

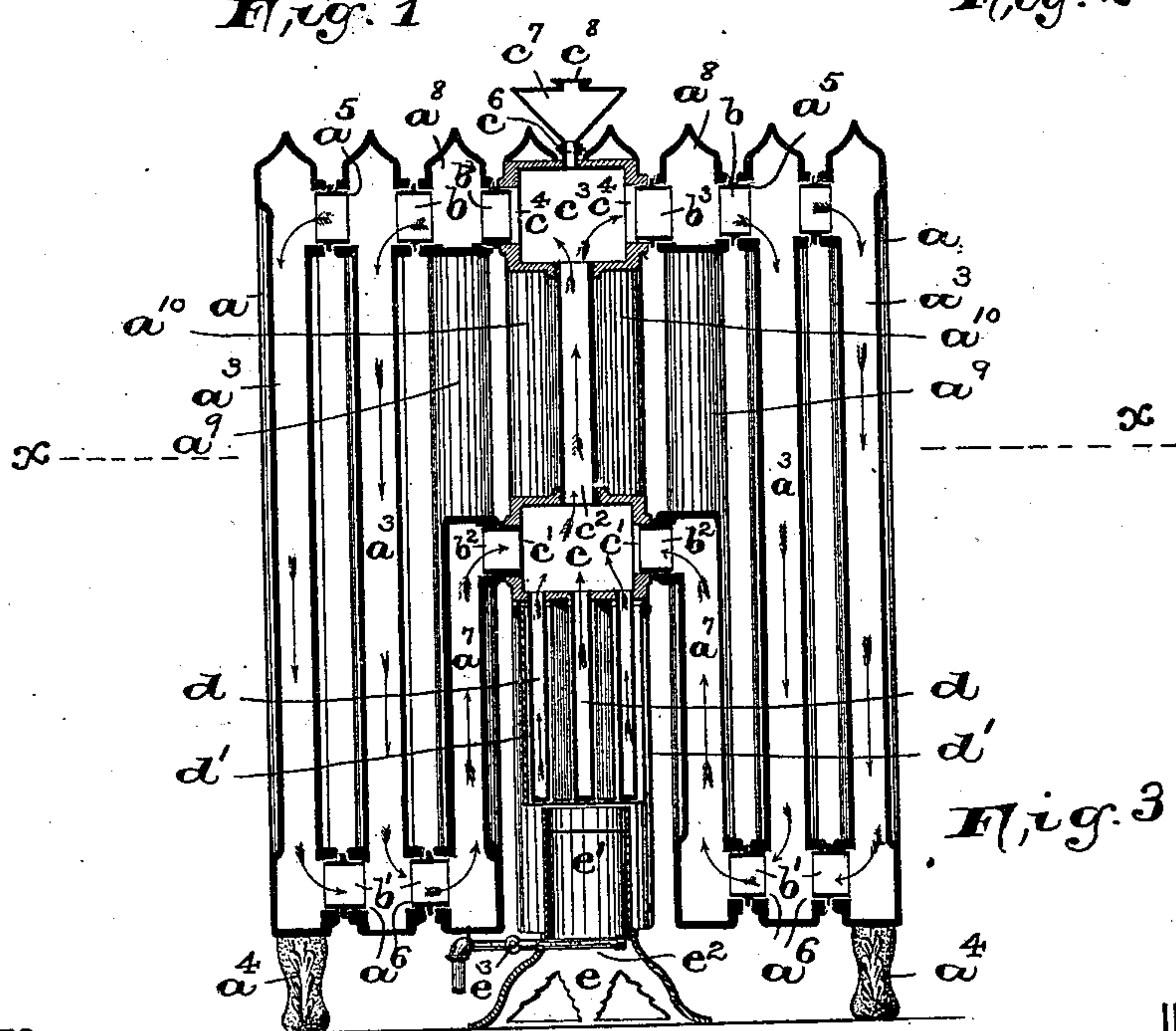
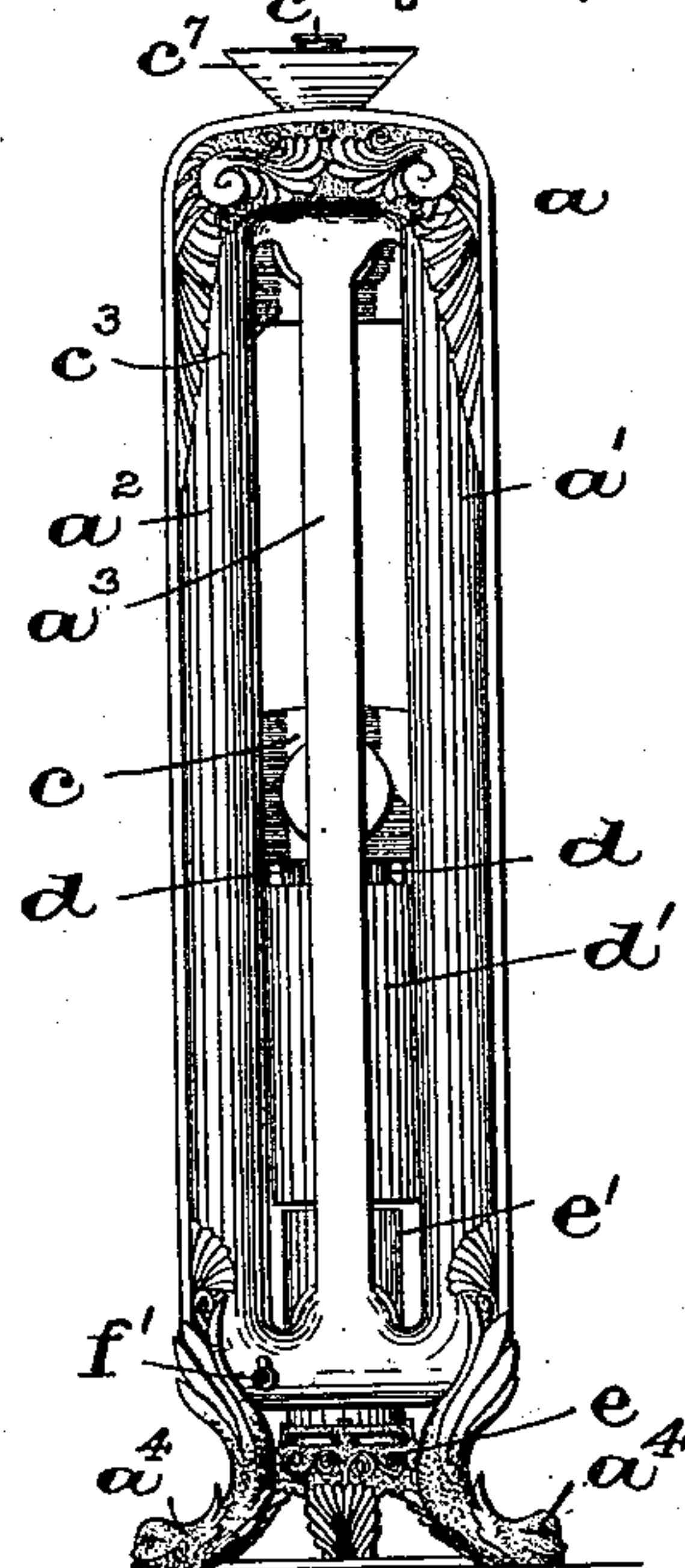
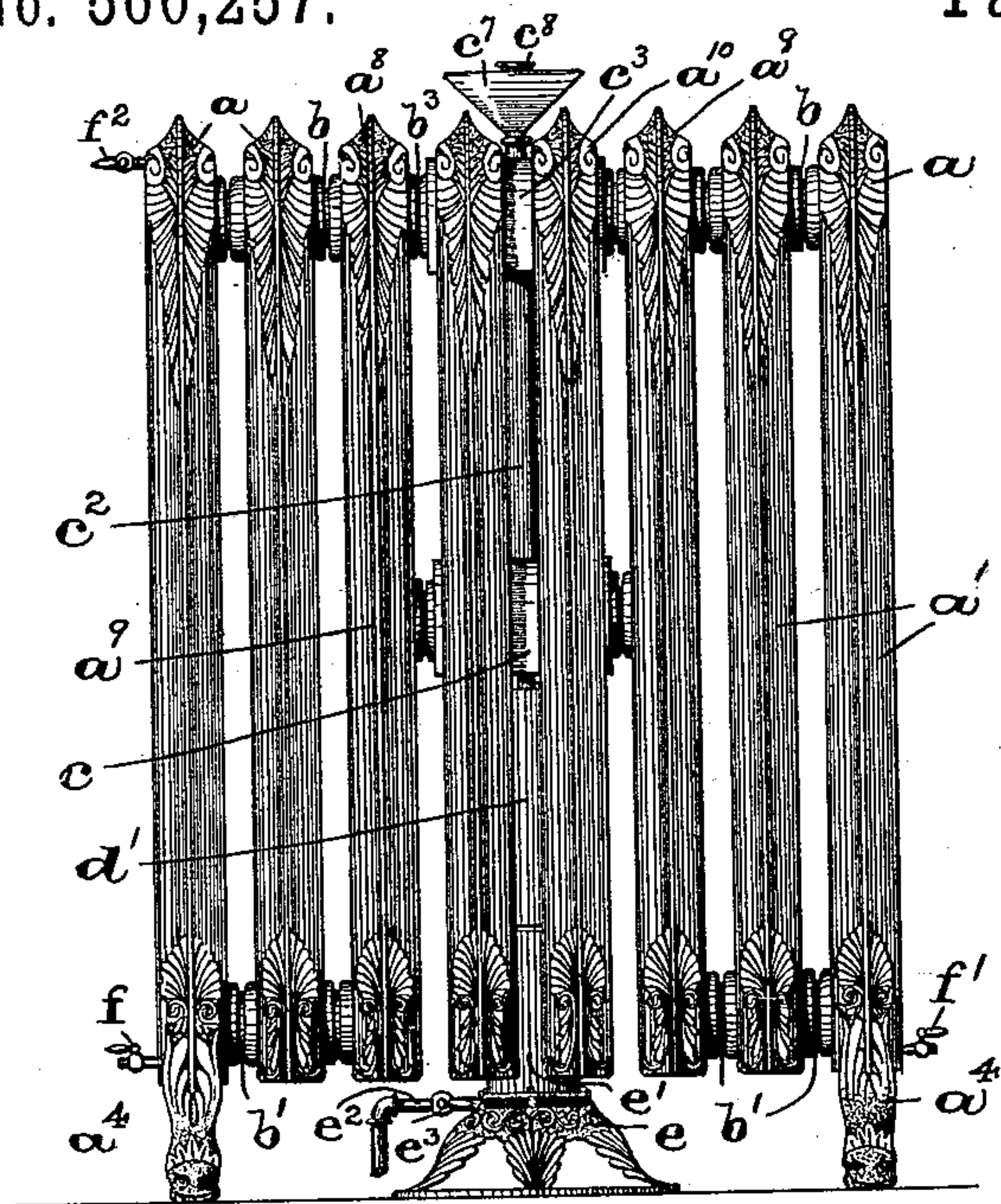
(No Model.)

2 Sheets—Sheet 1.

A. M. CANON & W. G. MOREHEAD.  
HOT WATER RADIATOR.

No. 560,257.

Patented May 19, 1896.



WITNESSES:

W. B. Fraentzel.  
Wm. E. Blewett.

**INVENTORS:**

Amos M. Canon and  
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ATTORNEY

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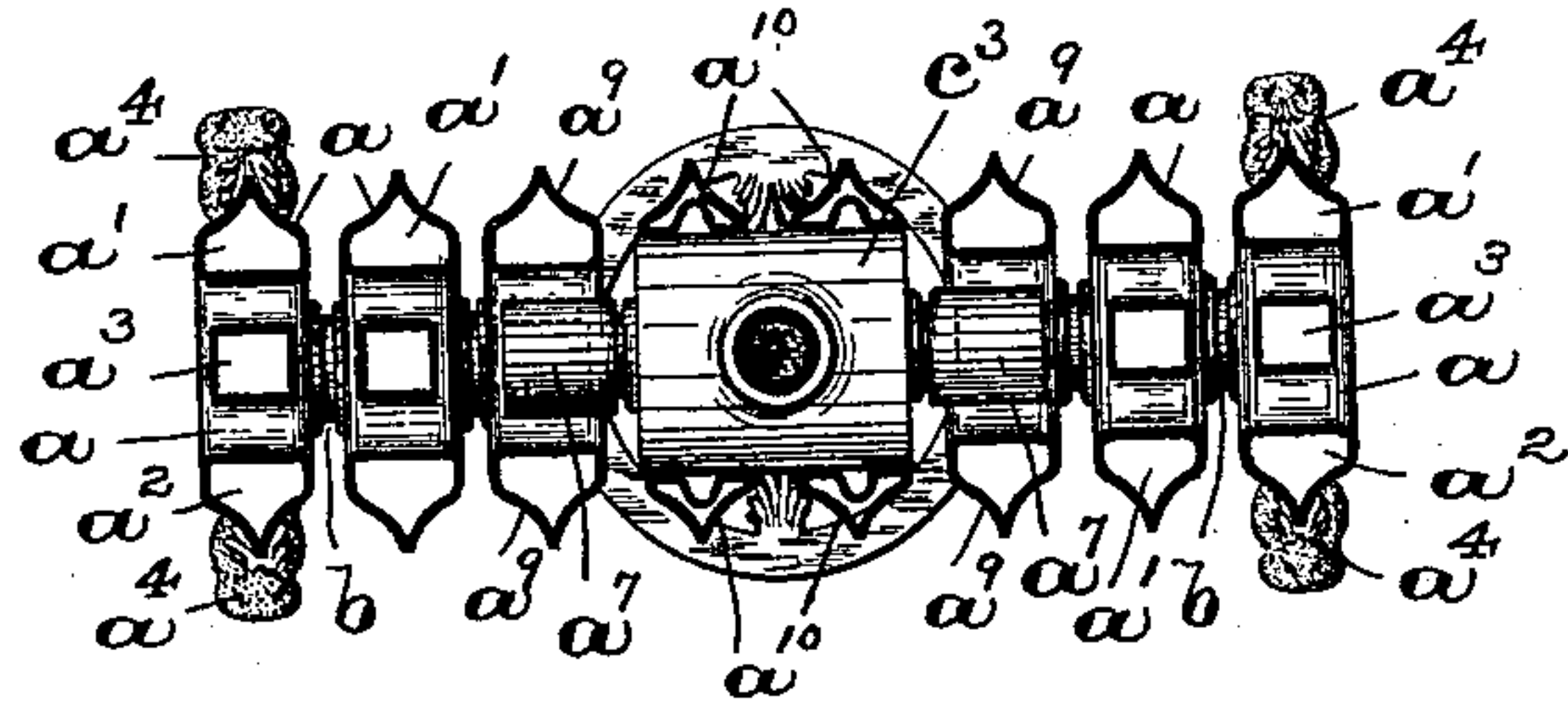


Fig. 4

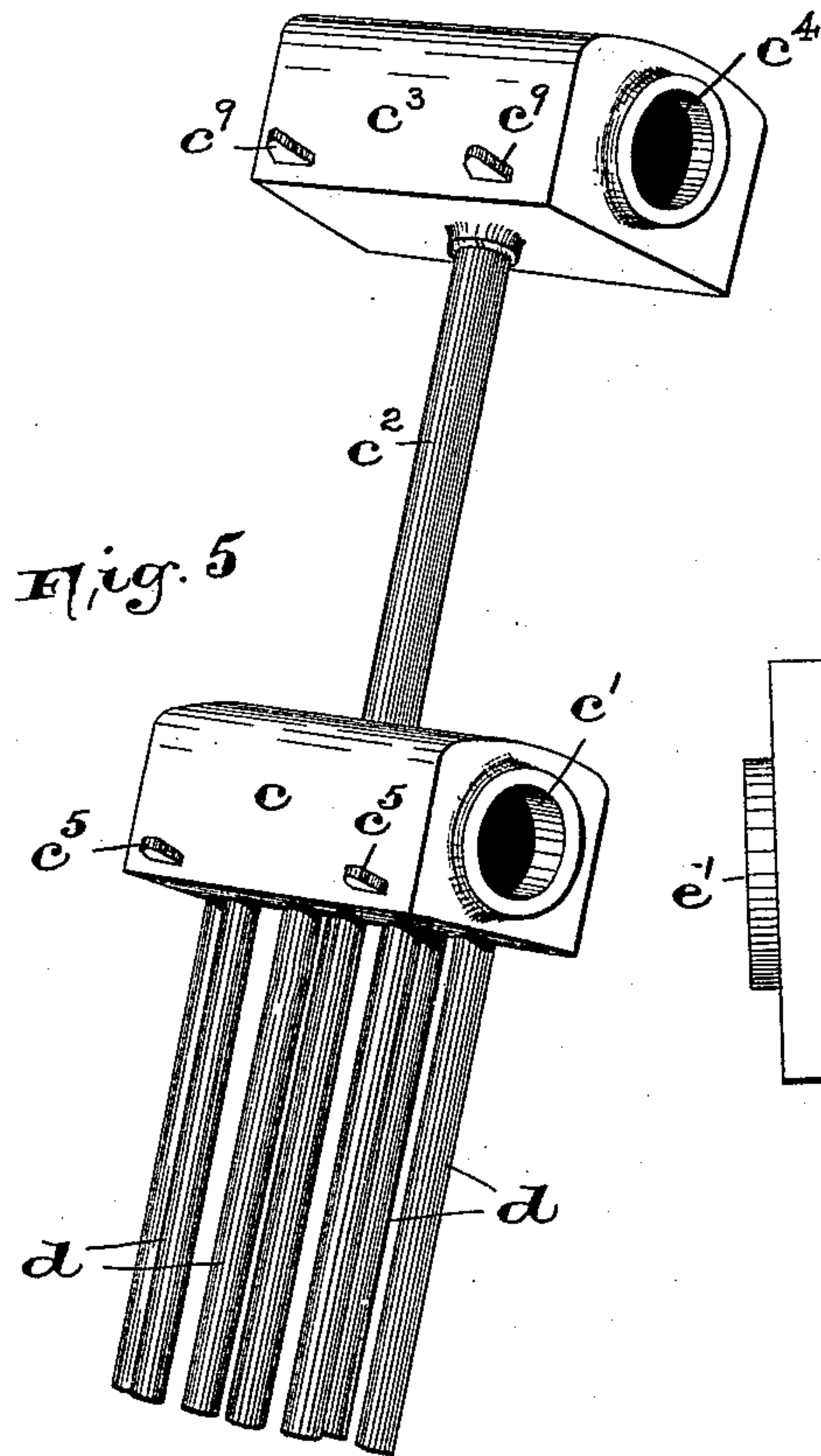


Fig. 5

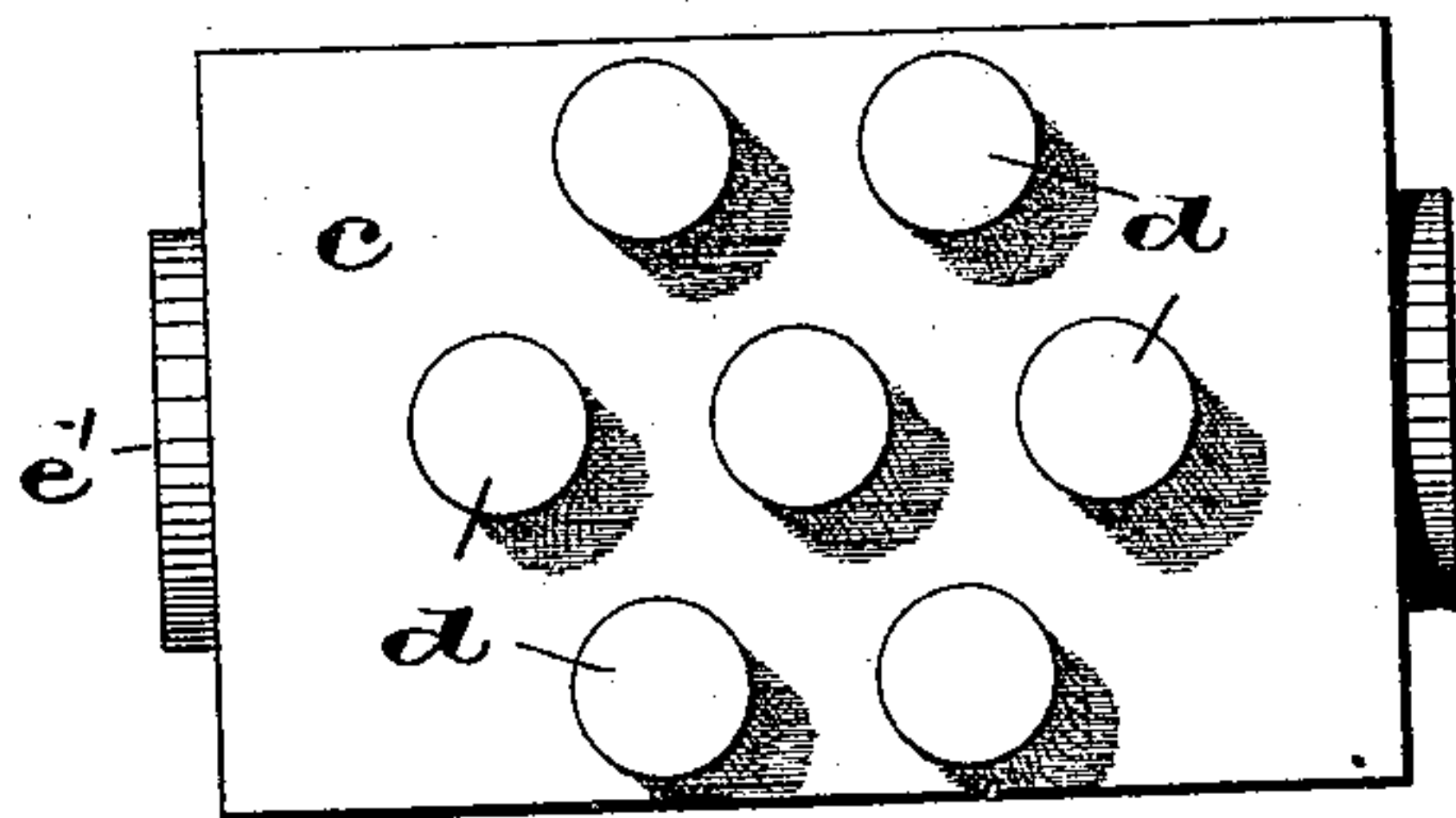


Fig. 6

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# UNITED STATES PATENT OFFICE.

AMOS M. CANON AND WILLIAM G. MOREHEAD, OF NEWARK, NEW JERSEY.

## HOT-WATER RADIATOR.

SPECIFICATION forming part of Letters Patent No. 560,257, dated May 19, 1896.

Application filed March 20, 1895. Serial No. 542,437. (No model.)

*To all whom it may concern:*

Be it known that we, AMOS M. CANON and WILLIAM G. MOREHEAD, citizens of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Hot-Water Radiators; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Our present invention has reference to a novel form of water-heater for house-warming purposes, and has for its object to provide a hot-water radiator in which the water is heated by means of a gas or other flame or flames, the construction of such radiator and the burner or burners connected therewith being simple and economical, and the radiator having the appearance of an ordinary steam or hot-water radiator. In our present form of construction the radiator-sections are filled with water, which is used over and over, the only loss being due to slight evaporation, which can be easily replaced.

A further object of our invention is to provide a radiator for a room, which can be connected with the ordinary gas-pipe in the building, or may be provided with any other suitable burner, such as that of an oil-lamp, to heat the water in the radiator and cause a circulation thereof through the radiator-sections, and when not required for further use, as in the summer, can be quickly disconnected and stored away until again wanted.

The invention consists in the novel combinations and arrangements of the radiator-sections and the heating chamber or reservoir, the radiator-sections being placed side by side and connected with each other, whereby a hot-water radiator is the result, which can be made up of any desirable number of radiating-sections to meet the requirements of the room to be heated.

The invention is clearly illustrated in the accompanying drawings, in which—

Figure 1 is a front view of our novel form of hot-water radiator. Fig. 2 is an end view of the same, and Fig. 3 is a longitudinal ver-

tical section of the radiator to more clearly illustrate the general arrangement and construction of the parts of the same. Fig. 4 is a horizontal section of the radiator, taken on line  $x$  in Fig. 3. Fig. 5 is a perspective view of the heating chamber or reservoir, a header and suitable pipe or conduit establishing a communication between said parts, and an arrangement of drop-tubes connected with the bottom of the said heating chamber or reservoir; and Fig. 6 is a bottom view of said reservoir and drop-tubes.

Similar letters of reference are employed in each of the above-described views to indicate corresponding parts.

In said drawings,  $a$  indicates the radiator-sections, which are made in the usual manner and comprise therein the tubular portions  $a'$  and  $a''$ , with a centrally-arranged tube  $a^3$ , which establishes a communication between said tubular portions  $a'$  and  $a''$ , as will be understood from an inspection of Figs. 2, 3, and 4. The two end sections of the radiator are provided with ornamental legs  $a^4$ , and when the radiator-sections are connected at the top by fittings  $b$ , secured in the openings  $a^5$ , and at the bottom by fittings  $b'$ , secured in the openings  $a^6$ , the parts will assume the appearance of an ordinary steam-radiator, as will be clearly seen from an inspection of Fig. 1. In the two radiator-sections  $a$  in the center of the radiator the central tube  $a^3$  in each section is dispensed with and short tubes or conduits  $a^7$  are employed, each of which is provided with a fitting  $b^2$  in the top, which is secured in oppositely-placed openings  $c'$  in a suitable water-heating chamber or reservoir, as will be clearly seen from Fig. 3. In an opening in the top of said chamber or reservoir  $c$  we have secured a stand-pipe or conduit  $c^2$ , which is tapped or otherwise secured in the bottom of a similar chamber or reservoir  $c^3$ , called a "header." This header  $c^3$  is provided with oppositely-arranged holes or openings  $c^4$ , in which are secured suitable fittings  $b^3$  to establish communication with the hollow parts  $a^8$  of the radiator-sections  $a^9$ , and thence by means of the fittings  $b$  with the other radiator-sections. The lower side of said chamber or reservoir  $c$  is provided with any desirable number and suitably-placed holes or



openings, in which are secured suitable drop-tubes  $d$ , which are preferably surrounded by a cylindrical casing  $d'$ , as indicated in Fig. 3. The lower ends of said drop-tubes terminate  
 5 directly above the burner  $e'$  of a suitable gas-stove  $e$ , fed from a perforated pipe  $e^2$  and arranged directly in the center of the radiator. In lieu of a gas-stove the burner of an oil-stove may be employed, as will be clearly  
 10 evident.

In order to give the radiator the general appearance of a steam-radiator the reservoir  $c$  is provided with suitable holding-lugs  $c^5$ , and the header  $c^3$  is provided with correspond-  
 15 ingly-arranged lugs  $c^9$ , and on these are secured the two blind radiator-sections  $a^{10}$ , which serve no other purpose than to produce the general effect of a complete radiator and add to the beauty of the same. In the  
 20 upper surface of the reservoir  $c^3$  is a perforation, in which we have secured a pipe  $c^6$  and which is in communication with an ornamental casing  $c^7$ , provided in the top with a removable cap or plug  $c^8$ . Said casing serves  
 25 a double purpose: first, for filling the radiator with water, and, secondly, when the water is being heated it serves as an expansion-chamber.

The end sections of the radiator are provided at the bottom with small faucets  $f$  and  
 30  $f'$  and a faucet or cock  $f^2$  at the top to permit the entrance of air into the radiator-sections and force the water therefrom when the cocks or faucets  $f$  and  $f'$  are opened when  
 35 it is desired to dispense with the further use of the radiator.

The gas-pipe  $e^2$ , connected with the heater  $e$ , is provided with a cock  $e^3$ , which can be turned on to permit the flow of gas into the  
 40 burner  $e'$ .

When the gas is lighted, the water in the drop-tubes  $d$  becomes quickly heated and displaces the cold water in the chamber or reservoir  $c$ , in which the water also becomes  
 45 quickly heated and rises in the tube or conduit  $c^2$  into the header  $c^3$ , from which the hot water passes in the direction of the arrows, as clearly indicated in Fig. 3, through the different radiator-sections, and finally back through  
 50 the short tubes or conduits  $a^7$  into the sides of the reservoir or chamber  $c$ . At the same time that the drop-tubes  $d$  are being heated and the water therein becomes displaced the conduits  $a^7$ , which connect the lower ends of  
 55 the radiator-sections with the water-heating chambers  $c$ , will also receive heat from the heater, thereby causing a displacement of the cold water in said conduits, and hence a very rapid circulation of the water throughout the  
 60 radiator-sections. In this manner a complete circulation of the water in the radiator will be the result and the cold water therein, being displaced by the warmer water as it becomes heated in the chamber or reservoir  $c$ ,  
 65 is quickly caused to fill the drop-tubes, where it in turn is quickly heated, and a constant and rapid circulation of the water through the

several parts of the radiator will be the result. At the same time, the drop-tubes being constantly filled with water, they cannot burn  
 70 out, and should the radiator become too hot the flame in the stove or heater  $e$  can be regulated or can be extinguished and quickly relighted, when desired.

It will be evident that the radiator-sections  
 75 as well as the number of burners in the stove can be increased to increase the heating capacity of the radiator. It will also be understood that any number of radiators may be  
 80 connected in series, the water in all of them being heated from one stove or heater in one of the radiators and forming a complete circulation through the series of radiators, or each radiator in the series may be provided  
 85 with a stove or heater directly connected therewith, as will be evident. Thus it will be seen that a cheap and serviceable hot-water radiator is the result, which can be used  
 90 to advantage in the winter and can be readily detached from the gas connections in the room and stored away in the summer when there is no use for the radiator.

Of course it will be understood that we do not limit our invention to the exact arrangements and combinations of the parts as here-  
 95 in shown, as we are fully aware that they may be varied without departing from the scope of our invention.

In place of the gas-stove shown in connection with our novel form of hot-water radiator any suitable stove or heater having a  
 100 gas or oil or other burner or burners may be used.

We are aware that it is not entirely new with us to combine with the water-sections  
 105 of a radiator a heater to heat the water in said sections, whereby a circulation of the same is caused; but we are also aware that in the constructions of radiators as heretofore made a large body of water has first to  
 110 be displaced by the heat from the burner, thereby rendering the device impracticable for the reason that a free circulation of water cannot be brought about without maintaining a great consumption of gas to heat  
 115 the large body of water. We have successfully overcome this difficulty, first, by the use of a comparatively large water-reservoir  $c$ , in which the water is heated, a small stand-pipe  $c^2$ , in which the water to be displaced is  
 120 reduced to a minimum, and a large header  $c^3$ , connected therewith, whereby a rapid circulation of the water in the several parts of the radiator is the result.

A second feature added to the above arrangement of the parts of the radiator, where-  
 125 by a practical result is obtained, is the use, in connection with the water-reservoir  $c$ , of the drop-tubes  $d$ , in which the water is rapidly heated to displace the colder water in the  
 130 other parts of the radiator.

Having thus described our invention, what we claim is—

1. In a hot-water radiator, the combination,



with a series of radiator-sections, a water-heating chamber or reservoir situated above the lower ends of said radiator-sections, a heater beneath said reservoir, but practically  
 5 above the lower ends of the radiator-sections, conduits providing communication between the lower ends of the radiator-sections and the reservoir, said conduits being so arranged as to receive heat from the heater, and a con-  
 10 duit providing communication between said reservoir and the upper ends of the radiator-sections, substantially as and for the purposes set forth.

2. In a hot-water radiator, the combination,  
 15 with a series of radiator-sections, a water-heating chamber or reservoir situated above the lower ends of the radiator-sections, a heater beneath said reservoir, but practically above the lower ends of the radiator-sections,  
 20 conduits providing communication between the lower ends of the radiator-sections and the reservoir, said conduits being so arranged as to receive heat from the heater, a header above said reservoir, a tube or stand-pipe  
 25 connecting said reservoir with said header, and connections providing communication between said header and the upper ends of the radiator-sections, substantially as and for the purposes set forth.

30 3. In a hot-water heater, the combination, with a series of radiator-sections, a water-heating chamber or reservoir situated above the lower ends of said radiator-sections, drop-tubes extending from said heating-chamber,  
 35 a heater beneath said chamber and drop-

tubes, but practically above the lower ends of the radiator-sections, conduits providing communication between the lower ends of the radiator-sections and the reservoir, said  
 40 conduits being so arranged as to receive heat from the heater, and a conduit providing communication between said reservoir and the upper ends of the radiator-sections, substantially as and for the purposes set forth.

4. In a hot-water heater, the combination,  
 45 with a series of radiator-sections, a water-heating chamber or reservoir situated above the lower ends of said radiator-sections, drop-tubes extending from said heating-chamber, a heater beneath said chamber and drop-  
 50 tubes, but practically above the lower ends of the radiator-sections, conduits providing communication between the lower ends of the radiator-sections and the reservoir, said conduits being so arranged as to receive heat  
 55 from the heater, a header above said reservoir, a tube or stand-pipe connecting said reservoir with said header, and connections providing communication between said header and the upper ends of the radiator-sections,  
 60 substantially as and for the purposes set forth.

In testimony that we claim the invention set forth above we have hereunto set our hands this 26th day of February, 1895.

AMOS M. CANON.

WILLIAM G. MOREHEAD.

Witnesses:

FREDK. C. FRAENTZEL,

WM. H. CAMFIELD, Jr.