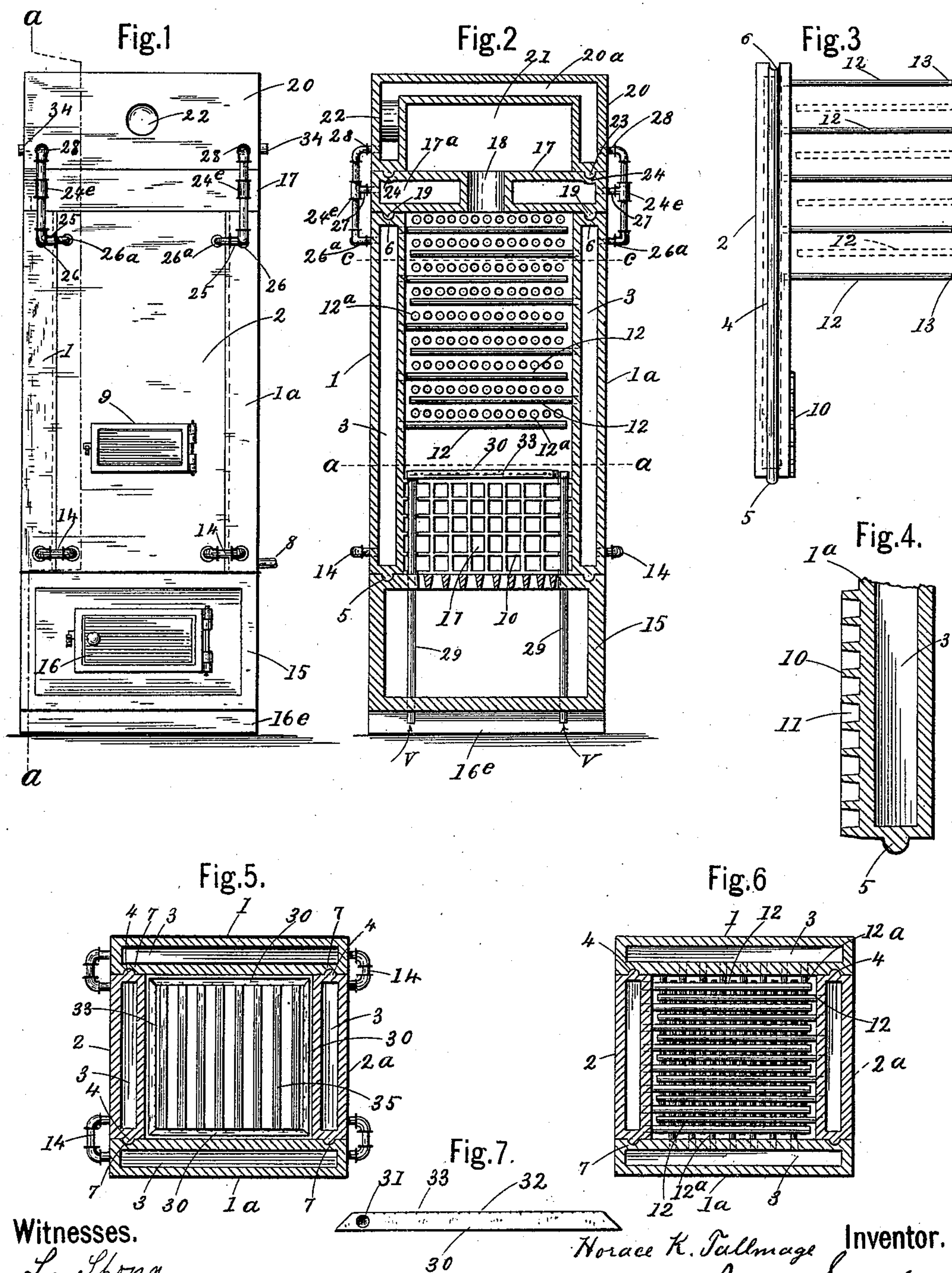


(No Model.)

H. K. TALLMAGE.
HOT WATER HEATER.

No. 532,836.

Patented Jan. 22, 1895.



Witnesses.

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UNITED STATES PATENT OFFICE.

HORACE K. TALLMAGE, OF BUFFALO, NEW YORK.

HOT-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 532,836, dated January 22, 1895.

Application filed September 28, 1894. Serial No. 524,379. (No model.)

To all whom it may concern:

Be it known that I, HORACE K. TALLMAGE, a citizen of the United States, residing in Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Hot-Water Heaters, of which the following is a specification.

My invention relates to a new and improved hot water heating apparatus by which a large amount of heating surface is obtained at a minimum cost of construction, all of which will be fully and clearly hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1, represents a front elevation of my improved steam boiler complete. Fig. 2, represents a vertical section through one side of the boiler, on or about line *a a*, Fig. 1. Fig. 3, is a detached side elevation of one section or side of the body of the boiler, showing one side of its series of water tubes in their proper position projecting out therefrom. Fig. 4, represents a vertical section through a portion of one of the sides cutting through the ribbed portion in which the fire box is located. Fig. 5, is a horizontal section on or about line *a a*, Fig. 2, showing a top view of the removable perforated air tubing surrounding the inner side of the fire box. Fig. 6, is also a horizontal section on or about line *c c*, Fig. 2, illustrating the preferred system of water tubes. Fig. 7, represents a horizontal under side view of one of the horizontal air tubes that are located in the upper portion of the combustion chamber as will appear farther on.

The body of the boiler, containing the water tubes and fire box consists of the parts 1 and 1^a, 2 and 2^a. These four parts are all provided with a water chamber 3, and two of said parts are provided with a longitudinal tongue 4, projecting out from each narrow side, also with a tongue 5, at the bottom and a tongue groove 6, at the top. See Fig. 3. The other two parts, 2 and 2^a, are each provided on one of their broad faces near each side or corner with a longitudinal groove 7, one on each side, adapted to receive the tongues 4 see Fig. 5, where these parts are shown put together thereby forming a substantially square fire box. In one of the side parts is an opening communicating with the water chamber, adapted to receive the inlet pipe 8, and

through another is an opening leading into the combustion chamber and provided with the usual door 9. See Fig. 1. On the lower portion of each inner side is a ribbed portion 10, consisting of a series of parallel ribs and cross ribs leaving the air spaces 11, between them. See Fig. 4. I have shown these spaces as square, but they may be made in any suitable shape, the object being to interpose a non-conducting body of air between the fire and water space and thereby keep the coal from lying close to the side where it is liable to be cooled or deadened by being too close to the water in the water space. The object of these ribs is therefore to provide a series of dead air spaces in which the air cannot circulate but is held in said recesses or depressions between the fuel and the water side and thereby avoid the objection above mentioned.

Projecting from the upper inner side of each part 1—1^a—2—2^a, is a series of water tubes 12, rigidly secured thereto and communicating with the water chamber. The outer or free ends 13, of all these pipes 12, are closed watertight. Two opposite sides 1 and 1^a, for instance, are put together so that the pipes 12, pass between each other, see Fig. 2, also Fig. 3, where the alternate pipes are shown by dotted lines, the pipes in one section being placed sufficiently below the pipes in the other so as to be substantially central between and below them as shown, one pipe being below the other in a vertical line. The pipes 12^a, on the opposite sections pass at right angles or crosswise between the pipes 12, in substantially the same manner, only the pipes of one section pass between the pipes in the other section in a horizontal plane instead of vertical as with former pair of sections, see Fig. 6, in this connection, where the preferred construction, or arrangement of pipes is shown, in which the pipes 12, in the two opposite sections 2 and 2^a, pass in between each other in a horizontal plane, and the pipes 12^a, in the two opposite sections 1 and 1^a (which pass at right angles or cross the pipes 12), also pass from each section in between each other in a horizontal plane. This is the preferred construction because more pipes can be got in a given space than in the construction shown in Figs. 2 or 3.

The several water chambers 3, are each connected at the lower ends with pipes 14, so that the water can circulate freely between each section. The connecting pipes 14, have
5 another object, that of holding the sections together.

Below the four main sections is the ash box 15, made in the usual way and provided with a door 16. At the bottom of the ash box are
10 two ribs which hold it above the floor. At the top is a hollow section 17, having a water chamber 17^a, and a vertical central opening 18. See Fig. 2. It is provided with a downwardly extending tongue 19, which extends
15 entirely around it and fits in the groove 6, when put in place. On the top of this section 17, is another section 20, having a surrounding water chamber 20^a. This section is provided with a chamber 21, a smoke pipe hole 22, and
20 with a tongue 23, extending around near the bottom edge and is adapted to fit in the groove 24, in the top of the section 17. This top section being square, can be turned so as to bring the smoke pipe hole 22, either to the
25 front or back or to any side.

The top portions, and the top of the four main sections, are all held together and provided with a water communication between all of the water chambers by means of connecting water tubes, 24^e. See Figs. 1 and 2.
30 The horizontal pipes 25, are each provided with a short branch pipe 26, connecting with the narrow sides of the sections 1 and 1^a, and with a short pipe 26^a connecting with the sections 2 and 2^a. The vertical pipes connected
35 with the pipes 25, extend upward and connect by pipes 27, with the upper section and by pipe 28, with the top section 20.

It will be seen that the above pipes not only
40 provide a water communication between the several water chambers but also hold the several parts together.

A series of screw threaded holes, are cut in the reversible top portion, each hole being
45 filled with a plug 34, which is removed when it becomes necessary to reverse the upper portion having the hole for the smoke pipe. These plugs are used to stop the holes left by the connecting pipes when they are removed from said top portion.
50

Four air pipes 29, extend up to the top of the fire box. They are located in or about each corner of the fire box, (see Fig. 2,) and extend down through the bottom of the ash
55 box, and are open so that the air passes in, in the direction of the arrows V, shown in said Fig. 2. The top ends of these pipes 29, are also open and four horizontal pipes 30, each have a hole 31, in the under side of
60 one end (see Fig. 7, where the under side of one of these pipes is shown), which is adapted to fit over the top of the pipes 29, so that the horizontal pipes 30, can be set thereon, and thus be easily removable so that when worn
65 or burned out they can be instantly replaced by new pipes. They are put in place substantially as shown in Fig. 5. Their free ends

are chamfered off so that they fit together as shown, and the inner sides 32, are provided with a series of perforations 33. See Fig. 2. 70
The object of this construction is to carry highly heated air to the point where it is most required to mingle with the gases of combustion, and the object in using metal for this is that it becomes more highly heated than 75
brick. Furthermore the tubes being small confine the air more closely so that it receives more heat in passing through.

The circulation in this boiler takes the usual course, the cold water passing in at the lowest 80 point and the hot water passing out above it as will be readily understood. The air passes into the pipes 29, in the direction of the arrows V, shown in Fig. 2, and it becomes sufficiently heated on its way up to combine 85 with the gases of combustion as it passes out through the perforations in the horizontal pipes 30. 35, in Fig. 5, represents the fire grate.

I claim as my invention—

1. A hot water heater consisting of four hollow main sections forming the substantially square body of the boiler, each section having several series of water tubes connected to one side only of the section, each tube of the 95 series communicating with the water chamber within the section, and having its outer end closed, the tubes in one section passing in between the horizontal rows of tubes in its opposite section, and the alternate intermediate series of tubes of the sections forming the other two sides of the boiler, passing in transversely between horizontal rows of tubes in its opposite section, an ash receptacle upon which the four main sections rest, a top 105 covering the main sections having an outlet for the products of combustion, and means for securing the sections together, substantially as described.

2. In a hot water heater, two pairs of hollow main sections forming the body of the boiler, a series of horizontal rows of water tubes connected to one side only of said sections and communicating with the water chambers within the sections, the tubes in the 115 first pair of sections extending horizontally between the tubes in its opposite section, in combination with a series of similar rows of water tubes in the second pair of sections, the tubes in one section extending horizontally 120 between the tubes in its opposite section and transversely between the horizontal rows of water tubes in the first pair of sections, an intermediate horizontal section having a vertical opening and a water chamber, 125 a covering top provided with a water chamber and a smoke outlet, and a series of pipes for securing the several parts of the boiler together and at the same time providing a water communication between all parts of 130 the boiler, substantially as described.

3. In a hot water heater, the combination with the fire chamber, of a series of metallic tubes extending up from below the ash box

to the top of the fire chamber, each substantially vertical tube having a horizontal tube provided with a series of small perforations extending lengthwise, the tube being closed at its free end which extends forward nearly to its next tube, and is made easily removable, substantially as described.

4. In a hot water heater, consisting of two pairs of hollow sections forming the main body of the boiler, a base in which the ash pit is located and upon which the body of the boiler rests, a horizontal section having a vertical opening for the products of combustion and a water chamber, and a top located above the horizontal section having a smoke outlet and a surrounding water chamber, in combination with a series of tubes for connecting and securing the several parts of the boiler together and at the same time providing a water communication through said tubes with all the water chambers of the boiler, substantially as described.

5. In a hot water heater, the combination of one pair of main sections having water chambers, and a longitudinal tongue on the two narrow sides of each section, with a second pair of sections having water chambers and two longitudinal grooves extending down near the edges of the inner face of each section in which the tongues of the first pair fit when the whole are put together, an ash box having grooves in its top in which the tongues from the lower ends of the main sections fit, an intermediate section having a vertical central opening and a water chamber, a covering top also having a water chamber and a smoke outlet, the whole fitted together by

similar grooves and tongues, and means substantially as above described for communicating with the several water chambers and holding them together, as above set forth.

6. In a hot water heater, a reversible square top portion having a water chamber and a smoke outlet and means substantially as above described for securing it to the main boiler, for the purposes described.

7. A section for a hot water heater, consisting of a side portion having a water chamber, a ribbed portion forming one side of the fire chamber, a tongue on each narrow side and bottom, and a groove in the top, the whole formed in one integral piece of cast metal, and a series of water tubes communicating with the water chamber and having their outer ends closed, substantially as and for the purposes described.

8. In a hot water heater, the combination with the fire chamber, of a series of non-circulating air spaces located on the surface of the fire chamber walls, and forming a non-conductor of heat between the fire and the water space, substantially as and for the purposes described.

9. In a hot water heater, the combination with the fire chamber, of a series of depressions extending over the surface of the fire-chamber walls, each of said depressions or recesses having walls which surround them on all sides excepting that next to the fire, thereby forming dead air spaces, as set forth.

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