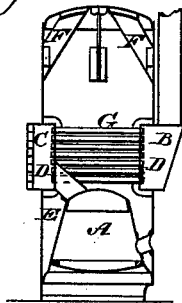


E. CROMPTON.  
Steam-Boiler.

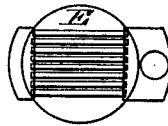
No. 220,060.

Patented Sept. 30, 1879.

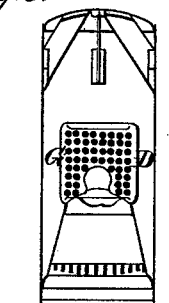
*Fig. 1.*



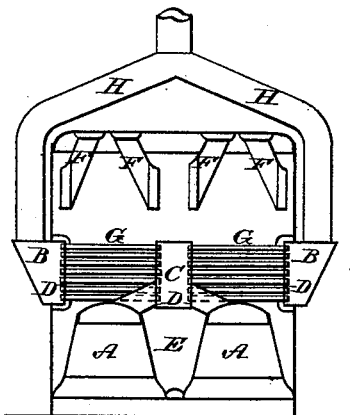
*Fig. 2.*



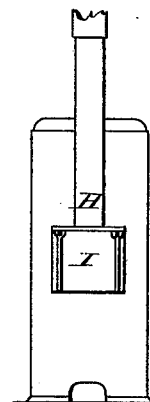
*Fig. 3.*



*Fig. 4.*



*Fig. 6.*



*Fig. 5.*



Witnesses:  
William W. Dodge.  
Donn J. Twitchell.

Inventor:  
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# UNITED STATES PATENT OFFICE.

EDWARD CROMPTON, OF LIVERPOOL, ENGLAND.

## IMPROVEMENT IN STEAM-BOILERS.

Specification forming part of Letters Patent No. **220,060**, dated September 30, 1879; application filed January 17, 1879.

*To all whom it may concern:*

Be it known that I, EDWARD CROMPTON, of Liverpool, in the county of Lancaster, England, engineer, have invented new and useful Improvements in Steam-Boilers; and I hereby declare the following specification to be an exact and clear description of the same.

To enable those skilled in the art to comprehend the nature of my invention, I have annexed drawings hereto.

This invention consists in an improved vertical boiler designed to give large heating-surface and effect economy in fuel.

It consists in arranging horizontal tubes within a vertical boiler, said tubes being fitted within or between two tube-plates forming parallel surfaces, and being secured in openings made for the purpose in the sides of the upright cylindrical body.

The tubes might be slightly inclined instead of quite horizontal; but I prefer the horizontal position, the tube-plates being flanged or riveted or otherwise fixed to the shell of the boiler.

The distance between the tube-plates is preferably less than the diameter of the shell in cylindrical boilers, and the spaces left outside the plates are used on one side as a combustion-chamber, and on the other as a smoke-box.

The drawings, however, explain the invention, and to them I now refer.

Figures 1, 2, and 3 shows sections taken through various parts of a vertical cylindrical boiler. A is a dome-shaped furnace, open at bottom, elsewhere surrounded by water, as shown by space E; B, the smoke-box leading to uptake; C, the combustion-chamber, the products of combustion passing to it by a tube or tubes, as shown, and from thence through the tubes G to the smoke-box. D D are the tube-plates, fixed in any suitable manner; F F, gusset-plates to stay the boiler.

Figs. 4, 5, and 6 are, respectively, vertical and transverse sections and end view of a double boiler. A A are the furnaces; B B, the smoke-boxes; C, the combustion-chamber, internal and surrounded by water.

The combustion chamber or chambers might be made partly external, and the smoke box or boxes fitted internally, if desired; but I prefer the arrangement shown.

D D are the tube-plates; E, the water-space; F F, gusset-plates to stay boiler; G, the tubes fitted in tube-plates. H are two converging uptakes from the smoke-box. I are doors fitted opposite the ends of the tube plates, so that they are easily accessible for repairs or for cleaning.

I prefer to apply these doors to all forms of my boiler.

I am aware that horizontal flues have been used in a great variety of boilers, and that they have been passed through upright boilers and seated at their ends directly in the round shell or cylinder of the boiler.

My boiler differs from all others in that I cut away the sides of the upright body, and secure therein flat vertical tube-sheets, and then seat the ends of the smoke-flues in said sheets.

The drawings illustrate my boiler in several forms, each and all, however, possessing the peculiarity above named.

The one great advantage of my construction is, that it enables me to give the boiler a very large heating-surface in proportion to the floor-space occupied, and this while employing horizontal flues, which give more economical results than those which stand in a vertical position. The construction is also advantageous on account of the cheapness, simplicity, and strength secured thereby.

What I claim is—

In a steam-boiler, the combination of an upright cylindrical body having portions of its sides cut away, vertical flat tube-sheets secured to the body and arranged to close the openings formed by cutting the same away, and horizontal smoke-flues passing through the body and secured at their ends in said sheets, as shown and described.

EDWARD CROMPTON.

Witnesses:

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JOHN O. O'BRIEN.