

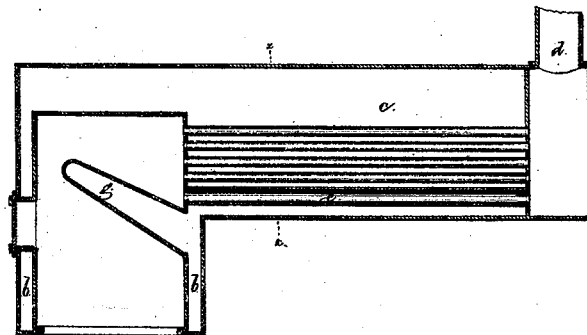
*C. A. Thompson,*

*Tubular Steam Boiler.*

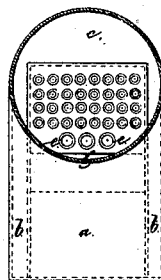
*No. 113466,*

*Patented Apr. 4, 1871.*

*Fig. 1.*



*Fig. 2.*



*Witness*

*Chas. Smith*

*Geo. A. Walker*

*Charles A. Thompson*

*Lemuel M. Cornell* *att'y*

# United States Patent Office.

CHARLES A. THOMPSON, OF FLUSHING, NEW YORK.

Letters Patent No. 113,466, dated April 4, 1871.

## IMPROVEMENT IN TUBULAR STEAM-BOILERS.

The Schedule referred to in these Letters Patent and making part of the same.

### *To all whom it may concern:*

Be it known that I, CHARLES A. THOMPSON, of Flushing, in the county of Queens and State of New York, have invented an Improvement in Tubular Steam-Boilers, and the following is declared to be a correct description thereof.

A tubular boiler has been made in which an inclined water-shield has interposed between the fire and the ends of the horizontal flues, so as to compel the products of combustion to travel around the said water-shield and heat the same; and also to protect the tube-sheet and tubes from the action of the intense fire. In boilers of this kind great difficulty has been experienced from an accumulation of ashes or cinders upon the water-shield, closing the ends of the tubes in the lower ranges, and, at the same time, the upper tubes are injured by undue heat, and the heat is not fully abstracted from the products of combustion in consequence of the insufficiency in the extent of heating-surface for the boiler.

An attempt has been made to prevent this banking of the ashes and cinders by tubular openings through the inclined water-shield; but the same form flues that rapidly clog up or burn out, and the heat does not all pass around the water-shield.

My invention consists in combining with the said tubular water-shield ranges of horizontal flues, which flues are of larger diameter in the lower range or ranges than in the upper ranges of tubes, so that there will be a superior draught through the lower ranges of tubes sufficient to carry through such tubes the ashes and cinders that would otherwise accumulate upon the water-shield.

### *In the drawing—*

Figure 1 is a vertical section of the boiler longitudinally, and

Figure 2 is a cross-section at the line *x x*.

The fire-box *a*, water-spaces *b*, boiler *c*, and escape-flue *d* are substantially similar to those before constructed, with the exception that the tubes *e e*, that form the lowest range or ranges of tubes through the boiler, are of considerably larger diameter than the tubes in the upper ranges, in order that there may be a stronger draught through these lower tubes for conveying away the ashes and cinders that may be carried up from the fire and lodge upon the upper surface of the water-shield *g*.

This water-shield *g* acts to prevent the direct contact of the heat with the ends of the tubes, and said water-shield *g* may be at a greater or lesser inclination; and where the tube-sheet is set back from the line of the rear of the furnace the water-shield stands in a horizontal position, extending back to said tube-sheet from the back edge of the furnace.

### *I claim as my invention—*

The boiler, made with ranges of tubes of different diameters, the lower range or ranges being of the largest diameter, in combination with the water-shield, for the purposes set forth.

Signed by me this 11th day of February, A. D. 1871.

CHARLES A. THOMPSON.

### *Witnesses:*

CHAS. H. SMITH,  
GEO. T. PINCKNEY.