

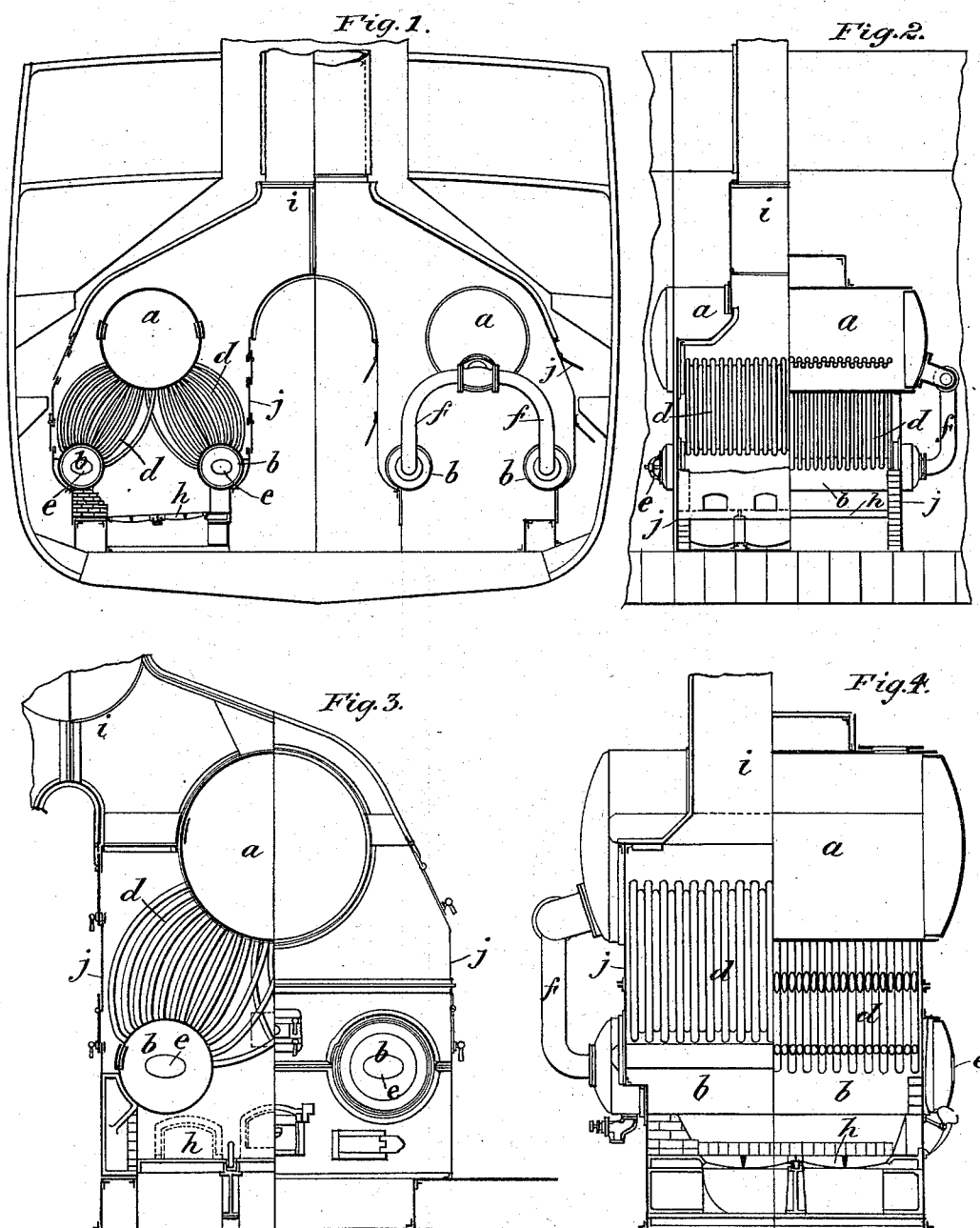
(No Model.)

2 Sheets—Sheet 1.

P. FERGUSON & W. Y. FLEMING.
STEAM BOILER.

No. 530,331.

Patented Dec. 4, 1894.



Witnesses:
J. L. Hebert.
O. Block.

Inventors:
Peter Ferguson,
William Y. Fleming.
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Attorney.

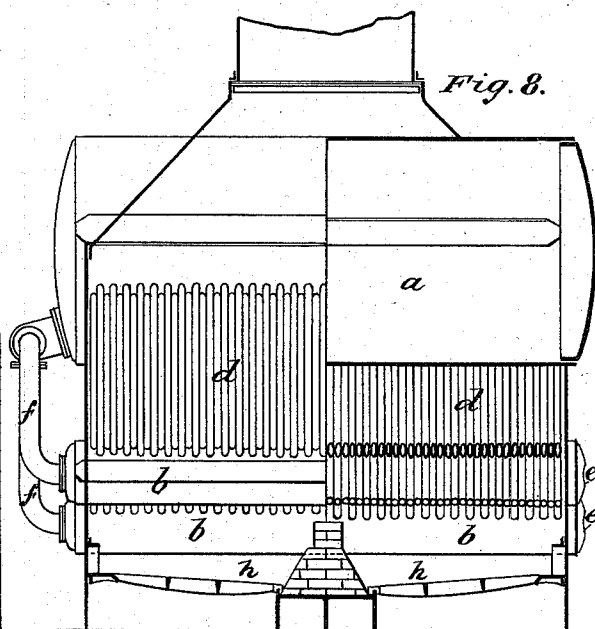
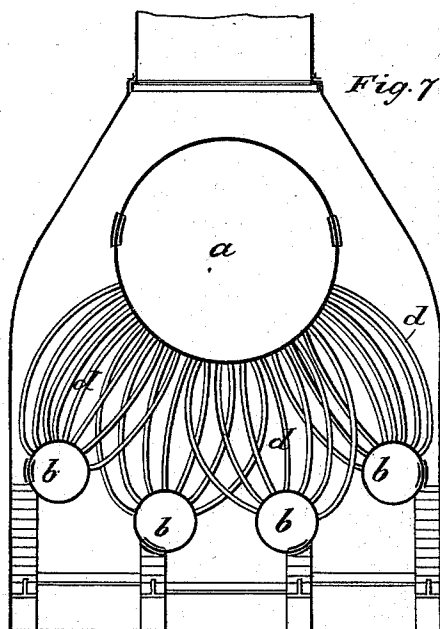
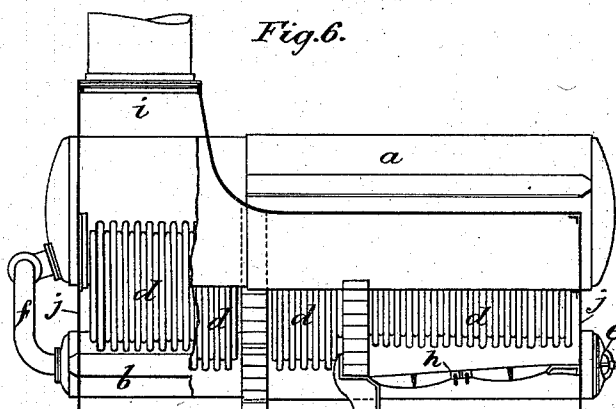
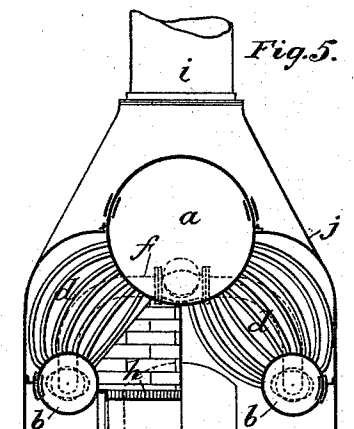
(No Model.)

2 Sheets—Sheet 2.

P. FERGUSON & W. Y. FLEMING.
STEAM BOILER.

No. 530,331.

Patented Dec. 4, 1894.



Witnesses:

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UNITED STATES PATENT OFFICE.

PETER FERGUSON AND WILLIAM Y. FLEMING, OF PAISLEY, SCOTLAND.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 530,331, dated December 4, 1894.

Application filed August 24, 1894. Serial No. 521,207. (No model.) Patented in England December 31, 1892, No. 24,141.

To all whom it may concern:

Be it known that we, PETER FERGUSON and WILLIAM YOUNG FLEMING, engineers and shipbuilders, of Phoenix Works, Paisley, Renfrewshire, Scotland, have jointly invented new and useful Improvements in Steam-Boilers, (which have not been patented in any country except Great Britain, by Letters Patent, dated December 31, 1892, No. 24,141;) and we do hereby declare that the following is a full, clear, and exact description of the same, which will enable others skilled in the art or manufacture to which it relates to make and use the same.

15 This invention relates to steam boilers of the type in which steam and water drums are connected by a large number of water tubes situated over a furnace or in a combustion chamber and it has mainly for its object by
20 improved arrangement and construction of the parts to provide for withdrawal and replacing of any of the tubes which may leak or give way, without taking down or removing the casing in which the heating surfaces
25 of the boiler are inclosed.

In the accompanying drawings which illustrate the invention, Figure 1, Sheet 1, is a cross section of a ship showing in part cross section and part end view a double boiler of
30 improved construction fitted therein, said boiler being fired from a central passage. Fig. 2 is a longitudinal section of the same. Fig. 3 is a part cross section and part end view, and Fig. 4 a longitudinal section corresponding to Fig. 2 but showing the boiler
35 as fired from the ends. Figs. 5 and 6, Sheet 2, represent in cross and longitudinal sections respectively a single fired boiler, and Figs. 7 and 8 like views of a double ended boiler.

40 The boiler is composed of a main drum or cylinder *a* partly filled with water, the upper portion being steam space, and two or more lower drums or cylinders *b, b*, entirely filled with water. The lower drums *b, b*, are
45 connected to the main drum *a* by a large

number of small water tubes *d, d, d*, any one of which may be withdrawn into the inside of the main drum *a* should it prove defective and a new tube inserted through said drum.

Where height is not of importance the small tubes *d, d, d*, may be longer and more nearly straight than as shown in the drawings by increasing the distance between the drums, provided always that none of them are too
50 long to be drawn into the main drum. Access can be had to all the drums by manholes *e, e, e*, for expanding tubes in case of leakage or replacing them in case of defect. The
55 downflow of the colder water from the main drum *a* takes place through tubes *f, f*, fitted outside the furnace and smoke casing *j*, said tubes *f, f*, being connected to the lower drums *b*. The circuit is thus completed. The tubes
60 *f, f*, should be sufficient to give a supply of water equal to that flowing through the small tubes *d, d, d*, and are so placed as to distribute the water to the drums *b*, so as to insure uniform distribution of the water through the
65 tubes *d*.

The hot gases from the furnace *h*, pass upward between the small water tubes *d, d, d*, which are so arranged as to intercept their passage as much as possible and thence to the funnel or smoke stack *i*.

70 Figs. 1 to 4 of the drawings show two independent boilers connected by a single smoke stack; Figs. 5 and 6, a single boiler and smoke stack, and Figs. 7 and 8 a single boiler having four drums *b*, connected to the
75 main drum or cylinder *a*, within the combustion chamber.

Having now described the invention, what we claim, and desire to secure by Letters Patent, is—

80 In a steam boiler, the combination of two or more water drums *b* in proximity to the furnace, an independent steam and water drum *a* in the uptake, said drums *a* and *b* being independent of each other, a number
85 90

of small water tubes *d* connecting the drums
b and *a* and each adapted to be withdrawn
into the main drum *a*, and independent cir-
culating tubes *f* fitted outside of the furnace
5 and smoke casing and connecting the lower
drums with the upper drum and having a ca-
pacity sufficient to give a supply of water
equal to that flowing through the small tubes
d, substantially as and for the purposes de-
10 scribed.

In witness whereof we have hereunto set

our hands and seals the 6th day of August,
1894.

PETER FERGUSON. [L. S.]
W. Y. FLEMING. [L. S.]

Witnesses:

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