

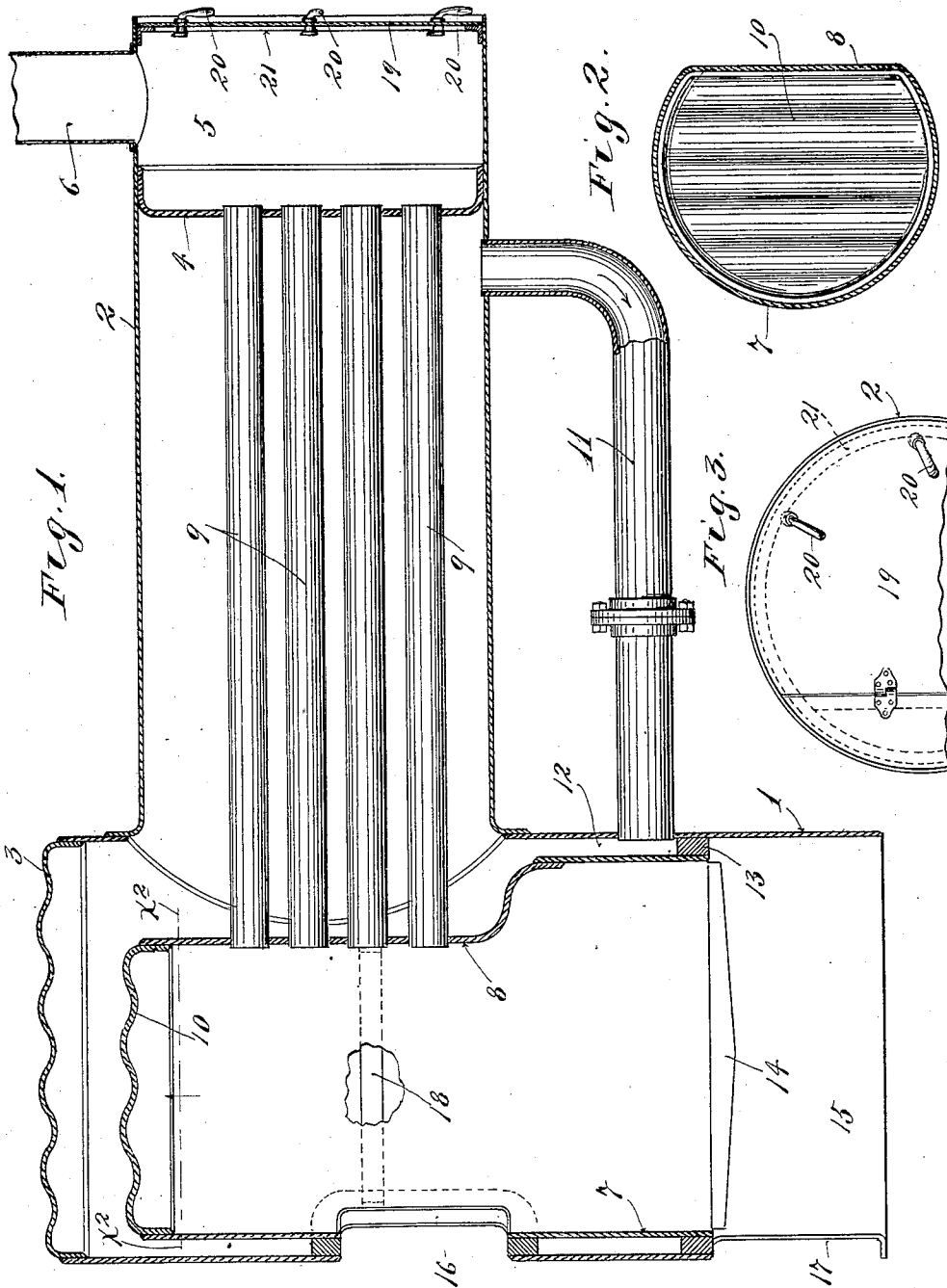
No. 863,829.

PATENTED AUG. 20, 1907.

G. C. ANDREWS.

BOILER.

APPLICATION FILED MAR. 22, 1906.



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UNITED STATES PATENT OFFICE.

GEORGE C. ANDREWS, OF MINNEAPOLIS, MINNESOTA.

BOILER.

No. 863,829.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GEORGE C. ANDREWS, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Boilers; 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.

This invention has for its object to provide an improved boiler of the "locomotive" type, which is especially adapted for use in connection with hot water and steam heating systems, and particularly the former.

To the above ends the invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

The improved boiler is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Referring to the drawings, Figure 1 is a view in vertical section taken centrally and longitudinally through a boiler designed in accordance with my invention. Fig. 2 is a horizontal section taken on the line $x^2 x^2$ of Fig. 1, looking upward; and Fig. 3 is a view in front elevation with parts broken away, showing the front or smoke box end of the boiler.

Boilers of the so-called "locomotive" type, as is well known, are provided with both vertical and horizontally extended portions, in the former of which the fire box is located.

The principal feature of novelty of this invention consists in the provision of cold water return tube leading from the lower annular portion of the horizontal section of the boiler, back to the lower portion of the vertical portion of the water containing compartment of said boiler.

The outer shell 1 of the vertical portion of the boiler is secured to and communicates in the usual way with the extended boiler shell 2. The upper end of the vertical shell 1 has a rigidly secured transversely corrugated head 3, and the horizontal shell 2 is provided some little distance from its outer end with a rigidly secured flue sheet 4, which forms within the extended end of said shell 2, the usual smoke box 5, from which the usual stack 6 extends upward.

The fire box or inner shell 7 of the boiler is rigidly secured within the vertical shell 1 in the usual way, and the upper rear portion thereof is pressed inward and flattened at 8 to afford a flue sheet, for the inner

ends of the flues 9, the outer end of which flues extend through the heretofore noted flue sheet 4, in the usual way. The fire box or shell 7, at its upper end, has a rigidly secured head 10 which is corrugated transversely of the boiler and in a direction parallel to the flattened portion or flue sheet 8, of said shell 7, thereby giving increased strength to the said head and increasing its radiating surface.

A large cold water tube 11 extends downward from the lower forward portion of the water compartment formed by the shell 2, thence backward and opens into the lower portion of the vertical annular water compartment 12 which is formed between the shells 1 and 7, above the lower mud ring 13.

The numeral 14 indicates, diagrammatically, the grates which may be of any suitable construction, and are supported in the usual or any suitable way at the back of the fire box, and above the ash pit 15.

The numeral 16 indicates the usual fuel door opening which opens through the shell 17 into the ash pit 15.

A second horizontally extended deflecting ring 18 is located between the shells 1 and 7 at the intermediate portion of the said shell or fire box 7. This deflecting ring 18 cuts off direct circulation of water from the bottom to the top of the vertical portion of the boiler, and causes the water which rises from the lower portion of said vertical section of the boiler, to move forward between the flues 9 and into the horizontally extended portion of the boiler.

The smoke box 5 is provided with a large hinged door 19 that is adapted to be locked in a closed position by a plurality of eccentric levers 20 applied to said door and engageable with the annular rib 21 secured within and to the extreme forward portion of the horizontal shell 2. This door 19 when open, affords ready access to the flues 9 so that the latter may be easily cleaned. The hinge of said door is vertically disposed and hence, the door will stand in an open position without being secured or latched.

The cold return flue 11 makes possible very rapid circulation of the relatively cool water from the forward portion of the horizontal section of the boiler, back to the vertical portion of the chamber 12 surrounding the fire box, at which point the water is very rapidly heated, and in which point very free and rapid circulation is required in order to obtain a maximum efficiency of the boiler. This return tube, therefore, greatly increases the efficiency of the boiler, and it

may be easily applied to boilers now in general use. Furthermore, the application or addition of the said tube may be accomplished at a very small cost.

What I claim is:

- 5 1. A boiler of the locomotive type having a deflecting ring extended horizontally at the intermediate portion of its vertical water compartment, substantially as described.
2. The combination with a boiler having vertically and horizontally extended water containing compartments, of a
10 cold water return tube extending from the lower outer por-

tion of said horizontally extended compartment back to the lower portion of said vertically extended compartment, and a deflecting ring extended between the intermediate portions of the fire box and of the vertical shell of said boiler, substantially as described.

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

GEORGE C. ANDREWS.

Witnesses:

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