2 Sheets—Sheet 1.

E. CHADWICK.

HEATER.

No. 188,501. Patented March 20, 1877.

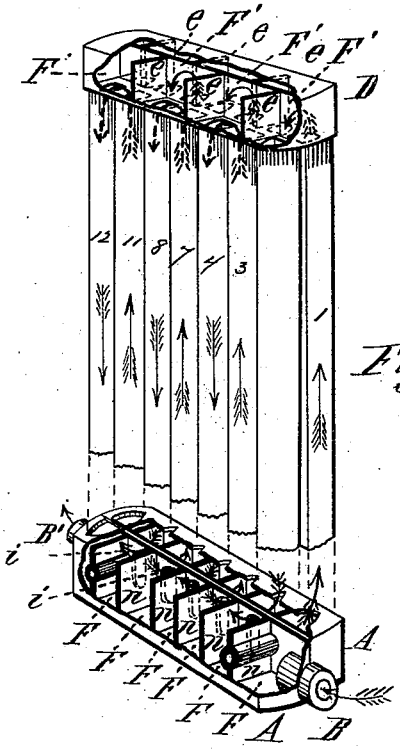

Fig. 1

Witnesses:
G. H. Blanden.
R. Earle

Inventor:
Edwin Chadwick.
By T. Alexander,
his Atty.

2 Sheets—Sheet 2.

E. CHADWICK.

HEATER.

No. 188,501. Patented March 20, 1877.

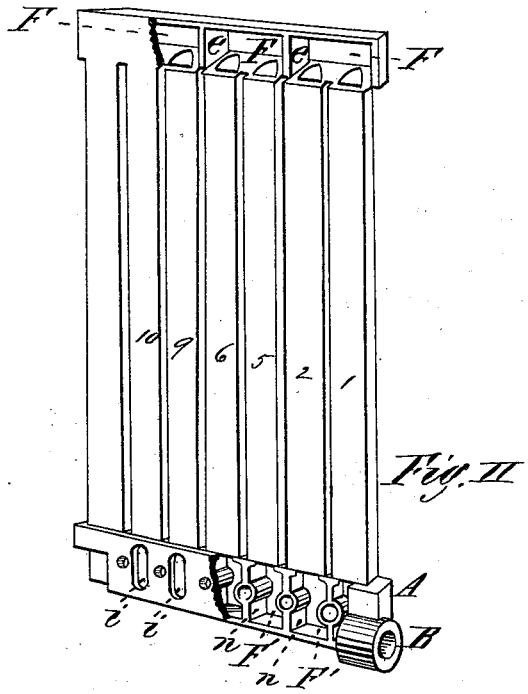

Fig. II

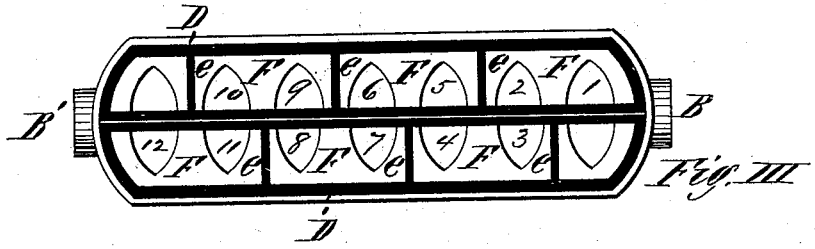

Fig. III

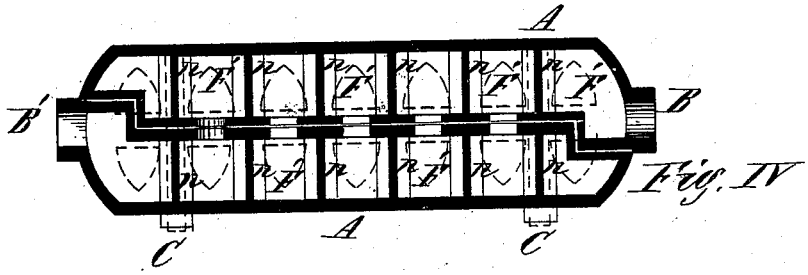

Fig. IV

Witnesses.
Jas. L. Ashe
G. H. Blanden.

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By T. A. Curtis.
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UNITED STATES PATENT OFFICE.

EDWIN CHADWICK, OF WESTFIELD, MASSACHUSETTS.

IMPROVEMENT IN HEATERS.

Specification forming part of Letters Patent No. **188,501**, dated March 20, 1877; application filed August 17, 1876.

To all whom it may concern:

Be it known that I, EDWIN CHADWICK, of Westfield, in the county of Hampden and State of Massachusetts, have invented a new and useful Improved Heater; and that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, and to the letters of reference marked thereon.

My invention relates to a heater for heating buildings and apartments therein; and has for its object the arrangement of pipes and chambers, whereby a large circulation of the heating medium is effected within a small space, and increased radiation is obtained.

To this end my invention consists of two sets of pipes, each set attached to, and communicating with, a series of chambers at each end, each chamber in the series at one end and in one set communicating with its opposite chamber in the other set, both sets being secured together and provided with an inlet and outlet, as will be more fully hereinafter described.

Figure I is a perspective view of my invention with parts broken away to show internal construction. Fig. II is a perspective view of one side of the heater, with a portion of the inside wall of the upper and lower casting broken away to show the partitions forming the series of chambers therein. Fig. III is a horizontal section of the upper casting of the two sides or sets arranged together, showing the position of the partitions forming the chambers therein, and the openings of the pipes into the same; and Fig. IV is a horizontal section of the lower casting, showing the partitions therein, and also the openings which provide communication between two lower castings.

In the drawings, A represents the lower casting, in which are the series of chambers F on one side of the heater; D, the casting in which are the series of chambers F′ on the same side of the heater, and 3 4 7 8 11 12 indicate the pipes through which communication is effected between the said upper and lower series of chambers, and these two castings and connecting-pipes are duplicated, forming two distinct sets of upper castings, pipes, and lower castings, which are firmly secured together by means of bolts C, so that a continuous communication is provided between the two sets by openings made through the inner walls of the lower castings A, as will be more fully hereinafter described. The upper castings D in both sets are divided into chambers F′ by the partitions *e e* extending across the castings inside, the said partitions in one side alternating in their position with those of the other side, as is clearly shown in Fig. III. The lower casting A is provided with partitions *n* extending across the casting inside between the pipes, as shown clearly in Fig. II, so that each pipe opens, at its lower end, into a chamber formed by two of said partitions, and openings *i* are made through the inside wall of the casting A, one into each of the said chambers F, as shown clearly in Fig. II, and also in Fig. IV, said openings being made in both lower castings A. The outer surface of the inner wall of each casting A is made approximately smooth, and suitable packing material placed between, and both sets of castings and pipes (one being a duplicate of the other) are firmly secured together by bolts C, which should pass through the partitions *n* to avoid leakage, and the heater is ready for use.

Steam or hot water being admitted at the inlet B, it passes up the pipe 1 to the chamber F′, down the pipe 2 on the same side into the chamber F, thence through the openings *i* in the inner walls of each casting A into the opposite chamber F, up through the pipe 3 to the next chamber F′, thence down the same side through the pipe 4 to the next lower chamber F, through the next openings *i*, up through the pipe 5, down the pipe 6, and so on, out through the outlet B′ opposite the point of entrance.

By this arrangement a long circulating movement of the heating medium is effected through a comparatively small coil or bulk of circulating space, which tends to a greater concentration and retention of the heat for radiating purposes. For use in such positions, when it may be difficult or inconvenient to use the drip, having its outlet at B′, I close that orifice, and leave out the partitions *e* and *n* in the castings D and A, and use the latter as

two large chambers connected by the pipes, and make them in duplicate and bolt them together, as before, as this method of making the heater in duplicate parts and bolting them together gives more radiating surface, and saves much expense over other methods of construction.

It is evident that either steam or hot water may be used as the heating medium in this device with equal facility and with equally good results.

Having thus described my invention, what I claim as new is—

1. An improved heater, consisting of the combination of the casting A provided with partitions *n*, openings *i*, and orifice B, the pipes 1 2 5 6, &c., and the casting D, provided with partitions *e*, the same being formed in two sets or duplicated, and secured together, substantially as described.

2. A heater composed of the combined duplicated castings D and A, connected together by the pipes 1 2, &c., and bolted together, substantially as set forth.

EDWIN CHADWICK.

Witnesses:
T. A. CURTIS,
G. H. BLANDEN.