(No Model.) 3 Sheets—Sheet 1.

H. J. SPENCER.

BOILER FOR STEAM HEATING APPARATUS.

No. 601,818. Patented Apr. 5, 1898.

Fig. 2

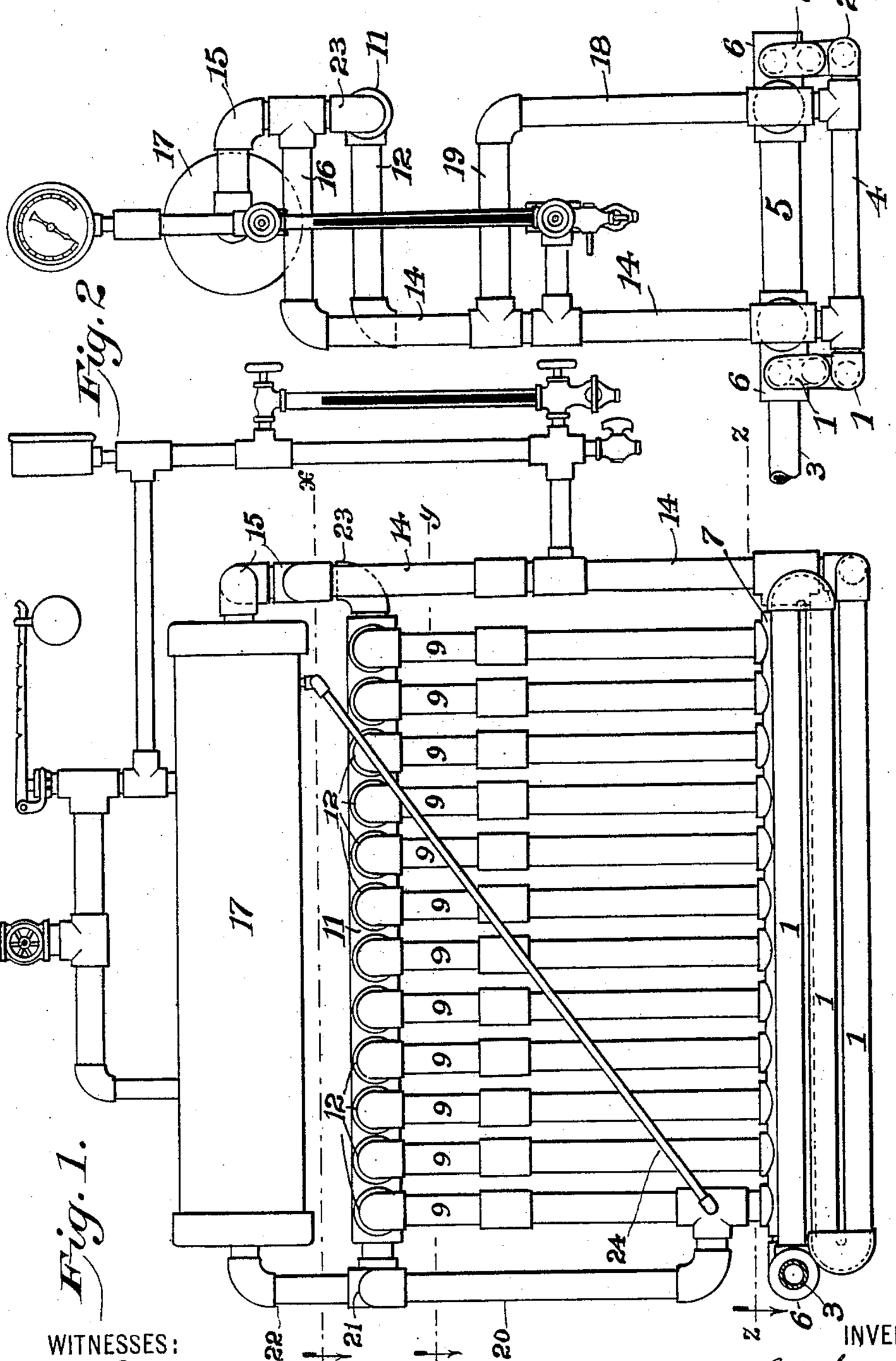

Fig. 1.

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(No Model.) 3 Sheets—Sheet 2.

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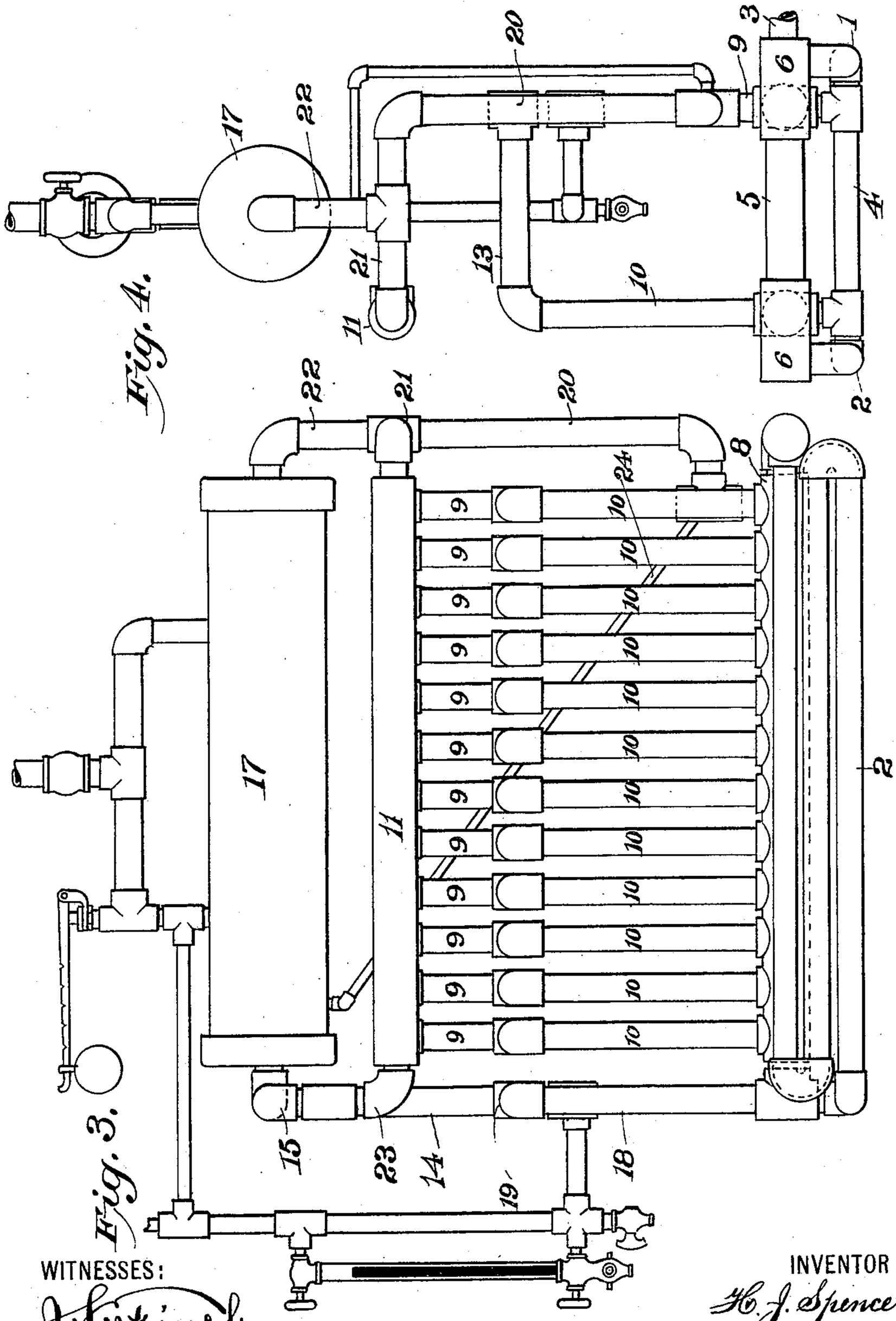

Fig. 4.

Fig. 3.

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BOILER FOR STEAM HEATING APPARATUS.

No. 601,818. Patented Apr. 5, 1898.

Fig. 5.

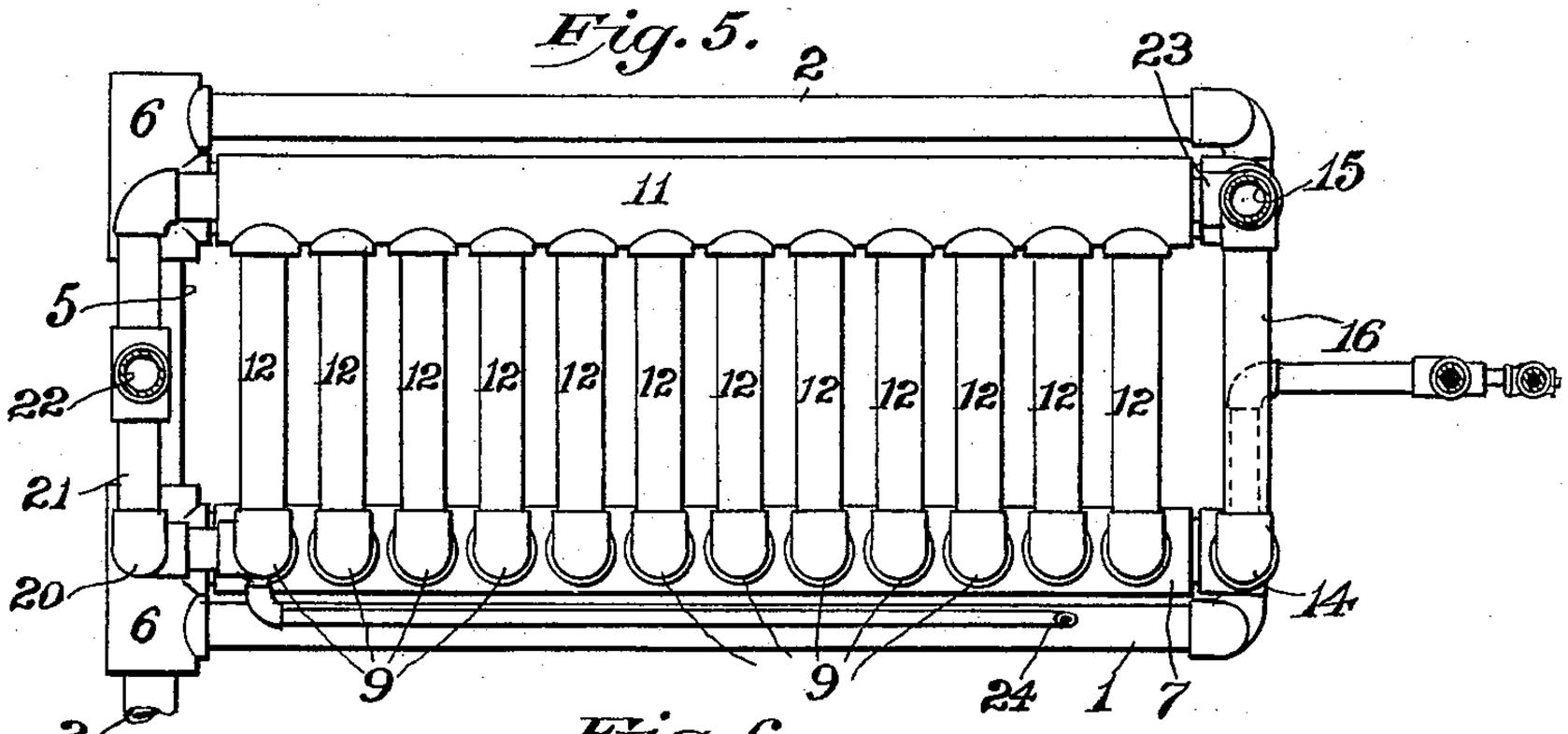


Fig. 6.

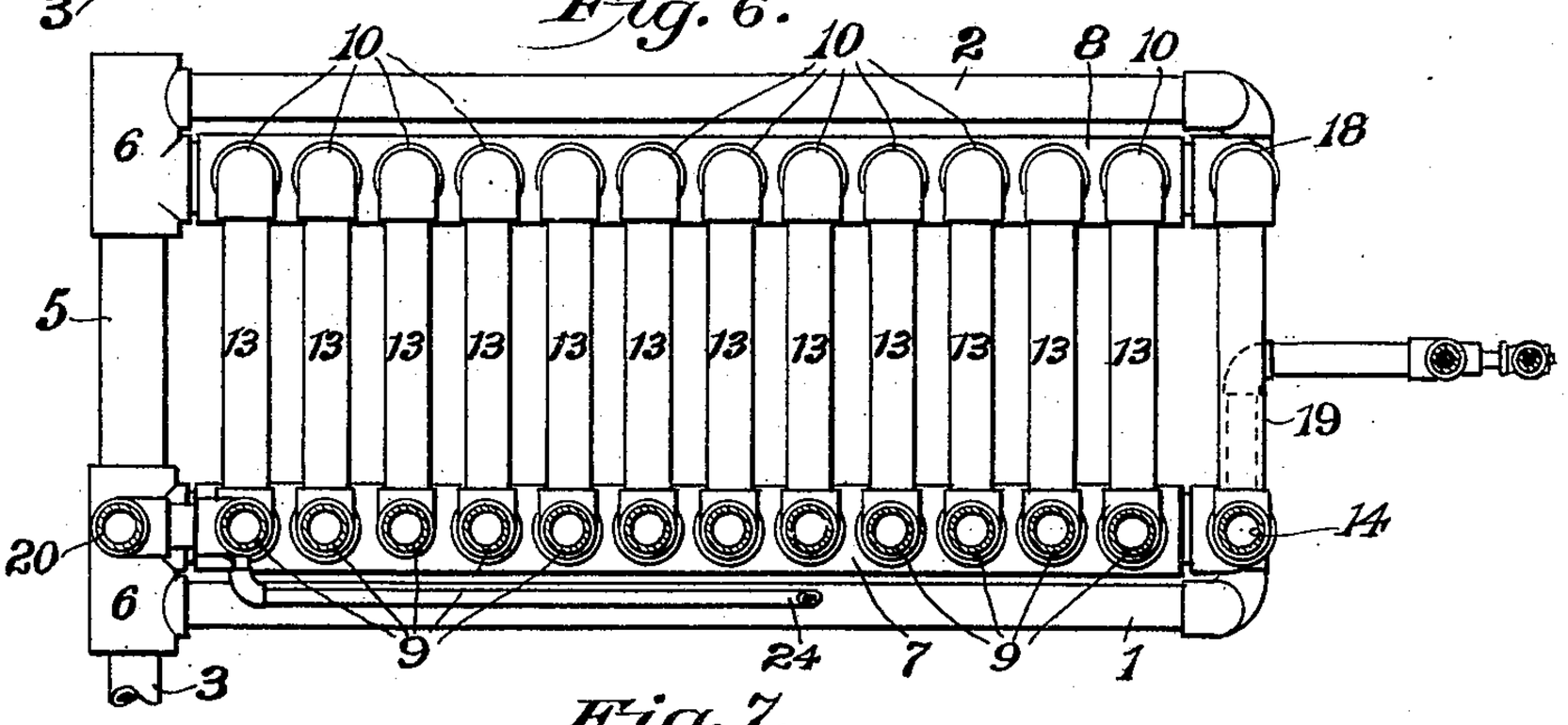
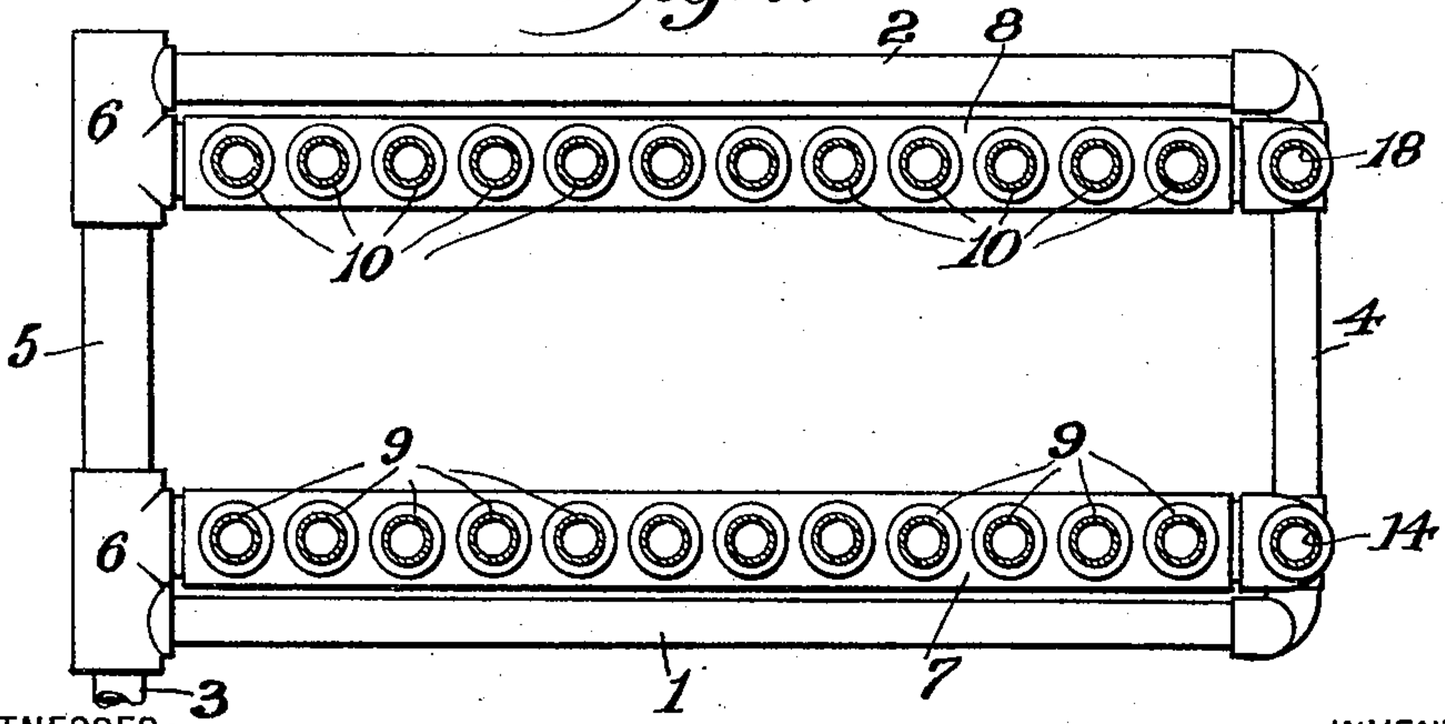


Fig. 7.



WITNESSES:

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UNITED STATES PATENT OFFICE.

HADLEY J. SPENCER, OF PORT CHESTER, NEW YORK.

BOILER FOR STEAM HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 601,818, dated April 5, 1898.

Application filed November 29, 1897. Serial No. 660,148. (No model.)

To all whom it may concern:

Be it known that I, HADLEY J. SPENCER, a citizen of the United States, residing at Port Chester, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Boilers for Steam Heating Apparatus; 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 to certain new and useful improvements in steam heating apparatus, but more particularly has reference to apparatus of this description employing a tubular boiler which communicates at the top with a steam-dome.

The object of my improvement is to provide an arrangement of pipes such as will afford a great heating area and at the same time give a very complete circulation; and with these ends in view my invention consists in certain details of construction, such as will be hereinafter described, and then specifically be designated by the claims.

In the accompanying drawings, Figures 1 and 3 are elevations of opposite sides of my improved apparatus. Figs. 2 and 4 are front and rear end views, respectively; and Figs. 5, 6, and 7 are sections respectively at the lines *x x*, *y y*, and *z z* of Fig. 1.

Similar numbers of reference denote like parts in the several figures of the drawings.

1 2 are pipes which are each disposed in horizontal lengths one above the other, the lengths of each pipe being continuous. These pipes are located, respectively, at opposite sides of the lowest portion of my boiler and constitute in reality the sides of the fire-box, the grate for the fire being immediately below these pipes.

I have not shown any grate or fire-box or even any brickwork for inclosing the boiler, since they form no part of my present invention, and it is sufficient merely to state that the usual brickwork is employed to inclose the boiler, while the grate is immediately below the pipes 1 2, so that the latter constitute water-backs at the sides of the fire-pot.

3 is the water-inlet at the back end of the pipe 1, the other or front end of this pipe being led into a cross-pipe 4 at the front of the boiler, which cross-pipe leads into the lowermost length of the pipe 2, so that it will be clear that the circulation between the pipes 1 2 is complete. At the rear of the boiler extends a cross-pipe 5, which leads into enlarged heads 6, with which heads the uppermost lengths of the pipes 1 2 communicate. It will thus be readily understood that a complete circulation will be had entirely around the lowermost portion of the boiler through the medium of the pipes 1, 2, 4, and 5, and I will now explain the arrangement of the vertically-disposed pipes which lead in communication with these horizontal pipes up to the steam-dome.

7 8 are base-pipes at the sides of the boiler on substantially the same horizontal plane as the uppermost lengths of the pipes 1 2, and these pipes 7 8 at their extremities are in communication, respectively, with the pipes 4 5. Rising from these pipes 7 8 are a series of vertical pipes 9 10, the former of which communicate with the horizontal pipe 11 near the top of the opposite side of the boiler through the medium of cross-pipes 12, while the pipes 10 are in communication with the pipes 9 through the medium of cross-pipes 13, which latter are in a lower horizontal plane than the pipes 12.

14 is a vertical pipe at the front of the boiler, which leads from the pipe 4, near one end thereof, up into an elbow 15 through the medium of a cross-pipe 16, which latter is slightly above the horizontal plane of the pipe 12, the elbow 15 being connected with one end of the steam-dome 17. Extending upward from the opposite end of the pipe 4 is a vertical pipe 18, which communicates with the pipe 14 through the medium of a cross-pipe 19, which is in substantially the same plane as the cross-pipes 13.

20 is a vertical pipe which leads from the bottom of the rearmost pipe 9 and is connected with one end of the pipe 11 by means of a cross-pipe 21, which latter at or about its middle portion is connected with the other end of the steam-dome by means of the pipe 22. The opposite extremity of the pipe 11 is connected with the elbow 15 by means of the short elbow 23, which latter joins onto the elbow 15 immediately below the cross-pipe 16.

The highest water-level in my system of

pipes is at or about the line $x\,x$, which I have used to designate one of the sectional views of the drawings, and from the foregoing description it will be clear that a complete circulation is afforded in the horizontal pipes at the base of the boiler around the fire-box, while the circulation through the vertically-disposed pipes is perfectly free and unimpeded, and the steam will readily pass up into the dome in a fairly dry condition through the connections 15 22.

Water is supplied to my boiler by any of the well-known automatically-operated contrivances, and I do not wish to be limited to any particular means for doing this.

I have provided a drip-pipe 24, which extends from the bottom of the steam-dome down to any convenient part of my system—for instance, to the bottom of one of the pipes 9—by means of which drip the waters of condensation are readily drawn off from the dome.

Any suitable steam or water gages or damper-regulators may be used in connection with my boiler; but I have not seen fit to describe any of these devices, since they form no part of my invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a boiler for a steam heating apparatus, the combination of the horizontal pipes disposed in communicating lengths one above the other at the sides of the fire-box, the horizontal pipes at the front and rear of said box and with which the first-mentioned pipes communicate, the horizontal pipes 7, 8, in communication with the before-mentioned pipes, the vertical pipes leading from the pipes 7, 8, the horizontal pipe 11 near the top of the boiler with which said vertical pipes communicate, the steam-dome at the top of the boiler, and connections between the ends of said dome and the ends of said pipe 11, substantially as set forth.

2. In a boiler for a steam heating apparatus, the combination of a system of communicating pipes horizontally disposed around the sides of the fire-box of a furnace, vertical pipes communicating with each other and extending upward at opposite sides of the boiler, a horizontally-disposed pipe near the top of the boiler into which these vertical pipes lead, a steam-dome on top of the boiler, and connections between the ends of said horizontal pipe and the ends of said dome and additional connections between the aforesaid connections and the horizontally-arranged series of pipes independent of the said vertical pipes, substantially as set forth.

3. In a boiler for a steam heating apparatus, the combination of a system of communicating pipes horizontally disposed around the sides of the fire-box of a furnace, the series of vertical pipes communicating with each other and leading upward from said system at opposite sides of the boiler, the steam-dome at the top of the boiler, the horizontally-disposed pipe 11 near the top of the boiler and into which the vertical pipes lead, the pipes 14, 18, 20, leading from said horizontal system upwardly and connected with the sides of said dome, and connections between the ends of the pipe 11 and the pipes 14, 20, substantially as set forth.

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

HADLEY J. SPENCER.

Witnesses:

FREDERICK H. MAPLES,

R. B. M. COOK.