

(No Model.)

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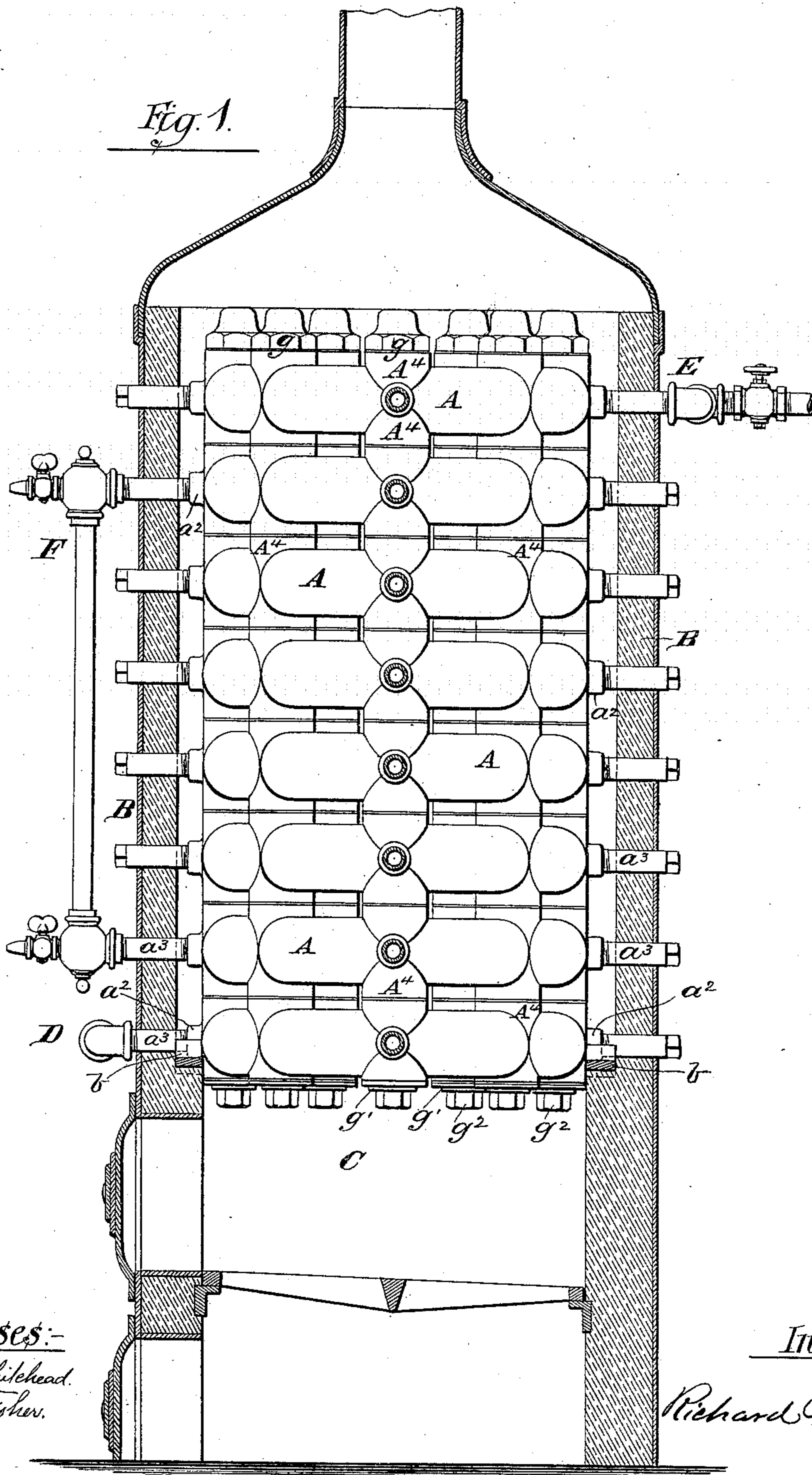
R. PONNAY.

SECTIONAL STEAM BOILER.

No. 376,257.

Patented Jan. 10, 1888.

Fig. 1.



Witnesses:-

Louis M. Whitehead.
Chas. B. Fisher.

Inventor:-

Richard Ponnay

by: Dayton & Poole
Attorneys:-

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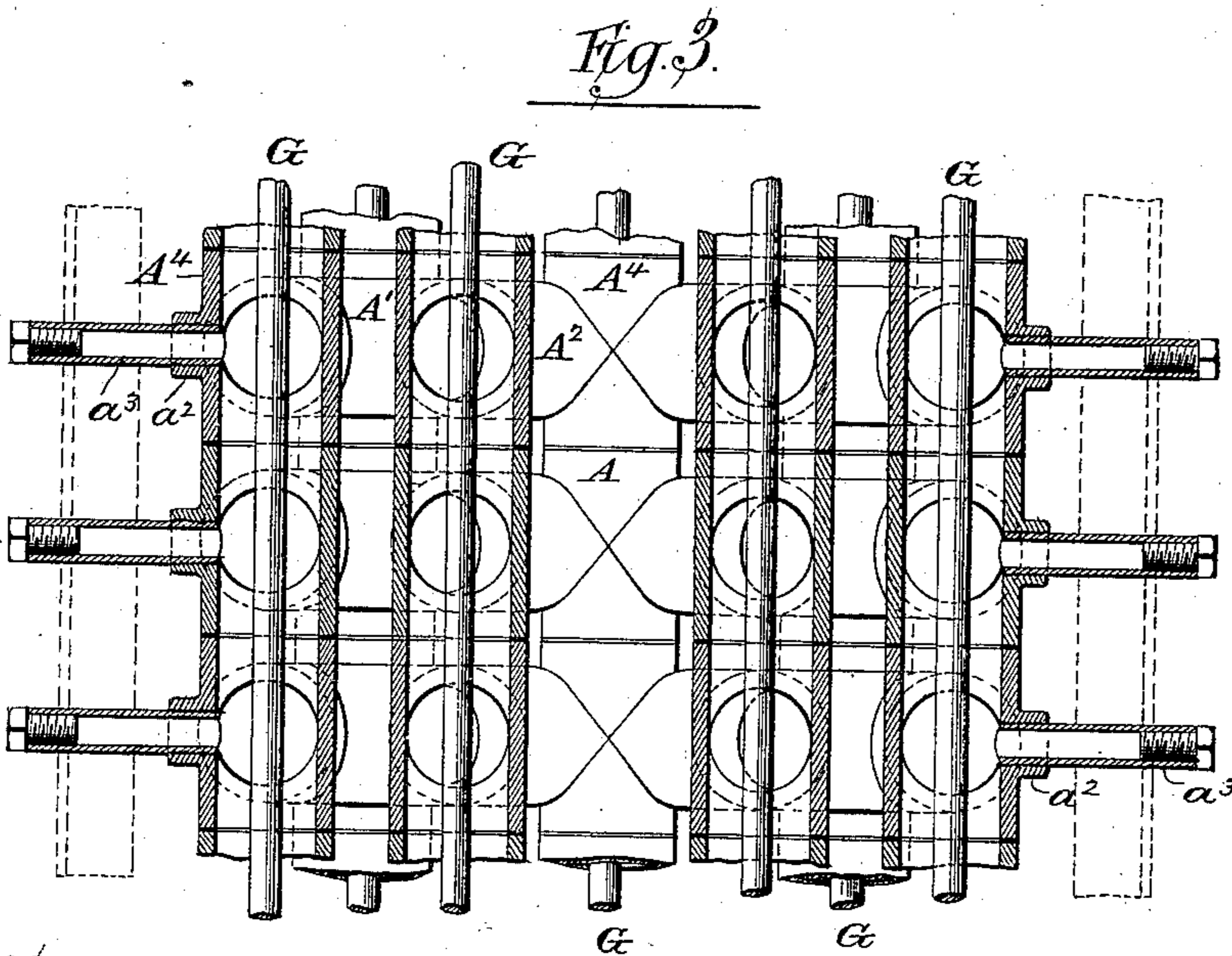
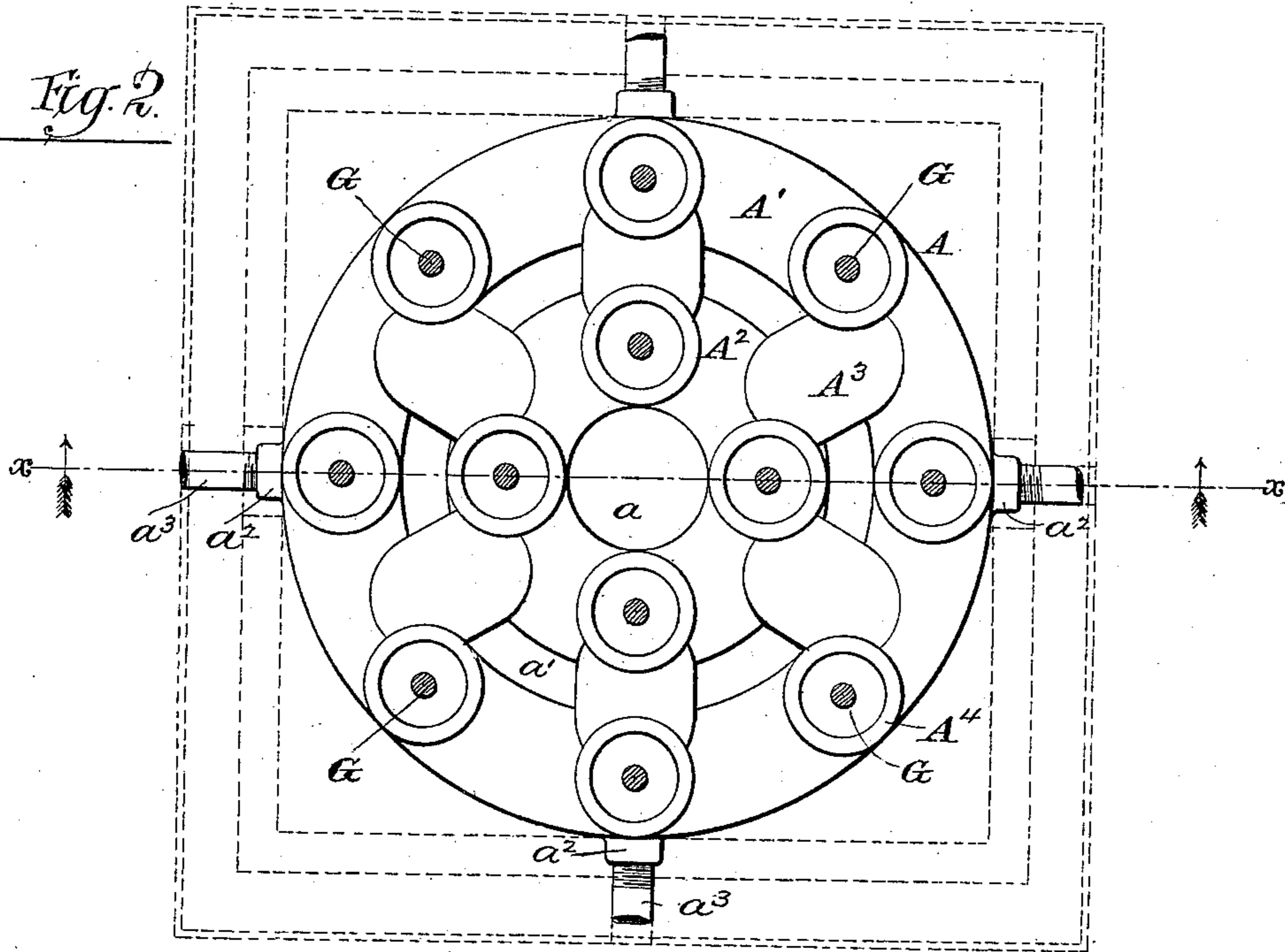
2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

RICHARD PONNAY, OF CHICAGO, ILLINOIS, ASSIGNOR OF TWO-THIRDS TO
CHARLES H. SMITH AND JOHN HEWITT, BOTH OF SAME PLACE.

SECTIONAL STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 376,257, dated January 10, 1888.

Application filed June 15, 1886. Serial No. 205,192. (No model.)

To all whom it may concern:

Be it known that I, RICHARD PONNAY, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful
5 Improvements in Sectional Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked
10 thereon, which form a part of this specification.

This invention has reference to improvements in cast-iron sectional steam-boilers, and has for its object to provide a practical construction in such boilers which shall have the
15 advantage of greater strength, fewer joints, less cost, freer circulation, and diminished liability to leakage as compared with similar structures heretofore made.

More particularly stated, the invention relates to that class of cast-iron sectional boilers in which the boiler is formed of a series of horizontal annular chambers having radial tubular connections between different parts of each section, and in which each section has
25 communication with adjacent sections through suitable vertical passages formed in the casting.

Referring to the accompanying drawings, Figure 1 is an elevation of a sectional boiler mounted in an upright casing or housing,
30 which is broken away in a vertical central plane. Fig. 2 is a plan view of one of the boiler-sections; and Fig. 3 is a fragmentary central vertical section of a boiler containing my improvements, taken in the line $x x$ of
35 Fig. 2.

A A are the several sections of the boiler, said sections being shown in the drawings arranged each in a horizontal plane and piled one above the other.

40 B is the housing or furnace setting, of which C is the fire-box.

D is the feed-water-inlet pipe.

E is the steam-supply pipe, and F is the water-gage.

45 Each section of the boiler consists of two annular and concentric cast chambered rings, $A' A^2$, lying in the same horizontal plane and connected with each other by radial tubes A^3 .

Each of the said chambered rings $A' A^2$ is circular in section, and both of said rings, together
50 with the radial connecting-tubes A^3 , are cast in one piece by means of suitable cores, thus avoiding all joints in the section itself.

Upon both the top and bottom of each ring A' and A^2 of each section are cast opposite
55 short open tubular bosses, A^4 , desirably of the same or nearly the same interior diameter as the rings $A' A^2$ themselves. As shown in the drawings, and as desirably constructed, four of the said bosses project from each upper and
60 lower face of the inner ring, A^2 , and eight from each corresponding face of the outer ring, A' ; but this number may be varied without departure from my invention. The cast sections thus formed of the two rings $A' A^2$ and
65 radial connections A^3 present a central vertical opening or passage, a , and other passages, a' , bounded by the rings and radial tubes, through which passages products of combustion may rise from the fire-box C. A space or
70 spaces are also provided external to the ring A' and within the setting B, through which said products of combustion may pass, as shown, or otherwise.

Each section A is provided with a boss or
75 bosses, a^2 , cast upon its outer periphery, some of which may be tapped to receive the connections for the feed and supply pipes, water-gage, &c., or all of them may be fitted with
80 pipes a^3 , which project through the housing and are plugged at their outer extremities, as shown, for the purpose of blowing out the boiler or of making additional connections as required.

The double annular cast section described
85 requires only to have the ends of the short open tubes A^4 dressed off in a lathe to fit said section to be joined with others in making up a boiler, and the joints between the meeting
90 ends of said tubes A^4 of adjacent sections, when placed one upon the other, require only the insertion of an annular packing of paper or other suitable material to make a close and
95 reliable joint after the sections have been properly clamped together.

For the purpose of binding a suitable num.

ber of sections A together to form a boiler, vertical bolts G G are employed, being passed through the openings formed by the tubes A⁴ from the bottom to the top of the boiler. Suitable caps, g g', are applied to the open, upper, and lower tubes, A⁴, between the heads and nuts of the bolts, as plainly indicated in Fig. 1.

The entire boiler is supported by the lowermost lugs or bosses, a², resting in suitable sockets, b, placed in the setting B, or by other suitable means.

I am aware that an annular sectional cast boiler has heretofore been proposed in which each section consisted of a single hollow ring having interior cross-tubes intersecting each other centrally at right angles and extending entirely across or from side to side of each section and connecting opposite parts of the same ring, the sections being connected with each other by meeting tubes located in substantially the same position as shown in the accompanying drawings. Such former device differs essentially from that herein shown in the following particulars:

First. Each annular section or chamber was made in two horizontally-divided parts without the aid of a core in casting, being provided with flanges throughout the entire length of the meeting faces to receive joining-bolts. This construction therefore presented very greatly extended joints along both sides of the annular ring and along both sides of the radial cross connecting-tubes. This divided form of construction was objectionable not only by reason of its great cost, but also by reason of the practical impossibility of making these extended joints permanently tight at all points. The impairment of the joints resulted from several causes—one the unequal expansion and contraction of the two divisions or parts of which each section was made, and another the expansion and deterioration of the flange-bolts, which were exposed to the direct heat of the fire. Both these flange-bolts and the flanges themselves, being thus exposed to the fire at a distance from the water, soon burned out and irreparable injury followed, of course.

Second. Each section contained but a single chambered ring, in view of which the sections so constructed were materially weakened by reason of the strain from shrinkage after casting, due to the projection of the cross tubes entirely across the section.

A third objection to such attempted construction lay in the fact that the vertical tubes through which the binding-bolts passed for holding the sections together were so small as to afford inadequate space for free circulation, and the boiler was therefore subject to foaming.

All these objections are obviated in the construction here shown. The casting of the entire section in a single piece obviates all joints except the short ones between the tubes A⁴ of adjacent sections, materially lessens the cost

of construction, and insures freedom from all defects of unequal expansion, burning out, and consequent leakage and destruction which attend the divided section and extended joints in such former structure. Moreover, the introduction of the inner annular chamber, A², making each section to consist of two concentric annular chambers or rings, and the use of only short radial tubes for the connection of the annular rings of the section with each other, and leaving a central opening, a', obviates the objection of strain from shrinkage in cooling of the metal after casting and insures greater strength in the section from this cause as well as from the absence of long joints. So, also, by making the vertical tubes A⁴, through which the clamping-bolts G G pass, of relatively large diameter, and providing such tubes upon both the rings A' A², the utmost freedom of circulation is obtained, so that there is no liability to foaming or per-verse operation from lack of due circulation between the various sections of the boiler.

Reference need not be made to various attempts to construct horizontal boilers from cast sections occupying vertical planes, inasmuch as such attempts have invariably proven futile, owing to the necessarily unequal temperatures to which the different parts of the same section are exposed in this arrangement and to other vital objections.

My invention is restricted to an upright boiler having the sections horizontal and to the provision of wide vertical connecting-tubes A⁴ on the inner as well as the outer of the two rings A' and A² of which each section is composed.

The sections A are all cast from the same pattern, which gives the bosses a² on all of said sections, though actually needed upon only part of them; but their presence upon all enables the sections to be interchanged in position, if necessary.

Having thus described the principle of my invention and pointed out wherein it is distinguished from others, I claim—

1. The cast double annular boiler-section described, composed of the chambered rings A' A², connected with each other by tubes A³, and both provided on their tops and bottoms with short open tubes A⁴, all cast in a single piece and adapted to be joined with other similar sections to form a boiler, substantially as described.

2. The combination, in a cast sectional steam-boiler, of two or more double annular sections, consisting each of the chambered rings A' A², each having tubular bosses A⁴ and tubular connections A³, joining said rings, and vertical binding-bolts G, passing through the tubes A⁴, said tubes A⁴ being of relatively large diameter, whereby they afford free circulation from one section to another, substantially as described.

3. The cast sectional boiler composed of a

plurality of annular sections, A, each provided
with one or more bosses a^2 and vertical tubu-
lar bosses A^4 , the said bosses a^2 and A^4 having
the same position relative to each other in
5 the several sections, whereby the sections are
interchangeable, substantially as described.

In testimony that I claim the foregoing as

my invention I affix my signature in presence
of two witnesses.

RICHARD PONNAY.

Witnesses:

M. E. DAYTON,
G. F. LANAGHEN.