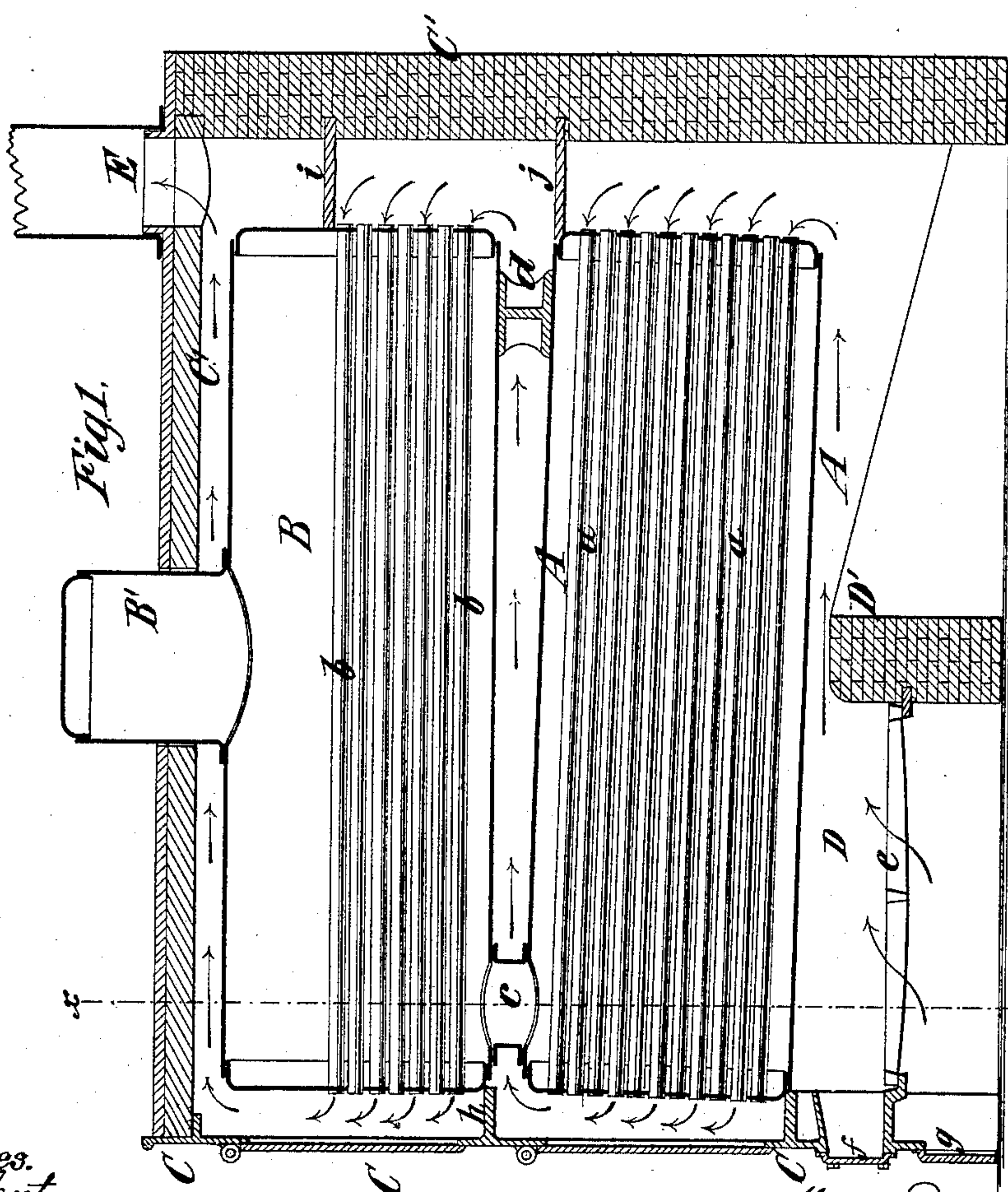
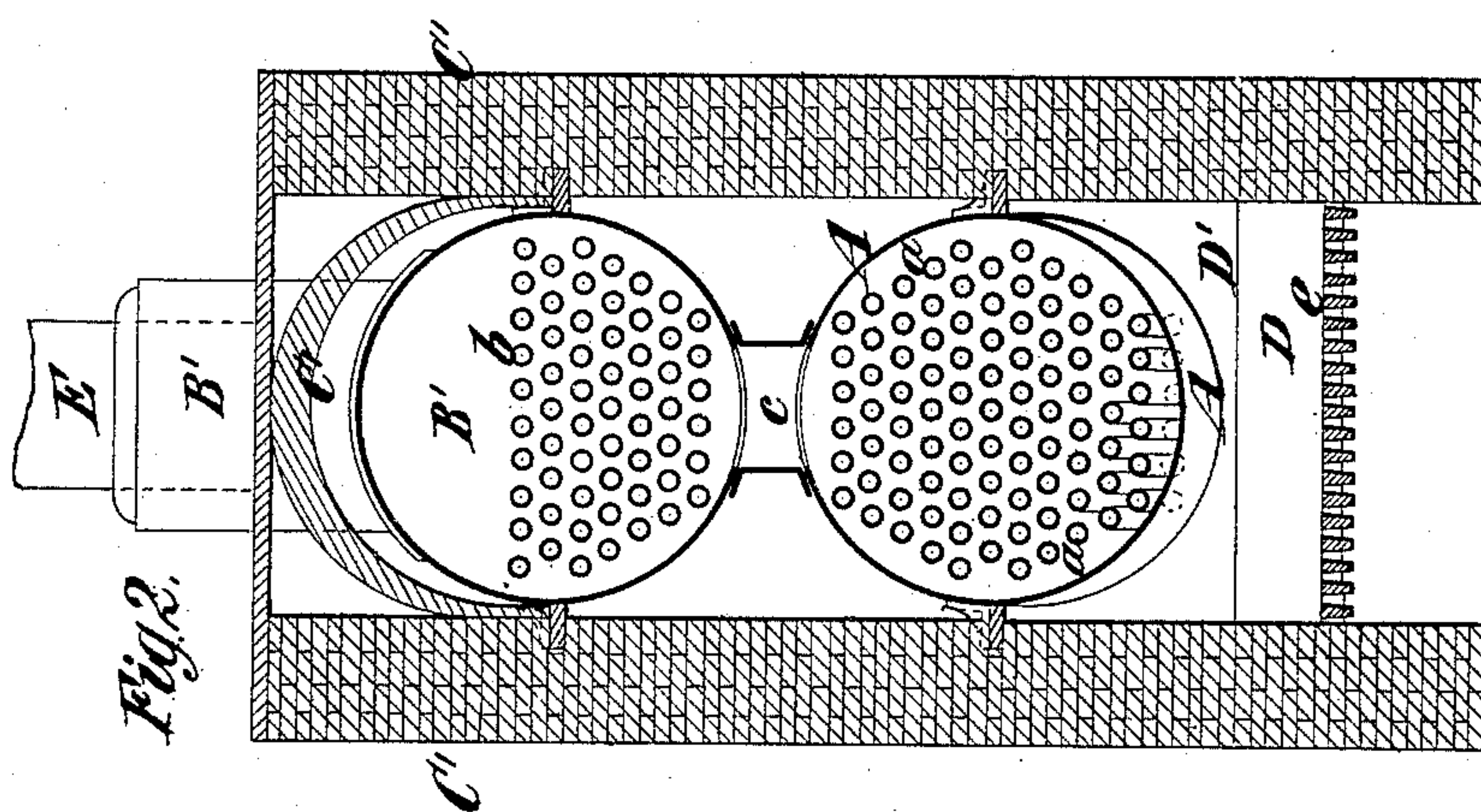


(No Model.)

W. D. ADAMS.  
STEAM GENERATOR.

No. 341,122.

Patented May 4, 1886.



Witnesses.  
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# UNITED STATES PATENT OFFICE.

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## STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 341,122, dated May 4, 1886.

Application filed January 27, 1886. Serial No. 189,903. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM D. ADAMS, of the city and county of New York, in the State of New York, have invented a new and useful Improvement in Steam-Generators, of which the following is a specification.

My invention relates to that class of generators in which two cylindric multitubular boilers are arranged one above another and connected by a throat or passage which provides for circulation between them; and the invention consists in novel combinations of parts, which are hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a longitudinal vertical section of a generator embodying my invention, and Fig. 2 is a transverse vertical section on the plane of the dotted line *x x*, Fig. 1.

Similar letters of reference designate corresponding parts in both figures.

A B designate lower and upper cylindric multitubular boilers arranged in a setting, here shown as consisting of the front C and brick-work C'. The lower boiler, A, is filled with or contains fire-tubes *a* throughout the entire area of its transverse section; but the upper boiler, B, contains similar tubes, *b*, in its lower portion or half only, the remaining or upper portion being designed for steam-space, which may be supplemented by a dome, B'.

The boilers are connected by a throat or passage, *c*, near one end, and in the operation of the generator the water-level will be above the tubes *b* in the upper boiler, B, the lower boiler, A, being entirely filled with water. A similar connecting throat or passage might be provided near the other end, but as unequal expansion in the two boilers might strain these connections, if two were employed, I prefer to arrange at the back end a saddle, *d*, supported on the lower boiler, and on which the upper boiler is supported and may adjust itself.

I prefer to arrange the lower boiler in a position inclined slightly upward toward its front end, or toward the end at which is the throat or passage *c*, so as to facilitate the circulation between it and the upper boiler.

The boilers should have the usual or other suitable arrangement of steam, feed, and blow-off pipes and valves, which I have not shown, as they form no part of my invention.

Beneath the lower boiler, A, at the front thereof, is the usual furnace, D, with grate-bars *e* and fire and ash-pit doors *f g*, and in the setting are horizontal partitions or division-plates *h i j*, by which the products of combustion are caused to take the course indicated by arrows in Fig. 1. From the furnace D the hot products of combustion pass over the bridge-wall D' rearward, under the lower boiler, A, thence forward through the fire-tubes *a*, thence rearward between the upper and lower boilers, thence forward through the tubes *b*, and finally rearward over and around the upper boiler, B, to the chimney-outlet E.

By the simple and inexpensive construction and arrangement above described I provide a generator in which there is a large amount of water-space and a large area of effective heating-surface, and as the upper boiler, B, is not subjected to so intense heat as is the lower one the ebullition therein will be less violent and dry steam will be produced.

If desired, a single boiler, B, might be arranged above and between two others, each similar to A, and such a construction and arrangement is within the scope of my invention.

By describing A and B as "cylindric multitubular boilers" I do not mean that they must be truly cylindric, as they may be larger in diameter at one end than the other, but only intend to refer to the type of structure of which they are examples.

It will be observed that according to my invention the two multitubular boilers are approximately equal in length and the furnace D is arranged under one end portion of the lower boiler, A. This arrangement of the furnace, in connection with the form of setting which I have shown, is very desirable, because then the products of combustion are compelled to pass from the furnace rearward beneath the lower boiler, A, thence forward through the tubes of the lower boiler, thence rearward between the two boilers, and again forward through the tubes of the upper boiler. In this



way nearly all the available heat is absorbed from the hot products of combustion before they make their escape, and the utmost simplicity of construction and arrangement is secured. It is also advantageous to employ a throat or passage connecting the boilers at one point only, in order to provide for their unequal expansion without injurious straining to the throat or connection, and it is advantageous to have the lower boiler inclined slightly downward from that end at which is the connection or throat *c* toward the other end, because by such an arrangement the circulation between the two boilers and the escape of steam from the lower boiler into the upper boiler will be facilitated.

What I here claim as my invention, and desire to secure by Letters Patent, is—

1. In a steam-generator, the combination of two cylindric multitubular boilers arranged one above the other and of approximately equal length, and connected by a throat or passage for circulation between them, a furnace under one end portion of the lower boiler, and a setting for the generator arranged substantially as described, whereby the products of combustion are caused to pass from the furnace rearward under the lower boiler, thence forward through the tubes thereof, thence rearward between the boilers, and then forward

through the tubes of the upper boiler, substantially as herein set forth.

2. In a steam-generator, the combination of the lower and upper cylindric multitubular boilers, A B, of approximately equal length, the throat or passage *c* connecting them at one end, and the lower boiler, A, having a downward inclination from the end at which is the throat or passage *c*, and the furnace D, under the end portion of the lower boiler, substantially as herein described.

3. The combination of the two cylindric multitubular boilers arranged one above another and connected by a passage or throat, *c*, at one end and having between them at their opposite ends a saddle, *d*, on which the upper boiler is supported and may move, substantially as herein described.

4. The combination, with the lower and upper cylindric multitubular boilers connected by a throat or passage for circulation, of a setting comprising a furnace, D, and partitions, whereby the products of combustion are caused to take the course described in their passage from the furnace to the chimney-outlet, substantially as herein set forth.

WILLIAM D. ADAMS.

Witnesses:

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