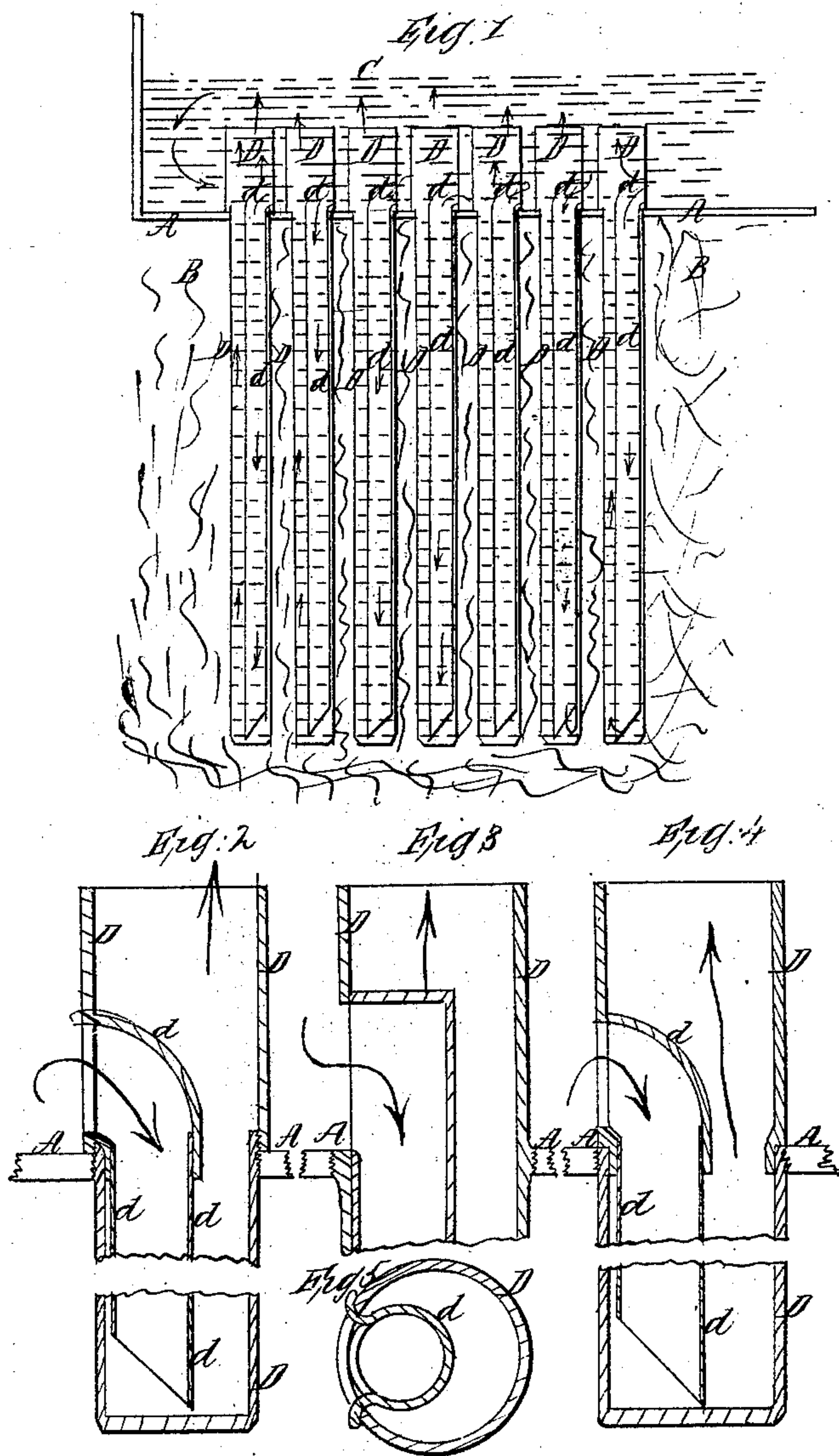


J. Nelson,

Steam-Boiler Water-Tube.

N^o 82,239.

Patented Sep. 15, 1868.



Witnesses:
W. C. Dey
C. C. Livings.

Inventor:
Joseph Nelson
By his attorney, J. D. Adams.

United States Patent Office.

JOSEPH NASON, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF, CHARLES H. JAMES, AND FRANK MILLWARD, OF CINCINNATI, OHIO.

Letters Patent No. 82,239, dated September 15, 1868.

IMPROVEMENT IN DROP-TUBE STEAM-GENERATORS.

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, JOSEPH NASON, of the city and county of New York, in the State of New York, have invented certain new and useful Improvements in Drop-Tube Boilers; and I do hereby declare that the following is a full and exact description thereof.

The object of my invention is to provide more effectually than heretofore against any conflict of the ascending and descending currents, at or near the top of the drop-tubes, and to provide for taking the water into the internal tubes from the spaces between the tops of the main tubes, where the water is preserved, as far as possible, from any disturbance due to the ebullition in the main tubes.

I will first describe what I consider the best means of carrying out my invention, and will afterwards designate the points which I believe to be new.

The accompanying drawings form a part of this specification.

Figure 1 is a section on a small scale.

Figures 2 and 3 are sections on a scale about half size, showing two forms of the details.

Figure 4 shows a third form.

The figures show the novel parts, with so much of the other parts as appears necessary to show their relations thereto.

Similar letters of reference indicate like parts in all the figures. Tints are employed mainly to aid in distinguishing parts, and do not necessarily indicate materials.

A is the crown-sheet or flue-sheet, which extends horizontally over a space, B, in which the gaseous matter from the fire circulates, and which supports above it a stratum of water, C, as represented. D are the drop-tubes, open at their upper ends, and closed at their lower ends. These tubes are screwed into the tube-sheet A, so as to form a strong and tight connection therewith.

I employ an internal tube, *d*, which is open both at the top and the bottom, and through which water is allowed to descend, to furnish a current, which may rise as it becomes heated, and becomes filled with particles of steam, thus inducing a double current, one descending through the interior tube *d*, and the other ascending on its exterior, and between it and the main tube D.

This general idea of circulating water in this manner in drop-tubes has been long known and approved, and my invention relates to details of the construction, which remain to be described.

Referring to fig. 2, the outer tube D is extended upward above the tube-sheet A by adding a length, D', which may be made of cast iron. It is open at both ends, and is, or may be, a plain tube, with the exception that there is a bent piece of internal pipe cast therewith, as indicated by *d'*, which, when the top is secured upon the main tube, forms a connection with the internal tube *d*.

The figures represent several modifications of the details.

Fig. 1 shows the general arrangement of this part of the boiler on a small scale. I do not deem it necessary to represent the other portions of the boiler, as they may be arranged in any approved manner.

Fig. 2 represents the top piece D' as threaded in its interior, and fitting upon male threads upon the top of the main tube D.

Fig. 4 represents the top piece as fitting within the top of the main tube D. This latter arrangement allows the main tube to be introduced, as usual, through the furnace or space B, and allows the top piece to be conveniently and permanently applied before the introduction of the tube to its place in the tube-sheet A.

Figures 3 and 5 represent another modification, in which the top piece is in one with the main tube. In this modification, the internal tube *d* is fastened to the external tube, or extended top, by cutting and bending outward a portion of the internal tube, so as to form lips, which connect it with sufficient force and tightness. It will be readily seen that the connection, with the internal tube *d*, of the external tube D need not be perfectly water-tight. In this form of the invention, the upper end of the internal tube *d* may be closed by

any convenient means, so that the water shall enter solely through the aperture provided in the side of the extended top.

I have tested my invention very thoroughly, and with highly-satisfactory results. The steam generated in the drop-tube rises, taking with it a current of water, and pours out in a continuous stream at the open top, while the internal tube d draws from the space between the tops of the tubes a current of water, which is nearly free from particles of steam. I take care to so arrange my tubes in the boiler that there shall be sufficient space between the tubes D' for the water to collect and remain tranquil, and I prefer to so construct the boiler that there shall be a space of two or three inches between the exterior tubes and the outer shell of the boiler, as indicated in fig. 1, from which a current of water may flow inward through the spaces.

The extended top D' , with the connected part d' , may be conveniently and cheaply made of cast iron. They may be cast as thin as the metal will flow, they being subject to no strain of any importance. The internal tube d is made a little smaller than the lower end of the portion d' , and is simply thrust into its place. The lower end of the interior tube d may rest upon the bottom of the main drop-tube D , the internal tube being cut at an angle, as represented, to allow an ample space for the water to flow out at the bottom.

Having now fully described my invention, what I claim as new, and desire to secure by Letters Patent, is as follows:

1. I claim the within-described extension of the drop-tube upward above the upper surface of the tube-sheet A , and the provision for allowing a current of water to enter through the side of such extension, and descend through an enclosed passage or tube, d , combined and arranged substantially as and for the purpose herein set forth.

2. I claim, in connection with the above, making the extended top D' in a separate piece from the main drop-tube D , and adapted to serve, relatively to the other parts, substantially in the manner and for the purposes herein specified.

JOSEPH NASON.

Witnesses:

C. C. LIVINGS,
W. C. DEY.