

(No Model.)

2 Sheets—Sheet 1.

J. F. PEASE.

HOT AIR AND STEAM HEATER.

No. 362,779.

Patented May 10, 1887.

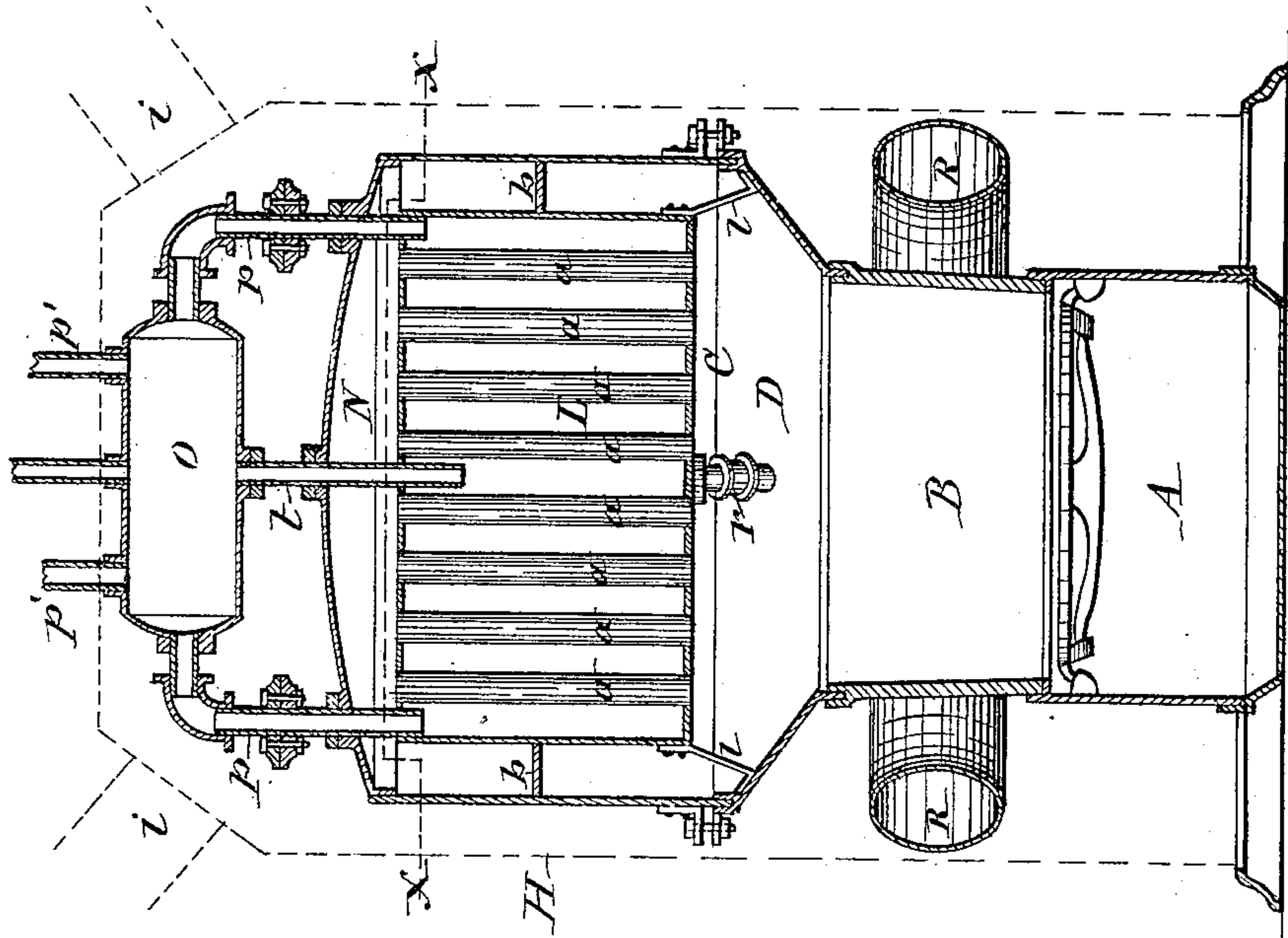


Fig. 2

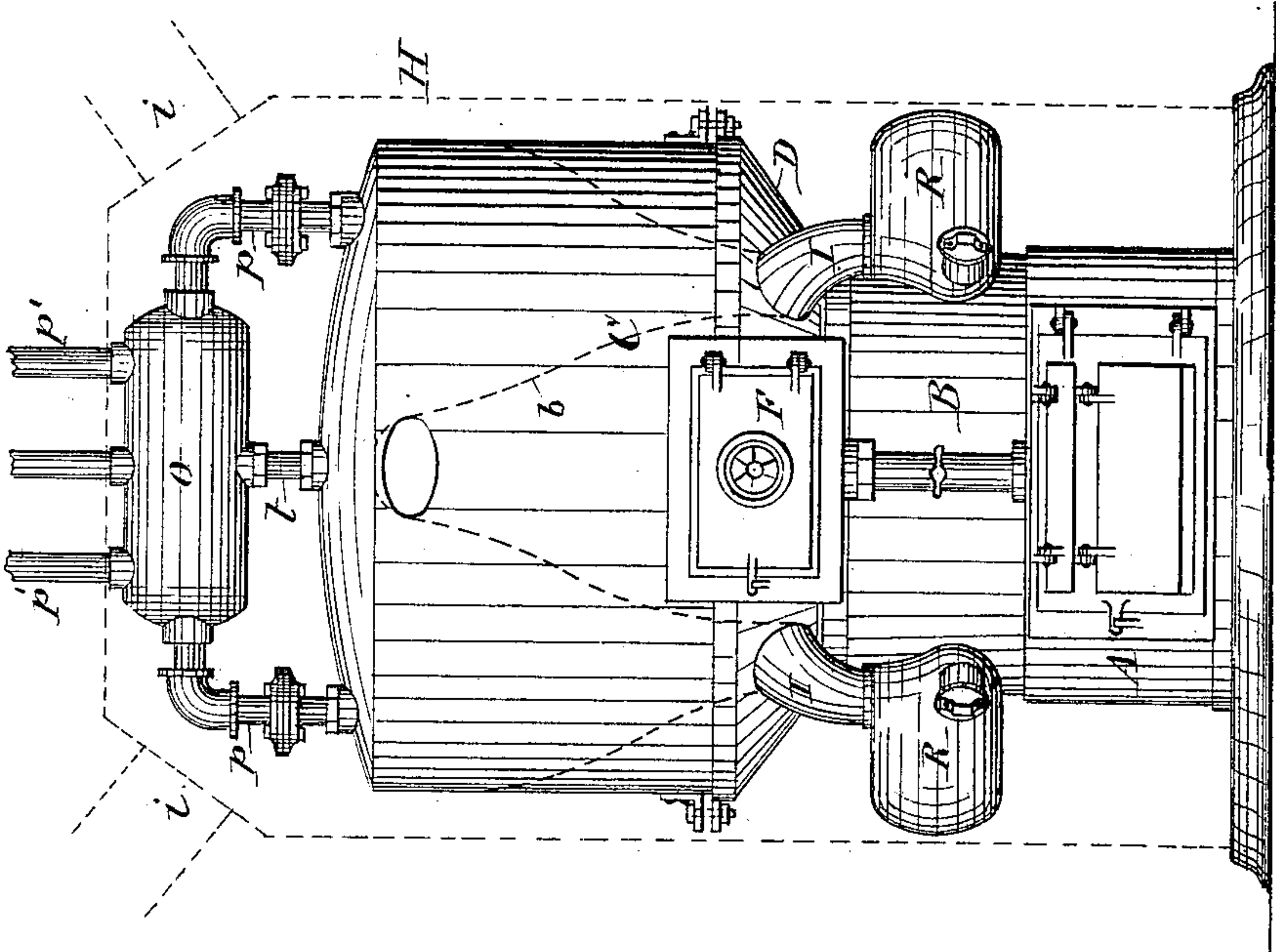


Fig. 1

WITNESSES:

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A. F. Walz

INVENTOR

John F. Pease
BY Wm. L. Lasso & Hines

ATTORNEYS

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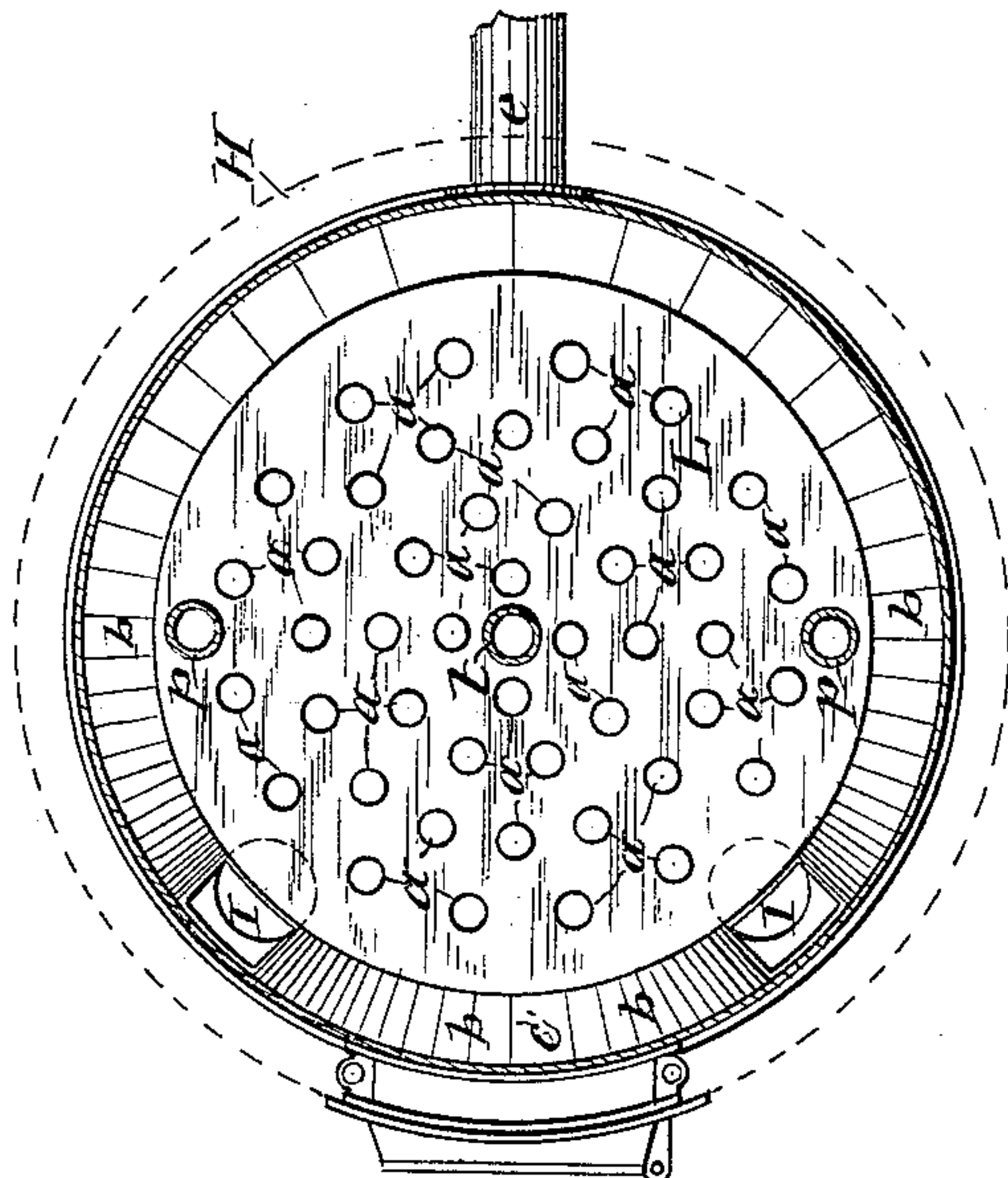


Fig. 3

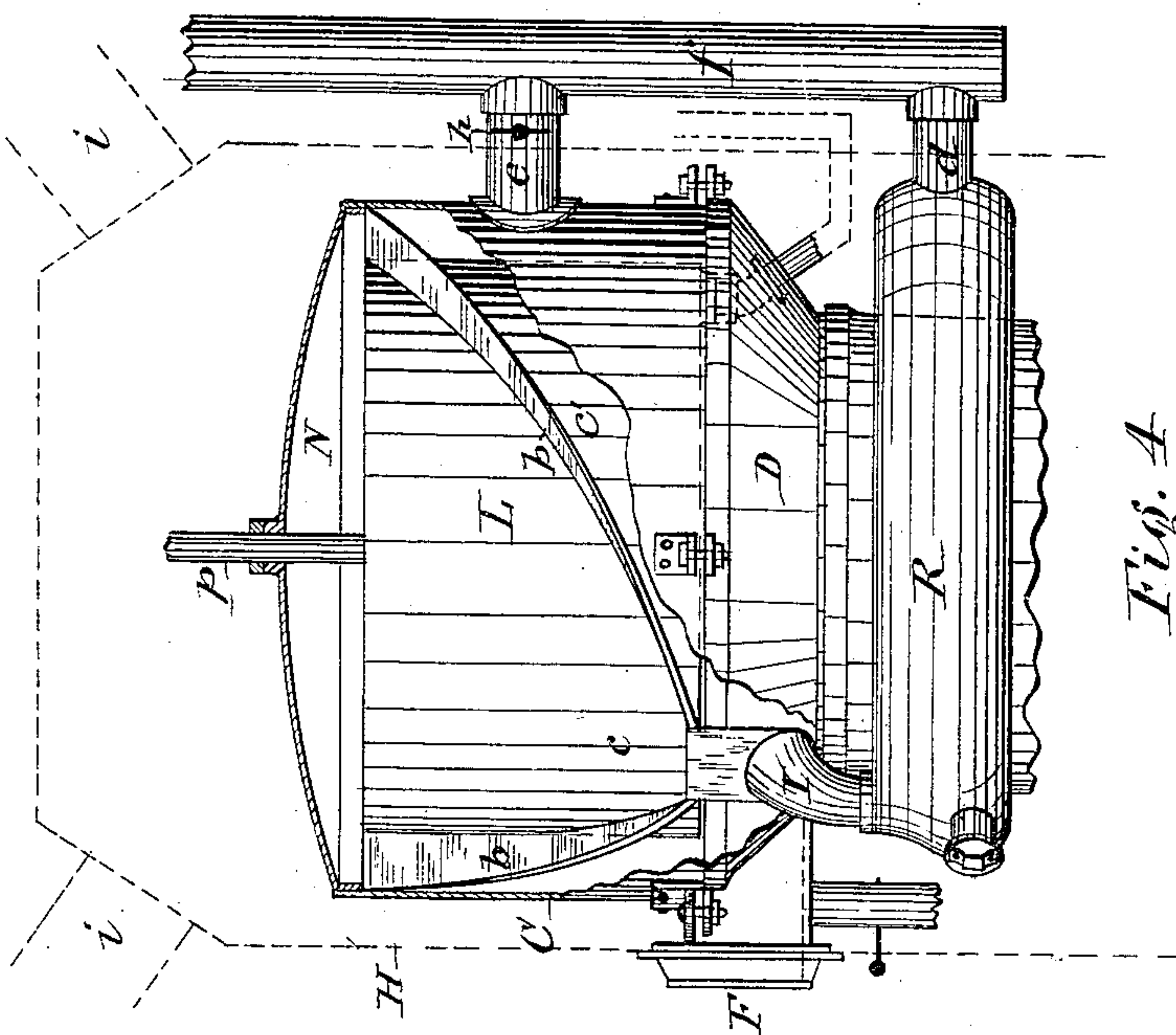


Fig. 4

WITNESSES:

C. Bendixon
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INVENTOR

John F. Pease
BY Shull, Larrs & Shull

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UNITED STATES PATENT OFFICE.

JOHN F. PEASE, OF SYRACUSE, NEW YORK.

HOT-AIR AND STEAM HEATER.

SPECIFICATION forming part of Letters Patent No. 362,779, dated May 10, 1887.

Application filed December 9, 1886. Serial No. 221,090. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. PEASE, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful

5 Improvements in a Hot-Air Furnace and Steam-Heater Combined, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

10 This invention relates to the class of steam and air heaters which have the boiler arranged inside of a combustion-chamber surmounting the fire-pot; and the invention consists in an improved construction and combination of

15 parts, as hereinafter fully described, and set forth in the claims.

In the annexed drawings, Figure 1 is a front elevation of a hot-air furnace and steam-heater combined embodying my improvements. Fig. 20 2 is a vertical transverse section of the same. Fig. 3 is a horizontal transverse section on line *x x*, Fig. 2; and Fig. 4 is a side elevation of that portion of the heating apparatus which is above the ash-pit, part of the combustion-chamber shell being broken away to show the

25 convergent flue which conducts the products of combustion from the upper smoke-box to the flues which lead to the radiator surrounding the fire-pot.

30 Similar letters of reference indicate corresponding parts.

A represents the ash-pit, B the fire-pot, and C the combustion-chamber, mounted, successively, one upon the other. The combustion-chamber C is of a greater diameter than the 35 fire-pot and joined thereto by an intervening flaring section, D, and under this flaring section and nearly surrounding the fire-pot is the radiator R, which communicates with the combustion-chamber by pipes or flues I I, extending 40 from the flaring section D to the radiator at opposite sides of the feed-door F, in the same or similar manner as shown in my pending application for Letters Patent, Serial No. 45 203,686, filed May 29, 1886.

L denotes a steam-boiler of cylindrical form set in an upright position in the combustion-chamber C, and concentric therewith. It is supported by legs *ll*, secured to the boiler and 50 resting on the flaring section D. Said boiler is of a diameter to reach part way over the flaring section D, and yet leave an annular

space between the vertical sides of the boiler and combustion-chamber. Vertically through the boiler are extended a series of flues, *a a*, 55 through which the products of combustion ascend from the fire-pot to the smoke-box N, which is formed over the top of the boiler by the crowning top of the combustion-chamber shell. In the annular space between the sides 60 of the boiler and combustion-chamber I place partitions *b b*, two of which run from the top of the front portion of the boiler obliquely down to the edges of the flues I I at the sides nearest the front, and the other two partitions 65 *b b* run from the top of the rear portion of the boiler obliquely down to the rear edges of the flues I I, thereby forming at the front and rear of the boiler updraft-flues *c' c'*, each of which gradually diminishes in width from the base to 70 the top, and at opposite sides of the boiler two downdraft-flues, *c c*, which converge, respectively, to the flues I I. When the furnace is in full operation, the products of combustion escape through the flues *a a* and *c' c'* to the 75 smoke-box N, and thence descend in the flues *c c*, and pass through the flues I I and the radiator R, in which they circulate toward the rear thereof, whence they escape through a pipe, *d*, into the exit-pipe *f*. 80

A direct-draft pipe, *e*, leads from the rear portion of the combustion-chamber C to the exit-pipe *f*, and is provided with a damper, *h*, which, when opened, allows the products of combustion to pass from the flaring section D 85 up through the flue *c'* at the rear of the boiler and out through the pipe *e* direct to the exit-pipe *f*, and thus increases the air-draft through the fire-pot. This is necessary when first starting the fire. After the fire is fairly under 90 way and in condition to burn the gases emitted from the fuel, the damper *h* is to be closed to cause the products of combustion to take the circuitous passage through the radiator, and thereby heat the same. 95

The described apparatus is inclosed in the usual way by a casing, H, (represented by dotted lines in the drawings,) said casing being provided with a suitable air-inlet at its base and with air-pipes *ii* at the top, which latter 100 pipes are extended to the apartments of the building to be heated. The air entering at the base of the case ascends and passes around the outside of the radiator and between the

radiator and fire-pot, and next impinges the under side of the flaring section D, and thence circulates around the exterior of the combustion-chamber C, and by contact with the afore-

5 said heated parts the air becomes intensely heated, and in this condition it is conducted by the pipes *ii* to the apartments to be heated.

p p' represent the pipes which conduct the steam to the usual radiators in the apartments
10 to be heated, and *r* designates the pipe which returns the water of condensation from said radiators to the boiler.

In order to render as dry as possible the steam which enters the pipes *p'*, I employ a
15 trap, O, of the form of a drum or cylinder, placed in a horizontal position outside of and preferably above the boiler and combustion-chamber and inside of the casing H, so as to be brought more intimately in contact with the
20 heat generated by the furnace. The pipes *p p* tap the steam-space of the boiler and terminate in the trap or cylinder O at the center of its ends, and the pipes *p' p'*, which lead to the radiators in the apartments to be heated,
25 are extended from the top of said trap. Another pipe, *t*, is extended from the bottom of the trap into the boiler to a greater depth than the pipes *p*, to return to the boiler the water of condensation collected in the trap
30 from the steam in its passage through the pipes which conduct the steam to the apartments to be heated.

One of the chief merits of my present invention consists in the combination of the en-
35 larged combustion-chamber joined to the fire-pot by the flaring section D and the corresponding enlargement of the diameter of the boiler, which reaches part way over the flaring section D and presents large heating-sur-
40 faces at opposite ends and is capable of containing a great number of flues *a a*.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

45 1. In combination with the fire-pot, superposed combustion-chamber, and radiator surrounding the fire-pot, a boiler arranged concentrically in the combustion-chamber, flues extended from the combustion-chamber to the
50 radiator, and flues between the sides of the boiler and combustion-chamber and formed convergent to the flues leading to the radiator, substantially as set forth and shown.

2. In combination with the fire-pot, the su-
55 perposed combustion-chamber of greater diameter than the fire-pot and joined thereto by a flaring section, a boiler arranged concen-

trically in the combustion-chamber and ex-
tending part way over the flaring section, a
60 smoke-box over the boiler, flues extending ver-
tically through the boiler, a radiator surround-
ing the fire-pot, flues extending from the flar-
ing section of the combustion-chamber to the
radiator, and flues between the vertical sides
65 of the boiler and combustion-chamber and
formed convergent to the flues leading to the
radiator, substantially as described and shown.

3. The combination, with the fire-pot, of the
flaring section D, the combustion-chamber C,
70 mounted on top of the flaring section, the
boiler L, arranged in the combustion-chamber
with downdraft-flues around the exterior of
the boiler and with the smoke-box N over the
boiler, updraft-flues through the boiler, and
the radiator R, communicating with the afore-
75 said downdraft-flues, substantially as specified.

4. In combination with combustion-chamber
C and the boiler L, arranged in said combus-
tion-chamber with the smoke-box N over the
80 top of the boiler, the cylinder O, arranged hori-
zontally above said smoke-box, the pipes *p p*,
extending from the center of opposite ends of
the cylinder down through the smoke-box and
tapping the top of the boiler, the pipe *t*, ex-
85 tending from the bottom of the cylinder down
through the smoke-box and through the top
of the boiler into the water-space thereof, and
the steam-pipes *p' p'*, extending from the top
of the cylinder, substantially as specified.

5. In combination with the combustion-cham- 90
ber C and boiler L, arranged in said combus-
tion-chamber with the smoke-box N over the
top of the boiler, the cylinder O, arranged hori-
zontally above the smoke-box, the pipes *p p*,
95 extending from the center of opposite ends of
the cylinder down through the smoke-box and
tapping the top of the boiler, the pipe *t*, ex-
tending from the bottom of the cylinder down
through the smoke-box and into the water-
100 space of the boiler, the steam-pipes *p' p'*, ex-
tending from the top of the cylinder, and the
casing H, extending over the cylinder O and in-
closing the same in common with the combus-
tion-chamber, substantially as described and
105 shown.

In testimony whereof I have hereunto signed
my name and affixed my seal, in the presence
of two attesting witnesses, at Syracuse, in the
county of Onondaga, in the State of New York,
this 1st day of December, 1886.

JOHN F. PEASE. [L. S.]

Witnesses:

C. BENDIXON,
HOWARD P. DENISON.