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METHOD OF BUILDING DRY SEAL, PISTON-TYPE GAS HOLDERS

Filed July 9, 1948

2 Sheets-Sheet 1

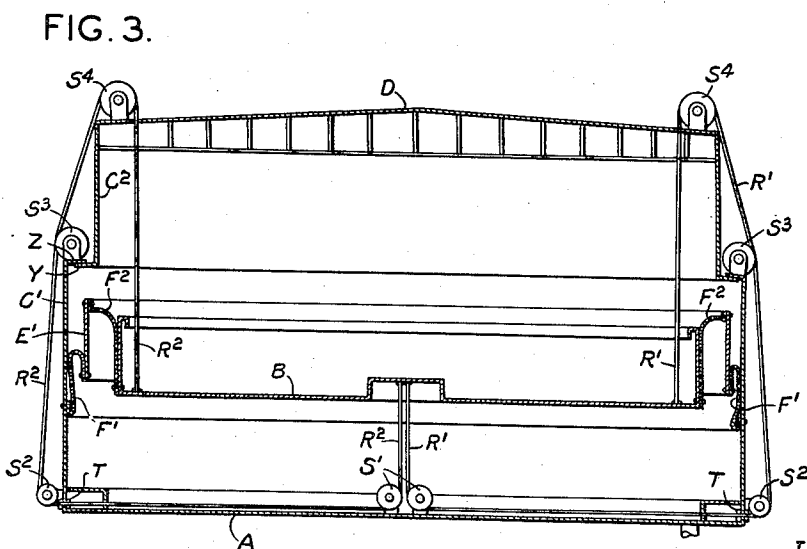
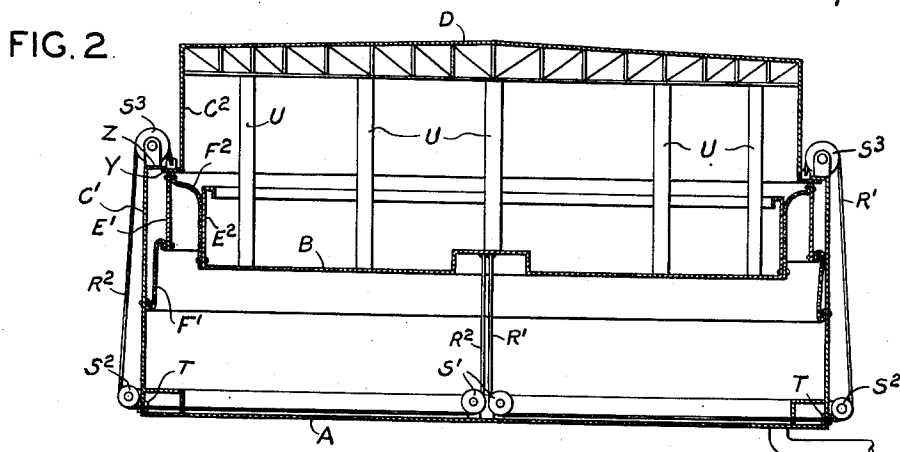
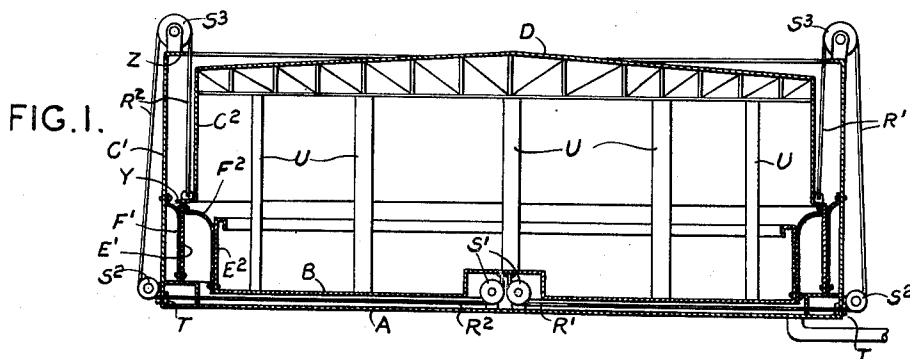
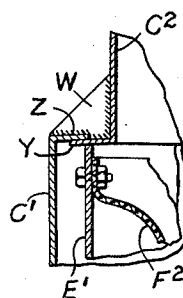


FIG. 2 a.



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FIG. 4.

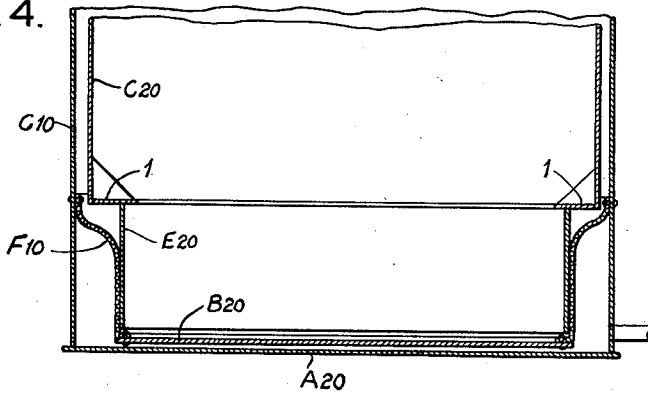


FIG. 5.

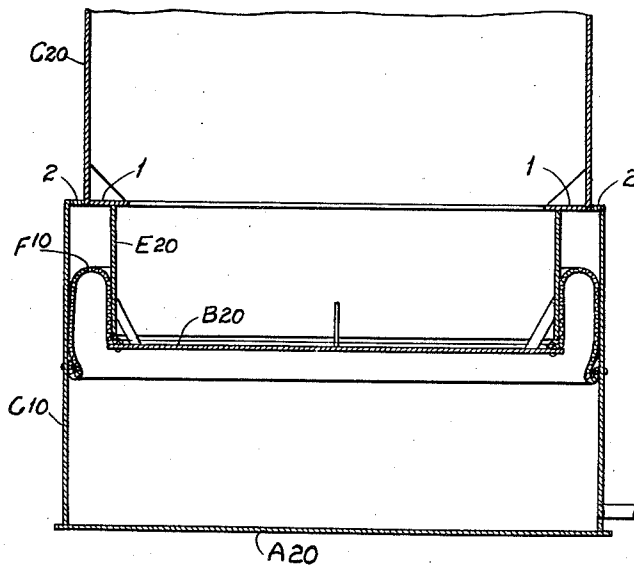
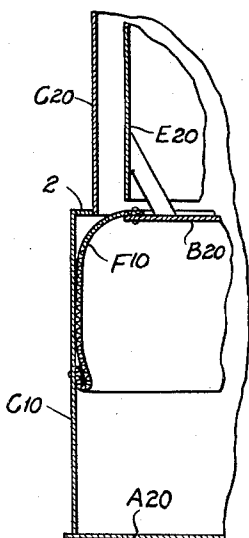


FIG. 6.



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METHOD OF BUILDING DRY SEAL, PISTON-
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This invention relates to piston type gas holders and other fluid storage apparatus of the kind that comprise a container or housing having a high side wall, a vertically-movable piston in said container, and a "dry seal" for maintaining a gas-tight joint between the piston and the container side wall.

The main object of my invention is to provide a method or procedure that effects a considerable saving in equipment and labor time, in constructing the container or housing of an apparatus of the kind referred to. Briefly described, my method or procedure contemplates building or fabricating the upper portion of the side wall and the roof of the container at a level or elevation lower than they occupy in the finished structure, then moving said parts upwardly into their final position by fluid pressure applied to the piston of the apparatus, and thereafter, permanently connecting or joining together the upper and lower portions of the container side wall.

Figure 1 of the drawings is a vertical, transverse sectional view of a partially completed dry seal gas holder, illustrating one way of practising my method and showing the upper portion of the container side wall and the roof, after they have been built or fabricated at a level lower than they occupy in the finished structure.

Figure 2 is a similar view, showing the upper portion of the container side wall and the roof, raised to the position they occupy in the finished structure.

Figure 2^a is a fragmentary sectional view, illustrating one way of connecting or joining the upper and lower portions of the container side wall.

Figure 3 is a vertical transverse sectional view of the gas holder after it has been completed.

Figure 4 is a fragmentary sectional view of a partially completed gas holder, illustrating another way of practising my method and showing how the upper portion of the container side wall can be directly mounted on and supported by the piston or a part carried by the piston, during the operation of building or fabricating the said upper portion of the container side wall.

Figure 5 is a view similar to Figure 4, showing the upper portion of the container side wall raised to its final position and ready to be connected or attached to the lower portion of the container side wall; and

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Figure 6 illustrates the container side wall after the upper and lower portions have been joined together, and showing the piston at the end of its upward stroke.

In Figures 1, 2, 2^a and 3, the reference character A designates the bottom of the container or casing of a dry seal, pressure-type gas holder, and B designates a vertically-movable piston in said container. Said container has a vertical side wall that comprises a lower portion C' and in inwardly off-set upper portion C², said lower portion being formed by or composed of a cylindrical shell of the same diameter as the bottom of the container, and said upper portion being formed by or composed of a cylindrical shell of less diameter than the shell C'. The basic idea of my method or procedure is that the shell C² is constructed as a complete unit, preferably on the interior of the shell C'; it is then raised to its final position by fluid pressure applied to the piston of the gas holder, and thereafter, the two shells C' and C² are permanently joined together so as to produce a side wall having an inwardly off-set upper portion. Due to the fact that the upper portion of the container side wall is built or fabricated close to the ground or at a considerably lower level than it occupies in the finished structure, a substantial saving is effected in equipment and labor time during the erection of the container side wall.

My broad idea is applicable to various kinds of dry seal, piston-type gas holders, and the upper portion of the side wall can be supported in various ways during the fabrication of same and during the operation of moving it upwardly into position for attachment to the top edge of the lower portion of the side wall. In Figures 1, 2 and 3 of the drawings I have shown how my method can be used in the construction of a gas holder whose piston sealing means is composed of two gas-tight fabric sealing elements F' and F² that co-act with a backing and reinforcing structure composed of a vertically-movable, cylindrical backing member E' arranged in the space between the piston and the container side wall, and an annular backing member E² rigidly attached to the piston and arranged in concentric relation with the vertically-movable backing member E'. As shown in the drawings, the sealing element F' is arranged on the outer side of

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the backing member E', and is attached to the container side wall and to the lower end of the backing member E', and the sealing element F² is arranged on the inner side of said vertically-movable backing member E', and is attached at one edge to the upper end of said backing member and attached at its other edge to the lower end of the backing member E² carried by the piston. In building a gas holder equipped with a piston seal backing and reinforcing structure of the kind just described, the fabric sealing elements F', F² and their co-acting backing and reinforcing members are connected with each other and combined with the piston and the lower portion C' of the container side wall while the piston B is resting on or supported by the bottom of the container, thereby completing the storage chamber of the apparatus and producing a gas-tight space which will hold a fluid under pressure. Either before or after the fabric sealing elements have been attached to the parts with which they are connected, I build a cylindrical shell C² provided at its bottom edge with a laterally-projecting flange Y that laps over and rests upon the top edge of the vertically-movable backing and reinforcing member E', as shown in Figure 2^a. After completion of said shell C², which is to constitute the upper portion of the container side wall, the roof D of the container is fabricated and permanently attached to the top edge of said shell. Temporary vertical supports U are then arranged between the roof D and piston B, and thereafter compressed air or the like is admitted to the storage chamber of the apparatus formed by the piston, by the bottom of the container, by the lower portion C' of the container side wall and by the piston sealing elements F' and F². The pressure said air exerts on the piston and on the sealing elements F' and F² causes the piston and the backing member E' to move upwardly until the flange at the bottom edge of the shell C² comes into engagement with a co-acting, inwardly-projecting flange Z at the top edge of the shell C', which forms the lower portion of the container side wall. The two side wall portions C' and C² are then permanently joined, preferably by welding them together and also installing lugs W, shown in Figure 2^a that help transmit the load of the shell C² and roof D to the lower portion C' of the side wall. During the operation of raising the shell C² and roof D into the position they occupy in the finished structure, said parts must be maintained in a level, or substantially level, position. Any suitable balancing mechanism can be used for this purpose. The one herein illustrated consists of a series of cables R', R², etc. attached to the center of the piston B and leading downwardly from the center of same under sheaves S' mounted on the bottom A of the container, then outwardly over the bottom of the container and through openings T in the side wall shell C' equipped with stuffing boxes, then around sheaves S² and S³ mounted at the lower and upper ends, respectively, of the side wall shell C', and thence downwardly from the top sheaves S³ to points of attachment on the flange and at the lower end of the side wall shell C². After the two side wall shells C' and C² have been permanently joined together, as previously described, the temporary supports U between the piston and roof are removed. The cables R', R², etc. are then disconnected from the shell C², said cables are lengthened, and thereafter said lengthened cables are passed over sheaves S⁴

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carried by the roof, and are lead downwardly from said sheaves to points of attachment adjacent the peripheral edge of the piston B, as shown in Figure 3, so as to produce a stabilizing mechanism which holds the piston level when the apparatus is performing its function.

In using my method or procedure to build a dry seal, piston-type gas holder whose piston sealing means is formed by a single fabric sealing element F¹⁰ that co-acts with an annular backing member E²⁰, attached to and projecting upwardly from the peripheral edge of the piston B²⁰ as shown in Figures 4, 5 and 6, the shell C²⁰ which is to form the upper portion of the side wall of the container, is supported by the annular backing member E²⁰ on the piston during the operation of building or fabricating said shell, and also while the roof of the container is being fabricated and attached to said shell. During this operation the piston B²⁰ rests on the bottom A²⁰ of the container, and the shell C²⁰ is supported on the backing member E²⁰ by removable lugs I detachably connected to the lower end of the shell C²⁰ and projecting inwardly from same. After the fabric sealing element F¹⁰ has been attached to the periphery of the piston and to the shell C¹⁰, which forms the lower portion of the container side wall, compressed air or the like can be admitted to the space between the piston and the bottom of the container so as to move the piston upwardly high enough to cause the bottom edge of the shell C²⁰ to be in approximately horizontal alignment with the top edge of the shell C¹⁰. Said shells are then permanently joined together preferably by welding a ring 2 to the adjacent end portions of said shells, after which the temporary supporting lugs I are removed from the shell C²⁰, as shown in Figure 6, so as to not interfere with the vertical movement of the backing member E²⁰ on the piston during the rise and fall of the piston.

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

1. A method for building a dry seal, piston-type gas holder composed of a container, a piston in said container and a flexible sealing means bridging the space between the piston and container side wall and attached to said parts, consisting of the following procedure:

(1) Building the bottom of the container of the apparatus and the lower portion of the container side wall;

(2) Building the piston of the apparatus on the interior of the said lower portion of the container side wall while the parts of said piston are supported by the bottom of the container;

(3) Building the upper portion of the container side wall above the piston, at a level considerably lower than its level in the finished side wall of the container;

(4) Installing a flexible sealing means between the piston and the lower portion of the container side wall and attaching said sealing means in a gas-tight manner to the lower portion of the container side wall and to the piston;

(4a) Fabricating and attaching a roof to said upper portion of the container side wall;

(4b) Then arranging temporary, vertically-disposed supports between said roof and the piston;

(5) Then admitting a medium under pressure to the space bounded by said flexible sealing means, by the piston, by the container bottom and by the lower portion of the container side wall, so as to raise the upper portion of the side

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wall to the position it occupies in the finished side wall, and thereafter permanently connecting the upper and lower portions of the container side wall together.

2. The method described in claim 1, plus the procedure of fabricating the roof of the apparatus and attaching said roof to the upper portion of the container side wall, prior to the operation of raising said upper portion to its final position in the container side wall.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
2,066,297	Mason	Dec. 29, 1936
2,105,080	Jagshitz	Jan. 11, 1938
2,304,354	Harvey	Dec. 8, 1942
2,355,874	Laird	Aug. 15, 1944
2,360,222	Gruening et al.	Oct. 10, 1944