

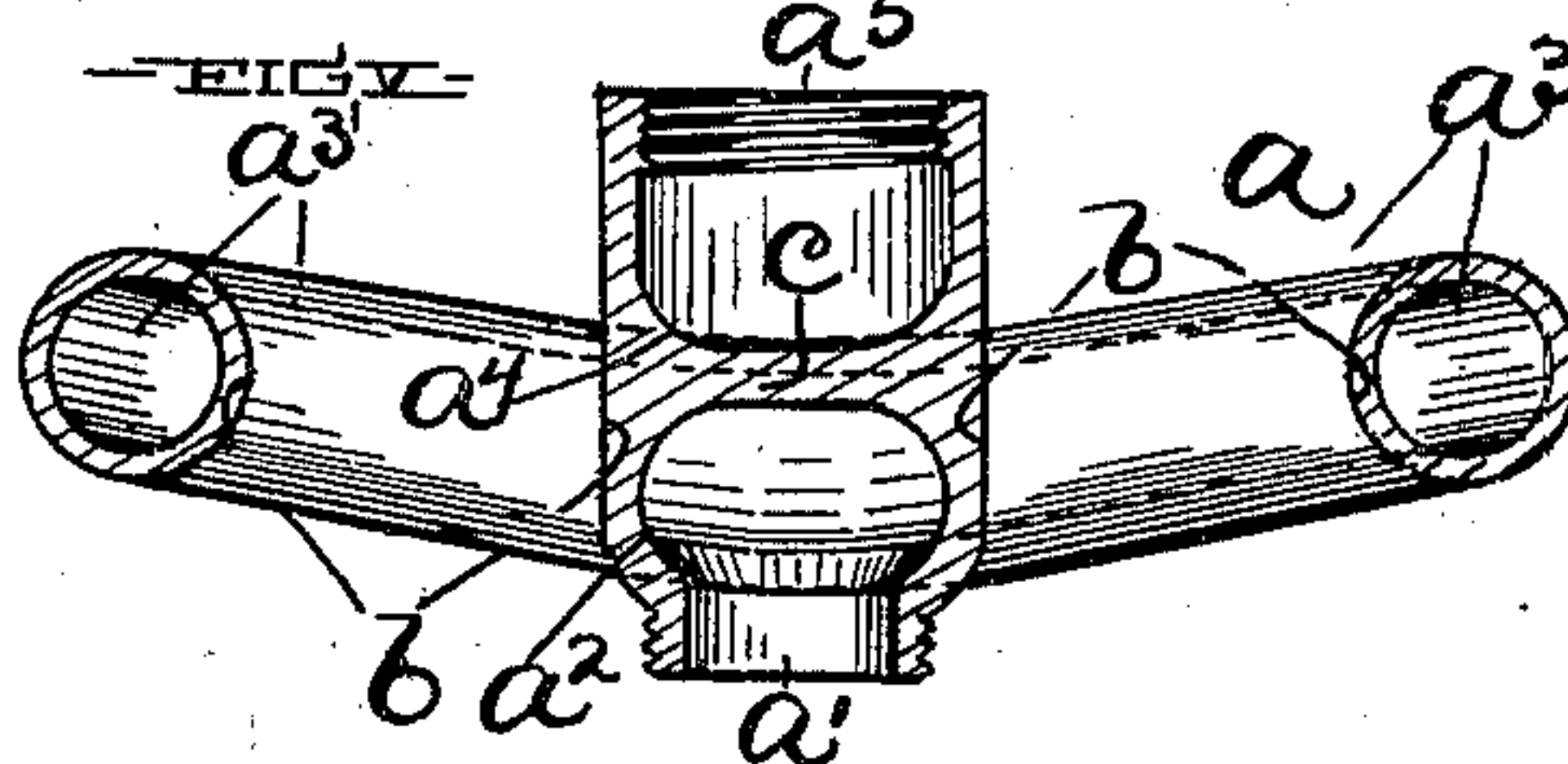
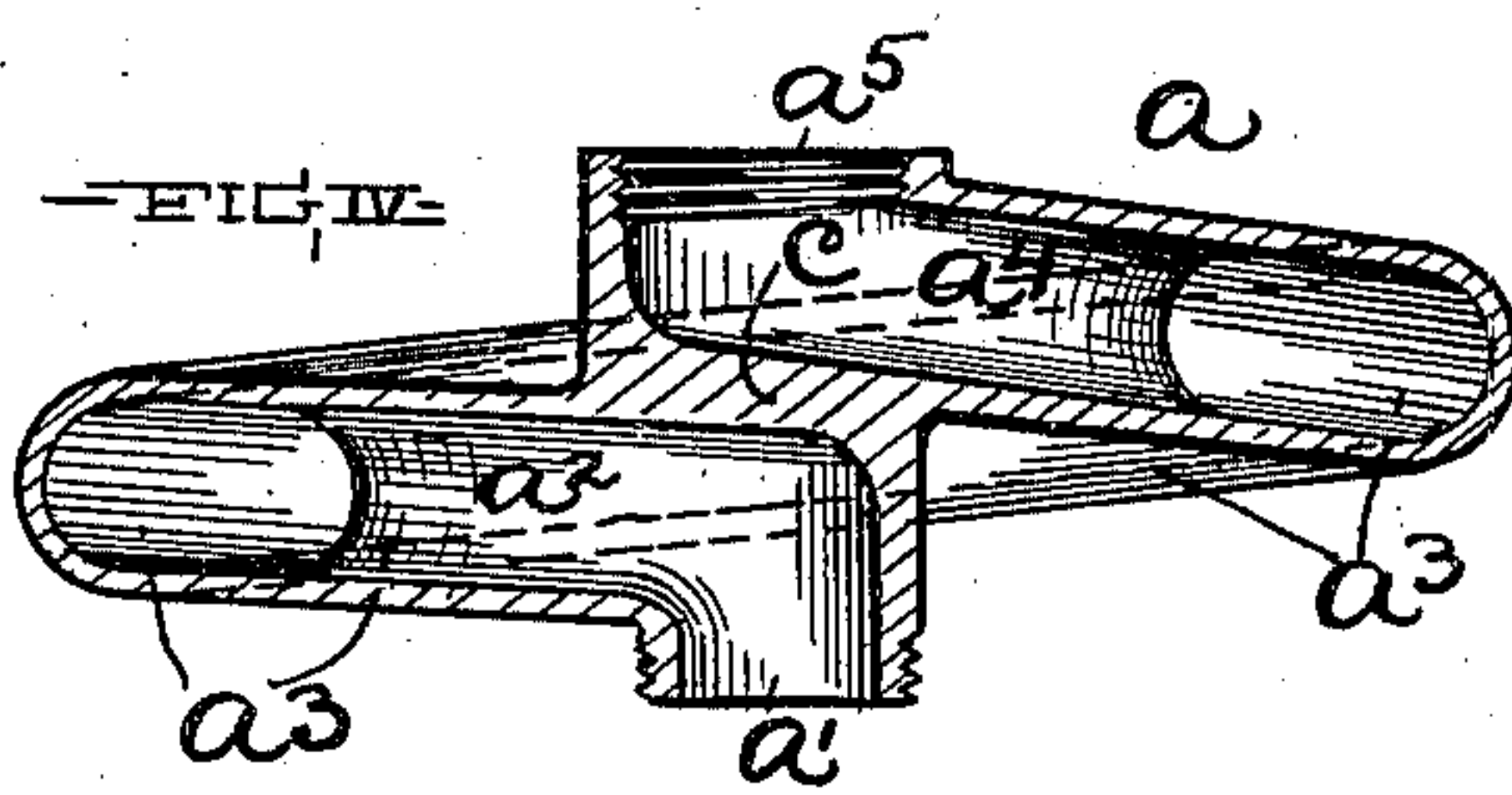
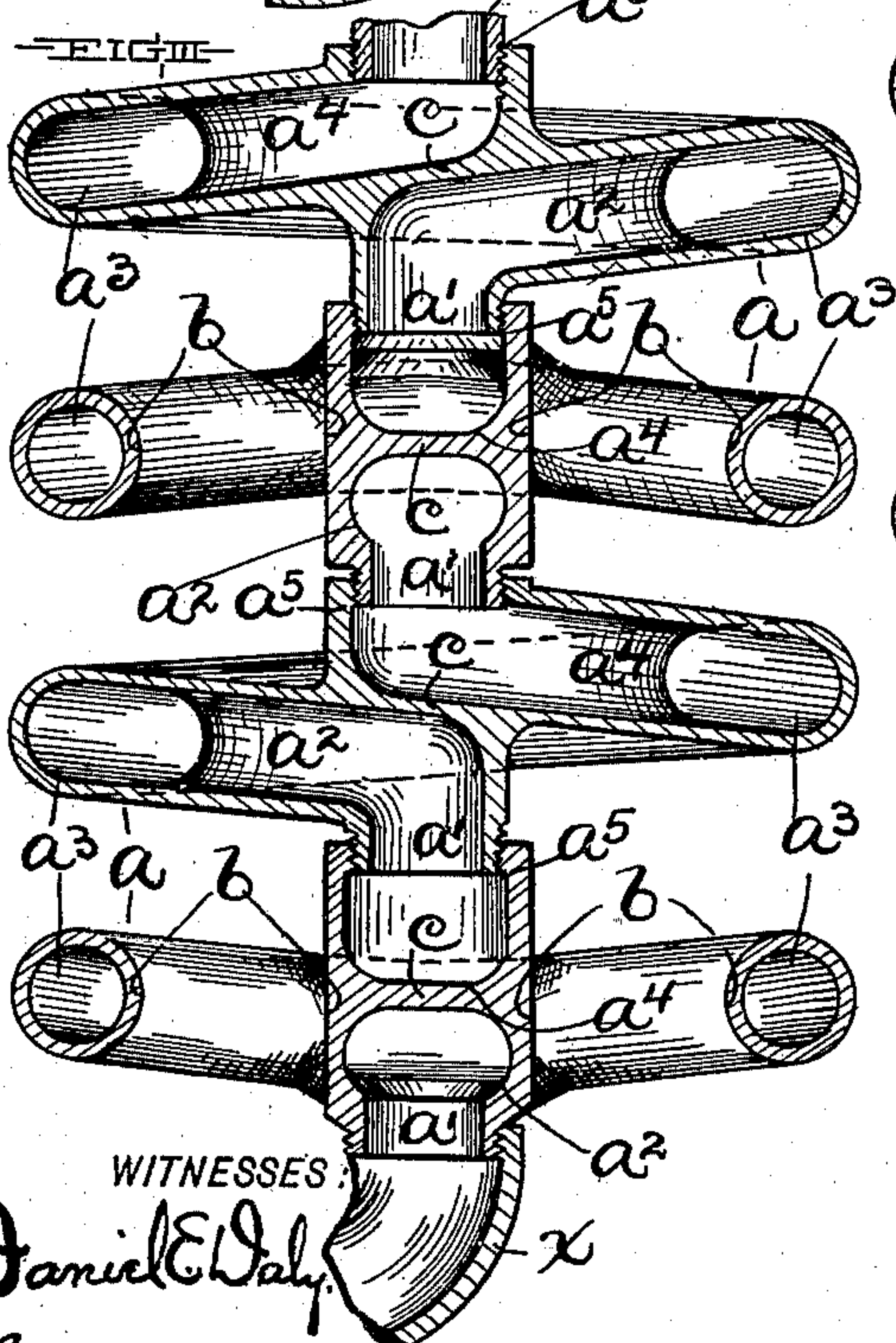
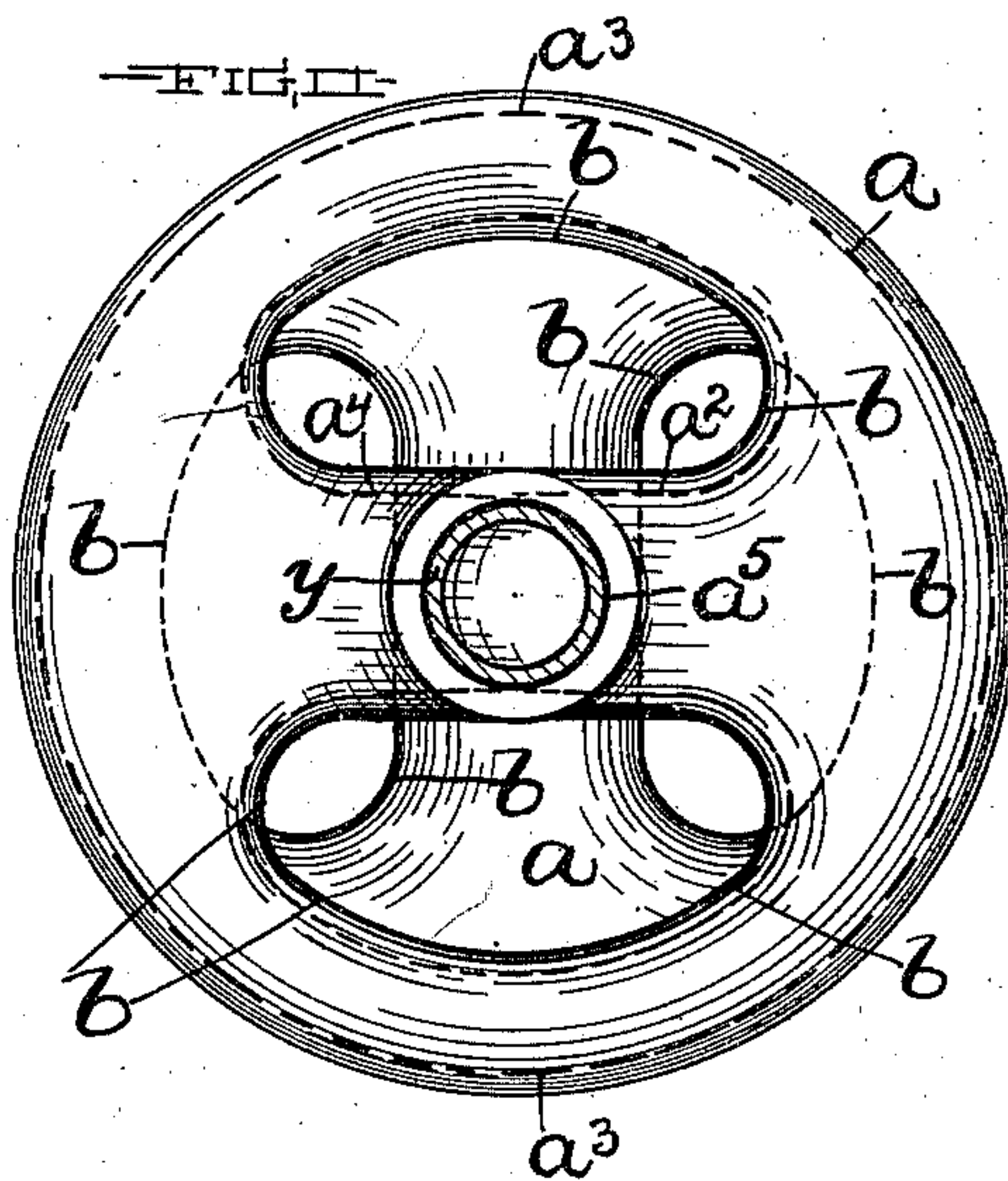
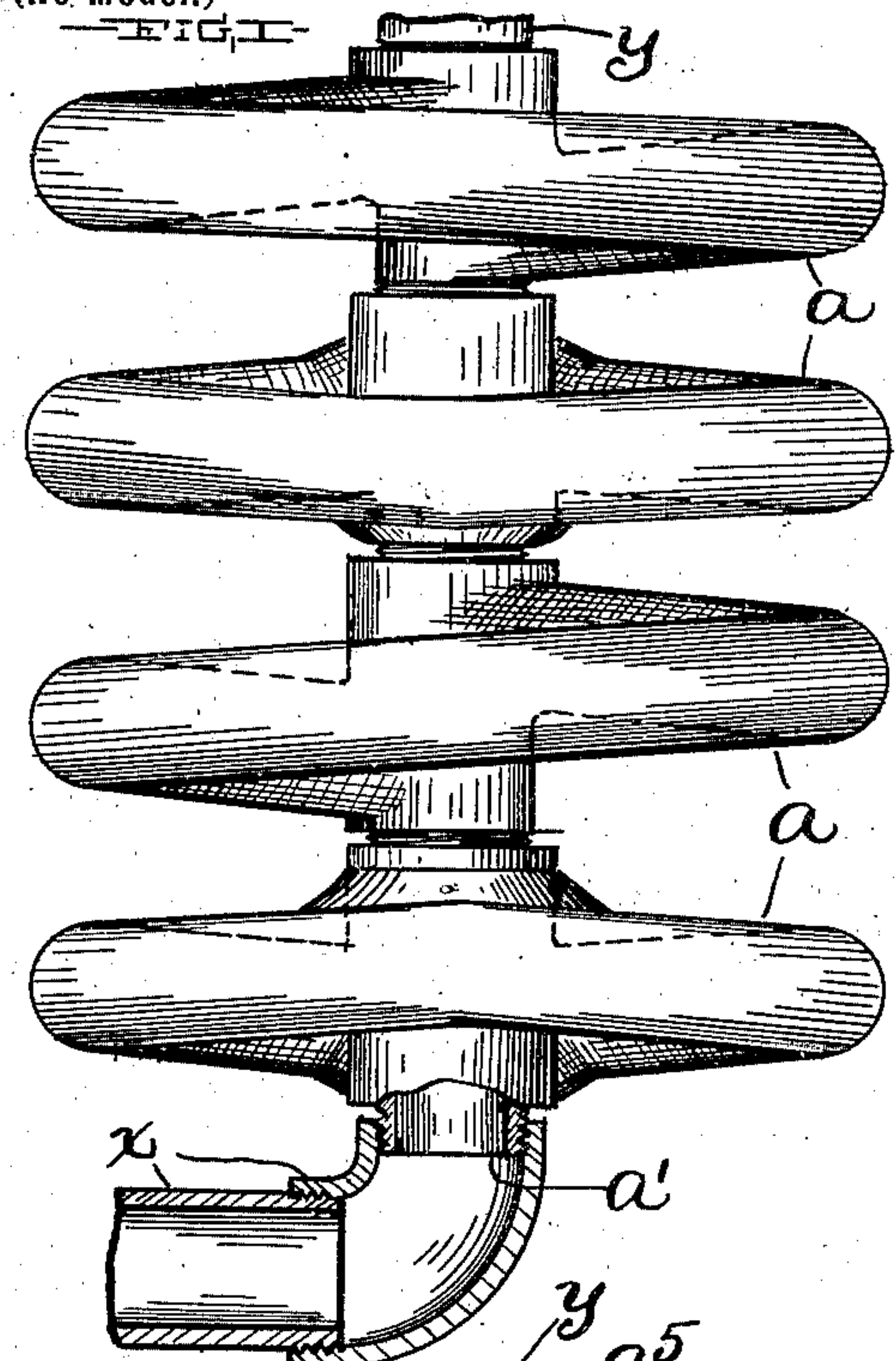
No. 709,006.

Patented Sept. 16, 1902.

B. A. GEURINK.
STEAM GENERATOR OR WATER HEATER.

(Application filed Apr. 7, 1902.)

(No Model.)



WITNESSES,

Daniel E. Daly,

Victor C. Lynch.

INVENTOR

Bernard A. Geurink

BY

Spencer & Waver
his ATTORNEYS

UNITED STATES PATENT OFFICE.

BERNARD A. GEURINK, OF CLEVELAND, OHIO.

STEAM-GENERATOR OR WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 709,006, dated September 16, 1902.

Application filed April 7, 1902. Serial No. 101,734. (No model.)

To all whom it may concern:

Be it known that I, BERNARD A. GEURINK, a citizen of the United States of America, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Steam-Generators or Water-Heaters; and I 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 pertains to make and use the same.

My invention relates to improvements in steam-generators or water-heaters, and more especially to the construction and relative arrangement of the sections comprising the water-circulating and flue-forming portion of the heater.

The object of this invention is to construct the water-circulating portion of the heater of interchangeable and corresponding sections arranged compactly at different elevations, respectively, and having the passage-ways formed therein sloping upwardly toward their discharging ends and arranged and connected to form a continuous passage-way from the inlet of the lowermost section to the outlet of the uppermost section.

Another object is to so relatively arrange the fluid-conducting passage-ways of each water-circulating section and to so place each section relative to the adjacent section or sections that products of combustion employed in heating the said sections shall not only be most economically utilized to the best advantage, but that the water fed to the said sections is quickly heated and most advantageously circulated.

Another object of my invention is to render the construction simple and durable and convenient in the assemblage of the parts and for making repairs.

With these objects in view my invention consists in certain features of construction and combinations of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure I is a side elevation, partly in section, of the water-circulating and flue-forming portion of a steam-generator or water-heater embodying my invention. Fig. II is a top plan of the same. Fig. III is a side elevation in central vertical section. Figs. IV and V are central

vertical sections taken at right angles to each other of a water-circulating section of the heater.

The water-circulating portion of a steam-generator or water-heater embodying my invention is composed of several cast-metal sections *a*, compactly arranged, respectively, in a horizontal plane at different elevations, respectively, and in line vertically, and the heater illustrated in the above-mentioned drawings has four of the said sections *a*, which are circular in plan, correspond in construction, and are interchangeable. Each section *a* is provided at the bottom and centrally with an internally-screw-threaded vertical induction-port or water-inlet *a'*, which depends below the remainder of the said section. Each section *a* is provided at the top and centrally with an upwardly-discharging induction-port or water-outlet *a''*, which is arranged in line vertically with the induction-port or water-inlet *a'* of the said section, which port or outlet *a''* extends above the remainder of the said section, and the surrounding wall of the said port or valve *a''* has external screw-threads corresponding with the internal threads of the aforesaid port or inlet *a'*, so that each section *a* can be screwed at its water-inlet *a'* onto the section *a* next below at the water-outlet *a''* of the last-mentioned section. Each section *a* is provided with two flue-forming apertures or openings *b* and *b'*, which extend vertically through the said section at opposite sides, respectively, and externally of the ports *a'* and *a''* of the said section. Each section *a* is provided interiorly with four passage-ways *a¹*, *a²*, *a³*, and *a⁴*, which slope, respectively, upwardly toward their discharging end. The passage-ways *a¹* and *a²* are formed at the outer side of the different flue-forming openings *b*, respectively, of the said section *a*, and the passage-ways *a³* and *a⁴* are formed between the said openings *b* at opposite sides, respectively, of the ports *a'* and *a''* of the said section. The passage-way *a¹* communicates at its lower and inner end with the induction-port *a'* of the said section *a* and discharges at its upper and outer end into the lower ends of the passage-ways *a³*, which communicate at their upper and discharging ends with the lower end of the passage-way *a⁴*, which

communicates at its upper and discharging end with the eduction-port a^5 of the said section. Each section is provided between its passage-ways a^2 and a^5 with an imperforate partition c , which prevents direct communication between the said passage-ways and causes all of the water or fluid conducted to the said section at its induction-port a^1 to pass, first, upwardly through the aforesaid passage-way a^2 between the two flue-forming openings b of the said section, thence upwardly through the passage-ways a^3 around the outer sides of the said openings b , and thence upwardly through the aforesaid passage-way a^5 between the said openings b to the eduction-port a^5 of the said section. Each section a has such arrangement relative to the adjacent section or sections a that the flue-forming apertures or openings b of each section a are out of line with the flue-forming openings b of the adjacent section or sections a , so that the path of the products of combustion employed in heating the said sections and passing upwardly through the openings b of the lowermost section a is circuitous, and the said products of combustion during their upward passage from the openings b of the said lowermost section are distributed and circulate around all portions of the sections a , and the said upward passage of the products of combustion is retarded or rendered sufficiently slow to utilize them most economically and to the best advantage. It will be observed also that the construction of the sections a is simple and durable, that packing of joints in the assemblage of the sections a is dispensed with, and that the said sections a are readily assembled and as quickly and conveniently separated for repairs, renewal, and cleaning.

In Figs. I and III a water-supply pipe x is shown connected with the induction-port a^1 of the lowermost section a , and in the same figures and in Fig. II is shown a pipe y for conducting steam or hot water from the eduction-port a^5 of the uppermost section a .

I would here remark that my improved heater comprises several sections arranged at different elevations, respectively, and each section of the heater essentially has the following: an induction-port or fluid-inlet arranged at the bottom and centrally of the section, an upwardly-discharging eduction-port or fluid-outlet arranged at the top and centrally of the section a suitable distance above the induction-port, a lower sloping passage-way a^1 , an upper sloping passage-way a^4 , and two intermediate sloping passage-ways a^3 and a^3 , with the lower passage-way a^1 and the upper passage-way a^4 arranged at opposite sides, respectively, of the aforesaid ports, with the lower passage-way a^1 extending laterally outwardly and upwardly from the induction-port, with the upper passage-way a^4 arranged a suitable distance above the upper end of the lower passage-way a^1 and extending lat-

erally outwardly and downwardly from the eduction-port, and with the two intermediate passage-ways a^3 and a^3 arranged at opposite sides, respectively, of the lower and upper passage-ways a^1 and a^4 and connecting the upper end of the lower passage-way a^1 with the lower end of the upper passage-way a^4 and gradually sloping upwardly from the lower passage-way a^1 , so that fluid passing upwardly from the said lower passage-way a^1 is divided at the upper end of the said passage-way between the intermediate passage-ways a^3 and a^3 and passes continuously upwardly in its passage upwardly through the heater.

What I claim is—

1. A heater of the character indicated, comprising several sections arranged at different elevations respectively, and each section provided with an induction-port or fluid-inlet arranged at the bottom and centrally of the section and an upwardly-discharging eduction-port or fluid-outlet arranged at the top and centrally of the section, and each section, except the lowermost section, communicating, at its induction-port, with the eduction-port of the section next below, and each section also having the following: a lower sloping passage-way, an upper sloping passage-way and two intermediate sloping passage-ways, with the lower passage-way and the upper passage-way arranged at opposite sides, respectively of the ports of the said section, with the lower passage-way extending laterally outwardly and upwardly from the induction-port, with the upper passage-way arranged a suitable distance above the upper end of the lower passage-way and extending laterally outwardly and downwardly from the eduction-port, and with the two intermediate passage-ways arranged at opposite sides respectively of the lower and upper passage-ways and connecting the upper end of the lower passage-way with the lower end of the upper passage-way and gradually sloping upwardly from the lower passage-way.

2. A heater of the character indicated, comprising several sections arranged at different elevations respectively, and each section provided with an eduction-port and an induction-port arranged at the top and bottom respectively and centrally of the section, and each section, except the lowermost section, communicating, at its induction-port, with the eduction-port of the section next below, and adjacent sections having mutually-engaging threads at their communicating ports, and each section also having the following: a lower sloping passage-way, an upper sloping passage-way and two intermediate sloping passage-ways, with the lower passage-way and the upper passage-way arranged at opposite sides respectively of the ports of the said section, with the lower passage-way extending laterally outwardly and upwardly from the induction-port, with the upper pas-

sage-way arranged a suitable distance above
the upper end of the lower passage-way and
extending laterally outwardly and down-
wardly from the eduction-port, and with the
5 two intermediate passage-ways arranged at
opposite sides respectively of the lower and
upper passage-ways and connecting the up-
per end of the lower passage-way with the
lower end of the upper passage-way and grad-

ually sloping upwardly from the lower pas- 10
sage-way.

In testimony whereof I sign the foregoing
specification, in the presence of two witnesses,
this 2d day of April, 1902, at Cleveland, Ohio.

BERNARD A. GEURINK.

Witnesses:

C. H. DORER,

TELSA SCHWARTZ.