

(No Model.)

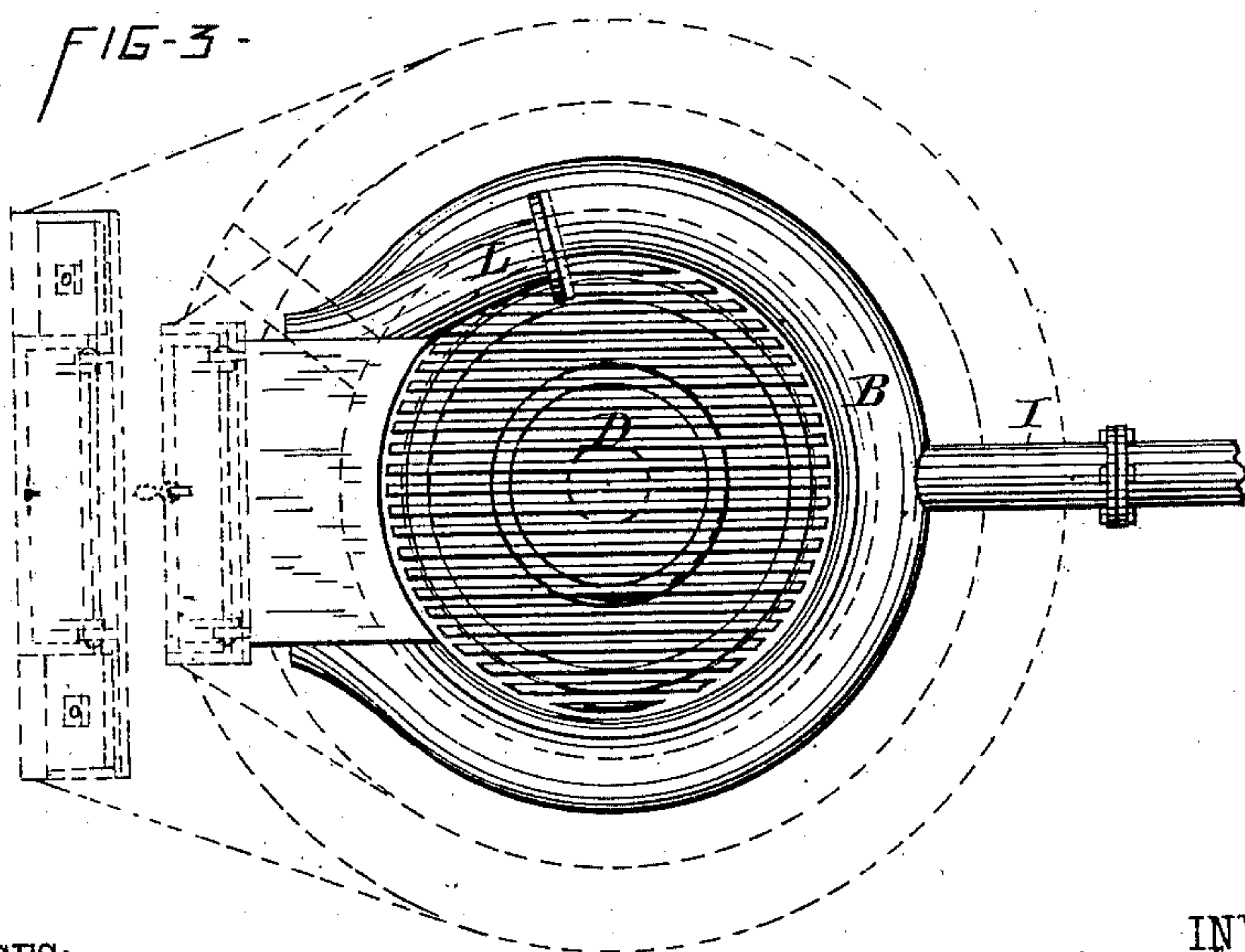
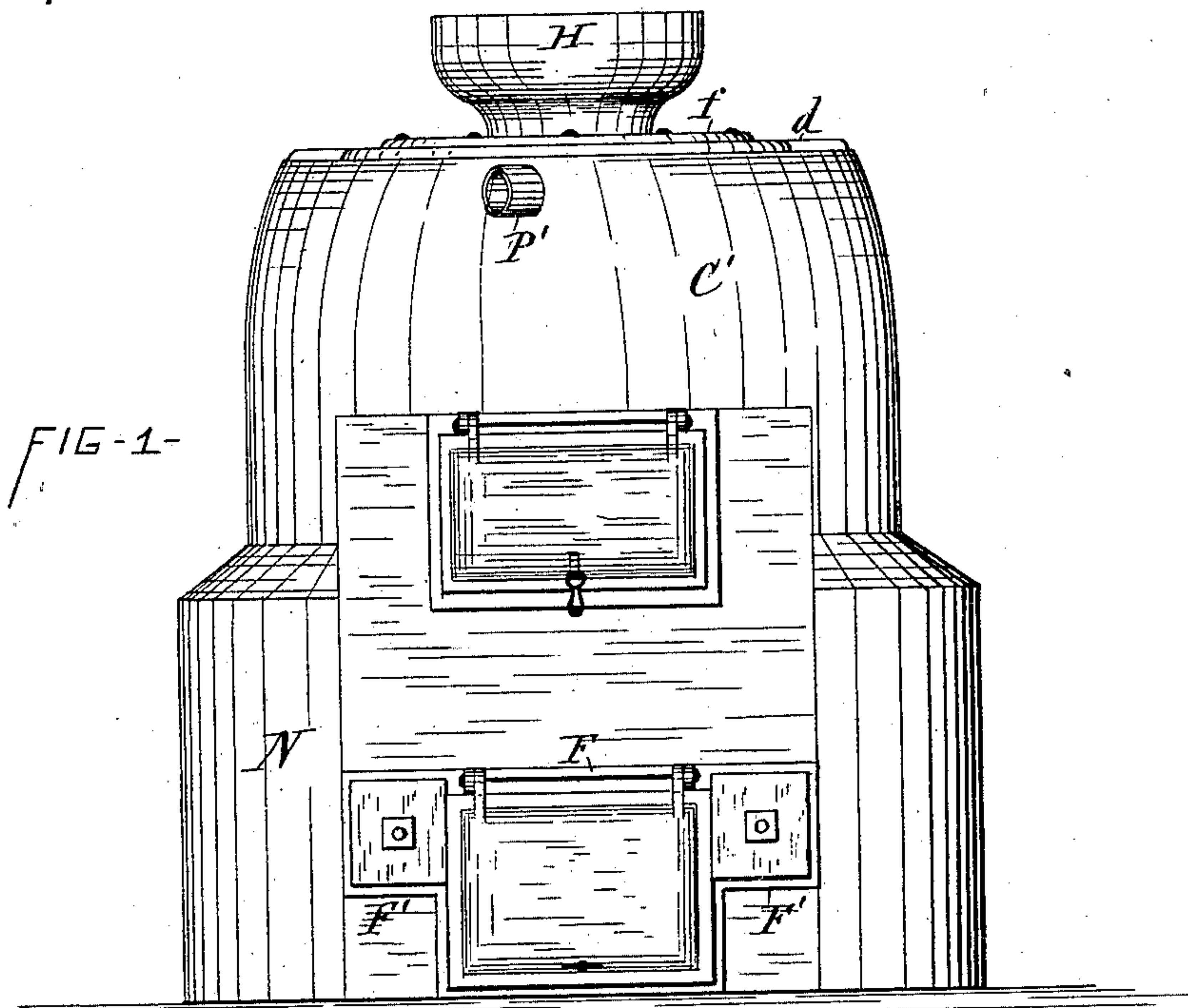
2 Sheets—Sheet 1.

A. CATCHPOLE.

STEAM BOILER.

No. 354,392.

Patented Dec. 14, 1886.



WITNESSES:

G. Bendison

A. F. Walz

INVENTOR

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(No Model.)

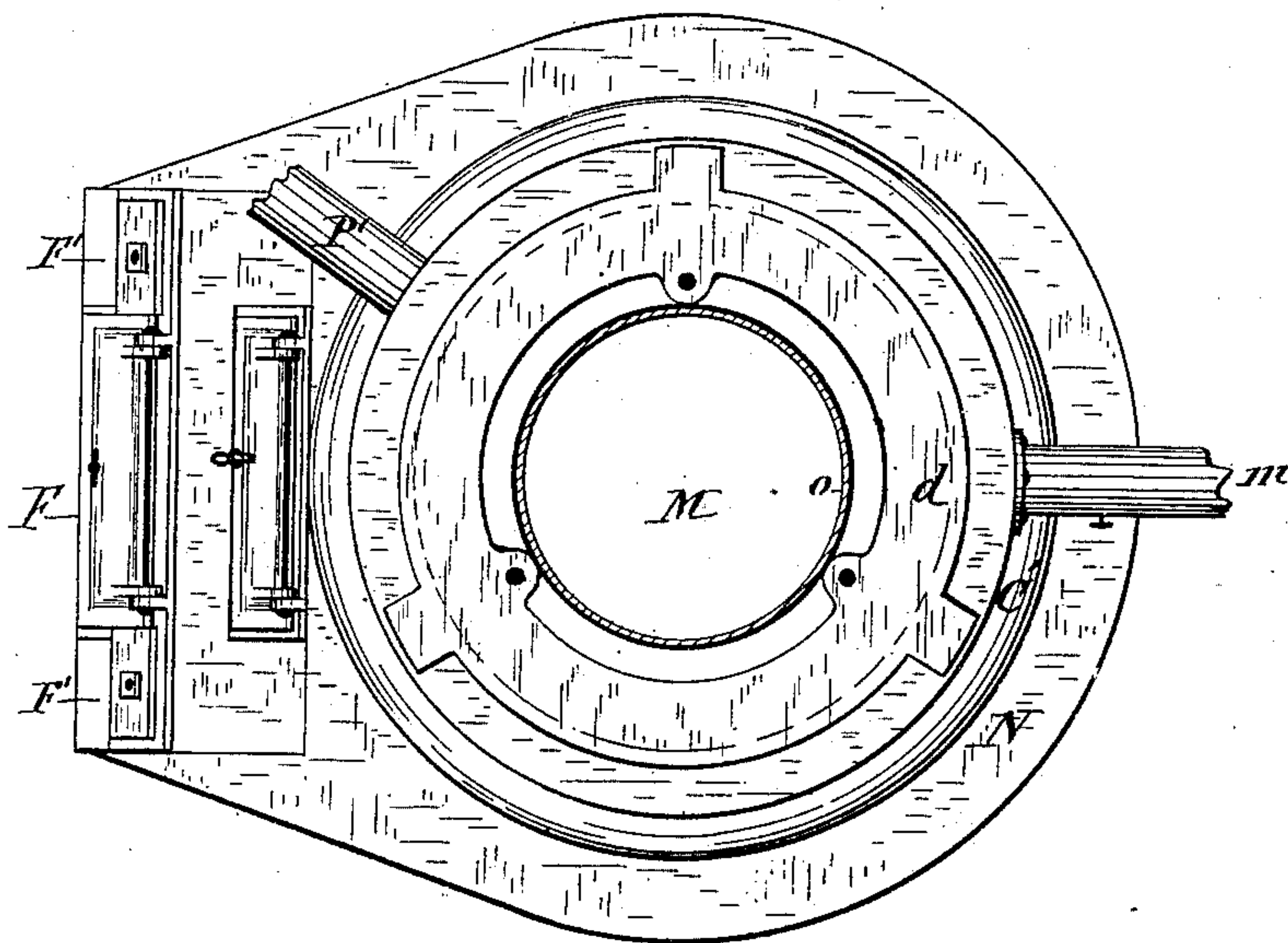
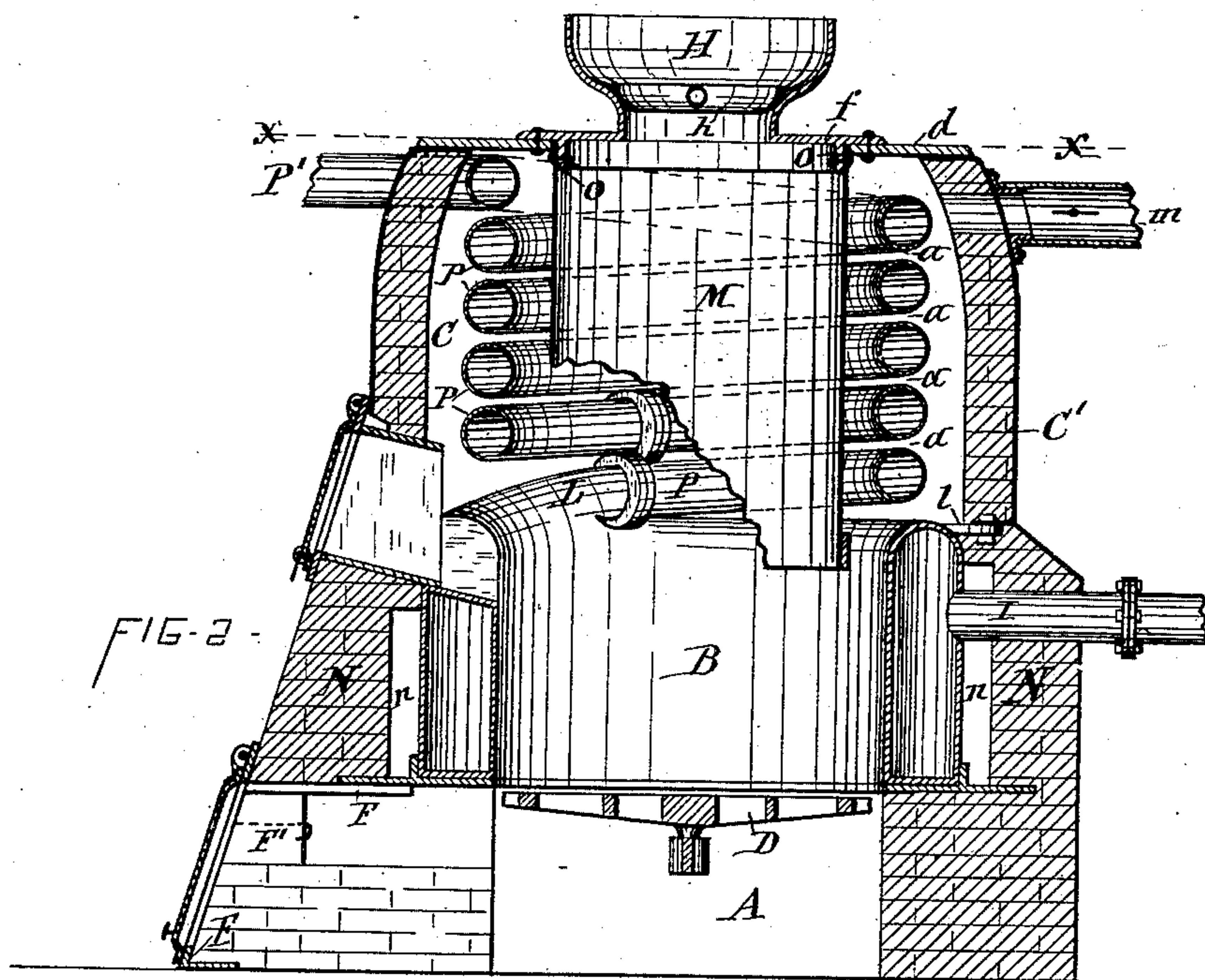
2 Sheets—Sheet 2.

A. CATCHPOLE.

STEAM BOILER.

No. 354,392.

Patented Dec. 14, 1886.



WITNESSES:

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UNITED STATES PATENT OFFICE.

ALFRED CATCHPOLE, OF GENEVA, NEW YORK.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 354,392, dated December 14, 1886.

Application filed September 15, 1886. Serial No. 213,588. (No model.)

To all whom it may concern:

Be it known that I, ALFRED CATCHPOLE, of Geneva, in the county of Ontario, in the State of New York, have invented new and
5 useful Improvements in Steam-Boilers, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to steam-boilers or
10 water-heaters specially adapted for heating hot-houses and other buildings.

The invention consists in a novel construction of an upright boiler which has its height reduced to a minimum, and is thus better
15 adapted for use in a low room, and at the same time possesses superior capacity for heating water with great economy in the consumption of fuel, and also possesses other advantages, as hereinafter fully explained.

20 In the accompanying drawings, Figure 1 is a front elevation of my improved boiler. Fig. 2 is a vertical transverse section of the same, a portion of the fuel-magazine being broken away to better illustrate the connection of the
25 coiled pipe with the hollow fire-pot wall. Fig. 3 is a top plan view of the fire-pot with the adjacent parts of the boiler shown in dotted lines, and Fig. 4 is a top plan view taken in the plane through *x*, Fig. 2.

30 Similar letters of reference indicate corresponding parts.

A represents the ash-pit, the walls of which are formed of masonry, upon which the boiler is supported.

35 D designates the grate, which may be of any suitable and well-known form, preferably formed in one piece and pivoted to permit of shaking and dumping it.

To facilitate the introduction of the grate
40 into its requisite position at the top of the ash-pit and its removal therefrom when required for repairs or renewal, I form the frame of the ash-pit door F with lateral extensions F' of its opening, and thereby enlarge said opening, so
45 as to permit of passing the grate through it. The extensions F' are provided with removable covers, preferably separate from the door F. Upon the wall of the ash-pit is seated the fire-pot B, which I form of a water-tight hol-
50 low wall, from the side of which projects a

branch pipe, I, for the attachment of the water-induction pipe, and from the top of said hollow wall projects a branch pipe, L, for the attachment of the coiled pipe P.

The described fire-pot, with the branch pipes
55 I L, I cast in one piece, and thus obviate leakage incident to weak joints. To the branch L, I attach a coiled pipe, P, which rises from the fire-pot at only a slight angle of inclination, and has spaces *a a* between the successive
60 helices. The aforesaid coil is of a smaller diameter than the fire-pot, and is thus made to project over the inner side thereof and become more exposed to the impingement by the pro-
65 ducts of combustion rising from the fire-pot.

From the upper end of the coil-pipe is extended a water or steam pipe, *p'*, which conveys the hot water to the apartment to be heated.

Around the exterior of the fire-pot B, I build
70 a wall, N, with an air space or jacket, *n*, between them, for the purpose of retaining around the said fire-pot the heat radiating therefrom and preventing, as much as possible, the penetration of the heat through the wall N.

75 The coiled pipe P, I inclose in a combustion-chamber, C, formed of a casing, C', which is secured at its base to lugs *l*, projecting from the exterior of the fire-pot. Said casing rises to an elevation above the coiled pipes P, and
80 is preferably contracted circumferentially toward the top, where it has secured to it a cap or plate, *d*, which is provided with an opening at its center.

Upon the plate *d* is mounted and firmly se-
85 cured another plate, *f*, which is either provided with an opening and suitable cover or formed with a hopper, H, at the center, and with an annular downward-projecting flange, *o*, on its under side, which flange is of greater
90 diameter than and concentric with the opening of the hopper H, and from said flange is suspended the fuel-magazine M, which is extended down through the center of the coil of the pipes P and terminates at or near the top
95 of the fire-pot in the usual manner.

The removable cover *h*, I prefer to place inside of the hopper and directly over its discharge-opening, so as to obviate the collection of gases in the hopper.

The casing *C* of the combustion-chamber may be lined with fire-brick, as represented in Fig. 2 of the drawings.

The smoke-exit flue *m* is connected to the upper part of the combustion-chamber.

In the operation of the described boiler the products of combustion, rising from the fire-pot *B*, are deflected radially by the magazine *M*, and in their ascent in the combustion-chamber *C* they circulate between the successive coils of the pipe *P*, and up on both sides thereof, and thereby effectually heat said pipe. The water in the hollow wall of the fire-pot, being subjected to the greatest heat and expanded more rapidly than the water in the upper part of the coil *P*, causes the water to rise from the fire-pot wall into the coil *P*, from which latter it escapes in an intensely-heated condition into the pipes which circulate through the apartments to be heated. The influx of water through the inlet-pipe *I* into the fire-pot wall keeps up the circulation of the water through the boiler.

I do not limit myself to a single coil of pipe, *P*, as it is obvious that another coil of pipe may be arranged at the outside of the described coil and suitably connected with the hollow wall of the fire-pot.

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

1. An upright boiler comprising a fire-pot formed of a water-tight hollow wall, a coil or coils of pipes rising from said wall and communicating with the interior thereof, and a combustion-chamber inclosing said coils, substantially as set forth.

2. An upright boiler comprising a fire-pot formed of a water-tight hollow wall, a coil or coils of pipes rising from said wall and communicating with the interior thereof, a combustion-chamber inclosing the coils, a water-inlet to the hollow wall, and a water or steam pipe extended from the coils, substantially as set forth and shown.

3. In a water-heater, the combination of a water-tight hollow wall encompassing the fire-

grate and rising above the same, a coil of pipe rising from said wall and communicating with the interior thereof, said coil being of a smaller diameter than the aforesaid wall, to project over the inner side of the same, a combustion-chamber inclosing said coil, a water-inlet to the aforesaid hollow wall, and a water or steam pipe extended from the coil, substantially as set forth.

4. The fire-pot *B*, consisting of a water-tight hollow wall provided with the branch pipes *I L*, all cast in a single piece, as set forth.

5. The combination of the fire-pot consisting of a water-tight hollow wall provided with a water-inlet, a coil or coils of pipes rising from said wall and communicating with the interior thereof, a combustion-chamber inclosing said coils, and a fuel-magazine in the center of the coils, substantially as described and shown.

6. In combination with the fire-pot and combustion-chamber, the top plate, *d*, provided with a central opening, the plate *f*, secured to the plate *d* and formed with the hopper *H*, the cover *h* in said hopper, and the magazine *M*, suspended from the plate *f*, substantially as described and shown.

7. In combination with the ash-pit and fire-grate, an ash-pit door frame formed with lateral extensions of its opening to allow the grate to be inserted under the fire-pot and removed therefrom through the aforesaid door, substantially as set forth.

8. The combination, with the fire-pot *B*, of the lugs *l*, projecting from the exterior thereof, and the casing *C*, secured to said lugs and rising above the fire-pot, as shown and set forth.

In testimony whereof I have hereunto signed my name and affixed my seal, in the presence of two attesting witnesses, at Geneva, in the county of Ontario, in the State of New York, this 2d day of September, 1886.

ALFRED CATCHPOLE. [L. S.]

Witnesses:

C. S. BURRALL,
GERMAIN DAVIS.