CHARLES W. TROTTER.

Improvement in Steam Heaters.

No. 115,392. Patented May 30, 1871.

Fig. 1.

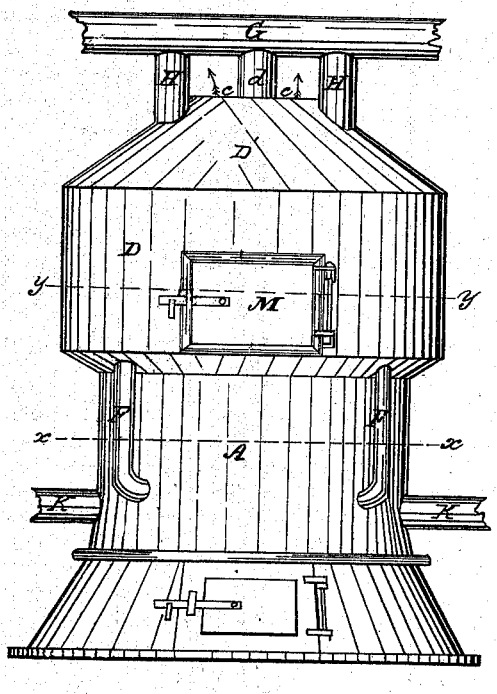


Fig. 2.

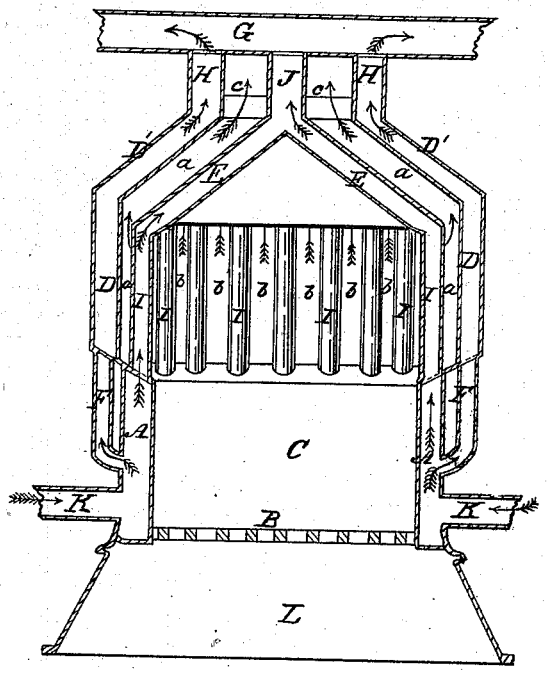


Fig. 3.

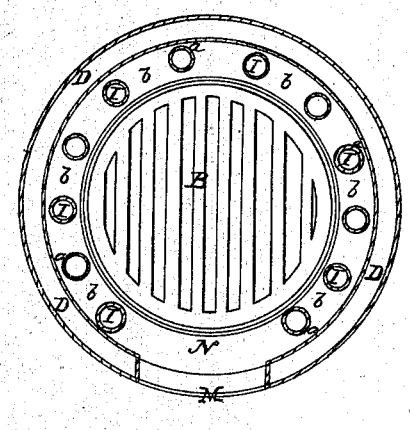
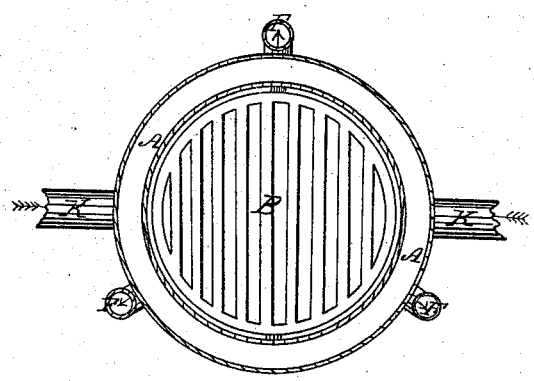


Fig. 4.



Witnesses:

Benjamin N. Meeds.

Geo. H. Pearson.

Inventor:

Charles W. Trotter.

By Abbperman & Johnson.

Attorneys.

UNITED STATES PATENT OFFICE.

CHARLES W. TROTTER, OF ROCHESTER, NEW YORK, ASSIGNOR TO HIMSELF AND GEORGE FRAUENBERGER, OF SAME PLACE.

IMPROVEMENT IN STEAM-HEATERS.

Specification forming part of Letters Patent No. 115,392, dated May, 30, 1871.

To all whom it may concern:

Be it known that I, CHARLES W. TROTTER, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Boilers for Heating Buildings, Green-Houses, and other purposes; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing which makes part of this specification, and in which—

Figure 1 represents an elevation of a boiler embracing my improvements. Fig. 2 represents a vertical section through the same. Fig. 3 represents a horizontal section through the upper chamber of the boiler at the line *y y* of Fig. 1. Fig. 4 represents a similar section through the lower chamber of the boiler at the line *x x* of Fig. 1.

My invention relates to an apparatus for heating water for conservatories, dwellings, and other buildings; and consists in constructing the boiler with double conical-shaped chambers at the top thereof, both of which communicate directly with a lower annular chamber immediately surrounding the fire-box, while the inner one of the said conical upper chambers constitutes the crown thereof; also, in constructing a boiler having upper and lower water-chambers with an intervening flue, and uniting the interior upper water-chamber with the lower chamber by a series of vertical tubes in such manner as to form an encircling communication between the outer water-chamber and the interior of the fire-box, whereby I am enabled to bring the outer as well as the inner water-chamber in direct contact with the chamber of combustion, and thus obtain a very large heating-surface, free from all danger of choking or clogging up any portion of the interior of the boiler.

In the accompanying drawing the boiler is represented as consisting of a lower annular chamber, A, immediately surrounding the grate B, and forming the fire-box C. This chamber A is surmounted by two other chambers, D E, having direct communication therewith. The outer chamber D is partly cylindrical and partly conical, and the cylindrical portion is of a diameter greater than that of the annular chamber A, and communicates with the latter by a suitable number of external pipes, F, while the conical portion D′ of the said chamber D forms the top of the boiler, and communicates directly with the conducting-pipe G by vertical pipes H. The interior conical chamber E forms the crown of the fire-box, and is arranged in such manner as to leave a space, *a*, between its outer surface and the inner surface of the outer conical portion D′ of the chamber, and communicates with the lower annular chamber A by a series of vertical tubes, I. These tubes, therefore, support the crown of the fire-box, and are arranged at such distances apart around the latter as to leave uninterrupted spaces, *b*, between them for the passage of the smoke and heat directly from the fire-box C into the flue *a*, between the outer and inner chambers D D′ E, thus exposing the entire inner surface of the outer chamber D D′, as well as the entire surface of the inner chamber E, to the direct action of the heat, while the intervening flue *a* communicates directly with the exit-opening *c*, for the smoke and gases, at the top of the boiler. The inner conical chamber E, being thus connected with the annular chamber A, is also in communication with the conducting-pipe G by means of vertical pipe J, located at the apex thereof, and passing into and through the exit-opening *c* of the flue *a* in the top of the outer conical chamber D′. It will be seen, therefore, that the horizontal conducting-pipe G is located and arranged directly over the exit-opening *c*, for the heat and smoke, and is connected to the inner and outer water-chambers at this point, whereby I am enabled to obtain a heating-surface extending from the bottom annular chamber directly to and in contact with the conducting-pipe G and the intermediate surfaces of the inner and outer chambers. The smoke-pipe is arranged at the apex of the outer conical chamber D′, and incloses that portion of the conducting-pipe G at its junction with the upper chamber of the boiler. The return-pipes K are connected to the lower annular chamber A just above the grate, and, as this chamber communicates with the flow-pipe G, the necessary circulation for water heating is free and uninterrupted, not only through the chamber which forms the crown of the fire-box, but also through the outer annular and conical chambers D D′.

The boiler, with its upper and lower cham-

bers, may be cast in sections and secured together in any convenient manner, and supported by a bed-plate, which forms the ash-pit L; and the upper outer chamber is provided with a door, M, through which the chamber of combustion is supplied with fuel, an opening, N, being left between the interior vertical tubes I for that purpose, as shown in Fig. 3.

No brick-work whatever is used in the construction of this boiler, and it can, therefore, be readily moved from place to place and used with any kind of fuel.

Having described my invention, I claim—

1. The interior vertical water-chamber divided near the middle of its length so as to form a lower and an upper section, A and E, and leave an annular intervening space, *b*, for the passage of the heat and smoke from said interior chamber, as herein shown and described.

2. In a water-heating apparatus in which the interior water-chamber is composed of an upper and a lower section, supporting the former upon the latter by means of a series of vertical water-tubes, I, arranged in a circular form in the division-space *b*, as herein shown and described.

3. The arrangement of the outer vertical water-tubes F for uniting the lower section A of the interior water-chamber with the upper outer water-chamber D, in connection with the inner series of vertical water-tubes I, arranged in a circular form for uniting the said lower section A with the upper inner section E, as herein shown and described.

4. In combination with a water-heating apparatus in which the interior chamber is composed of a lower and an upper section, A E, the interior vertical water-tubes I, the intervening space *b*, the outer vertical water-tubes F, the outer water-chamber D, the intervening flue *a*, the conducting-pipe G, and its connecting-tubes H and J, the several parts being constructed and arranged as herein shown and described.

CHAS. W. TROTTER.

Witnesses:

GEO. FRAUENBERGER,

GEO. ENHORN.