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PATENTED APR. 17, 1906.

J. A. COPPRIDGE & T. B. STULTZ.
HOT WATER HEATER.

APPLICATION FILED AUG. 15, 1905.

2 SHEETS—SHEET 1.

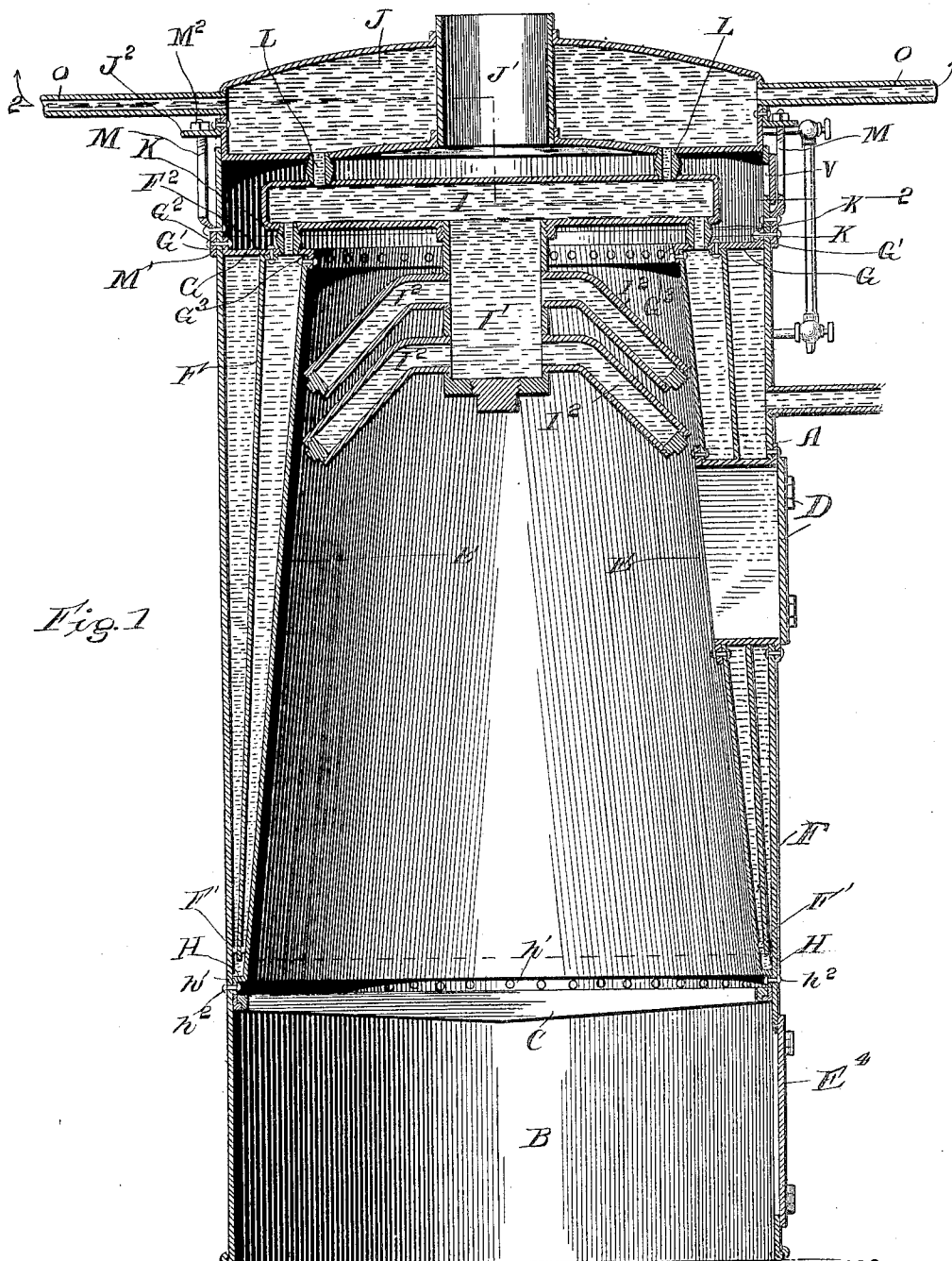


Fig. 1

WITNESSES:

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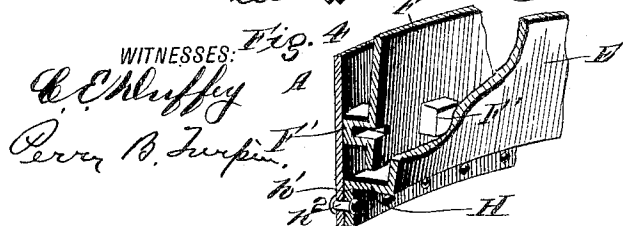
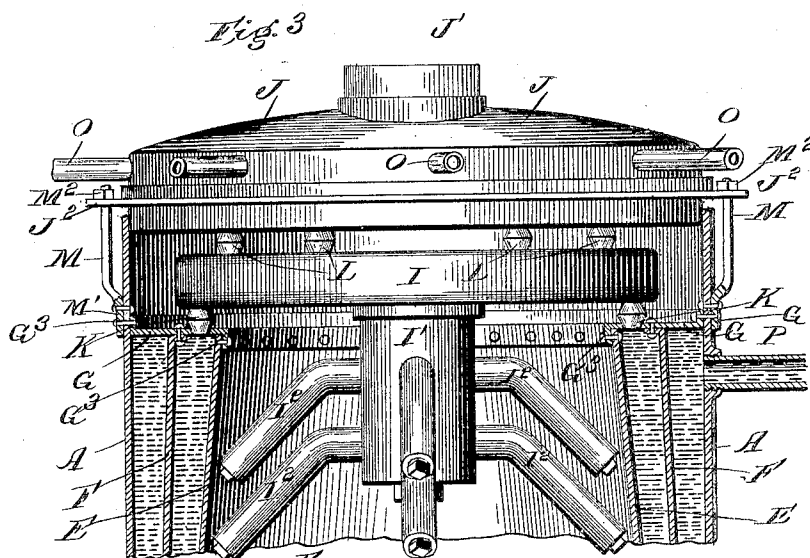
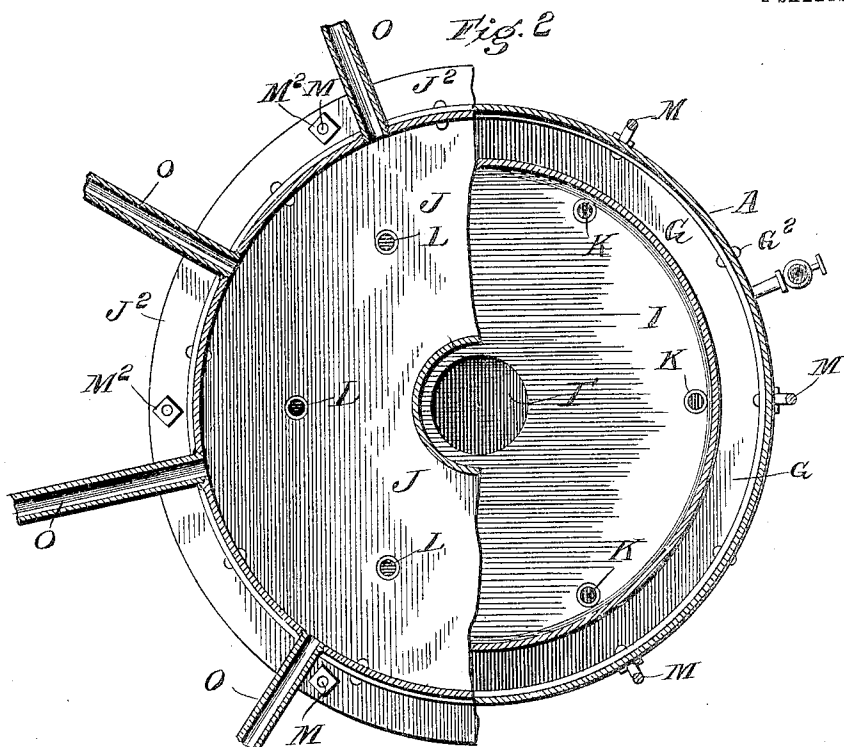
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2 SHEETS-SHEET 2



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UNITED STATES PATENT OFFICE.

JOEL ANDERSON COPPRIDGE AND THOMAS BENJAMIN STULTZ, OF
ROANOKE, VIRGINIA.

HOT-WATER HEATER.

No. 818,355.

Specification of Letters Patent.

Patented April 17, 1906.

Application filed August 15, 1905. Serial No. 274,312.

To all whom it may concern:

Be it known that we, JOEL ANDERSON COPPRIDGE and THOMAS BENJAMIN STULTZ, citizens of the United States, and residents of Roanoke, in the county of Roanoke and State of Virginia, have invented certain new and useful Improvements in Hot-Water Heaters, of which the following is a specification.

This invention is an improvement in hot-water heaters, having for an object to provide a novel construction for heating the water circulating through radiators and the like for heating purposes; and the invention consists in certain novel constructions and combinations of parts, as will be hereinafter described and claimed.

In the drawings, Figure 1 is a vertical section of a heater embodying our invention. Fig. 2 is a cross-section on about the line 2 2 of Fig. 1. Fig. 3 is a sectional elevation of the upper portion of the heater; and Fig. 4 is a detail perspective view, partly in section, showing the construction at the lower end of the water-chamber.

Our improved heater is designed especially for heating residences, but may be used for heating stores, schools, churches, &c., when a quick uniform heat is desired. In appearance the heater is somewhat similar to an ordinary vertical boiler and is built of sheet-steel, boiler-iron, or other suitable material.

As shown, the heater includes a cylindrical shell or casing A, having at its bottom an ash-pit B and above the same a grate C, a suitable fire-door D being provided above the grate and an ash-pit door E being provided, leading to the ash-pit, as will be understood from Fig. 1 of the drawings. Within the shell we provide a water-heating space by means of the inner wall-plate E, the intermediate plate or partition F, and the top plate G.

The inner wall-plate E is in the form of a truncated cone and is provided at its lower edge with an outwardly-projecting flange H, from which depends a cylindrical flange H', riveted at H² to the shell A. This trunco-conical plate E inclines inwardly toward its upper edge, extending to this extent over the fire and increasing the heating effect of the fire upon the water within the water-heating chamber.

The partition-plate F conforms generally in inclination to the wall-plate E and extends at its lower end nearly to the lower end of the

wall-plate E and is provided at its lower edge with reversely-projecting lugs F', by which it is spaced away from the outer shell A and the inner wall-plate E at its lower edge to permit water supplied to the space between the shell A and the plate F to pass into the space between the plate F and the plate E in the circulation of water secured in the heater in the operation of the invention.

The top plate G is provided at its outer edge with a flange G', riveted at G² to the shell A, and at its inner edge with a depending flange G³, which laps within the upper end of the trunco-conical wall E and is riveted thereto, as shown. By this means the top plate G is secured at G² to the outer shell and at G³ to the inner shell or wall E. At its upper end the partition F is flanged at F² to lap against the under side of the top plate G, and it is riveted to the top plate at a point about midway between the inner plate E and the outer plate or shell A, as best shown in Figs. 1 and 3 of the drawings. We thus provide surrounding the trunco-conical plate E a water-chamber divided by the intermediate plate or partition forming inner and outer compartments which communicate at their lower ends, so the water supplied to the outer compartment may pass at its lower end to the inner compartment, and these inner and outer compartments are preferably enlarged toward their upper ends, such enlargement of the inner compartment facilitating the rising of the water therein as it circulates upward under increased temperatures.

The space within the inner wall-plate forms a fire-pot, and the products of combustion pass upward around the lower dome-section, presently described, and thence out through the upper dome-section, as will be described.

Above the water-chamber we provide a lower dome-section I, an upper section J, and the connecting devices presently described. As shown, the dome-section I is a flat circular chamber which extends outwardly over the inner compartment of the water-chamber and is connected with such inner compartment by slip-nipples K, which are tapered at their opposite ends to fit in openings, respectively, in the top plate G and the bottom plate of the dome-section I, so that when pressure is exerted to draw the dome-section down toward the top plate G the nipples will be tightened in the openings

formed to receive them. It will be noticed that these connections at K communicate with the inner annular compartment of the water-chamber within the shell, and the nipples K operate to space the dome-section I sufficiently above the dome-plate to permit the products of combustion to circulate outwardly between the dome-section and the top plate G to the outer side of the dome-section I, as will be understood from Fig. 1. At its center the dome-section I is provided with a depending cylindrical extension I', which projects down within the upper end of the inner trunco-conical wall E, and preferably is provided with projecting tubes I², which hang directly over the fire in the fire-box and incline downwardly, so that the coldest water within the dome will drop into said tubes and be heated to a high temperature.

The upper or main dome J is formed to fit within the upper end of the shell A, as shown in Figs. 1 and 3, and is provided with a central opening at J', through which smoke and the like are discharged to a suitable offtake, the slip nipples or tubes L tapering at their opposite ends to fit at their upper and lower ends in the openings, respectively, of the bottom plate of the dome J and the top plate of the dome I and are pressed to a tight fit when the dome J is forced downwardly toward the dome I, as will now be described.

Devices are provided between the shell A and the dome J for pressing the latter downwardly into the upper end of the shell. As shown, they include bolts M, secured at their lower ends at M' to the shell A and extending upwardly through openings in the flange J², projecting from the dome J, and nuts M² on these bolts above the flange J² enable pressure to be exerted to force the upper dome downwardly, thus securing a tight fit between the domes J and I and their connecting-nipples M L and the dome I and the top plate G and their connecting-nipples, as will be understood from Figs. 1 and 3 of the drawings. In practice cement or other suitable packing may be provided for the joint between the lower end of the dome J and the shell. We also may find it desirable to provide at N doors at intervals to permit access to the portions of the domes within the shell for cleaning purposes.

By the described construction it will be noticed we provide a heater which can be readily manufactured in quantities for use and shipped to the place where it is desired to use them already to be set up for use.

As shown, pipes O extend from the upper dome J for connection with suitable radiators, and a pipe or pipes O connect with the outer compartment of the water-chamber for the return of water from the heater, it being understood that in the use of the invention the entire plant, including the radiators,

the connecting-pipes, the upper and lower domes, and the inner and outer compartments of the water-chamber within the shell, are to be filled with water.

Soft or hard coal, wood, or other suitable fuel may be employed. As the fire burns a thin annular sheet of water in the inner compartment of the water-chamber will become heated and rise, the colder water in the outer compartment will enter the inner compartment at the bottom thereof and it is replaced by other water, and so on, as the operation proceeds, the inner inclination of the inner wall-plate increasing the heating effect of the fire, as will be readily understood.

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

1. The hot-water heater herein described comprising the outer shell or casing, the inner wall-plate within said shell and made in trunco-conical form and inclining inwardly toward its upper end forming a water-chamber within the shell the lower end of the inner plate being secured to the outer plate or shell, the top plate flanged at its inner and outer edges and secured at such edges respectively to the inner wall-plate and the shell forming the top of said water-chamber, the intermediate plate or partition flanged at its upper end and secured at such end to the top plate between the inner and outer plates and provided at its lower end with reversely-projecting lugs spacing it apart from the inner and outer plates, said partition forming the water-chamber into inner and outer compartments, the lower dome arranged above said water-chamber, the tapered slip-nipples connecting said dome with the inner compartment of the water-chamber, the centrally-depending tubular extension projecting from said dome downwardly into the fire-box formed by the upper end of the inner wall-plate and provided with downwardly-extending tubes, the upper dome having a central discharge-opening for smoke, &c., and fitting within the upper end of the outer shell and provided above said shell with the lateral flange, the tapered slip-nipples connecting said upper dome-section with the lower dome-section, the bolts secured at their lower ends to the shell and projecting thence upwardly through the lateral flange of the upper dome-section, the nuts on said bolts, the feed-pipes leading from the upper dome-section for connection with the radiators and the return-pipes delivering to the outer compartment of the water-chamber within the shell, all substantially as and for the purpose set forth.

2. In a heater substantially as described, the combination of the outer shell, an inner wall, a top plate between the outer shell and inner wall, a partition-plate depending from said top plate and dividing the water-cham-

ber between the outer and inner plates into separate compartments, means being provided whereby said compartments communicate at their lower ends.

5 3. A water-heater having an annular water-chamber and an intermediate partition dividing the same into inner and outer compartments, means for feeding the water to the outer compartment and for conducting the
10 water from the inner compartment, the outer compartment forming a cover for the inner compartment and communicating therewith, substantially as set forth.

4. The combination in a water-heater with
15 the shell or casing, of the water-chamber and fire-pot within the same, and the dome over the fire-pot and communicating with the water-chamber, and provided with a depending central extension having laterally-projecting tubes within the fire-pot, substan-
20 tially as described.

5. The combination with the outer shell and the inner trunco-conical plate forming a water-chamber within the outer shell, of a
25 partition-plate dividing said water-chamber into inner and outer compartments which communicate at their lower ends, and the dome above said water-chamber and communicating with the inner compartment
30 thereof, substantially as set forth.

6. The combination of the outer shell or casing, the trunco-conical inner plate within the shell, the top plate between the upper end of said inner plate and the shell and the
35 partition-plate depending from said top plate and spaced at its lower end away from the shell, the dome above the water-chamber and connected with the compartment or space between the inner plate and the partition-plate.
40

7. The combination of the outer shell, the trunco-conical inner plate, rivets securing the lower end of said plate to the outer shell, the top plate secured at its outer edge to the
45 shell, and at its inner edge to the trunco-conical plate, the partition depending from the top plate between the inner plate and the shell and forming inner and outer compartments in the water-chamber, said compart-
50 ments communicating at their lower ends,

and the dome above the water-chamber and communicating with the inner compartment thereof, substantially as set forth.

8. The combination in a heater of the shell, the plate within the same and forming
55 a water-chamber, the lower dome, slip-nipples connecting the lower dome with the water-chamber, the upper dome, slip-tubes connecting said dome with the lower dome, and
60 devices between the upper dome and the casing or shell whereby the upper dome may be pressed down toward the lower dome and the latter toward the water-chamber, substan-
tially as set forth.

9. The water-heater comprising the shell
65 having an annular water-chamber, a lower dome above and communicating with the water-chamber, an upper dome above and communicating with the lower dome, and devices for securing the upper dome in connec-
70 tion with the shell, substantially as set forth.

10. In a water-heater the combination with the shell or casing and means providing a fire-pot within the same, of a dome above
75 said fire-pot, a tubular extension depending from said dome within the fire-pot, and laterally and downwardly extending tubes projecting from said extension within the fire-
pot, substantially as and for the purpose set forth.
80

11. The combination in a hot-water heater with a shell, and an inner wall-plate, of a partition-plate extending between the shell and inner wall-plate and provided at its lower end with reversely-projecting lugs spacing it
85 apart from the inner wall-plate and the shell whereby to establish communication between the compartments at the outer and inner side of the said partition, substantially as and for the purposes set forth.

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Witnesses to signature of Joel Anderson Coppridge:

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