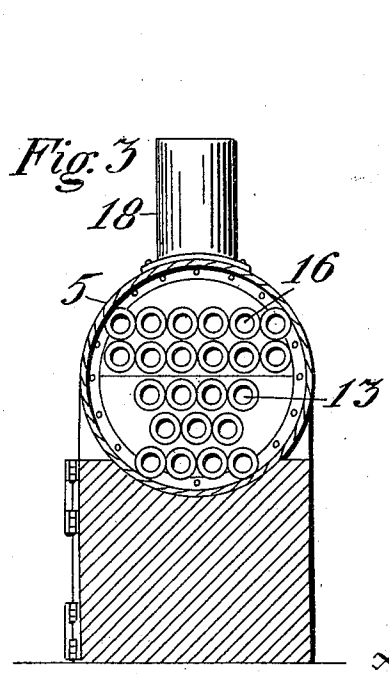
No. 645,507. Patented Mar. 13, 1900.

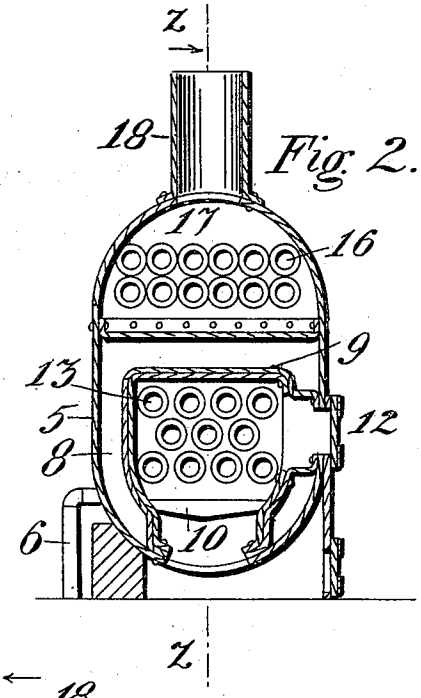
E. HUMPHREY.

STEAM BOILER.

(Application filed Dec. 4, 1899.)

(No Model.)





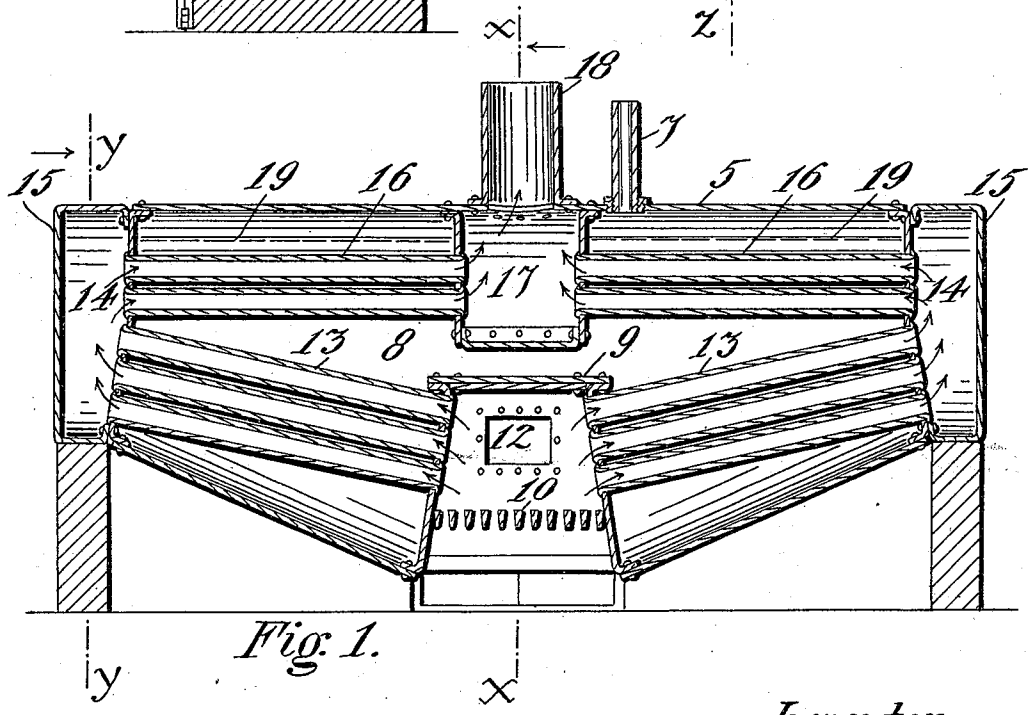


Fig. 1.

Witnesses,
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ERNEST HUMPHREY, OF DENVER, COLORADO.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 645,507, dated March 13, 1900.

Application filed December 4, 1899. Serial No. 739,155. (No model.)

To all whom it may concern:

Be it known that I, ERNEST HUMPHREY, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Steam-Boilers; and I do 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, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in steam-boilers, my object being to utilize to the best advantage the heat from the fire-box and obtain increased efficiency from a given amount of fuel.

My improvements consist of certain novel features of construction and arrangement of parts, all of which are hereinafter set forth and subsequently pointed out in the claim.

The invention will now be described in detail, reference being made to the accompanying drawings, in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a vertical longitudinal section taken through my improved boiler on the lines Z Z, Fig. 2. Fig. 2 is a cross-section taken on the line X X, Fig. 1, viewed in the direction of the arrow. Fig. 3 is a cross-section taken on the line Y Y, Fig. 1, looking in the direction indicated by the arrow.

Similar reference characters indicating corresponding parts in the views, let the numeral 5 designate the shell of the boiler, provided with a suitable inlet 6 for the water and a suitable outlet 7 for the steam. In the lower transverse central portion of the chamber 8, inclosed by the shell, is located the fire-box 9, provided with grate-bars 10 and a fuel-opening 11, normally closed by a cover 12. From the chamber of the fire-box lead tubes 13 in opposite directions. These tubes are upwardly inclined from the fire-box and their outer extremities communicate with end chambers 14, inclosed by heads 15, securely bolted to the ends of the boiler-shell. From the end chambers 14 other tubes 16 lead to a central chamber 17, located directly above the fire-box and communicating with the stack 18.

The chamber 8, in which the fire-box, tubes, and the chamber 17 are located, is provided with water to a suitable depth. The water-level is indicated by the broken line 19 in the upper part of Fig. 1.

From the foregoing description it will be readily understood that the heat passes from the fire-box 9, through the tubes 13, to the chambers 14, and thence in the opposite direction, through the tubes 16, to the chamber 17, the products of combustion escaping by way of the stack 18.

It must be understood that I do not limit the invention to the details of construction herein shown, as I am aware that many modifications may be employed without departing from the spirit of the invention.

Having thus described my invention, what I claim is—

A steam-boiler comprising a shell inclosing a water-chamber, a fire-box located in the lower transverse central portion of the chamber, tubes leading therefrom in opposite directions to chambers formed at the extremities of the water-chamber, and tubes leading from the auxiliary end chambers to a chamber formed in the upper central portion of the boiler and communicating with the smoke-stack.

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

ERNEST HUMPHREY.

Witnesses:
GRACE MYTINGER,
A. J. O'BRIEN.