(No Model.)

2 Sheets—Sheet 1.

A. BRAKE.

WATER HEATER.

No. 422,288. Patented Feb. 25, 1890.

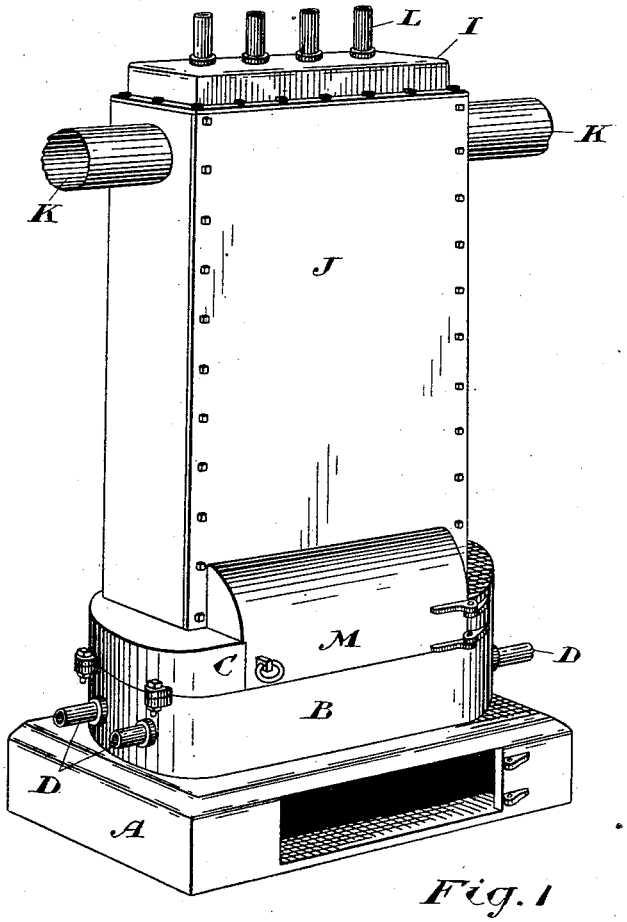

Fig. 1

Witnesses

J. Edw. Maybee

W. G. McMillan.

Inventor

Archibald Brake

by Donald C. Ridout & Co

Atty's

(No Model.) 2 Sheets—Sheet 2.

A. BRAKE.

WATER HEATER.

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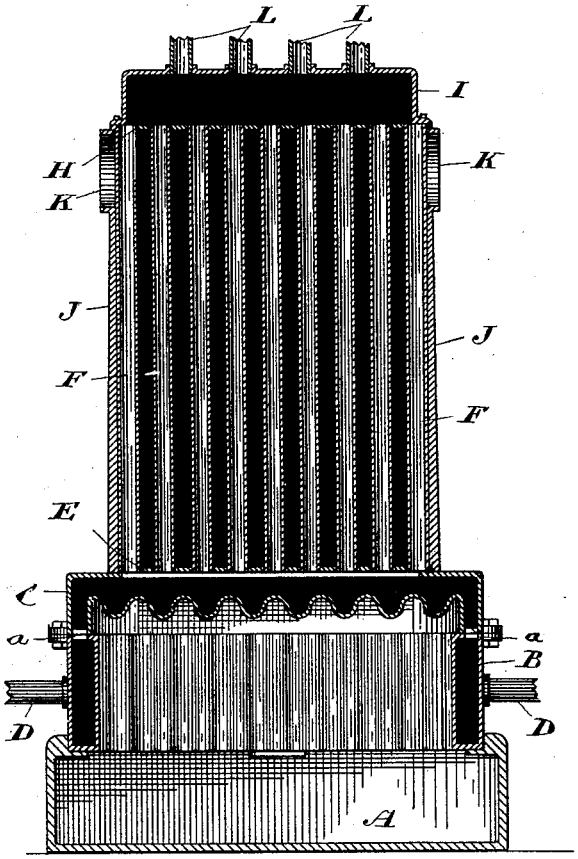

Fig. 2

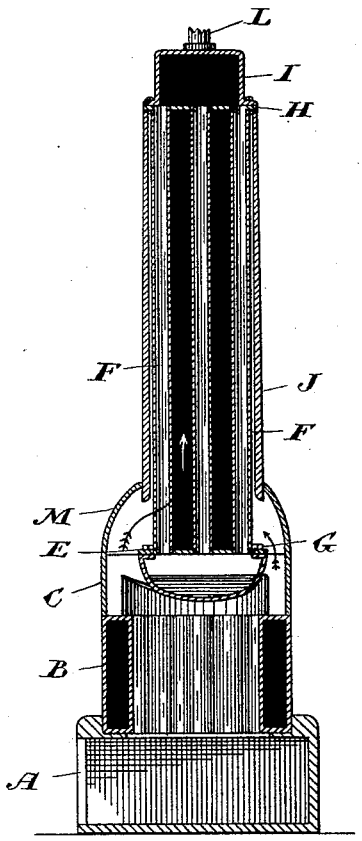

Fig. 3

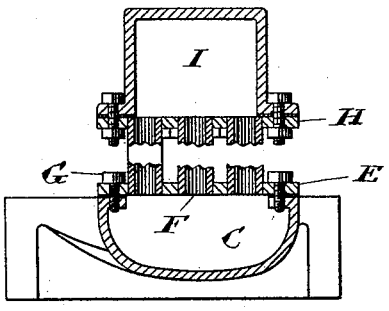

Fig. 4

Witnesses

J. Edw. Maybee

H. G. Macmillan

Inventor

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UNITED STATES PATENT OFFICE.

ARCHIBALD BRAKE, OF TORONTO, ONTARIO, CANADA.

WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 422,288, dated February 25, 1890.

Application filed June 27, 1889. Serial No. 315,745. (No model.)

To all whom it may concern:

Be it known that I, ARCHIBALD BRAKE, molder, of the city of Toronto, in the county of York, in the Province of Ontario, Canada, have invented a certain new and useful Improvement in Hot-Water Heaters, of which the following is a specification.

The invention relates to that class of water-heaters in which the water passes through tubes suspended above the fire-box.

The object of the invention is to construct a cheaply-made boiler in which the tubes will remain tight and in which a large heating-surface is secured in a boiler occupying but very little space; and it consists, essentially, of vertical wrought-metal tubes expanded into wrought-metal tube-sheets, each wrought-metal tube-sheet being bolted to a cast-metal section shaped to form a water-space, the whole being otherwise constructed substantially as hereinafter more particularly explained.

Figure 1 is a perspective outside view of my improved heater. Fig. 2 is a sectional side elevation of same. Fig. 3 is a vertical cross-section. Fig. 4 is an enlarged detail showing the joint between the wrought-metal tube-sheets and their respective waer-sections.

On reference to Fig. 1 it will be noticed that my hot-water heater is constructed so as to occupy but very little ground-space. For cheapness of construction I make the heater with cast metal arranged in sections properly jointed together. The bottom section A forms an ash-pit, and is shaped so as to support and retain in position the next section B, which constitutes the fire-box. It will be observed that the fire-box section B is hollow, the interior wall of the section being corrugated, as indicated. Immediately over the fire-box section B, I bolt the hollow section C, which is shaped, as shown, to form a water-crown immediately over the fire-box. A water-tight joint is formed between the water-crown section C and the fire-box section B. An opening *a* at either end through the top of the section B and the bottom of the water-crown section C permits the water which enters the fire-box section B from the return-pipes D to flow into the water-crown section C. The top of the water-crown section C is cast open, but is closed by the wrought-metal tube-sheet E, in which tube-sheet the lower ends of the tubes F are expanded. The joint between the water-crown section C and the tube-sheet E is made by bolts G, which compress any suitable packing placed between said section and tube-sheet, as indicated in Fig. 4. The upper tube-sheet H is also made of wrought metal, and the upper ends of the tubes F are expanded in the said tube-sheet H to form water-tight joints in the same manner as the connection is made between the tube-sheet E and the lower end of the said tubes. The upper water-section I is made of cast-iron, and is bolted, as indicated in Fig. 4, to the tube-sheet H, a suitable joint being made between the two, as shown in Fig. 4.

The outer casing of my improved heater is composed of plates J, preferably made of cast-iron and bolted together, as indicated in Fig. 1. As indicated by Fig. 3, the water-crown section C is shaped so that the flame and heated gases will ascend from the fire-pot into the space inclosed by the plates J and surround the tubes F, finally escaping through the smoke-flues K, thus utilizing to the fullest extent the heat produced in the fire-box.

To recapitulate, I may state that the water, which enters the fire-box section B by way of the pipes D, ascends through the water-crown section C, thence up the tubes F into the upper water-section I, and thence out of the distributing-pipes L.

When the furnace-door M is opened, the fuel may be easily inserted in the fire-box, and the lower outer portions of the tubes F may be readily cleaned. For this latter purpose I also have a door opposite to the door M.

What I claim as my invention is—

1. The water-crown section C, having a corrugated bottom and downwardly-projecting perforated ends, the lower tube-sheet E, bolted thereto, the tubes F, secured in said tube-sheet, the upper tube-sheet secured to said tubes F, and the upper water-section I, bolted to said upper tube-sheet, substantially as and for the purpose specified.

2. The fire-box section B, having a corru-

gated interior wall, the water-crown section C, bolted to the section B, in combination with the tube-sheet E, tubes F, connecting the upper and lower sections, and upper water-section I, arranged substantially as and for the purpose specified.

3. The fire-box section B, having a corrugated interior wall, the water-crown section C, bolted to the section B, in combination with the tube-sheet E, tubes F, connecting the upper and lower sections, upper water-section I, and casing formed by the outer plates J, arranged substantially as and for the purpose specified.

Toronto, May 30, 1889.

ARCHIBALD BRAKE.

In presence of—
CHARLES C. BALDWIN,
CHAS. H. RICHES.