T. BOEHMLER & H. E. OLBRICH.

Fire Tube Boiler.

No. 201,988. Patented April 2, 1878.

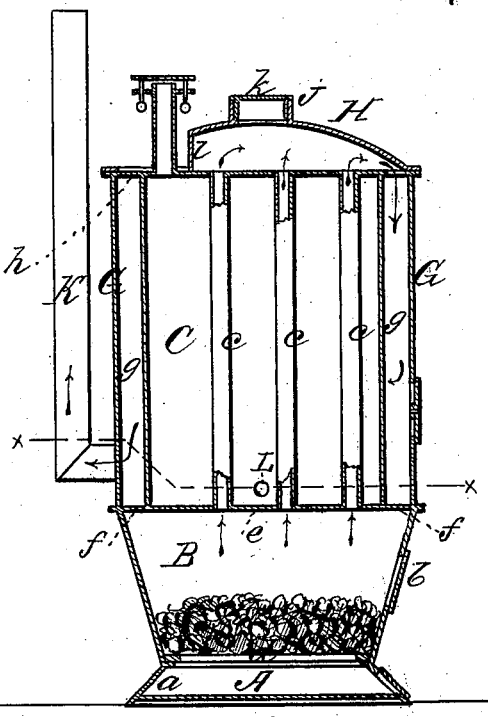

Fig. 1.

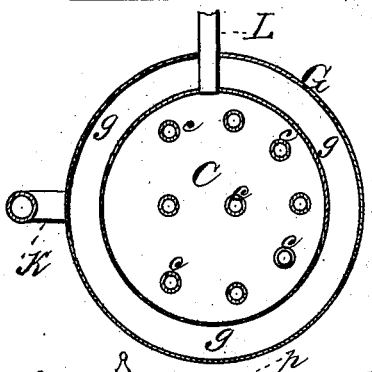

Fig. 2.

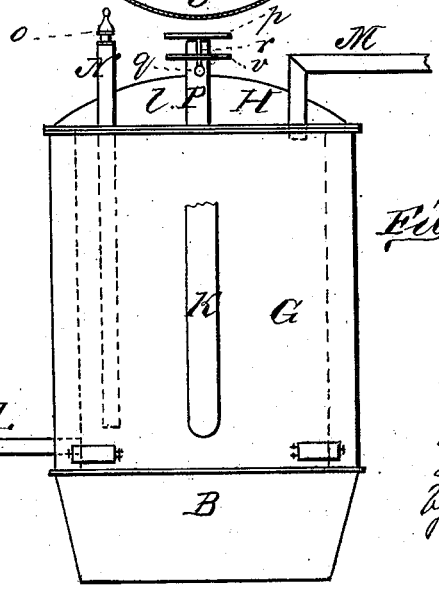

Fig. 3.

WITNESSES.

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UNITED STATES PATENT OFFICE.

THEODORE BOEHMLER AND HENRY E. OLBRICH, OF CEDAR FALLS, IOWA.

IMPROVEMENT IN FIRE-TUBE BOILERS.

Specification forming part of Letters Patent No. **201,988**, dated April 2, 1878; application filed December 22, 1877.

To all whom it may concern:

Be it known that we, THEODORE BOEHMLER and HENRY EDWARD OLBRICH, of Cedar Falls, in the county of Black Hawk and State of Iowa, have invented a new and valuable Improvement in Boilers; and we do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a vertical central section of our invention. Fig. 2 is a horizontal section of the same. Fig. 3 is a side elevation thereof.

This invention relates to certain improvements in the construction of boilers for steaming feed, its object being to provide for the more convenient attachment of the low-water indicator, safety-valve, and eduction-pipe without dispensing with the steam-dome; and to this end the invention consists in an upright shell, with a jacket surrounding its sides, and having a dome extending over a portion of its top, and a low-water indicator, safety-valve, and eduction-pipe, located at one side of the dome, as more fully hereinafter shown and described.

In the annexed drawings, the letter A indicates a circular base, forming the ash-pit of my improved boiler, and provided with a door opening into an ash-pan, *a*, for the purpose of removing the ashes. This base is made of cast-iron, and supports a circular cast-iron fire-box, B, having a cast-iron grate, *d*, and a door, *b*, for supplying fuel. C designates an upright cylindrical boiler, which rests upon the fire-box B, and is provided with flues *c*, of suitable size and in sufficient number, extending through the boiler-heads, and preferably made of gas-pipe. The lower head *e* of the boiler is extended out beyond its barrel in a flange, *f*, extending around the same. This flange is bolted or otherwise secured to the fire-box, forming with the head the crown-sheet of the latter. Instead of the flange being a part of the head *e* aforesaid, it may form a part of or be attached to the upper edge of the fire-box. I do not, however, confine myself to either construction, as I may use any known mode of forming the said flange, which, in my improved generator, is the bottom of the diving-flue *g*. This flue is formed by a sheet-metal barrel, G, of cylindrical form, and of greater diameter than the boiler, and of the same height therewith, the lower end of which is bolted or otherwise secured to the flange *f*. A space is thus formed entirely around the boiler. The jacket G is connected to the upper end of the boiler by suitable braces, and by a metallic plate, *h*, in the form of a segment of a circle, which accurately closes about one-fourth of the upper end of the jacket. The remaining three-fourths thereof are covered in by a preferably cast-iron dome-shaped cap, H, in the form of a segment of a sphere or spheroid, having a vertical wall, *l*, which snugly fits against the inner edge or sine-line of the segmental plate *h* aforesaid. The dome forms the horizontal portion of the diving-flue, and directs the products of combustion escaping from the flues of the boiler into the vertical space between the boiler and jacket. This dome has at its apex a pipe or stack, J, closed at pleasure by a damper, *k*. When this damper is closed the products of combustion escape into the open air through a pipe, K, opening into the diving-flue at its lower end, and in their passage over and around the boiler materially aid in generating steam and in keeping up a rapid and constant supply thereof. Water is fed to the boiler as required from a reservoir above the level of the boiler through a pipe, L, opening into the water-space of the said boiler at its lower end. M represents a metallic pipe, extending from the steam-space into the receptacle, and provided with the usual cut-off valve, through which steam is conducted to the feed to be treated. N represents a second pipe, extending, like pipe M, through the head of the boiler down toward the bottom thereof to the safe water-line. This pipe has a steam-whistle, *o*, upon its upper end, which will be sounded, as soon as the water in the boiler gets below the safe point, by the upward rush of steam, which enters its exposed lower end. Intermediate to the pipes M and N, at the rear of the generator, is a third pipe, P, extending through the upper head of the boiler into the steam-space, and no farther. The upper end of this pipe is

closed by a cap-valve, *p*, that is kept in place by its own weight and that of the balls *q* upon the ends of the metallic rods *r* depending vertically from the said valve and extending through a guide-flange, *v*, upon the pipe P below its upper end. When the steam-pressure becomes too great this valve rises, the excess of steam escapes, and it then falls to its seat.

What we claim as new, and desire to secure by Letters Patent, is—

The combination, with an upright tubular boiler, of the jacket G, surrounding its sides, the dome H, extending over a portion of the top of the boiler, the low-water indicator N, safety-valve P, pipe K, and eduction-pipe M, extending through the upper part of the boiler at one side of the dome, substantially as specified.

In testimony that we claim the above we have hereunto subscribed our names in the presence of two witnesses.

THEODORE BOEHMLER.
HENRY EDWARD OLBRICH.

Witnesses:
C. C. KRUPP,
W. T. GIBSON.