

No. 723,003.

PATENTED MAR. 17, 1903.

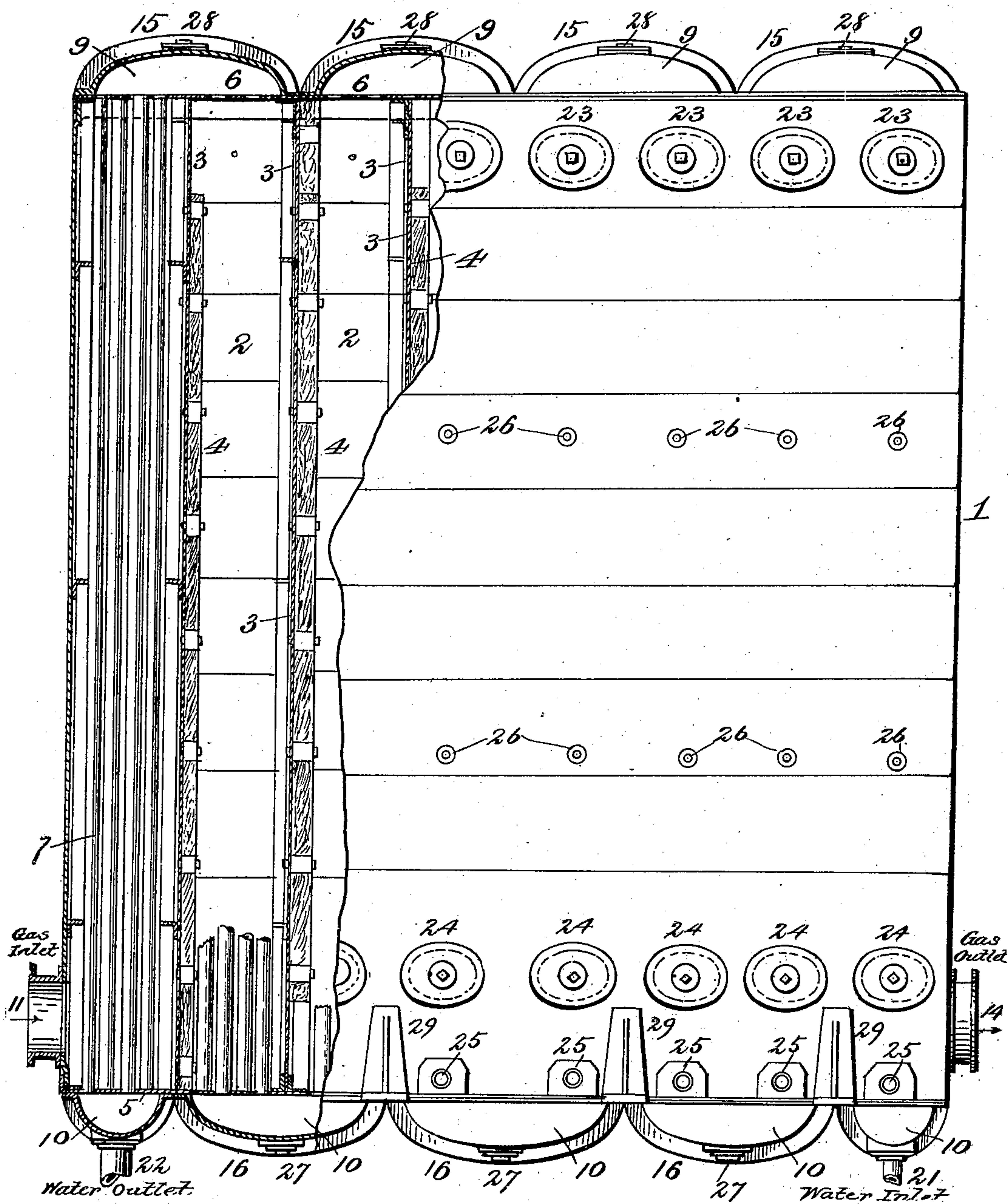
E. A. MOORE.  
GAS COOLER.

APPLICATION FILED JUNE 5, 1902.

NO MODEL.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses  
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4 SHEETS—SHEET 2.

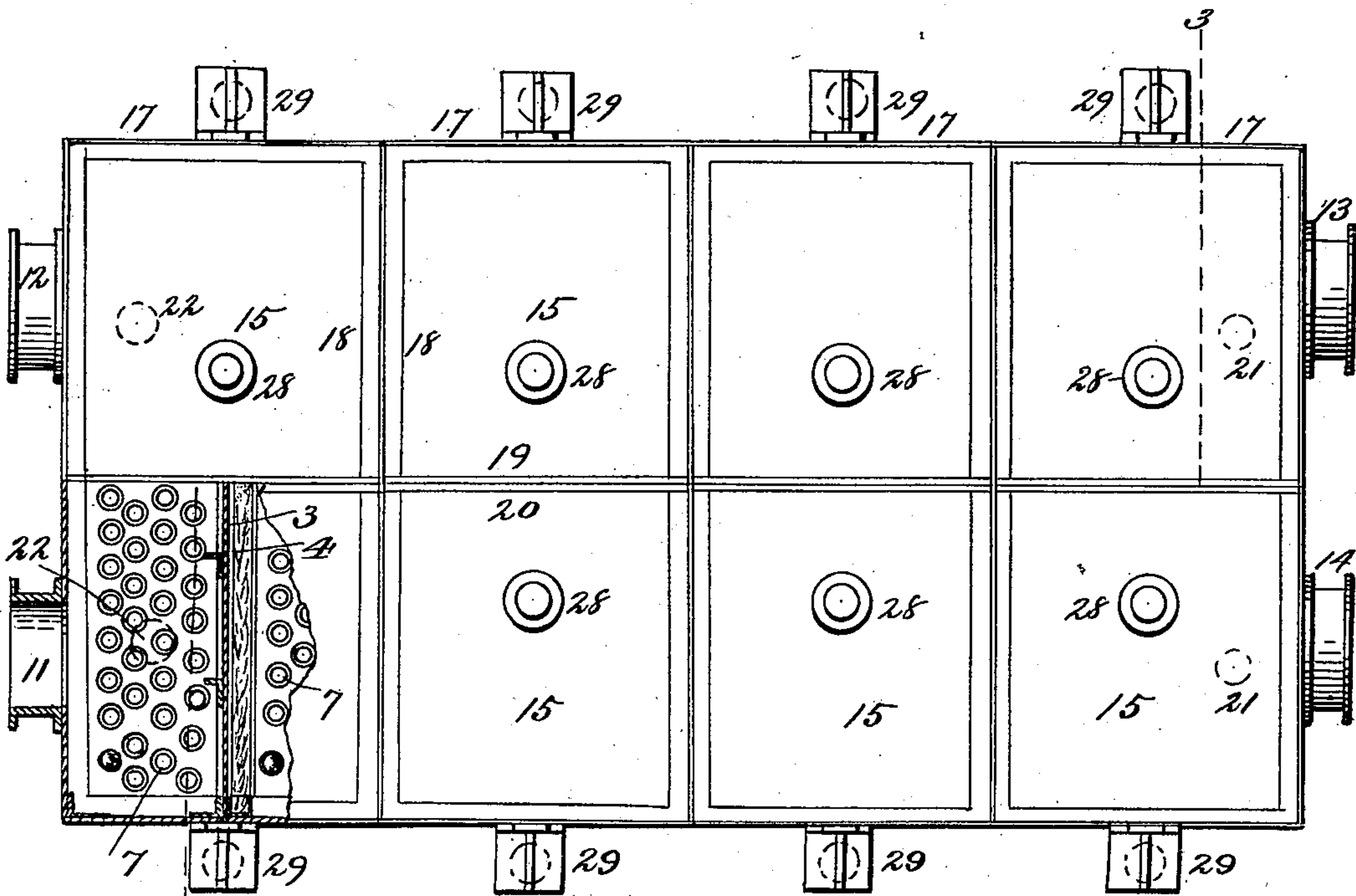


Fig. 2.

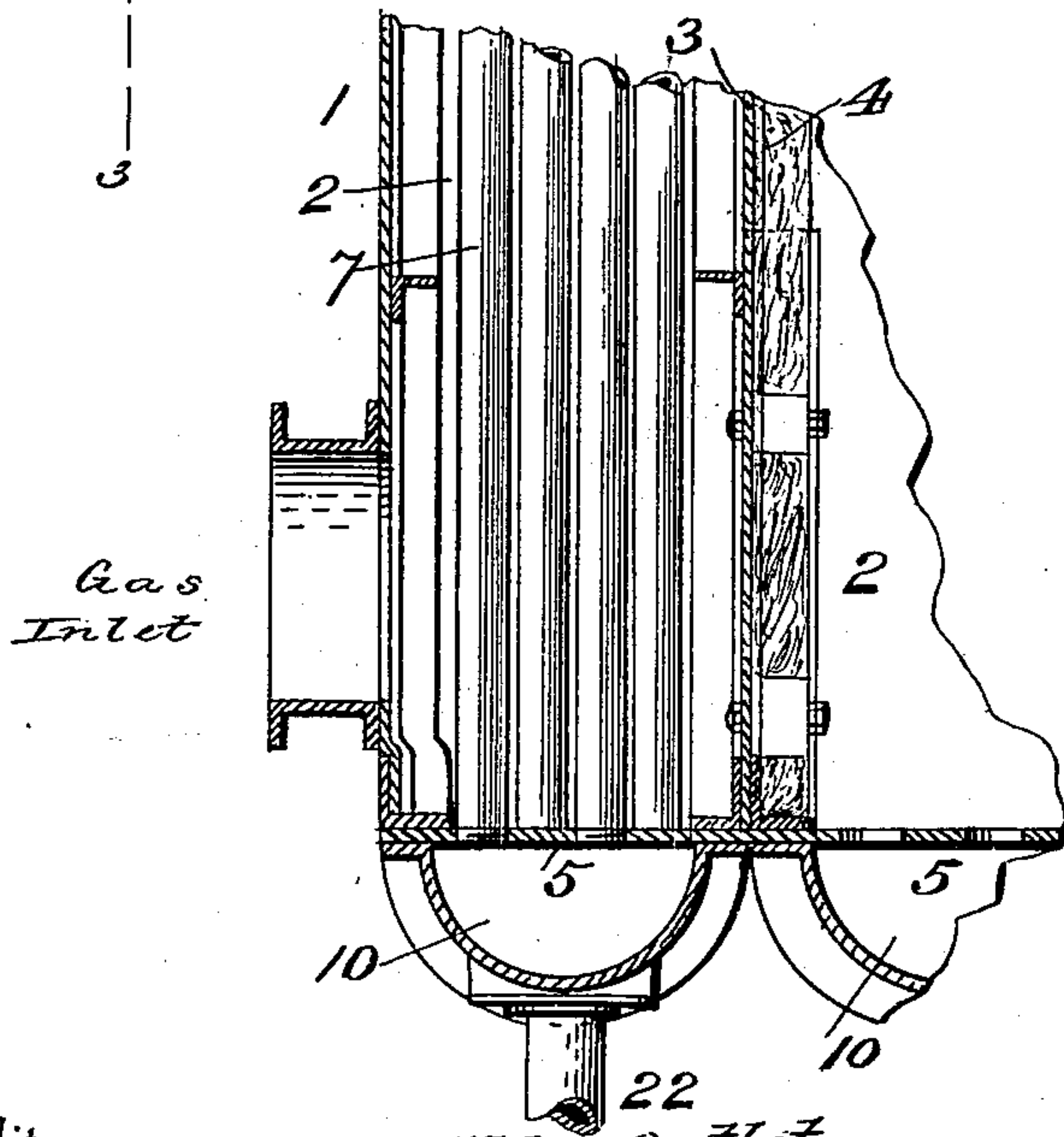


Fig. 4.

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4 SHEETS—SHEET 3.

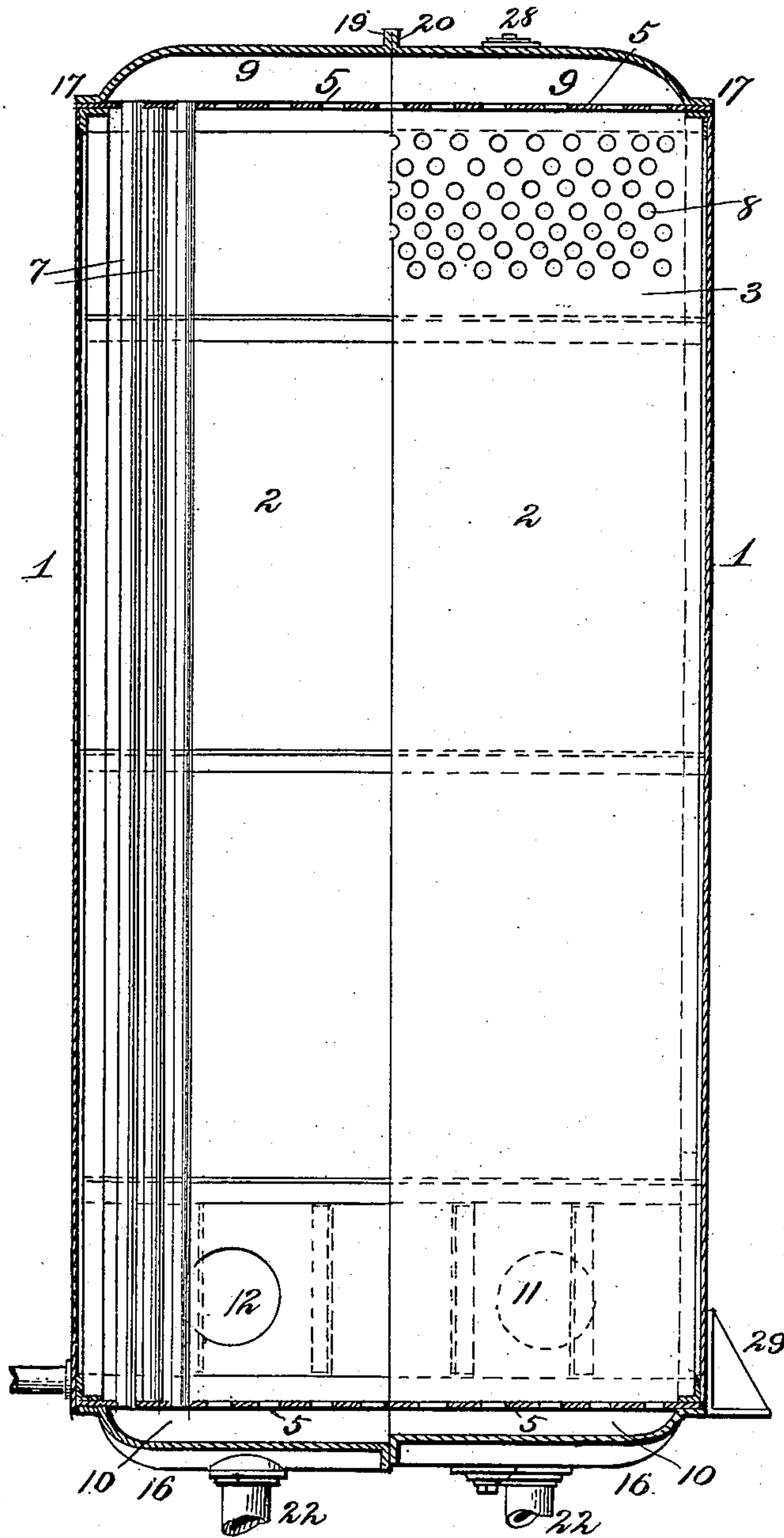


Fig. 3.

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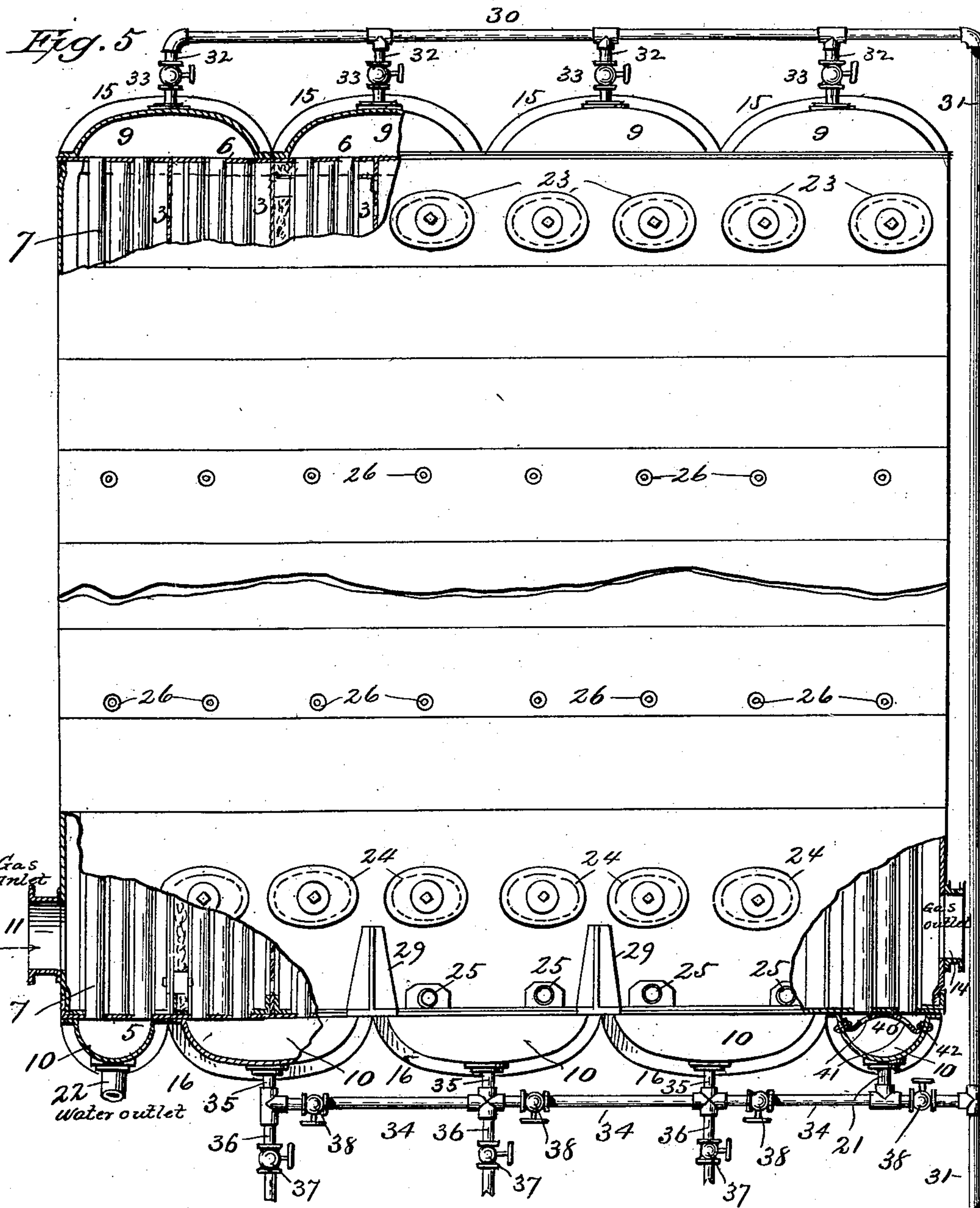


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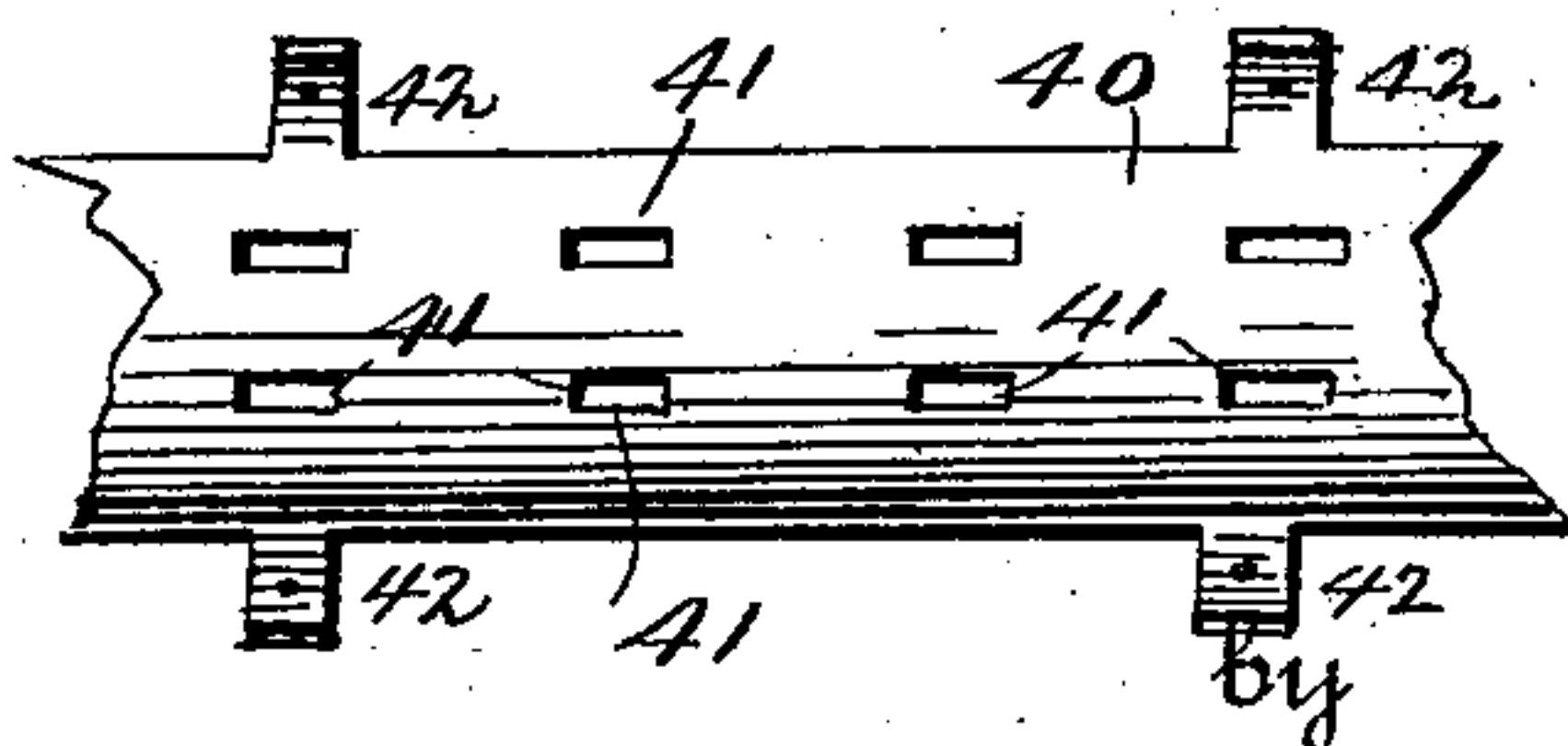
4 SHEETS—SHEET 4.

*Fig. 6.*

Witnesses

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# UNITED STATES PATENT OFFICE.

EDWIN A. MOORE, OF PHILADELPHIA, PENNSYLVANIA.

## GAS-COOLER.

SPECIFICATION forming part of Letters Patent No. 723,003, dated March 17, 1903.

Application filed June 5, 1902. Serial No. 110,377. (No model.)

*To all whom it may concern:*

Be it known that I, EDWIN A. MOORE, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Gas-Coolers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates, primarily, to gas-works, has especial reference to gas-coolers in which water is used as the cooling medium, has for its object the increasing of the cooling-surfaces over which the gas travels in its passage, and consists in certain improvements in construction which will be fully disclosed in the following specification and claims.

In the accompanying drawings, which form part of this specification, Figure 1 represents a side elevation, partly in section, of a gas-cooler embodying my invention; Fig. 2, a top plan view, partly in section; Fig. 3, an end elevation, partly in section; Fig. 4, a vertical section, partly in elevation, showing the lower end of two adjacent compartments; Fig. 5, a side elevation showing the coolers connected at both ends to water-supply pipes, and Fig. 6 a plan of the baffle-plate.

Reference being had to the drawings and the numerals thereon, 1 indicates the body of the cooler, preferably rectangular in form and made of rolled sheet metal properly secured together by angle-irons and rivets in the usual manner of putting up sheet-metal structures, and is separated into a number of cooling-compartments 2 by transverse vertical partitions 3, having an asbestos lining 4 to retard the transmission of heat from one compartment to another. The partitions 3 extend from the lower tube-sheet 5 to the upper tube-sheet 6, and between the tube-sheets and secured thereto in the usual manner are tubes 7, through which water passes and around which the gas passes in its circuit through the cooler. Each partition is provided at opposite ends alternately with openings 8 for the passage of gas from one compartment to another, and at each end of the cooler adjacent to the tube-sheets are water-

chambers 9 at the upper end and 10 at the lower end, each of which chambers connects two adjacent compartments, the combined area of the openings 8 being in excess of the area of the gas-inlets 11 and 12 at one end of the cooler, the gas-outlets 13 14 being at the opposite end thereof. The chamber 10, to which the supply-pipe 21 is attached, is provided with a curved baffle-plate 40 to distribute the water and cause it to flow up through all the tubes 7 in the compartment 2 above said chamber, and the baffle-plate is provided with elongated openings 41 to allow part of the water to flow through the plate. The baffle-plate is also provided with lugs 42, by which it is secured in position.

The chambers 9 and 10 are formed by plates 15 16, properly bent and provided with horizontal flanges 17 18, by which they are secured to the body 1, and vertical flanges 19 20, by which they are secured together at their adjacent edges, and the outer chamber at one side of the cooler is provided with water-supply pipes 21 and the corresponding chamber at the opposite side is provided with water-discharge pipes 22, by which construction the coldest water operates upon the coolest gas, and vice versa.

Each compartment 2 is provided with man-holes having covers 23 at the upper end and 24 at the lower end of the cooler, tar-discharge openings 25 at the lower end of each compartment for the removal of the tar which adheres to the outer surfaces of the tubes 7 and is collected from the gas in transit through the cooler, and steam connections 26 for supplying steam to melt or dissolve any tar or other matter which may harden upon the tubes whenever it becomes necessary to clean the cooler.

27 represents removable plugs in the plates 16 for the attachment of pipes for supplying water and removing sediment from the chambers 10, and the plates 15 are provided with removable plugs 28 for the attachment of pipes for supplying water, as shown in Fig. 5.

In Fig. 5 the chambers 9 are shown connected to an extension 30 of the main water-supply pipe 31 by branches 32, having valves 33, and the chambers 10 are connected to pipe 34 by branches 35, having extensions 36, pro-



vided with blow-off valves 37 for removing mud and other sediment from chambers 10, and in pipe 34 are valves 38 for controlling the supply of water to either of the chambers 10.

In the operation of gas-coolers it frequently occurs that the gas heats the water so highly that it loses its cooling effect on the gas before the water has passed through the tubes of all the gas-cooling compartments. It is my purpose to remedy this defect by providing means for supplying cold water to any one or more of the gas-cooling compartments while the gas is passing through the cooler, and thus augment the supply of cold water and cool or revivify the water which has been heated by the gas, and thereby greatly increase the efficiency of the cooler.

Gas from coke ovens or retorts enters the cooler at the lower end, travels up around the tubes 7 in the first compartment 2, crosses through the openings 8 in partition 3 into the second compartment, thence downward, and travels in like manner until it has passed through all of the compartments and is discharged through the gas-outlet at the opposite side of the cooler, and water enters the cooler at the lower end and near the outlet for the gas and traverses the tubes in the several compartments in the opposite direction to that in which the gas is flowing, and the supply of water may be augmented at any of the water-chambers 9 or 10 of the cooler.

Having thus fully described my invention, what I claim is—

1. A gas-cooler provided with a plurality of gas-compartments separated by vertical partitions, and communicating alternately at opposite ends through openings in said partitions, tubes in said compartments communicating at their ends with water-chambers common to two adjacent compartments, gas inlet and outlet openings on opposite sides of the cooler, water supply and discharge pipes,

and means for removing tar from each compartment.

2. A gas-cooler provided with a plurality of gas-compartments separated by vertical partitions having heat non-conducting linings, and communicating alternately at opposite ends through openings in said partitions, tubes in said compartments communicating at their ends with water-chambers common to two adjacent compartments, gas inlet and outlet openings on opposite sides of the cooler, water supply and discharge pipes, steam-inlet and tar-discharge openings for each compartment.

3. A gas-cooler provided with a plurality of gas-compartments having tubes for the passage of a cooling medium, separate water-chambers at the upper and lower ends of the cooler connecting two adjoining gas-compartments, a water-supply pipe crossing the cooler, pipes communicating with the water-chambers and the supply-pipe, and means for controlling the supply of water to each of said chambers.

4. A gas-cooler provided with a plurality of gas-compartments, and water-chambers at the ends of said compartments; in combination with a water-supply pipe connected separately to said water-chambers, and means for controlling the supply of water to the chambers, for cooling or revivifying the water passing through the cooler.

5. A gas-cooler provided with a plurality of gas-compartments, separated by partitions having heat non-conducting linings secured thereto, and means for supplying water to cool the gas.

In testimony whereof I affix my signature in presence of two witnesses.

EDWIN A. MOORE.

Witnesses:

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