J. F. DANIELS.

Cast-Iron Sectional-Boiler.

No. 167,438. Patented Sept. 7, 1875.

Fig 1.

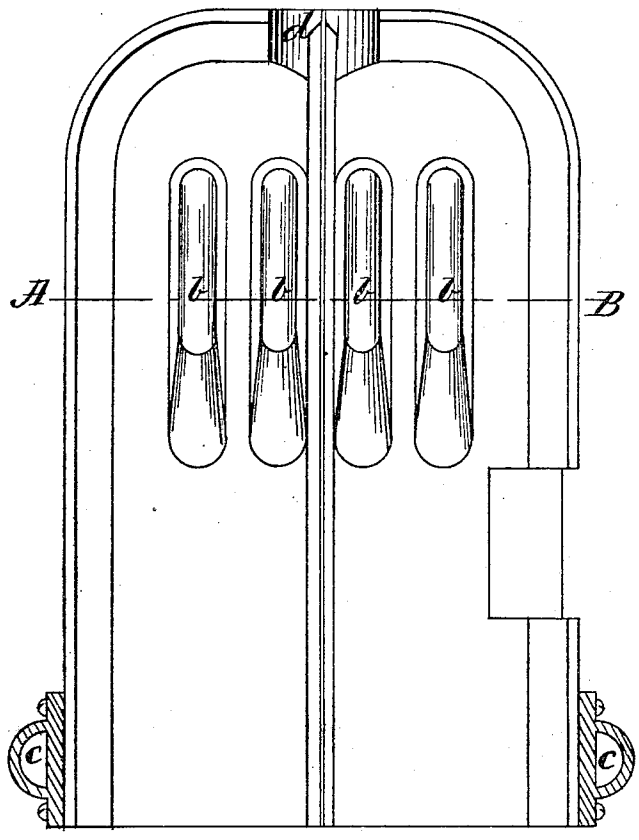
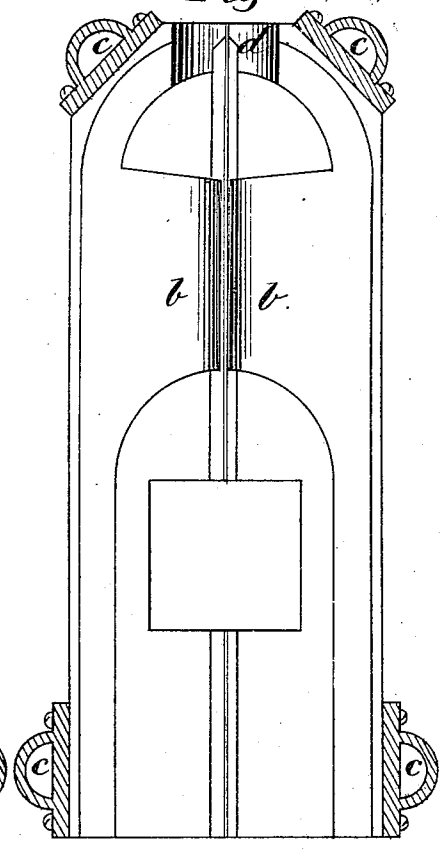


Fig. 2.



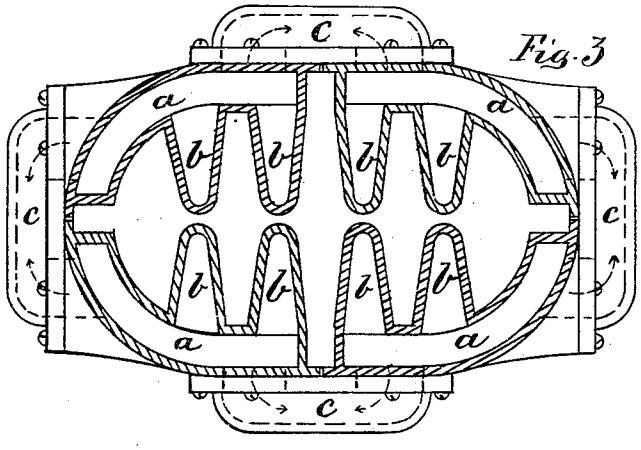
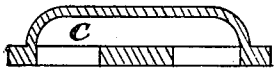


Fig. 3

Fig. 4



Witnesses:

John R. Heard.

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UNITED STATES PATENT OFFICE.

JOHN F. DANIELS, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN CAST-IRON SECTIONAL BOILERS.

Specification forming part of Letters Patent No. **167,438**, dated September 7, 1875; application filed February 11, 1875.

To all whom it may concern:

Be it known that I, JOHN F. DANIELS, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Cast-Iron Sectional Boilers; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in cast-iron sectional boilers; and consists in the employment of a jacketed or shell boiler, made in two or more sections, that are connected together on the outside by means of cast-iron circulating-pipes, through which the steam and water are circulated from one section to another. On the inside of this, my improved sectional boiler, I have arranged a number of hollow projections, that are cast in one piece with the boiler, or attached thereto in any suitable manner, and which hollow projections are in open communication with the space containing the steam or water in the boiler. The upper end of the furnace is contracted, and provided with an outlet for the products arising from the combustion of the fuel in the furnace, which outlet being so contracted for the purpose of preventing the hot products to escape from the furnace before they have given off the greatest amount of heat possible. My improved boiler is portable, and may, if so desired, be taken to pieces for transportation or otherwise. The hollow projections inside the boiler may be arranged opposite each other or zigzag, without departing from the spirit of my invention.

On the accompanying drawing, Figure 1 represents a central longitudinal section. Fig. 2 represents a central longitudinal section at a right angle to the one shown in Fig. 1. Fig. 3 represents a cross-section on the line A B, shown in Fig. 1; and Fig. 4 represents a horizontal section of one of the circulating-pipes, by means of which the sections are united together.

Similar letters refer to similar parts wherever they occur on the drawing.

This, my improved boiler, is composed of a number of hollow cast-iron sections, *a a a a*, as shown in Fig. 3, each section having an outer and an inner wall, between which the water and steam are contained. Projecting from the inner wall of each section I make hollow horns or projections *b b b b*, that may be cast in one piece with each section of the boiler, or otherwise connected thereto, as may be desirable. The hollow horns or projections *b b b b* may be located opposite or zigzag to each other, according to circumstances. Each section *a* is connected to the next one by means of a circulating-pipe, *c*, shown in Fig. 4, of which I use as many as I have sections in the boiler, at the upper and lower part of the latter, so that the water and steam can freely pass from one section to the other ones. The upper part of the boiler is contracted, and provided with a small outlet, *d*, for the products of the combustion of the fuel to escape to the chimney after first having been detained long enough in the furnace so as to give up most of its heat.

What I wish to secure by Letters Patent, and claim, is—

1. In a vertically-jointed cast-iron sectional boiler, as herein shown, the hollow vertical projections *b b b b*, cast to the shell, substantially as and for the purpose set forth.

2. The sectional cast-iron boiler as herein shown, consisting of two or more hollow sections, *a a a a*, hollow projections *b b b b*, and the circulating-pipes *c c c c*, as and for the purpose set forth.

In testimony that I claim the foregoing as my own invention I have affixed my signature in presence of two witnesses.

JOHN F. DANIELS.

Witnesses:

ALBAN ANDRÉN,

JOHN R. HEARD.