

No. 655,636.

Patented Aug. 7, 1900.

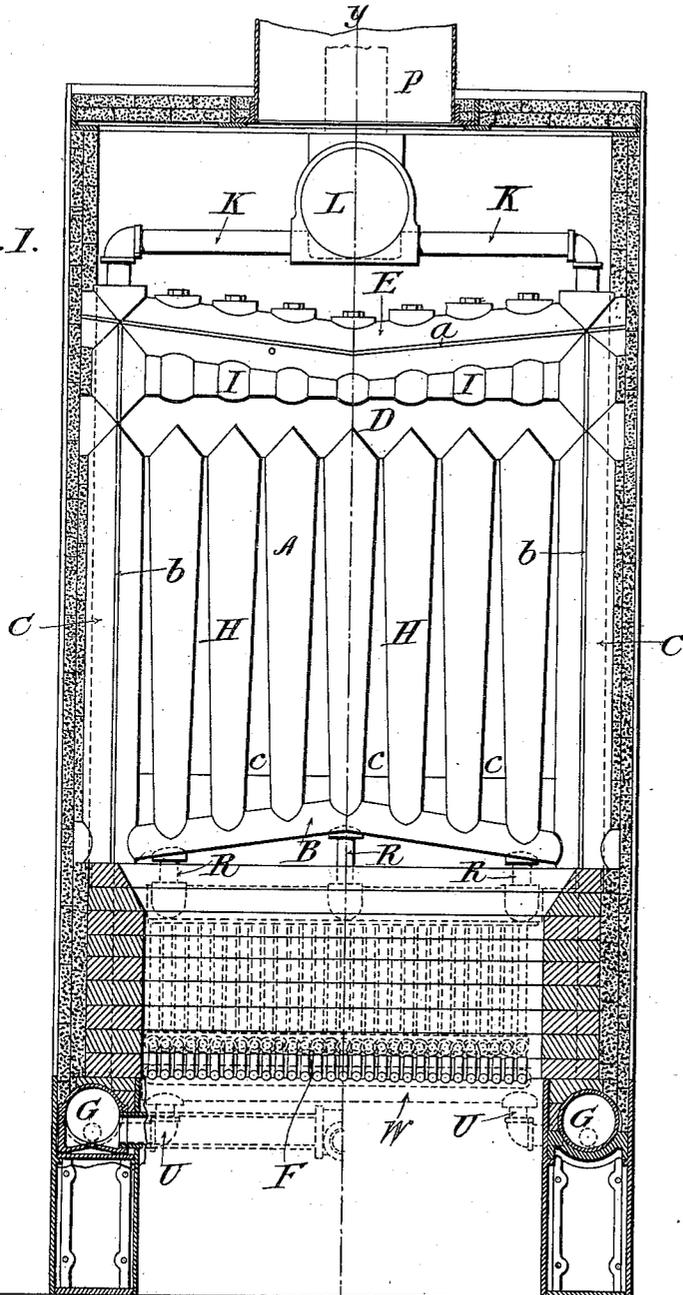
C. W. NEWTON.  
SECTIONAL STEAM GENERATOR.

(Application filed Dec. 21, 1899.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.



Witnesses:

*C. J. Saffy*  
*E. J. Webb*

Inventor:

Chas. Wesley Newton.

By *O. E. Duff*  
Atty.

No. 655,636.

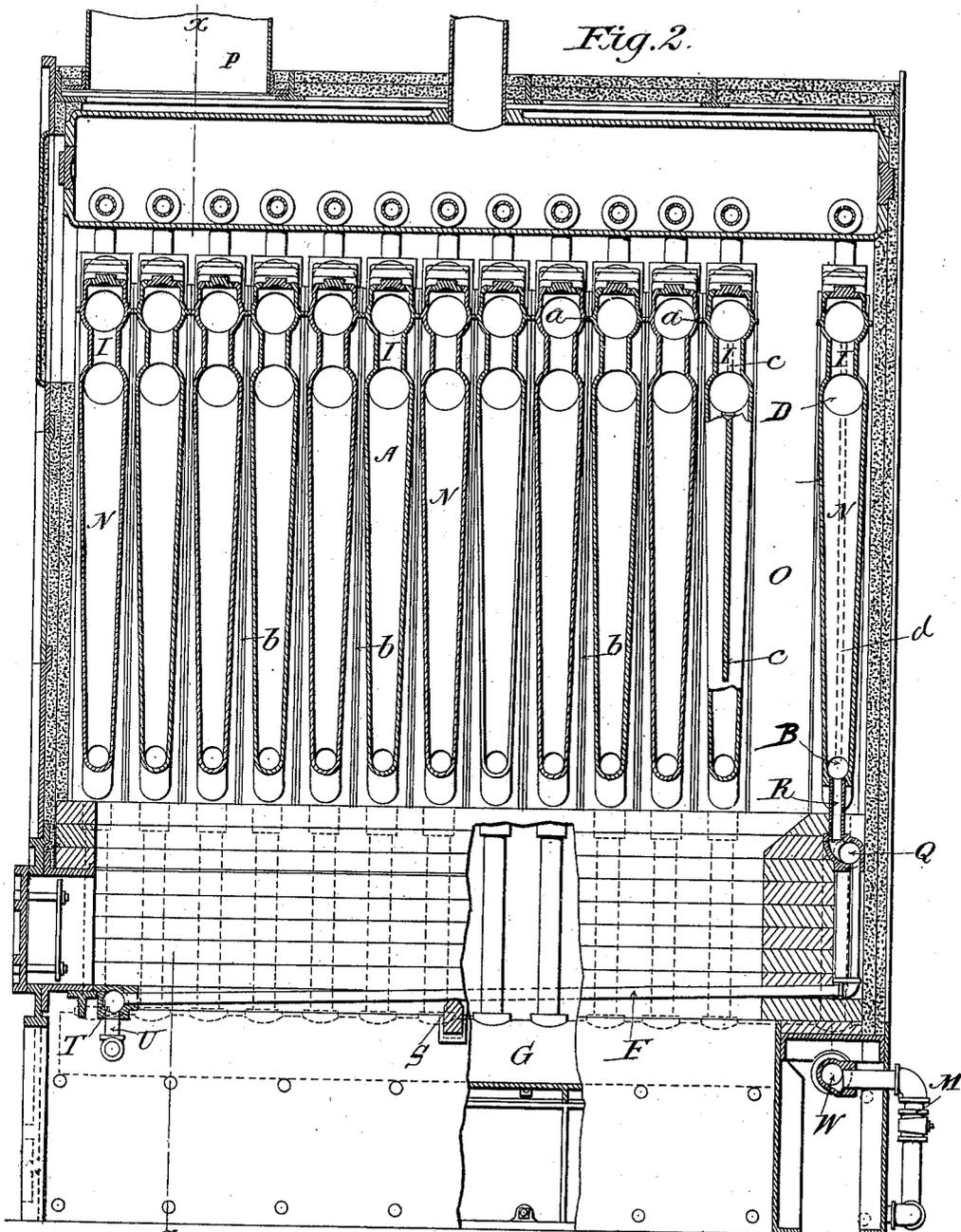
Patented Aug. 7, 1900.

C. W. NEWTON.  
SECTIONAL STEAM GENERATOR.

(Application filed Dec. 21, 1899.)

(No Model.)

2 Sheets—Sheet 2.



Witnesses:

*C. High Duff*

*E. J. West*

Inventor:

*Charles Wesley Newton*

By *O. E. Duff*  
*Atty.*

# UNITED STATES PATENT OFFICE.

CHARLES WESLEY NEWTON, OF BALTIMORE, MARYLAND.

## SECTIONAL STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 655,636, dated August 7, 1900.

Application filed December 21, 1899. Serial No. 741,167. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES WESLEY NEWTON, a citizen of the United States, residing at 1202 West Fayette street, Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Sectional Steam-Generators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to that class of boilers in which are employed a series of vertical sections, a greater or less number of sections being employed to provide for the steaming capacity; and one object of my invention is to improve upon the construction of boilers referred to and to provide one of simple construction in which there is a large heating-surface and in which the products of combustion are fully utilized.

Another object is to provide for a more complete circulation of the water in this class of boilers and also to prevent the water from being carried by the steam.

My invention consists in certain novel features of construction of a sectional boiler, and more particularly in the construction and arrangement of the vertical sections provided with water-spaces upon which the direct rays of heat from the furnace impinge and between and around which the heating-gases from the furnace may circulate, as will be hereinafter fully described, and indicated in the claims.

I have shown my boiler as a steam-generator; but the same construction may be also used for a hot-water heating system, in which the whole boiler will be filled with water.

Referring to the drawings, Figure 1 is a vertical section on line *xx* of Fig. 2; and Fig. 2 is a longitudinal vertical section through line *yy*, Fig. 1.

As stated, the boiler consists of a series of vertical sections, all the sections being of similar construction, and the whole are inclosed in an iron casing lined with fire-brick or non-conducting material and may be inclosed with brick walls.

In the drawings, A is one of the sections, composed of a lower angular manifold B, round in cross-section, connected to the side or circulating tubes C C, the center of the

manifold being higher than its end connection with the circulating-tubes.

D D represent a second manifold which is connected to the circulating-tubes C C. This manifold is straight and is located at about the height at which the water is carried. A third manifold E, which will be called the "steam-manifold," is located above manifold D and is also connected to the steam-space of the circulating-tubes C C. The manifold E is also bent or angular, its center being below its end connection to the circulating-tubes.

Diametrically formed on the opposite sides of the steam-manifold E' and the circulating-tubes C are ribs *aa* and *bb*. When the sections are in place, these ribs are in contact with one another, thereby forming the tops and sides of the furnace. The last section of the series is closed between the water-tubes by a web *c*, which extends nearly down to the manifold B, and thus forming the back of the furnace and one side of the smoke-flue. By this arrangement and in connection with the circulating-tubes and top manifold the heat from the fire is confined in the upper part of the furnace among the water-tubes and can only escape by again descending and passing under the webs *cc* up the smoke-flue. The independent section has also webs *dd* placed between the water-tubes; but they extend from one manifold to the other, and thus form the back of the smoke-flue.

The manifold B forms substantially the top of the combustion-chamber of the furnace, although they are spaced apart to permit the heat from the fire to circulate among the tubes.

The circulating-tubes C C extend below the manifold B and below the water-grate F when they are connected to the mud-drums G G. These drums extend on each side of the boiler and are connected at their rear ends by the blow-off pipe W, and the circulating-tubes of each section are also connected to the mud-drums. The manifolds B and D are connected by inverted vertical conical water-tubes H H, nearly touching at the top, where they join the manifold.

The manifolds D and E are connected by straight tubes I I, the water-line being below these tubes and in manifold D. Pipes K K, leading from each of the steam-spaces of the circulating-tubes, connect them with the

steam-drum L, which extends the length of the boiler and to which each section is connected in a similar manner.

It will be seen that each section, except the two rear sections, which form smoke-flues, is interchangeable and independent of each other and any can be cut out without disturbing the others should they be defective.

By the construction of the sections of the boiler and their arrangement, as described, it will be seen on heat being applied to the same that a double and free circulation will be produced in each section. The angular manifold B conducts the water from the circulating-tubes toward the center of the furnace, where there is the greatest heat, the water passing up the inverted conical tubes, when by their enlargement it expands freely and its circulation becomes slower, thereby preventing the water from being carried with the steam to the steam-drum. The water now being free of the steam passes to the right and left and down each circulating-tube, to again come in contact with the heat of the furnace. The water as it passes down the tube precipitates any foreign matter to the bottom of the circulating-tube, where it finds its way to the mud-drum. The mud-drum is provided with its usual blow-off pipe and valve M, said pipe being connected to the pipe W.

The rear section N is the same as the others heretofore described and is connected to the steam and mud drums in the same manner. It is placed against the rear wall of the furnace and leaves a space between it and the other sections of the boiler, which forms the flue O, which extends up over the top of the sections and around the steam-drum to the forward part of the boiler, when it joins the smoke-stack P. The manifold B of the rear section is also connected to the water-grate manifold Q by the pipes R R R. Each tube of the grate F is extended back of the bridge-wall S and is connected by vertical pipes to the manifold Q. The tubes of the forward end of the grate are connected to a manifold T, which in turn is connected by pipes U U to the mud-drums G G.

From the above specification it will be seen that not only the water in the rear section circulates through the same, but also the water circulating through the grate.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a sectional boiler, the combination of a series of sections, above the combustion-

chamber of the furnace, each having a lower angular manifold converging upward, to which is connected a second manifold by conical tubes, a downward angular converging steam-manifold connected to the second manifold by straight tubes and circulating-tubes, connecting the end of all the manifolds, substantially as described.

2. In a sectional boiler, the combination of a series of sections, each having a lower upward angular converging manifold, to which is connected a second manifold by conical tubes, a downward angular converging steam-manifold connected to the second manifold by vertical tubes, circulating-tubes connecting the ends of all the manifolds, and a steam-drum connected to the circulating-tubes, substantially as described.

3. In a sectional boiler, the combination of a series of sections, each consisting of a series of manifolds, water-tubes and circulating-tubes, the top manifold and circulating-tubes of each section being in contact, forming the top and sides of the furnace and an independent section apart from and forming between it and the last section of the series, a flue for the furnace, substantially as described.

4. In a sectional boiler, the combination of a series of sections, with an independent back section, connected to steam and mud drums, and connected to the manifold of a water-circulating grate, said grate also being connected at its forward end to the mud-drums, substantially as shown and described.

5. The combination in a sectional steam-generator of an independent back-section consisting of the upwardly-projecting angular manifold B, the manifold D, said manifolds connected by upwardly-enlarging tubes H, the connecting-tubes R, R, R, to the lower manifold and tubes I, I, connecting the manifold D to steam-manifold E, and steam-pipes K K, to steam-drum L, as set forth.

6. In a sectional boiler composed of a series of sections with an end section composed of manifolds and water-tubes connecting the same, of webs between the manifolds and water-tubes of said end section extending nearly down to the bottom manifold, the openings forming an outlet from the furnace to the smoke-flue, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES WESLEY NEWTON.

Witnesses:

OSCAR T. EARLE,  
WILLIAM H. BERRY.