

No. 662,608.

Patented Nov. 27, 1900.

W. SWINDELL.  
GAS FURNACE.

(Application filed Mar. 30, 1899.)

(No Model.)

4 Sheets—Sheet 1.

FIG. 1.

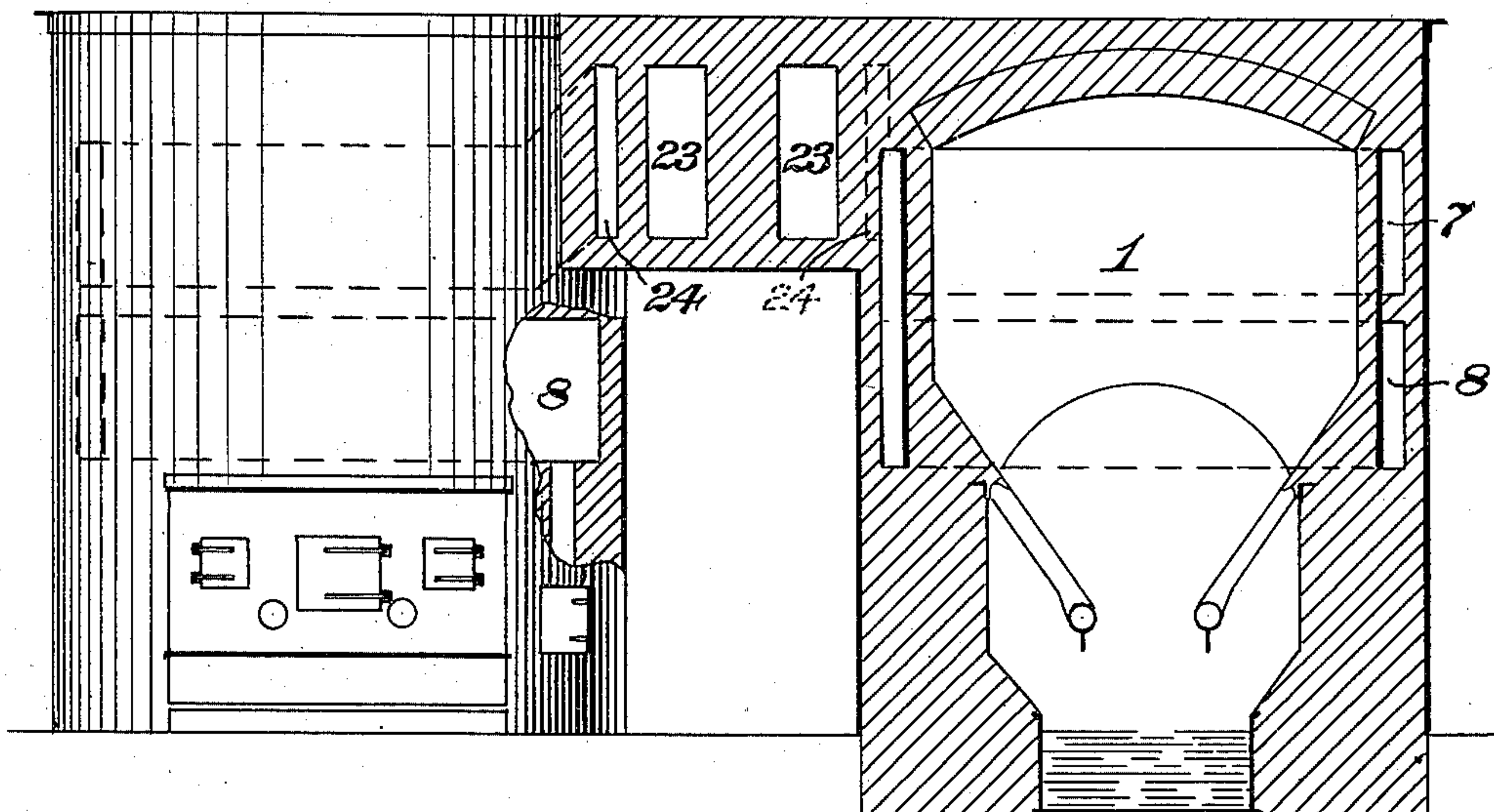
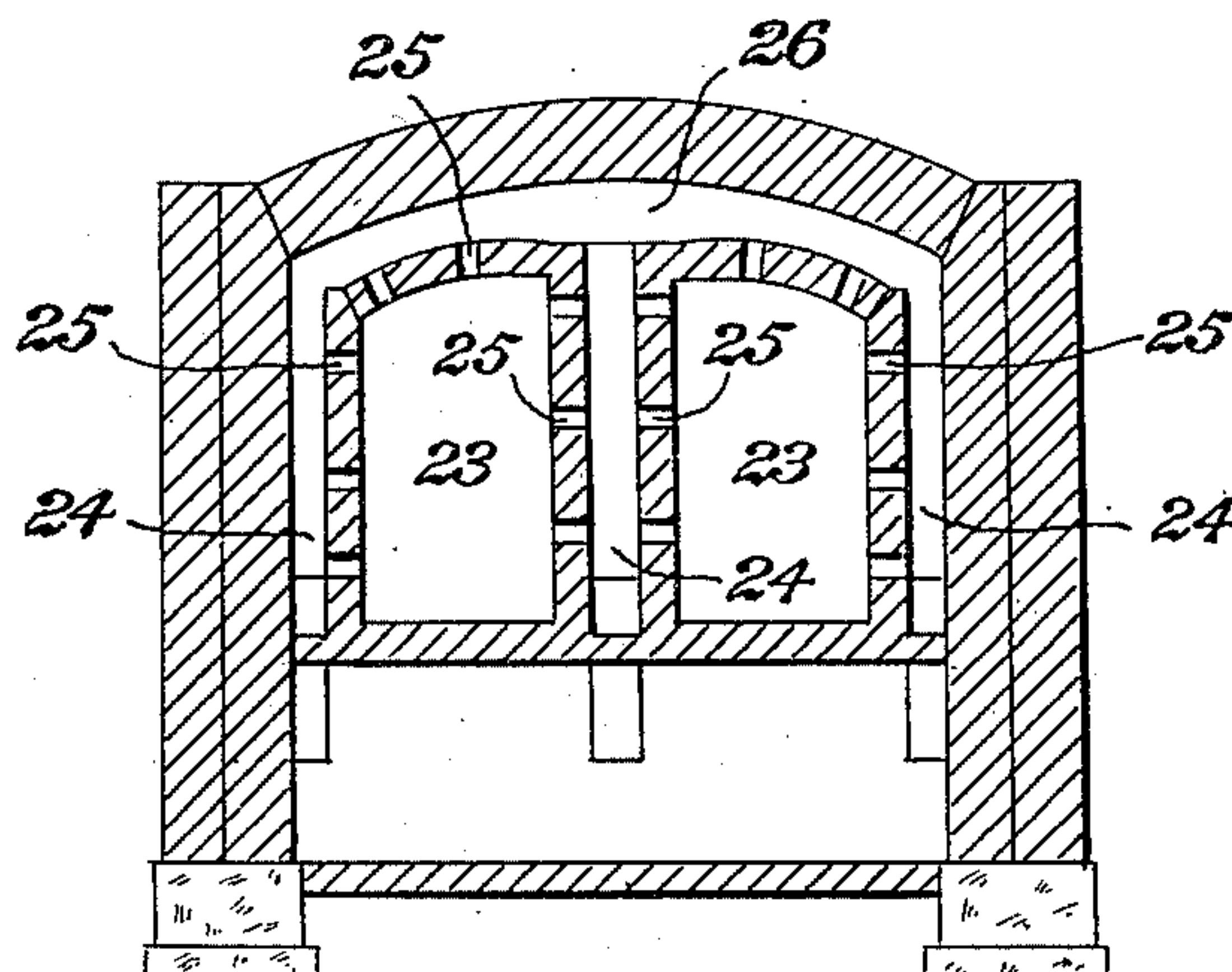


FIG. 2.



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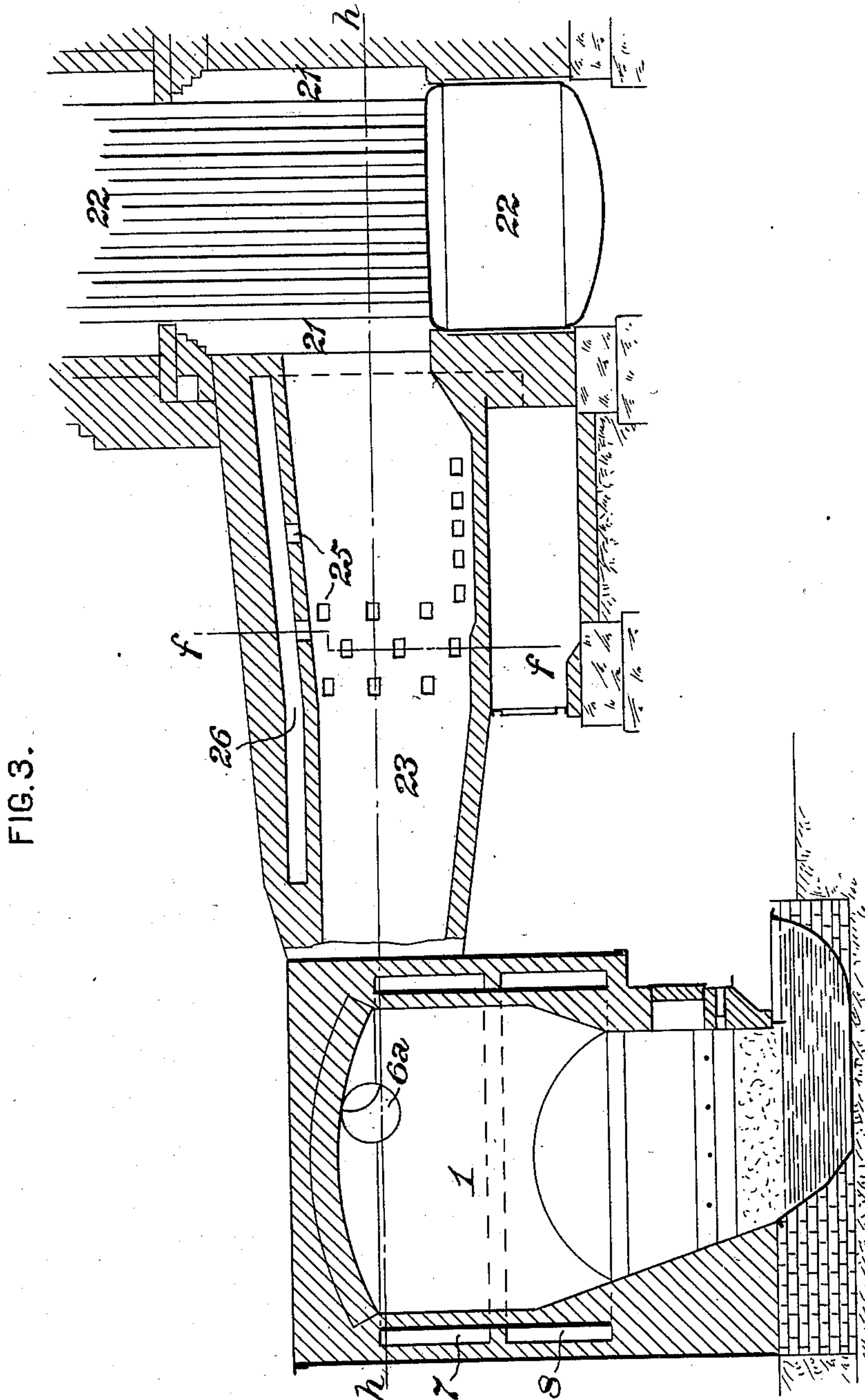
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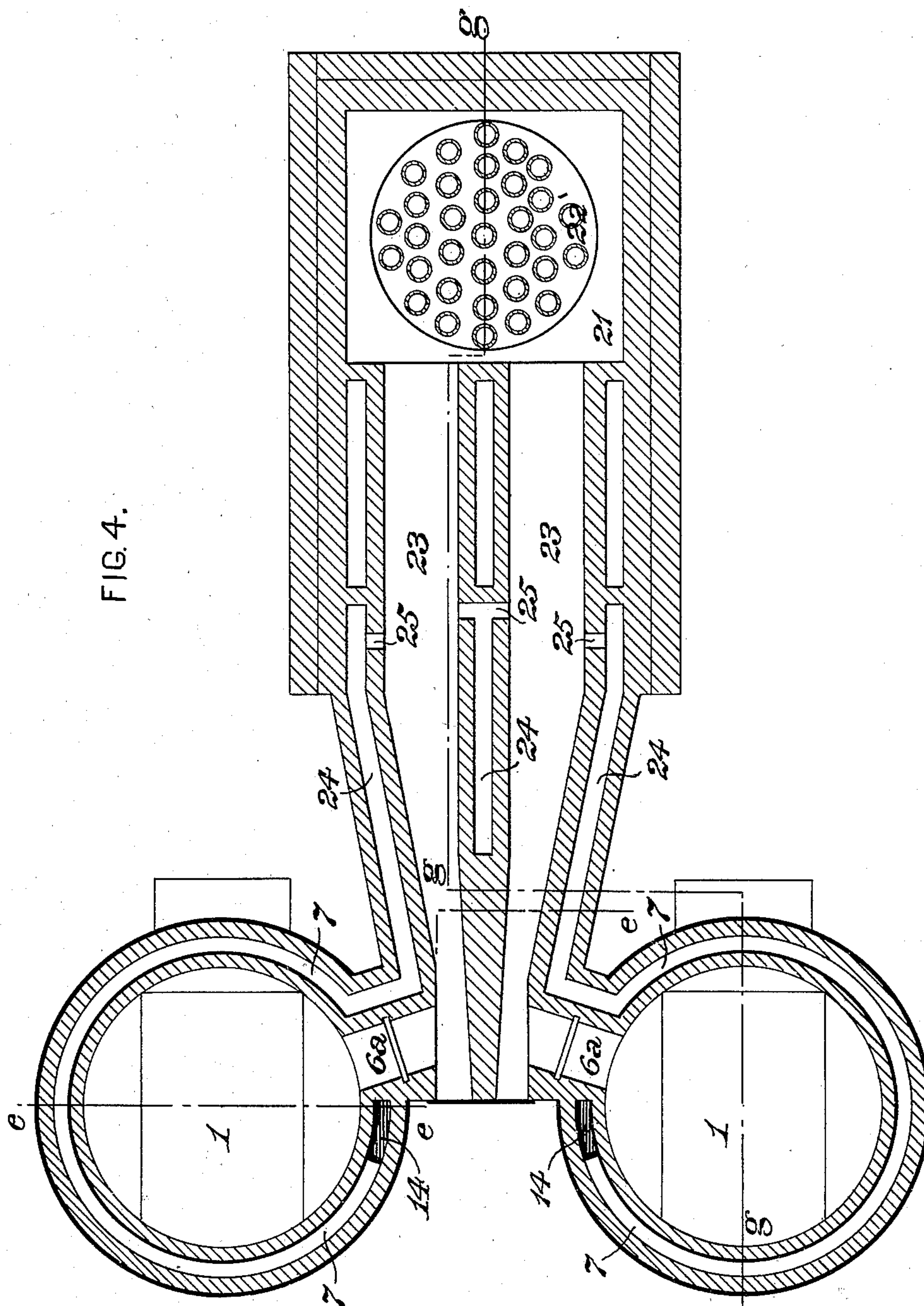
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4 Sheets—Sheet 3.



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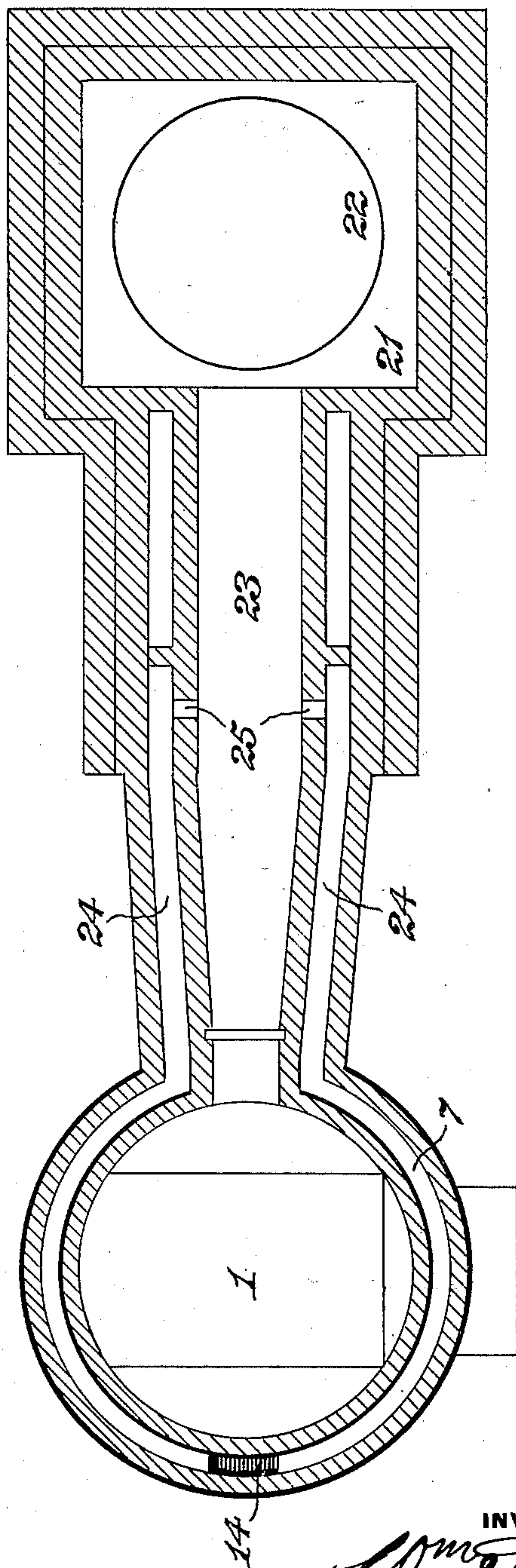
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4 Sheets—Sheet 4.

FIG. 5.



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# UNITED STATES PATENT OFFICE.

WILLIAM SWINDELL, OF ALLEGHENY, PENNSYLVANIA.

## GAS-FURNACE.

SPECIFICATION forming part of Letters Patent No. 662,608, dated November 27, 1900.

Application filed March 30, 1899. Serial No. 711,068. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM SWINDELL, of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Gas-Furnaces, of which improvement the following is a specification.

The object of my invention is to provide simple and inexpensive means whereby the combustion of a mixture of gas and heated air may be effectively and economically utilized in heating a boiler-furnace or other furnace-chamber.

To this end my invention, generally stated, consists in the combination of a source of gas-supply, a source of heated-air supply, a furnace-chamber, and means for conducting gas and heated air from their respective sources of supply to the furnace-chamber and imparting additional heat to the air in its traverse thereto.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a vertical transverse section through an apparatus embodying my invention at the line *ee* of Fig. 4; Fig. 2, a similar section at the line *ff* of Fig. 3; Fig. 3, a vertical longitudinal section at the line *gg* of Fig. 4; Fig. 4, a horizontal section at the line *hh* of Fig. 3, and Fig. 5 a similar section showing my invention as applied in connection with a single gas-producer.

In the practice of my invention I provide a source of gas-supply, which is preferably, as shown, a gas-producer of any suitable and approved construction, one or more of which may be employed, two being shown in Figs. 1 and 4 and one in Fig. 5. I also provide a source of heated-air supply, which may be any suitable and preferred form of air-heating apparatus. In the instance exemplified the source of heated-air supply is an air-heating chamber composed of two superposed sections 7 8, surrounding the generating-chamber or fuel-chamber 1 of a gas-producer connected with air-inlet passages 12 and connected one with the other by ports 14. The air-heating chamber 7 8 accords in all substantial particulars of construction and relation to the gas-producer with that set forth in an application for Letters Patent filed by

me under date of March 21, 1889, Serial No. 709,958, and not being in and of itself claimed as of my present invention need not be herein fully and at length set forth.

A furnace-chamber 21, which in this instance incloses a vertical water-tube boiler 22, but which may be used for any other desired purpose, is located at a convenient distance from the gas-producer and heating-chamber, and a gas-flue 23 leads from the gas-outlet 6<sup>a</sup> of the producer, or one from each producer when two or more are employed, to the furnace-chamber 21. Air-flues 24 extend from the air-heating chamber or other source of heated air, or from each of said sources when two or more are employed, in the direction of the furnace-chamber, said air-flues adjoining the gas flue or flues 24 on each of its or their sides for the whole or the major portion of the length thereof, in the discretion of the constructor. Communication between the air-flues 24 may be established by a connecting-flue 26, extending over the tops of the gas-flues 23. The air-flues are separated from the gas-flues by comparatively thin walls, and the air is further heated in its passage through the air-flues by the hot gas passing through the gas flue or flues.

Mixing-ports 25 are formed in each of the walls which separate the gas flue or flues from the adjoining air-flues, said mixing-ports, the number and location of which may be determined by the constructor, providing for the delivery of the heated air from the air-flues 24 and 26 into the gas flue or flues 23, within which the air and gas are mingled and the mixture ignited, the products of combustion passing into and heating the furnace-chamber 21.

My invention provides in a unitary, compact, and simple structure an apparatus in which air is preliminarily heated for admixture with gas, and is further heated without additional consumption of fuel for the purpose in its traverse to the location of admixture and in which the products of combustion of the gaseous fluid are delivered directly to and effectively utilized in the furnace-chamber.

I claim as my invention and desire to secure by Letters Patent—

The combination of two sources of gas-sup-

ply, two sources of heated-air supply, a furnace-chamber, two gas-flues, each leading from one of the gas-supply sources to the furnace-chamber, two air-supply flues, each  
5 leading from one of the air-supply sources and adjoining one side of one of the gas-flues, a central air-flue interposed between and adjoining the gas-flues, a flue connecting the

central and lateral air-flues, and ports establishing communication between the gas and air flues.

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Witnesses:

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