

No. 706,846.

Patented Aug. 12, 1902.

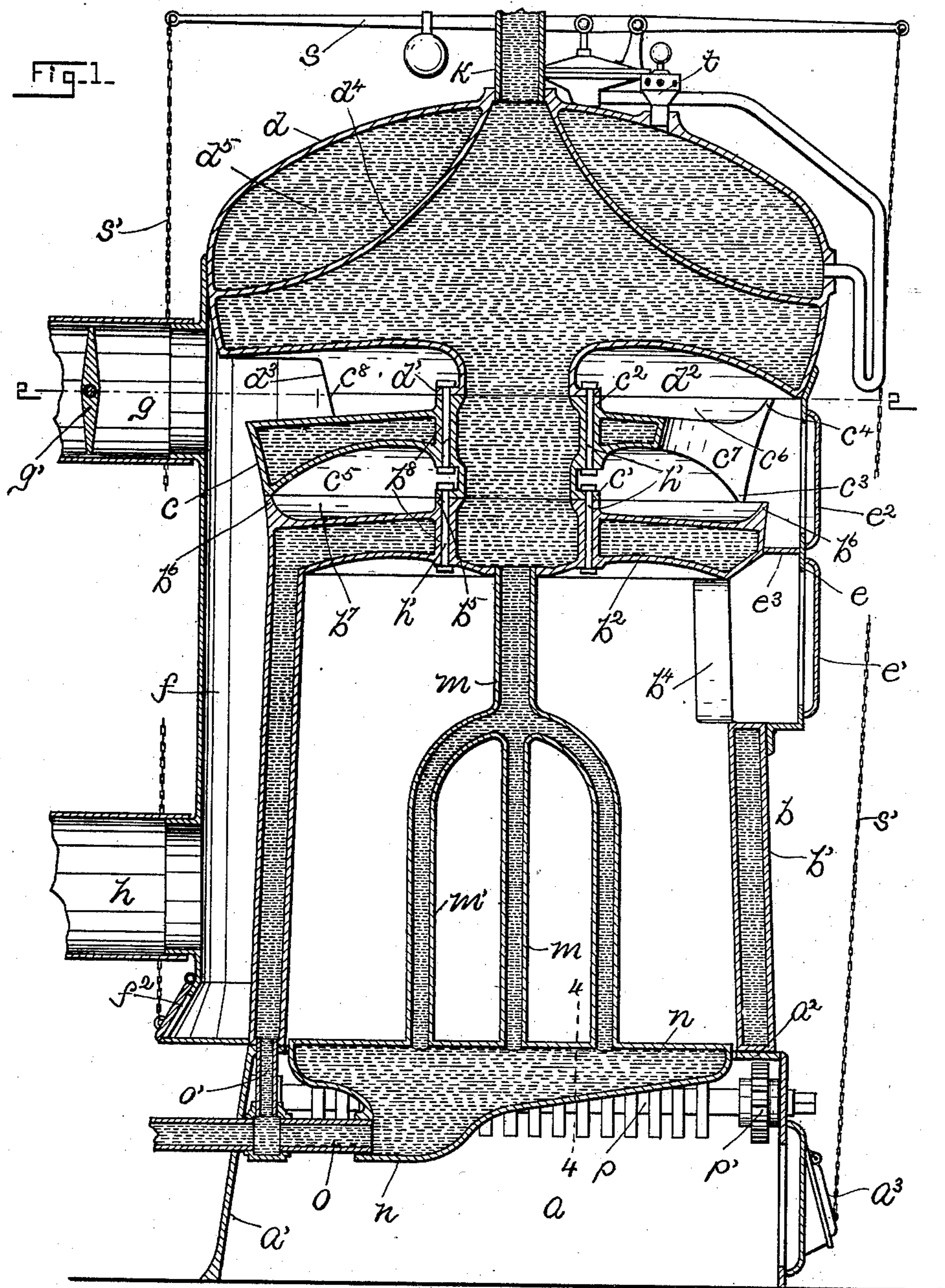
W. H. PAGE.

STEAM GENERATOR OR HOT WATER HEATER.

(Application filed Oct. 22, 1901.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES

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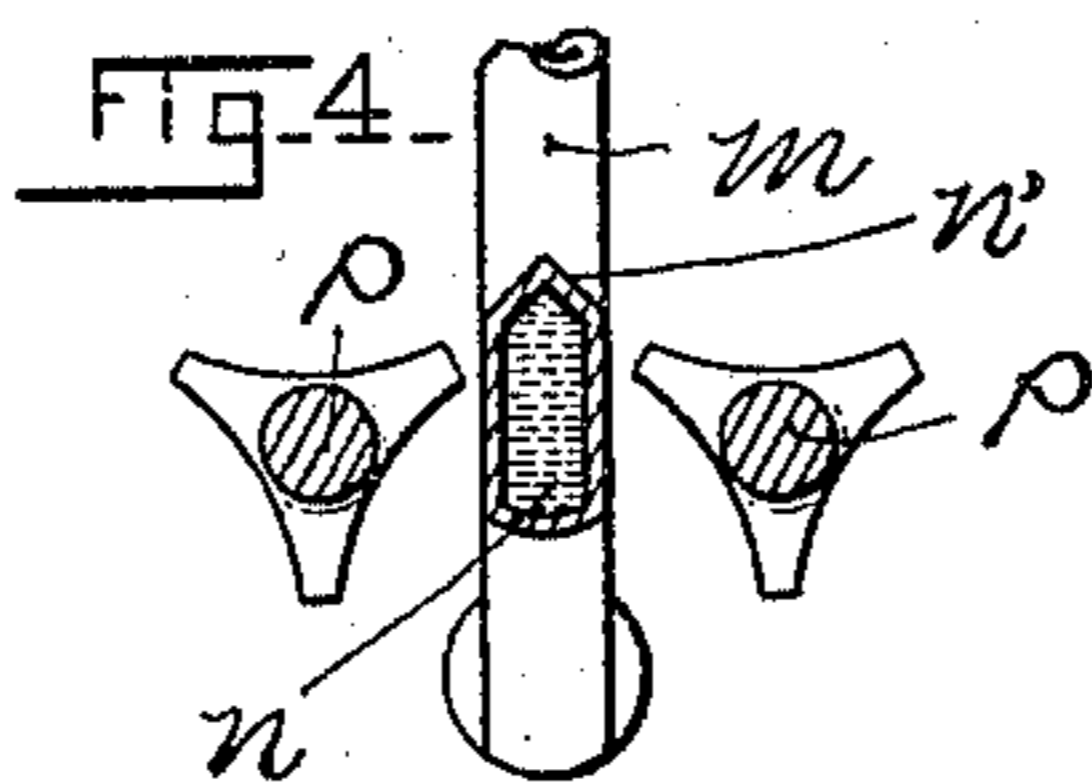
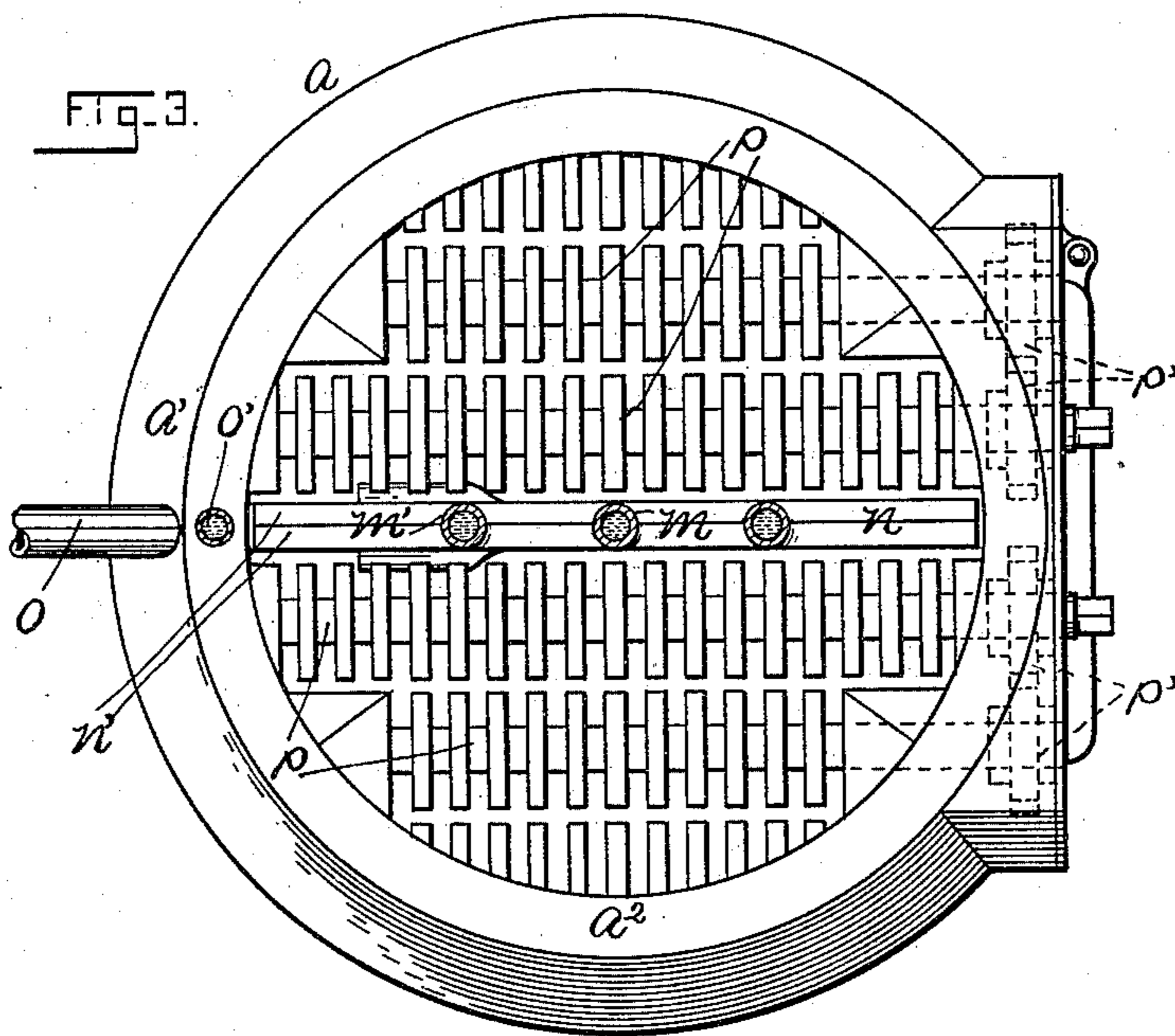
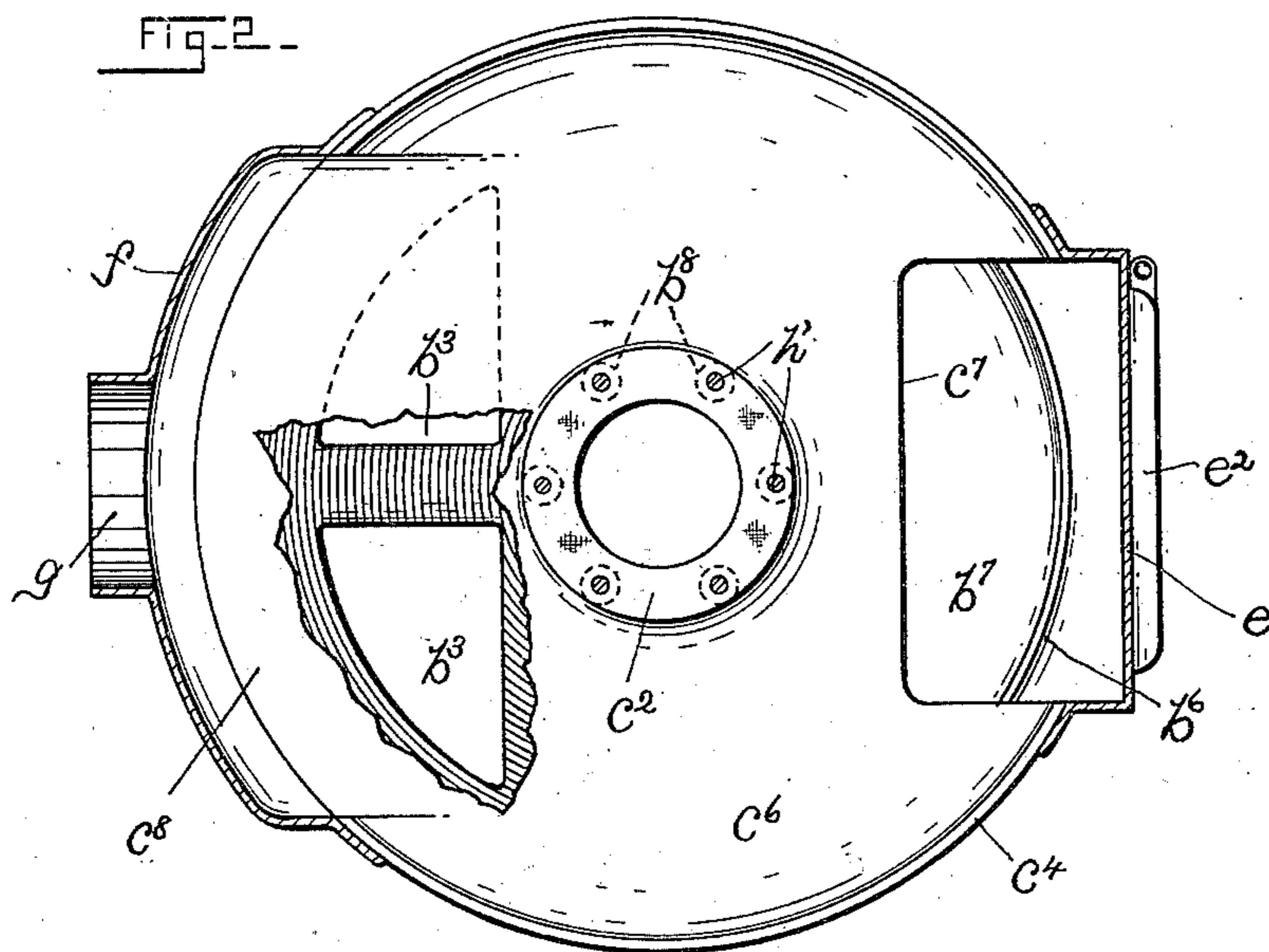
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(Application filed Oct. 22, 1901.)

(No Model.)

2 Sheets—Sheet 2.



WITNESSES

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UNITED STATES PATENT OFFICE.

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STEAM-GENERATOR OR HOT-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 706,846, dated August 12, 1902.

Application filed October 22, 1901. Serial No. 79,545. (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, State of Connecticut, have invented certain new and useful Improvements in Steam-Generators or Hot-Water Heaters, of which the following is a full, clear, and exact description.

This invention is in steam-generators and hot-water heaters of the vertical sectional class commonly used in house-heating. A heater of the class referred to similar in general appearance and construction to that of this present application is shown and described in Letters Patent No. 668,841, issued to me on the 26th day of February, 1901, and reference may be had to the same for a more detailed illustration and description of such heaters than is deemed necessary in connection with this present application.

The immediate purpose of this invention, like that of the said earlier patent, is to provide a heater in which the water shall be so presented to the furnace-fire as to receive the greatest benefit and influence from the caloric products of the said fire.

In addition to the purpose of this invention as just recited the newly-invented heater is so constructed that its water capacity is greater and a larger body of water is presented to the influence of the fire than is the case in many, if not all, other heaters having a fire-pot of corresponding capacity.

Incidentally my newly-invented heater is so constructed as to provide unobstructed upward passage for the water, means whereby steam is quickly generated, and certain other features of improvement, as hereinafter fully described and as shown in the annexed drawings.

My newly-improved heater is made up of four principal parts or sections which are adapted to be assembled in the following-named order in the building up or mounting of the heater: The base or ash-pit section receives thereon the boiler-section, and the latter in turn supports the intermediate section, upon which latter the dome or top section of the heater is mounted. The several heater-sections are each adapted to be cast as a single structure. They are circular in plan view

and are arranged concentric to the vertical central line of the heater. The said sections are secured together, as hereinafter explained, and, with the exception of the ash-pit section, are provided with water-space, through which the water may freely circulate. The boiler, intermediate, and dome sections are also so formed as to provide passage-ways or flues through which the fire and its caloric products pass in such manner as to best act upon the water to effect the heating of the latter.

The drawings forming a part of this application are provided to assist in explaining my invention, and they illustrate the same, as follows:

Figure 1 is a central vertical sectional view of a heater of the newly-invented construction. Fig. 2 is a cross-sectional view taken on the line 2 2 of Fig. 1, the said Fig. 2 being broken away in part to better disclose the construction of the heater. Fig. 3 is a plan view of the ash-pit section of the heater. Fig. 4 shows in vertical section on the line 4 4 of Fig. 1 an important feature of this invention, hereinafter fully described.

Referring to the drawings, the letter *a* denotes the ash-pit section as a whole; *b*, the boiler-section; *c*, the intermediate section, and *d* the dome-section.

The letter *a'* denotes the wall of the ash-pit section *a*, the said wall being a slightly-tapering cylindrical shell having a circular plate *a'*² at its upper edge, upon which the boiler-section is received.

The boiler-section *b* consists of a slightly-tapering cylindrical hollow shell *b'*, whose smaller (upper) end is closed over by a hollow crown-sheet *b'*², excepting where one or more openings *b'*³ are formed in the said crown-sheet. At a point diametrically opposite the just-mentioned openings *b'*³ an opening *b'*⁴ is located in and extends through the circular side wall *b'*, the last-named opening being provided in order that the interior of the boiler-section *b* (the fire-pot) may be reached for the introduction of fuel. The boiler-section *b* is adapted to rest on the ash-pit section, as already mentioned, and the plate *a'*² of the latter is of proper width to receive the lower end of the hollow wall *b'*.

The central portion of the upper face of

the hollow wall b^2 of the boiler-section b is extended somewhat, as at b^5 , and the outer edge of the said upper face of the wall b^2 is formed with a circular flange b^6 , thus providing a circular depression or concavity surrounding the said raised central portion b^5 .

The intermediate section c consists of a circular shallow chamber whose opposite faces are provided with extended central portions c^1 c^2 , adapted, respectively, to engage the raised central portion b^5 of the boiler-section b and a similar formation on the dome-section, as hereinafter more fully described. The said opposite faces of the intermediate section c also have formed on their outer circular edges flanges c^3 c^4 , thus providing circular recesses c^5 c^6 , encircling, respectively, the extended portions c^1 c^2 of the intermediate section c . The circumferential edge of the intermediate section c is cut away, as at c^7 , to provide a draft-passage, as hereinafter explained, and at a point diametrically opposite thereto the flange c^4 is cut away for a considerable distance, as at c^8 , to provide an exit for the waste products of combustion.

The dome-section d is shaped substantially as shown in the drawings and midway its height bulges out and overhangs slightly the fire-pot section. The lower portion of the dome-section d registers with the confronting face of the intermediate section. The said dome-section has on its lower side a centrally-raised portion d^1 , surrounded by a circular depression d^2 , whose circular outer edge is adapted to register with the flange c^4 of the intermediate section c . The depression d^2 is cut away, as at d^3 , to register with the cut-away portion c^8 of the flange c^4 of the intermediate section.

The various sections of the heater are assembled as described and in the manners shown in the drawings, and when thus assembled it will be seen that the depression b^7 of the boiler-section b confronts the depression c^5 of the intermediate section c , thus forming a circular chamber or open space between the boiler and intermediate section of the heater. In like manner the depression c^6 of the intermediate chamber forms, with the depression d^2 of the dome-section, a similar chamber or open space between the said intermediate and dome sections. The heater-sections are so assembled that the opening b^4 of the boiler-section b and the cut-away portion or opening c^7 in the intermediate section c are at the front side of the heater, while the registering cut-away portions c^8 d^3 of the intermediate and dome sections are at the rear side of the heater. A box or casing e is located at the front side of the heater, inclosing the openings b^4 c^7 , which said box is provided with doors e^1 e^2 , the former of which registers with the opening b^4 of the boiler-section b and is the feed-door of the heater, while the last-named door e^2 provides access to the open spaces above and below the intermediate sec-

tion c to permit the cleaning of said spaces. The said opening formed by the cut-away portions c^8 d^3 of the intermediate and dome sections is inclosed by a smoke-box f , which box is located at the rear side of the heater and extends from the dome-section d to the lower end of the boiler-section b . Two exits of pipe form are provided from the smoke-box f , one of which, g , leads from the upper portion of the said box and the other, h , from the lower portion of the same.

The boiler-section b and the intermediate section c are secured together at their central portions, as are also the intermediate and dome sections, by means of bolts h' , which latter are preferably arranged concentric with the vertical central line of the heater, and legs or posts b^3 are preferably cast in the hollow wall b^2 of the boiler-section and in the intermediate section c , through which the said bolts h' are passed, the said legs b^3 serving also to strengthen the wall b^2 and the intermediate section c .

The confronting and engaging central portions of the boiler, intermediate, and dome sections of the heater have openings that register with each other, thus providing a central water-passage leading from the wall b^2 of the boiler-section to the dome-section.

The lower portion of the space inclosed by the circular hollow wall of the boiler-section b is utilized as the fire-pot of the heater, and from the said fire-pot smoke and other products of combustion pass upward through the openings b^3 in the wall b^2 of the boiler-section into the space between the boiler and the intermediate sections. The smoke then passes to the front side of the heater and through the opening c^7 into the open space between the intermediate section c and the dome-section d . At the rear of the heater the said products of combustion pass from the space between the intermediate and dome sections into the smoke-box f . Should a direct draft be desired, the damper g' in the pipe g is adjusted to allow the said smoke and other products to pass out from the upper end of the fire-box f ; but should a more indirect draft be desired the damper g' is adjusted to close the passage through said pipe g , when the smoke, &c., must pass downward in the box f and through the pipe h . A division-wall e^3 is located in the box e to prevent communication from the fire-pot through the said box e into the open space between the intermediate and dome sections of the heater without passing first through the opening b^3 into the open space between the boiler-section and the intermediate section.

The fire within the fire-pot and the caloric products arising therefrom passing upward through the heater, as described, effect the heating of the water in the several sections of the heater, causing the said heated water to flow upward into the dome-section, from which an outlet is found for the heated water

or the steam, as the case may be, through the pipe k . To insure the very rapid heating of the water, a water-passage m of pipe form is located concentric with the vertical central line of the heater and leading downward from the central portion of the wall b^2 through the fire-pot to a hollow water-bar n , located in the ash-pit a . The passage m and the water-bar n are adapted to be cast as a single structure, and, if desired, branch passages or arms m' may be provided connecting the passage with the bar n . The upper end of the pipe or passage m is adapted to be screwed into or otherwise secured to the hollow wall b^2 and provides a water-passage from the water-bar n , leading centrally through the fire-pot to the central water-passage connecting the hollow-wall b^2 with the dome d . The bar n is of slightly-less length than the diameter of the fire-pot, and the end thereof at the rear side of the boiler is provided with pipe connection o , by means of which water is introduced into the said bar, and from the said pipe o through suitable pipe connection o' the boiler-section b is also supplied. It will be seen that the pipe m and its branches m' lead directly upward through the center of the fire and are subjected to very great heat, so that the water introduced thereinto from the bar n will be quickly heated and flow upward very rapidly through the said pipes, joining at the central portion of the wall b^2 the upwardly-rising heated water in the circular hollow wall b' of the boiler-section, the latter being supplied through the pipe connection o' . The centrally-located passage m , leading through the center of the fire-pot, makes it possible to utilize the very hottest portion of the fire for the purpose of heating the water within the said passage, and because of the comparatively small volume of water located in the said passage the heating of the same is very quickly accomplished and its flow rapid.

While the water-bar n is shown as connected only at one end with the boiler-section b , it will be apparent that such connection could be made at both ends should it be desired so to do.

The water-bar n and the water-passages m m' , as already mentioned, are formed as a single structure that may be readily placed in position or removed from the heater. The water-bar n also forms the central portion of the grate of the heater, the same extending parallel with the grate-bars p , located on each side thereof, the upper edge of the said bar having beveled faces n' to deflect the fuel onto the said grate-bars. The grate-bars p on each side of the water-bar n are connected by means of the usual gears p' , mounted upon their shanks, certain of said shanks being

extended and squared to receive a suitable wrench.

By means of a shell d^4 , cast in the dome d , a chamber d^5 is provided, which is supplied with water adapted to be heated by the water in the main chamber of the dome. The water within the chamber d^4 serves by expansion, when heated to a given temperature, to act upon an automatic draft-regulator s , which acts, through the chains s' , to close a draft a^3 in the ash-pit door and also open a cold-air check f^2 in the fire-box when it is desired to shut off the heater or to reverse the just-named operation when it is desired to open the heater.

The reference-letter t denotes a suitable safety-valve for the water-chamber d^5 .

As a whole the improvements herein described do not increase materially the cost of producing the class of heaters to which they relate, while at the same time the introduction of the intermediate chamber c increases the capacity of the heater and with the water-bar n and the passages m m' render the rapid heating of the water possible, and they utilize the fire to the very best advantage. It should also be observed that the separate (expansion) chamber d^5 within the dome can be connected with a water-boiler for culinary purposes if not used to regulate the draft.

Having thus described my invention, I claim—

1. In combination, an ash-pit section, a fire-pot section mounted thereon, a hollow water-bar n extending across said ash-pit section, and a water-passage of pipe form located substantially centrally of the said fire-pot and connecting the said water-bar with the water-chamber over the said fire-pot.

2. In combination, a water-jacketed fire-pot section, a hollow water-bar located below said fire-pot section, a water-passage of pipe form located in the fire-pot and connecting the said water-bar with the water-chamber over the fire-pot, and branch pipes m' connecting the said water-bar with the said central water-passage.

3. In combination, an ash-pit section, a superimposed water-jacketed fire-pot section, and a grate supported in and by the ash-pit section, said grate being formed of fixed hollow water-bar n and rocking sections, substantially as herein set forth, and a water-passage of pipe form located in the fire-pot and connecting the said water-bar n with the water-chamber over the fire-pot.

Signed at Norwich, Connecticut, this 9th day of October, 1901.

WILLIAM H. PAGE.

Witnesses:

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