

(No Model.)

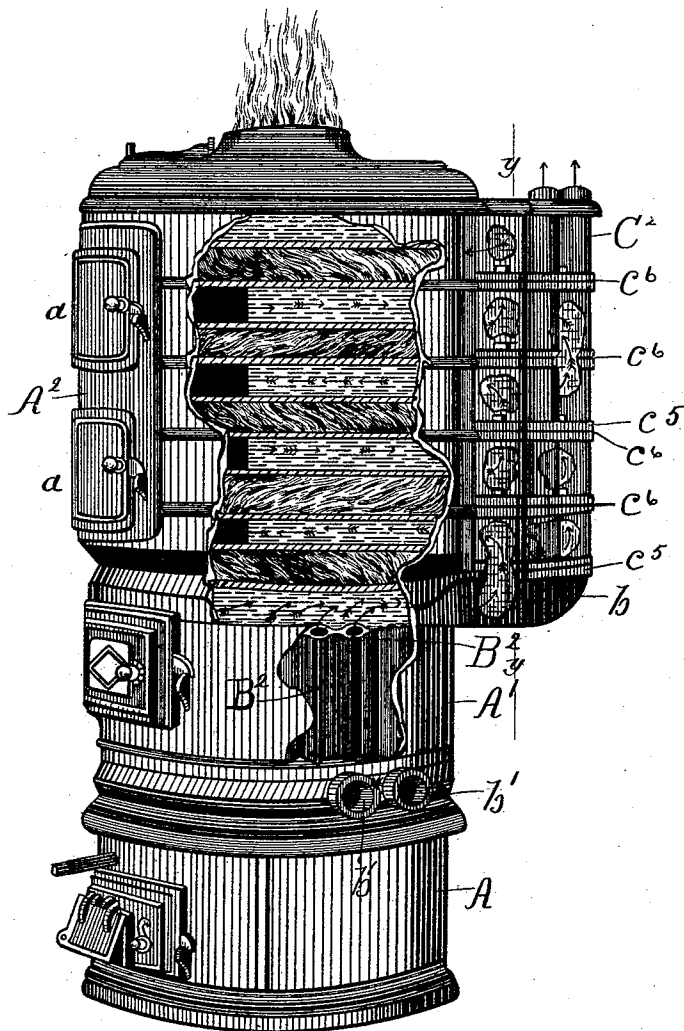
3 Sheets—Sheet 1

T. DOHERTY.
SECTIONAL WATER BOILER.

No. 479,873.

Patented Aug. 2, 1892.

Fig. 1.



WITNESSES

F. Chas. L. Bradford

INVENTOR

Thomas Doherty
by *Parker & Burton*
his Attorneys.

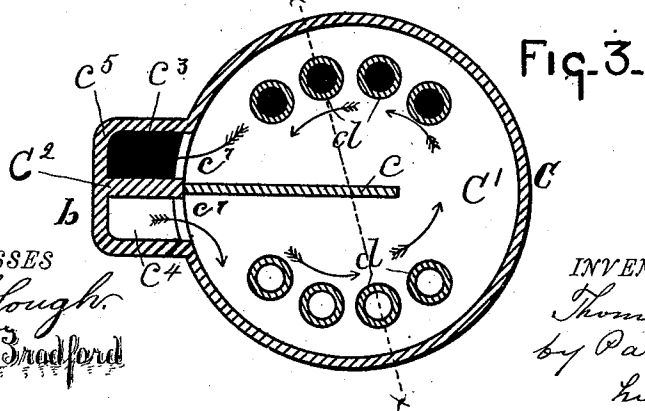
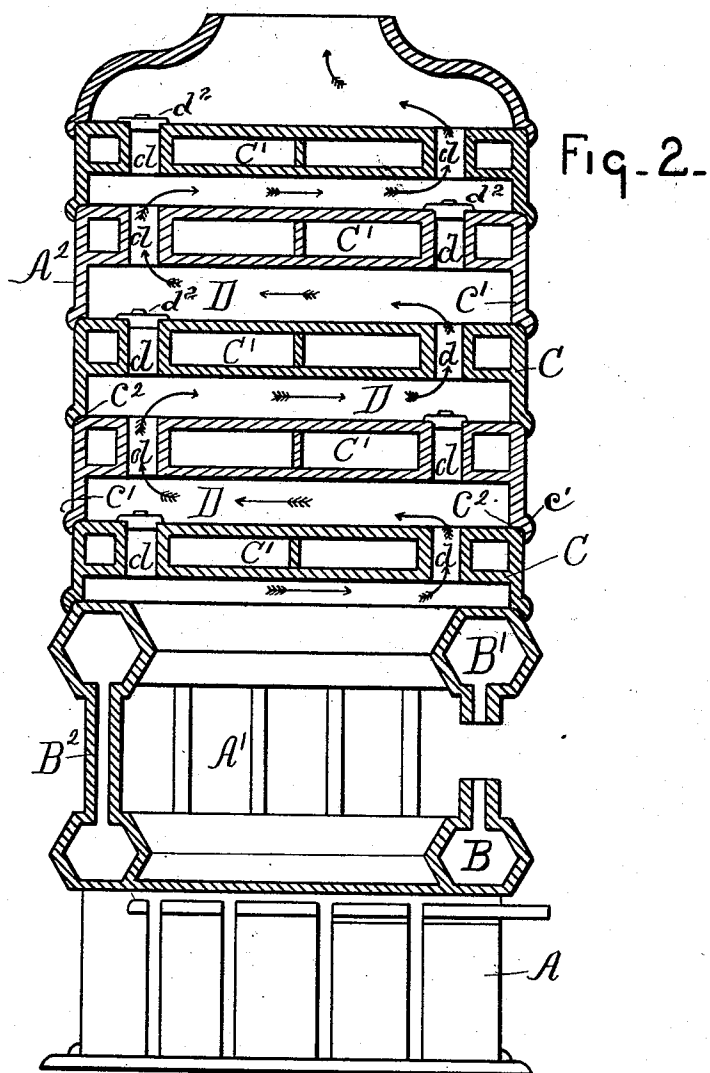
(No Model.)

3 Sheets—Sheet 2.

T. DOHERTY.
SECTIONAL WATER BOILER.

No. 479,873.

Patented Aug. 2, 1892.



WITNESSES
F. Clough.
D. W. Bradford

INVENTOR
Thomas Doherty
by Parker & Burton
his Attorneys.

(No Model.)

3 Sheets—Sheet 3.

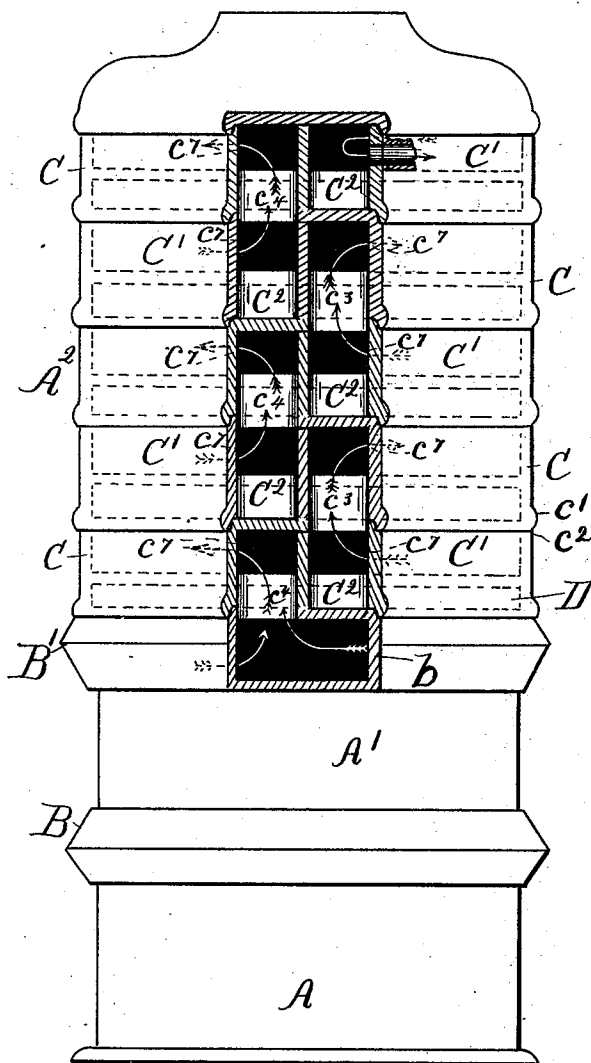
T. DOHERTY.

SECTIONAL WATER BOILER.

No. 479,873.

Patented Aug. 2, 1892.

Fig. 4.



WITNESSES
W. H. Bradford
J. C. Clough

INVENTOR
Thomas Doherty
by Parker & Burton
Attorneys.

UNITED STATES PATENT OFFICE.

THOMAS DOHERTY, OF SARNIA, CANADA.

SECTIONAL WATER-BOILER.

SPECIFICATION forming part of Letters Patent No. 479,873, dated August 2, 1892.

Application filed December 2, 1891. Serial No. 413,829. (No model.)

To all whom it may concern:

Be it known that I, THOMAS DOHERTY, a citizen of Canada, residing at Sarnia, county of Lambton, Province of Ontario, Canada, have invented a certain new and useful Improvement in Sectional Water-Boilers; and I declare the following to be a full, clear, and exact description of the invention, such as it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

In the drawings, Figure 1 is a perspective of a sectional water-boiler with parts broken away to show the interior. Fig. 2 is a vertical section on the line *xx* of Fig. 3. Fig. 3 is a horizontal section of one of the sections of a boiler. Fig. 4 is a perpendicular cross-sectional view through the rear extension on the line *yy* of Fig. 3, showing the circulation of the water and the openings into the water-chambers of each section.

In the drawings, A is the ash-pit of the heater under the boiler proper.

A' is the fire-pot.

A² is the sectional boiler proper, in which are arranged the means for circulating and heating the water and the smoke-flues leading from the fire-chamber.

The ash-pit A is substantially like that heretofore employed in this class of heaters and is provided with any suitable grate and with doors and means for regulating the draft.

The fire-pot A' has a lower annular water-chamber B and a similar upper chamber B'. These water-chambers are connected by vertical pipes B², which allow the water to circulate freely from the lower to the upper chamber. The upper chamber B' is provided with a portion *b*, extending back of the boiler and opening upward into the extensions on the boiler-sections above and through which the connection is made with the circulating system above. The fire-pot may be made by casting the parts B and B' separately and in connecting them with pipes, or the whole may be cast together. I prefer to cast the annular portions and the vertical pipes together. The lower chamber B is provided with one or more inlet-pipes *b'* for supplying water to the boiler.

The boiler proper A² is made of sections C. These sections I prefer to make round and of sufficient thickness to provide for an interior water-chamber C'. This water-chamber is partially divided by the diaphragm *c*. (Shown in Fig. 3.) Around the lower edge of each section is an annular flange *c'*, formed at its lower edge to make a joint at *c*² with the section below it, or in the case of the lower section with the portion B'. This leaves a smoke-chamber D for the heated products of combustion within the flange *c'* and between the sections. The sections are so constructed that when assembled a passage is provided between the chambers D of adjacent sections through the flues *d d*. These flues extend through the sections C and the water-chamber C' and provide heating-surface to the water within the section. They are preferably arranged on opposite sides of the diaphragm *c*. Any number desired may be employed and of any suitable size.

Each of the sections C is provided with a rear extension C², containing water-passages *c*³ and *c*⁴, each opening into the water-chamber C' at *c'* on opposite sides of the diaphragm *c*. In the construction shown in Fig. 3 the passage *c*⁴ opens into the water-chamber C' and downward, while the passage *c*³ opens out from the chamber C' and upward, the bottom of the passage *c*³ being shown as closed in the drawings. These compartments *c*³ and *c*⁴ alternate in adjacent sections, so that the opening upward from one of the passages in the extension C² is into the one opening downward from the section immediately above. This permits the water to come up through one side of the extension C² into the chamber and around the diaphragm and out into the other side of the extension C² and upward into the section immediately above, where the movement of the water is reversed, passing around the diaphragm in the opposite direction and upward through the opposite side of the extension C². Around the upper and lower edges of the extension C² is the flange *c*⁵, through which to bolt the extension together. Between the surfaces of the adjacent flanges *c*⁵ I provide rubber packing *c*⁶. This is the only water-tight joint to be made between the sections of the boiler and is sufficiently re-

moved from the fire-pot to admit of the use of rubber packing.

The flues through the respective sections I prefer to arrange on opposite sides of the diaphragm, as is shown in Fig. 3. This provides for a passage from the fire-chamber straight up through the boiler, if the flues are left unobstructed. To force the heated products of combustion, under and over each section respectively, I use the lids or stoppers d^2 and close the openings on the opposite sides of adjacent flues and leave a free passage through the sections on the right and left sides alternately. This causes the products of combustion to take the direction shown by the arrow in Fig. 2.

In the front of the boiler are provided doors a , through which to clean the smoke-chambers between the sections C of the boiler.

In the drawings the sections are shown with flues d on both sides of the diaphragm, and provision is made for closing one side with the lid or stopper. These sections may be made with flues through but one side, if desired, in which case the flues should be arranged on alternate sides of the diaphragm to produce the result shown and described by arranging the lids on alternate sides.

I am aware that water-heaters have been patented and constructed of several sections and having extensions adapted to join and through which the water is permitted to circulate to reach the several sections. These are more particularly described in patents to Spence, No. 359,105, of March 8, 1887, and No. 380,227, of March 27, 1888; to Blondin, No. 440,300, of November 11, 1890, and to Beaupré, No. 442,566, of December 9, 1890, and I do not lay claim, broadly to, such constructions. The one which most nearly approaches my own is that of Beaupré, No. 442,566, and in which the water passes in diaphragms, and the consequent circulation of the water is complicated and prevents the free circulation of the water, which, as it has to depend solely upon the difference in temperature and consequent specific gravity for that circulation,

tends in many instances to prevent it altogether. The sections, too, in consequence of such complications, are difficult to construct except by casting and are far more liable to cracks and other defects which cannot be discovered until put in place or which may result after being put in place from unequal expansion and contraction. The object of my invention is to avoid these defects, and I have done so by means of the construction hereinbefore explained.

What I claim is—

1. In a water-boiler, a section consisting of an inclosed water-chamber, smoke-flues through said section, an annular flange on the walls of said section whereby a smoke-chamber is provided within said flange and between two sections when joined, a rear extension attached thereto containing two water-passages, one of which opens only into a lower adjacent section and the other of which opens only into an upper adjacent section, substantially as described, and also within and integral with said water-chamber, and a central perpendicular diaphragm extending from the division between the two water-passages centrally nearly across said water-chamber, as set forth.

2. In a sectional water-heater, the combination of a fire-pot, a basic water-chamber, sections C C C, adapted to be joined to form a heating-chamber, each containing central transverse diaphragms extending nearly across the water-chamber, and water-passages upon either side of the central diaphragm, one of which leads to the lower chamber and the other of which leads to the upper chamber, and a horizontal diaphragm at the junction of each section in said water-passages, preventing the water from circulating otherwise than through each section, and return-pipes, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

THOMAS DOHERTY.

Witnesses:

OLIVER J. ATKINSON,
SARA A. HASLETT.