

No. 724,049.

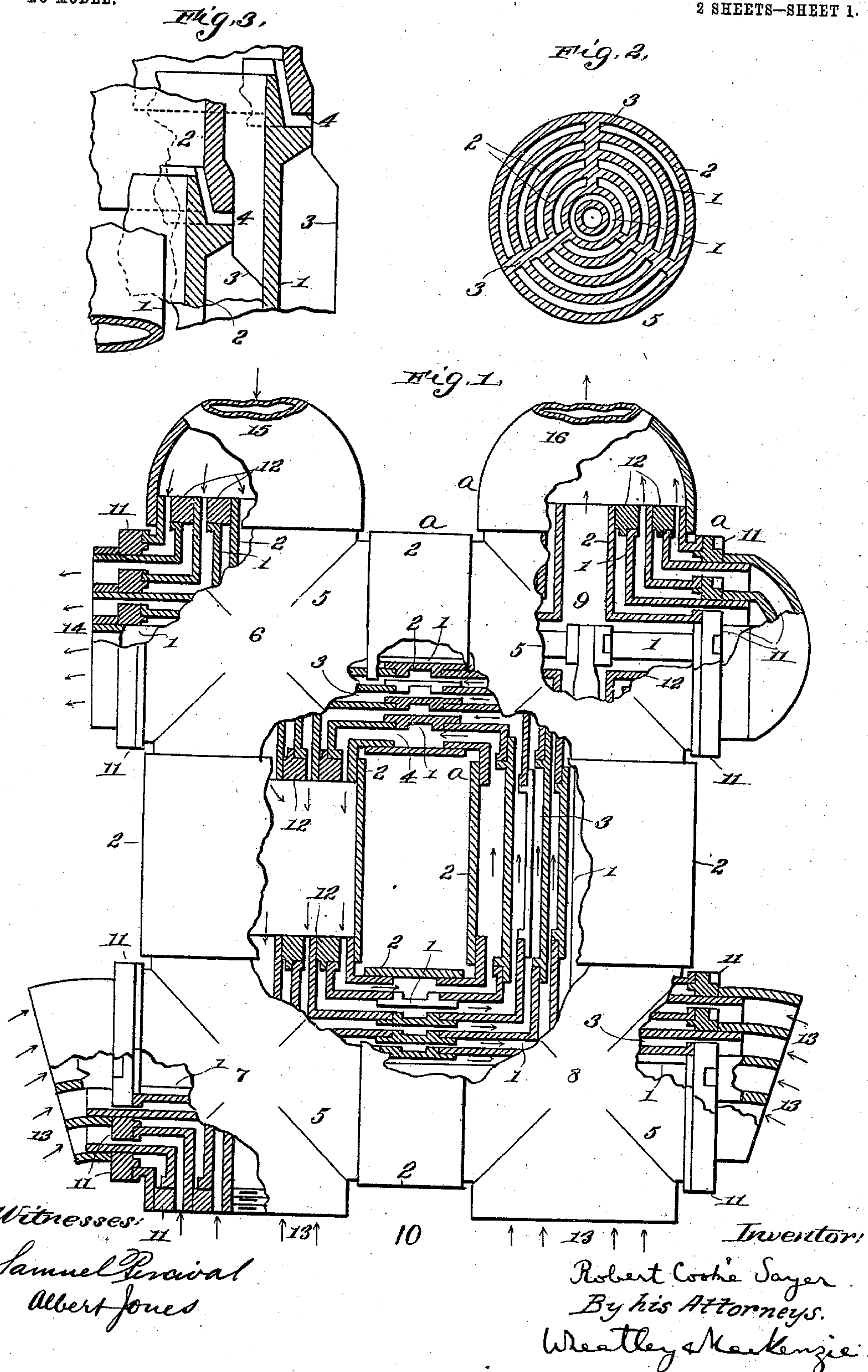
PATENTED MAR. 31, 1903.

R. C. SAYER.  
APPARATUS FOR BOILING WATER.

APPLICATION FILED SEPT. 21, 1900.

NO MODEL.

2 SHEETS—SHEET 1.



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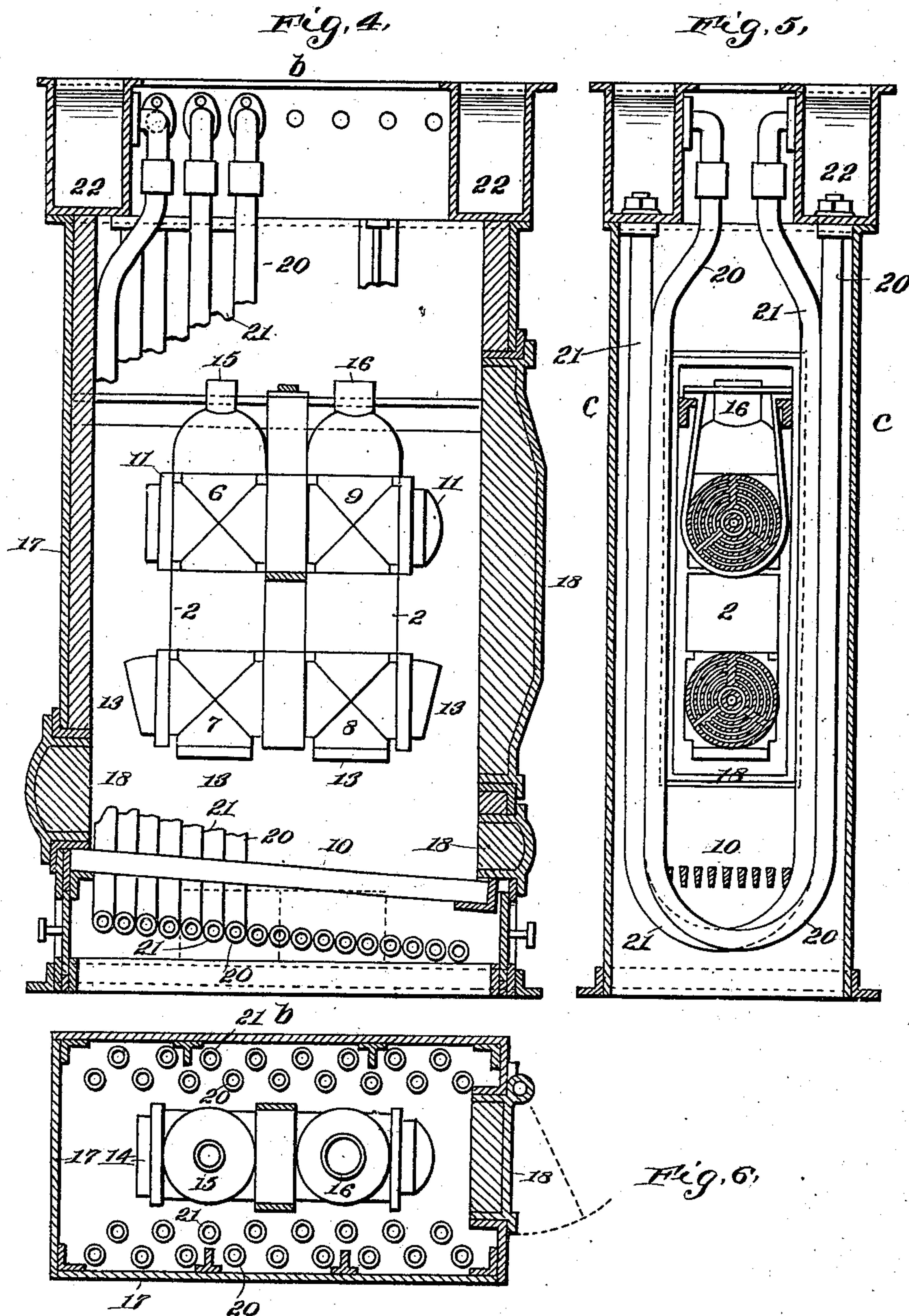
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2 SHEETS—SHEET 2.



Witnesses:  
Samuel Percival  
Albert Jones

Inventor:  
Robert Cooke Sayer  
By his Attorneys  
Wheatley & Mackenzie.



# UNITED STATES PATENT OFFICE.

ROBERT COOKE SAYER, OF BRISTOL, ENGLAND.

## APPARATUS FOR BOILING WATER.

SPECIFICATION forming part of Letters Patent No. 724,049, dated March 31, 1903.

Application filed September 21, 1900. Serial No. 30,698. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT COOKE SAYER, engineer, a subject of the Queen of Great Britain and Ireland, residing at Bristol, England, have invented certain new and useful Improvements in Apparatus for Boiling and Evaporating Water, (for which I have made application for patent in Great Britain, No. 14,592, dated the 15th of August, 1900;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of this invention is to evaporate water to give high pressure; and it essentially consists of a number of concentric tubes and formed with webs that separate and mutually strengthen the tubes, the spaces so formed being arranged alternately to carry water and hot air. The concentric tubes are suspended within a furnace more or less lined with tubes for heating the feed-water. The furnace is provided with a door through which to draw out the boiler and others for stoking.

In the accompanying sheets of illustrative drawings, Figure 1 is a sectional elevation of the boiler without its inclosing walls constructed according to this invention. Fig. 2 is a section at *a a* on Fig. 1, and Fig. 3 a detail of the tube connections. Fig. 4 is a sectional elevation of the boiler in the furnace. Fig. 5 is a sectional elevation at *b b* in Fig. 4, and Fig. 6 is a sectional plan at *c c* in Fig. 5.

The tubes 1 and 2 are connected with or carry webs 3, have coned or other suitable ends 4, and are connected to angle-joints 5 by the outer tubes 2 being screwed up, and so form tight spaces for water and hot air alternately. Circuits 6 7 8 9 6 of the spaces are formed, and the nuts and caps 11 close the water-spaces and 12 close the hot-air spaces. The whole is suspended over a source of heat at 10, and both are inclosed within walls 17,

Figs. 4 to 6, having proper doors 18, through which to stoke and draw out the boiler, and the walls are in part lined with water-tubes 20 and 21, able to carry the feed-water from its reservoir 22 and back again. The heat envelops all the pipes and is directed to enter openings 13, pass through its spaces, and exit at 14, heating the water that enters at 15, completes its circuits through its spaces of uniform or varying cross-sections, and gives off its steam at 16.

What I claim, and desire to secure by Letters Patent, is—

1. A tubular boiler for heating and evaporating water consisting of a number of concentric tubes, separating-webs formed in one with the tubes which mutually strengthen the tubes by distributing the strain due to the steam-pressure between the concentric tubes.

2. A tubular boiler for heating water and evaporating it, consisting of a number of concentric tubes forming alternate heating and heated spaces and having separating-webs to increase their strength, angle-joints for connecting lengths of such tubes to form continuations of such spaces, a means for securing them together and closing the heated or heating spaces, entrances and exits to the heating-spaces, entrance for the water-supply and exit for the generated steam.

3. A tubular boiler, consisting of concentric tubes and joints strengthened with webs and connected together to form circuits, an inclosing furnace in which the tubes are suspended over a source of heat, feed-water tubes lining the walls inside to heat the feed-water and doors in the walls.

In testimony whereof I have affixed my signature in presence of two witnesses.

ROBERT COOKE SAYER.

Witnesses:

LIONEL A. WILSON,  
GILBERT J. RICKETTS.