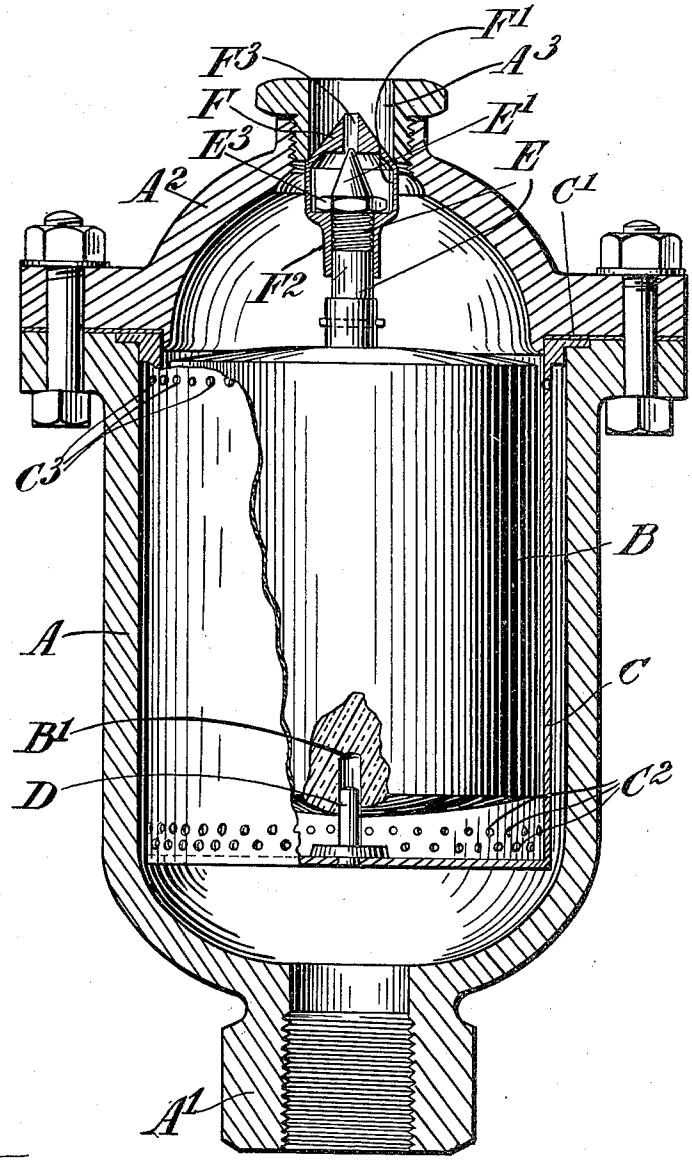
VENT VALVE FOR WATER OR OTHER LIQUID CARRYING CONDUITS.

APPLICATION FILED APR. 15, 1910.

1,009,044. Patented Nov. 21, 1911.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses
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COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

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2 SHEETS—SHEET 2.

Fig. 2.

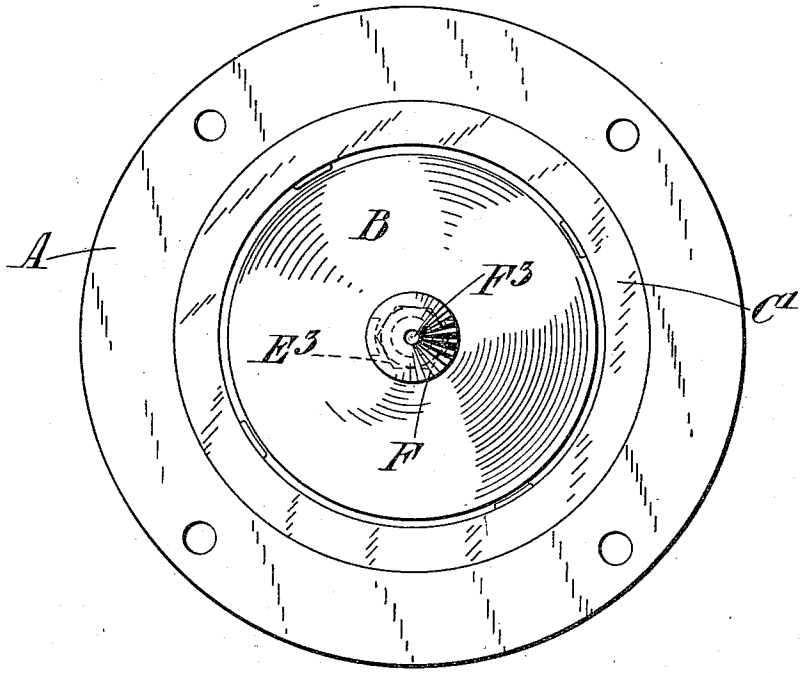
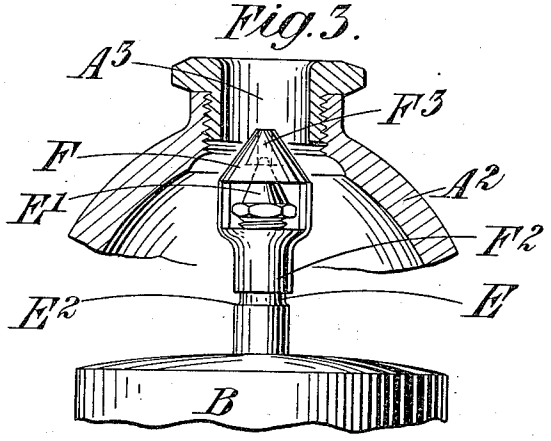


Fig. 3.



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UNITED STATES PATENT OFFICE.

EDWARD BURGESS, OF BRIXTON, LONDON, ENGLAND, ASSIGNOR OF ONE-HALF TO PERCY HORSLEY, OF LONDON, ENGLAND.

VENT-VALVE FOR WATER OR OTHER LIQUID CARRYING CONDUITS.

1,009,044. Specification of Letters Patent. Patented Nov. 21, 1911.

Application filed April 15, 1910. Serial No. 555,625.

To all whom it may concern:

Be it known that I, EDWARD BURGESS, a subject of the King of England, residing at Brixton, in London, England, have invented certain new and useful Improvements in Vent-Valves for Water or other Liquid Carrying Conduits, of which the following is a specification.

It is well known that difficulty is experienced in providing a valve that will allow egress of air or other gas from liquid-carrying conduits without permitting the passage of liquid. Valves for this purpose are usually float controlled and mounted in a chamber situated at a conveniently high point in the conduit system so that any air in the conduit will rise to the chamber and may be discharged by the valve. It is desirable therefore, with such devices to have in addition to a comparatively small or auxiliary valve that can be easily opened and closed by the float for normal working, a larger or main valve that may be opened on emergency, as for instance, when it is desired to draw off the whole of the liquid from the conduit system in which case air must be admitted to the conduits.

The valve forming the subject matter of the present invention provides both for the normal and emergency working and is found to entirely prevent the passage of liquid while allowing free escape of gas or on emergency the free admission of air by opening the main valve.

The invention will be clearly understood by reference to the accompanying drawings, wherein—

Figure 1 is a central vertical section through the valve and valve chamber; Fig. 2 is a plan of the same with the cover of the valve chamber removed, and Fig. 3 shows part of the apparatus with the valve in a different position.

Like letters indicate like parts throughout the drawings.

The valve chamber A is provided at A′ with means for connection to the water-main. The chamber is cylindrical in shape and has at the upper end a cover A^2 provided with an outlet A^3. In the chamber is a float B and surrounding the float is a pocket or baffle C. This baffle is secured in the chamber by a flange C′ that lies in a recess in the wall of the chamber and is held in place by the cover A^2. The baffle is provided with perforations C^2 at its lower end and other perforations C^3 at the upper end. In the center of the pocket or baffle C and on the bottom of the same is a vertical pin D. This enters an orifice B′ in the float B and serves to guide the float as it rises and falls. Projecting from the upper end of the float is a spindle E whose upper end E′ is conical. Carried on the spindle in advance of the conical end E′ of the spindle E is a conical valve F which is connected by arms F′ to a sleeve F^2 that is free to slide on the spindle E. The endwise movement of the sleeve on the spindle is limited by a shoulder E^2 on the lower portion of the spindle and by a nut E^3 on the upper portion. The valve F is provided with a central orifice F^3 which is axially alined with the conical end E′ of the spindle E. The valve F finds a seating in the mouth of the orifice A^3 in the cover A^2 of the valve chamber and constitutes the main or emergency valve, while the conical end E′ of the spindle E finds a seating in the orifice F^3 of the main valve and constitutes an auxiliary valve.

The operation of this device is as follows:—So long as the chamber A is comparatively full of water the float B will be kept at the limit of its upward movement and thus both the valves E′ and F will be closed. If, however, air collects in the main it will find its way to the highest point, at which the chamber A is situated, and entering the chamber will displace the water, so that the float will drop. As the float drops the valve E′ opens, the air thus being allowed to escape and as the water returns the float rises and again closes the valve E′. This is the normal operation of the valve for relieving the mains of air and can be carried out without displacing the valve F owing to the idle movement permitted between the float and the valve F. Even if the quantity of air in the chamber A is such that the float falls so far as to be suspended by the nut E^3 from the valve F, the pressure upon the valve F within the chamber A is usually sufficient to retain this upon its seating so that the air escapes by the valve E′ only. If, however, the mains are to be emptied the pressure upon any air that is contained in the chamber A is reduced as the water is drawn off, so that the float as it drops can now not only open the auxiliary

valve E′, but also draw down the valve F, thus allowing free access for the external atmosphere to the main (see Fig. 3); this prevents forming a vacuum in the main and allows the water to be readily run off.

It has been found that ball valves which are commonly employed for relieving mains of air or admitting air thereto are very irregular in action, as they are not sensitive and once closed sometimes refuse to open even when the water is run off and all pressure has been relieved within the main. A further difficulty with these valves is that as the water, mingled with air, traverses the main valve which may be open at one moment to release air, is the next moment struck with a body which brings it forcibly upon its seating resulting often in the damage of the seating or the ball to such an extent that the valve leaks.

The auxiliary valve serves the purpose of a relief valve for the main valve when drawing water off from the main, as should air collect under pressure in the valve chamber while drawing the water off, that is relieved by the auxiliary valve and thus permits the main valve to open earlier than might otherwise be the case. The main valve will, as already described, usually remain closed for ordinary vent purposes, but should there be a considerable amount of air in the main at a low pressure, the main valve is opened as soon as the float drops low enough and affords an easy outlet, or if the pressure be a little too high at first for the opening of the main valve, the pressure would first be relieved by the auxiliary valve and then later by the opening of the main valve.

To prevent the water from striking the float violently and bringing the valve with undue force against its seating, the baffle or pocket C is employed. The water can only enter the baffle from the perforation C^2 or C^3 and thus the float rises with moderate force. The perforations C^2 allow the water to drain steadily out from the pocket C as the level in the main falls, so that the float is also lowered without undue violence. As the auxiliary valve does all the normal working the larger main valve is saved a considerable amount of wear and thus it and its seating are both kept in good condition and insure the proper closing of the larger aperture A^3 whereas even should the auxiliary valve get somewhat worn the aperture being comparatively small is easily closed. The aperture A^3 is formed in a screw-threaded nipple that is screwed into the cover of the valve chamber and can be readily removed therefrom. A number of different sized nipples can be kept in stock and different sized valves therefor so that any required size of valve and nipple with the seating for the valve can be readily placed in any one valve chamber. It will thus be seen that it is not necessary to keep a large stock of valve chambers and other parts complete with varying sized valves and moreover if a seating or its valve or both get worn, these parts can be readily replaced while the apparatus remains *in situ*. The conical form of valve is found to give much greater satisfaction in working than a flat valve.

What I claim as my invention and desire to secure by Letters Patent is:—

In an air valve of the kind described for liquid-carrying conduits the combination of, a chamber that is provided at its lower end with means for communicating with the conduit, a cover for the top of the chamber the cover and chamber having flanged faces whereby they are connected together, a perforated bucket-shaped liner within the chamber having at its open end an outwardly directed flange that is connected between the flanges of the cover and chamber, a float within the liner, a conical valve in the valve chamber controlling a main outlet port and tending to close against the passage of fluid from within, an auxiliary conical valve controlling an outlet port in the main valve and tending to close against the passage of fluid from within, means operatively connecting the auxiliary valve and float whereby the latter opens the valve when the level of the liquid in the chamber drops, and means operatively connecting the main valve and float whereby the latter opens the main valve when the level of the liquid and the pressure within the float chamber are sufficiently reduced, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWARD BURGESS.

Witnesses:
A. M. Hayward,
W. H. Derriman.