

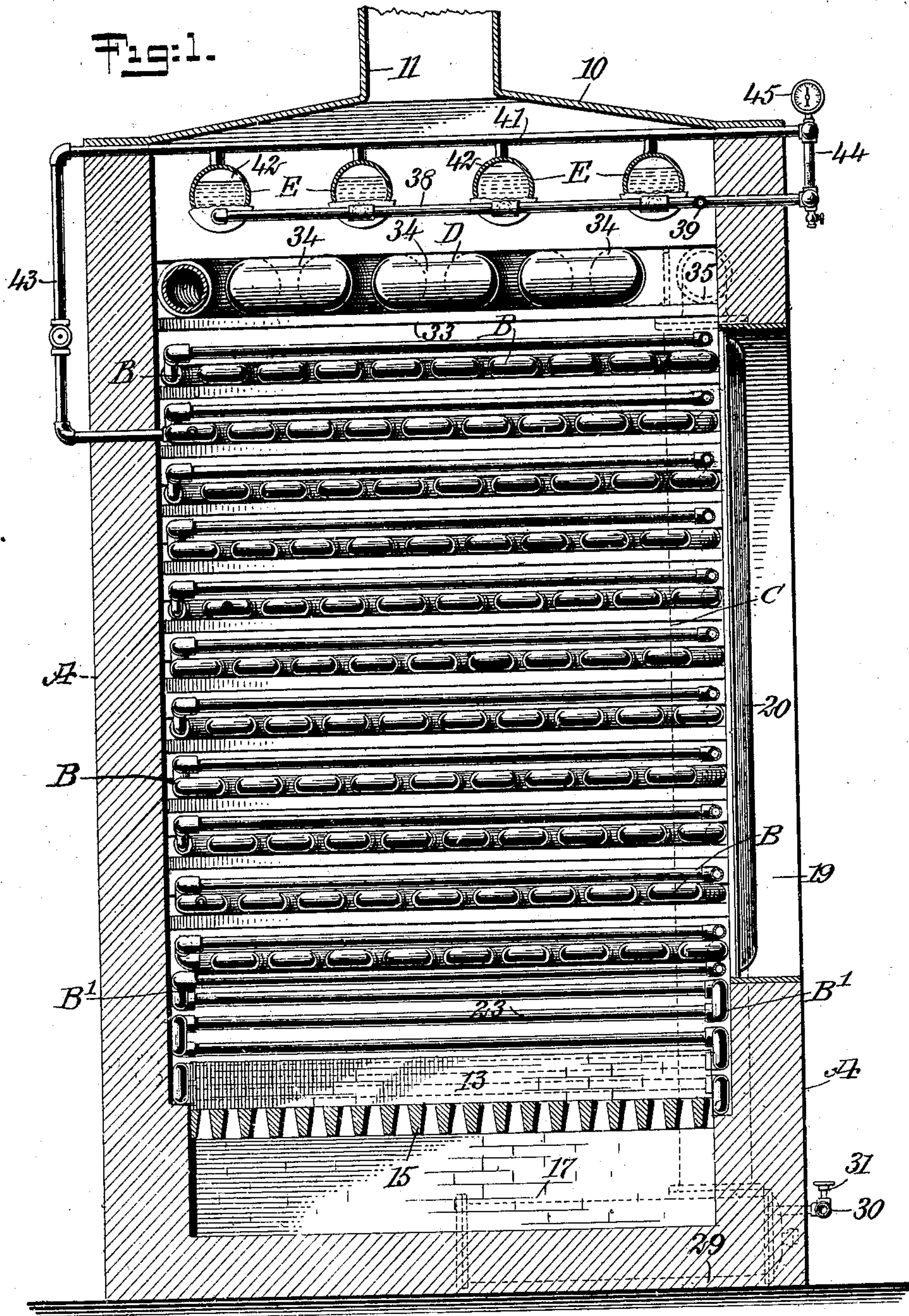
No. 861,089.

PATENTED JULY 23, 1907.

— C. E. CHAPMAN.  
BOILER.

APPLICATION FILED APR. 3, 1906.

3 SHEETS—SHEET 1.



WITNESSES:

*Geo. H. Maylor*  
*Wm. H. Maylor*

INVENTOR

*Charles E. Chapman*

BY *Mum & Co*

ATTORNEYS



No. 861,089.

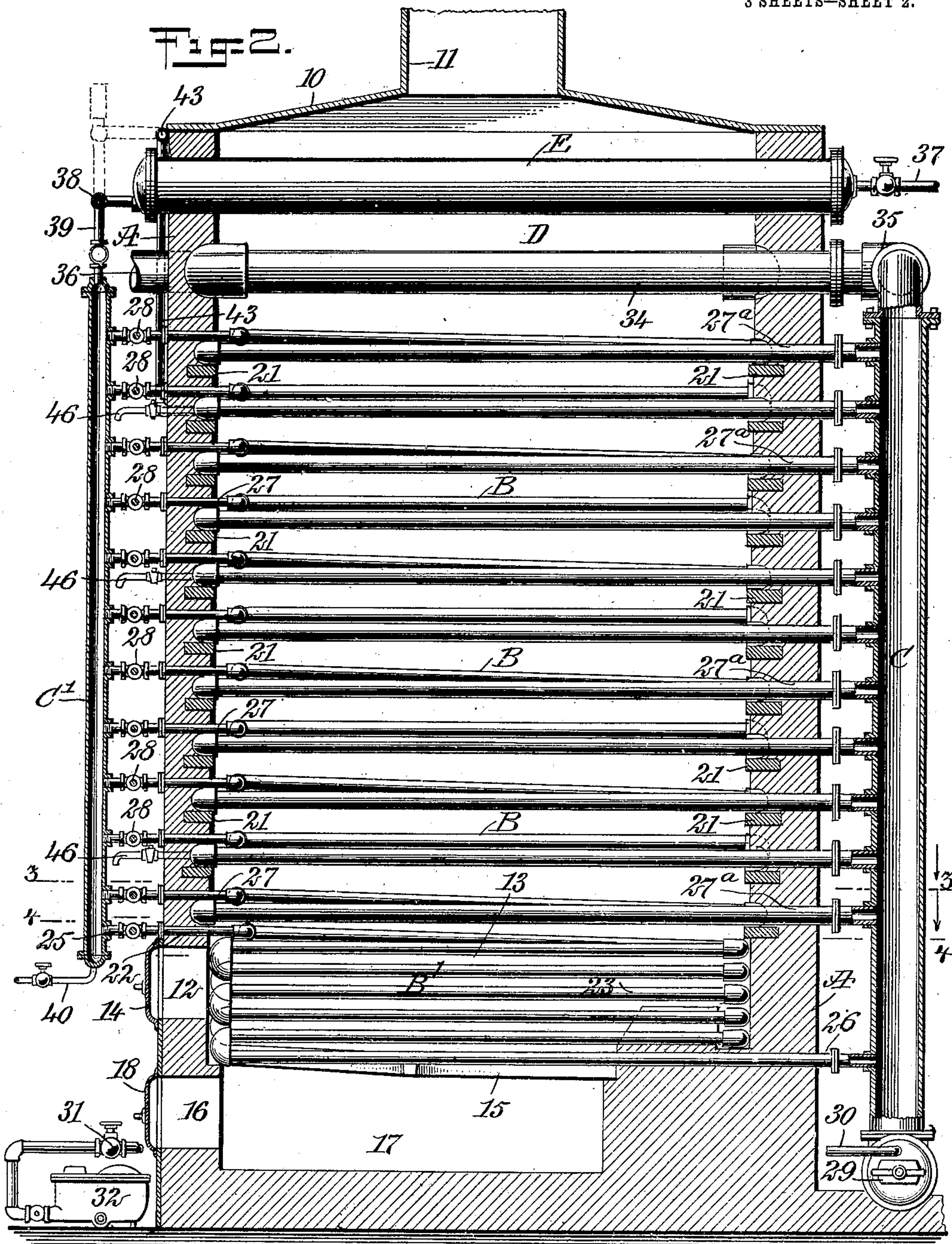
PATENTED JULY 23, 1907.

C. E. CHAPMAN.

BOILER.

APPLICATION FILED APR. 3, 1906.

3 SHEETS—SHEET 2.



WITNESSES:

*Geo. W. Naylor*  
*Attorney*

INVENTOR

*Charles E. Chapman*

BY *Mum Co*

ATTORNEYS



No. 861,089.

PATENTED JULY 23, 1907.

C. E. CHAPMAN.  
BOILER.

APPLICATION FILED APR. 3, 1906.

3 SHEETS—SHEET 3.



WITNESSES:

Geo. W. Taylor.  
H. A. Acker.

INVENTOR

INVENTOR  
*Charles E. Chapman*

BY *Munro*

ATTORNEYS



# UNITED STATES PATENT OFFICE.

CHARLES EDWARD CHAPMAN, OF FORT EDWARD, NEW YORK, ASSIGNOR OF ONE-HALF TO  
JOSEPH GOODFELLOW, OF FORT EDWARD, NEW YORK.

## BOILER.

No. 861,089.

Specification of Letters Patent.

Patented July 23, 1907.

Application filed April 3, 1906. Serial No. 309,602.

*To all whom it may concern:*

Be it known that I, CHARLES EDWARD CHAPMAN, a citizen of the United States, and a resident of Fort Edward, in the county of Washington and State of New York, have invented a new and Improved Boiler, of which the following is a full, clear, and exact description.

The purpose of the invention is to provide an exceedingly simple yet effective construction of boiler, and one which will not only be a rapid producer of steam but also one wherein the steam will be heated until when it leaves the boiler it will be in an exceedingly dry state and at a maximum degree of heat.

A further purpose of the invention is to construct the boiler with a series of independent coils lying one above the other, each coil being independently connected with a common water header and a common steam header, the steam header having connection with a steam dome, also in the form of a coil, which acts as a superheater, being located above the boiler proper.

Another purpose of the invention is to provide a means whereby any coil or coils may be removed and returned, or another substituted, without disturbing the positions of the others, and to locate the water dome above the heating surface of the boiler, and provide means for maintaining the same pressure in the water dome as in the coils.

It is also a purpose of the invention to provide an independent valve for the water inlet of each coil, and means whereby the valves can be simultaneously operated, or be operated in sets or sections.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth and pointed out in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a vertical section through the boiler taken from side to side and practically on the line 1—1 of Fig. 3; Fig. 2 is a vertical section through the boiler taken from front to rear and substantially on the line 2—2 of Fig. 3; Fig. 3 is a horizontal section taken practically on the line 3—3 of Fig. 2; Fig. 4 is a horizontal section taken substantially on the line 4—4 of Fig. 2.

A represents the casing of the boiler, which is preferably of brick and is provided with a metal cover 10 having a suitably attached or integral flue 11. At the front the casing is provided with openings 12 leading into the fire box 13, which openings are normally closed by doors 14, the fire box having suitable grate bars 15. At the front of the casing other openings 16 are also made, leading into the ash pit 17, which latter openings are normally closed by doors 18. In the further construction of the casing a large opening 19 is made in one side,

through which access may be gained to the coils for removal, replacement and repair, and this large opening is normally closed by one or more doors 20, fitted to the casing in a steam-tight manner.

Within the casing at the front and at the rear metal or stone shelves 21 are embedded, and opposing shelves serve as supports for the return ends of coils B. Any desired number of these coils may be placed one over the other above the fire box 13, and a coil B' extends along the sides to the back of the fire box as is shown in Figs. 1 and 4, wherein it will be seen that the upper member 22 of the coil B' is carried along the front of the fire box, while the other members 23 lie one above the other at the sides and back of the fire box.

The upper terminal 24 of the coil B' extends out through the front wall of the casing A, and is provided with a valve 25, while the lower terminal 26 of said coil extends out through the rear wall of the casing.

With reference to the upper horizontal coils B, their upper or receiving terminals 27 are likewise carried out from the front wall of the casing, and each of said terminals is provided with a valve 28. The lower terminals 27<sup>a</sup> of the coils B extend out through the rear wall of the casing A. The projecting front or receiving terminals of all of the coils are in vertical alinement, as are likewise the projecting rear or discharge terminals, as is shown in Fig. 2. The front or receiving terminals of all of the coils are connected with a vertical water header C, which is without the casing A at its front; and the discharge terminals of all of the coils are connected with a steam header C', also without the casing A but located at the back. The steam header C' is provided with a mud drum 29 at its lower end, and said drum has the usual pipe and valve connections 30 and 31 with a steam trap 32.

A steam dome D is fitted in the front and rear walls of the casing A, being partially supported by shelves 33, if desired; and said dome is in the form of a coil of large piping having any desired number of return members 34. The steam dome D is located above the uppermost generating coil B, and its rear terminal 35 is connected with the upper end of the steam header C, while its forward terminal 36 is passed out from the front wall of the casing to conduct the steam wherever desired.

By reason of the location of the steam dome D it receives the benefit of all of the products of combustion before they pass out through the flue 11, and said dome is therefore practically a superheater of the steam.

A series of parallel water domes E is located within the casing A above the steam dome D, and said water domes extend out through the front and the rear walls of the casing as is shown in Fig. 2. A water supply pipe 37 having a suitable valve is connected with the



rear end of the dome E, as is also best shown in Fig. 2. A water circulating pipe 38, located in front of the boiler casing A, is connected with the forward end of all of the water domes E, as is shown in Fig. 1, thus establishing communication between them; and a branch 39 from the water circulating pipe 38 is connected with the upper end of the water header C', which header is provided with a drain pipe 40 at its lower end.

10 A second pipe 41 is carried over the water domes E at their front ends, which pipe is also located without the casing, and said pipe 41 is in communication with the steam space 42 in each of the water domes E, as is shown in Fig. 1, and is provided with a branch 43, connected with one of the steam-generating coils B, usually an upper one as shown in Fig. 1, in order to maintain the same pressure in the water domes as in the said steam generating coils B and B'. A water gage 44 is provided for each end of the water circulating pipe 38 for the water domes, and a steam gage 45 is provided for the corresponding end of the steam connecting pipe 41 of the same domes.

It will be observed that the products of combustion are utilized to a maximum degree, making the boiler a quick generator of steam, and that the location of the water and steam domes is such that they are fully exposed to the products of combustion, and consequently the water is almost vaporized when it reaches the generating coils, and the steam in the steam dome D supplied thereto by the steam header C is superheated, and passes out in a dry condition and at an exceedingly high degree of heat. In fact, in practice it has been found that if the water in the water domes is at four-hundred degrees the steam in the header C' will be about seven-hundred degrees Fahrenheit.

By reason of the arrangement shown, the gravity pressure of the water is greatest where most needed, namely, at the fire box; and it may be here remarked that the coils B are provided with the customary test cocks 46.

A boiler constructed as described is simple, durable and effective; the circulation is perfect, and steam of superior quality is obtained. Furthermore, the boiler can be repaired in any of its parts at a minimum of expense and at a minimum of labor.

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

1. In a boiler, a series of independent coils above the fire box, a water header and a steam header common to all the coils, and a water dome above the coil and connected with the upper end of the water header, said dome being in the path of the products of combustion from the fire box.

2. In a boiler, a casing provided with a fire box a series of independent coils within the casing above the fire box, a water header and a steam header outside of the fire box, and common to all the coils, and a water dome within the casing and above the coil and connected to the upper end of the water header.

3. In a boiler, a casing, a water header without the casing, water domes within the casing and at the top thereof, a water supply pipe for one of the domes, a water circulating pipe connected with all of the water domes, a connection between the said pipe and the water header, and a connection between the steam generating devices for the boiler and the upper portion of each of the said water domes.

4. In a boiler, a casing provided with a fire box, a series of horizontally located steam generating coils located within the said casing above the fire box, each coil being independent of the other, a water header and a steam header located outside of the casing, which headers are common to all of the said steam generating coils, a steam dome located above the uppermost generating coil and connected with the steam header, a series of water domes located above the steam dome, a water supply pipe connected with one of the water domes, a water circulating pipe connected with all of the domes and with the water header, and a connection between one of the steam-generating coils and the upper portion of each of the water domes.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES EDWARD CHAPMAN.

Witnesses:

J. H. CHEESMAN,  
J. GOODFELLOW.