

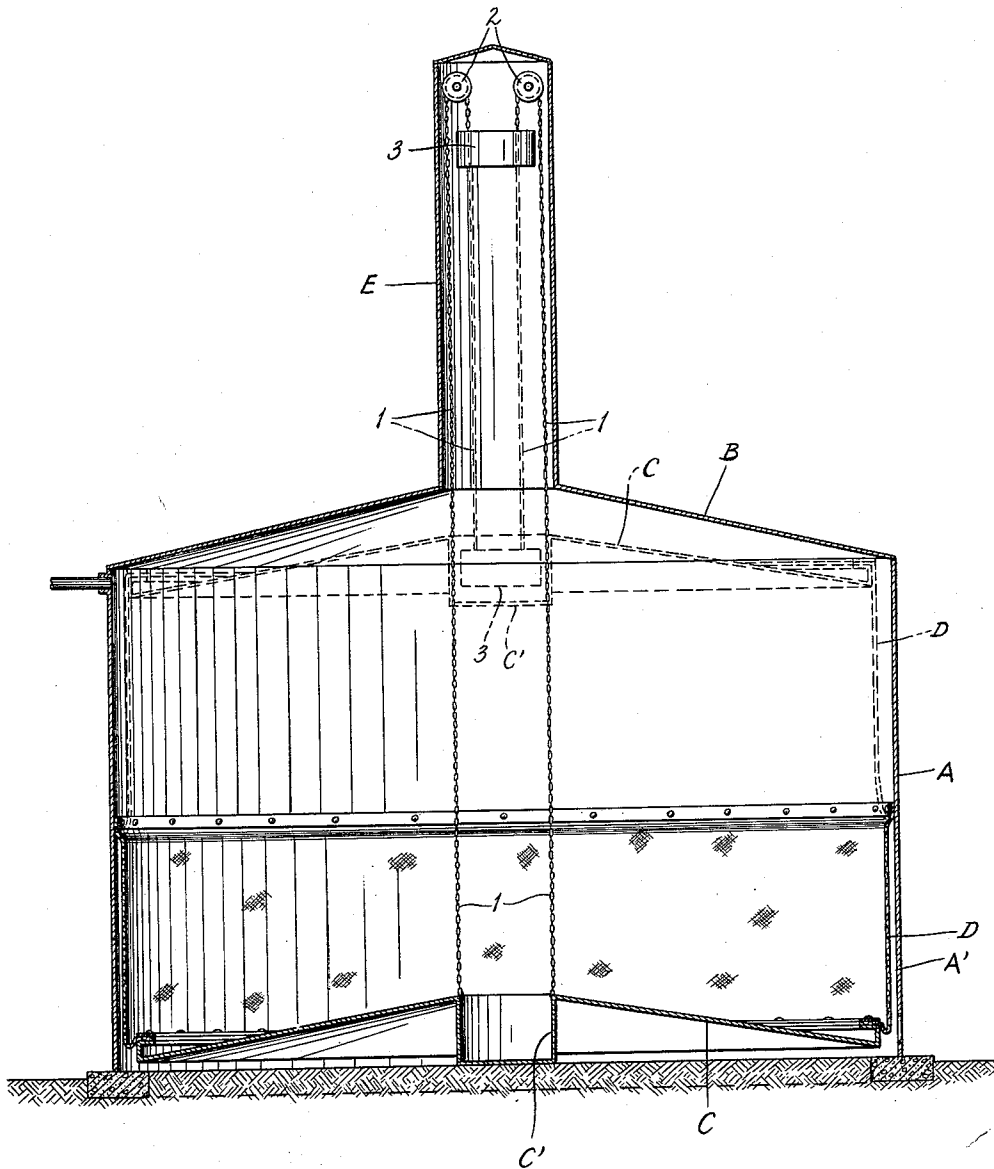
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GAS HOLDER

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GAS HOLDER

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This invention relates to gas holders of the type that comprise a piston or vertically-movable member which is adapted to rise and fall so as to vary the volume of the gas space, and a stationary roof arranged above or over the piston.

One object of my present invention is to provide a gas holder of the general type mentioned, in which the piston is of simple design, in expensive to construct, and of such shape or form that when it is in its extreme elevated position, there is relatively little dead space between the piston and the stationary roof of the apparatus.

Another object is to provide a gas holder of the general type first referred to, which is of such design that the counterweighting mechanism for the piston may be completely housed inside of the apparatus, without the necessity of forming a center opening in the piston, or employing any other sealing means than the gas-tight fabric element attached to the peripheral edge of the piston and to the side wall of the gas space. Other objects and desirable features of my invention will be hereinafter pointed out.

The figure of the drawing is a vertical transverse sectional view of a gas holder embodying one form of my invention, wherein the stationary roof constitutes the top wall of the gas space.

In the particular form of my invention herein illustrated, the gas space of the apparatus comprises a stationary side wall A, a stationary roof or top B that is pitched upwardly at its center, or that is substantially cone-shaped, and a bottom formed by a vertically-movable piston C, the peripheral edge of said piston being connected or joined by a flexible gas-tight fabric element D to the side wall A of the gas space. Said side wall is arranged in an elevated position, or is located at a point a considerable distance above the ground on which the apparatus is erected and the flexible element D is constructed so as to permit the piston C to have a relatively great range of movement, i. e., upwardly into close proximity to, or into substantially nested relationship with the roof B, and downwardly a considerable distance below the bottom edge of the side wall A of the gas space, thereby producing a gas space of relatively great volume. The roof B of the gas space is attached to and supported by the side wall A of the gas space. The side wall A of the gas space is supported or sustained in an elevated position above the surface of the ground, by any suitable type or kind of supporting structure. In the form of my invention herein illustrated a cylindrical metal shell is used to form

the side wall A of the gas space, and the lower end portion of said shell that is located below the point where the sealing element D is attached to the side wall of the gas space constitutes a supporting means A' for the side wall of the gas space. It is not necessary, however, that said supporting means A' be of gas-tight construction, and as previously stated, any means could be used to support the side wall A of the gas space.

In order that the piston C will be inexpensive to construct and strong enough to successfully perform its function, I prefer to make said piston substantially cone-shaped, or, in other words, have the piston slope upwardly from its outer edge toward its center. In a piston of this shape the metal plates of which the piston is constructed take up the tension in the piston, thereby overcoming the necessity of using rods to reinforce and strengthen the piston. Another advantage of a piston of this general shape is that the piston conforms approximately to the shape of the top or roof B of the gas space, and hence, when the piston is in its extreme elevated position, it is in substantially nested relationship with the roof B and the dead space in the gas chamber of the apparatus is reduced to a minimum. Still another advantage of such a piston is that it may be easily hung on or suspended from chains, cables or similar flexible devices that constitute part of a counterweighting mechanism for the piston.

I prefer to equip the apparatus with such a counterweighting mechanism so as to assist in the movement and control or speed of operation of the piston C. One novel feature of my present invention is that the co-acting parts of the apparatus are of such design or construction that the counterweighting mechanism can be completely housed inside of the apparatus, without the necessity of forming a center hole in the piston, or employing any other sealing means for the piston, than the fabric element D which is attached to the peripheral edge of the piston and to the side wall A of the gas chamber. Thus, as shown in the drawing, the roof B of the gas space has erected thereon a tubular housing E that projects upwardly from the center of said roof, said housing E being of gas-tight construction and arranged so that the interior of same is in constant communication with the gas space of the apparatus. Chains, cables or other suitable flexible devices that are attached to the central portion of the piston C lead upwardly from same over sheaves or pulleys 2 arranged

inside of the upper end portion of the housing E, and thence downwardly from said pulleys to a weight 3 that moves vertically inside of the housing E. Said housing is made long enough to provide for the vertical movement of said weight resulting from the rise and fall of the piston C, and if it is desired to reduce the height or overall length of the housing E, a wall C' can be formed in the piston at the center of same to receive the weight 3 when the piston C is in extreme elevated position, as shown in broken lines in the drawing.

A gas holder of the construction above described is inexpensive to build, because it is composed of only a few rugged parts of simple design, that are easy to fabricate, and in the event a cylindrical metal shell is used to constitute the side wall of the gas space and also the supporting means for said side wall, it is not necessary to provide a bottom for said shell, inasmuch as the vertically-movable piston C, which is gas-tight, constitutes the bottom of the gas chamber of the apparatus. Another desirable feature of such a gas holder is that it is easy to keep in an operative condition, and frequent inspections of same are not absolutely necessary, inasmuch as there are no stuffing boxes or similar chain or cable openings in the roof of the gas space that are liable to leak, or which require servicing to keep them gas-tight. All parts of the counterweighting mechanism of my improved gas holder are arranged on the interior of the apparatus in a gas-tight housing that guides the weight of the counterweighting mechanism and also supports the sheaves or pulleys of the counterweighting mechanism over which the weight chains or cables travel. And this highly desirable result is attained without forming a center opening in the piston, or employing any other sealing means for the piston than the fabric element which is attached to the peripheral edge of the piston and to the side wall of the gas chamber.

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

1. A gas holder having a gas space comprising a stationary side wall, a substantially cone-shaped stationary roof, a substantially cone-shaped piston that constitutes one horizontal wall

of said gas space and which is adapted to move upwardly into approximately nested relation with said roof, a gas-tight flexible diaphragm attached to said side wall and to the peripheral edge of said piston.

2. A gas holder, having a gas space comprising a roof and a side wall, a vertically-movable piston that constitutes the bottom of the gas space, a gas-tight, flexible diaphragm attached to said piston and to the side wall of the gas space, a gas-tight housing on said roof whose interior is in communication with the gas space, and a counterweighting mechanism for the piston positioned inside of said housing.

3. A gas holder, having a gas space comprising a roof and a side wall, a vertically-movable piston that constitutes the bottom of the gas space, a gas-tight, flexible diaphragm attached to said piston and to the side wall of the gas space, a gas-tight housing on said roof whose interior is in communication with the gas space, a counterweighting mechanism for the piston comprising sheaves or pulleys mounted in the upper end portion of said housing, flexible devices attached to the piston and leading upwardly from same over said sheaves, and a weight in said housing attached to said flexible devices.

4. An apparatus of the kind described in claim 3 in which the piston is provided with a well or depression adapted to receive said weight when the piston is in an elevated position.

5. A gas holder, having a gas space comprising a vertical side wall, a substantially cone-shaped roof for said gas space, a gas-tight housing projecting upwardly from the central portion of said roof, a vertically-movable piston constituting the bottom of the gas space and corresponding approximately in shape or form to the shape of said roof so as to be capable of moving into substantially nested relation with said roof, a gas-tight, flexible diaphragm attached to the peripheral edge of said piston and to the side wall of the gas space, and a counterweighting mechanism for the piston comprising sheaves or pulleys mounted inside of the housing adjacent the upper end of same, a vertically-movable weight in said housing, and flexible devices extending over said sheaves and attached at their opposite ends to the weight and to the piston.

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