

(No Model.)

3 Sheets—Sheet 1.

A. CATCHPOLE.

BOILER.

No. 379,048.

Patented Mar. 6, 1888.

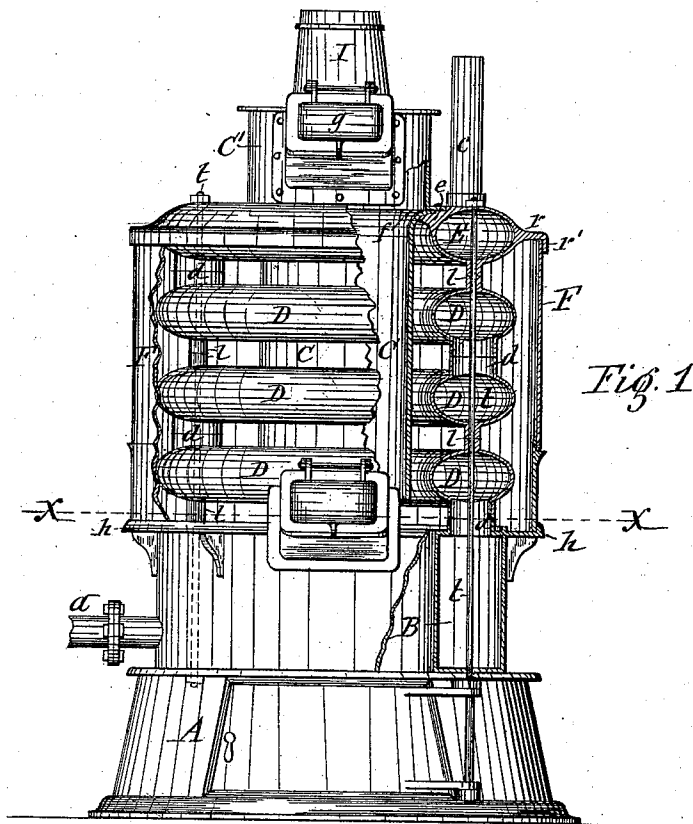


Fig. 1

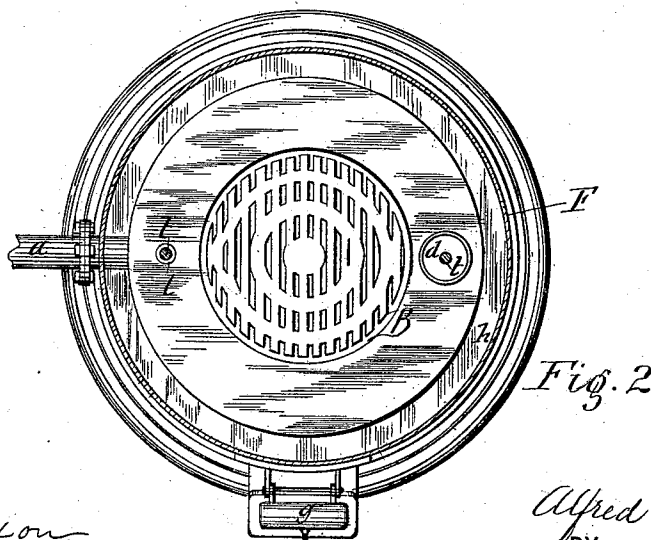


Fig. 2

WITNESSES

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Smith, Laass & Smith

ATTORNEYS

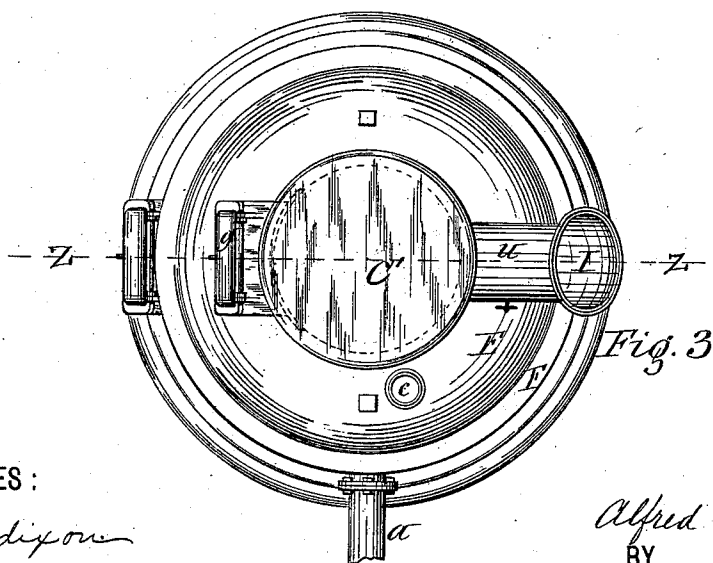
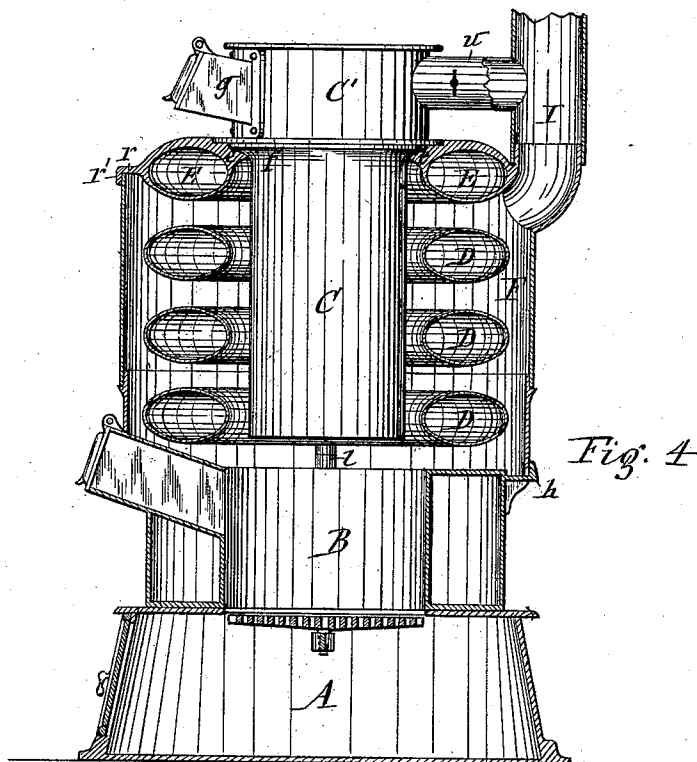
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3 Sheets—Sheet 2.

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(No Model.)

A. CATCHPOLE.
BOILER.

3 Sheets—Sheet 3.

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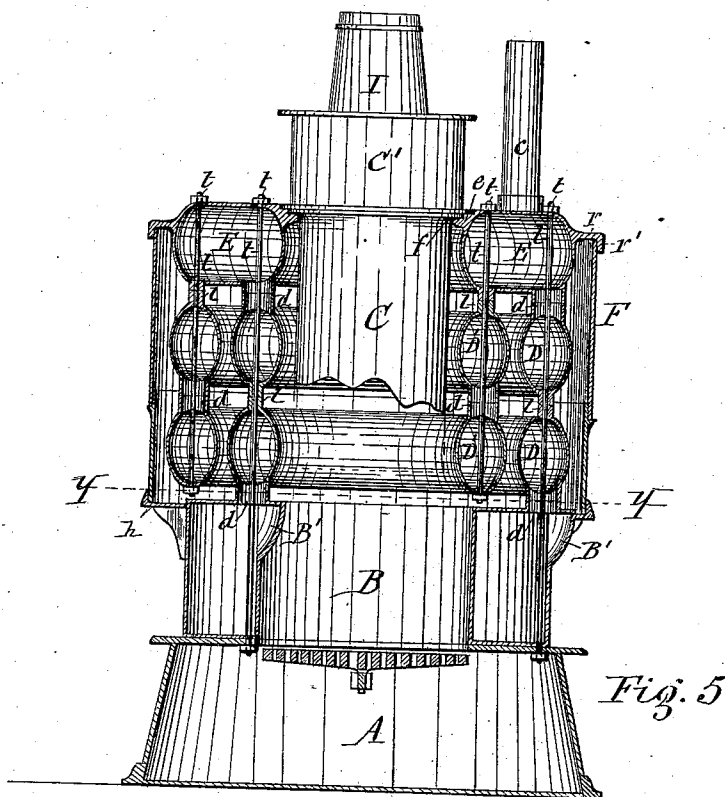


Fig. 5

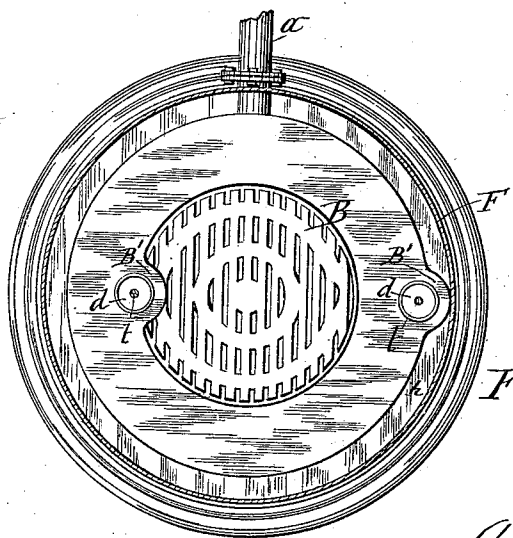


Fig. 6

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UNITED STATES PATENT OFFICE.

ALFRED CATCHPOLE, OF GENEVA, NEW YORK.

BOILER.

SPECIFICATION forming part of Letters Patent No. 379,048, dated March 6, 1888.

Application filed July 11, 1887. Serial No. 243,948. (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 useful Improvements in Boilers, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to the class of boilers in which the water-compartments consist of hollow rings mounted horizontally one upon the other and concentrically with the fire-pot; and the invention consists in an improved construction and combination of parts which form a boiler of great efficiency with economy in the consumption of fuel.

The invention is fully illustrated in the annexed drawings, in which—

Figure 1 is partly a front elevation and partly a vertical sectional view of a boiler embodying my improvements. Fig. 2 is a horizontal transverse section on line *x x*, Fig. 1. Fig. 3 is a top plan view of the same. Fig. 4 is a vertical transverse section on line *z z*, Fig. 3. Fig. 5 is a vertical transverse section of a boiler embodying modifications of my invention; and Fig. 6 is a horizontal transverse section on line *y y*, Fig. 5.

Similar letters of reference indicate corresponding parts.

A represents the ash-pit, which at the same time constitutes the base of the boiler.

B denotes the fire-pot, formed of a hollow annular shell, to which is connected the feed-water pipe or water-inlet pipe *a*. Over the fire-pot and concentric therewith are annular water-pipes D D D and E, arranged horizontally one above the other, with spaces between them, as shown in Figs. 1 and 4 of the drawings. Said pipes communicate with each other and with the fire-pot shell A by means of vertical pipes *d d d*, interposed between said parts and connected thereto; and in order to cause a more perfect circulation of the water in the boiler I arrange the vertical pipes *d d d* alternately at diametrically-opposite points in the circumferences of the pipes D D D. The pipes *d d d*, I form integral with the pipes D D D by casting coinciding sections of the pipes *d d* on the respective pipes D D', the ends of said pipe-sections being easily trimmed or planed

to properly seat them one upon the other, and thus materially reducing the cost of construction.

The pipes D D D and E are secured in their respective positions by means of tie-rods *t*, passing vertically through the pipes *d d d* and through tubular nipples *l l l*, cast on the horizontal pipes in range with the vertical pipes and planed at the same time with the pipes *d d*.

The uppermost pipe, E, serves the function of a dome when the boiler is used for generating steam, and as an additional water-ring when used for heating water. From this pipe is extended the hot-water or steam pipe *c*, which leads to the usual radiators in the apartments to be heated. Said dome communicates separately with the two sets of pipes D D' and at diametrically-opposite points in the circumferences of said pipes, thereby causing a perfect circulation of water across the interior of the dome. The pipes D D D are inclosed in the combustion-chamber F, which is mounted on a flange, *h*, projecting outward from the top of the fire-box shell.

The pipe E, I cast with an outward-projecting rim, *r*, which latter terminates with a downward-deflected flange, *r'*, which laps over and embraces the top portion of the shell of the combustion-chamber F. I also cast the aforesaid pipe with an inward-projecting rim, *e*, from which I suspend the magazine C, which is formed at its upper end with a flare, *f*, by which it is hung on the aforesaid rim, said magazine being arranged concentric with the pipes D D D and combustion-chamber shell F and forming an annular combustion-chamber around the pipes.

In the operation of the described boiler the products of combustion ascending from the fire-pot are diffused through the annular combustion-chamber by the central position of the magazine, and in rising in the said combustion-chamber to the exit-flue I the products of combustion are caused to circulate around and between the pipes D D D and impinge the same, so as to thoroughly heat them. The heat being most intense in the fire-pot, causes the water to expand more rapidly therein than in the pipes D D D and E, and consequently the heated water ascends from the fire-pot shell B through the pipes *d d d*, and successively in

opposite directions around the two halves of each pipe D and E, and thence through the pipe *c* to the radiator, and back through the pipe *a* to the boiler.

5 C' represents an extension of the magazine C projecting above the boiler, and provided with a feed-door, *g*, and with a branch pipe, *u*, extended to the exit-pipe I, for the purpose of carrying off the gases which may rise in the
10 magazine.

When a boiler of greater capacity is desired, I employ two or more sets of pipes, D D and D' D', as represented in Fig. 5 of the drawings, the pipes D' D' being of smaller circumfer-
15 ences than the pipes D D and arranged concentric within the same. The two sets of pipes are connected with the fire-pot B at diametrically-opposite points by the pipes *d d* tapping offsets B' B' of the top portion of the fire-pot
20 shell. The top pipe or dome, E, is enlarged in width, so as to reach across the two sets of pipes D D', and communicates with the same at diametrically-opposite points by the pipes *d d*, and thus said sets of pipes communicate
25 with each other at the top by the medium of the dome E.

When the boiler is in operation for generating steam, the water rises from the fire-pot shell A through the inner set of pipes, D' D',
30 and descends through the outer set, D D.

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

35 1. In combination with the combustion-chamber F, the annular pipe E, formed with the

outward-projecting rim *r* and downward-deflected flange *r'* on said rim and embracing thereby the top portion of the combustion-chamber, substantially as described and shown.

2. In combination with the combustion-chamber F, annular pipes D D, and vertical connecting-pipes *d d*, the annular pipe E, formed with the inward-projecting rim *e*, outward-projecting rim *r*, and downward-deflected flange *r'* on the latter rim embracing the top
45 portion of the combustion-chamber, and the magazine C, provided with the flare *f* and suspended thereby from the internal rim, *e*, substantially in the manner described and shown.

3. The combination, with the hollow fire-pot shell B, of the sets of pipes D D and D' D', arranged concentrically with each other and communicating separately from each other with the interior of the shell B, respectively,
55 at diametrically-opposite points in the circumference thereof, and the dome E, arranged over the sets of pipes and communicating separately with the same at diametrically-opposite points in the circumferences thereof, whereby the water is caused to circulate across the in-
60 terior of the dome, substantially as described and shown.

In testimony whereof I have hereunto signed my name, in the presence of two witnesses, at Syracuse, in the county of Onondaga, in the
65 State of New York, this 6th day of July, 1887.

ALFRED CATCHPOLE. [L. S.]

Witnesses:

HOWARD P. DENISON,
C. BENDIXON.