Fig. 1.

Fig. 2.

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This invention relates to dry seal, pressure type gas holders, and particularly gas holders of the kind in which the "dry seal" or flexible, gas-tight sealing means between the piston and the side wall of the holder co-acts with a backing and reinforcing structure composed of or comprising an annular backing member attached to and projecting upwardly from the top side of the piston, and a vertically-shiftable, annular backing member arranged between the casing side wall and the above-mentioned backing member on the piston, the function of said backing and reinforcing structure being to assist in controlling the shape or form assumed by said flexible sealing means, and absorb forces exerted on said sealing means by the gases confined in the holder.

Co-pending application Serial No. 752,434, filed by John W. Allen on June 4, 1947, now Patent 2,555,767, issued May 29, 1951, discloses a dry seal gas holder equipped with a backing and reinforcing structure of the kind above mentioned, and my invention has for its main object to provide a gas holder of the general kind above mentioned, whose side wall is equipped with an inspection walk-way located on the interior of the casing of the gas holder in a position where it is adapted to serve as a convenient and easily accessible run-way or path for workmen engaged in inspecting the gas-tight joint between the flexible piston sealing means and the vertically-movable backing member for said sealing means.

Another object is to provide a dry-seal, pressure-type gas holder that is equipped with an internal walk-way or run-way of the kind above mentioned, which also serves as a wind girder for the casing side wall that is located on the interior of the casing.

Another object is to provide a gas holder which is of such construction that, in the event of an internal explosion, the gases resulting from the explosion will be effectively vented from the casing of the holder without rupturing the roof and/or side wall of the casing.

And still another object of my invention is to provide a gas holder whose casing side wall has an outwardly offset upper portion that forms a space for housing a vertically-movable weight which forms part of a leveling mechanism for the piston. Other objects and desirable features of my invention will be hereinafter pointed out.

Figure 1 of the drawings is an enlarged, fragmentary, vertical sectional view of a dry seal, pressure-type gas holder constructed in accordance with my invention; and

Figure 2 is a vertical, transverse sectional, diagrammatic view of said gas holder.

In the accompanying drawings, which illustrate one form of my invention, the reference characters 1 and 2 designate the upper portion and the lower portion, respectively, of the stationary side wall of a gas holder casing, and 3 designates the roof of the casing. The piston 4, which reciprocates vertically in said casing, forms the top wall of the space or chamber of the apparatus, in which the gases are stored, and the annular space between the piston and the side wall of the casing of the holder is sealed by a so-called "dry seal" usually made of gas-tight fabric, or other suitable flexible material, and constructed in such a manner as to provide for the rise and fall of the piston 4. In order to prolong the life of the above mentioned flexible, gas-tight material, the gas holder is equipped with a plurality of annular, concentrically-arranged abutment members that co-act with the above-mentioned "dry seal" during the cycle of operations of the apparatus, to absorb forces exerted by the gases on the dry seal and also causes said dry seal to assume a more or less predetermined shape or form during the rise and fall of the piston. In the apparatus herein illustrated the dry seal is composed of two flexible elements 5 and 6, and the means that absorbs forces exerted by the gases on the dry seal is composed of two concentrically-disposed annular abutment members 7 and 8 of different diameter, arranged in telescoped relation in such a manner that during the cycle of operations of the piston, the member 6 will move vertically relatively to the member 7, the member 7 being rigidly attached to the piston 4 and projecting upwardly from same, and the member 6 being arranged between the member 7 and the side wall casing of the holder.

As shown in Figure 2, the flexible sealing element 4 has one of its edges attached to approximately the middle point of the lower portion 2 of the casing side wall, and the other edge of said sealing element 4 is attached to the bottom edge of the abutment member 8 at a point on the outer side of said member, i.e., on the side face of said member presented to the casing side wall. The flexible sealing element 5 has one of its edges attached to the inner side of the abutment member 7 (the side face presented to the piston 4) at a point above the bottom edge of said member, and the other edge of the sealing element 5 is attached to the bottom edge of the piston abutment member 7 on the outer side of said member. The above described co-acting,
3 flexible sealing elements and fenders are so proportioned and arranged that when the piston A is at the end of its downward stroke, in its lowest position, the member 6 rests on or is supported by the bottom of the gas storage space of the holder and is disposed in telescoped relationship with the abutment member 7 carried by the piston A. At such times the internal pressure of the gas storage space presses the flexible sealing element 4 snugly against the outer face of the member 6, and presses the flexible sealing element 5 snugly against the outer face of the piston abutment member 1. During the first portion of an upward stroke of the piston, the member 6 remains at rest, and the member 7 on the piston, which is of less height or depth than the member 6, moves vertically relatively to said member 6 until the top edge of the piston member 7 comes into engagement with laterally-projecting brackets or arms 8 on the member 6 that overhang the member 7. Thereafter, during the continued upward movement of the piston, the member 5 moves with the piston and remains in fixed relationship with the member 7 on the piston. By the time the piston has reached the end of its upward stroke, as shown in Figure 2, the internal pressure of the gas storage space has stripped the flexible sealing element 4 off the member 6 and forced said sealing element into snug engagement with the upper half of the lower portion 2 of the casing side wall, and said internal pressure has also stripped the flexible sealing element 5 off the piston abutment member 1 and forced said sealing element into snug engagement with the inner face of the vertically-shiftable abutment member 6.

In a structure of the kind above described, it is necessary to examine the joint or connection between the sealing element 4 and member 6 at frequent intervals, so as to ascertain whether said joint is in a gas-tight condition. One of the main objects of my invention is to enable such inspections to be easily made while the gas holder is in service, and I attain this highly desirable result by outwardly offsetting the upper portion 1 of the side wall relatively to the lower portion 2 of said side wall, and arranging an inspection walk-way or run-way 9 at the lower end of said offset portion. When the piston is at or adjacent the end of its upward stroke, as shown in Figure 2, the walk-way B is located adjacent the bottom edge of the vertically-shiftable abutment member 6. Said walk-way extends continuously around the circumference of the casing side wall, and as it is located on the exterior of the gas storage space, it permits workers standing on same to easily and safely inspect the joint between the sealing element 4 and the member 6 while the gas holder is in service and nearly full. The particular manner in which the inspection walk-way 9 is constructed is immaterial, so far as my broad idea is concerned, but I prefer to build it so that it functions as a circumferential wind gird for the casing side wall.

It can be conveniently constructed at a low cost from a horizontally-disposed plate or web member tack-welded to the outer side of the lower portion 2 of the side wall, preferably at a point slightly below the top edge of said portion 2, and tack-welded to the inner side of the upper portion 1 of the side wall, preferably at a point slightly above the bottom edge of said portion.

In order to permit gases that are created in the casing as the result of an internal explosion, to escape rapidly from the casing, and thus not rupture the side wall and/or roof of the casing, I prefer to provide the walk-way B with vent openings or relatively great area, and also form an annular ventilating opening 13 being in the roof 3 of the casing and the top edge of the outwardly-offset upper portion 1 of the side wall of the casing. In the drawings, the walk-way B is illustrated as being provided with vent openings 13 that are disposed directly above the bottom edge of the upper half 1 of the casing side wall to preclude the possibility of rain being blown inwardly through the vent openings in the walk-way B. Instead of building the walk-way B in the form of a plate girder provided with ventilating openings 13, said walk-way can be constructed in the form of a lattice girder, whose open spaces constitute ventilating openings for the casing of the holder. The weight of the roof 3 and of the upper half 1 of the side wall of the casing of the gas holder, is carried by vertically-disposed posts 14 attached to the exterior of the lower portion 2 of the side wall, and provided with laterally-projecting tie members 15 attached to the offset upper portion 1 of the side wall. As shown in Figure 1, a hand rail 12 is attached to the posts 14 at a convenient distance above the walk-way B, so as to carry the walking platform on the upper edge of the gas storage that extends circumferentially around the side wall greatly simplifies the operation of inspecting joints in the piston sealing means that have to be carefully examined at frequent intervals, and offsetting the upper portion of the casing side wall provides an unobstructed space on the interior of the casing for one or more vertically-movable weights C that co-act with cables sustained by pulleys or guide wheels, so as to form a mechanism which holds the piston in a level position.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:
1. A gas-holder, comprising a casing having a side wall whose upper portion is offset outwardly relatively to the lower end of the casing, and carrying a vertically-movable piston in said casing, a vertically-movable, annular backing member arranged in the space between the piston and the casing side wall, a coacting annular backing member on the top side of the piston, disposed in telescoped relationship with said vertically-movable backing mem-
ber, a flexible sealing element attached to the casing side wall and to the lower end portion of said vertically-movable backing member, a second flexible sealing element attached to said vertically-movable backing member and to the peripheral portion of the piston, and an inspection walk-way extending circumferentially around the interior, of the outwardly offset portion of the casing side wall, at level which is adjacent the lower end of said vertically-movable backing member when the piston is at the end of its upward stroke.

2. A gas holder of the kind described in claim 1, in which said walk-way is formed by an annular wind girder that joins the outwardly offset upper portion of the casing side wall to the lower portion of said wall.

JOHN H. WIGGINS.

REFERENCES CITED
The following references are of record in the file of this patent:

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<thead>
<tr>
<th>Number</th>
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<td>Great Britain</td>
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