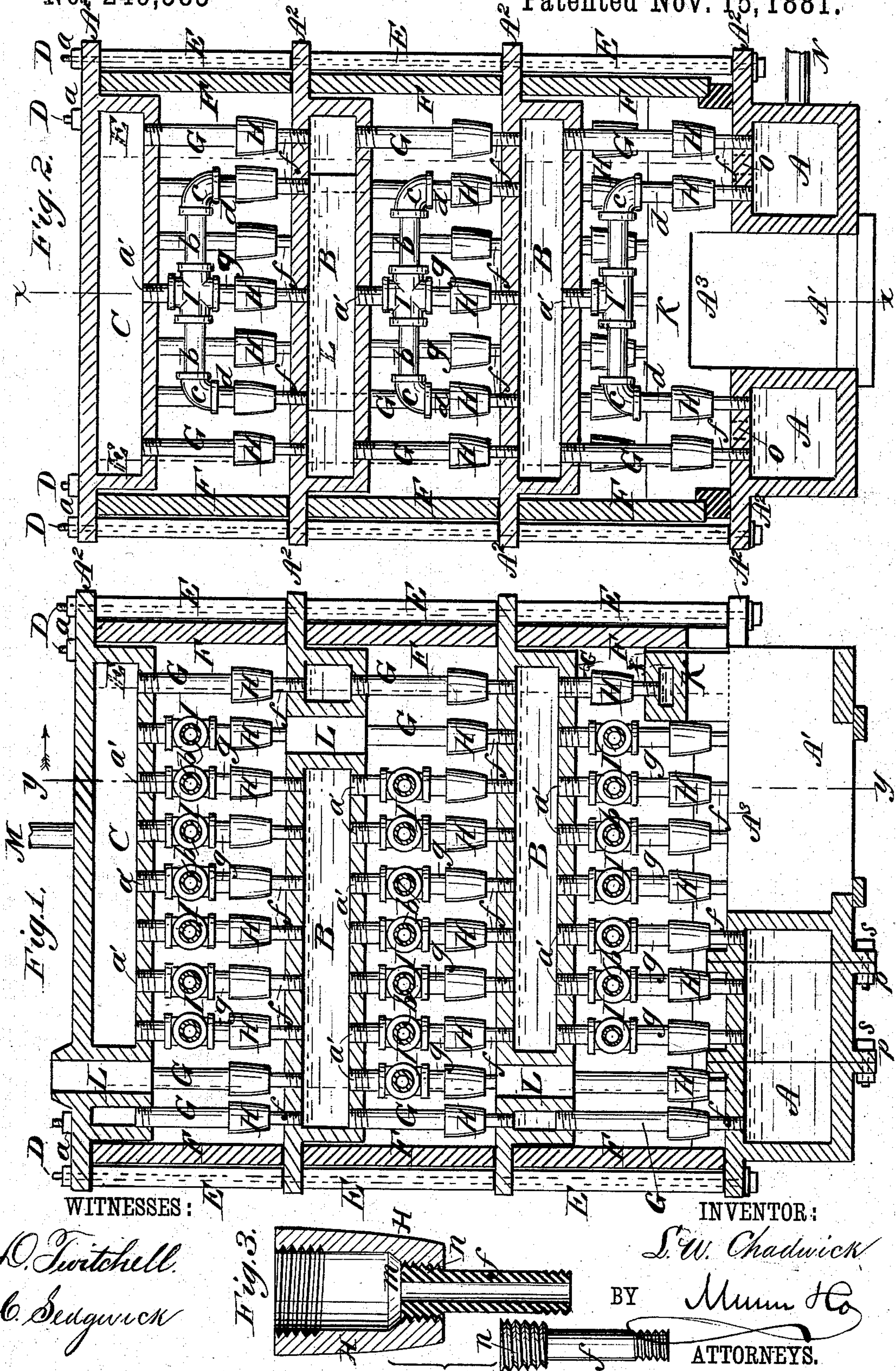


(No Model.)

L. W. CHADWICK.  
SECTIONAL STEAM BOILER.

No. 249,585

Patented Nov. 15, 1881.





# UNITED STATES PATENT OFFICE.

LAWRENCE W. CHADWICK, OF SHENANDOAH IRON WORKS, VIRGINIA.

## SECTIONAL STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 249,585, dated November 15, 1881.

Application filed August 5, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, LAWRENCE W. CHADWICK, of Shenandoah Iron Works, in the county of Page and State of Virginia, have invented  
5 a new and Improved Sectional Steam-Boiler, of which the following is a full, clear, and exact specification.

The object of this invention is to provide a  
10 cheap, strong, and economical boiler for generating steam for heating or mechanical purposes.

The invention consists of a boiler composed of several horizontal water and steam chambers set one above the other within a casing  
15 or shell closely fitting against their edges and supported and connected by vertical and horizontal water-circulating pipes and T's, the said chambers having vertical openings through them, that serve as flues for the passage of the  
20 products of combustion; and it consists, further, in combination with the chambers and tubes, of a fire-place, water-front, and of novel pipe-coupling devices, all of which will be hereinafter set forth.

Figure 1 is a sectional side elevation of my improved boiler on line *x x*, Fig. 2. Fig. 2 is  
25 a sectional elevation on line *y y*, Fig. 1. Fig. 3 represents sectional details of a reducer used in connecting the boiler-pipes.

30 Similar letters of reference indicate corresponding parts.

In the drawings, A represents the lower water-chamber, surrounding the ash-pit A' on three sides; and B B C represent, respectively,  
35 the horizontal water and steam chambers, that are arranged successively above the chamber A at suitable distances apart. Each of these chambers A B C has a flange, A<sup>2</sup>, extending on all sides from its top, through which flange  
40 A<sup>2</sup> are passed the vertical tie-rods D, that are held in place by nuts *a*.

The shell or casing of the boiler is constructed in corner sections, E E, and side sections, F F, the former of which are set on end  
45 between the boiler-chamber flanges A<sup>2</sup>, and are held in place by the tie-rods D, on which they are pivoted, while the sections F F, that have their inner faces almost in contact with several chambers, B B C, are made to slide  
50 in and out on swinging the corner sections, E E, aside, so that the boiler may be easily in-

spected and repaired. In this instance three water-chambers and one steam-chamber are shown; but the number may be reduced or increased without departing from my invention. 55 These chambers A B C are interiorly connected with each other by means of vertical pipes, T's, and reducers in such a manner that repairs or renewal of parts can be most easily effected. Near their circumferences 60 these chambers A B C are preferably connected by pipes G, that are screwed into the bottoms of the chambers B C, and have screwed in their lower ends reducers H, which connect with pipes *f*, that are in turn screwed into the 65 tops of the chambers A B.

The T's I are preferably used for making connection between the central portions of the chambers A B C, thereby stiffening the boiler somewhat laterally, and at the same time presenting horizontal pipes to the action of the 70 products of combustion. These T's I are located on a central line from front to rear of the boiler, and connect with the bottoms of the chambers B C along this central line by pipes 75 *a' a' a'*. Into the side openings of these T's I are screwed short pipes *b*, on which are elbows *c*, that are connected with reducers H by short pipes *d*, and from these reducers H short pipes *f* connect with the tops of the chambers A B. 80 The central and lower openings of most of these T's I communicate, by means of a short pipe, *g*, reducer H, and pipe *f*, with the tops of the chambers A B; but directly over the fire-chamber A<sup>3</sup> three-way T's are substituted for the 85 four-way T's, and defining or making the roof of the fire-chamber A<sup>3</sup>.

The reducers H consist of conically-shaped cups interiorly screw-threaded at the top to connect with the pipes there entering them, and 90 having their bases reduced and tapered, as shown at *m*, to receive the small pipes connecting them with the tops of the chambers A B, and these small pipes *f*, that connect with the bottoms of the reducers H, have a tapering up- 95 per end, as shown at *n*, and both ends right screw-threaded. And when the boiler is put together the pipes *f* are inserted from the top through the lower ends of the reducers H, and the latter screwed in place on the ends of the 100 pipes above them, and then the pipes *f* are turned to the right, and thereby screwed into



the chambers A B, and at the same time tightly screwed down in the reducers H. Thus it will be seen that no left-hand screw-thread is required, and the connecting-pipes *f* are readily  
5 and easily adjusted, and when screwed tightly down serve, in effect, as so many stay-bolts.

Above the fuel-opening is a water-chamber, K, that forms the front of the fire-chamber A<sup>3</sup>; and this chamber K is connected with the chamber B, immediately above it, by pipes and reducers G *f* H, and the said chamber K communicates with the chamber A through openings *o*. Thus a complete water and steam circulation is had between the chambers A B C K. The  
10 products of combustion from the fire-chamber A<sup>3</sup> move rearward about the connecting-pipes and reducers, over the chamber A and against the bottom of the lower chamber, B, up through a flue, L, in the rear portion of the latter chamber;  
20 then forward and up through the continuation of the flue L, formed through the front part of the upper chamber, B; thence rearward and up through a flue, L, formed through the rear part of the steam-chamber C. Thus it will be  
25 seen that all parts of the boiler are exposed to the heat from the fire, an unusually extended fire-surface is obtained, and the steam in the chamber C may be superheated. Steam is taken from the chamber C through the steam-pipe M, and the water is supplied to the boiler  
30 through the supply-pipe N into the chamber A.

I do not confine myself to the construction of the boiler precisely as herein shown, as the chambers A B C K may be of other than rectangular cross-section, and other modifications  
35 may be made without departing from my in-

vention. The chambers A B C K may be each cast entire or in flanged sections, as indicated in Fig. 1, wherein the sections of chamber A are held together by bolts *s* passing through  
40 the flanges *p*.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. An improved sectional steam-boiler consisting of a series of horizontal water and steam chambers provided with alternate opposite vertical flues, and arranged one above the other, and connected by vertical and horizontal  
45 pipes and T's, substantially as and for the purpose set forth. 50

2. In a steam-boiler, the combination, with the laterally-flanged water and steam chambers A B C and the bolts D, of the pivoted shell-sections E and sliding shell-sections F, substantially as herein shown and described, said  
55 sections being movable to permit inspection of the boiler, as set forth.

3. The combination, with the water and steam chambers A B C, of the pipes G *f* and reducers H, substantially as herein shown and described. 60

4. The combination, with the pipe G and the water and steam chambers B C, of the reducer H, provided with a reduced tapering screw-threaded bore, *m*, and the tapering pipe *f*, screw-threaded in the same direction at each end, substantially as and for the purpose described. 65

LAWRENCE W. CHADWICK.

Witnesses:

WM. MILNET, Jr.,  
J. R. DEACON.