

C. T. Boardman,
Steam-Boiler Fire-Tube.

N^o 47,790.

Patented May 23, 1865.

Fig 2.

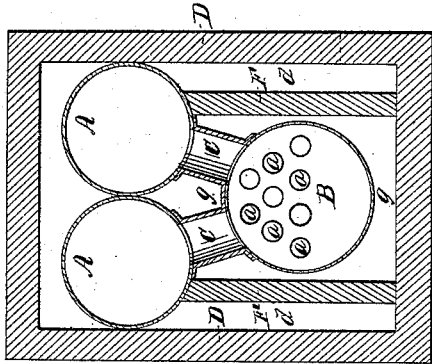


Fig 1.

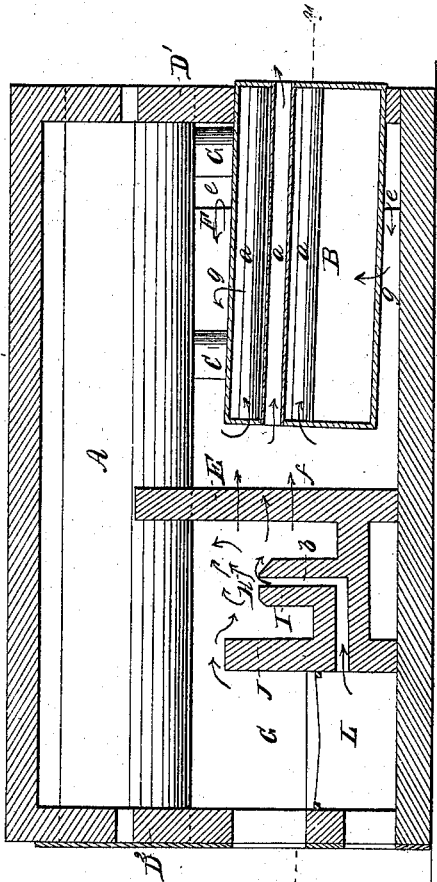
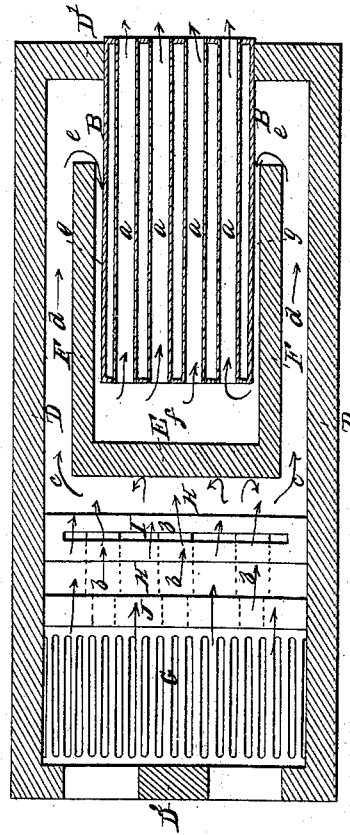


Fig 3.



Witnesses.

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UNITED STATES PATENT OFFICE.

CHARLES T. BOARDMAN, OF PAWTUCKET, RHODE ISLAND.

IMPROVEMENT IN STEAM-BOILERS.

Specification forming part of Letters Patent No. 47,790, dated May 23, 1865.

To all whom it may concern:

Be it known that I, CHARLES T. BOARDMAN, of Pawtucket, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a central longitudinal section of my invention. Fig. 2 is a transverse vertical section of the same in the plane indicated by the line *x x* in Fig. 1. Fig. 3 is a horizontal section of the same in the plane indicated by the line *y y* in Fig. 1.

Similar letters of reference indicate corresponding parts in the several figures.

This invention consists in two plain cylindrical boilers arranged side by side, and one inclined tubular boiler arranged below the rear portions of the said cylindrical boilers and connected with them by means of laterally-inclined water-legs, such arrangement forming a boiler well adapted for the economical generation of steam, and affording provision for the collection of sediment in a comparatively cool part of the boiler.

It also consists in a novel arrangement of the flues and setting of such a boiler, and in a novel arrangement of an air-duct and mixing-chamber for the admission of air from the ash-pit to mix with the gases of combustion in rear of the bridge-wall of the fire-place of such a boiler.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A A are the two plain cylinder-boilers, arranged side by side.

B is the tubular-boiler, having its tubes *a a* extending through it in a longitudinal direction. This boiler is about half the length of A A, and is arranged centrally under the lower parts thereof, as shown in Fig. 1. It is parallel with A A in a vertical direction, but has a downward inclination from front to rear, as shown in Fig. 1.

C C are the laterally-inclined water-legs connecting the two boilers A A with the boiler B. These legs are of cylindrical form, and two separate ones are employed to connect each of the boilers A A with B, one near

the front and the other near the rear end of the latter.

D D D' D² are outer walls of the setting, and E is a pier erected below the boilers A A, and a short distance in front of B, extending from the foundation of the setting upward to the boilers A A, but not extending all across the space between the side walls, D D, of the setting. From the sides of this pier E two vertical parallel walls, F F, extend backward to within a short distance of the rear wall, D', of the setting, the said walls F F extending upward from the foundation to the boilers A, as shown in Fig. 2. A space should be left between these walls and the sides of the boiler B.

G is the fire-place, and L the ash-pit. In rear of the grate is the ordinary bridge-wall, J, and between this and the pier E is a mixing-chamber, H, into which air to mix with the gases of combustion is admitted in an upward direction from the ash-pit through a duct or ducts, *b*, in a bridge-wall, I, behind and somewhat lower than J.

The operation is as follows: The gaseous products of combustion pass from the fire-place over the bridge-wall J into the mixing-chamber H, where they are met by the air issuing upward from the duct or ducts *b*, and in which a thorough mixing of the air and gases is effected, and the ignition of the combustible portions of the gases not previously ignited takes place before the gases can escape through the openings *c c* at the sides of the pier E, which are the only outlets from the said chamber. The flame and heated products pass thence through the flues *d d*, between the walls F F and D D, and under the outer portions of the bottoms of the boilers A A and through the openings *e e*, Fig. 3, at the ends of the walls F F, and return in a backward direction through the flue space *g*, formed between the walls F F around the tubular boiler B and water-legs C C, and under the boilers A A, and after passing into the space *f*, between the front of the boiler B and the pier E, return in a rearward direction through the tubes *a a* of the boiler B whence they are collected in a breeching at the rear of the said boiler and escape to the up-take or chimney.

The water in the boiler B and legs C C is heated to such an extent by heat which in the ordinary mode of setting two plain cylinder-

boilers would be lost that considerable steam is generated in the said boiler B, and the steam so generated passes upward through the legs C C into the boilers A, which are to be connected with one elevated steam chamber or drum.

The sediment eliminated from the water subsides into the boiler B and collects at the lower end of the bottom thereof, where the water is comparatively cool, and whence it can be blown out through a mud-valve.

This invention can be applied to any pair of cylinder-boilers which have been previously set in the ordinary way, and in this consists one of its merits.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The arrangement of the two cylindrical boilers A A, the tubular boiler B, and the laterally-inclined connecting water-legs C C, sub-

stantially as and for the purpose herein specified.

2. In combination with the two cylindrical boilers A A, tubular boiler B, and walls D D, of their setting, the pier E, and connected parallel upright walls F, arranged substantially as herein described.

3. The gas and air mixing chamber H, bridge-wall I, and air duct or ducts b, in combination with each other and with the bridge-wall J, pier E, and ash-pit L, substantially as herein set forth.

4. The combination of the boilers A A B, fire-place G, mixing-chamber H, side flues, d d, and return-flue g, the whole arranged substantially as and for the purpose herein specified.

C. T. BOARDMAN.

Witnesses:

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G. W. REED.