

(No Model.)

2 Sheets—Sheet 1.

P. HANREZ.

STEAM BOILER.

No. 384,972.

Patented June 26, 1888.

FIG. 1

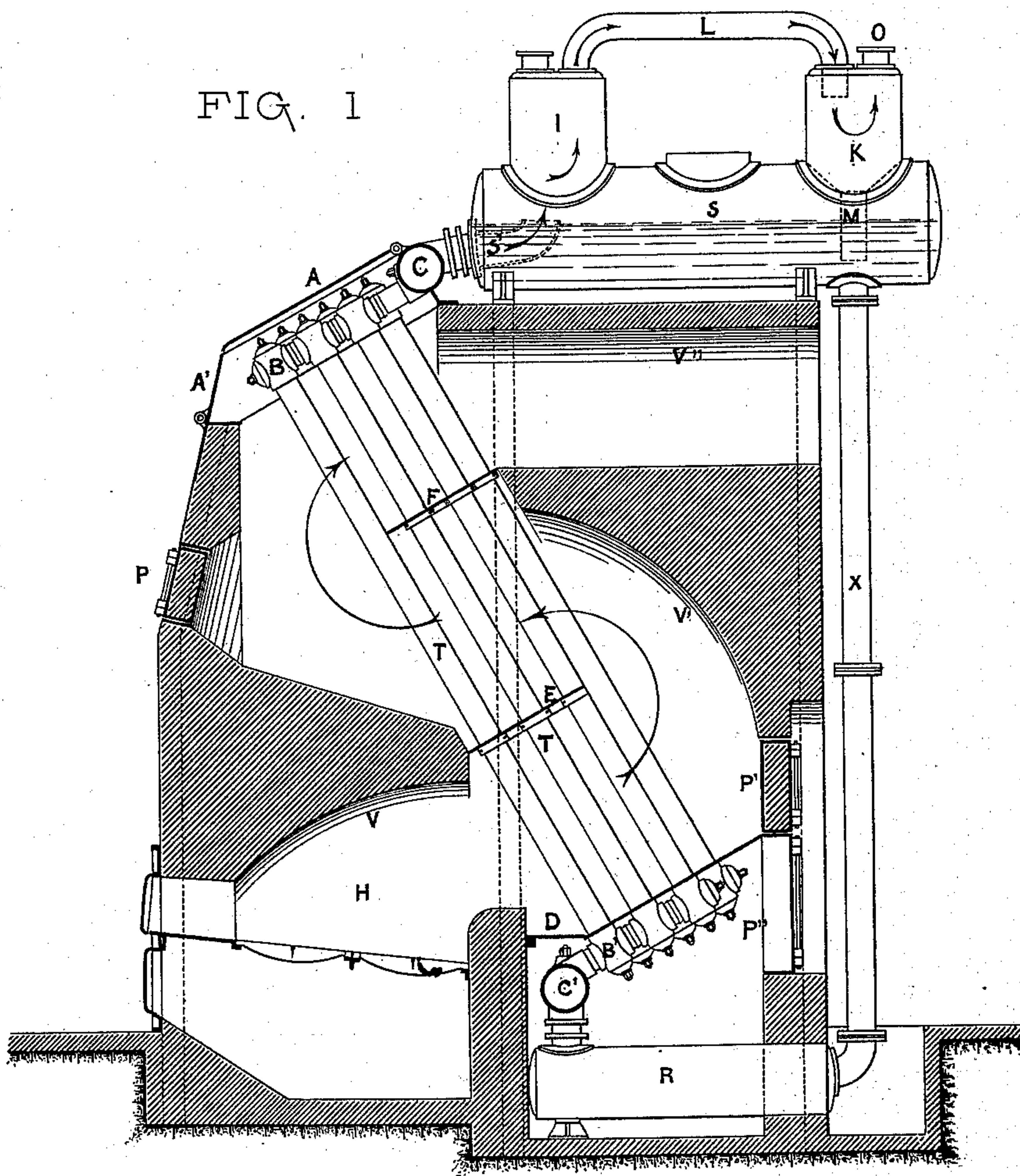
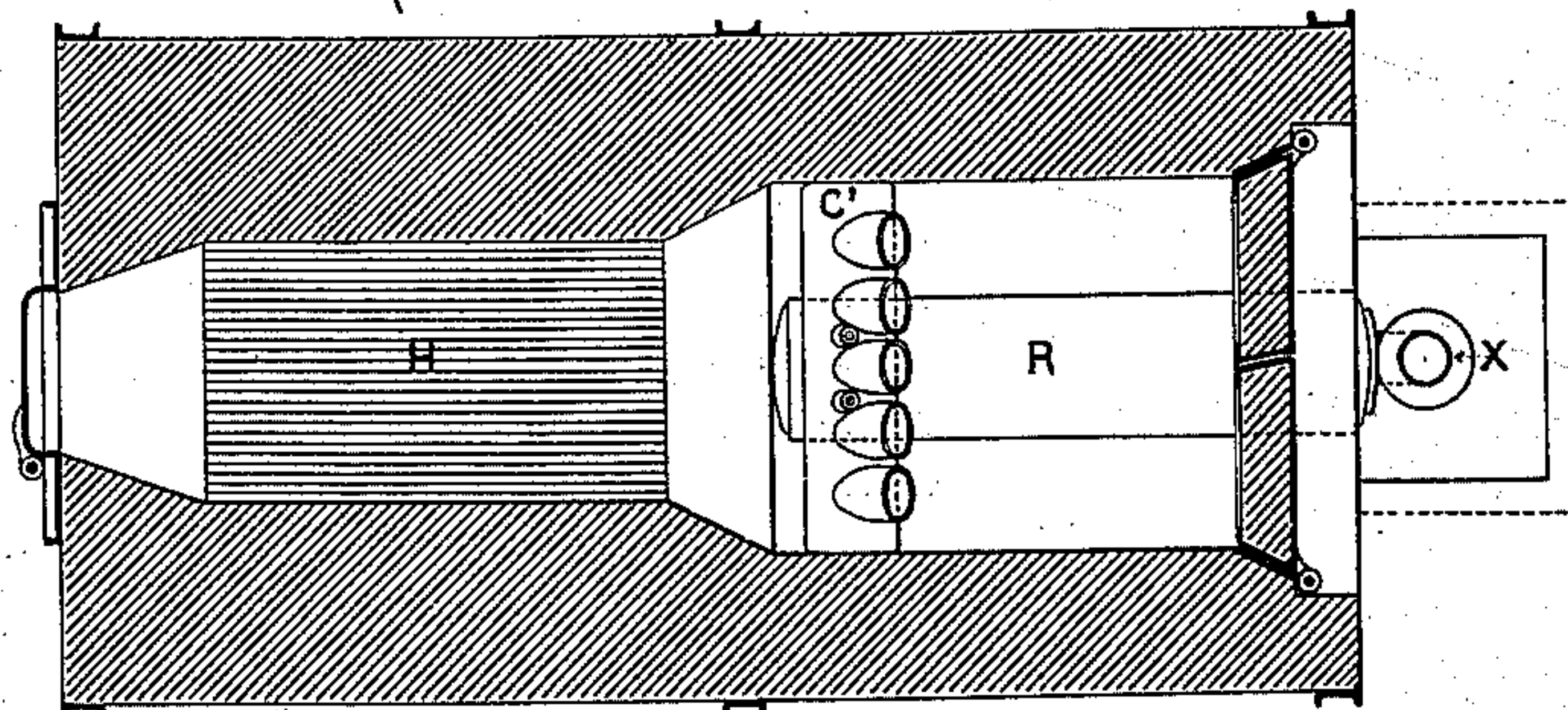


FIG. 2



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W. D. Porter.

Inventor:
Prosper Hanrez.
by Herbert W. T. Jenner.
Attorney

(No Model.)

2 Sheets—Sheet 2.

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FIG. 3

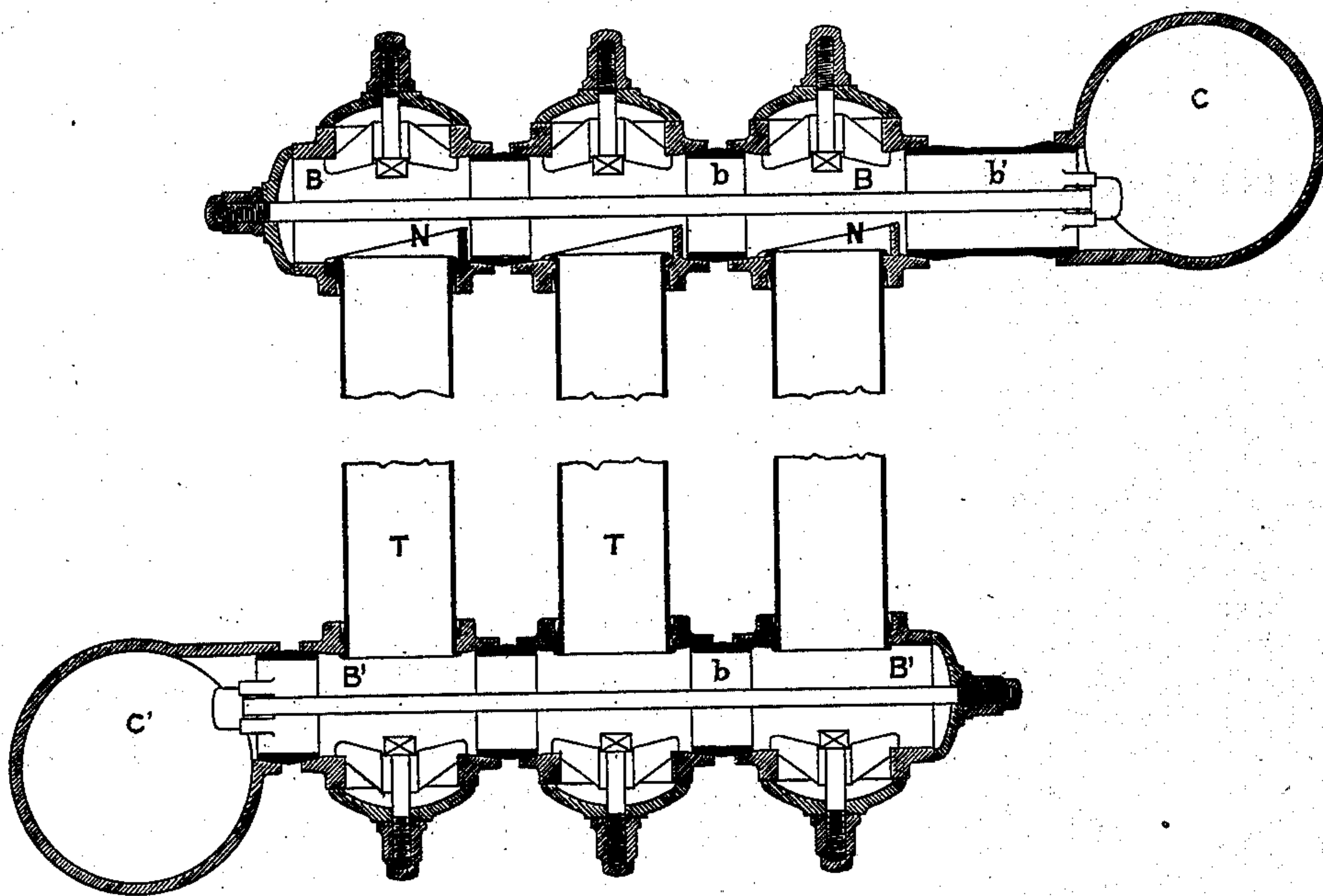
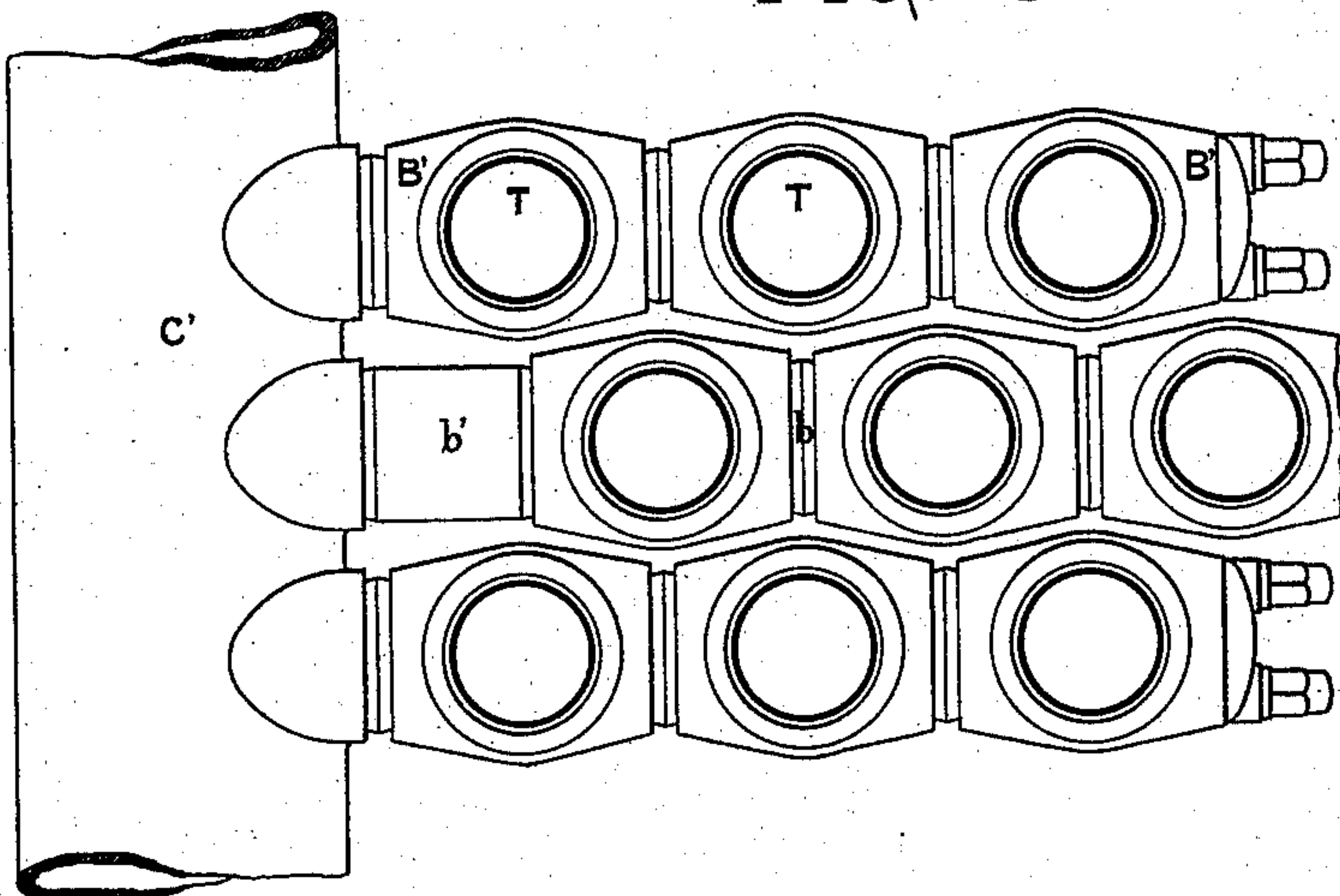


FIG. 4



Witnesses:

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UNITED STATES PATENT OFFICE.

PROSPER HANREZ, OF BRUSSELS, BELGIUM.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 384,972, dated June 26, 1888.

Application filed March 10, 1888. Serial No. 266,823. (No model.) Patented in Belgium November 9, 1886, No. 75,167, February 24, 1887, No. 76,463, and December 14, 1887, No. 79,920; in France November 15, 1886, No. 179,647, and February 26, 1887, No. 179,647, and in England December 23, 1887, No. 17,697.

To all whom it may concern:

Be it known that I, PROSPER HANREZ, a subject of the King of Belgium, and residing at Brussels, in the Kingdom of Belgium, have
5 invented certain new and useful Improvements in Steam Boilers, (for which I have obtained Letters Patent in Belgium, dated November 9, 1886, No. 75,167, February 24, 1887, No. 76,463, and December 14, 1887, No. 79,920; in
10 France, dated November 15, 1886, No. 179,647, and February 26, 1887, No. 179,647; and provisional protection in England, dated December 23, 1887, No. 17,697,) of which the following is a specification.

15 This invention relates to sectional steam-boilers. The nature of the invention consists in the construction, arrangement, and combination of parts forming a sectional boiler and the setting thereof, the object being to insure
20 certain contact of the water with the parts most strongly heated; also to facilitate the free escape of steam; also to separate the steam from the water which it contains, thus obtaining dry steam; and also to facilitate inspection of
25 all parts of the boiler.

The accompanying drawings illustrate my invention.

Figure 1 is a sectional side elevation showing the whole boiler, comprising the tubes and
30 tube-connection boxes, receivers, steam and water reservoirs, masonry, setting, furnace, and inspection-apertures. Fig. 2 is a sectional plan showing the furnace, lower tube-connection box, and the lower water-reservoir. Figs. 3 and 4
35 are detail views showing the manner in which the ends of the tubes are fixed into boxes connected to each other, forming one chamber at either end, the lower one connected to the water-reservoir and the upper one to the steam
40 and water reservoir.

In the different figures similar letters of reference designate corresponding parts.

45 T is a group of separate tubes placed at an angle of more than forty-five degrees with the horizon, but not quite vertical. The ends of each tube are fixed in the ordinary manner into a cast or wrought iron box, which boxes are connected to each other by suitable joints—such as the rings *b b'*—forming together the junction
50 boxes or chambers B B'. The chambers are

connected by similar rings or pipes to the upper and lower collectors, C C', which are again connected in suitable manner to the steam and water-reservoirs, S and R. These two reservoirs are placed in connection with each other
55 by means of the pipe X. Upon the reservoir S two domes, I and K, are provided, joined by the large pipe L, the end of which descends into the upper part of the dome K. The base of this dome K terminates in a funnel, M, the
60 lower end of which is extended below the water-level of the reservoir S.

The furnace is located in front of the lower part of the group of tubes. A plate, D, prevents the flame from striking directly against
65 the junction-box B, and two other transverse partitions or baffle-plates, E and F, fixed at or about right angles across and between the tubes at even or suitable distances apart, compel the
70 gases produced by combustion to change their direction so as first to impinge against the lower, then the middle, and last the upper part of the group of tubes. As many of such baffle-
75 plates may be employed as are advantageous according to the length of the tubes. The flame and gases are also directed in their course by the form of the masonry arches V V' V". The
80 doors P, P', P'', and A' permit of easy inspection and cleaning of all inclosed parts of the boiler. It will be obvious that the flame strikes first that part of the tubes in which water is always
85 certain to exist, and where it is always under great pressure, and that the gases of combustion do not touch or act upon the upper part of the tubes, where the greatest quantity of steam is formed and passes, until after
90 they have acted upon the two (or more) lower sections of heating-surfaces, and being thus deprived of a large amount of their heat. It is the contrary which takes place, for the most part, in other sectional boilers—such as, for example, those of Babcock, Root, and De Naeyer,
95 in which the part situated directly over the fire is that in which exists not only the steam which is there formed but also that which comes from the lower parts. To further facilitate the circulation, I provide in the interior of the upper tube-box, B, beveled projections or lips N, Fig. 3, which prevent water lodged
100 in this box from counteracting or hindering

the free escape of steam. These lips may be connected to or formed upon the ends of the tubes, or connected to or formed upon the boxes, as shown to the right hand in the drawings, as may be found the more convenient in making the boilers. The steam which collects in this box B escapes to the collector C, and from thence is discharged by pipe S' into the receiver S beneath the dome I, and thence by the pipe L into the dome K, where it is obliged to change its direction to arrive at the steam-pipe O. Any water carried by the steam is thus projected by its force of inertia into the funnel M, at the bottom of which it mixes with the water in the reservoir, and is thus separated from the steam in the interior of the steam-reservoir. I do not limit myself to the use of two domes only, connected as described, as any convenient number may be employed. The greater the number the more thoroughly will the steam be dried. Suitable fittings are attached to the boiler in the usual manner.

What I claim as my invention, and desire to secure by Letters Patent, is--

1. The combination, in a sectional steam-boiler, of a group of tubes at an angle exceeding forty-five degrees with the horizon, but not quite vertical, and having junction-boxes, steam and water-containers and reservoirs, baffle-plates dividing the group of tubes longitudinally into three or more sections, of which the lowest section first receives the action of a furnace placed in front thereof, masonry arches to direct the course of the flames and gases, and inspection and cleaning doors, all arranged substantially as described.

2. The combination, with the tubes and the upper tube-junction box of sectional steam-boilers, arranged as specified, of an internal beveled projection or lip at the upper side of the head of each tube formed on the interior of the separate boxes, substantially as and for the purposes set forth.

3. In a sectional steam-boiler, the combination, with the upper steam and water reservoir and a discharge-pipe, S', disposed as specified, of a series of steam-domes connected successively by pipes, the last pipe descending so far into the last of the series of domes as to compel the steam to alter its direction to arrive at the steam-pipe, and the last dome being provided with a funnel extending below water-level, substantially as and for the purposes set forth.

4. In a sectional steam-boiler, the combination, with the upper junction-boxes for coupling the ends of the tubes, of the tubes secured into the said boxes, and circular beveled projections at the ends of the said tubes inside the boxes for preventing accumulated water from hindering the free escape of the steam, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

PROSPER HANREZ.

Witnesses:

GEORGE BEDE,
AUG. GÉNARD.