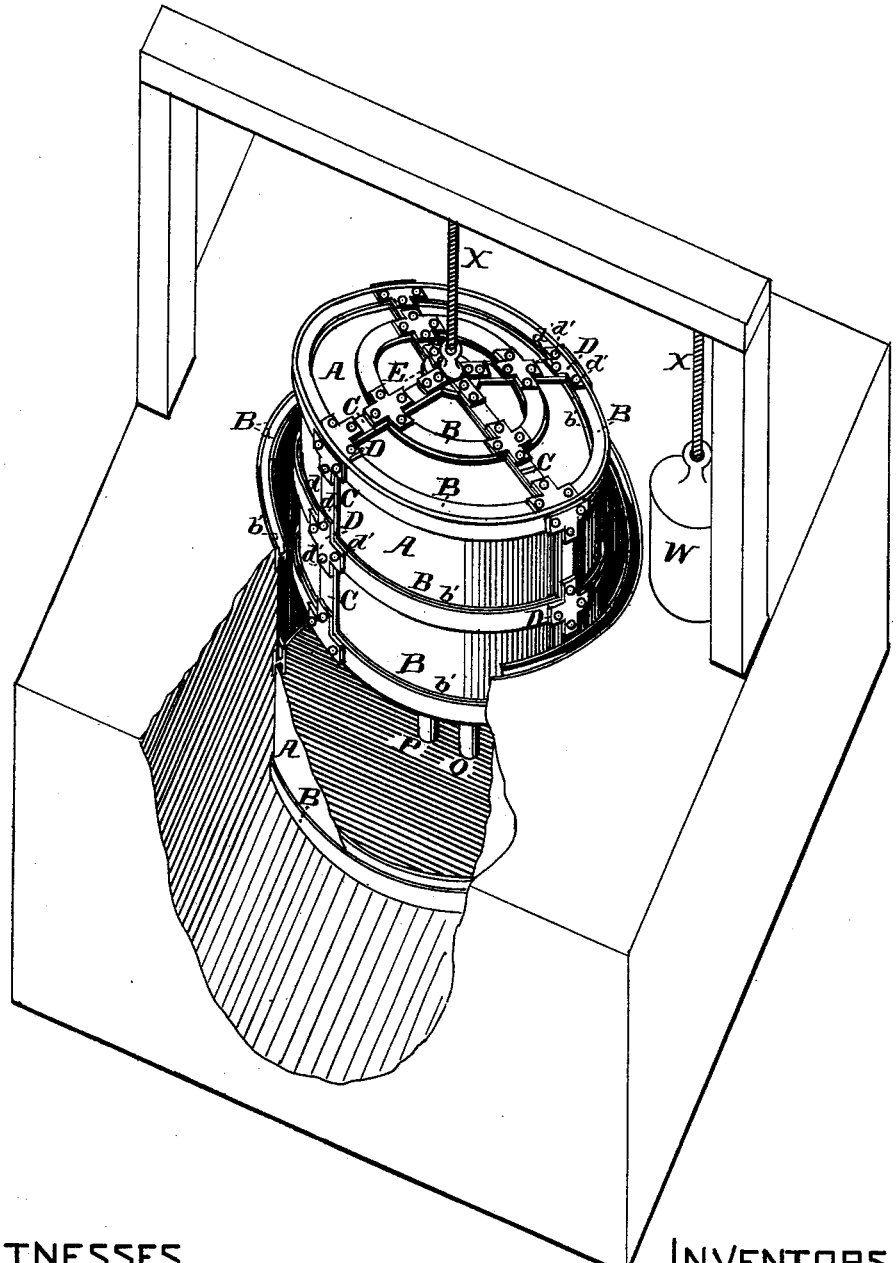
2 Sheets—Sheet 1.

W. & R. H. SMITH.

GAS-HOLDER.

No. 190,918. Patented May 15, 1877.



WITNESSES.

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& Alexander Mason ATTYS.

2 Sheets—Sheet 2.

W. & R. H. SMITH.

GAS-HOLDER.

No. 190,918. Patented May 15, 1877.

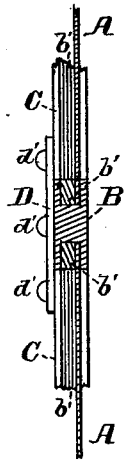


Fig 1.

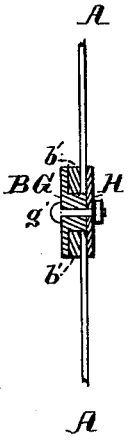


Fig 2.

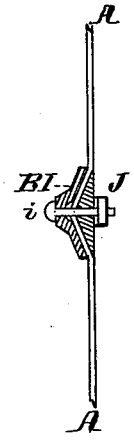


Fig 3.

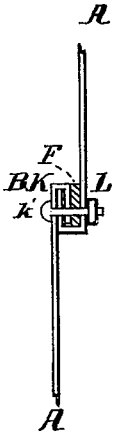


Fig 4.

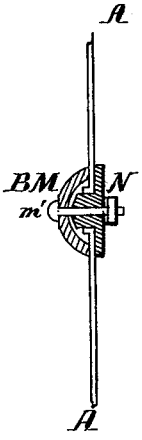
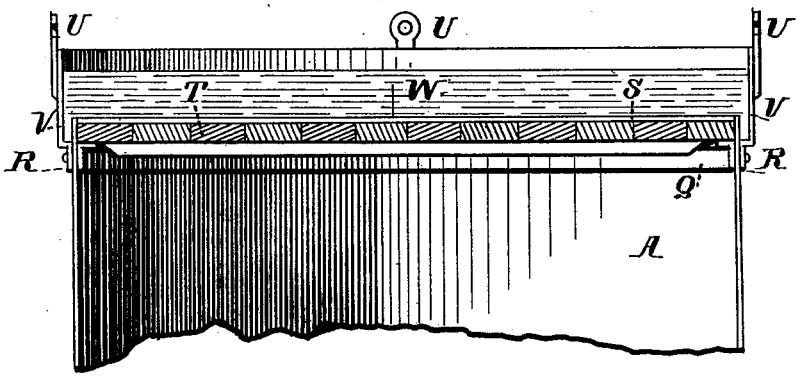


Fig 5.

Fig 6.



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UNITED STATES PATENT OFFICE.

WILLIAM SMITH AND ROLAND H. SMITH, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN GAS-HOLDERS.

Specification forming part of Letters Patent No. **190,918**, dated May 15, 1877; application filed October 12, 1876.

To all whom it may concern:

Be it known that we, WILLIAM SMITH and ROLAND H. SMITH, of Pittsburg, in the county of Allegheny and in the State of Pennsylvania, have invented certain new and useful Improvements in Gas-Holders for Illuminating and other Gases; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

Our invention relates to that class of holders or reservoirs used for the storage of gas for illuminating and other purposes.

The object of our invention is to simplify the construction and produce a perfectly gas-proof holder and water-tight tank for the same.

To accomplish this, instead of riveting our sheets of metal together to form the holder, as at present is done, we first form a frame or skeleton thereof by joining together a system of segmental and straight pieces, they having grooves or other analogous arrangement for the reception of a gas or water proof cement, and on inserting the sheets of metal into said grooves, and packing the same with cement the joints are made, forming a perfectly gas-proof holder, the trouble with those heretofore used being that no matter how carefully constructed there is always a heavy per centage of loss from escaping gas. There is the same trouble in the tanks from escaping water.

In Plate 1, Figure 1, we show an isometrical perspective view of our reservoir and water-tank, partly in section.

Like letters of reference refer to like parts in all the drawings.

A A represent the sheet-iron or other material forming the shell of the holder and tank. These sheets are inserted in the grooves of the segmental jointing-pieces B B and straight jointing-pieces C C. The grooves in these pieces are formed so large and deep as to give sufficient room for the reception of the cement to pack the joint. These jointing-pieces B B and C C are united at their ends and bound together by the fastening-pieces D D, or their equivalents, of any desired shape or form, secured by the bolts or rivets *d' d' d' d'*. Only four of these bolts are shown here as forming the connection; but in practice we will probably use more and pass them through the sheet A and jointing-pieces B D, in order to help stiffen the whole.

The top of the holder is formed in the same way. We have shown here the angular turn from the sides to the top as in one circular piece. In small holders this can be accomplished, and even in large holders, where wrought-iron is used for the joints; but where cast-iron is the material used, all the large circles will have to be made in segments. On the top the straight jointing-pieces radiate from a central crown-piece, E, or its equivalent, to the circumference, and the holder may be balanced by an attachment to this crown-piece X X, connecting with the weight W, or it may be hung from the sides, as desired.

The formation of the accompanying water-tank to the holder is substantially the same, only that the cement-joints of the holder are on the exterior surface, while those of tank are on the interior. The floor of the tank may be made in any way thought advisable, of wood or brick packed in cement, or puddled clay, &c. Through this floor the inlet-pipe P and outlet-pipe O appear rising to the height of the top of the tank.

In Plate 2, Fig. 1, we have shown in section an enlarged view of the mode of jointing. A A are the plates or sheets resting in the channels *b b b b* of the circular jointing-pieces B and straight jointing-pieces C C. D is the binding-piece, securing the whole together by the bolts *d' d' d'*.

As this method of securing the joints, for the purpose of preventing the escape of gas and water, may be accomplished by many mechanical changes of the jointing-pieces, we have thought best to illustrate some of those that have suggested themselves to us, the one heretofore described being considered by us the most practical.

In Plate 2, Fig. 2, the jointing-piece is in two parts, one, B G, being in a T-shape with a plate, H, secured to it by the bolt *g'*, thus forming the channels *b' b'*.

In Plate 2, Fig. 3, the angular-faced piece B I has its mate J secured to it by the bolts *i*, the plates A A being bent to suit, and B I be-

ing filled with cement, and J tightened up the joint will be made. The nuts of the bolts in all such cases can be packed by a suitable washer.

In Plate 2, Fig. 4, the sheet-iron A A is bent in the form shown at B, K, and L, and secured by the bolt *k'*, thus making space for the cement F.

In Plate 2, Fig. 5, the T-shaped piece N is covered by the arched piece B M, filled with cement, and held together by the bolts *m'*. Various other forms could be shown, and we do not confine ourselves to any.

In constructing the top of the holder economy or safety may induce the adoption of the plan illustrated in Plate 2, Fig. 6, where the top is constructed of wood T, suitably jointed and covered with the cement S, and supported by the angle-iron Q, attached to the body of the holder A. On the outside the water-ring V is attached by the angle R. U U U are eyes for lifting, V being filled with water, W. It not only acts as a seal to the escape of gas, but serves to produce and regulate the pressure thereon in the pipes.

When large holders are constructed on our principle it will probably be necessary to stiffen them by a series of diagonal and vertical rod-braces in the interior. They may also be, if required, stiffened by small light straps on the exterior surface.

We prefer wrought-iron for use in the jointing-pieces; but it is evident that the same may be made of cast-iron or other suitable material, and in any number of parts.

Though plastic cement or packing will probably be the best for the purpose of making our joint, a rigid metallic packing can be used, such as lead or other suitable metal or alloy, and a flexible packing may also be used.

The manner of making our joint is as follows: The sheets A A are held by temporary wedges at suitable distances apart against one side of the channel *b'*. Any appropriate cement or packing is then introduced, and, as the work progresses, the wedges are removed or allowed to remain. One tier after another is thus built until the holder is finished, the cement is allowed to dry, and a coat of paint is applied, and the reservoir or tank is ready for use.

Reservoirs can be constructed on our plan for the storage of any fluid substance, as well as for gas.

We claim as our invention—

1. A gas holder or tank constructed of sheet-metal plates A A, united together by means of the segmental-grooved jointing-pieces B B, and the straight-grooved jointing-pieces C C, and the cement filling between the grooved jointing-pieces and the plates, substantially as set forth.

2. The binding-pieces D D, in combination with the jointing-pieces B C, and plates A, substantially as and for the purposes herein set forth.

In testimony that we claim the foregoing we have hereunto set our hands this 22d day of August, 1876.

WILLIAM SMITH.
ROLAND H. SMITH.

Witnesses:
ANDREW HUMBERT,
B. C. SAWYER.