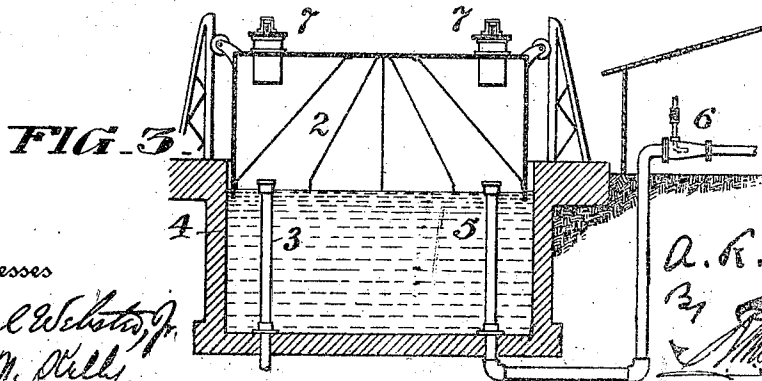
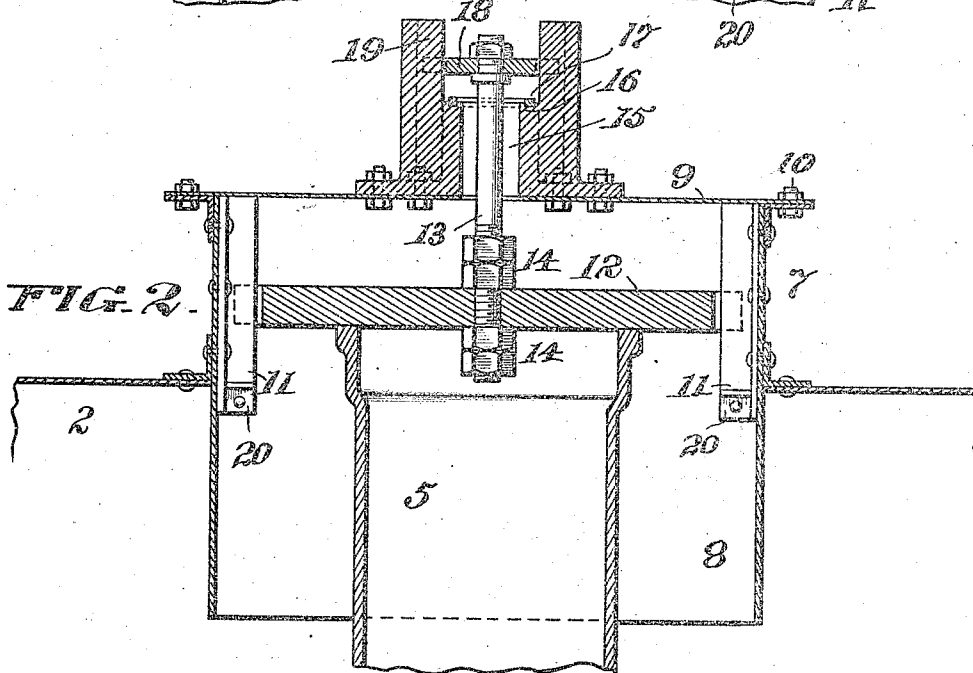
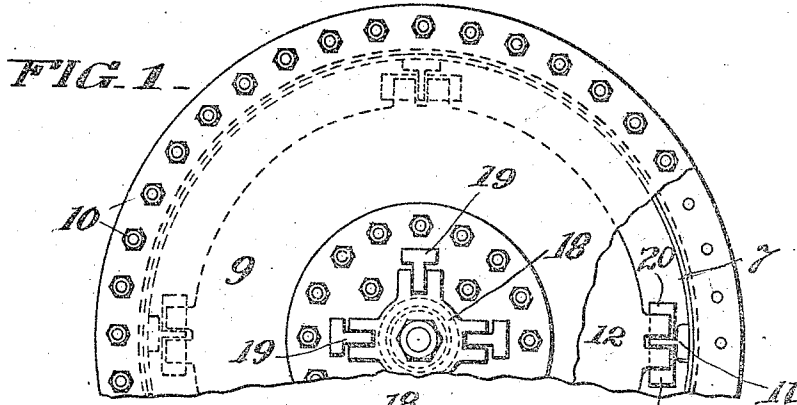


A. R. CRUSE.
SAFETY DEVICE FOR GAS HOLDERS.
APPLICATION FILED JULY 20, 1911.

1,013,643.

Patented Jan. 2, 1912.



Witnesses

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ARTHUR R. CRUSE, OF PHILADELPHIA, PENNSYLVANIA.

SAFETY DEVICE FOR GAS-HOLDERS.

1,013,643.

Specification of Letters Patent.

Patented Jan. 2, 1912.

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To all whom it may concern:

Be it known that I, ARTHUR R. CRUSE, a citizen of the United States, and a resident of Philadelphia, county of Philadelphia, State of Pennsylvania, have invented an Improvement in Safety Devices for Gas-Holders, of which the following is a specification.

My invention has reference to safety devices for gas holders and consists of certain improvements which are fully set forth in the following specification and shown in the accompanying drawings which form a part thereof.

The object of my invention is to provide a gas holder with an automatic seal to the outlet pipe or pipes and a relief to the holder adjacent to said seal when the holder is fully down and an exhaustor or other pumping device is being employed for rapidly emptying the holder.

Under the usual system of continued working of the exhaustor or pump after the holder has been emptied of gas, there is, owing to the man hole construction employed about the delivery pipe, liability to exhaust the water from the tank or well inside of the seal formed by the man hole tube and thereby not flooding the pipes but producing a condition of vacuum within the holder which at times causes the collapse of the crown of the holder. By my improvements the flooding of the pipes is avoided and the danger of destruction of the holder is entirely obviated.

My invention consists of a gas or other holder provided with a gas outlet pipe in communication with an exhaustor or pump, combined with an automatic valve which closes the gas outlet when the holder is at or about its lowest normal position whereby the exhaustor or pump can not exhaust the contents of the holder when in such position.

My invention also consists in the said construction where the holder is further provided with a water seal about the outlet pipe when the holder is down and a relief valve or device for automatically opening the seal to the atmosphere to prevent the seal being broken and also to prevent a partial vacuum being produced within the holder.

My invention also comprehends details of construction which, together with the features above set forth, will be better under-

stood by reference to the drawings, in which:—

Figure 1 is a plan view of the seal and valve devices embodying my invention removed from the holder and with a portion broken away; Fig. 2 is a sectional elevation of the same applied to the holder, a portion of which and the outlet pipe are alone illustrated; and Fig. 3 is a sectional elevation of the holder and exhaustor with my improvements applied thereto.

2 is the gas holder and may be guided vertically in the water tank 4 in any suitable manner, the illustration given in Fig. 3 being by way of example only and as a restriction in any manner of the gas holder structure. The top of the holder is shown as flat but in practice the holders are made crown or dome shaped, but this is immaterial to my invention.

5 is the gas outlet pipe from the holder through which the gas may be drawn by an exhaustor 6. Any character of exhaustor or pump suitable for the purpose may be employed for exhausting the holder and forcing the gas into the mains to give the desired pressure for circulation.

The top of the holder 2 above the outlet pipe 5 is provided with a man-hole 7 which has a downwardly extending tubular part 8 which dips into the water around the top of the pipe 5 when the holder is down to form a water seal between the main space in the holder and the outlet pipe. The man-hole is closed at the top with a plate 9 detachably bolted in place. The interior wall of the upper part of the man-hole body is provided with vertical T shaped guides 11 for guiding a cover plate or valve 12 which fits tightly upon the top of the outlet pipe 5, when the holder is down, as illustrated in Fig. 2. The underside of this plate 12 and top of the pipe 5 are faced so as to make a gas tight joint; and the weight of the plate or valve 12 is sufficiently heavy to seat positively upon the pipe against obstruction of fine dirt and also to provide means for holding the relief valve closed against the internal pressure of the holder when raised, said relief valve to be now referred to.

The top of the man-hole cover is provided with a vent hole and in alinement with which is bolted the nozzle casting 15 which has vertical guides 19 at the top and

also an annular groove 16 in which is arranged a rubber gasket 17 upon which the relief valve 18 may seat itself when the holder is raised above its bottom position. The relief valve 18 is guided upon the guides 19 and is connected to the cover plate or valve 12 by the rod 13 which is secured to the relief valve at the top and to the cover plate at the bottom, the connection to the latter being by a screw and lock nuts above and below the plate to provide capacity for adjustment to control the distance between the said parts 12 and 18. The lower ends of the guides 11 may have safety clips 20 of angle iron bolted in place to the webs of said guides to act as supports to catch the cover plate 12, should it become detached from the rod 13 or relief valve 18, and thus prevent it falling on top of the pipe 5 and injuring it or falling into the tank. With this provision the cover plate would continue to act in a degree until the parts were again connected.

It will be understood that the relief valve 18, being held to its seat by the weight of the plate or valve 12, acts to hold the pressure within the tank except when said valve is positively opened by the tank descending after the cover plate 12 has come to rest upon the top of the outlet pipe 5 and a water seal has been established. If any fine dirt held the cover plate from properly seating upon the end of the pipe 5, the suction of air through the relief valve into the man hole above the water seal and thence into the pipe 5, would in most cases suck in the dirt and clear the contacting surfaces. It will be seen that at the time the water seal is formed by the tubular part 8, the end of the pipe 5 should be sealed by the cover plate, the relief valve 18 is opened, so that, if the cover plate should from any cause fail to properly seat, suction of the exhauster is shifted from the interior of the tank and water seal to the atmospheric air which enters through the relief valve 18. In this way all danger of drawing water into the pipe or of collapsing the holder is obviated. I have shown a second outlet pipe 3 which may be employed in conjunction with the pipe 5 if so desired, and this would also be combined with the relief and cover plate constructions above described. The holder is, of course, provided with a gas supply pipe as usual, but this I have not shown as it forms no part of my invention.

I have illustrated my improvements in the form I have adopted for commercial adaptation of my invention, and while I prefer the same, I do not restrict myself to the details of construction, as these may be modified without departing from the spirit of the invention. It will further be understood that I may omit the use of the relief

valve 18 if so desired though I prefer that it should be employed.

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

1. The combination of a gas or other holder, and an outlet pipe therefor, with a water seal tubular portion extending down from the top of the holder about the outlet pipe when the holder is down, a cover plate arranged above the outlet pipe and guided within the tubular water seal portion, and means for suspending the cover plate with provision for slight vertical movement relatively to the holder.

2. The combination of a gas or other holder, and an outlet pipe therefor, with a water seal tubular portion extending down from the top of the holder about the outlet pipe when the holder is down and provided with a vent aperture to the atmosphere, a cover plate arranged above the outlet pipe and guided within the tubular water seal portion, a relief valve to close the vent aperture when the holder is raised, and means connecting with the relief valve for suspending the cover plate with provision for slight vertical movement relatively to the holder and for raising the relief valve when the cover plate seats upon the outlet pipe and the holder descends.

3. The combination of a gas or other holder, and an outlet pipe therefor, with a water seal tubular portion extending down from the top of the holder about the outlet pipe when the holder is down and provided with a vent aperture to the atmosphere, a cover plate arranged above the outlet pipe and guided within the tubular water seal portion, a relief valve to close the vent aperture when the holder is raised, means connecting with the relief valve for suspending the cover plate with provision for slight vertical movement relatively to the holder and for raising the relief valve when the cover plate seats upon the outlet pipe and the holder descends, and means carried by the water seal portion for supporting the cover plate should it become detached from the suspending means or relief valve.

4. In a gas or other holder structure, the combination of a movable holder having a man-hole opening in its top, an outlet pipe opening from within the holder adjacent to the man-hole when the holder is down, a cover plate to seal the outlet pipe when the holder is down, suspending devices for the cover plate to hold it to the holder with provision for slight vertical movement relatively to the holder, and a removable cover for the man-hole in the holder carrying the suspending devices.

5. The combination of a gas or other holder having an outlet pipe, and an exhauster sucking upon the holder through the outlet

pipe, with a cover plate to seal the outlet pipe when the holder is down, suspending devices for the cover plate to hold it to the holder with provision for slight vertical movement relatively to the holder, guiding devices on the holder for guiding the cover plate vertically and holding it against lateral displacement, and separate safety supports normally out of contact with the cover plate and carried by the holder for limiting the downward movement of the cover plate and holding it substantially horizontal should it become detached.

6. The combination of a gas or other holder, and an outlet pipe therefor, with a water seal tubular portion extending down from the top of the holder about the outlet pipe when the holder is down and provided with a vent aperture to the atmosphere, a cover plate arranged above the outlet pipe and guided within the tubular water seal portion, a relief valve to close the vent aperture when the holder is raised, means connecting with the relief valve for suspending the cover plate with provision for slight vertical movement relatively to the holder and for raising the relief valve when the cover plate seats upon the outlet pipe and the holder descends, and means for adjusting the distance apart of the cover plate and relatively to the relief valve.

7. The combination of the holder having the man-hole structure comprising a tubular part extending down into the holder and a man-hole cover on the top, guides on the inside of the tubular part, a relief aperture through the man-hole cover, an outlet pipe arranged to be surrounded by the tubular part as the holder descends, a cover plate guided upon the guides and arranged to seal the entrance to the outlet pipe when the

holder is down, a relief valve for the relief aperture, and connecting means between the cover plate and relief valve whereby the latter is raised to open the relief aperture when the cover plate seals the outlet pipe and vice versa.

8. In a gas or other holder structure, the combination of a well, a movable holder adapted to move vertically with respect to the well said holder having a raised man-hole chamber extending above the top plate of the said holder, an outlet pipe leading from the well and having its end extending up into the man-hole chamber when the holder is fully down, a cover plate arranged within the man-hole chamber, and supporting means for the cover plate to hold it within the man-hole chamber with provision for slight vertical movement relatively to the holder.

9. The combination of a gas or other holder structure comprising a vertically movable holder and water seal, with an outlet pipe having an opening arranged near the crown or top of the movable holder when lowered, a man-hole structure opening through the crown or top of the movable holder immediately above the opening into the outlet pipe, a cover plate arranged below the man-hole to seal the opening into the outlet pipe when the holder is down, and suspending devices for the crown plate to hold it to the holder with provision for slight vertical movement relatively to the holder.

In testimony of which invention, I hereunto set my hand.

ARTHUR R. CRUSE.

Witnesses:

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WALTER L. SHEPPARD.