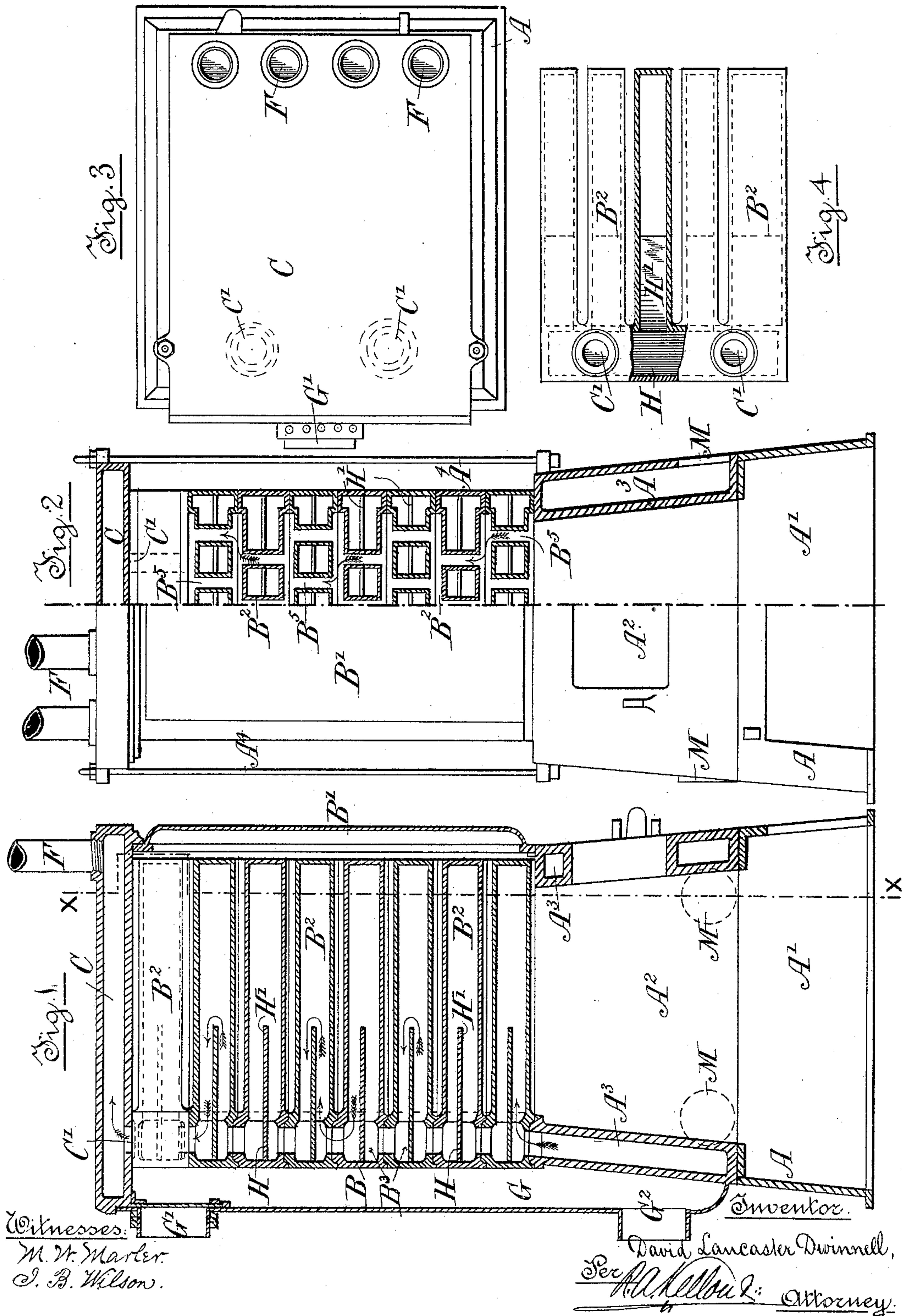


(No Model.)

D. L. DWINNELL.
HOT WATER BOILER.

No. 431,453.

Patented July 1, 1890.



UNITED STATES PATENT OFFICE.

DAVID LANCASTER DWINNELL, OF MONTREAL, QUEBEC, CANADA, ASSIGNOR
OF ONE-HALF TO GEORGE ANGUS MILLER AND CHARLES HERBERT MIL-
LER, OF SAME PLACE.

HOT-WATER BOILER.

SPECIFICATION forming part of Letters Patent No. 431,453, dated July 1, 1890.

Application filed March 12, 1890. Serial No. 343,615. (No model.)

To all whom it may concern:

Be it known that I, DAVID LANCASTER DWINNELL, of the city of Montreal, in the district of Montreal and Province of Quebec, Canada, have invented certain new and useful Improvements in Hot-Water Boilers; and I do hereby declare that the following is a full, clear, and exact description of the same.

This invention relates to that class of boilers or heating-furnaces generally used in connection with a system of hot-water pipes and coils or pipes and radiators used for warming buildings, and has for its object to produce a boiler or furnace which shall be simple and economical in construction and at the same time afford the maximum amount of heating-surface and improve the circulation.

The invention is a further development of or improvement upon that covered by another application which I intend to file simultaneously herewith, the essential principle and operation being the same.

For full comprehension of the improvements reference must be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate like parts.

In said drawings, Figure 1 represents a transverse vertical section of my improved boiler or furnace; Fig. 2, a front view of same, one-half being in section on the line $x x$, Fig. 1. Fig. 3 is a plan view of the furnace, and Fig. 4 a plan view, partly in section, of one of the cast sections.

A is the base of the furnace, cast in one or more pieces and including ash-pit A' and fire-chamber A^2 , A^3 being the water-jacket surrounding the fire-chamber and in communication with the water-back B.

B' is the casing of the heating-chamber, the back of which is the rear wall of the water-back B.

B^2 are the several sections mounted one upon the other and properly secured together and to the top casting C and fire-chamber A^2 by bolts A^4 . Each section B^2 has a chamber B^3 extending completely across its rear for the entire internal width of the furnace, and when the different sections are mounted one

upon the other these chambers will be all in the same vertical line, thus forming the water-back, which opens at its top end into the hollow top casting C by the passages $C' C'$, and the flow-pipes F lead directly out of this top chamber.

As seen clearly in Figs. 2 and 4, there are any suitable number of the cast chambers B^2 arranged in horizontal lines within the casing B' from side to side, and while they all communicate in one vertical line in forming the water-back at the rear of the furnace they dodge each other in such manner that there are intermediate zigzag passages $B^5 B^5$, so as to permit the products of combustion to freely ascend between them from the fire-chamber A^2 .

G is the smoke-chamber, located preferably at the rear of the water-back B, and usually of the full width of the furnace. The products of combustion will pass over the top of said water-back and out through either of the outlets $G' G^2$, which are provided with suitable dampers, whereby the passage of the smoke may be directed to the flue through either opening at will.

That part of the water-back B which forms connection with the chambers $B^2 B^2$ is divided horizontally by diaphragms H H, one diaphragm being opposite the center of each row of chambers, and all of said diaphragms have extensions $H' H'$ entering the chambers for a distance of from one-third to one-half of their length, so as to divide the same horizontally to that extent. The said diaphragms are either cast upon or set into the rear wall of the water-back.

M M are the openings where the return-pipes communicate with the water-jacket A^3 at its lowest point.

Having thus described the construction of my boiler or furnace, I may explain its operation as follows: The water entering the supply or return pipes passes through the openings M into the water-jacket A^3 and comes immediately under the action of the fire. It then passes upward into the water-back B and enters the lower row of cast chambers B^2 underneath the diaphragms H and their extensions H' , thence over said diaphragms

back into the rear chamber B and upward into the next row of water-chambers, as shown by the arrows in Fig. 1, and so on through the whole series and into the top compartment C through the openings C', being exposed meanwhile to the action of the fire and heat from the products of combustion passing through the zigzag passages B⁵, and from this top chamber the heated water passes off through the flow-pipes F, (one or more,) which conduct the water in the required direction and through any suitable system of pipes, radiators, &c., throughout the building. Except when starting the fire the upper outlet G' will seldom be used, as I prefer to lead the smoke off by the lower opening G² of the smoke-chamber G, as I thereby facilitate the heating of the rear walls of the water-back, as explained in my said simultaneous application.

What I claim, and desire to secure by Letters Patent, is as follows:

1. In a hot-water boiler, the combination of the fire-chamber, the water-jacket, and a se-

ries of similarly-formed sections each having a portion of the water-back formed therewith, and a diaphragm to provide a circuitous passage for the water, said sections being superimposed and each being arranged over the opening between the sections next below to provide a circuitous passage, substantially as described.

2. In combination with the fire-chamber and water-jacket, the series of water-chambers each having a portion of the water-back formed therewith, said water-backs providing the sole communication between the sections and each being provided with a diaphragm extending from the rear wall into the main body of the water-chamber across the water-back and leaving a passage above and below in communication with the water-backs of adjacent sections, substantially as described.

Montreal, January 10, 1889.

DAVID LANCASTER DWINNELL.

Witnesses:

J. D. MILLER,

A. M. ELLICOTT.