

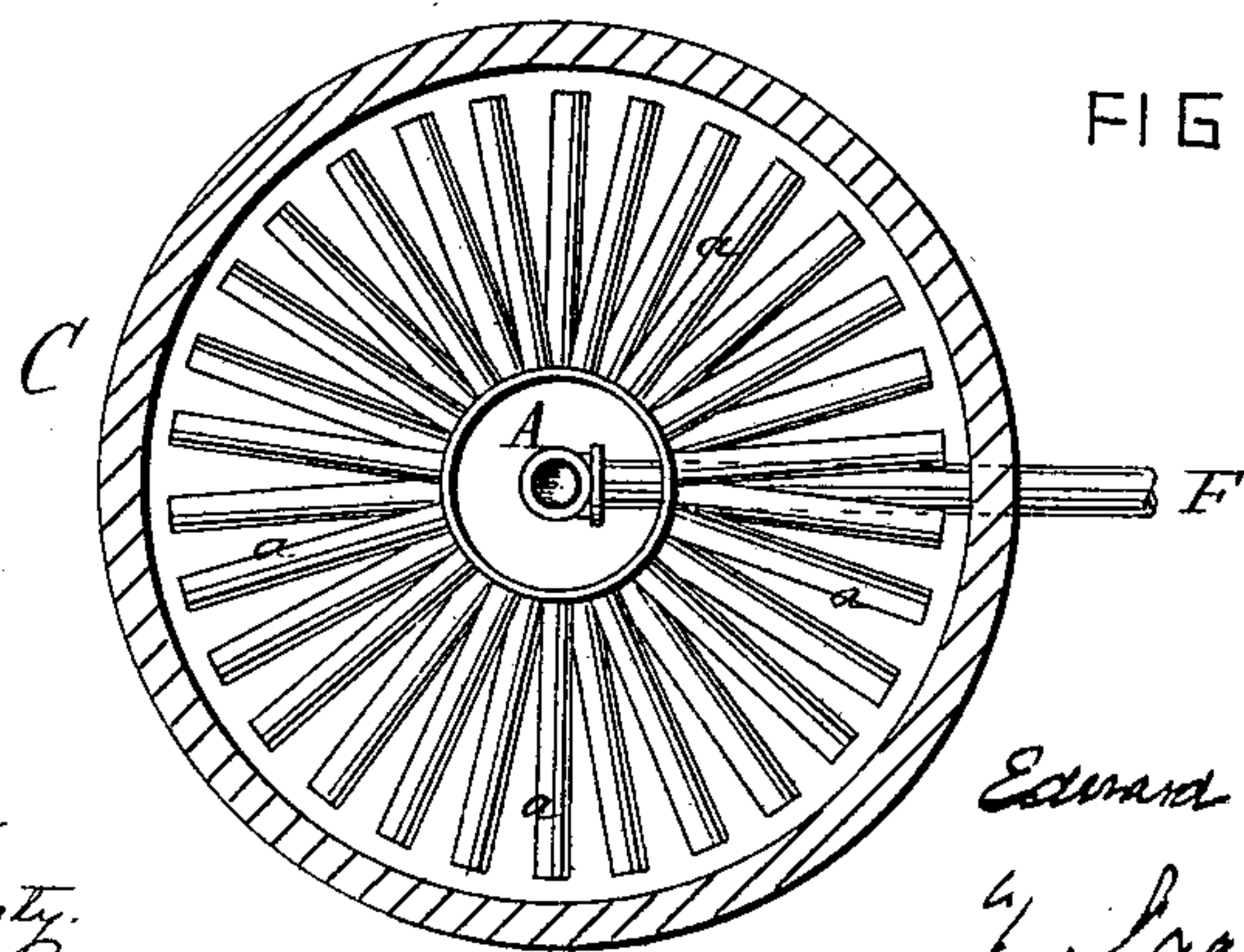
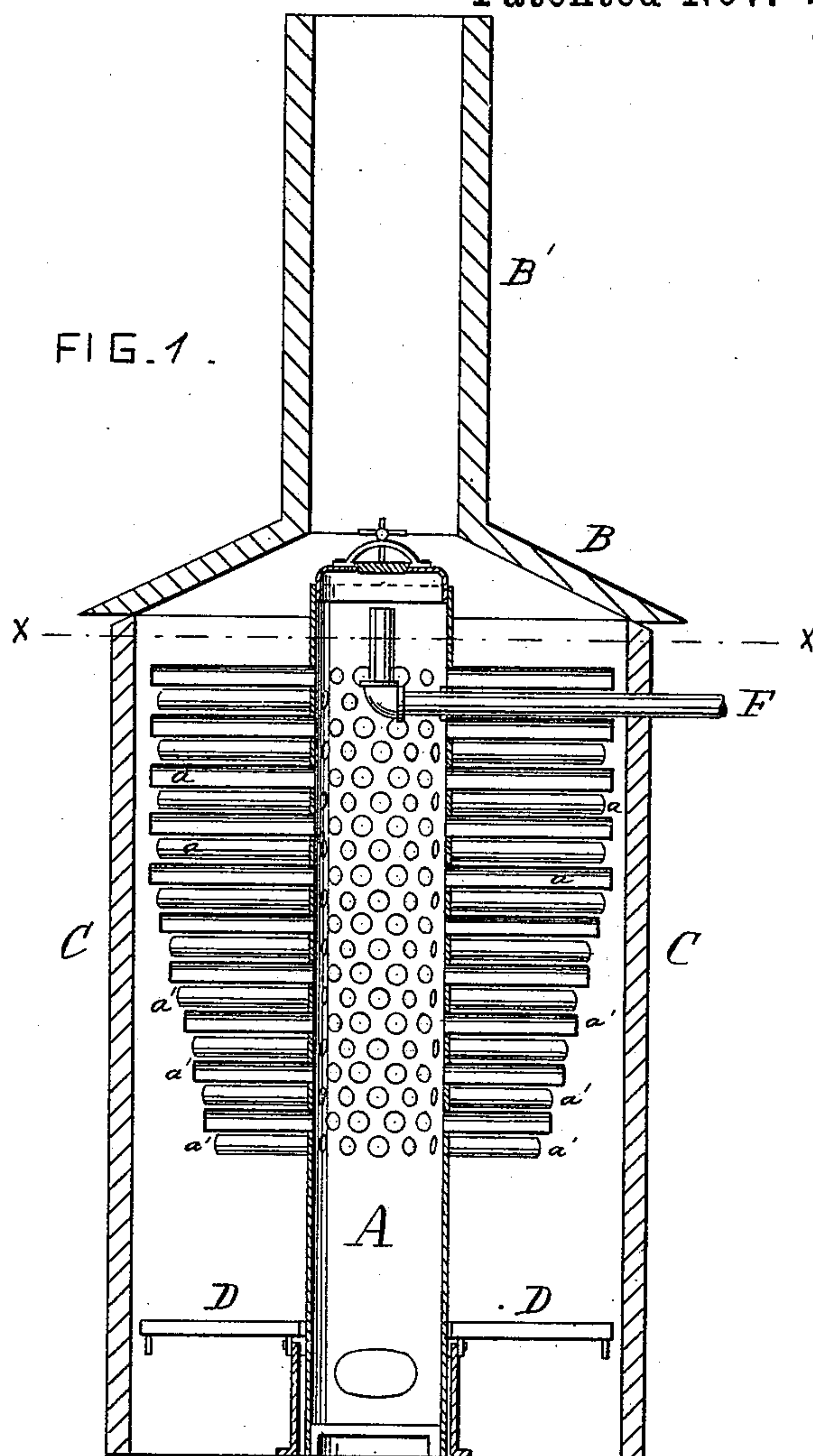
(No Model.)

E. S. T. KENNEDY.

STEAM BOILER.

No. 329,911.

Patented Nov. 10, 1885.



WITNESSES

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UNITED STATES PATENT OFFICE.

EDWARD S. T. KENNEDY, OF NEW YORK, N. Y.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 329,911, dated November 10, 1885.

Application filed August 28, 1885. Serial No. 175,545. (No model.)

To all whom it may concern:

Be it known that I, EDWARD S. T. KENNEDY, a citizen of the United States of North America, and a resident of the city, county, and State of New York, have invented a new and useful Improvement in Steam-Boilers, of which the following is a specification.

The object of this invention is to construct a boiler of the "porcupine" type possessing better water-circulation and greater durability than those ordinarily in use. In the ordinary porcupine-boiler the tubes radiating from the central cylinder are all of the same length. They all extend to within a very short distance from the boiler-inclosing shell or wall. This method of construction is correct as far as concerns the higher planes or series of tubes, as they should be as long as possible in order to intercept the heat on its upward passage; but as regards the lower series or planes of tubes nearer the fire, it is found in practice that they may be of too great length for securing good circulation at all times or for durability, for the intense heat of the lower part of the combustion-chamber, (when the fire is urged,) impinging on the extremities of the tubes, often repels the water therein, thereby not only preventing proper circulation, but causing said tubes to be burned and seriously injured.

These objections are avoided by my invention, which consists of a central upright cylinder set on a suitable support, preferably arranged in the bottom of the ash-pit, and provided with a series of radiating tubes closed at their outer ends, set staggering in successive planes, one above another, the tubes in the lowest series being the shortest, and the tubes increasing in length in each successive series upward for a considerable distance above the grate.

Figure 1 is a vertical sectional elevation of my improved boiler. Fig. 2 is a plan of the same on line $x x$, Fig. 1.

Reference is to be had to the accompanying drawings, forming part of the specification, in which similar letters of reference indicate corresponding parts in both the figures.

In the drawings, A represents the upright boiler-cylinder, extending down through the ash-pit and supported on the bottom thereof, so as to have the firmest possible foundation, and so that the lower portion of the cylinder

shall be in a comparatively cool place to properly exercise the function of a mud-drum.

C represents the boiler-inclosing shell or walls. The space inside the shell or walls from the grate-bars D to the hood E forms the combustion-chamber.

From the central cylinder, A, series of tubes $a a'$, closed at their outer ends and communicating at their inner ends with the interior of the boiler-cylinder, radiate in horizontal planes, one above the other. The tubes of the lower series or plane nearest the grate-bars are shorter than any of the others. Those of the next highest series or plane are somewhat longer than those of the first, and in each succeeding series or plane the tubes are still longer than in the series next below, until a suitable distance above the grate is reached, as indicated in Fig. 1, and above that point all the tubes in the succeeding series or groups are of equal length. Thus it will be seen that the several lower series or groups of radiating tubes would be inclosed in outlines representing the frustum of an inverted cone, the lower groups or series decreasing in diameter downward.

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

1. A boiler constructed, substantially as herein shown and described, of an upright central cylinder provided with series or groups of tubes radiating therefrom in successive planes, one above another, each of the several lower series or groups of which is longer than the group next below, so that the several lower groups could be inclosed in outlines representing the inverted frustum of a cone, as set forth.

2. The combination, with the vertical boiler-cylinder A, adapted to be supported on the bottom of the ash-pit, of the upper series or groups of radiating tubes, a , of equal length, and lower tube groups or series decreasing in diameter downward, as set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 16th day of July, 1885.

EDWARD S. T. KENNEDY.

Witnesses:

JACOB J. STORER,
WM. E. STILLINGS.