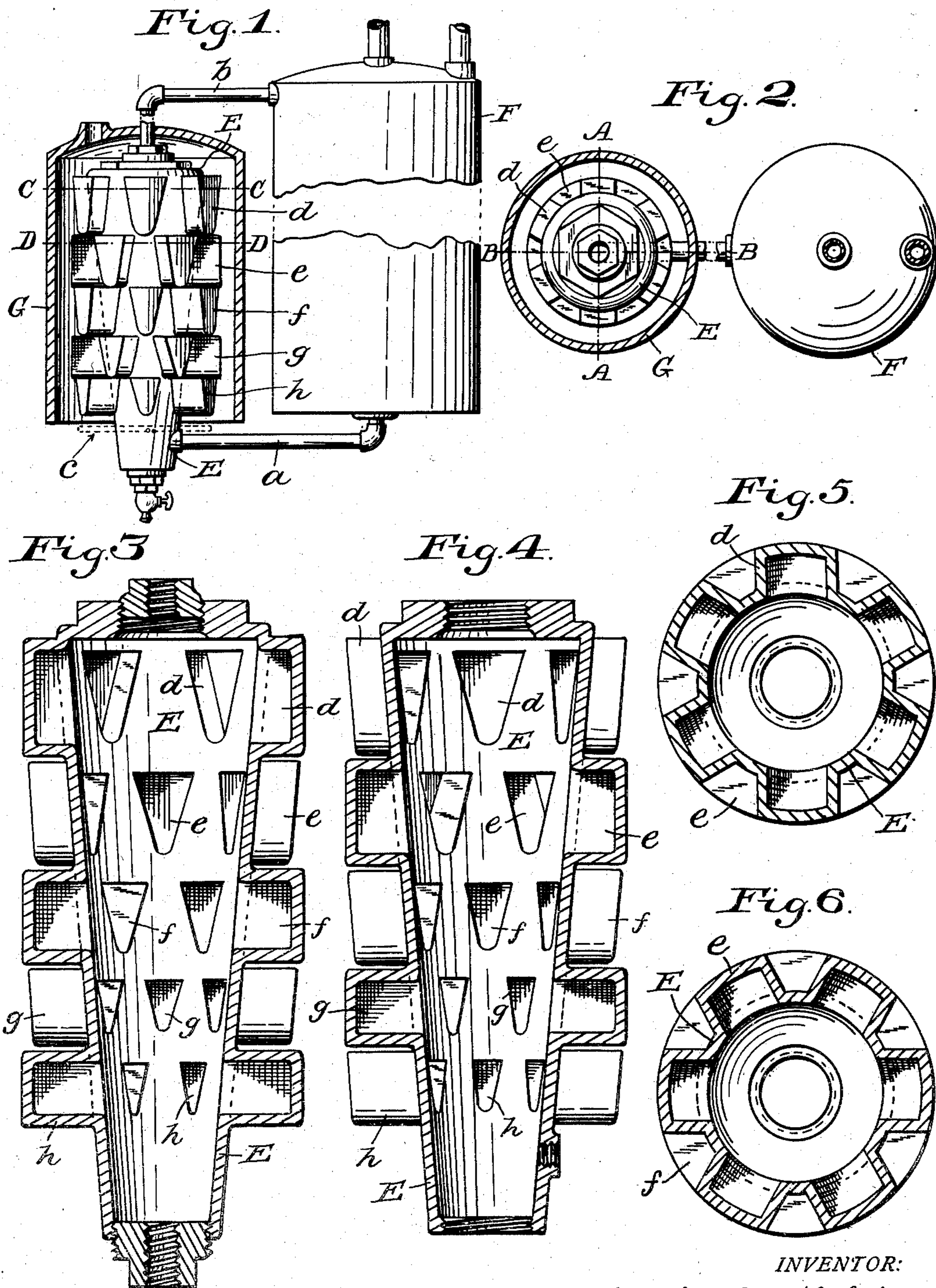


No. 846,472.

PATENTED MAR. 12, 1907.

C. L. HOLDEN.
HEATING BOILER.
APPLICATION FILED FEB. 10, 1905.



Witnesses:

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UNITED STATES PATENT OFFICE.

CHARLES L. HOLDEN, OF INDIANAPOLIS, INDIANA.

HEATING-BOILER.

No. 846,472.

Specification of Letters Patent.

Patented March 12, 1907.

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To all whom it may concern:

Be it known that I, CHARLES L. HOLDEN, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented new and useful Improvements in Heating-Boilers; and I do declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which forms a part of this specification.

This invention relates to boilers or vessels in which water may be heated either for the purpose of supplying hot water for various uses or for generating steam from the water to be used for heating or otherwise, and the invention has reference particularly to features thereof that effect economy in the use of fuels for heating the water.

The object of the invention primarily is to provide improvements in the construction of boilers of the above-mentioned class whereby the heat from the fuel may be utilized to the best advantage not only to quickly heat the water, but to attain also ultimate economy of fuel in operation.

More specifically, it is an object to provide the maximum amount of heating-surfaces that may be advantageously exposed to the direct action of the heat that may be generated by the fuel, the improvements having reference more particularly to sectional cast-metal boilers, as well as to single section or independent boilers or heaters.

With the above-mentioned and other objects of minor importance in view the invention consists in providing water-heating vessels of boilers or heaters with lateral branches of novel form and arrangement and in providing novel forms of fire-surfaces for heating the water; and the invention consists, further, in the novel parts and the combinations and arrangements of parts, as hereinafter particularly described and claimed.

Referring to the drawings, Figure 1 is an elevation of a boiler or water-heating vessel and tank or reservoir, the boiler having a jacket which is shown in vertical central section and the boiler being connected to the tank in a novel manner; Fig. 2, a top plan of the apparatus with the top of the jacket cut off; Fig. 3, a vertical central sectional view of the boiler on the line A A in Fig. 2; Fig. 4, a vertical sectional view of the boiler on the

line B B in Fig. 2; Fig. 5, a horizontal sectional view of the boiler on the line C C in Fig. 1, and Fig. 6 a horizontal sectional view of the boiler on the line D D in Fig. 1.

Similar reference characters in the several figures of the drawings designate corresponding parts or features.

In practically embodying the invention the boiler may be composed either of a single suitably-designed independent section or of any suitable number of sections suitably adapted to be connected together so as to be detachable in emergency.

In construction a boiler is provided which is adapted to be used either in groups or independently, as shown for illustrative purposes. The boiler comprises a shell E, which is circular, with inclined sides, its diameter being greater at its top than at its bottom, and the shell is provided with a relatively large number of radiating lateral branches *d e f g h*, that are V shape in cross-section, and is connected to a tank F by circulating-pipes *a* and *b*. The upper branches *d* are all arranged in one horizontal plane. The branches *e*, of less depth and greater length, are arranged in another horizontal plane and different vertical planes than are the branches *d*. The other branches *b*, *g*, and *h* are arranged in different lower planes, the lowermost branches being the longer and shallower, all arranged in staggered order, as shown, and the closed ends of the branches being all equal distances from the axis of the shell. A jacket G incloses the boiler except at its bottom, and any suitable annular gas or oil burner may be arranged approximately at the plane indicated by the dotted lines at *c*, the jacket having a suitable opening in its top for the escape of the fumes of combustion. The heat generated by the burning gas will pass upwardly between the branches and also between the ends thereof and the jacket, the latter serving the purpose of fire-box walls with the independent arrangement of the boiler, which, however, as above stated, may form one connected part of a sectional boiler of larger capacity.

It will be observed that the connecting-pipe *b* extends from the top of the heating vessel to the top of the tank F, the tank being provided at the top thereof, as usual, with an outlet-pipe, and also obviously has an inlet-pipe connected thereto, so that hot water may be drawn from the top of the tank as soon as received therein from the boiler.

In practical use the heat from the fire will rise within the jacket G about the boiler-shell E and will be deflected by the branches *h* against the branches *g* and by these against the branches *f*, and so on as the heat rises it will be deflected against each higher series of branches, a portion of the heat rising between the ends of the branches and the jacket or outer wall of the heat-passage.

The lateral branches of the boiler, as will be apparent, provide a large amount of heating-surface, which is also largely increased by reason of the V shape thereof. The lower portions of the shell E and branches being narrow permits the water therein to become heated rapidly, which tends to produce rapid circulation, and consequently rapid heating of the whole bulk of water in the boiler.

Being aware of Letters Patent No. 576,313, granted to me February 2, 1897, I do not now broadly claim a tapering boiler-shell with the larger end thereof upward when in operative position and decreasing in size regularly toward the bottom thereof, nor the heater or burner arranged above the bottom of such boiler-shell; but

What I do claim as new is—

1. A boiler including a shell having a plurality of series of branches, the branches of the different series having different lengths decreasing in length from one end to the other end of the shell.

2. A boiler including a shell having a plurality of series of integral branches the openings to which in the shell are narrower at one end than at the other end thereof.

3. A boiler including an oblong shell having main portions of the wall thereof inclined to its major axis and branch portions that have opposing side walls inclined to planes that are at right angles to the major axis.

4. A boiler including a boiler-shell having a greater diameter at its top than at its bottom and provided with lateral branches that

are longer and narrower at their bottoms than at their tops and closed at their ends.

5. A boiler including an oblong shell having a plurality of series of lateral branches formed integral therewith, one end of the shell having less diameter than the other end thereof, and the branches having inclined sides, a jacket extending about the shell and the branches thereof, an oblong tank, a pipe connected to one end part of the tank and also to the smaller end part of the shell adjacent to a series of the branches thereof; and a pipe connected to the other end part of the tank and also to the larger end part of the shell adjacent to a separate series of the branches thereof.

6. A boiler including an oblong circular shell having a plurality of series of lateral branches extending radially to the axis of the shell, the lengths of the branches differing in the different series with a burner arranged nearer to the longer than the shorter branches, a jacket extending about the shell and the branches thereof, an oblong tank having a pipe connected to the top thereof, the pipe being connected also to the top of the shell, with a pipe connected to the bottoms of the tank and the shell.

7. A boiler including a shell provided with a plurality of series of radiating branches each series in a different horizontal plane, the branches of either series being in radial planes between the planes of the branches in next adjacent series thereof, the branches extending an equal distance from the axis of the shell, and the shell having less diameter at the bottom than at the top thereof.

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

CHARLES L. HOLDEN.

Witnesses:

WM. H. PAYNE,
E. T. SILVIUS.