

No. 675,352.

Patented May 28, 1901.

W. C. HIGGINS.  
HOT WATER AND STEAM HEATER.

(Application filed Sept. 29, 1900.)

(No Model.)

3 Sheets—Sheet 1.

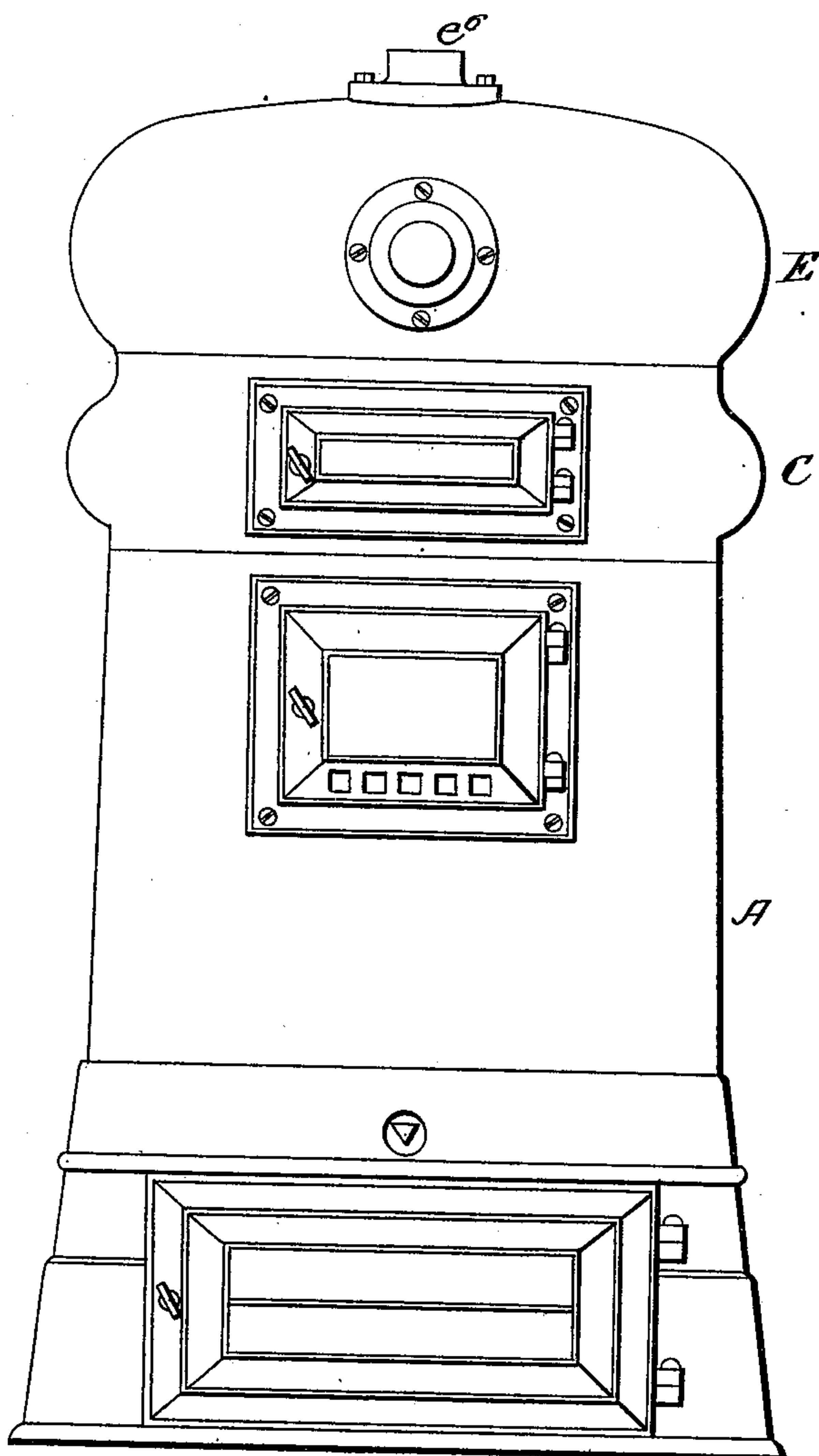


Fig. 1.

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INVENTOR:

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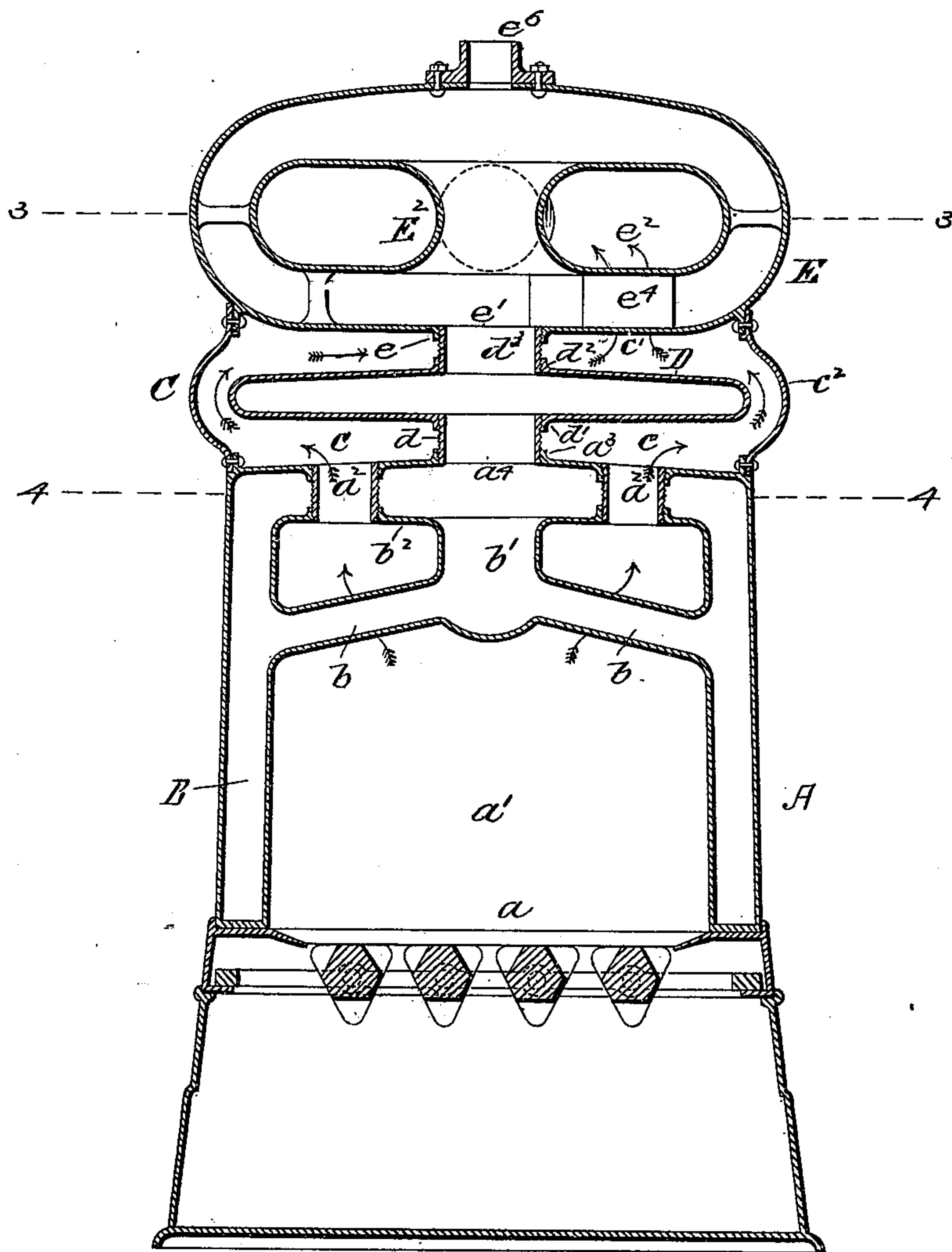


Fig. 2.

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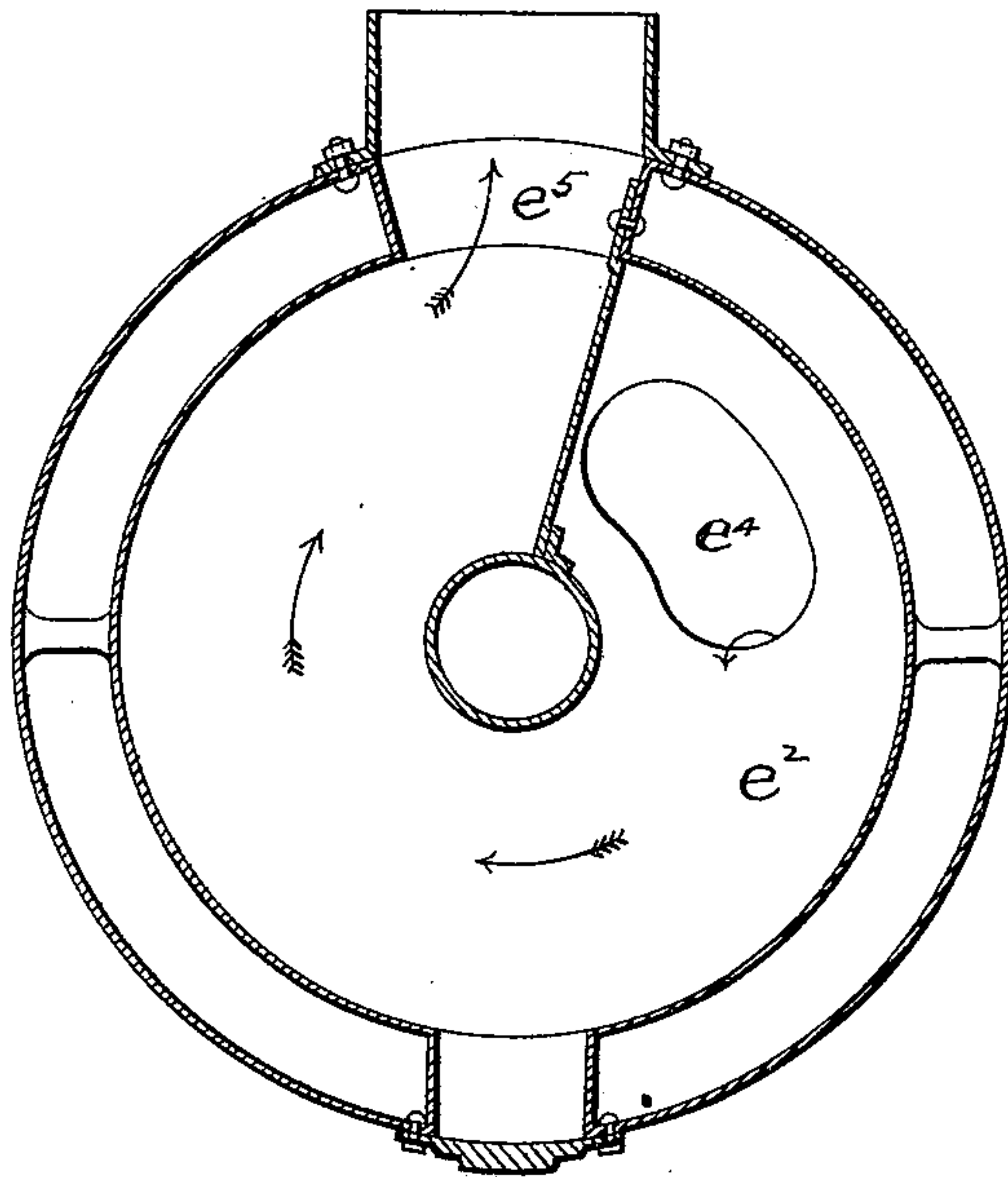


Fig. 3.

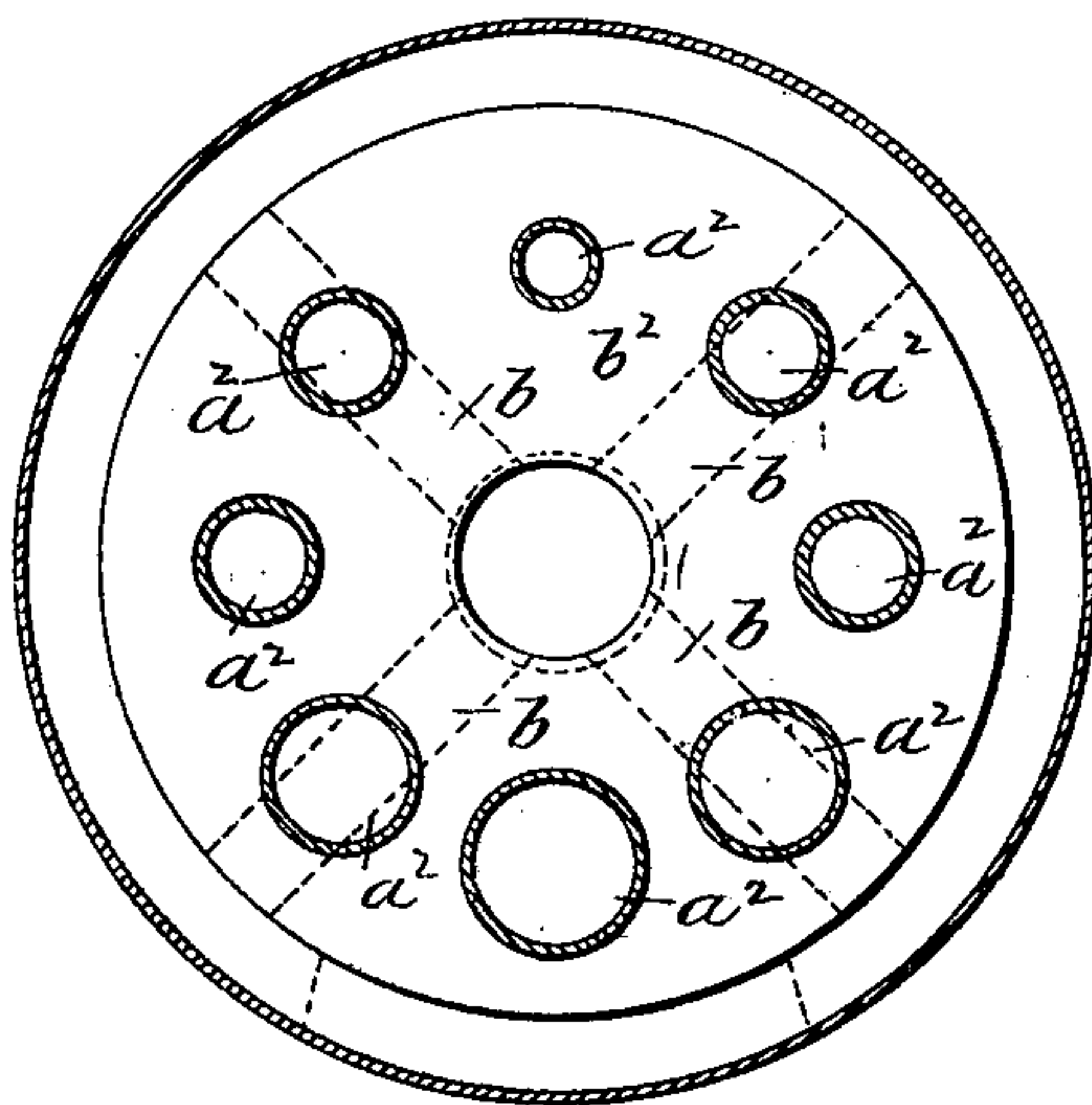


Fig. 4.

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# UNITED STATES PATENT OFFICE.

WERTER C. HIGGINS, OF ARLINGTON, MASSACHUSETTS.

## HOT-WATER AND STEAM HEATER.

SPECIFICATION forming part of Letters Patent No. 675,352, dated May 28, 1901.

Application filed September 29, 1900. Serial No. 31,492. (No model.)

*To all whom it may concern:*

Be it known that I, WERTER C. HIGGINS, a citizen of the United States, residing at Arlington, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Hot-Water and Steam 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 the herein-described improvement in hot-water and steam heaters.

It comprises a structure which may be said to have three independent sections, the first of which is the lower part or section embracing a fire-pot, combustion-chamber, and a water-heating boiler of peculiar construction, a portion of which is tubular and contained in the combustion-chamber. The second part or section relates to a combination of water-heating chamber and flue which is capable of indefinite extension and which is combined with the lower and upper sections, as will be hereinafter specified. The third part or section relates to a water-heating chamber which surrounds an annular flue, one end of which is connected through its bottom with the flue of the intermediate section and the other end of which at its side or top with the smoke-escape port. The whole provides an organization which is very simple in construction, cheap to make, and very effective as a quick and economical hot-water or steam producer for the purposes of heating.

I will now describe the invention in connection with the drawings, wherein—

Figure 1 is a view in front elevation of a heater containing the features of my invention. Fig. 2 is a vertical central section thereof. Fig. 3 is a view in horizontal section upon the dotted line 3 3 of Fig. 2. Fig. 4 is a view in horizontal section upon the dotted line 4 4 of Fig. 2.

In the drawings, A is the lower section or part of the heater. It contains the fire-grate  $a$  and the combustion-chamber  $a'$ . It preferably is cylindrical in shape and comprises an integral hollow casting, which furnishes, first, the water-chamber B, surrounding the fire-pot and combustion-chamber upon its sides and upon its top, and, second, the tubes

$b$ , which extend from the sides upward and inward to the central chamber  $b'$ . These tubes form passages for the circulation of the water from the sides to the central chamber, and they extend across the combustion-chamber and as many of them may be used as desired. The combustion-chamber is connected with the flue  $c$  of the intermediate section C by means of a number of passages  $a^2$ , which extend through the top of the section A and which preferably are graduated as to size (see drawings) and some of which are arranged over the tubes  $b$ . When the passages are so graduated, it is preferable that the smaller ones be at the rear and the larger ones at the front of the section or so disposed as to cause a larger part of the products of combustion to pass into the flue at a point opposite the outlet  $c'$  from said flue. The section A has a collar or rim  $a^3$  on its top plate, surrounding the opening  $a^4$ . This collar or rim is threaded to receive a threaded sleeve  $d$ , connecting the section A with the collar  $d'$  of the flat water-shell D in the flue-space  $c$ . This shell is wide and thin and exposes a large water-heating surface upon its bottom and top to the products of combustion which pass through the flue-space  $c$ . It has a threaded rim or collar  $d^2$ , which receives a threaded sleeve or coupling  $d^3$ , which unites it to the upper section E. The upper section has a threaded flange or collar  $e$ , surrounding the opening  $e'$  and which receives the coupling  $d^3$ , and the flue  $e^2$ , which is contained in the chamber  $e^3$  of the section, is circular in shape and has a water-passage through it, thereby rendering it substantially annular, and is practically surrounded by the contents of the chamber. It has at one end the connection  $e^4$  with the flue  $c$ , the connection extending vertically in the section E from the flue-space  $c$  to the flue  $e^2$ . It also has at its other end the flue or passage  $e^5$ , which may extend through the side of the section E, as represented in the drawings or through the top and connects the flue with the escape-pipe. The circulation of the water is through the chambers or cavities of the lower section, the chamber of the heating-shell D, and the chamber of the upper section E to the circulating-outlet  $e^6$ , about which is means for attaching a circulating-pipe to the section. A cast-metal or other shell  $c^2$  forms the outer wall of



the section C and is joined to the lower section B and the upper section E in any suitable or convenient way. The products of combustion pass from the fire about the tubes  
 5  $b$  against the crown-sheet  $b^2$ , through the openings  $a^2$ , into the flue  $c$ , impinging against the wall of the heating-chamber D, and taking a course across said chamber to the outlet  $e^4$  and in relatively large undivided volume,  
 10 where they enter as a body of considerable size the large annular flue  $E^2$ , about which they pass in large volume to the outlet. There is thus insured provision for carrying the heat in relatively large volume through  
 15 the flue of the intermediate section and through the flue of the upper section, while at the same time it is caused to take a tortuous course, and the heating-surfaces of the water-holding chambers thus enlarged and  
 20 increased. This I consider to be advantageous, because I apprehend that a better result is obtained by the conduction of the heat in relatively large volumes past and through the water-heating surfaces rather than by  
 25 causing it to be split into thin layers, from which the heat is quickly extracted.

It will be understood, of course, that the section A is provided with suitable ash-pit and feed openings and that clean-out holes  
 30 are arranged in all sections wherever they may be desirable.

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

35 1. The section A having a combustion-chamber provided with a series of flues connecting said combustion-chamber with a flue-space above it, a water-chamber surrounding said combustion-chamber on its sides and top,  
 40 a water-outlet to said chamber located over the center of said combustion-chamber, a series of tubes integral with said combustion-chamber connecting the water-chamber about said combustion-chamber with said central  
 45 opening and passing through said combustion-chamber, whereby their contents are heated by exposure upon all sides to the products of combustion, as set forth.

50 2. In a heater of the character specified, the combination of the lower section A containing a fire-pot, a combustion-chamber and a water-heating chamber, a central or inter-

mediate flue-chamber above or beyond the first-named section, passages connecting the combustion-chamber therewith, a flat water- 55 heater D contained in said flue and connected with the water-heating space or chamber of the lower section and an upper water-heating section having an annular flue located therein provided with a water-passage through its 60 center, said flue being connected at one end with an intermediate flue-space and at the other end with an outlet, said water-heating section being connected with an intermediate water-heater and also having a suitable out- 65 let, whereby said annular flue is entirely surrounded by water.

3. In a heater of the character specified, the water-heating section E having within it an annular flue adapted to be surrounded by the 70 contents of the chamber, having at one end an inlet through the bottom of the chamber and at the other end an outlet, the said section also having a water-inlet and an outlet whereby the water in said water-section is 75 enabled to take heat from all sides of an annular body of the products of combustion, as set forth.

4. In a heater of the character specified, the combination of the section A having a fire-pot, 80 a combustion-chamber, a water-heating chamber and passages from the combustion-chamber which are variable as to capacity so as to cause the products of combustion to pass more heavily at one side than at the other, an 85 intermediate flue-chamber, a water-heating shell contained therein connected with the water-chamber of the first section and a third water-heating section having a circular, horizontally-arranged flue of large area therein 90 provided at one end with an opening through the bottom of the chamber to the intermediate flue-chamber and at the side of said chamber opposite that through which the other portion of the products of combustion 95 enter it, the said circular flue having at its other end an outlet and the said last-named water-chamber being connected with the intermediate water-chamber and having an outlet.

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Witnesses:

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 J. M. DOLAN.