

March 3, 1931.

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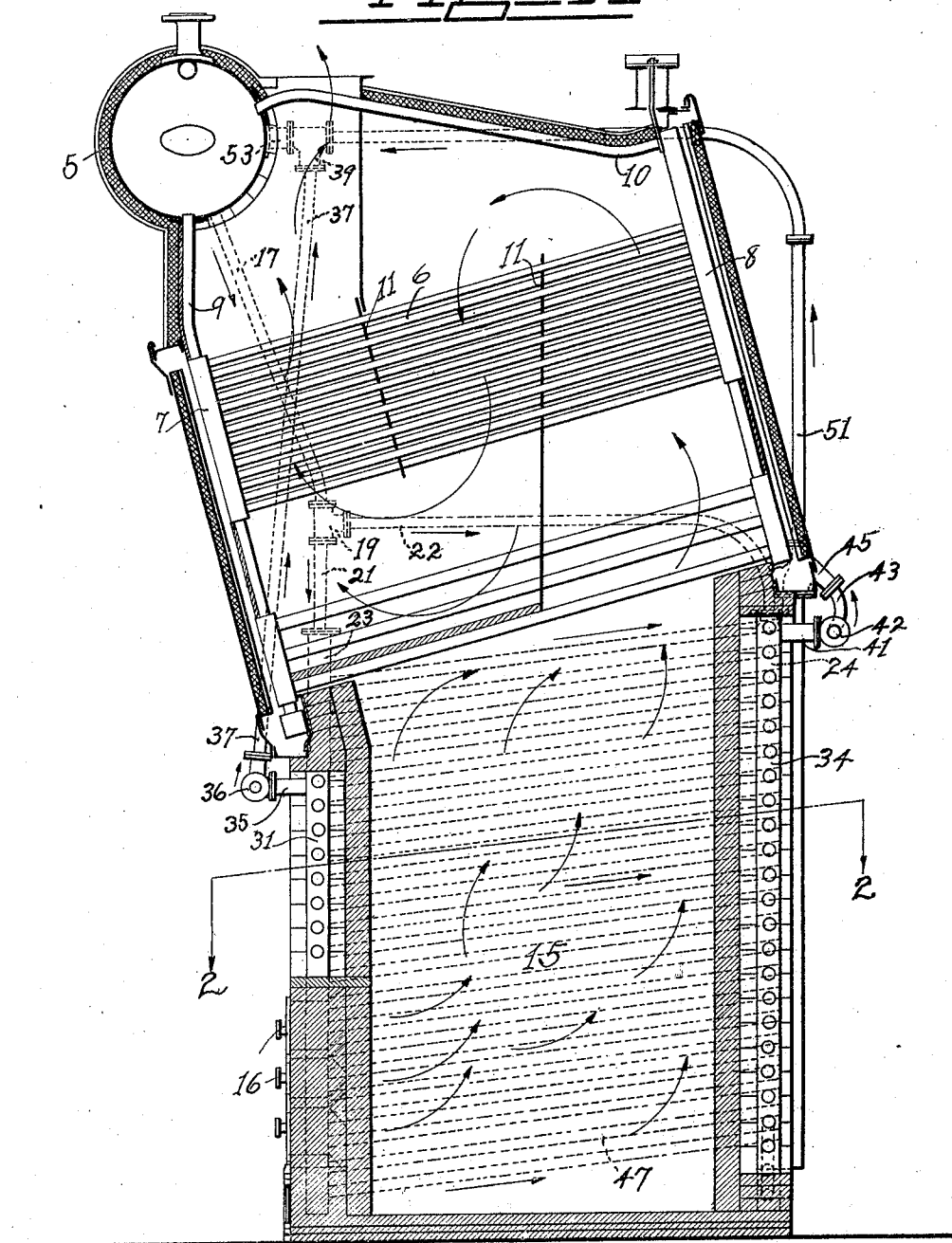
1,794,802

FURNACE COMBUSTION CHAMBER

Filed July 2, 1926

7 Sheets-Sheet 1

FIG-1



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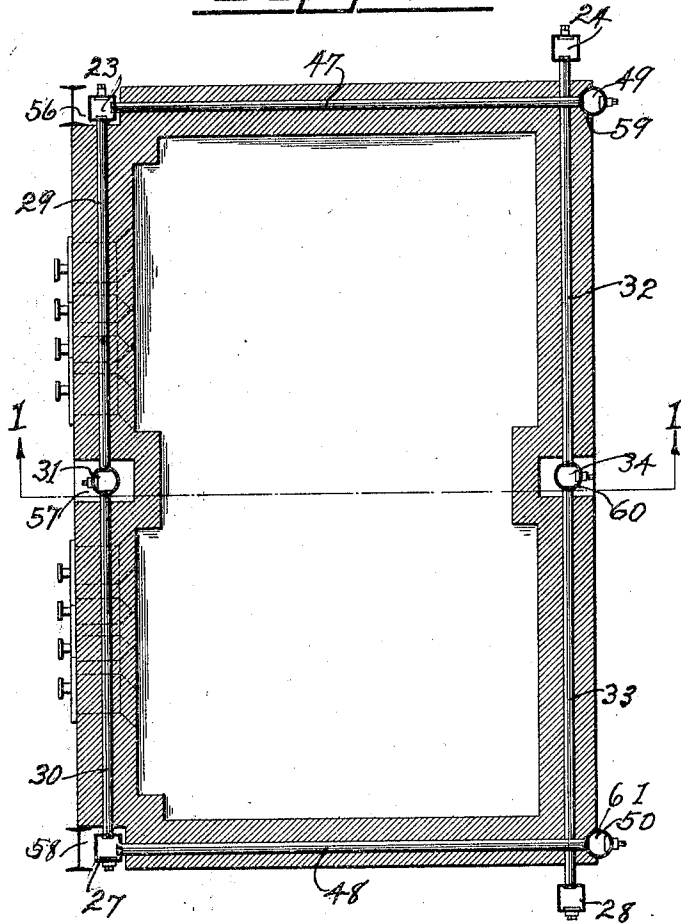
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FIG-2



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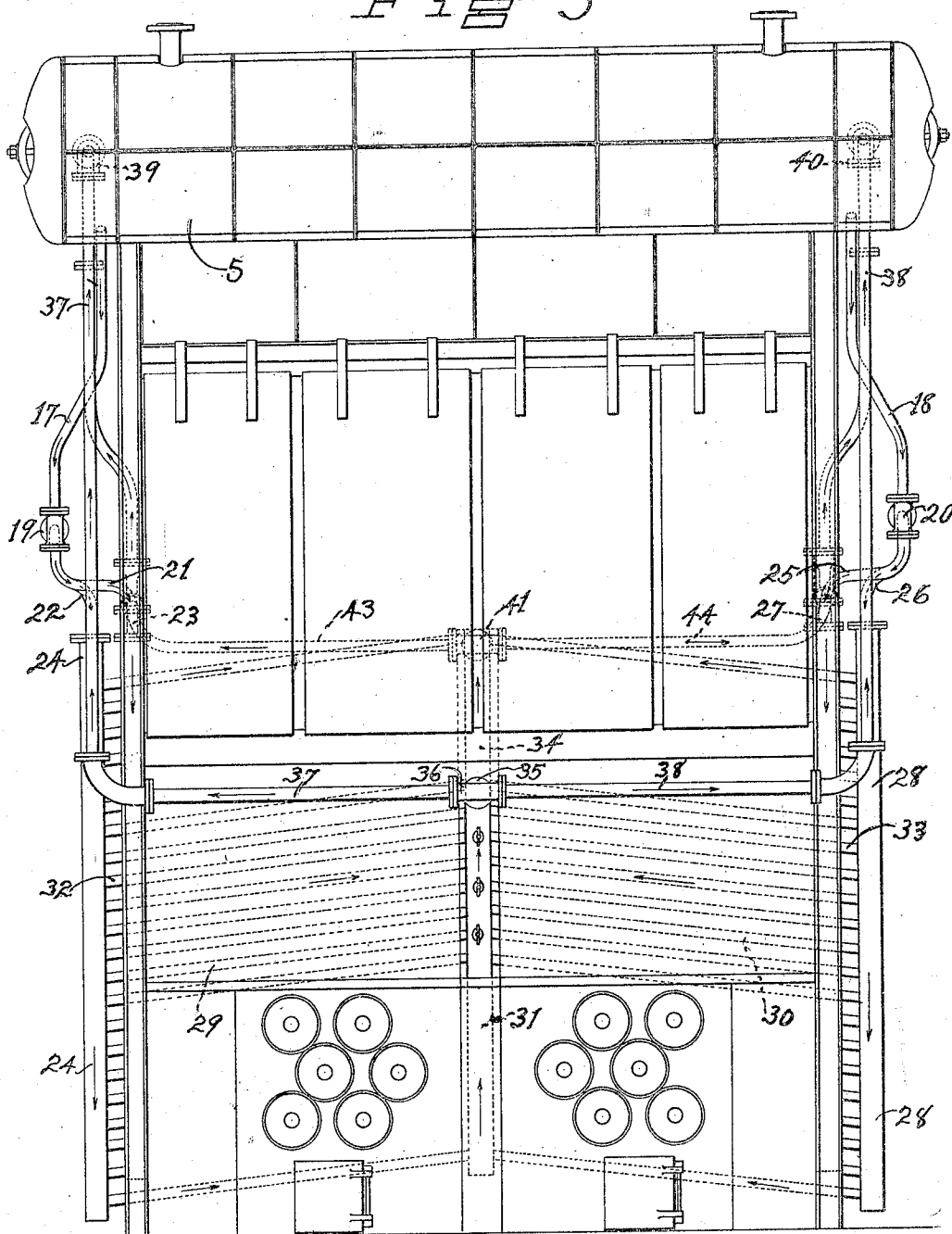
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Fig-3



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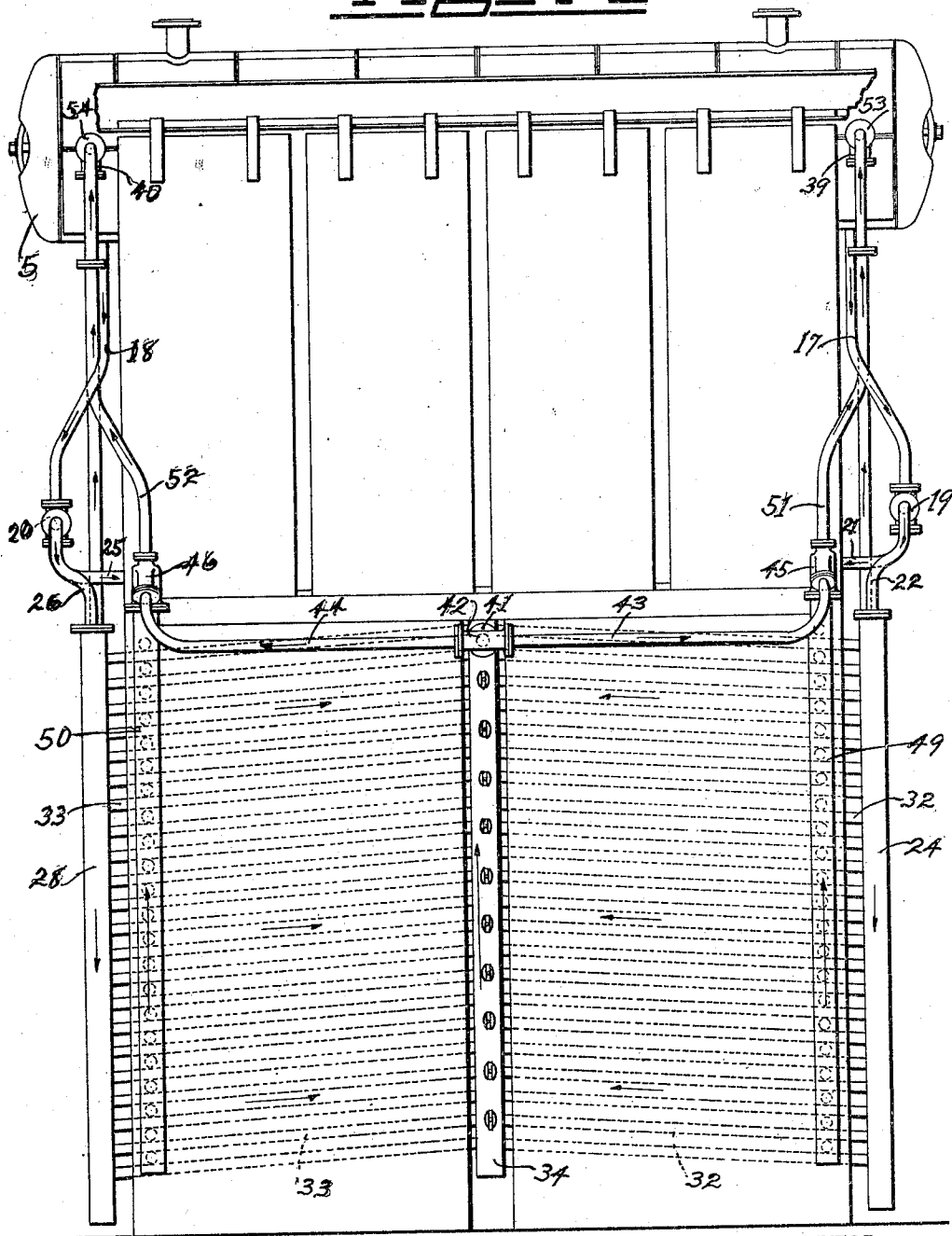
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Fig. 4



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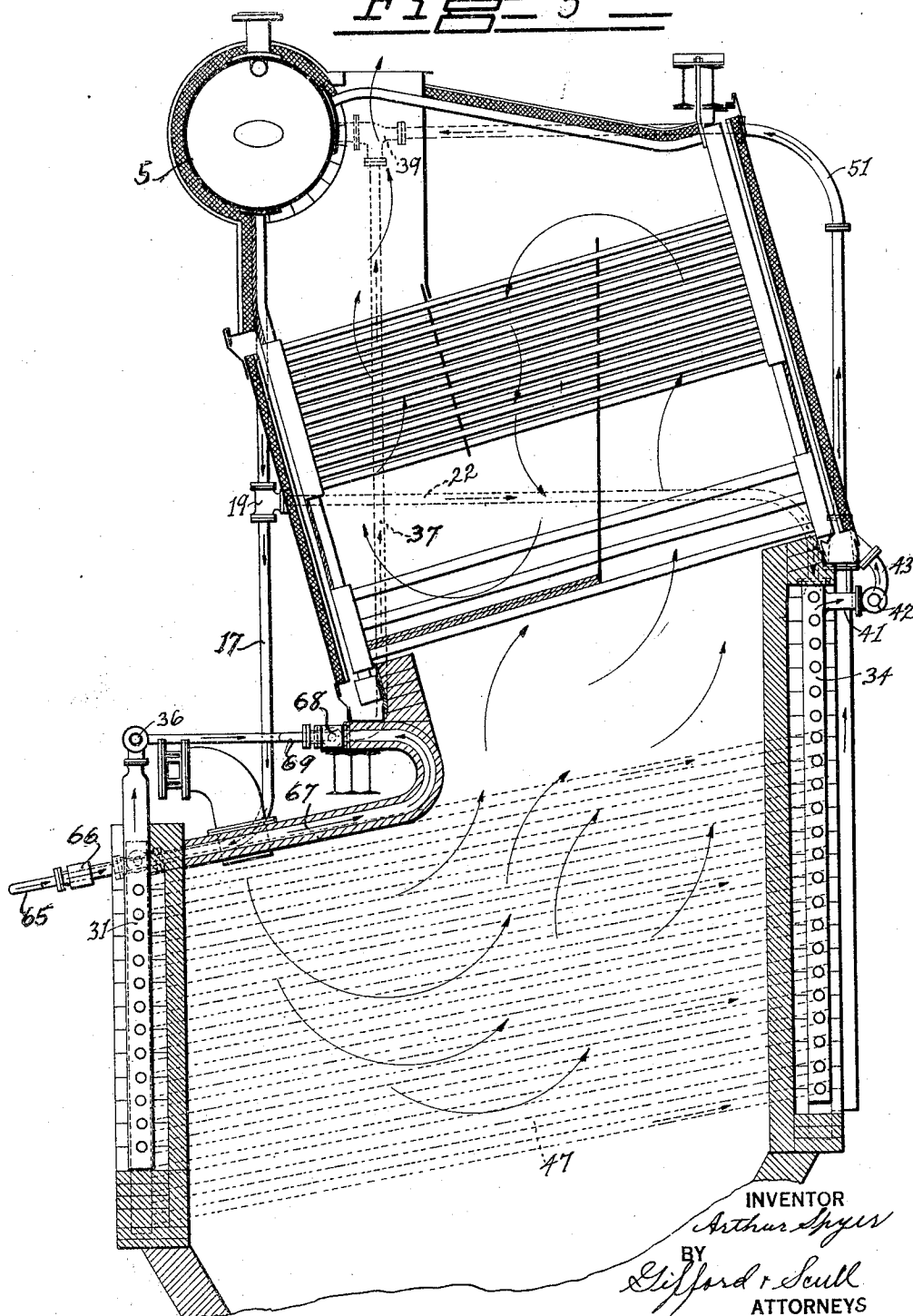
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FIG. 5



March 3, 1931.

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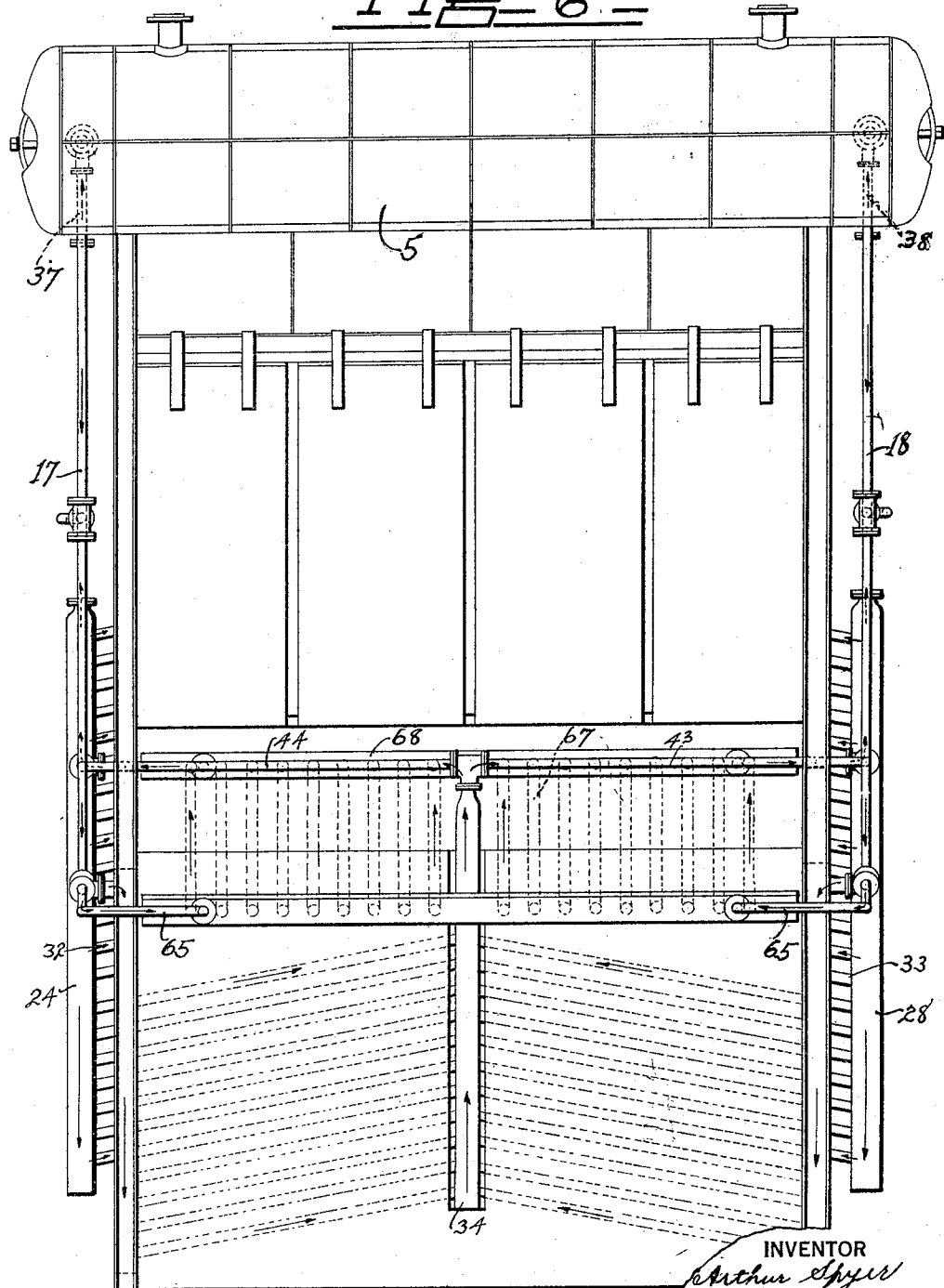
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FURNACE COMBUSTION CHAMBER

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FIG 6



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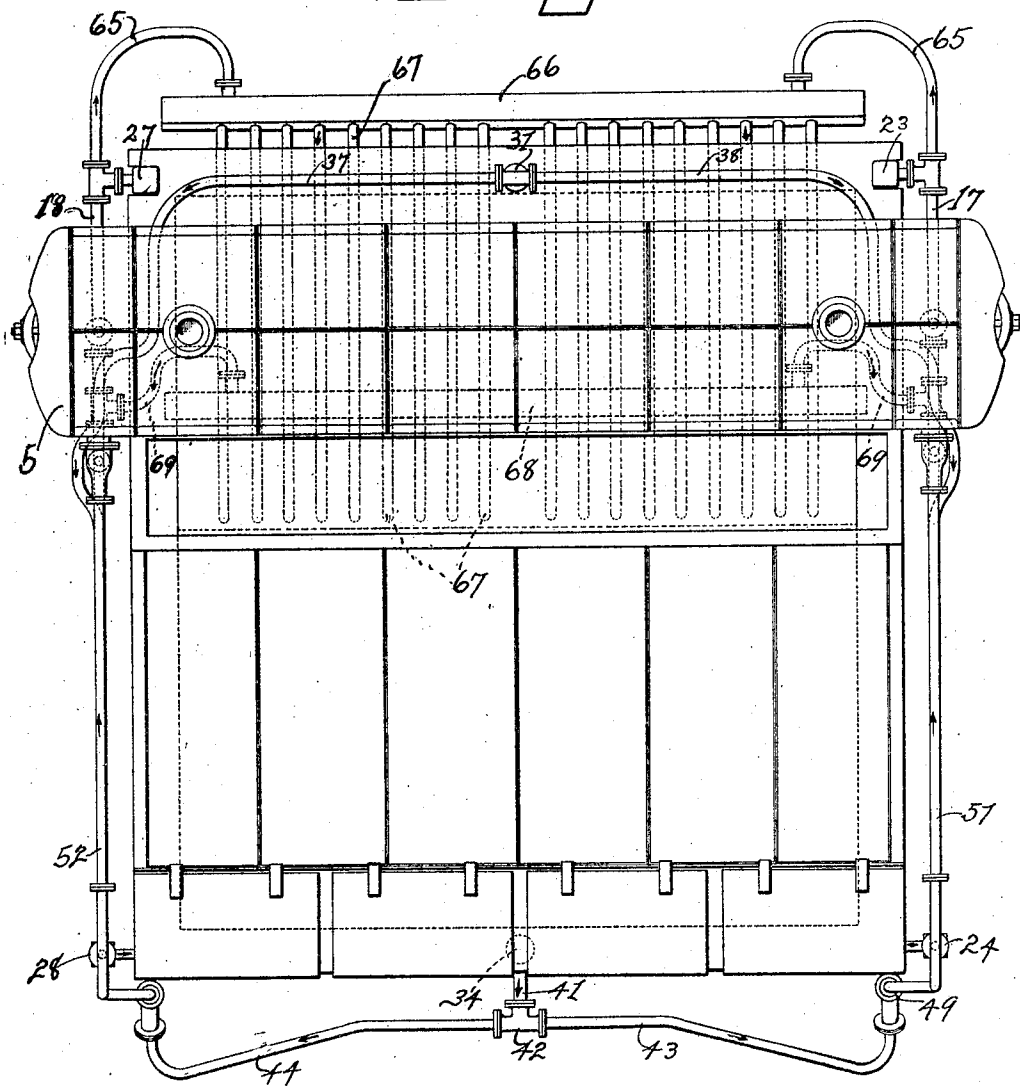
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FURNACE COMBUSTION CHAMBER

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Fig 7



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UNITED STATES PATENT OFFICE

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FURNACE COMBUSTION CHAMBER

Application filed July 2, 1926, Serial No. 120,050, and in Great Britain March 13, 1926.

This invention relates to a furnace for a boiler in which furnace wall tubes are disposed and connected to headers.

The invention will be understood from the description in connection with the accompanying drawings, in which Fig. 1 is a vertical section through an illustrative embodiment of the invention; Fig. 2 is a section along the line 2—2 of Fig. 1; Fig. 3 is a front view of the device; Fig. 4 is a rear view of the same; Fig. 5 is a vertical section through a modification and Figs. 6 and 7 are front and plan views, respectively, of the same.

In the drawings reference character 5 indicates a transverse steam and water drum of a boiler that is provided with inclined tubes 6 connected to downtake headers 7 and uptake headers 8, the downtake headers being connected to the steam and water drum 5 by means of the nipples 9, and the uptake headers being connected to the steam and water drum by the tubes 10. Baffles 11 are disposed across the inclined tubes 6 in the usual manner to guide the hot gases, as shown by the arrows.

The boiler above described is of a well-known type, and below the same is located a furnace 15 that is provided with fuel burners 16 on the front side thereof.

Tubes 17 and 18 lead from the water space of the drum 5 near the ends thereof downwardly to T-unions 19 and 20. Tubes 21 and 22 lead from the T-union 19 to vertical downtake headers 23 and 24, respectively, located near the corners of the furnace at one side thereof. Tubes 25 and 26 lead from the T-union 20 to similar vertical downtake headers 27 and 28, respectively, located near the corners of the furnace on the opposite side thereof. Rows 29 and 30 of inclined tubes are located in the front wall of the furnace and connect the downtake headers 23 and 27, respectively, to the uptake header 31, and similar rows 32 and 33 of inclined tubes are located in the rear wall of the furnace and connect the downtake headers 24 and 28 to the uptake header 34. A nipple 35 connects the uptake header 31 to the T-union 36, located near the upper part of the furnace on the outside thereof and in front of

the same near the middle. Tubes 37 and 38 lead from the T-union 36 to T-unions 39 and 40, respectively, near the ends of the drum 5. A nipple 41 leads from the upper end of the uptake header 34 to a T-union 42 located near the upper part of the furnace on the outside thereof behind the rear wall and near the middle. Tubes 43 and 44 lead from the T-union 42 to the connections 45 and 46 (Fig. 4).

Rows 47 and 48 of inclined tubes are located in the end walls of the furnace and connect the downtake headers 23 and 27 to uptake headers 49 and 50, respectively, the upper ends of which are connected to the connections 45 and 46, respectively. Tubes 51 and 52 connect the connections 45 and 46 to the T-unions 39 and 40, respectively, which are connected to the steam space of the drum 5 by means of nipples 53 and 54 near the ends of this drum.

The inclined tubes in the walls of the furnace connecting the vertically disposed headers are straight, and outwardly opening recesses 56, 57, 58, 59, 60 and 61 are made in the walls so as to permit easy access to the tubes from the exterior. The headers are disposed externally to the furnace and no bent tubes are required between the headers. It will be seen that the above described construction provides rows of tubes disposed in the walls and intersecting one another at a corner formed by intersecting walls. At the intersection of the rows of tubes, the tubes in one row are passed through the space between the tubes in the intersecting row. The headers to which the ends of the tubes in each row are connected, are disposed preferably exteriorly of the wall and may be placed in recesses therein. By this arrangement, many advantages are obtained, among which may be mentioned the facility with which the tubes may be installed, cleaned and replaced and the fact that the tubes extend the full length of the walls, thereby furnishing their cooling affect clear to the corner of the wall.

The system of circulation of water through the tubes from the boiler will be readily understood, and it will be seen that no compli-

cated arrangement of tubes for supplying water to the headers and returning steam and water from the headers is required.

In the modification shown in Figs. 5, 6 and 7, a water cooled arch is shown near the upper portion of the furnace on the front side, composed of tubes that are connected to horizontal headers. These tubes may be protected by tile or brickwork. In this modification, branches 65 from the tubes 17 and 18 lead into a lower horizontal header 66 from which a row of tubes 67 leads to the horizontal header 68, both of the headers 66 and 68 being located outside of the furnace wall, and the tubes 67 connecting the same extending so as to form a combustion arch. The fuel burners may be installed between the tubes 67 for introducing the fuel into the combustion chamber. The header 68 is connected by branches 69 to the tubes 37 and 38. It will thus be obvious that water circulates through the tubes 67 by entering the header 66 and passing inwardly and upwardly through the tubes 67 to the header 68, from which the water and steam pass through the branches 69 and tubes 37 and 38 to the steam space of the drum 5.

I claim:

1. In a boiler furnace, vertically disposed downtake headers near the corners of said furnace, vertically disposed uptake headers near the middle of the front and rear walls of said furnace, rows of straight tubes connecting said uptake and downtake headers, and outwardly opening recesses in the walls of said furnace to receive some of said headers.

2. In a furnace, two intersecting walls, rows of straight tubes disposed in each of said walls, each row extending beyond the intersection of said walls, the tubes in one row being disposed between the tubes of the other row at said intersection, headers connected to the tubes in each row, and one of said headers being disposed within an outwardly opening recess in a wall.

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