T. WESTON.

SECTIONAL STEAM BOILER.

No. 190,457. Patented May 8, 1877.

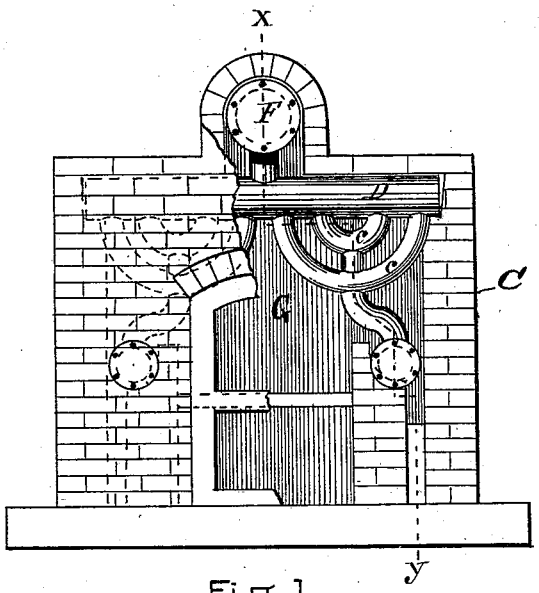


Fig. 1.

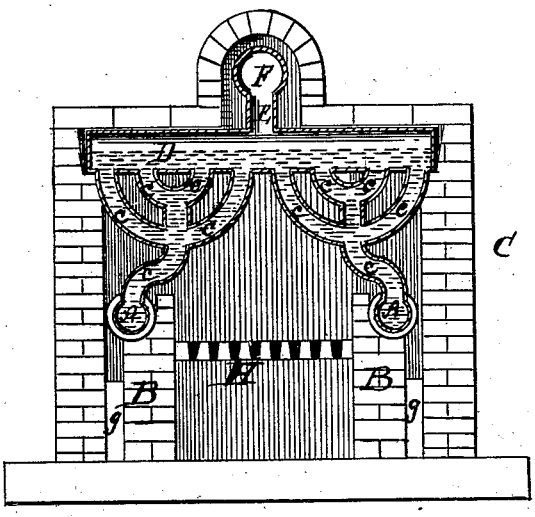


Fig. 2.

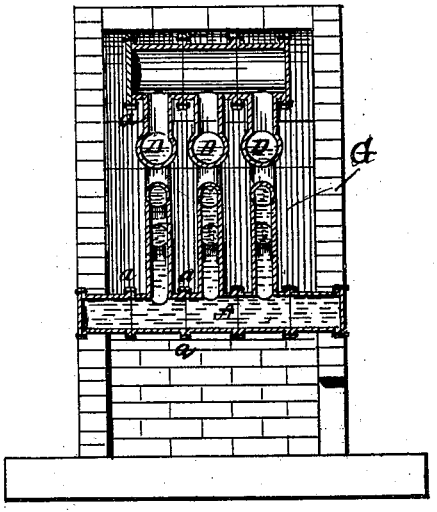


Fig. 3.

WITNESSES

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## IMPROVEMENT IN SECTIONAL STEAM-BOILERS.

Specification forming part of Letters Patent No. **190,457**, dated May 8, 1877; application filed March 6, 1877.

*To all whom it may concern:*

Be it known that I, THOMAS WESTON, of Hingham, in the county of Plymouth and State of Massachusetts, have invented an Improvement in Steam-Boilers, of which the following is a specification:

This invention relates to an improvement in steam-boilers; and consists in a peculiar arrangement of the tubes relatively to the fire-box or furnace, and to each other, by which a uniform distribution of heat upon the tubes is effected, and in increasing or diminishing its steam-generating capacity by making the same in detachable sections, as hereinafter explained.

Reference is made to the accompanying drawing, forming a part of this specification, in explaining the nature of my invention, in which—

Figure 1 is a front elevation of my invention, showing the brick chamber or oven inclosing the boiler partially broken away to expose the boiler. Fig. 2 is a vertical section through the center of one of the sections; and Fig. 3 is a section on the dotted line *x y*, Fig. 2.

Two horizontal tubes, A, one on each side of the fire-box, and separated from it by the partial brick partitions B, are each provided with a tube, C, projecting upward and inward toward each other, and opening into the horizontal tube D, which extends across the combustion-chamber, near its top, transversely to the tubes A. The converging tubes C may be divided, or provided with any number of auxiliary curved tubes *c*, branching out from each side of the tubes C, and opening into the transverse tube D. This transverse tube D is provided at the center of its length with the short vertical tube E, which connects the tube with a horizontally-arranged steam-drum, F, transversely arranged to the tube D. Each end of the horizontal tubes A and of the steam-drum F is open, and is provided with flanges *a*.

The above description is a detail of the form of one section of the boiler, and as many such sections may be used in the construction of the boiler as desired.

In the drawing three of the above-described detachable sections are shown in position, bolted together through the flanges *a* on the tubes A and on the steam-drum F. The sections thus united open into each other.

Of course, when the sections are in position, the opening at each end of the connected steam-drums F is closed, and that at each end of the connected tubes A partially closed, by caps bolted to the flanges *a;* a sufficient opening being retained for the introduction of the feed-water at one end of each tube A, and for the "blow-off" cocks at the other end of each tube. The steam-drum is provided with the usual opening for the escape of steam to the cylinder.

The detachable sections thus constructed and united are inclosed in a brick chamber, G, being supported therein on the partial partitions B, and by the projection of the ends of tubes A into and through the front and rear walls of the chamber, so as to be flush with the outside thereof, as shown. The chamber is further provided with the long slits *g*, which serve as flues for the discharge of smoke and unconsumed gases into the pipes leading to the chimney.

The chamber is supplied with the customary furnace-doors and other necessary openings, and the partial partitions B support the grate-bars H. The tubes are designed to be kept filled with water to about the center of the tube D.

The tubes may be of cast or wrought iron, or of any desirable metal.

It will be observed that the general construction of the boiler is in the form of a series of detachable arches sprung across the combustion-chamber from the two parallel horizontal tubes, and that the center of the arch on the line of the steam-drum is immediately over the center of the furnace. It will also be observed that the products of combustion can circulate freely around each and every tube excepting tubes A, and that the utmost amount of fire-surface is obtained, and that the distribution of heat is very nearly uniform on all the tubes.

It will also be seen that the spaces between the arches themselves, and between the walls of the chamber and the arches, form the flues for the transfer of the gaseous products of combustion to the main flue *g*, and that the flues *g* are made long, so that the heavier in-

combustible gases may settle therein and be carried off without interfering with the action of the heat-producing gases.

It will be seen further that the sediment deposited in the tubes A, not being exposed to the direct influence of the flames, will not injure the tubes, and that the tubes may easily be cleaned by removing the end caps.

If it is desirable to enlarge the boiler, or remove or renew a part thereof, the top of the chamber is taken off and a section added, taken out, or substituted, as the case requires, it being necessary only to attach or detach the section by bolting or unbolting the flanges *a*.

The advantages of my invention consist in the described combination of horizontal and arching tubes in detachable sections, arranged in relation to the furnace, as shown, to secure a uniform degree of heat upon all the tubes, a variable capacity to the boiler, according to the number of sections used, and the most perfect and economical use of the products of combustion.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In combination with a combustion-chamber, the boiler described, consisting of two parallel sectional tubes, A, converging tubes C, either with or without the auxiliary tubes *c*, the transverse horizontal tubes D, and the sectional steam-drum F, having vertical tubes E, all arranged in relation to the furnace, substantially as set forth.

2. In combination with a combustion-chamber, one or more detachable tubular arches, each consisting of two horizontal tubes, A, partial wall B, for protecting tubes A from the flames, as described, two converging tubes, *b*, with or without the branching tubes *c*, the transverse tube D, and the sectional steam-drum F, having vertical tube E, and adapted to be united with a parallel section by the flanges on tubes A and steam-drum F, substantially as set forth.

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