2 Sheets—Sheet 1.

J. G. SCHMIDT.

Steam-Boiler.

No. 205,765. **Patented July 9, 1878.**

Fig. 1.

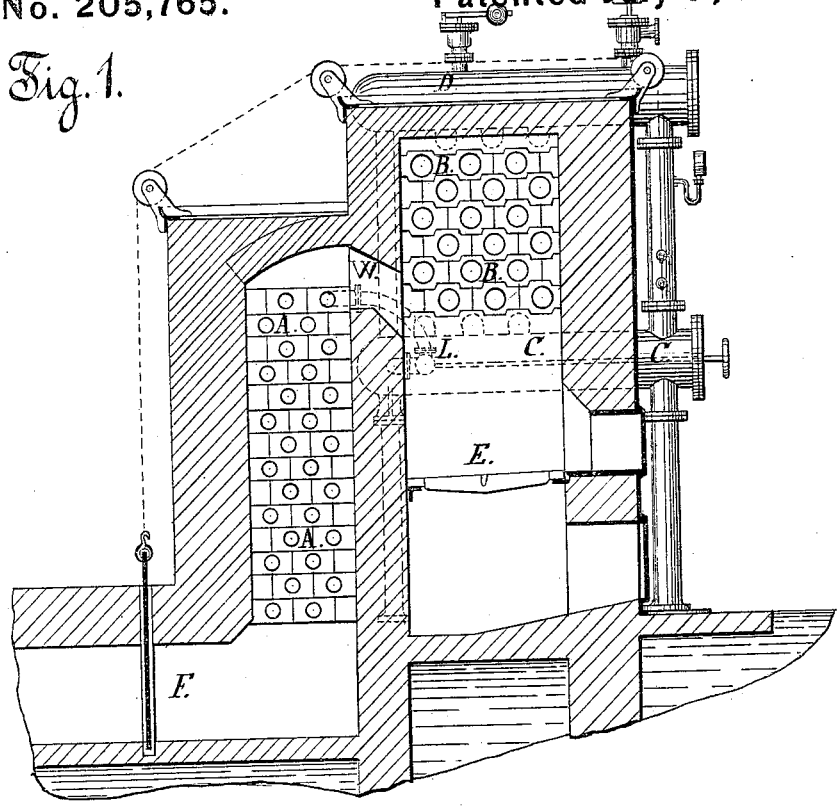
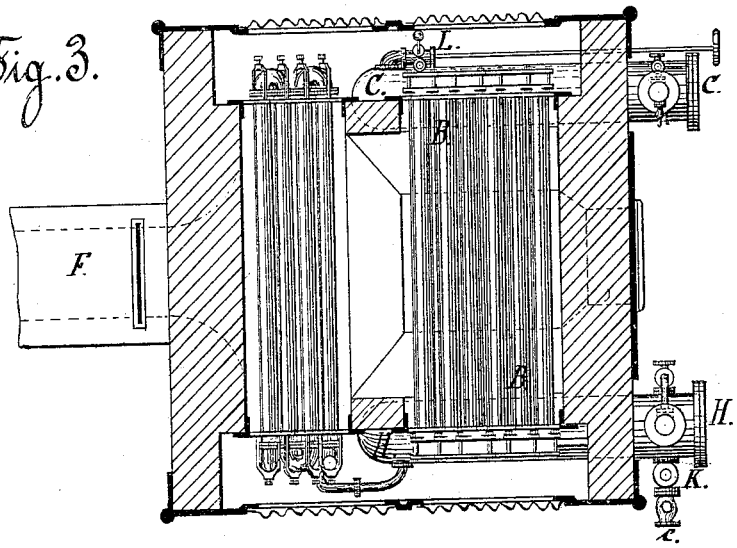


Fig. 3.



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Inventor:
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2 Sheets—Sheet 2.

J. G. SCHMIDT.

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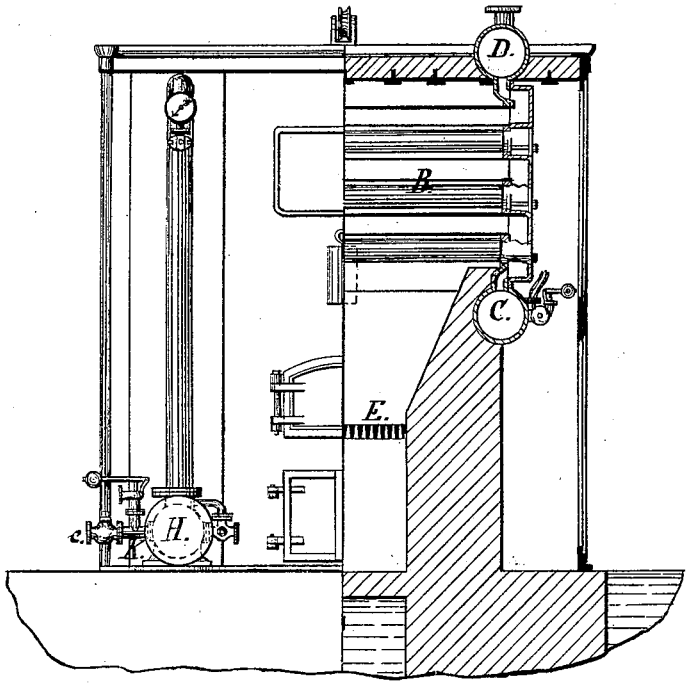
No. 205,765. **Patented July 9, 1878.**

Fig. 2.



Witnesses

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D. W. Briesen

Inventor:

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UNITED STATES PATENT OFFICE.

JULIUS G. SCHMIDT, OF BERLIN, PRUSSIA, GERMANY.

IMPROVEMENT IN STEAM-BOILERS.

Specification forming part of Letters Patent No. **205,765**, dated July 9, 1878; application filed February 23, 1878.

To all whom it may concern:

Be it known that I, JULIUS GUSTAV SCHMIDT, a manufacturer, of Berlin, Kingdom of Prussia, German Empire, have invented Improvements in Tubular Steam-Boilers; and that the following, with reference to the accompanying drawings, is a full and clear specification of my invention.

The latter relates to that class of tubular steam-boilers in which the tubes forming series of zigzag tubes or pipes are united to each other and to the water and steam drum by elbows, and in which are used more than one series of these zigzag tubes; and the object of it is to partly utilize in the best manner the heat of the fuel by the counter-current of the fire and water, and partly to generate completely dry steam.

In the accompanying drawing, Figure 1 represents a vertical longitudinal section of the boiler; Fig. 2, half a front view and half a vertical cross-section, and Fig. 3 a horizontal section.

The feed-water enters, by a check-valve, *c*, at K, into the feed-water heater H, flowing into the lower row of the zigzag tubes A A until all the water-tubes of the water-reservoir and the lowest row of the steam-tubes are filled with it. The steam-generator is composed of steam-tubes B B, joined by elbows, so as to form two or more vertical series of zigzag tubes, which are connected at the bottom with the water-drum C, and at the top with the steam-drum D, from which the steam for driving purposes is taken off. The fire burning upon the grate E touches the lowest row of the steam-tubes filled with water, but passes directly through the flue W to the top of the water-reservoir, and, enveloping its tubes, from there down into the flue F and into the chimney. Besides the lower row filled with water and exposed to the direct action of the fire, all the other tubes of the steam-generator are filled with steam, and subjected only to the radiant heat of the burning fuel. From the grate to the chimney the products of combustion take a direction exactly opposite to that of the feed-water, coming at the beginning in contact with its hottest, and leaving it on the coldest, part. Therefore the heat of the fuel is used at greatest advantage.

The steam generated and contained in the steam-generator B B is not subjected to the direct action of the flames; but the radiant heat of the burning fuel is sufficient to make it perfectly dry.

For the regulation of the flow of the water from the water-reservoir to the steam-generator, the cock L, fitted with a regulating-valve, is interposed between them. All the other fittings, valves, cocks, &c., of the boiler may be as usual, and also the details of the construction of the boiler itself.

What I want to secure by Letters Patent is—

1. The separate water-reservoir composed of water-tubes of a tubular boiler, in combination with the steam-generator, situated so high above the former that its lower row of tubes is filled with water, for the purpose specified, and substantially as described.

2. The construction of the steam-generator of a tubular boiler in such a way that its steam-containing tubes are subjected only to the radiant heat of the burning fuel, while all the tubes containing water are subjected to the action of direct heat, and in a direction opposite to the current of the feed-water.

This specification signed by me this 14th day of January, 1878.

JULIUS GUSTAV SCHMIDT.

Witnesses:

CARL T. BURCHARDT,

BERTHOLD ROI.