T. E. McNEILL & R. N. PRATT.

Steam Generators.

No. 141,578. Patented August 5, 1873.

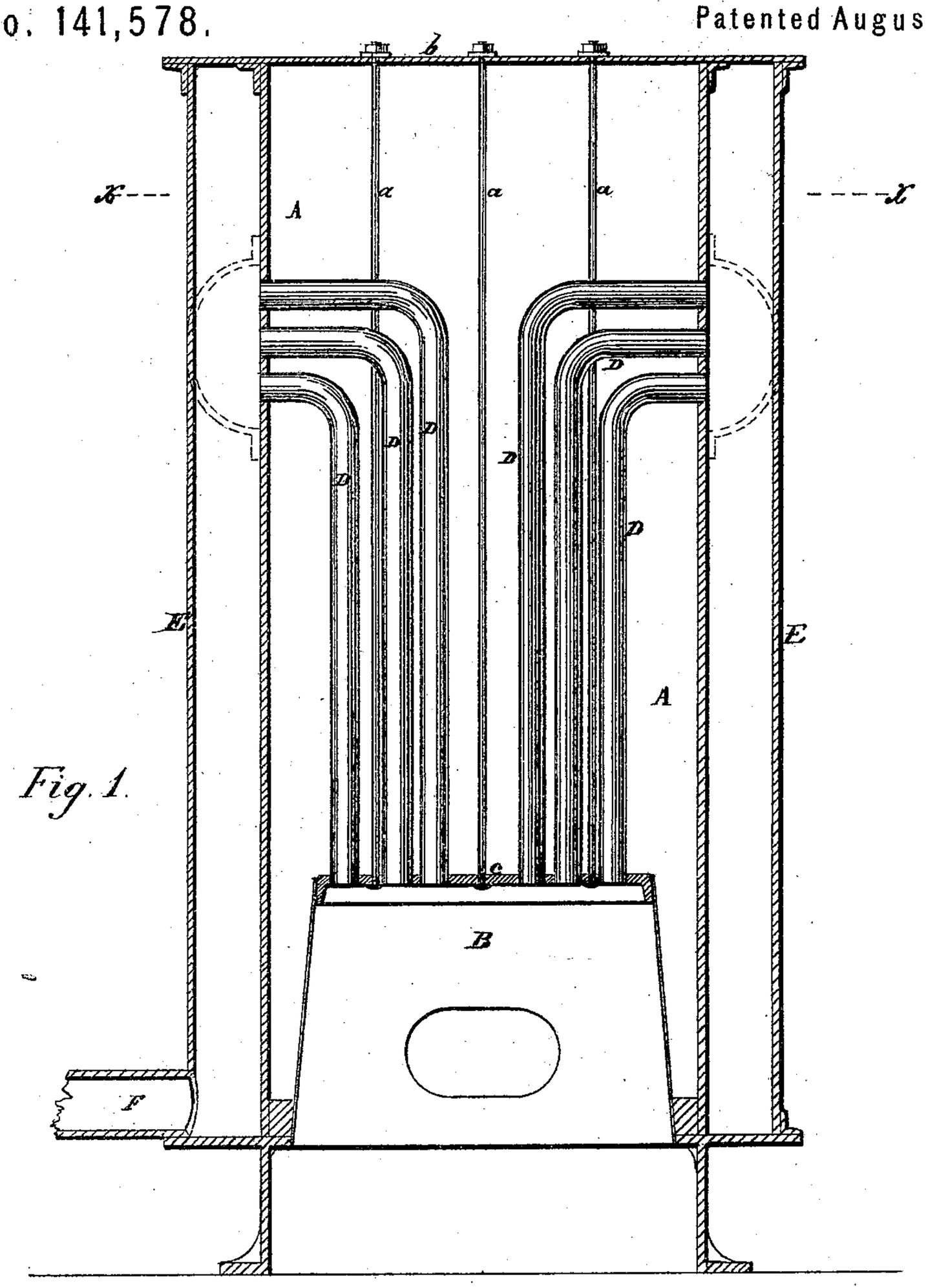

Fig. 1.

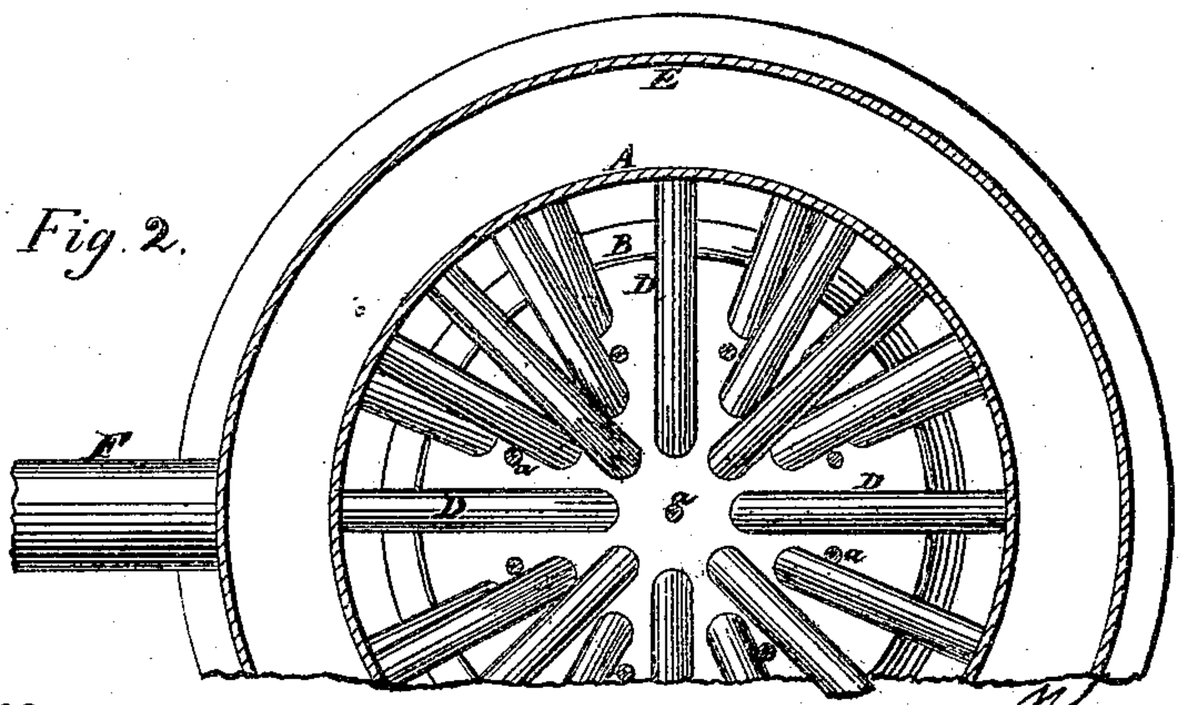

Fig. 2.

Witnesses:
Fred Hamer
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UNITED STATES PATENT OFFICE.

THOMAS E. McNEILL AND RUFUS N. PRATT, OF NEW YORK, N. Y.

IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. **141,578**, dated August 5, 1873; application filed September 21, 1872.

To all whom it may concern:

Be it known that we, THOMAS E. McNEILL and RUFUS N. PRATT, both of the city, county, and State of New York, have invented an Improvement in Steam-Boilers, of which the following is a specification:

This invention consists in a novel arrangement of the tubes and external smoke-jacket and the outlet flue or chimney of an upright tubular boiler, whereby the superheating of the steam is avoided and the heat of the gaseous products of combustion is very effectively employed in the generation of the steam.

Figure 1 is a vertical transverse section of a steam-boiler constructed according to our invention. Fig. 2 is a horizontal section of the same taken in the line *x x* of Fig. 1.

A is the cylindrical shell of the boiler, in the lower end of which is arranged the furnace or fire-box B, the stays or braces *a* extending from the top *b* of the shell to the crown-sheet *c*. D are the tubes through which the gaseous products of combustion pass from the furnace. The lower ends of these tubes are secured in and through the crown-sheet, and, extending vertically to a greater or less distance from the top of the water-space—or, in other words, from the usual water-level of the boiler—are turned radially at right angles to the vertical, and have their horizontal end portions secured in and through the cylindrical sides of the shell. External to and at any suitable or desired distance from the shell, and concentric therewith, is a jacket, E, between which and the shell is thus constituted an annular flue, communicating at its bottom, and close to the bottom of the boiler, with an outlet-flue, F.

The hot gaseous products of combustion passing from the fire-box through the tubes are retarded in their course by the partial obstruction offered by the bend in the tubes, and are thereby retained in contact with the tubes for a longer period in their transit than would otherwise be the case, and a correspondingly greater transmission of heat from the said products is had through the tubes to the water. After leaving the tubes the gases aforesaid descend through the space or annular flue between the jacket E and the boiler-shell, and by their contact with the latter serve to still further increase the temperature of the water and promote the generation of steam, and when thus utilized to the utmost practicable degree are allowed to escape through the outlet-flue F.

The upper ends of the tubes being below the surface of the water, and the outlet-flue F being at the bottom of the jacket E, so that the draft through the jacket is downward, there is no superheating of the steam; but all of the heat that is transmitted from the tubes and from the interior of the jacket is employed in the heating of the water and the generation of the steam.

We are aware that bent tubes substantially like ours have been combined with a jacket surrounding the upper part of the boiler, and having an outlet-flue at the top; but with that arrangement, although the tubes do not superheat the steam, the jacket is liable to do so. With our arrangement the superheating is altogether avoided.

What we claim as our invention, and desire to secure by Letters Patent, is—

The jacket E, having its outer flue or chimney communication at or near its bottom, in combination with the bent tubes D, the fire-box, and the cylinder A, substantially as herein shown and described.

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