No. 826,747. PATENTED JULY 24, 1906.

T. REDMAN.

APPARATUS FOR PURIFYING GAS.

APPLICATION FILED AUG. 22, 1904.

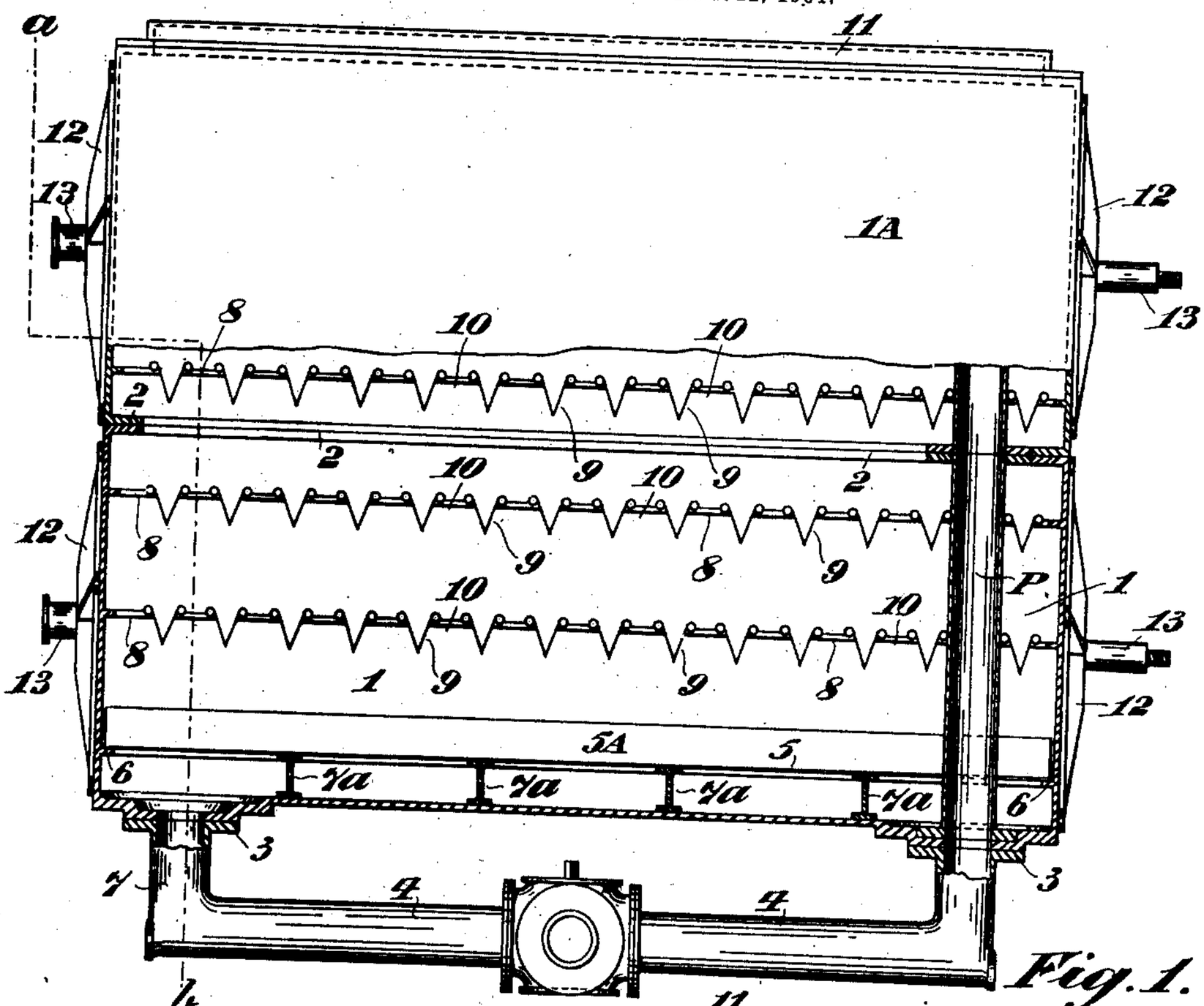


Fig. 1.

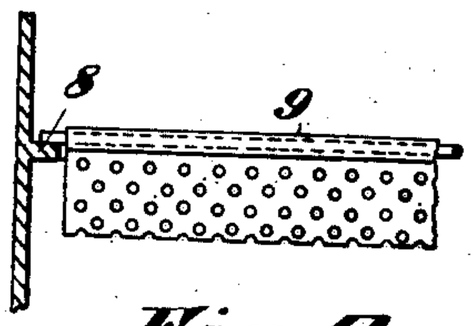


Fig. 4.

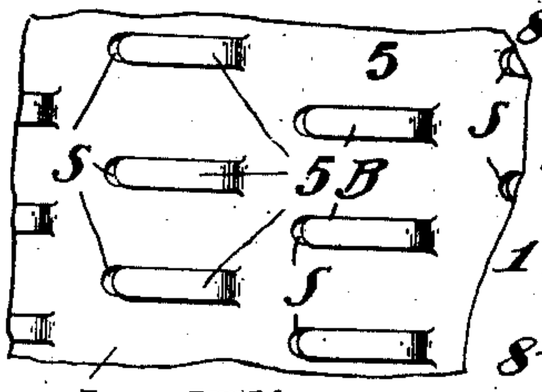


Fig. 6.

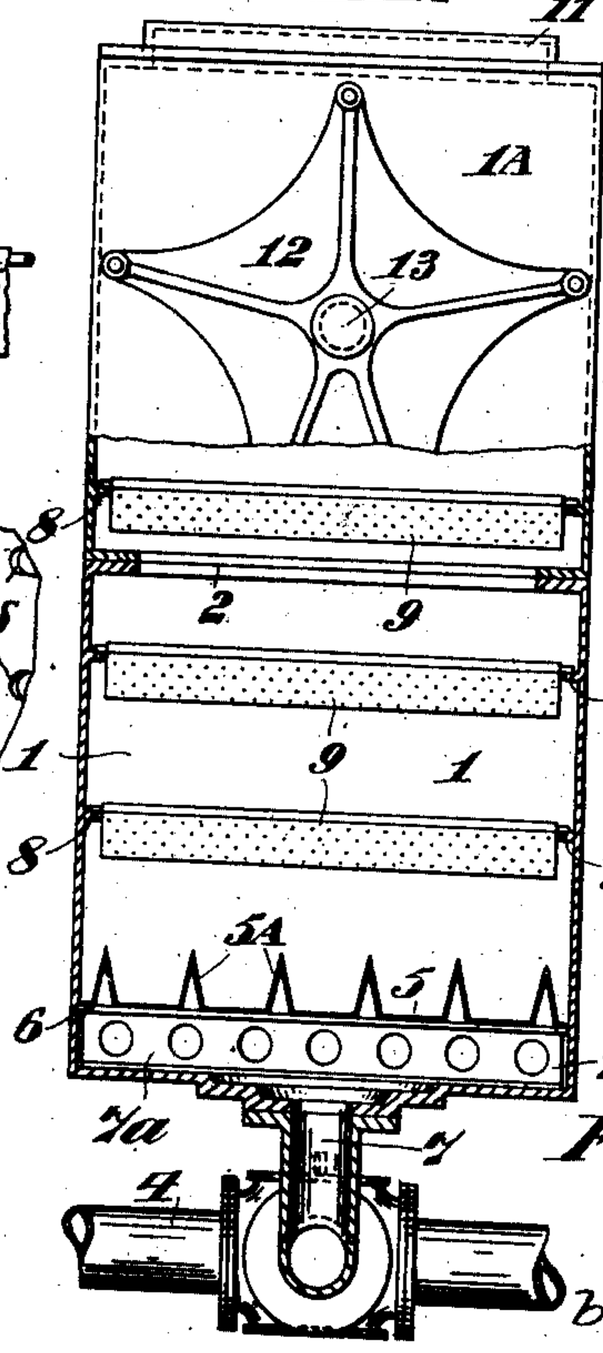
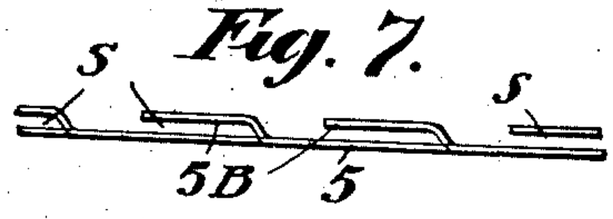


Fig. 7.



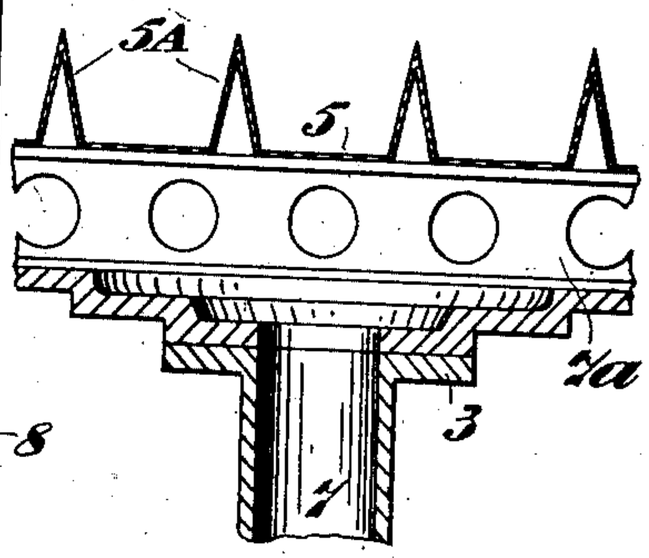


Fig. 3.

Fig. 5.

ATTEST.

C. Middleton

Edward L. Reed

Fig. 2.

INVENTOR.

THOMAS REDMAN.

By Spear, Middleton, Donaldson & Spear

Attys.

UNITED STATES PATENT OFFICE.

THOMAS REDMAN, OF BOLTON, BRADFORD, ENGLAND.

APPARATUS FOR PURIFYING GAS.

No. 826,747. Specification of Letters Patent. Patented July 24, 1906.

Application filed August 22, 1904. Serial No. 221,766.

To all whom it may concern:

Be it known that I, THOMAS REDMAN, a subject of the King of Great Britain and Ireland, residing at The Priory, Bolton, Bradford, in the county of York, England, have invented certain Improvements in and Relating to Apparatus for Purifying Gas, (for which I have made application in Great Britain for a patent numbered 9,514 and dated April 26, 1904,) of which the following is a specification.

The object of this invention is to construct and combine with tanks applicable for the purification of gas grid-plates and grid-bars constructed so as to utilize to a fuller extent the purifying material and internal capacity of said tanks in a manner for preventing the consolidation or "packing" of the purifying material therein, and thereby to reduce the excessive resistance to the flow of gas through same, such resistance as is experienced with purifiers provided with grids constructed and applied as hitherto; also, to arrange the tanks and internal bearings provided for supporting the grid-bars and purifying material, so that two or more tanks may be utilized and form a tower-purifier built in sections and adapted so that each tank or section comprising the tower may, along with the purifying material within same, be mechanically removed from its position and emptied into a receptacle adapted to break up and pulverize the particles as they descend and repeatedly turn them over and change their position in relation to each other for exposing the purifying material in such a way as to require little attention and labor for effecting the easy and speedy revivification of said material.

In describing my invention in detail reference is made to the accompanying sheet of drawings, in which—

Figure 1 represents an elevation of a tower-purifier, partly in section, the bottom tank resting upon the gas-main range of pipes. Fig. 2 is an end elevation of same, partly in section, through line *a b*. Fig. 3 is a detached sectional detail of a portion of the bottom tank of a tower-purifier. Fig. 4 is an elevation of a grid-bar, and Fig. 5 an end view of same. These detached details are drawn to an enlarged scale. Figs. 6 and 7 are views of a modification.

In carrying out my object the bottom tank of the illustrated gas-purifying-tower is denoted by the numeral 1, and the tank 1^A above forming part of tower-purifier is jointed to tank 1 by internal unbolted flanges 2, the bottom tank 1 of tower-purifier resting upon the flanges 3 of gas-main range of pipes 4, comprising inlet and outlet pipes to purifier arranged in the ordinary manner. Suitable flexible joint-forming material is placed between all the flanges, which is compressed by the weight of tank and contents without the aid of bolts or the like to an extent sufficient to prevent the leakage of gas.

The bottom tank 1 of purifier is adapted for supporting a metallic grid-plate 5, made in sections which cover the entire area of tank. The grid-plates rest upon flange 6, formed on tank side plates and upon girders 7^a, perforated through the web for effecting the distribution of gas flowing from the inlet branch 7 throughout the whole under surface of the metallic grid-plates 5. Each section or piece of grid-plate 5 is flat in places, as shown, and perforated, and in order to utilize metallic plates instead of bulky wood and like grids, and thus obtain greater capacity within the tank for the purifying material, as well as a greater and more evenly-distributed perforated area for the gas to pass and come into immediate contact with the purifying material above, the grid-plates are conical in the vertical direction, as shown at 5^A.

Above the metallic grid-plates 5, and in each tank forming a tower-purifier, flanges 8 are formed around the interior surface for the reception and support of metallic grid-bars 9, perforated and of conical section, placed a short distance from each other, so that when purifying material is placed within the tanks the perforated conical sectioned grid-bars 9, along with the unoccupied interior of the tanks, become charged with said material, and as it becomes more consolidated on settling the conical sectioned grid-bars 9 form a base against and upon which the material presses to such an extent as to bridge the material over the spaces 10 between said grid-bars, by which arrangement each tier of grid-bars forms a rigid perforated base for supporting the layer of purifying material resting thereon deposited between one tier of grid-bars 9 and another tier immediately above, thus isolating the weight, and thereby arresting excessive consolidation of purifying material by dividing the weight of same into layers or sections, thus preventing "packing" and undesirable density at and toward the bottom of tank.

By each tier of perforated grid-bars 9, sup-

porting the layer of purifying material deposited therein, the entire depth of said material is retained in a state of comparative spongy looseness, and consequently porous, thereby removing the cause of the hitherto excessive resistance to the flow of gas passing through the purifiers.

By depositing and supporting the purifying material in the manner described it is retained in a comparatively loose condition, so that tower-purifiers may be constructed and gas passed through same at a low pressure by reason of the retained openness of the purifying material, through the whole of which the gas will readily permeate and be more effectually purified than is the case when wood and like bulky grids of the ordinary construction are used and applied as hitherto.

The perforations through metallic grid-plates 5 may be of the elongated type, such as are shown by Figs. 8 and 9—a plan and side elevation, respectively—the perforations being so formed as to leave a tongue 5^B on top side of grid-plates, by which arrangement the perforations are protected by the tongues and the purifying material retained on the upper surface of said plates.

The gas flows to the purifying material through the open spaces S between flat surface of said plates and tongues 5^B and is diverted in a direction so that the gas is distributed and spread horizontally through some of the purifying material before beginning to permeate vertically through same, by which the gas is more evenly distributed to and the purifying material more effectually utilized.

The pipes P extend through each tank. The flanges may be attached to internal flanges 2 and faced to the same level, so that on placing the tanks together the several sections form one continuous pipe.

In the drawings I have shown a tower of two tanks; but it will be obvious that a purifying-tower of greater depth may be constructed by the addition of more tanks arranged in the manner described without increasing the density of the purifying material at and near the bottom of tower, because, as before stated, each tier of perforated bars 9 support its own layer, thus preventing consolidation. The top tank or section of tower is covered by a suitable lid 11.

The ends of each tank are fitted with a strengthening-plate 12, provided with trunnions 13, adapted for the purpose of attachment for mechanically lifting the tank and contents and conveying same to be emptied. This may be accomplished by utilizing suitable gear. (Not shown.)

What I claim as my invention is—

1. Gas-purifying tanks having grid-plates 5 and a series of rows of perforated **V**-shaped grid-bars 9 extending from one side to the other of the tank.

2. Gas-purifying tanks having grid-plates 5 and a series of rows of perforated **V**-shaped grid-bars 9 extending from one side to the other of the tank, the bars of each row having spaces 10 between them, substantially as described.

3. In combination, a gas-purifying tower constructed in sections, each section being provided with strengthening-plates and trunnions, grid-plates and perforated **V**-shaped grid-bars supported in each section, substantially as described.

4. In combination with a gas-purifying tank, perforated **V**-shaped grid-bars, and grid-plates having openings therein and tongues extending over said openings.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

THOMAS REDMAN.

Witnesses:
JOHN GILL,
RALPH REDMAN.