

C. P. ALTMANN.
STEAM BOILER.

(Application filed Sept. 7, 1901.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1

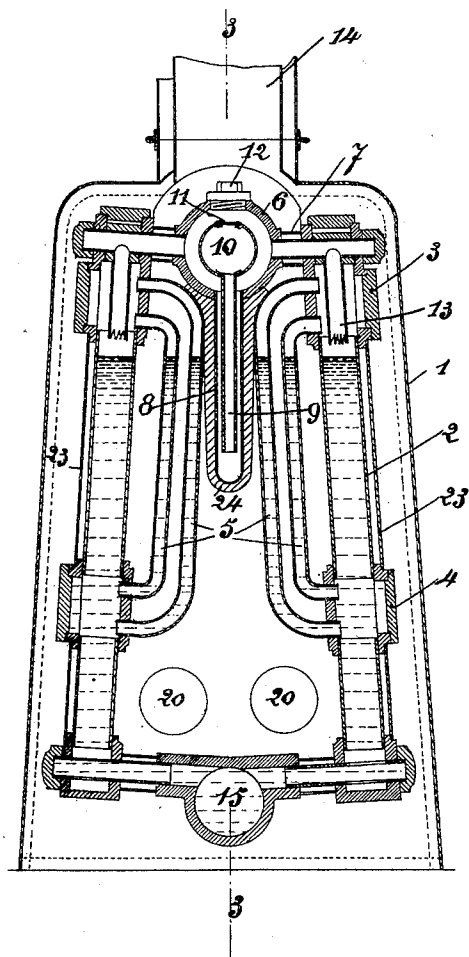
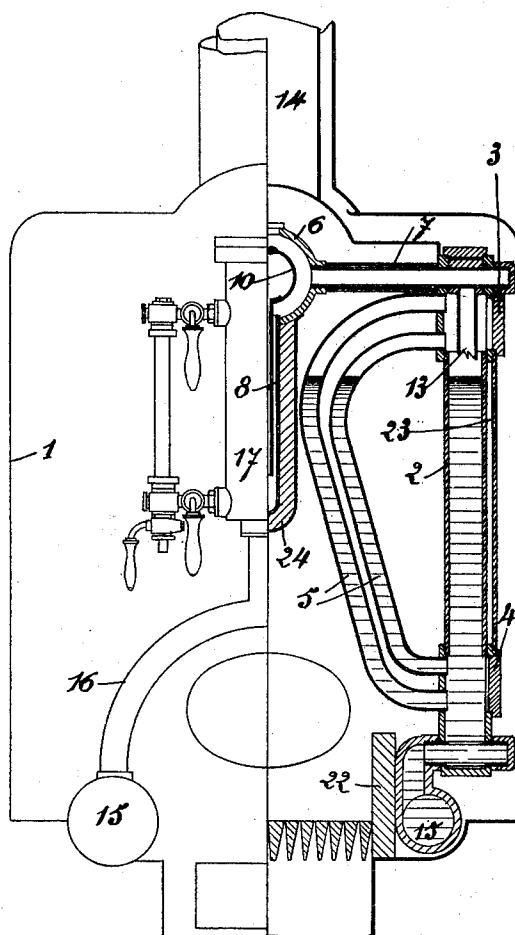


Fig. 2



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No. 703,362.

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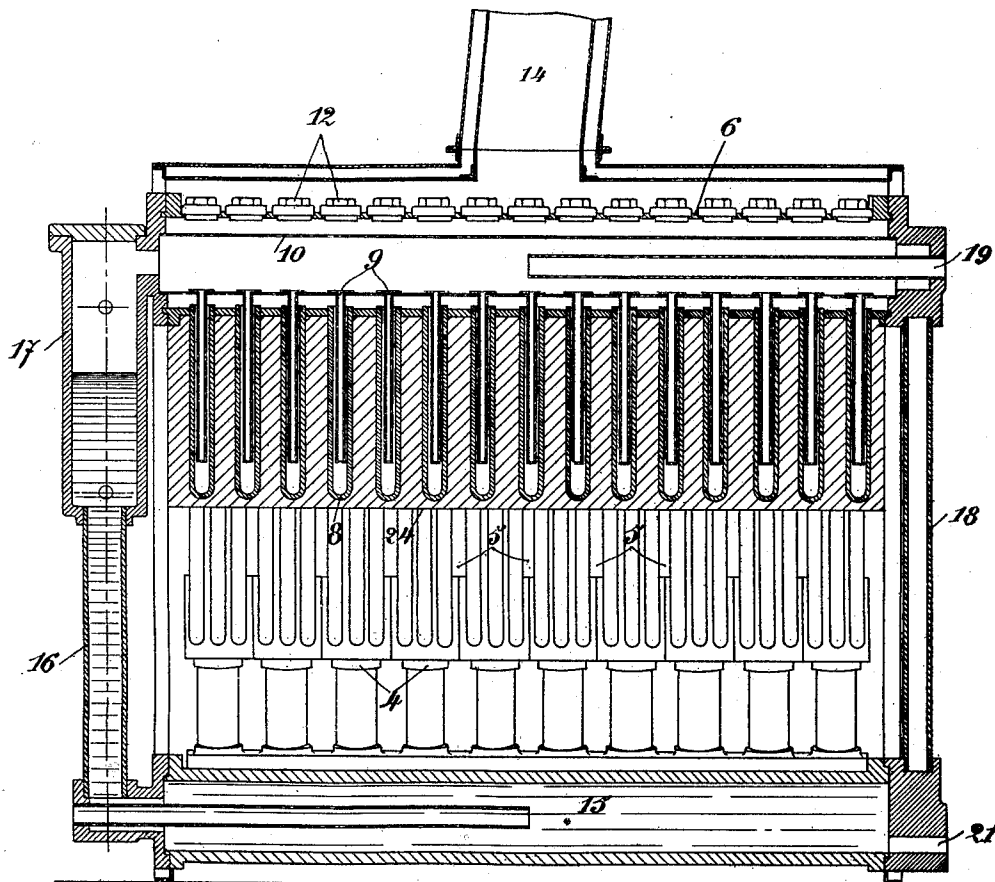
(Application filed Sept. 7, 1901.)

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2 Sheets—Sheet 2.

Fig. 3.



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UNITED STATES PATENT OFFICE.

CHARLES PHILIPPE ALTMANN, OF LYONS-VAISE, FRANCE.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 703,362, dated July 1, 1902.

Application filed September 7, 1901. Serial No. 74,600. (No model.)

To all whom it may concern:

Be it known that I, CHARLES PHILIPPE ALTMANN, a citizen of the Republic of France, and a resident of Rue des Tuileries, No. 11, Lyons-Vaise, France, have invented certain new and useful Improvements in or Relating to Steam-Boilers, of which the following is a specification.

The present invention relates to improvements in steam-generators with superheaters especially applicable to marine boilers and the like, but also suitable for other purposes, the improved apparatus being adapted for use either with solid or with liquid fuel.

The new boiler is of the multitubular type and has a relatively large heating-surface. The water circulation is a very easy and effective one and the steam produced is dry and superheated. The parts of the boiler which do not contain water are beyond the reach of the hot gases, as also are the parts which receive the sludge, lime, &c., and the expansion of the tubes will accordingly take place evenly.

In the accompanying drawings, Figure 1 shows a cross-section of a steam-boiler especially adapted for use with liquid fuel. Fig. 2 is a cross-section of a boiler to be fed with solid fuel. Fig. 3 is a longitudinal section on the line 3 3 of Fig. 1.

The several elements of the steam-generator are arranged within an outer casing 1, and consist on either side of a series of similar elements symmetrically arranged. Each element consists of a tube 2 of convenient diameter, which is vertically arranged or slightly inclined and communicates at the ends with two steam-collectors 3 and 4, connected by tubes 5 5, which are suitably bent toward the ends.

On the upper part of the steam-generator there is a steam-superheater consisting of a cylinder 6, horizontally arranged and communicating with each of the upper collectors 3 by means of a tube 7. On the under side of the superheater 6 there is a series of tubes 8, which are open only at their upper ends and contain concentric tubes 9 of small diameter, which communicate at their upper ends with a cylindrical drum 10, arranged concentrically within the outer cylinder 6. This drum is open on its upper side to permit the

introduction of the tubes 9 into the tubes 8. After the introduction of the tubes 9 the drum may be closed by a plate 11. A hermetical connection between plate 11 and the drum is not absolutely necessary. On the upper side of the cylinder 6 there are screw-threaded plugs facilitating the replacing of the tubes 9. In the center of each collector 3 there is a tube 13, communicating at the upper end with the tube 7. The lower end of the tube is arranged below the orifice of the lower of the tubes 5 and is serrated at its lower end. The chimney 14 is arranged centrally above the superheater.

For use with liquid fuel the collector 4 is connected, as represented in Fig. 1, with a second collector 15, which is arranged below the center of the apparatus and which receives the feed-water. The collector 15 communicates at one of its ends with a tube 16 and a reservoir 17, which is in communication with the drum 10. At the other end the collector 15 is attached to a tube 18, not communicating with it, but connected with the back part of the steam-collector 6, containing the steam-pipe 19. Orifices 20 20 are provided at one end of the generator for the introduction of the heating apparatus or burners for heavy oil, naphtha residue, or the like. For emptying the generator there is provided at one end of the collector 15 an orifice 21, normally closed by a screwed plug or any other convenient cover. In the case when solid fuel, such as coal or the like, is used, two feeding-collectors 15 may be provided, one on each side of the fire-box, separated from the furnace by partitions 22 of refractory material and of convenient height. The reservoir 17 communicates in this case with the collectors 15 by means of a double-branched tube 16.

The operations of the apparatus take place as follows: The hot gases come into contact in the first place with the tubes 5 5, then with the tubes 2, and finally in rising they heat the tubes 8 and the cylinder 6 and discharge direct into the chimney 14. If required, the chimney may be arranged in the lower part of the generator. In this case the gases before escaping into the chimney would pass along the outsides of the tubes 2. If the arrangement is such that the gases escape direct from the upper part of the gener-

ator into the chimney, plates 23 23 may be provided on the exterior side of the tubes 2, preventing the direct influence of the heat on the outer casing of the apparatus. The circulation of the water contained in the tubes 5 is a very effective one, the water having an ascending movement within the tubes 5 and descending within the tubes 2. The steam produced passes from the tubes 5 into the collectors 3 and from the collectors 3 through the tubes 7 into the cylinder 6, whereupon it is forced to descend through the pipes 8, in contact with which it becomes dry and superheated. From the tubes 8 the steam passes up through the tubes 9 and through the drum 10 and the orifice 19 to the engine.

In order to prevent the tubes 8 (which do not contain water) and the lower part of the cylinder 6 from being injured by the radiation from the fire-box, a protective cover 24, of refractory material, may be provided. If the steam produced in the tubes 5 should take any water into suspension, it will lose it in passing along the tubes 13. The water particles will be retained by the grooved edges on the under side of the tubes, which form obstructions, and will fall back into the tubes 2. If it should occur, however, that some particles of water are still held in suspension, they will be vaporized during the passage through the tubes 8. It is obvious that the steam escapes from the generator not only dried, but also sufficiently superheated.

The sludge will collect in the collector (or collectors) 15, which is preserved from the direct action of the heat. The parts subject to the influence of the heat will not be filled

with sludge, and accidents which would result therefrom will thus be avoided. In cases where the invention is applied to marine boilers the extraction of the sludge and of the water may be easily effected from the lower part of the collector 15.

The tubes 16 and 18 and the reservoir 17 could be dispensed with; but they facilitate very much the fitting up and removal of the tubes and of the superheater. The reservoir 17 carries such apparatus as the gage-glass, manometer, valves, &c.

The form and dimensions of the different parts of the boiler can be varied to suit requirements.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, I declare that what I claim is—

A superheater for a steam-boiler comprising a cylindrical reservoir, a cylindrical drum located in said reservoir, a series of vertical tubes depending from the reservoir, tubes concentrically located within the said vertical tubes and depending from the inner drum, and a layer of refractory material protecting the parts of the superheater directly subject to the action of the heat, the parts being arranged and combined substantially as and for the purposes described.

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

CHARLES PHILIPPE ALTMANN.

Witnesses:

ED LAMY,
G. TROULLIEUR.