R. E. CLISDELL.

WATER HEATER.

APPLICATION FILED JULY 8, 1914.

1,142,495.

Patented June 8, 1915.

2 SHEETS—SHEET 1.

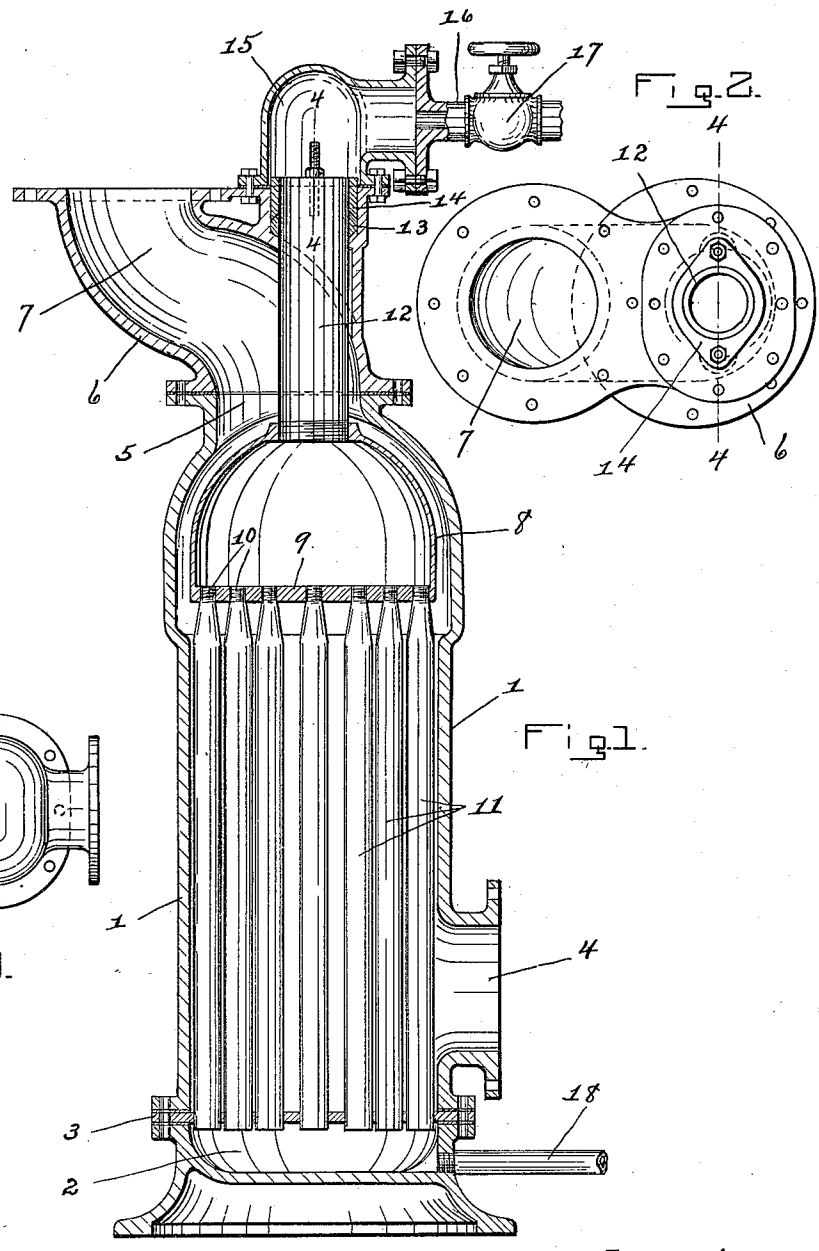


Fig. 1.

Fig. 2.

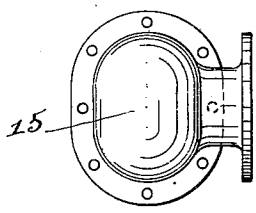


Fig. 3.

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2 SHEETS—SHEET 2.

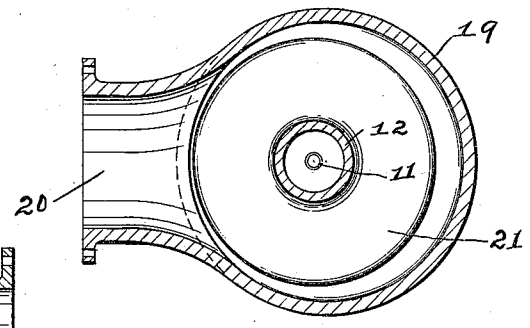


Fig. 6.

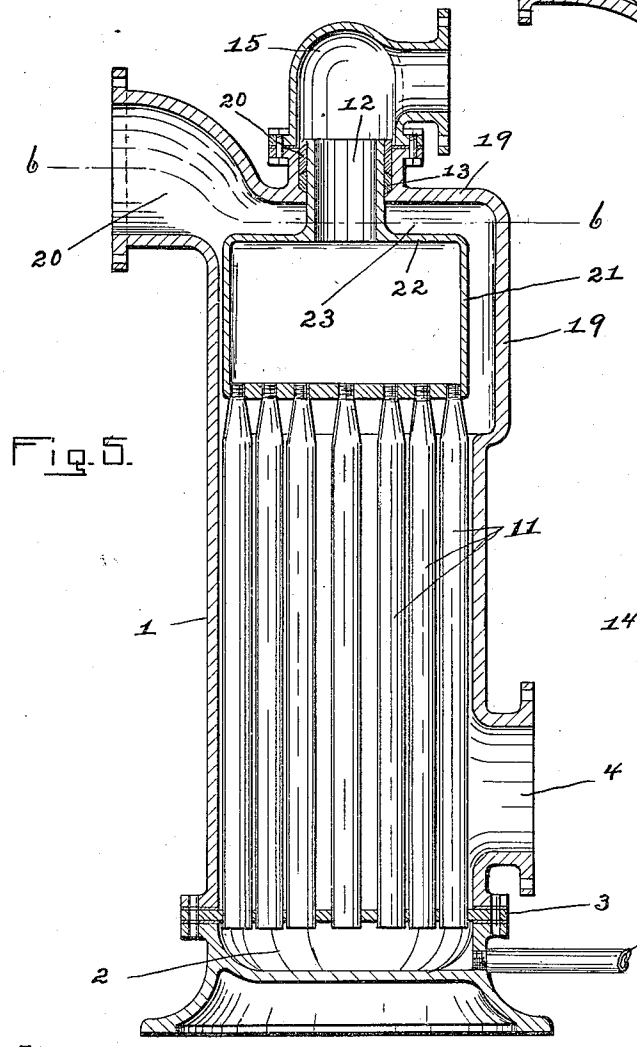


Fig. 5.

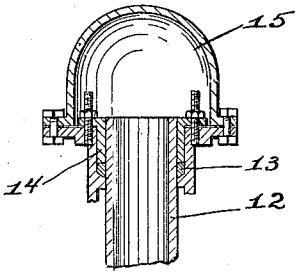


Fig. 4.

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UNITED STATES PATENT OFFICE.

ROBERT E. CLISDELL, OF SCHENECTADY, NEW YORK.

WATER-HEATER.

1,142,495. Specification of Letters Patent. Patented June 8, 1915.

Application filed July 8, 1914. Serial No. 849,848.

To all whom it may concern:

Be it known that I, ROBERT E. CLISDELL, a citizen of the United States, residing at Schenectady, county of Schenectady, and State of New York, have invented certain new and useful Improvements in Water-Heaters, of which the following is a specification.

The invention relates to such improvements and consists of the novel construction and combination of parts hereinafter described and subsequently claimed.

Reference may be had to the accompanying drawings, and the reference characters thereon, which form a part of this specification. Similar characters refer to similar parts in the several figures therein.

Figure 1 of the drawings is a central, vertical, longitudinal section of one form of water-heater embodying my invention. Fig. 2 is a top plan view of the same with the inlet elbow removed. Fig. 3 is a top plan view of the inlet elbow detached. Fig. 4 is a vertical cross-section taken on the broken line 4—4 in Figs. 1 and 2. Fig. 5 is a view similar to Fig. 1 of another form of water-heater embodying my invention. Fig. 6 is a horizontal cross-section of the same taken on the broken line 6—6 in Fig. 5.

This invention relates to the type of water-heater in which the water circulates through an inclosure containing steam heated pipes.

Certain objects of the invention are to secure greater efficiency and economy in the use of the steam; and to increase the durability of the heater.

Other objects will appear in connection with the following description:

Referring to Figs. 1, 2, 3, and 4 of the drawings, 1 is the main casing, of general circular form in cross-section, which casing is supported upon a hollow base, 2, from which it is separated by a horizontal plate or diaphragm, 3. The casing, 1, is provided near its lower end with a water-inlet, 4, and at its upper end with a water-outlet, 5. The casing, 1, is surmounted by a head, 6, containing an outlet passageway, 7, communicating with the water-outlet, 5. Within the upper end of the casing, 1, is a steam-dome, 8, conforming to, but smaller than, the interior of the casing, said dome having an integral horizontal bottom, 9, containing numerous screw-threaded apertures adapted to receive the upper reduced screw-threaded ends, 10, of a like number of vertical steam-pipes, 11, the lower ends of which pass down through correspondingly located apertures in the horizontal base-plate, 3, within which apertures the lower ends of the respective pipes are expanded to make a tight joint. The steam-pipes, 11, are thus mounted in fixed relation to the base-plate, 3, and serve to support the steam-dome, 8.

The respective ends of the vertical steam-pipes, 11, may be secured in connection with the respective apertures in the bottom of the dome and in the horizontal base-plate in the manner above described or in any other known manner, whereby they are adapted to make a tight joint and to accomplish the above stated functions.

An inlet steam-pipe, 12, is mounted upon the dome at the apex thereof, and extends upward therefrom through a close-fitting aperture in the head, 6, forming a sliding joint with the head, 6 which joint is made steam-tight and water-tight by means of a packing, 13, and gland, 14.

The aperture in the head, 6, through which the inlet steam-pipe, 12, passes, is covered by an elbow, 15, bolted upon the top of the head, 6, with which elbow is detachably connected a steam-supply-pipe, 16, having a controlling valve, 17, whereby the supply of steam can be regulated. The elbow, 15, thus forms a cap covering the aperaure in the head independently of said steam-inlet-pipe so as not to interfere with the movements of the steam-inlet-pipe due to expansion and contraction.

For certain purposes of the invention the cap for the aperture in the head, 6, may be of any desired form, such as not to interfere with the movements of the steam-inlet-pipe, while providing a means of connection for the main-steam-supply-pipe, but I prefer the elbow-form shown or some similar form whereby a steam-chamber is formed somewhat larger than, and communicating with, the opening in the steam-inlet-pipe.

In the use of the heater, steam is introduced from the pipe, 16, passing down through the steam-inlet pipe, 12, in somewhat expanded form and thence into the dome, 8, where it further expands and from which it passes down through the pipes, 11, within which it is condensed, the water of condensation draining into the hollow base,

2, from which it is conducted by a waste-pipe, 18. The water entering the casing at 4 flows around the steam-pipes, 11, and upwardly between the dome, 8, and the top of the casing and out through the passageway, 7, absorbing in its course both the sensible and the latent heat from the steam which is condensed and converted into water in passing down through the pipes, 11. By connecting the passageway, 7, with the water-inlet, 4, by means of a return pipe in a heating system, not shown, circulation of the water may continue in the usual manner.

By introducing the steam at the top of the heater through the pipe, 12, the first action of the steam is at substantially its maximum of sensible heat upon the outflowing water at its maximum temperature; while the steam is not subjected to the minimum temperature of the inflowing water until it reaches the lower portion of the pipes, 11, where it condenses, giving off its latent heat which quickly heats the inflowing water.

The sliding joint at the stuffing-box formed by the packing, 13, and gland, 14, affords freedom for expansion and contraction of the pipes, 11, avoiding injurious strains upon the connections between said pipes and the bottom, 9, of the dome and horizontal base-plate, 3.

In the form of my invention shown in Figs. 5 and 6, the casing, 1, has an integral head, 19, and is provided with an outlet passageway, 20, through the head at one side of the casing. The steam-dome, 21, is mounted eccentrically within the casing nearer the side from which the passageway, 20, extends, and the top, 22, of said dome and the head, 19, of the casing are preferably substantially flat and parallel with each other. The space between the dome, 21, and casing, 1, through which space the heated water rises, becomes gradually restricted on the side toward the outlet passageway, 20, thereby tending to deflect the upwardly flowing water around the dome away from the outlet passageway and into the space, 23, between the top of the dome and the head, 19, thus causing much of the outflowing water to traverse a devious path over a large area of the heated dome, 21, in reaching the outlet passageway, 20. Steam may be supplied to the steam-inlet pipe, 12, in any known manner. As the steam-dome is free to rise and fall in accordance with the movements of expansion and contraction of the pipes, 11, there is practically no tendency for the connections between the steam-pipes and the dome and the bottom or base-plate, 3, to become loose.

The stuffing-box formed by the packing, 13, and gland, 14, is readily accessible for adjustment or renewal by removing the inlet-elbow, 15.

What I claim as new and desire to secure by Letters Patent is—

1. In a water-heater, and in combination, a casing provided with a water-inlet and a water-outlet, and having a bottom provided with apertures, and a head provided with an aperture; a steam-dome mounted with freedom for vertical movement within the upper part of the casing, said dome having a bottom provided with apertures; dome-supporting steam-pipes mounted at their lower ends in the respective apertures in the bottom of the casing, and at their upper ends in the respective apertures in the bottom of the dome; a steam-inlet pipe extending from the dome upward within said aperture in the head of the casing, said pipe closely fitting said aperture with freedom for longitudinal movement; and a steam-inlet-cap covering said aperture in the head independently of said steam-inlet-pipe.

2. In a water-heater, and in combination, a casing provided with a water-inlet and a water-outlet, and having a bottom provided with apertures, and a head provided with an aperture; a steam-dome mounted with freedom for vertical movement within the upper part of the casing, said dome having a bottom provided with apertures; dome-supporting steam-pipes mounted at their lower ends in the respective apertures in the bottom of the casing, and at their upper ends in the respective apertures in the bottom of the dome; a steam-inlet pipe extending from the dome upward through said aperture in the head of the casing; a stuffing-box for the upper end of said steam-inlet pipe; and a steam-inlet elbow bolted upon said head inclosing said stuffing-box and the outer end of said steam-inlet pipe.

3. In a water-heater, and in combination, a casing provided near its lower end with a water-inlet and at its upper end near one side with a water-outlet; a steam-dome mounted eccentrically within the upper part of said casing nearer the outlet side thereof; means for supplying steam to said dome; and steam-pipes extending downward from said dome within the casing.

4. In a water-heater, and in combination, a casing provided near its lower end with a water-inlet, and at its upper end near one side with a water-outlet, and with an aperture in its head; a steam-dome mounted eccentrically within the upper part of said casing and spaced away from the head of the casing; a steam-inlet pipe extending from said dome through said aperture in the head of the casing; and steam-pipes extending downward from said dome within the casing.

5. In a water-heater, and in combination, a casing provided near its lower end with a water-inlet, and at its upper end near one side with a water-outlet, and having a bot-

tom provided with apertures, and a head provided with an aperture; a steam-dome eccentrically mounted with freedom for vertical movement within the upper part of said casing nearer the outlet side thereof, said dome having a bottom provided with apertures; dome-supporting steam-pipes mounted at their lower end in the respective apertures in the bottom of the casing and at their upper end in the respective apertures in the bottom of the dome; and a steam-inlet pipe extending from the dome upward through said aperture in the head of the casing, said pipe closely fitting said aperture with freedom for longitudinal movement.

6. In a water-heater, and in combination, a casing provided near its lower end with a water-inlet and near one side of its upper end with a water-outlet; a steam-dome mounted within the upper part of said casing with a water-passageway between said dome and said casing of greater width at the side opposite said outlet than adjacent to said outlet; means for supplying steam to said dome; and steam-pipes extending downward from said dome within the said casing.

In testimony whereof, I have hereunto set my hand this 30th day of June, 1914.

ROBERT E. CLISDELL.

Witnesses:
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."