

No. 625,514.

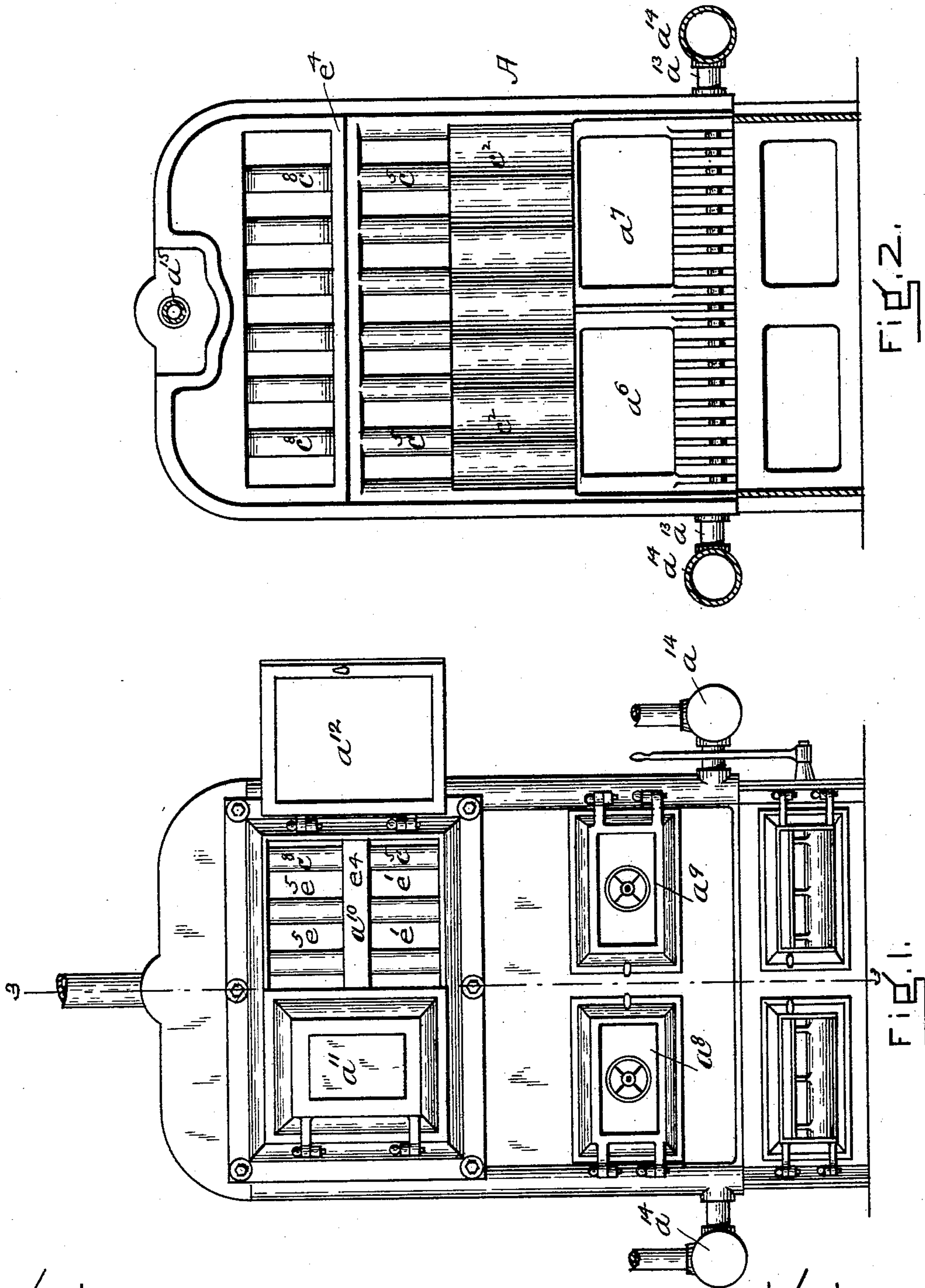
Patented May 23, 1899.

W. H. PAGE.
HOT WATER HEATER.

(Application filed June 17, 1897.)

(No Model.)

3 Sheets—Sheet 1.



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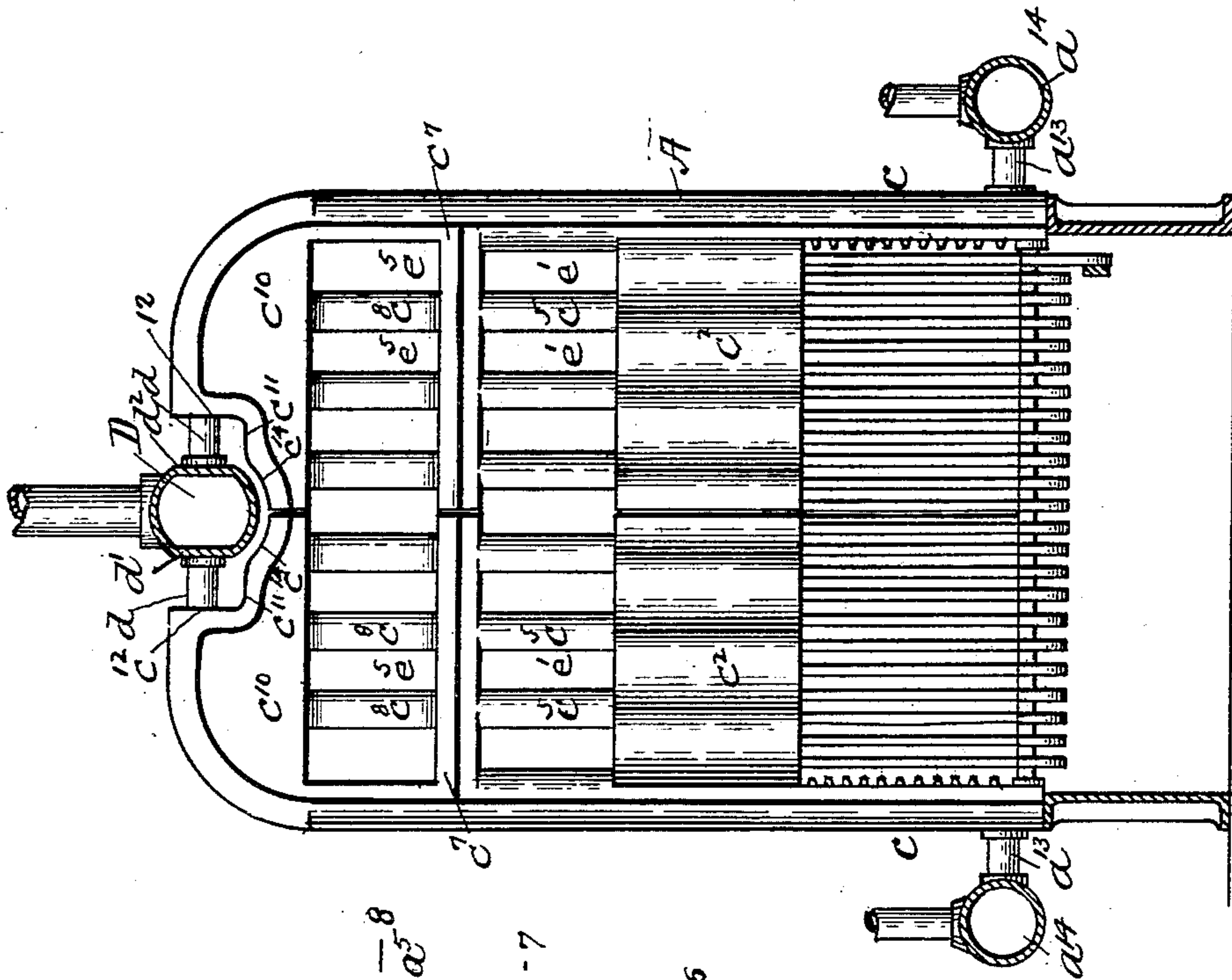


Fig. 4.

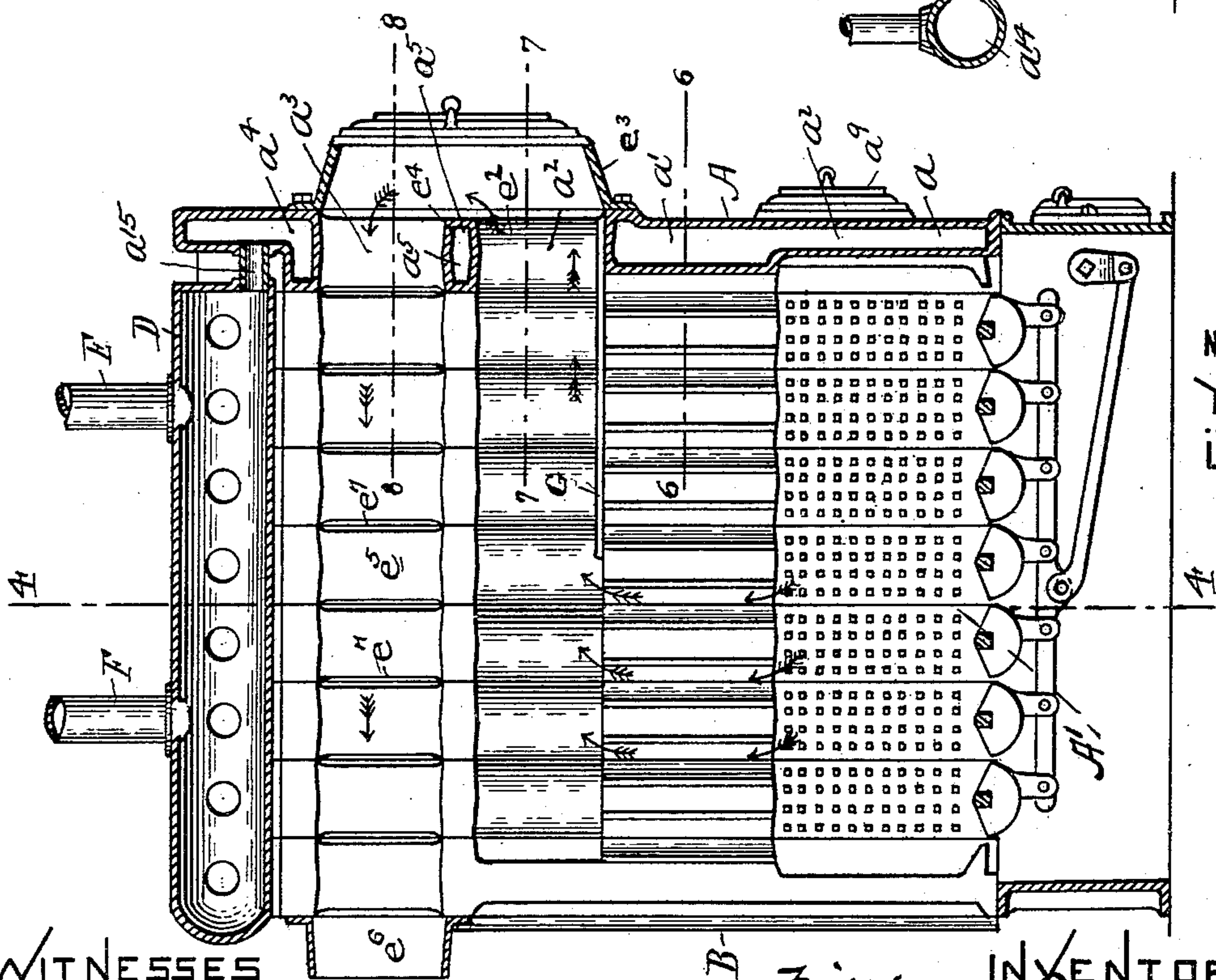


Fig. 5.

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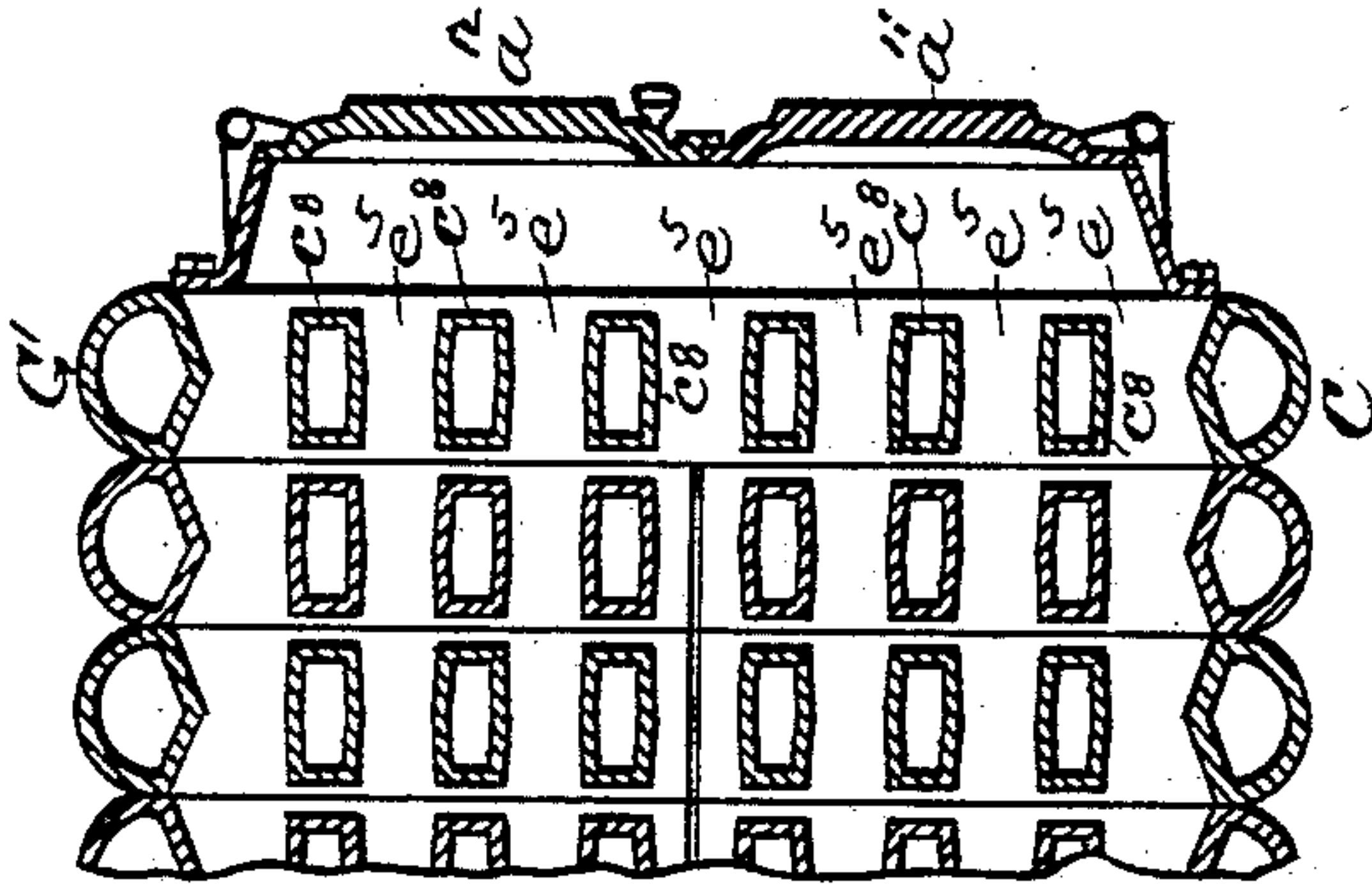


Fig. 6.

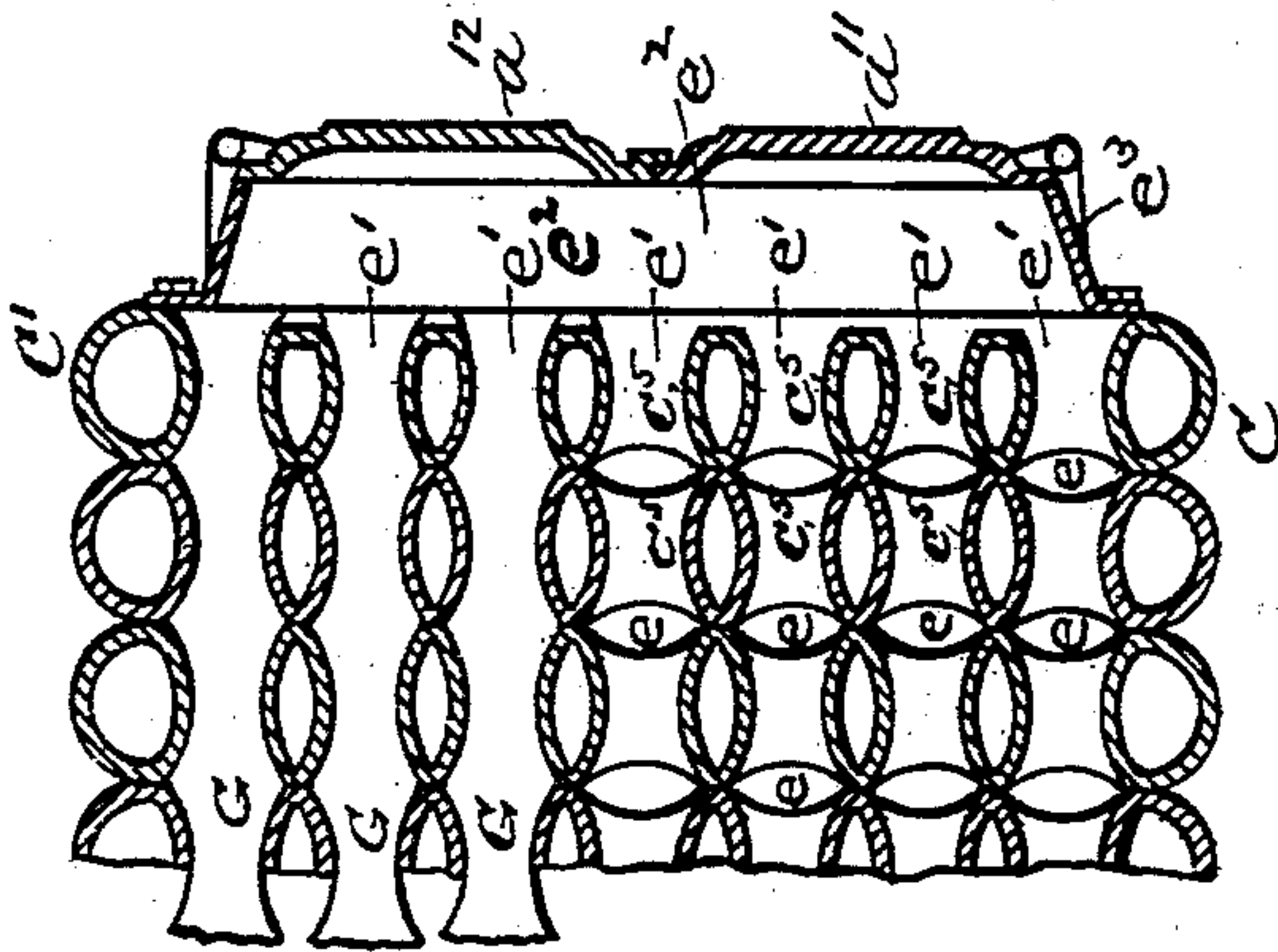


Fig. 7.

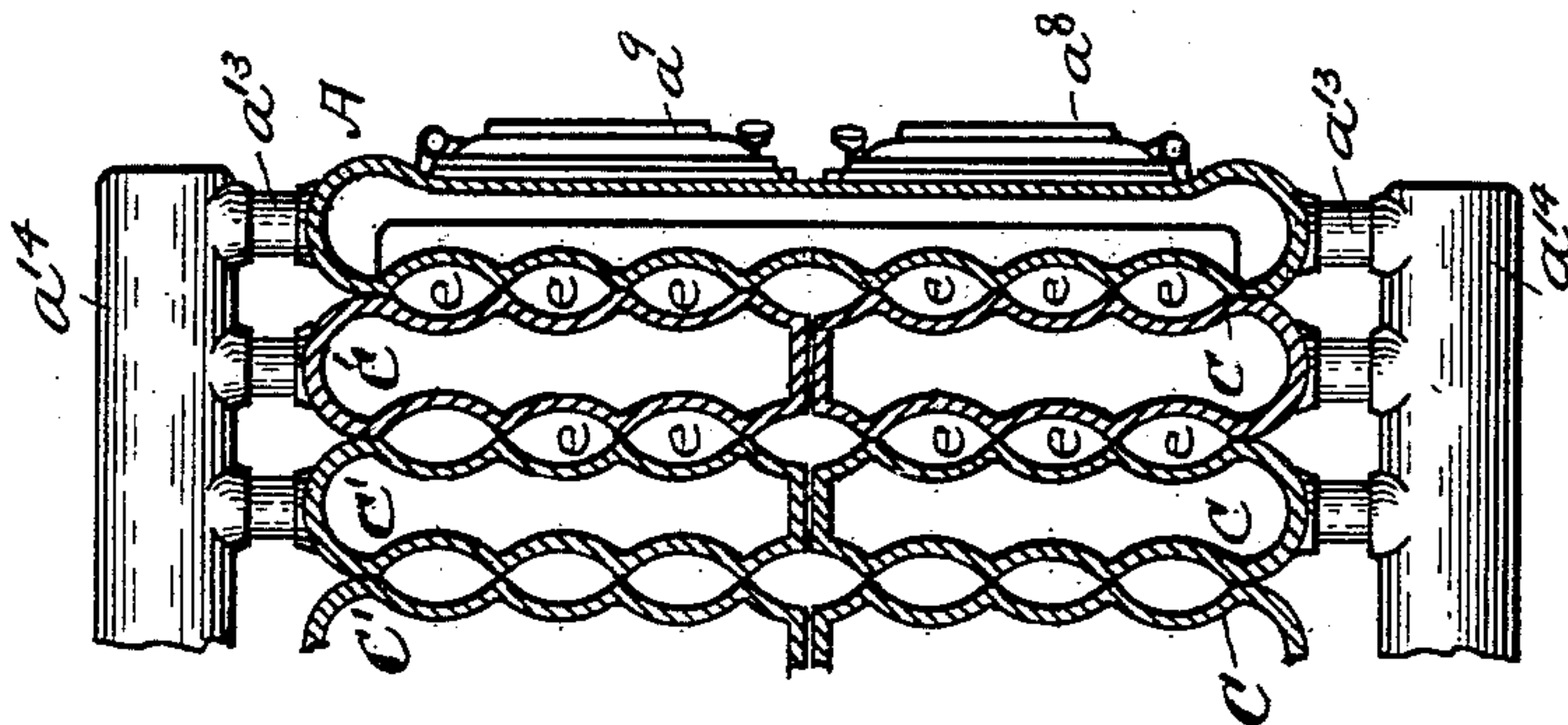


Fig. 8.

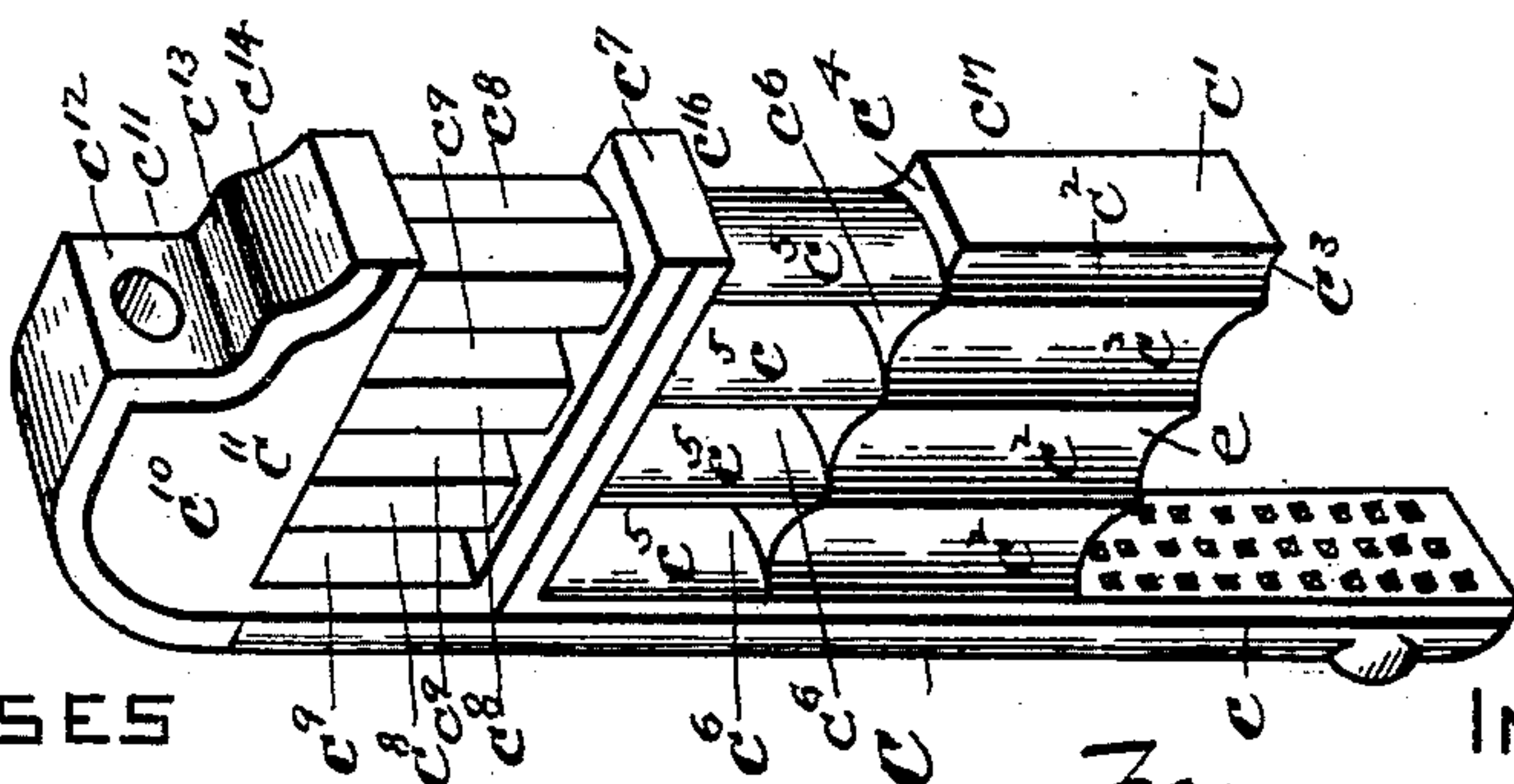


Fig. 9.

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UNITED STATES PATENT OFFICE.

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HOT-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 625,514, dated May 23, 1899.

Application filed June 17, 1897. Serial No. 641,077. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. PAGE, a citizen of the United States, residing at Norwich, in the county of New London and State of Connecticut, 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 comprising a front section of peculiar shape, a back section, and a series of intermediate sections having the construction and arrangement of flues hereinafter described.

In the drawings, Figure 1 is a view in front elevation of the heater. Fig. 2 is a view in elevation of the rear face of the front plate. Fig. 3 is a view in longitudinal section upon the dotted line 3 3 of Fig. 1. Fig. 4 is a view in longitudinal section crosswise the heater upon the dotted line 4 4 of Fig. 3. Fig. 5 is a view in perspective of one of the intermediate sections. Fig. 6 is a view in horizontal section upon the dotted line 6 6 of Fig. 3. Fig. 7 is a view in horizontal section upon the dotted line 7 7 of Fig. 3. Fig. 8 is a view in horizontal section upon the dotted line 8 8 of Fig. 3.

The heater comprises the front section A, the rear section B, and any desired number of intermediate sections, each intermediate section being made of two parts C C', which are practically counterparts and which are adapted to abut at the center of the length of the furnace. Each section is about fifteen inches in width, and the two parts not only abut at the center of the length of the heater, but also against each other, and the outer ones against the front and back sections, respectively. The front and rear sections are preferably in one casting of the full width and height of the heater. The front section is in the form of a hollow casting, having a water-heating chamber a below the openings to the combustion-chamber A', a water-heating chamber a' above the openings to the combustion-chamber, intermediate vertical connecting-chambers a^2 connecting the chambers a a' , and vertical passages a^3 extending to the upper chamber a^4 , the vertical passages a^3

being connected midway their length by the horizontal passage a^5 . The front section also has the openings a^6 a^7 to the combustion-chamber, which are closed by the doors a^8 a^9 , and the opening a^{10} to the flues, which is closed by the doors a^{11} a^{12} . The front section also has a connection a^{13} on each side near the bottom with the circulating-pipes a^{14} and at the top by means of the connection a^{15} with the end of the drum D.

Each of the intermediate sections C C' has a part c , which forms a portion of the exterior wall of the heater and which is hollow throughout its length from bottom to top, the part below the extension c' forming a part of the wall of the combustion-chamber. The extension c' is shaped as represented in Fig. 5—that is, it has a series c^2 of elliptical or curved recesses upon each side, the plane or flat under surface c^3 , and the plane or flat top c^4 , from which rise elliptical columns c^5 , separated by spaces c^6 . These elliptical columns extend to the under surface of a rectangular box or section c^7 , from which rise the square columns c^8 , which are separated by flue-spaces c^9 , and the square columns extend to the top c^{10} , which has parallel sides c^{11} and the perpendicular vertical end surface c^{12} , the flat surface c^{13} , and the curved surface c^{14} . Two of these sections make a complete division of the boiler from side to side, and the two divisions abut at c^{16} c^{17} , and any number of these divisions combined with the front and back sections form an inclosing jacket or wall to the combustion-chamber, separate vertical smoke and heat flues e extending from the combustion-chamber to the horizontal flues e' between the oval columns c^5 , said horizontal flues extending forward to the space e^2 , formed by an outward extension e^3 from the front section and which extends about the cross-section e^4 of the casting, providing the water-space a^5 , and thence backward through the flues e^5 between the square columns c^8 to the escape-port e^6 upon the rear sections.

The vertical flues e do not connect with each other, and the horizontal flues e' preferably do not; but the horizontal flues e^5 may be connected by lateral flues e^7 .

It will be understood that each of the sections C C' is hollow in the parts c' c^7 c^{10} and

in the connecting-columns $c^5 c^8$ and that there is thus provided by the various shapes large radiating surface for the hot water, which passes through the section, as well as passages for the conduct of the products of combustion from the fire, first upwardly, then forward to the front of the heater, then upward, and then backward to its rear. The rear section is much like one-half of a complete division—that is, its interior surface is formed like an interior surface of such division. The outer surface is plane. It is hollow, is connected at its sides with the pipes a^{14} , and at its top with the drum D, and it has a collar about the escape-port. The drum D is contained in a recess extending downward from the top of the heater. It has two flat sides, and it is connected with each of the sections C C' and with the back by lateral connections d .

The water is heated in its course through the various chambers and finally enters the drum D, from which it is distributed through the distributing-pipes F in the usual way. The drum preferably has two flat sides $d' d^2$. (See Fig. 4.)

In order that the products of combustion may not pass directly from the combustion-chamber to the horizontal flue-sections at the front of the heater, I have employed to cover some of the vertical flues a covering-plate G, (see Fig. 3,) which covers and closes these flues over which it is and causes the products of combustion to pass upward in the rear vertical flues e to the rear end of the lower horizontal flues.

It will be understood that the course of the water is from the feed-pipes a^{14} into the various legs of the intermediate sections C C' and into the cavities of the front section and the rear section or sections, thence upward through the chambers having the curved walls, thence through the passages in the oval columns, thence into the chamber formed by the box, thence into the passages formed by the rectangular columns, thence to the chamber in the section c^{10} , and from there to the drum D, the water also passing through the outer vertical chambers. This submits the water to varying forms of radiating or heating surfaces and in various conditions, such as alternating relatively large bodies contained in the larger lower chambers and smaller quantities or bodies, such as would be held in the oval and rectangular passages.

While I have described the device as a hot-water heater, I would not be understood as limiting it to such use, as it is equally applicable for use for generating steam in a steam heating apparatus.

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

1. A hot-water or steam heater comprising

a main front section having the water-heating chambers described, the entrance to the combustion-chamber and the entrance to the flues the extension e^3 and appropriate doors for said openings, in combination with the intermediate sections C, C' and the rear section B, said intermediate sections C, C' being shaped and joined as specified, whereby there is provided a combustion-chamber A', confined vertical flues e leading from said combustion-chamber, the lower course of horizontal flues e' separated from each other, each forming a continuation of a flue e , the connecting-flue e^2 and the upper course of connected horizontal flues e^5 , as and for the purposes described.

2. In a hot-water or steam heater, the section C having the portion c' provided with curved side recesses c^2 running vertically thereon, columns c^5 extending upward from said section and separated from each other by spaces c^6 , the box c^7 and columns c^8 extending upward from said box to the top section c^{10} , and said top section, the outer walls of said top section, said box e^7 , said columns c^5 and the widest parts of said portion c' being flush with each other, the whole forming three water-heating chambers and connecting-passages, and adapted to cooperate with other like sections to form vertical, horizontal and return horizontal flues, as described.

3. In a hot-water or steam heater the section C having the hollow leg c and side, the lower portion c' , the box c^7 and an upper section forming heating-chambers and hollow columns connecting the lower portion and box and hollow columns connecting the box and upper chamber, the inlet and outlet to the section, the sides and inner ends of the section being shaped to abut similar sides and ends of other sections.

4. A hot-water or steam heater comprising a front A having water-heating chambers substantially as specified and shaped upon its interior as shown and described, the rear section B shaped upon its inner surface as described, the intermediate sections C, C' shaped as specified, the partition-plate G, the drum D connected with the front section as specified and with the intermediate and rear sections as described, and the pipes a^{14} connected with the front, rear and intermediate sections, the whole forming a combustion-chamber, vertical flues e , forward-extending horizontal flues e' , the connection e^2 and backward-extending horizontal flues e^5 for the products of combustion and water chambers and passages of the nature specified.

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