Dec. 22, 1931. F. H. WAGNER 1,838,016

WATERLESS GAS HOLDER

Filed Oct. 23, 1926 2 Sheets-Sheet 1

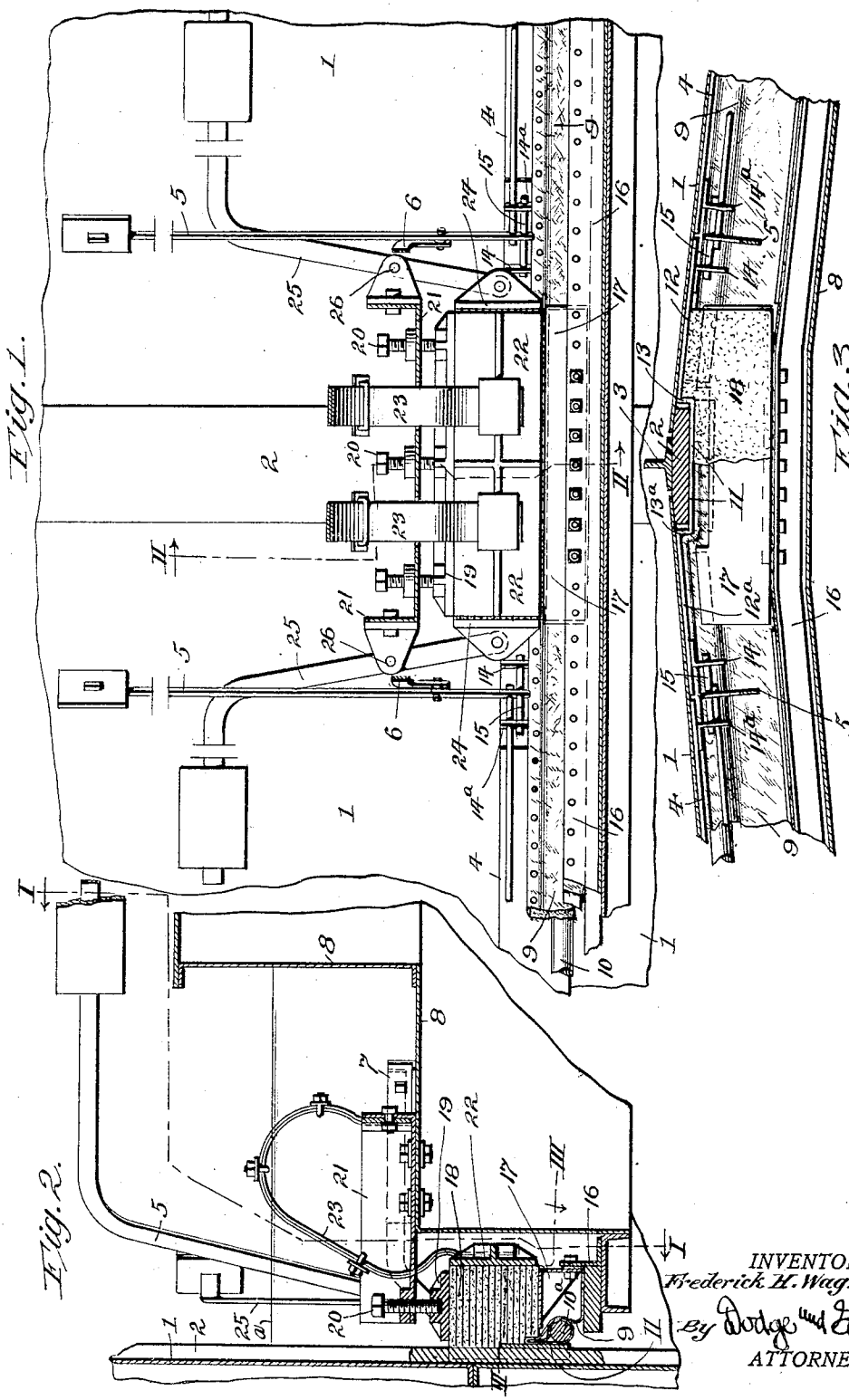


Fig. 1.

Fig. 3.

Fig. 2.

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Fig. 4.

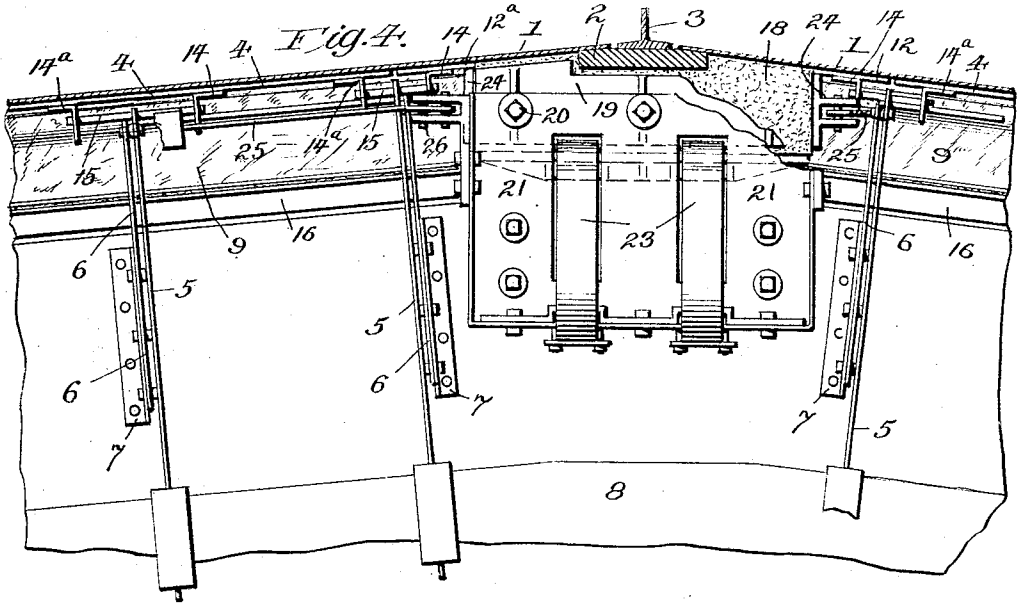
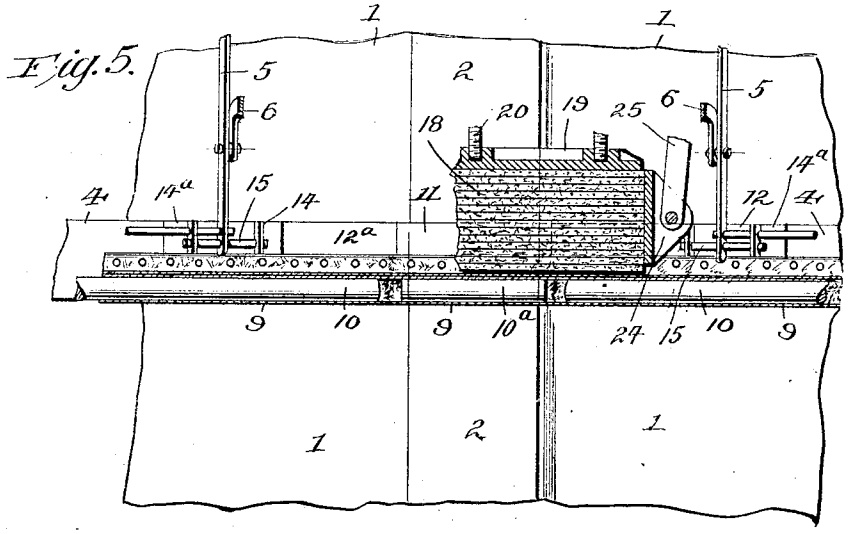


Fig. 5.



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UNITED STATES PATENT OFFICE

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WATERLESS GAS HOLDER

Application filed October 23, 1926. Serial No. 143,765.

This invention pertains to gas holders and relates more particularly to that type now commonly known as waterless gas holders. Such holders are set forth and claimed in Letters Patent to Jagschitz Number 1,275,696 dated August 13, 1918 and in a broad sense the holder may be said to comprise a shell within which there is mounted a piston-like closure provided with means around its edge to effect, in connection with a proper liquid sealing medium such as tar, a gas tight joint between the inner wall of the shell and the adjacent portion or periphery of the closure.

Stated more specifically the Jagschitz or commercial waterless gas holder may be said to employ a series of shoes or rubbing bars which are forced outwardly into contact with the inner face of the wall of the holder or shell and cooperating therewith is means to force said bars into face-wise contact with such inner surface. Means is also provided for holding a body of liquid, such as tar, adjacent the periphery of the piston so that said tar will, in a measure, lubricate the shoes and effect a seal between the shoes and the shell of the holder. Under certain conditions difficulty has been found in effecting a tight joint around and about the vertically disposed columns which are commonly employed in the building up of the holder.

The present invention has for its main object the provision of means whereby leakage of the sealing medium along the edges of the columns will be prevented or minimized to such an extent that the leakage becomes negligible.

The invention is illustrated in the annexed drawings wherein,

Figure 1 is a sectional elevation of the sealing means which I propose to employ, the section being taken on the line I—I of Figure 2;

Figure 2 a transverse section taken on the line II—II of Figure 1;

Figure 3 a horizontal section taken on the line III—III of Figure 2;

Figure 4 a top plan view partly broken away; and

Figure 5 a vertical sectional view with parts broken away to more clearly show the rubbing bars or shoes and the parts which cooperate therewith.

In the drawings 1 denotes the plates of the shell or body of the gas holder which at their adjacent vertical edges are secured to vertically disposed columns, or corner posts as they are sometimes termed, said elements comprising an inner member 2 and an outer strengthening member 3 which latter may be of any desired form.

Member 2, see Figures 2 and 4, is located inward of the plates 1 and as a consequence it presents within the shell a relatively wide inner face and two narrow faces or edges which latter stand respectively at an angle to the face of the adjacent plate element 1. It is about this inwardly projecting column that the greatest difficulty obtains in effecting a tight joint.

As in the Jagschitz patent mentioned, rubbing bars 4 are employed, said bars bearing face-wise against the inner face of the shell and being urged into contact through action of weighted levers 5 fulcrumed on arms 6 secured to brackets 7 secured to the piston or closure member 8.

Said member 8, as will be seen upon reference to Figure 2 as in the Jagschitz patent, is so formed at its periphery as to produce a channel or trough for the reception of a liquid sealing medium, the bottom of the trough adjacent the rubbing bars being made by a canvas strip 9 secured to the upper inner face of the shoes and to a fixed portion of the piston or closure 8. Wooden rods or bars 10 are associated with the textile strip 9 to prevent the same from being forced outwardly under the weight of the tar into rubbing contact with the wall of the holder. All of the foregoing is in accord with previous practice.

In accordance with the present invention a special form of rubbing bar, together with associated sealing means is provided at each corner post and as the arrangement is duplicated at each post a description of one such arrangement will suffice.

Owing to the fact that the plates 1 will inevitably present a more or less wavy face it is impossible to effect a tight joint by a shoe pressed outwardly thereagainst and against the broad face of the corner post member 2. Furthermore, it is impossible to have the shoe so fit into the re-entrant angle between the plate and the edge of member 2 as to effect a tight joint; any such close fitting also tending to cause a cramping action under movement of the closure up and down in the gas holder shell.

In the present case there is provided a shoe of the form best shown in Figure 3. It may be said to comprise a central section 11 and laterally extending wing sections 12 and 12ª connected to the former by intermediate short sections 13 and 13ª, respectively. Section 11, which bears against the wide inner face of member 2, is of such length that the connecting elements 13 and 13ª stand in spaced relation to the edges of said member 2, while the wing sections 12 and 12ª bear against the plates 1 and terminate close to the ends of the main rubbing bars 4.

Those weighted levers 5 which are mounted adjacent to each side of the corner posts are connected to the wings 12 and 12ª through brackets 14 secured to the wings and similar brackets 14ª secured to the adjacent ends of the bars 4, pivot pins or rods 15 extending through the lever and brackets. The corner post rubbing bars are thus forced outwardly into contact with the broad face of the corner bar and also against the plates. The canvas element 9 extends along and is secured to the inner face of this intermediate or corner post rubbing bar, and a short protecting bar 10ª, see Figure 5, is employed in conjunction therewith opposite the broad face of the post.

To prevent the liquid sealing medium from flowing down through the spaces between the edges of the corner post and the elements 13 and 13ª of the rubbing bar there is provided a special sealing means for such edges, which means also coacts with the inner face of the post. Adjacent the post and extending upwardly from a fixed element 16, see Figure 2, is a bracket 17 which forms the support for a flexible absorbent pad, preferably composed of a plurality of layers of felt or cloth 18. The various layers are so notched or cut out on their outermost edge that they conform to the adjacent parts—namely the canvas strip 9, the shoe, and above the latter the element 2 of the corner post. With reference to the latter, see Figure 4, it will be noted that the felt bears directly against the inner face and both edges; it also bears against the shell to each side of the post. Means is provided to hold the felt packing in place. To that end an overlying pressure plate 19 is employed, said plate being held in position by set screws 20 mounted in a fixed bracket 21.

A pressure plate 22 urged in an outward radial direction by bowed springs 23 (or equivalent means) is positioned against the inner face of the pad.

In order to prevent the felt from elongating and thus opening up a channel at the edges of the bar or element 2, end pressure plates 24 are employed, said plates being constantly forced against the felt by the action of weighted levers 25 fulcrumed at 26 and pivotally connected to the plates.

It will thus be seen that the intermediate or corner post rubbing bar carries the canvas around to the main rubbing bars and, to a greater or less degree effects a seal with the corner post. It will likewise be seen that the felt, be it in layers or a single thick piece, will provide an effectual seal for the post and particularly for the edges thereof and the immediately adjacent portions of the shell plates to each side of the post. The felt being submerged in the sealing liquid, see Figure 2, the level of which is indicated by *a*, there is no tendency for the same to become hard.

By reason of its nature the tendency of the felt to wear away under friction due to the up and down movement of the piston or closure is negligible.

While I have referred in the foregoing description to tar as the sealing medium, it is to be understood that any liquid which will serve the purpose may be employed.

In operation the sealing liquid tends to lubricate the parts and do away with friction between the shoes and the felt packing where they contact the wall of the shell, at the same time tending to seal any openings which may be present between the parts and prevent the escape of gas from the holder.

I have not deemed it essential to illustrate in this case the means for returning such liquid to the channel or reservoir as may escape downwardly past the shoes and the felt seals for that feature is set forth in the Jagschitz patent above mentioned.

It will be understood, of course, that the holddown plate 19 will be so adjusted with reference to the underlying felt as to prevent the felt from tipping up when the piston moves downwardly. The pressure must not be excessive and in fact is such as to allow the end and side pressure plates to move the felt over the bracket and hold the same in direct contact with the corner post rubbing bar, the corner post and that portion of the shell which lies to each side of the corner post.

Having thus described the invention, what is claimed is:

1. In a waterless gas holder, the combination of a shell having a series of vertically disposed posts embodied in its structure, said posts extending inwardly of the shell; a piston-like closure for the shell; a series of rubbing bars bearing against the inner face of the shell intermediate the posts; a rubbing bar located at each post, said bars having a contour substantially the same as the contour of the inwardly projecting portion of the post and likewise having lateral projections extending substantially parallel to and contacting the shell to each side of the post; a trough formed about the piston-like closure, embodying a flexible element located at the lower portion thereof, said element being attached to the rubbing bars; means urging said bars into face-wise contact with the shell; and means located at each post and within the trough effecting a sealing contact with those faces of the post exposed within the shell.

2. A structure as set forth in claim 1 wherein the sealing means at each of the posts is composed of felt notched out to conform to the contour of the posts, combined with means urging said felt into contact with the inwardly exposed faces of the posts.

3. A structure as set forth in claim 1 wherein the sealing means at each of the posts is composed of superposed layers of felt notched out to conform to the contour of the posts, combined with a support for such layers; and means acting to force the felt into contact with the edges and inner face of the post.

4. In a waterless gas holder, the combination of a shell having a series of vertically disposed posts embodied in its structure, said posts extending, in part at least, inwardly of the shell; a piston-like closure for the shell; a series of rubbing bars bearing against the inner face of the shell intermediate the posts; a rubbing bar located at each post, said latter bars having a contour substantially the same as the contour of the inwardly projecting portion of the post and likewise having lateral projections extending substantially parallel to and contacting the shell to each side of the post; a trough formed about the piston-like closure embodying a flexible element located at the lower portion thereof, said element being attached to the rubbing bars; means urging said bars into face-wise contact with the shell and the posts; a bracket secured to a fixed portion of the lower part of the trough opposite each post, said bracket extending outwardly toward the inner face of the post; a plurality of layers of felt resting upon said bracket, said layers being notched out to conform to the adjacent rubbing bar and to the post and extending to each side of the post and bearing against the adjacent portion of the plates of the holder; means for holding said layers against vertical displacement; and means acting upon the ends of the felt layers and upon the inner edges thereof serving to force the layers into contact with the plate, the inner face of the corner post and the edges of the latter.

In testimony whereof I have signed my name to this specification.

FREDERICK H. WAGNER.