

(No Model.)

3 Sheets—Sheet 1.

B. CHAFFEE.
HOT WATER BOILER.

No. 538,504.

Patented Apr. 30, 1895.

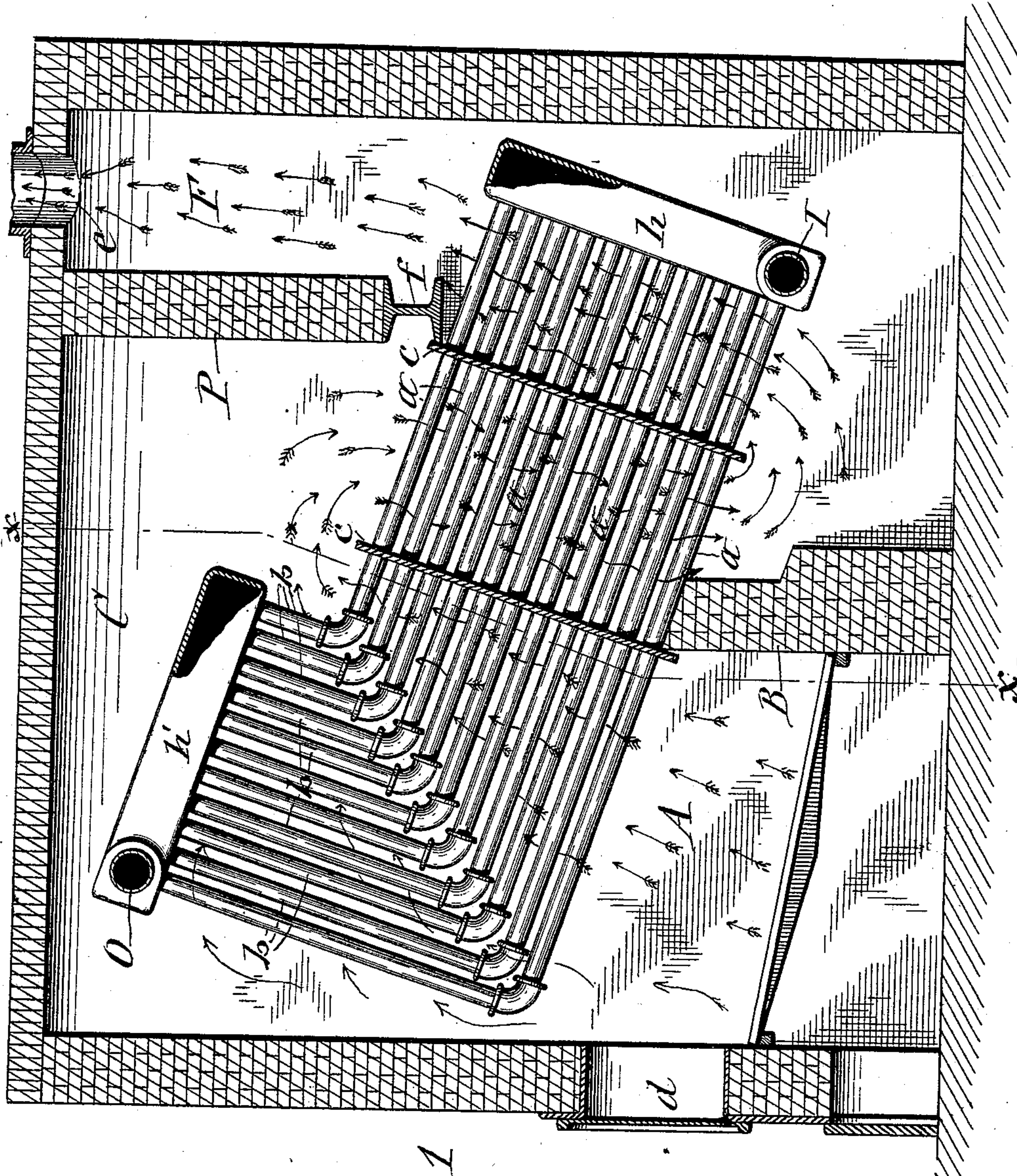


Fig. 1

WITNESSES:

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C. L. Bendixen

INVENTOR:

Burrill Chaffee
By E. Laas
his ATTORNEY

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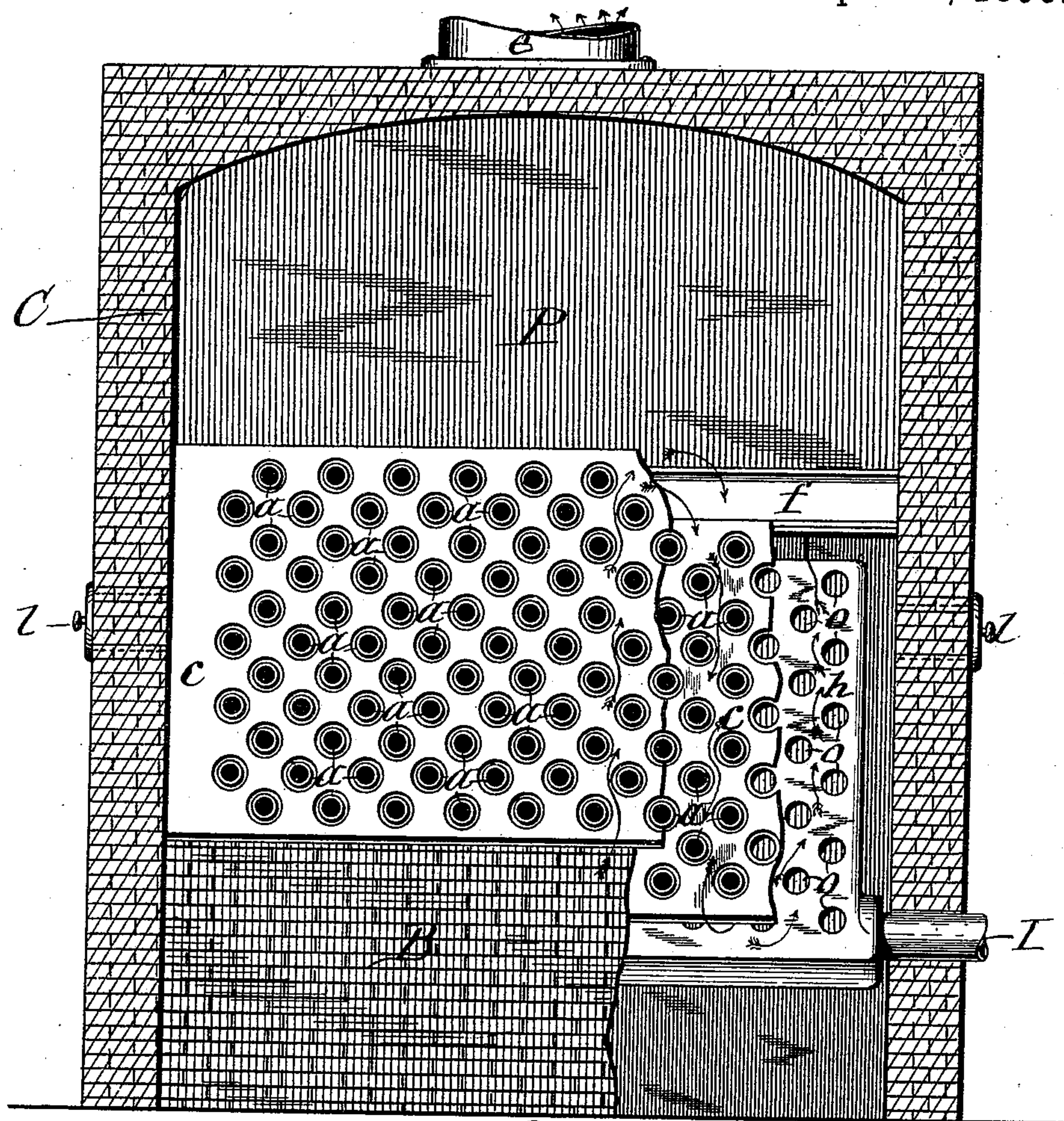
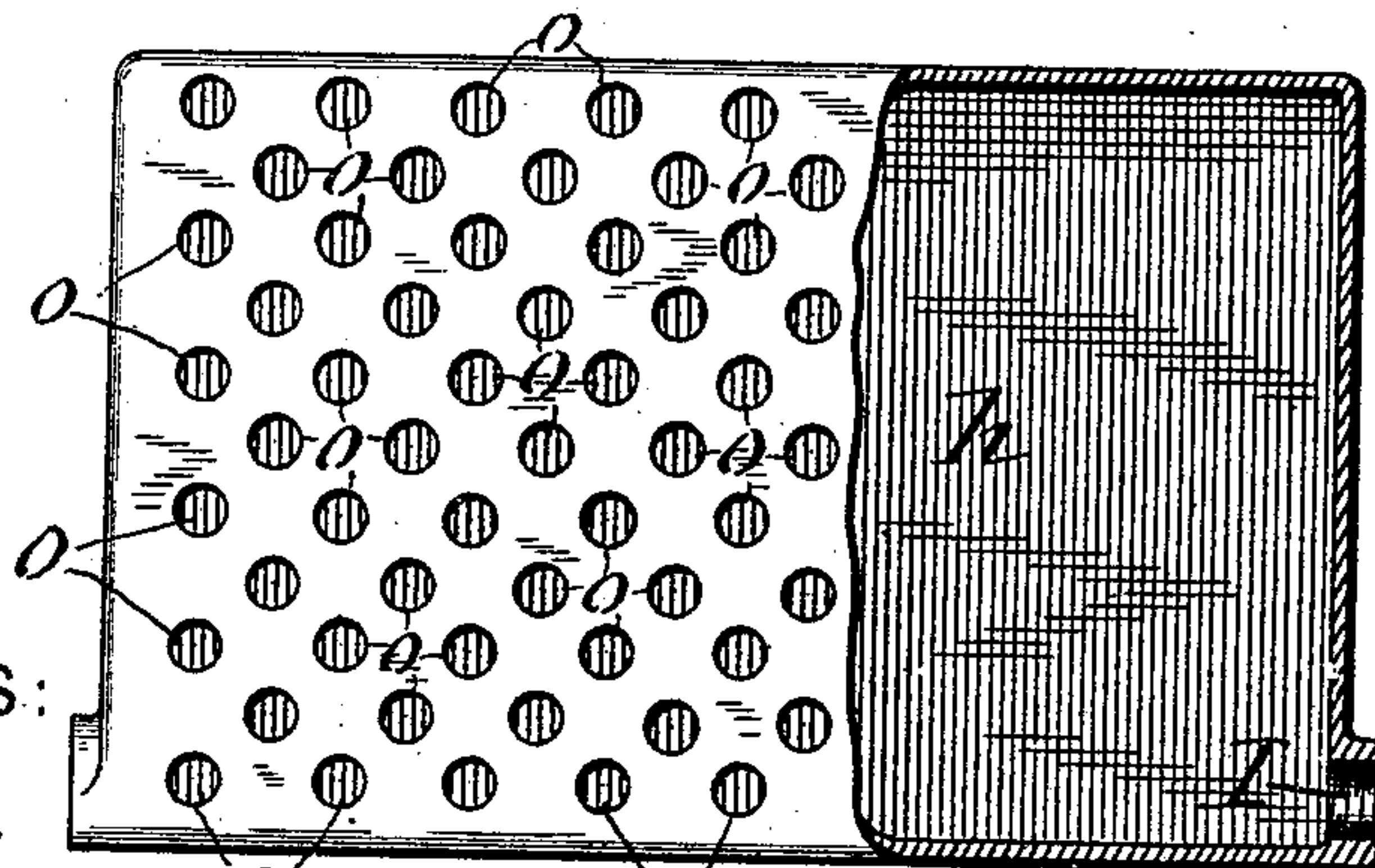


Fig. 2



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Fig. 3

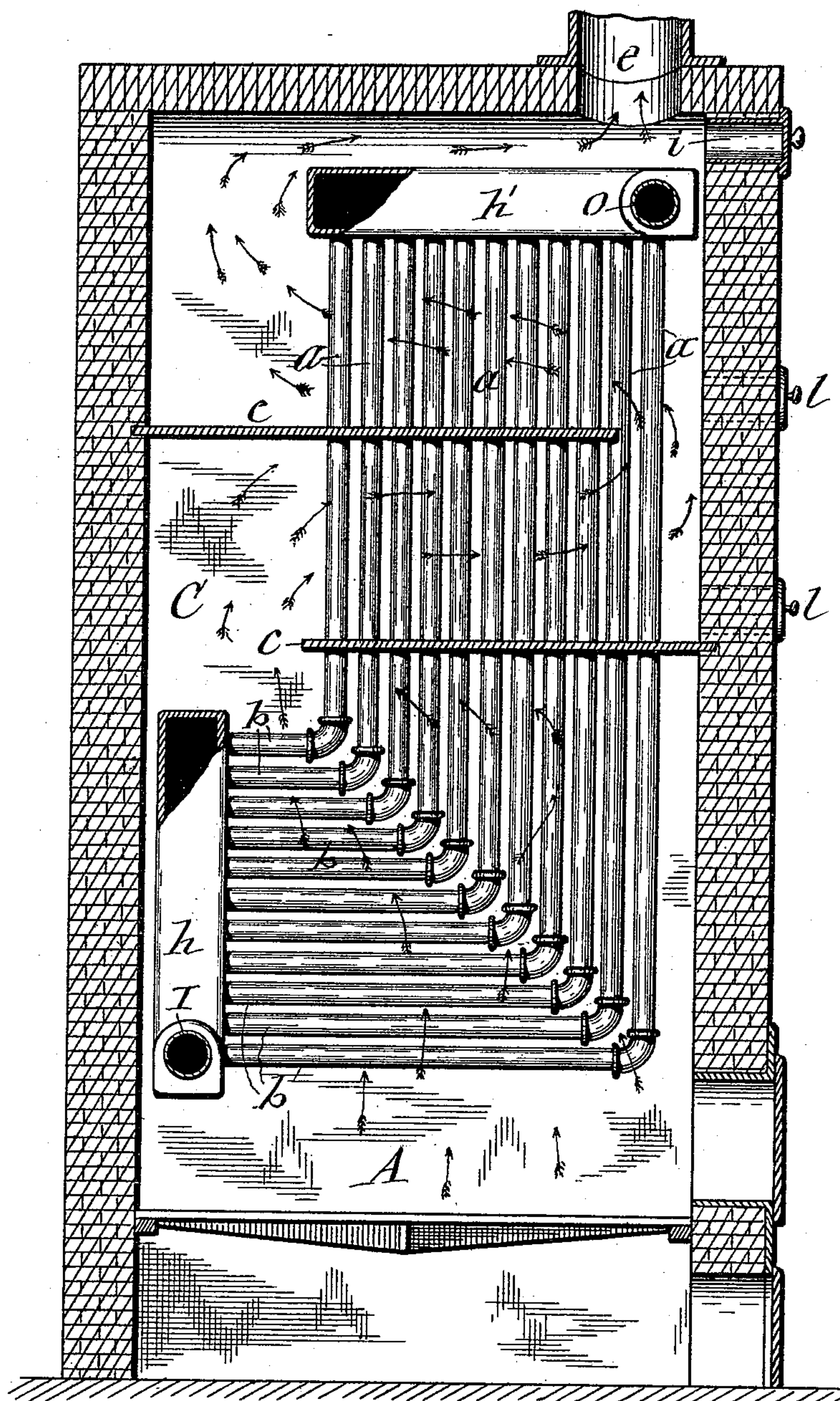
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WITNESSES:

C. E. Robinson
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Fig. 4

INVENTOR:

Burrill Chaffee
By E. Laas
his ATTORNEY

UNITED STATES PATENT OFFICE.

BURRITT CHAFFEE, OF SYRACUSE, NEW YORK.

HOT-WATER BOILER.

SPECIFICATION forming part of Letters Patent No. 538,504, dated April 30, 1895.

Application filed April 11, 1894. Serial No. 507,092. (No model.)

To all whom it may concern:

Be it known that I, BURRITT CHAFFEE, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and
5 useful Improvements in Hot-Water Boilers, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to the class of hot
10 water boilers which are composed of a series of water pipes arranged in a combustion chamber to be heated by the products of combustion; and the invention consists in a novel construction of the combustion chamber and
15 disposition of the headers and water-pipes in said combustion chamber whereby the efficiency of the boiler is materially increased, and the cost of its construction is simplified.

In the annexed drawings, Figure 1 is a vertical longitudinal section of a boiler embodying my invention. Fig. 2 is a vertical transverse section on line X X in Fig. 1, with portions of the partition-plates broken away to show their relative positions. Fig. 3 is partially a face view and partially a vertical sectional view of one of the headers, and Fig. 4
20 is a vertical transverse section of a modification of my invention.

Similar letters of reference indicate corresponding parts.

—C— represents the combustion chamber or inclosing chamber of the boiler. This chamber is provided with the fire door —d— at one end and with the smoke exit —e— at
35 the opposite end.

Referring to Figs. 1 and 2 of the drawings, —A— denotes the fire-box and —B— the bridge wall. Between this bridge wall and exit —e— is a vertical partition —P— extending completely across the chamber —C— and
40 from the top part way toward the bottom to form the flue —F— in the rear end of the chamber, which flue communicates with the exit —e—. To provide the said partition with
45 a straight base, I support the same on a metallic I-beam —f—.

The boiler proper is composed of two headers, —h—h'— which are disposed at right angles to each other and respectively in opposite
50 ends of the combustion chamber, and two

series of water-pipes —b— and —a—, which are united at right angles to each other and to the headers, and thus simplify the connections of the component members of the boiler.

In order to increase the efficiency of the boiler, I place both headers —h— and —h'—
55 isolated from the inner sides of the combustion chamber so as to permit the products of combustion to circulate completely around the headers and effectually envelop the same, thus obtaining increased heating surfaces
60 which enhance the efficiency of the boiler. Each of said headers form water chambers formed in one piece of metal, and presenting
65 broad heating surfaces.

In order to more effectually compel the products of combustion to circulate around the headers as aforesaid and at the same time cause the products of combustion to more
70 effectually impinge the pipes —b—a—, I employ the metallic partition-plates —c—c— which extend alternately from opposite sides of the combustion chamber part way across the same a sufficient distance to receive one
75 of the series of pipes through them and thus form a serpentine flue for the products of combustion from the fire-box to the smoke-exit as indicated by arrows in Figs. 1 and 4 of the drawings.

—O— denotes the hot-water outlet in the upper header —h'—. By means of a pipe attached to said outlet, and branch-pipes attached to said pipe, the hot water is conducted to the radiators located in the apartments of the building to be heated.
80 85

—I— denotes the water-inlet in the lower header —h—. Through this inlet the water is returned from the aforesaid radiators by means of suitable pipes, said hot-water distributing pipes and return pipes being arranged in various ways according to the location of the boiler in relation to the apartments to be heated, and therefore requiring no illustration in this case.

In the modification of my boiler as illustrated in Fig. 4 of the drawings, the chamber —C— is elongated vertically and the branch-water pipes —b—b— are disposed horizontally over the fire-box —A— and the main water pipes —a—a— extend vertically from
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said branch-pipes, the header —*h'*— being disposed vertically over the rear end of the fire-box while the other header —*h*— extends horizontally across the upper part of the chamber —*C*—, at the same side which is provided with the fire-door —*d*—. The exit —*e*— in this case is over the header —*h'*— near the aforesaid side of the chamber —*C*—. The lower metallic partition plate —*c*— extends from the front wall of the chamber —*C*— part way across the interior of said chamber, and the upper partition plate extends from the rear wall part way across the chamber, each of said plates being of a sufficient width to receive all the pipes —*a*—*a*— through it and form the tortuous or serpentine passage for the products of combustion indicated by arrows. The arrangement of the partitions across one series of pipes serves to deflect the products of combustion to the other series of pipes and effectually heat the same.

—*i*— designates an opening through which to remove soot and dust from the top of the upper header —*h*—.

Suitable openings provided with removable covers may be provided in the side walls of the chamber —*C*— to afford access to the in-

terior of the chamber as indicated by dotted lines at —*l*— in Figs. 2 and 4 of the drawings.

What I claim as my invention is—

In combination with the combustion chamber having the fire-box in one end and the smoke-exit in the opposite end, two headers disposed at right angles to each other respectively in opposite ends of the combustion chamber and isolated from the inner sides of the combustion chamber to permit the products of combustion to circulate completely around the headers, two series of water-pipes united at right angles to each other and to the headers, and partitions at intervals of the length of the combustion chamber and extending from opposite sides part way across the same to compel the products of combustion to pass in a sinuous course between the pipes and completely envelop the two headers substantially as set forth and shown.

In testimony whereof I have hereunto signed my name this 6th day of April, 1894.

BURRITT CHAFFEE. [L. S.]

Witnesses:

JOHN J. LAASS,
C. L. BENDIXON.