

(No Model.)

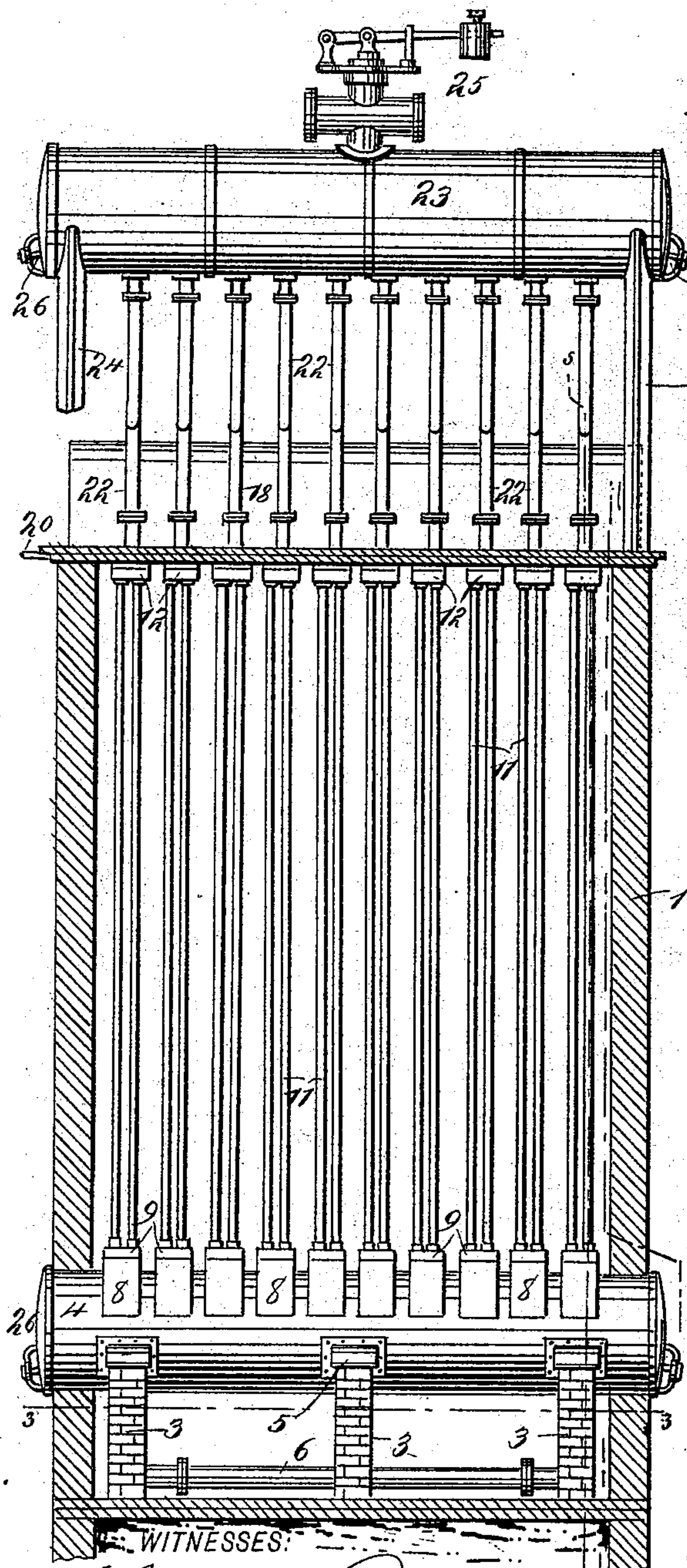
3 Sheets—Sheet 1.

C. ALFONSO.
TUBULAR BOILER.

No. 525,248.

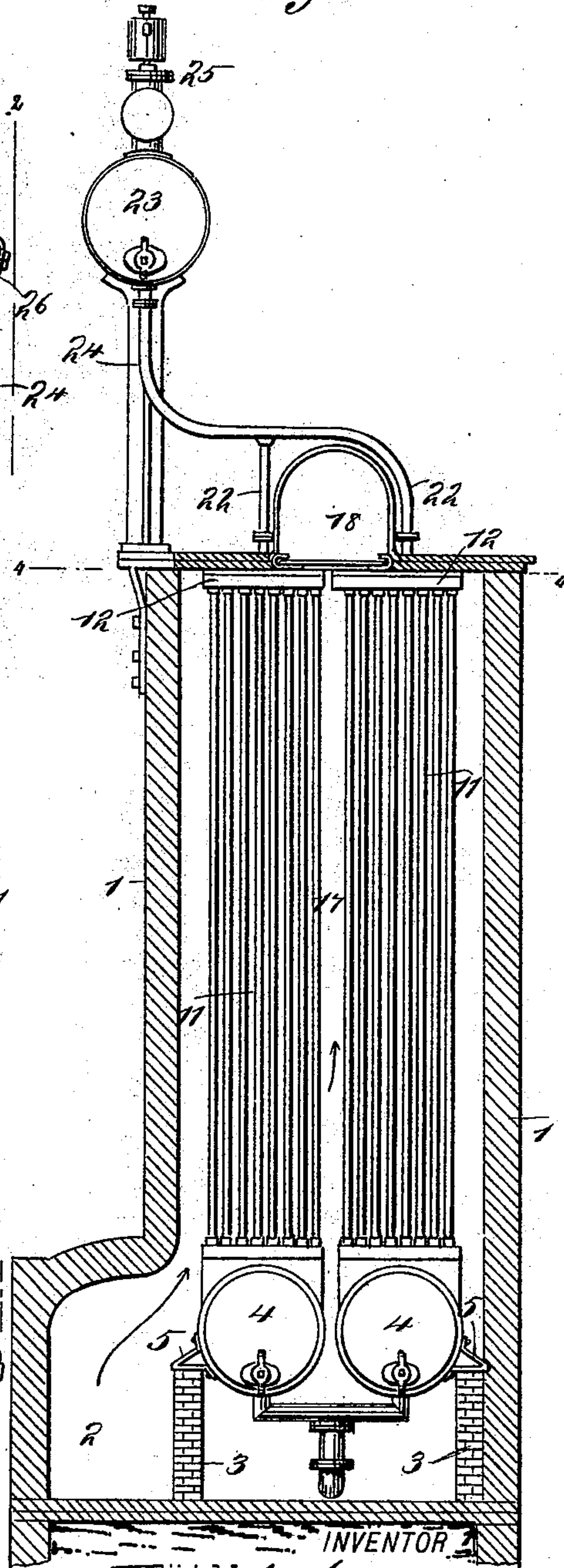
Patented Aug. 28, 1894.

Fig: 1.



WITNESSES:
Chas. Nida
E. Sedgwick

Fig: 2.



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Fig: 3.

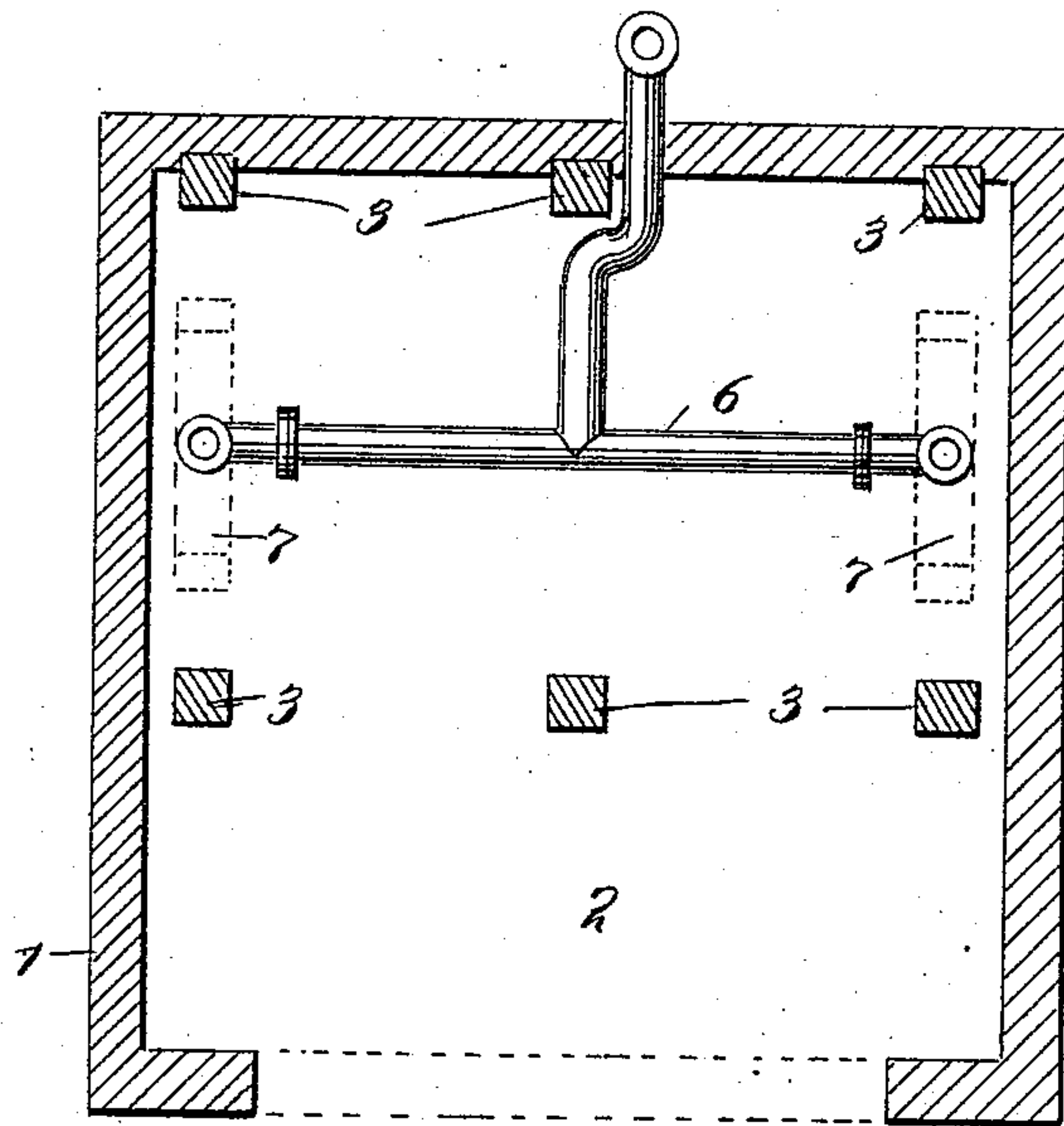
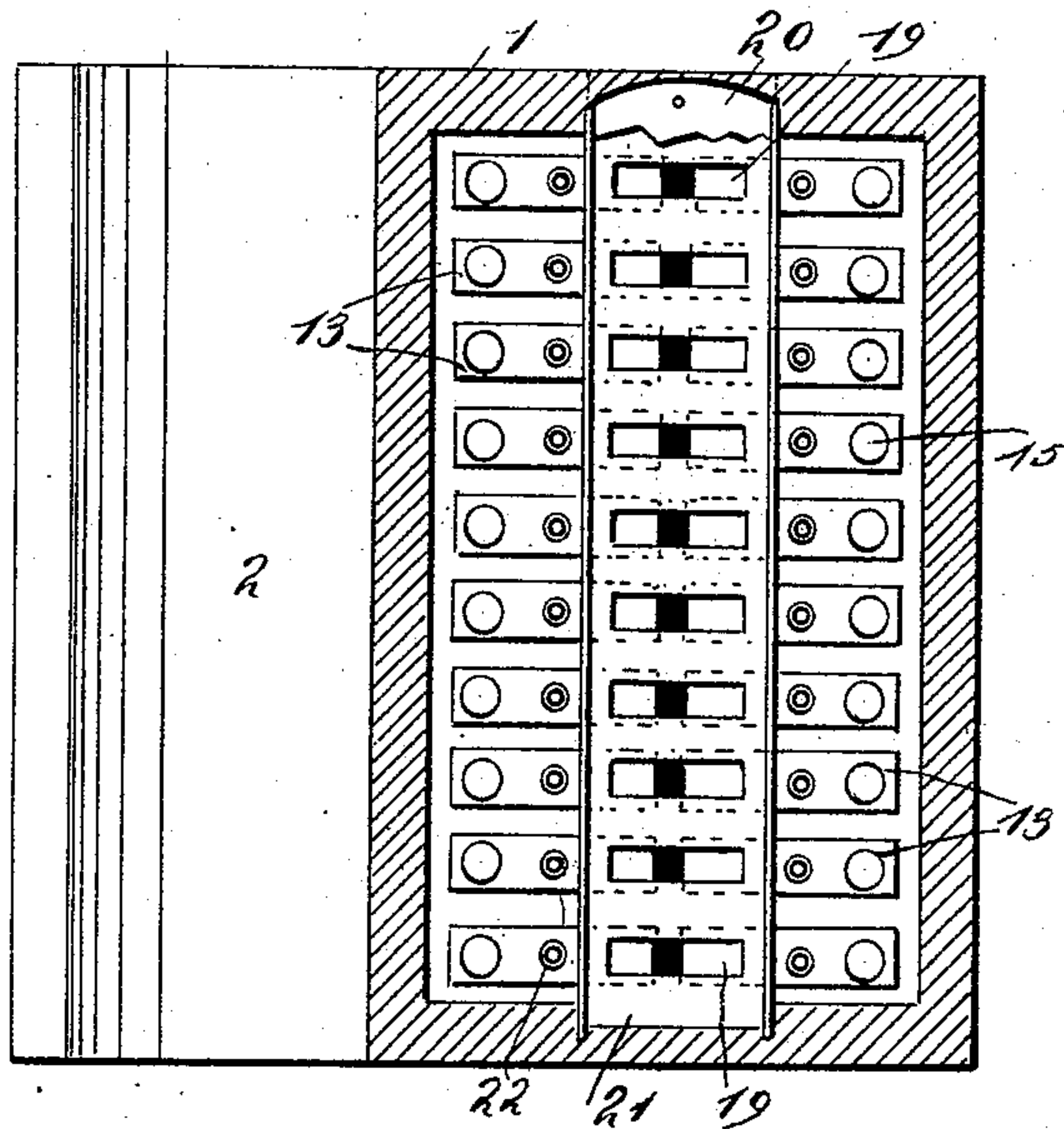


Fig: 4.



WITNESSES:

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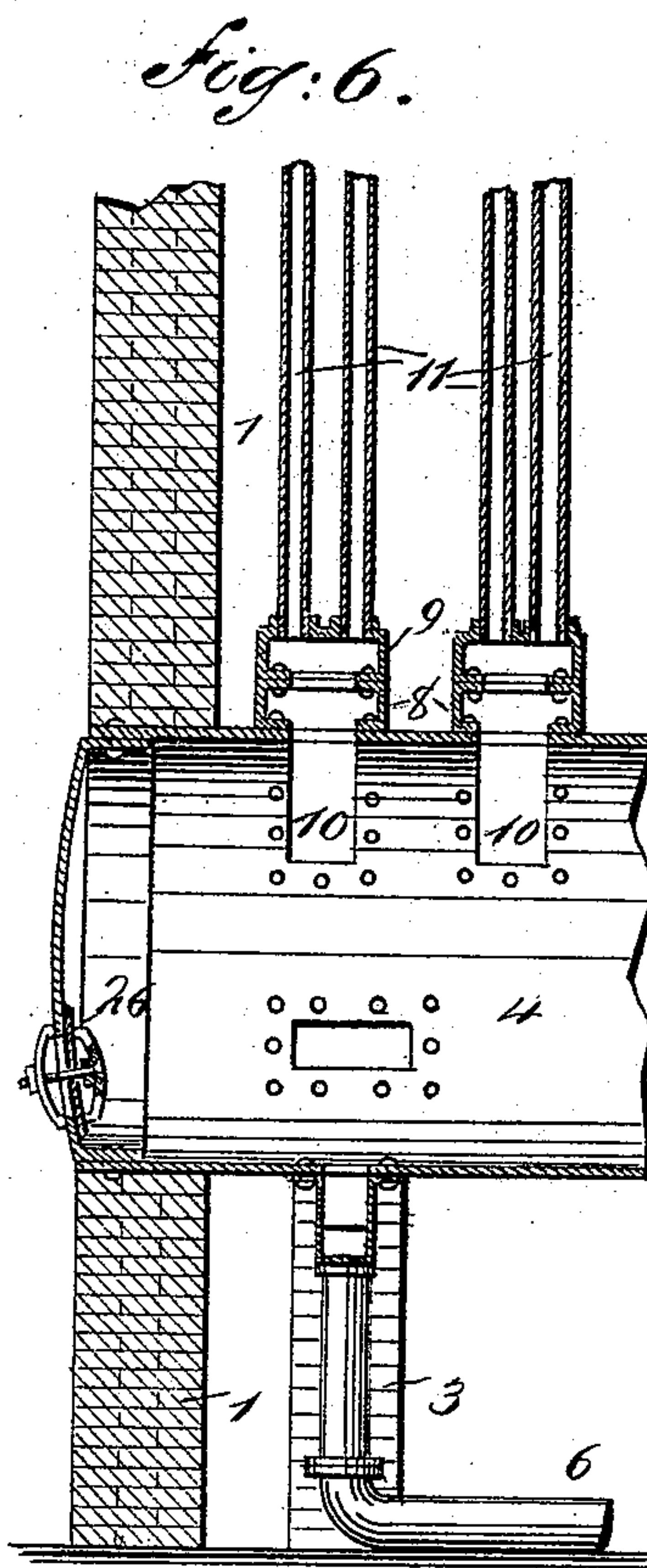
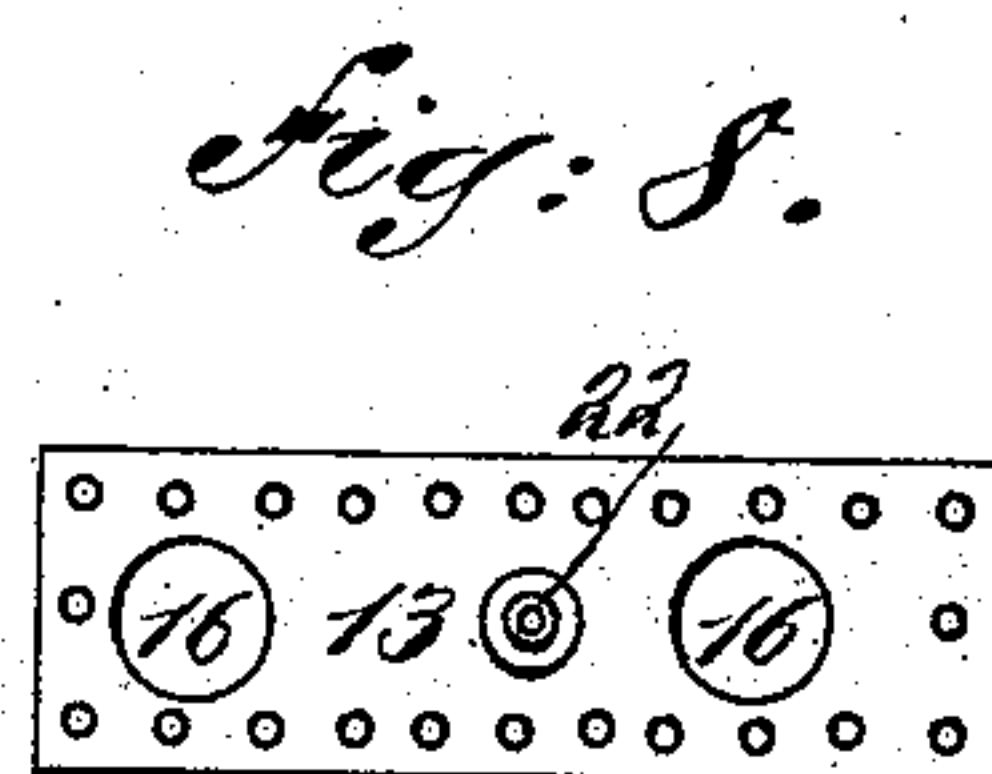
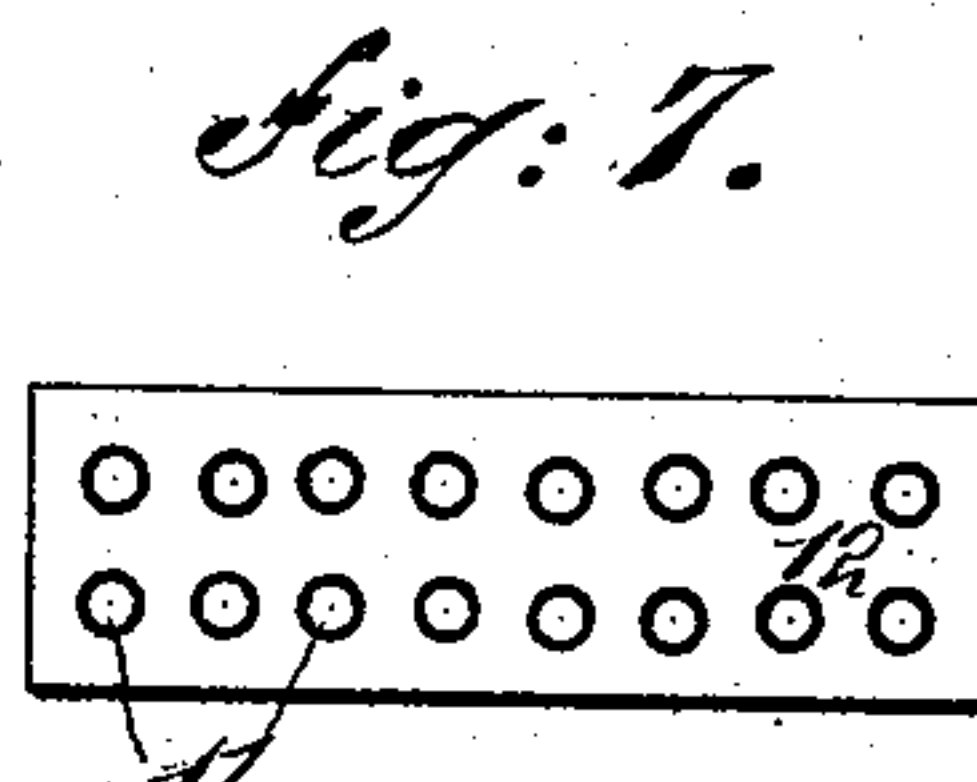
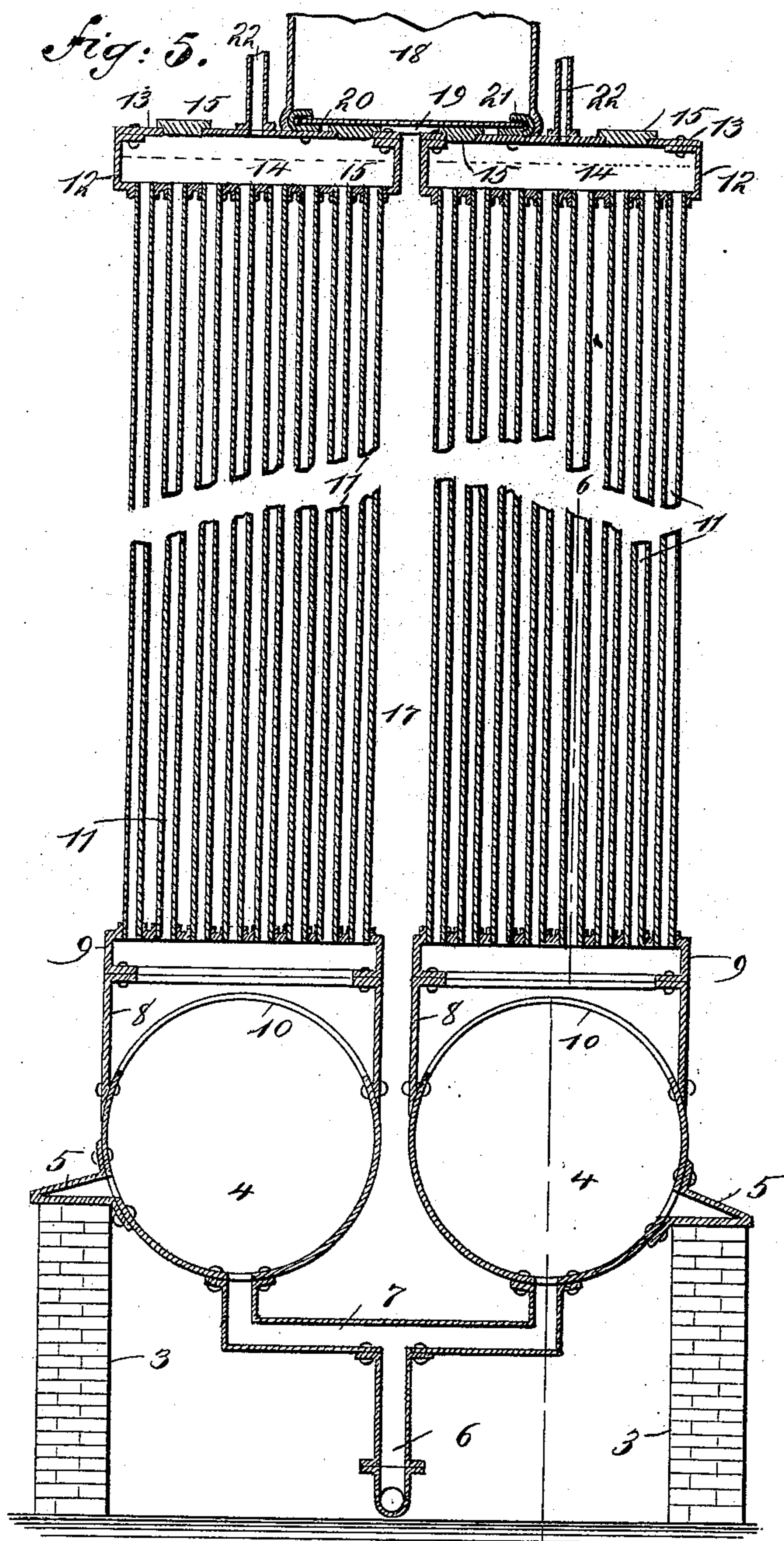
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3 Sheets—Sheet 3.

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Patented Aug. 28, 1894.



WITNESSES:

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UNITED STATES PATENT OFFICE.

CRECENCIO ALFONSO, OF RANCHUELO, CUBA.

TUBULAR BOILER.

SPECIFICATION forming part of Letters Patent No. 525,248, dated August 28, 1894.

Application filed October 26, 1893. Serial No. 489,200. (No model.)

To all whom it may concern:

Be it known that I, CRECENCIO ALFONSO, a subject of the King of Spain, and a resident of Ranchuelo, in the Island of Cuba, have invented certain new and useful Improvements in Tubular Boilers, of which the following is a full, clear, and exact description.

My invention relates to a tubular boiler provided with heaters, water tubes, steam chambers, steam tubes and a steam reservoir or dome, and the object of the invention is to produce steam, or superheated steam that is free of water particles, in an energetic and economic manner, and to provide simple means for regulating the draft.

The invention consists of the arrangement of the several parts, and of certain features of construction and combinations of the same, as will be fully disclosed hereinafter and pointed out in the claims.

Reference is to be had to the accompanying drawings which form a part of this specification, and in which—

Figure 1 is a side elevation, partly in section, of a boiler constructed according to my invention. Fig. 2 is an end elevation of the same, partly in section on line 2—2 of Fig. 1. Fig. 3 is a sectional plan on line 3—3 of Fig. 1. Fig. 4 is a horizontal section on line 4—4 of Fig. 2. Fig. 5 is a cross sectional elevation on line 5—5 of Fig. 1. Fig. 6 is a longitudinal sectional elevation on line 6—6 of Fig. 5. Fig. 7 is a detail view of the bottom of the box 12; and Fig. 8 is a detail view of one of the covers 13.

Like reference numerals indicate the same parts in all the views.

The main parts of the boiler are located in and on a structure 1 of bricks or other suitable material, which in its lower part is provided with a furnace located at 2, (Figs. 2, 3 and 4.) The boiler is located in the rear portion of the structure, and is adapted to be supported on pillars 3. The boiler consists primarily of the twin heaters 4, to which are secured flanged V-shaped extensions 5 that are adapted to rest on top of the pillars 3. The said extensions may be hollow so as to allow the water supplied to the heaters to fill the extensions whereby the latter are protected against injury by excessive heating. It will be observed that the inner faces of the

upper walls of the said extensions are inclined upwardly from their outer ends to their connection with the heaters, so that the water heated in the extensions, or the steam evolved therein, will readily rise along the inclined surfaces of the said upper walls. A common feed pipe 6 having branches 7 supplies water to both heaters 4, preferably at the bottom thereof, as shown. It will be seen that the feed pipe also contributes to steady the heaters and constitutes, as it were, a brace connection between the same.

To the upper part of the heaters 4 is secured a series of casings, preferably located at regular intervals apart, and the said casings, as shown in the drawings are composed of a lower part 8, secured to the heater, and an upper part 9. The heaters are provided with apertures 10 at the places where the said casings 8, 9, are fitted on the heaters. The upper part 9 of each casing has a steam-tight connection with a plurality of spaced water tubes 11. As illustrated in Figs. 1, 2, 5, 6 and 7, sixteen tubes arranged in two parallel rows of eight are connected with each of the casings 8, 9. The casings practically form an extension of the heaters and materially increase the heating surface of the boiler. The number of water tubes 11 may of course be varied, but it is preferred in any event to arrange the same in parallel rows transversely of the heaters, as shown.

The upper ends of the water tubes 11 are secured to boxes 12 which are similar to the upper parts 9 of the casings located at the lower ends of the said tubes. The boxes 12 with their covers 13 form chambers 14 in which the steam generated in the casings 8, 9 and water tubes 11 will collect. The water should preferably cover the upper ends of the water tubes 11, yet not entirely fill the chambers 14. Screw plugs 15 (Fig. 5) are adapted to tightly close openings 16 (Fig. 8) provided in the covers 13 in order to enable the covers to be riveted or otherwise secured to the boxes.

The combustion gases from the furnace 2 rise in contact with the heaters 4, the casings 8, 9, the water tubes 11, and the walls of the steam chambers 14. It will be seen by reference to Fig. 5, that a central passage 17 is formed between the heaters 4 and the tubes

and steam chambers connected therewith. This central passage has a communication with the smoke pipe 18 by means of the apertures 19, which are adapted to be closed partly
5 or all by means of the sliding damper 20 which is capable of longitudinal movement in the guides 21. The apertures 19 are produced in the guides 21, as shown in Fig. 4. It will be understood that the damper is adapted to
10 be drawn out on that side of the smoke pipe 18 which is nearest to the chimney, so that even if but one of the openings 19 is uncovered, the combustion gases will travel through the entire length of the smoke pipe, for a purpose presently to be stated.

Each of the boxes 12 has a steam tube 22 secured to it, and the steam tubes in their lower portions extend adjacent or contiguous to the smoke pipe 18 so as to secure further heating of the steam. The steam tubes
20 belonging to different heaters may be connected so as to have a common upper portion, as will be seen in Fig. 2. A steam reservoir or steam dome 23 is supported on standards
25 24 secured to the top of the structure 1. The steam tubes 22 are all connected with the said steam dome. It will be understood that the boiler will be provided with the usual fixtures, such as a safety valve (shown at 25),
30 manholes (the covers of which are designated by the numeral 26), a pressure-gage, &c.

It will be obvious that instead of two heaters any number of the same may be used, and similarly the arrangement and form of the
35 water tubes, and other features of the boiler may be varied without departing from the nature of my invention.

An important advantage of the invention is the fact that the steam is allowed to separate from the water in special heated chambers, and is then further heated as it travels

through the tubes 22 along the smoke pipe 18. The generation of pure steam, free from water, is insured by this arrangement.

Having thus fully described my invention, 45 I claim as new and desire to secure by Letters Patent—

1. In a tubular boiler, the combination, with the furnace, the heaters, the water tubes connected therewith and located in the path of
50 travel of the combustion gases, and a series of steam chambers arranged in spaced parallel rows, of a smoke pipe extending above the said chamber, a damper to control the inlet of combustion gases into the said smoke
55 pipe, a steam reservoir, and steam tubes connecting the steam chambers with the steam reservoir, said tubes being located adjacent to the smoke pipe, as and for the purpose set forth. 60

2. In a tubular boiler, the combination, with the furnace, the heaters, the spaced casings located on the heaters, the vertical water tubes connected with the casings, and the
65 steam chambers communicating with the upper ends of the water tubes and arranged in essentially vertical alignment with the casings; the heaters, casings, water tubes, and steam chambers being located in the path of
70 travel of the combustion gases, as described, of a smoke pipe extending above the steam chambers, a sliding damper adapted to control the inlet of combustion gases into the said smoke pipe, a steam reservoir, and steam
75 tubes connecting the steam chambers with the steam reservoir, said tubes being located adjacent to the smoke pipe in their lower portions, as and for the purpose set forth.

CRECENCIO ALFONSO.

Witnesses:

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LUIS CASAÑAR.