

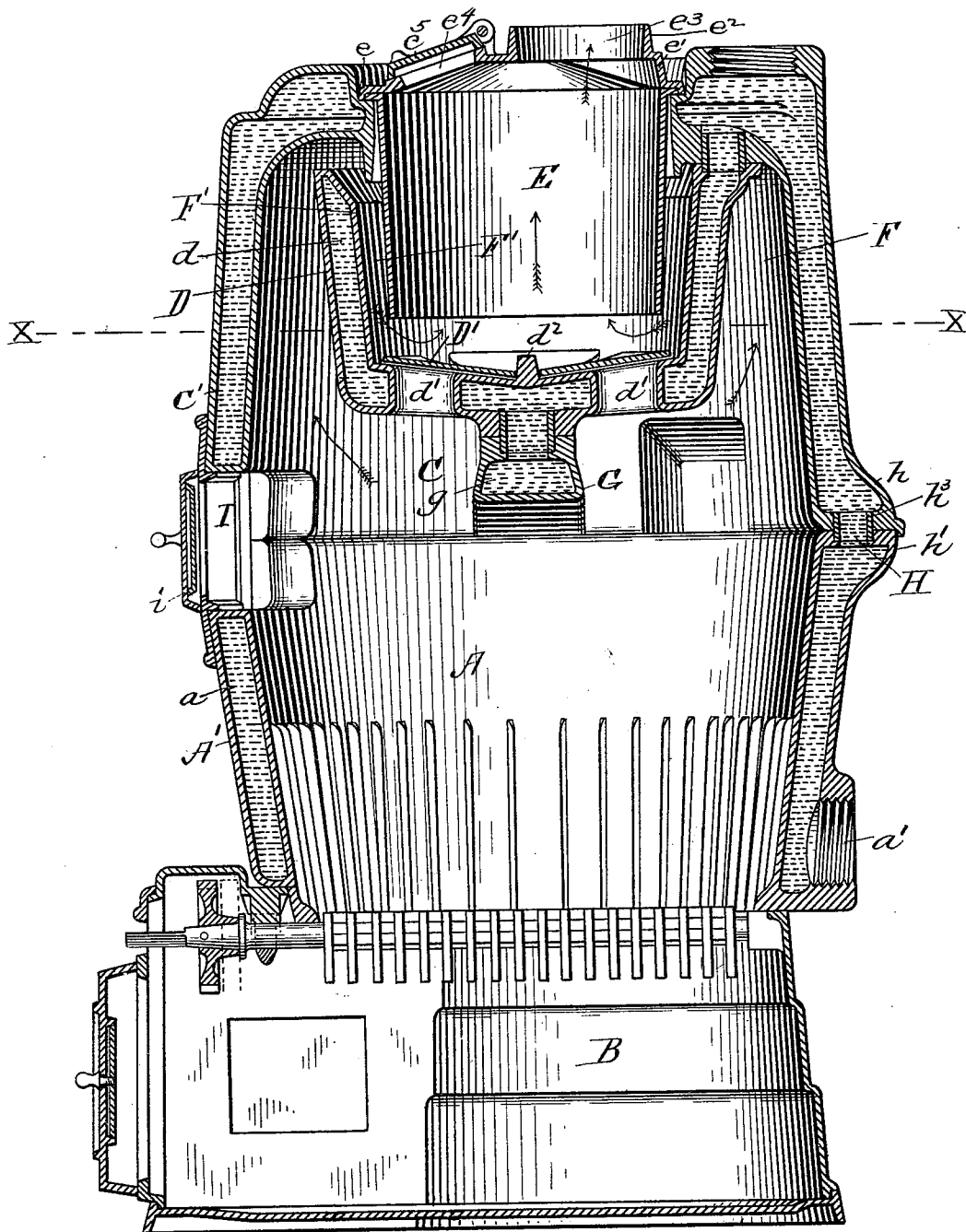
(No Model.)

4 Sheets—Sheet 1.

E. D. VAN STONE.
HOT WATER HEATER.

No. 544,450.

Patented Aug. 13, 1895.



WITNESSES

J. W. Dolan.
John McCreath.

FIG. 1.

INVENTOR
Edwin D. Van Stone
by his Attys
Charles & Raymond

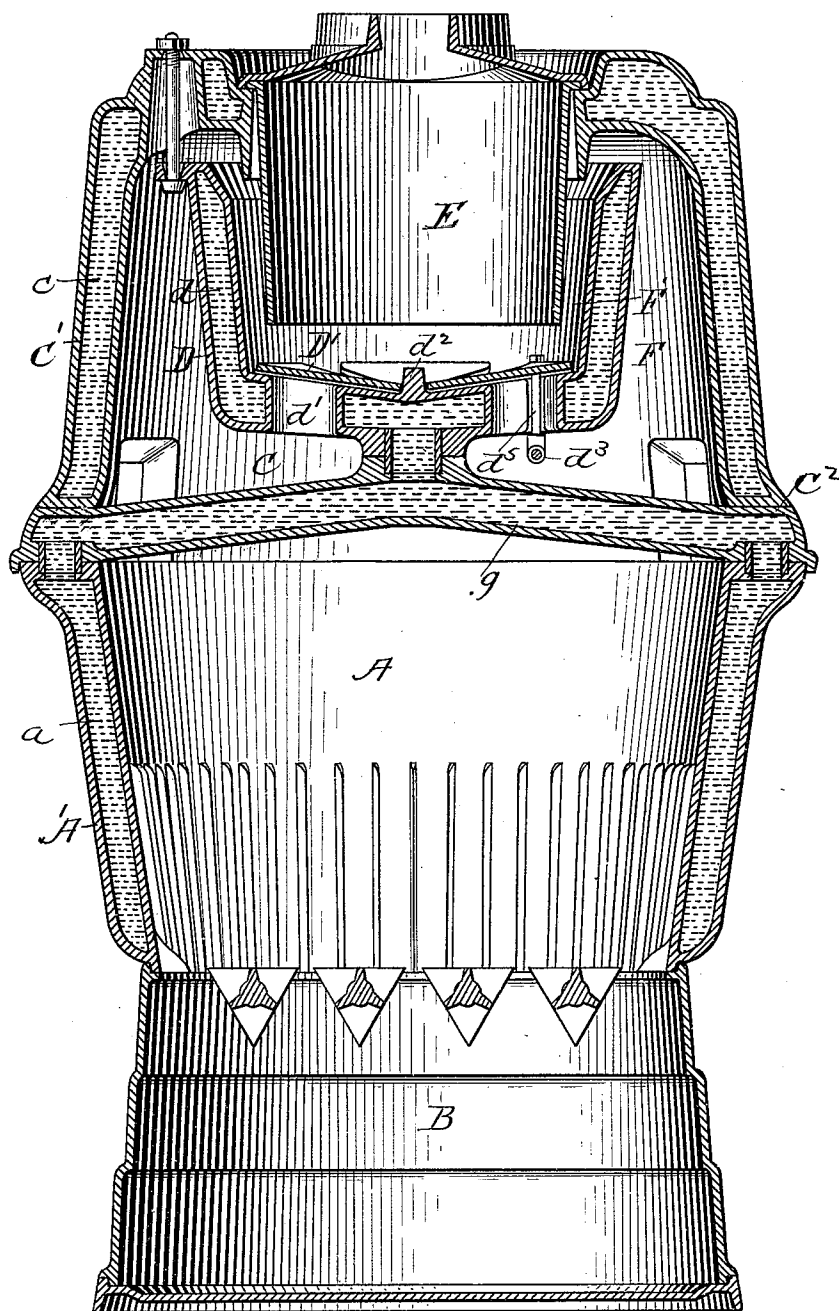
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E. D. VAN STONE.
HOT WATER HEATER.

No. 544,450.

Patented Aug. 13, 1895.



WITNESSES

J. M. Dolan.
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FIG. 2.

INVENTOR
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Clark & Raymond

(No Model.)

4 Sheets—Sheet 3.

E. D. VAN STONE.
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No. 544,450.

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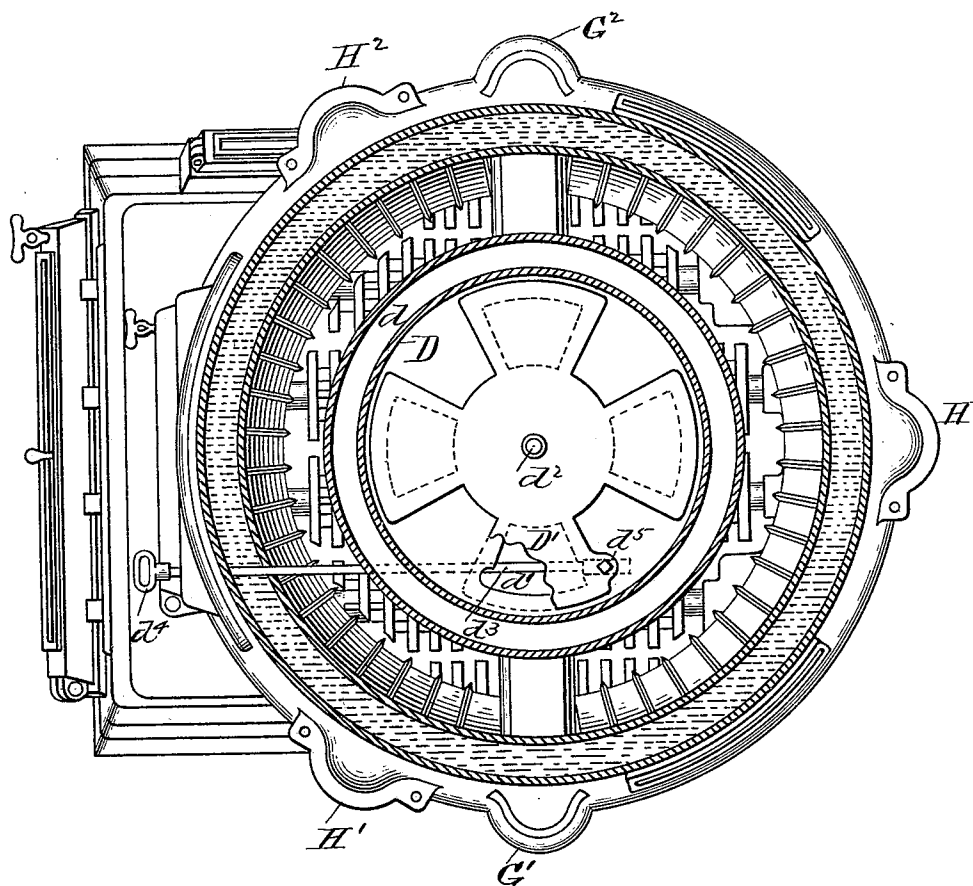


FIG. 3.

WITNESSES

J. W. Dolan.
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INVENTOR
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Charles J. Raymond

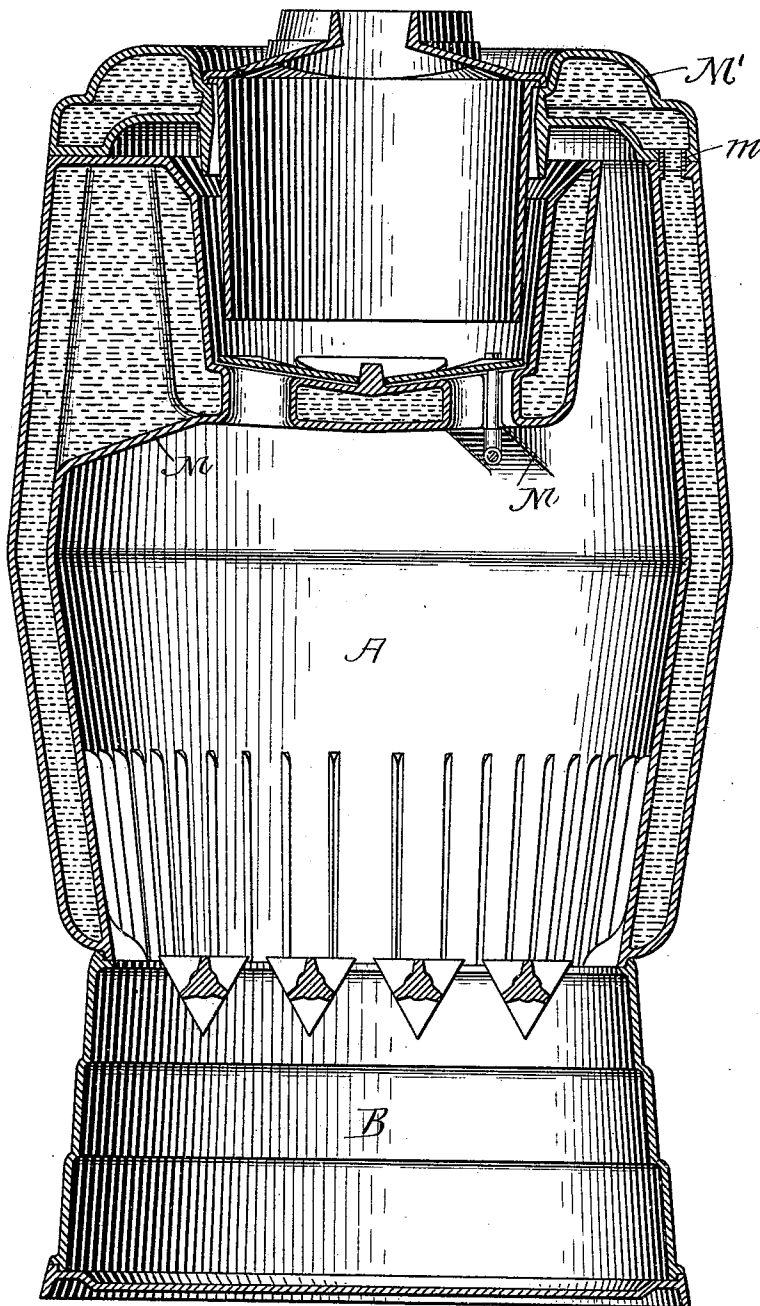
(No Model.)

4 Sheets—Sheet 4.

E. D. VAN STONE.
HOT WATER HEATER.

No. 544,450.

Patented Aug. 13, 1895.



WITNESSES.

J. W. Dolan.

John McEach.

FIG. 4. *Inventor*
E. D. Van Stone
by his attys
Charles & Reynolds.

UNITED STATES PATENT OFFICE.

EDWIN D. VAN STONE, OF ALBION, NEW YORK, ASSIGNOR TO THE MAGEE FURNACE COMPANY, OF BOSTON, MASSACHUSETTS.

HOT-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 544,450, dated August 13, 1895.

Application filed August 1, 1894. Serial No. 519,147. (No model.)

To all whom it may concern:

Be it known that I, EDWIN D. VAN STONE, a citizen of the United States, residing at Albion, in the county of Orleans and State of New York, have invented a new and useful Improvement in Hot-Water Heaters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

The invention relates to a hot-water heater having the features and construction hereinafter specified.

In describing the invention reference will be had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a view in vertical central section of a heater having my invention. Fig. 2 is a view in vertical central section at a right angle to the view represented in Fig. 1. Fig. 3 is a view in horizontal section upon the dotted line *xx* of Fig. 1 and in plan of the parts below said line. Fig. 4 is a view in vertical section illustrating a modified form of the heater, to which reference is hereinafter made.

A is the fire-pot; B, the ash-pit; C, the combustion-chamber. The fire-pot is formed by a hollow shell A', which completely surrounds it and which provides the water-heating space or chamber *a*. It has the water-inlet *a'*. The combustion-chamber C is formed by the upper hollow casting C', which is supported by the fire-pot A, and which has the water-heating cavity or chamber *c*, which is connected with the water-heating cavity or chamber *a* of the fire-pot section.

Within the combustion-chamber there is an inner shell D, which has the water-heating cavity *d*, which is connected with the cavity or chamber *c* of the shell C'. This shell is of a peculiar shape, and in connection with the inner wall of the dome-section C and a circular plate E forms an up and down or indirect flue-passage F F', which will hereinafter be more fully specified.

The dome or upper section C' has a circular opening through its top, through which extends downward the circular flue-plate E above mentioned. This is supported upon the dome by the flange *e*, and preferably is slightly tapering from its upper edge down-

wardly. It is covered by a plate *e'*, having a collar *e²*, surrounding a hole or port *e³*, and which receives the smoke-pipe, and also a hole *e⁴*, covered by a hinged cover *e⁵*, opening upward and which provides a cold-air inlet. The parts or sections D, C', and A' may be integral, or the parts A' C' may be cast together or the parts C' and D may be cast together. When the part D is made separate, I prefer to support it by a hollow connection or support G, preferably extending from either or both sides of the heater-casing in the lower part of the combustion-chamber and the cavity *g* of which is connected with the cavity *a* of the fire-pot shell A' and also with the cavity *d* of the inner heater-section D, whereby a proper circulation is maintained. The inner section or shell D has flues *d'* through its bottom which connect the lower part of the combustion-chamber directly with the escape port *e³*, and these flues are adapted to be closed by the damper D', which is in the form of a circular plate slightly tapering or inclined from its center upwardly and which is turned upon the pivot *d²* and is of a shape to cover the flues *d'*, if desired, the plate having openings to correspond with the flues. The plate is turned by means of a rod *d³*, (see Fig. 3,) which extends to the handle *d⁴* without the furnace, near the combustion-chamber door, and is connected at its inner end with the damper-plate by a turned-up end or connection *d⁵*, (see Fig. 2,) which passes through one of the flues.

Where the parts A', C', D, and G are made separate, I prefer that they be united by push-nipples, and in Figs. 1, 2, and 3 they are shown as so connected, and the circulation between the various parts is maintained by the passages which the push-nipples provide. Where the union is accomplished by the push-nipples, the castings are formed to receive them, (see Fig. 1, where one of the connections between the parts A' C' is shown at H,) the sections *h h'* of the castings being bowed or enlarged at the point of the union to provide space for the nipple *h³*. There are three of these connections between the sections A' C', (see Fig. 3,) and they are lettered respectively H H' H². Similar shapes G' G² are formed in the lower casting A' for the reception of the

ends of the cross-support G, the said ends being connected with the cavity of the lower section by drive-nipples. (See Fig. 2.) The dome or upper section C' of the casting and the lower section A' are cut away to form the rectangular or square opening I, which forms the feedway to the fire-pot and which is closed by the door *i*. The section C' is also cut away at C² C³ to receive the ends of the cross-support G. (See Fig. 2.) It will be observed that the products of combustion may pass directly from the fire-pot to the smoke-port *e*³, as they would when a fire is being started or hastened through the ports *d'* in the interior heating-section D; but generally the ports *d'* are closed and the products of combustion pass upward through the flue F over the upper end of the interior section D, then downward through the flue F', and then upward to the escape-port *e*³. It will be noticed that the flues F and F', are of a peculiar shape—that is, that they are circular in shape, the outer one F surrounding the inner section D and the inner one surrounding the circular flue-plate E—and that each of them tapers, the first from its lower end gradually upward and the second from its upper end gradually downward, so that the gases of combustion are obliged as they recede to enter the narrower or more contracted passage and thereby impinge with greater force on the sides of the water-sections. It will also be observed that the heating efficiency of the structure is increased because it is provided with the up-flue F and a down-flue F', the advantages of the down-flue construction thus being obtained. It will be noticed also that the sections A', C, and D are relatively thin, so that the water is subjected to the heat in a thin body, whereby it is quickly brought to the desired temperature, and that the interior heating-section D not only has a construction whereby the water is held in the thin body but it is also subjected on all sides to the gases of combustion and is a very efficient addition or supplement to the other heating-sections of the heater.

In Fig. 4 I have shown a construction in which the sections A', C', (excepting its top,) and D are cast together or are in one casting, and when the heater is so constructed I do not use the cross-support G. When this construction is employed I prefer that the interior heating-section D be connected with the section C' by integral sections M of the depth of the inner section, and forming thin narrow passages between the two sections. As many of these thin narrow passages may be used as desired. They form the passages between the two parts, and also the means whereby the inner section is supported. When this form of construction is employed, I prefer that the top M' be made separate,

and its water-chamber be connected with the section C' by drive-nipples *m*, one of which is represented in Fig. 4.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. A hot water heater having the fire pot section A containing the water chamber *a*, the upper section C' containing the water section *c*, and the interior section D having the water chamber *d*, as and for the purposes described.

2. In a hot water heater the combination of the upper section C' having the water chamber *c*, the interior section D having the water chamber *d*, and the flue plate E, the whole forming the up flue F, circular in form and tapering toward the top, and the down flue F', circular in form and tapering toward the bottom, as and for the purposes described.

3. In a hot water heater the interior section D, circular in form and having the flues *d'* connecting the combustion chamber with the escape port, and a damper for closing said flues, as and for the purposes described.

4. The combination in a hot water heater of the section D having a wall and a bottom, the holes or passages *d'*, the pivot *d*², the damper plate D', the rod *d*³ having a handle *d*⁴ and supported by the connection *d*⁵, as and for the purposes described.

5. The combination of the dome or top section C having the opening *e* in its top, the downward extending flue plate E and a cover plate *e'* having a collar *e*² and a smoke escape port *e*³, as and for the purposes described.

6. The combination of the sections A', C' and D with the cross support G supporting the section D and connecting the water chamber of the section A' with the water chamber of the section D, as and for the purposes described.

7. The combination of the upper section C' having the hole *e*, the circular flue plate E extending downward through said hole, the cover plate *e'* having the cold air inlet *e*⁵, as and for the purposes described.

8. The combination in a water heater of the section D having the cavity *d* and the cross support G which rests in the enlargements G', G², as and for the purposes described.

9. The combination of the sections A', C', D and the cross support G united by drive nipples, as and for the purposes described.

10. The combination of the sections A', C', D with the water chamber *a*, and means for connecting the latter with the water chamber *d*, as and for the purposes described.

EDWIN D. VAN STONE.

Witnesses:

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J. M. DOLAN.