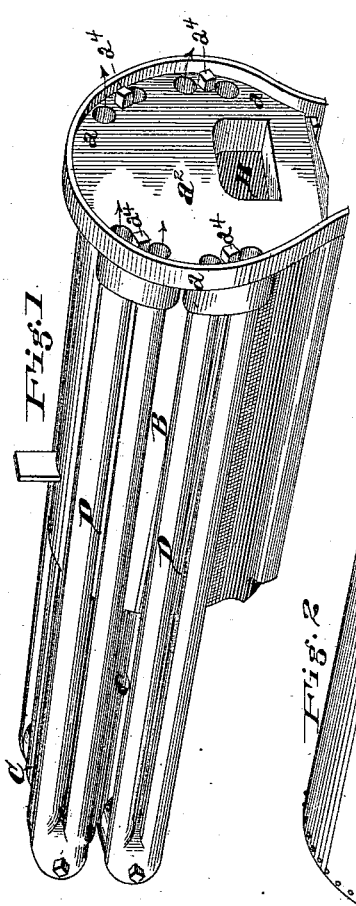
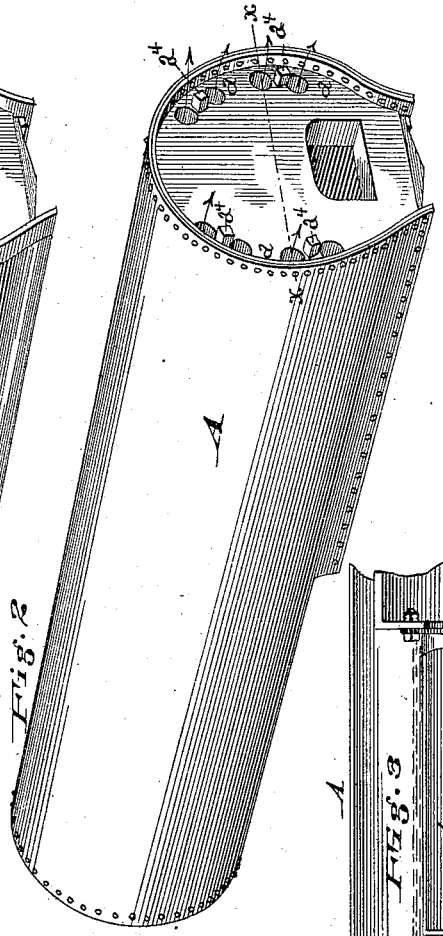
2 Sheets—Sheet 1.

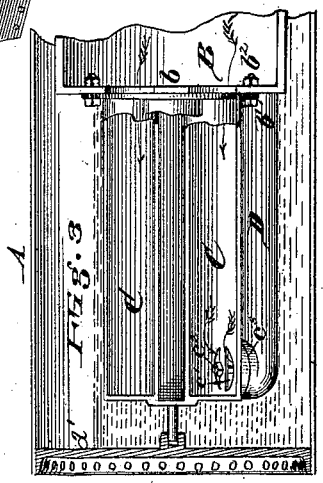
F. TRUMP.

SECTIONAL STEAM BOILER.

No. 187,200. Patented Feb. 6, 1877.







Attest
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J. S. Boroff

Inventor.
Fuller Trump.
By Y. Millward
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2 Sheets—Sheet 2.

F. TRUMP.

SECTIONAL STEAM BOILER.

No. 187,200. Patented Feb. 6, 1877.

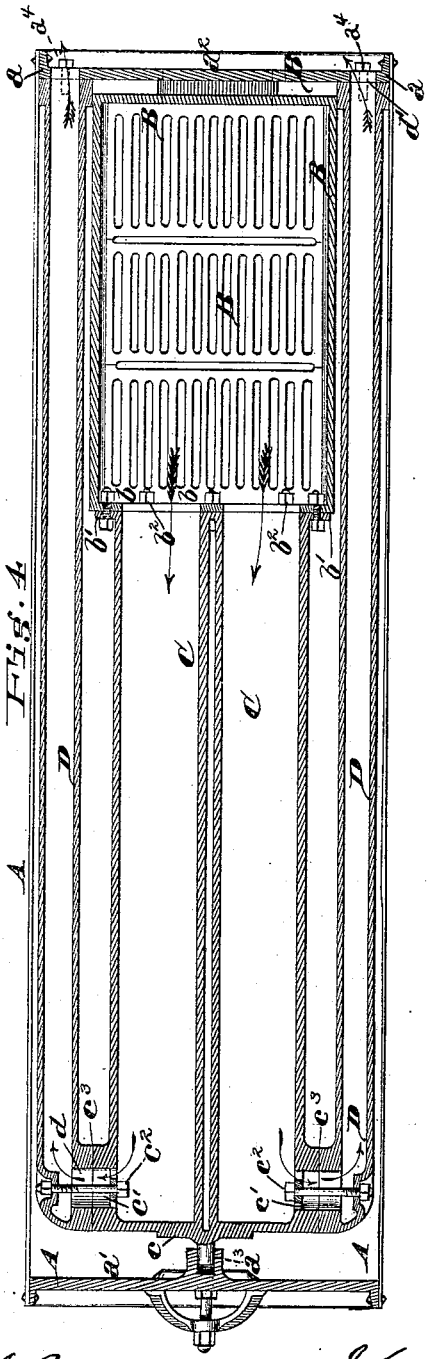

Fig. 4.

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UNITED STATES PATENT OFFICE

FULLER TRUMP, OF SPRINGFIELD, OHIO.

IMPROVEMENT IN SECTIONAL STEAM-BOILERS.

Specification forming part of Letters Patent No. **187,200**, dated February 6, 1877; application filed August 23, 1876.

To all whom it may concern:

Be it known that I, FULLER TRUMP, of Springfield, Clarke County, State of Ohio, have invented an Improvement in Steam-Boilers, of which the following is a specification:

My invention has for its object the production of a steam-boiler adapted to be made of wrought-iron at those portions submitted to tensile strain, and of cast iron in those parts called upon to receive compression only, and of such construction generally as that the flues both from the fire and return may be attached entire to one end of the boiler-shell, and the fire-box detached from the tubes by the release of exterior bolts, and the joints of the tubes so disposed as to give convenience for effecting tightness, and provision for free expansion and contraction.

My invention, which is adapted for application to both horizontal and vertical boilers, consists, first, in a peculiar arrangement of the tubes attached to the fire-box, by which single, direct, and double return flues are provided; second, in the peculiar arrangement of the joints of the tubes, by which convenience of manufacture and free expansion and contraction are provided for.

Figure 1 is a perspective view of my improved boiler, exclusive of the shell. Fig. 2 is a perspective view of my improved boiler complete. Fig. 3 is a sectional view of my boiler taken diagonally through the system of direct smoke-conducting pipes, and at an angle to its normal vertical line. Fig. 4 is a sectional plan of my improved boiler taken on the line *x x*, Fig 2.

A is the shell of the boiler, provided with cast-metal heads, while of itself wrought metal, which wrought metal is used upon account of lightness and extreme durability under tensile strain.

The head a^1 is provided with the usual manhole, while the head a^2 constitutes the opposite end of the boiler, and is formed, in common with the fire-box B, of the same body of metal, but of increased area, to form a projecting flange, *a*.

To the inner flanged end *b* of the fire-box is secured a system of cast-metal direct flame-tubes, C, preferably four in number, and cast solid together upon a circular flange, b^1, through which they connect with, and by which they are secured to, the fire-box B, by means of bolts b^2, conveniently reached for adjustment from the interior of the fire-box.

To the farther end of these direct tubes is cast a projecting lug, *c*, to, when the pipes are in position, engage loosely with a socket, a^3, upon the boiler-head a^1, in a manner to support the tubes in position and allow for expansion in that direction of the tubes when heated. Connected to these direct pipes is a system of double return pipes, D, each direct pipe connecting to a pair of these return pipes, which are cast together, and have but a common opening, *d*, to the pipe C.

The pipes C are provided with openings c^1, to correspond with the openings *d* in pipe D, and the two classes of pipes are secured together at this point by means of bolts c^2, which keep the ground-joint faces c^3 of the pipes perfectly in contact. These return pipes extend forward the full length of the boiler, and attach rigidly with ground joints d^1 against the boiler-head flange *a* by means of exterior bolts and nuts a^4, that can be reached from the outside to adjust.

In this manner the cast fire-box and direct and return tubes are secured solely to one end of the boiler, and the other ends, while supported to the opposite end of the boiler, are left free to expand and contract under sudden heat, and under which, if the cast parts were secured rigidly to both ends of the wrought parts, they would fracture, owing to the unequal subjection to heat, and the unequal powers of expansion and contraction of the two styles of metal. And the manner of securing the tubes and fire-boxes by exterior bolts renders the adjustment of the parts of the boiler together of convenient labor, and the detachment of the various parts of equal ease. It will be seen that the planes of the joints c^3 and d^1 are at right angles, and thus an ease of adjustment and durability of joint under expansion and contraction above the average capability is provided.

Having thus described my invention, I claim—

1. The combination of fire-box B, direct flues C, and return flues D, all secured to one

end of the boiler, the adjacent ends of the direct flues and return flues being secured together for direct communication, substantially as and for the purpose specified.

2. The combination of fire-box B and flues C and D, the flues D being secured by a transverse joint to the end of the boiler and to the flues C by a longitudinal joint adapted to permit the flues to move on one another under unequal expansion and contraction, substantially as specified.

In testimony of which invention I hereunto set my hand.

FULLER TRUMP.

Witnesses:
A. T. BYERS,
ROBT. C. RODGERS.