

J. SHACKLETON.

Steam-Boilers.

No. 149,160.

Patented March 31, 1874.

Fig. 2.

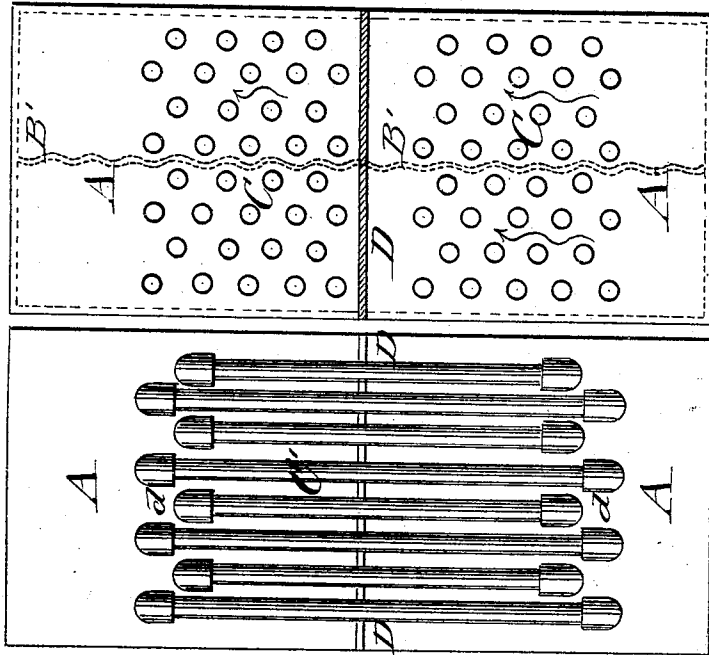
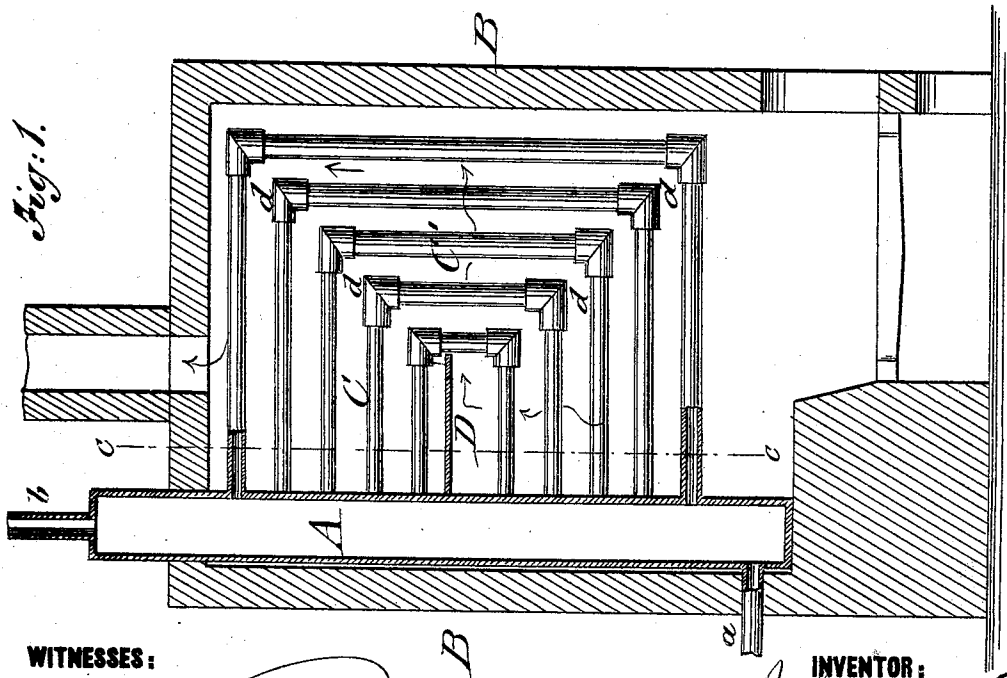


Fig. 1.



WITNESSES:

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UNITED STATES PATENT OFFICE.

JOSEPH SHACKLETON, OF RAHWAY, NEW JERSEY.

IMPROVEMENT IN STEAM-BOILERS.

Specification forming part of Letters Patent No. **149,160**, dated March 31, 1874; application filed February 14, 1874.

To all whom it may concern:

Be it known that I, JOSEPH SHACKLETON, of Rahway, in the county of Union and State of New Jersey, have invented a new and Improved Steam-Boiler, of which the following is a specification:

In the accompanying drawing, Figure 1 represents a side elevation of my improved steam-boiler, showing general arrangement in furnace; and Fig. 2 is an end view of the same, partly in section on line *c c*, Fig. 1, showing two boilers arranged side by side.

Similar letters of reference indicate corresponding parts.

The invention relates to an improvement on the improved steam-boiler upon which I received a patent dated April 5, 1870, and will first be fully described, and then pointed out in the claim.

In the drawing, A represents a water-receptacle, of cast or wrought iron or other suitable material, which is placed in vertical direction into a portable or stationary furnace, B. Receptacle A is provided with a water-induction pipe, *a*, at the lower part, and a steam-education pipe, *b*, at the top, and also with one or more vertical partitions, B', for lessening the danger of explosion. The rear wall of receptacle A is perforated for a system of pipes, C, the holes being cut with screw-threads for their firm attachment. The pipes C extend in horizontal direction, and are arranged symmetrically to the horizontal axis of the system in such a manner that an intermediate series of pipes is placed diagonally between and sidewise of the adjoining series of pipes, as shown clearly in Fig. 2. Every two corresponding horizontal pipes, C, are connected in vertical direction by elbows *d* and pipes C', forming thereby pipe-rectangles, which extend gradually from the smaller innermost tier to the larger outermost series, each rectangle being placed in separate connection with the water-receptacle A. The vertically-connecting pipes are made of somewhat larger diameter to make allowance for the easier passage of the water and steam. The fire-box is arranged below the system of pipes, and constructed in the usual manner. The current of

the fire and the gases of combustion are forced in a wave line around the pipes, enveloping thereby the same, and producing rapidly the generation of steam. A horizontal plate, D, is attached to receptacle A immediately below the upper pipes of the innermost rectangles, extending laterally to the full width of the receptacle, and causing the impinging of the fire thereon, so that it is deviated from its direct upward course toward the chimney at the top of the furnace and thrown sidewise, passing between and around the vertical pipes toward the upper corner of the rectangles, and thence along the top of the furnace to the chimney. The upper parts of the pipe-rectangles are thereby fully brought into effective participation, and the heating power of the fuel and the gases of combustion almost completely utilized. The development of the steam produces a continuous circulation of the water in the receptacle and the pipe-rectangles, and accelerates the heating up of the water and the generation of steam throughout the whole system.

The pipes are of sufficient strength for the pressure of the steam, and cause but little trouble or danger in case of bursting, besides being easily repaired by unscrewing the vertical pipes and connecting-elbows.

The steam is conducted from the exit-pipe to the engine heating-pipes, or to other applications, as required.

The compact arrangement of the pipe-rectangles confines the boiler within small space, while, by an increased number of pipes, or the use of additional receptacles and pipe systems, any desired power may be obtained.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

The combination, with vertical pipe A, having induction *a* and education *b*, and the series of rectangular pipes C and C', of the deflecting-plate D, arranged as and for the purpose described.

JOSEPH SHACKLETON.

Witnesses:

PAUL GOEPEL,
T. B. MOSHER.