C. SHAW.

Steam-Boiler.

No. 199,866. Patented Jan. 29, 1878.

Fig. 1.

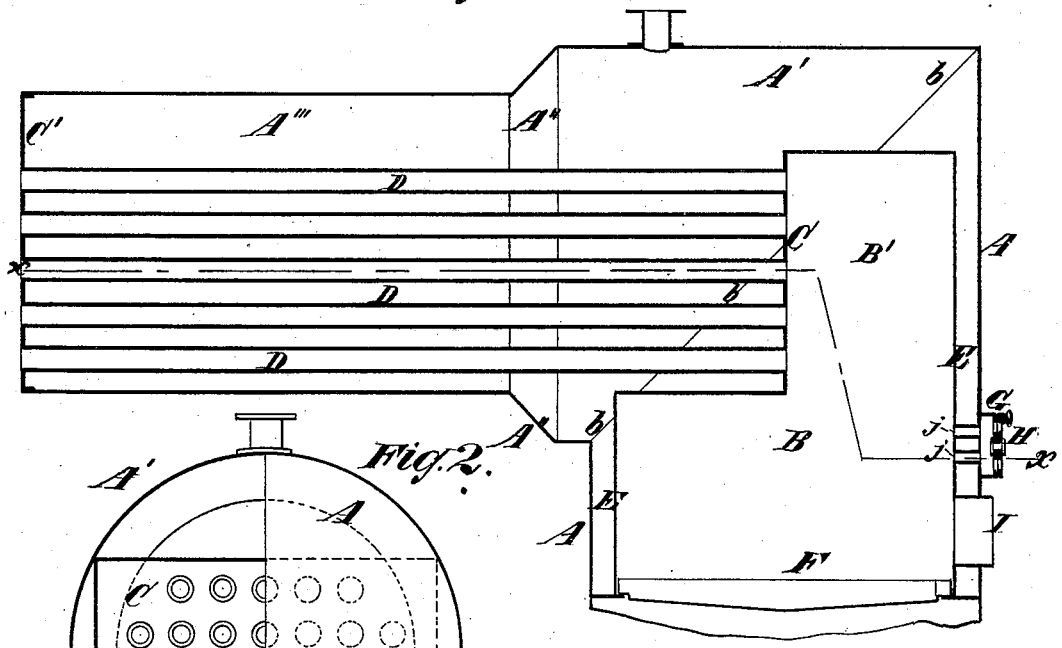


Fig. 2.

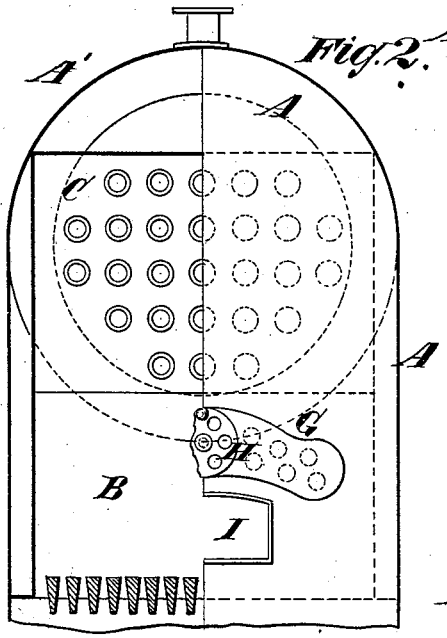
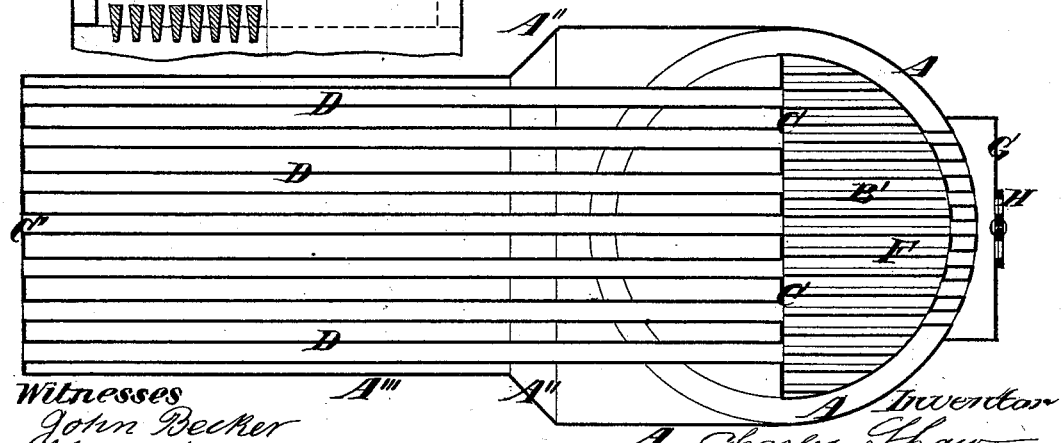


Fig. 3.



Witnesses
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UNITED STATES PATENT OFFICE.

CHARLES SHAW, OF BRIDGEPORT, CONNECTICUT.

IMPROVEMENT IN STEAM-BOILERS.

Specification forming part of Letters Patent No. **199,866**, dated January 29, 1878; application filed December 15, 1877.

To all whom it may concern:

Be it known that I, CHARLES SHAW, of Bridgeport, in the county of Fairfield and State of Connecticut, have invented an Improvement 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 drawing, forming part of this specification.

My invention relates to tubular steam-boilers, principally of the locomotive type, and has for its object such an improved construction of tubular boilers as will increase their efficiency in use and their durability.

Figure 1 in the accompanying drawing represents a central vertical section of a boiler constructed in accordance with my invention. Fig. 2 is a partial end view and partial section of the same. Fig. 3 is a section made on the line *x x* in Fig. 1.

A, A′, A″, and A‴ represent the outer shell of a boiler constructed in four courses, represented respectively by the said letters of reference.

A is a vertical cylindrical course, joined to the first horizontal course A′ by the elbow or miter joint *b*. A′ is a horizontal cylindrical course, united to the conical course A″, which extends entirely around the boiler, and is in turn joined to the horizontal cylindrical course A‴. The course A‴ is of smaller diameter than the course A′.

B B′ is the fire-box, the part B of which is cylindrical, and the part B′ of which is semi-cylindrical, the flat side of said part B′ being at C, and forming a tube-plate. The end of the boiler C′ forms the other tube-plate.

The tubes D are inserted in the said tube-plates in the usual manner.

The front side of the fire-box B B′ is substantially concentric with the front side of the vertical course A through its entire height, and the back side of the part B of the furnace is substantially concentric with the back side of the said vertical course A.

This construction secures a cylindrical water-leg, E, entirely surrounding the fire-box, and lessens the unequal expansion of plates, which injures the plates of boilers constructed according to other methods, and having many angles.

The smaller diameter of the course A‴ secures the application of the heated gases of combustion, after their heat has been partially extracted, to a smaller body of water; and the connection of the said course with the conical course A″ secures a better circulation between the back end of the boiler and the water-leg E, which aids in maintaining a more uniform temperature throughout the boiler than has hitherto been attained.

By this construction I am to a greater extent enabled to avoid right angles, and to use and to secure the benefits of cylindrical construction throughout nearly all parts of the boiler, thereby obtaining a more durable tubular boiler than has hitherto been manufactured.

To secure a more perfect combustion of gases above the fuel on the grate F, I place on the front of the vertical course A, above the fire-box door I, an air-box, G, provided with a valve, (preferably a register-valve,) and I connect the said air-box with the interior of the fire-box by means of tubes *j*, which pass through the water-leg E.

By this means I am able to supply air to the unconsumed gases above the fuel in right proportion to secure perfect combustion, and, as the tubes *j* are surrounded with heated water, the said tubes impart heat to the air, and I thus measurably secure the advantages of a hot draft.

I claim—

1. In a tubular boiler, the combination of the vertical course A, having its entire upper edge beveled or mitered, and the horizontal course A′, having its entire front edge correspondingly mitered or beveled and joined thereto, so that the top surface of the boiler fully overlaps the vertical course, substantially as described.

2. The combination, in a tubular boiler, of the cylindrical courses A′ A‴ and the truncated conical course A″, connecting said cylindrical courses, and forming an oblique wall entirely around the boiler, substantially as set forth.

3. In a tubular boiler of the locomotive type, the fire-box composed of the lower cylindrical part B and the upper semi-cylindrical part B′, the flat side of which forms a tube-plate, substantially as and for the purpose set forth.

CHARLES SHAW.

Witnesses:
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JOSEPH RIGNEY.