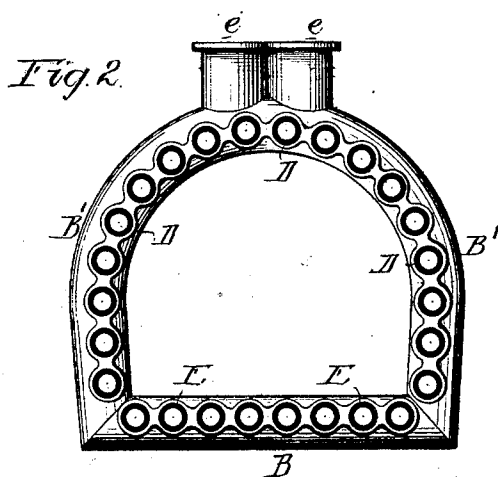
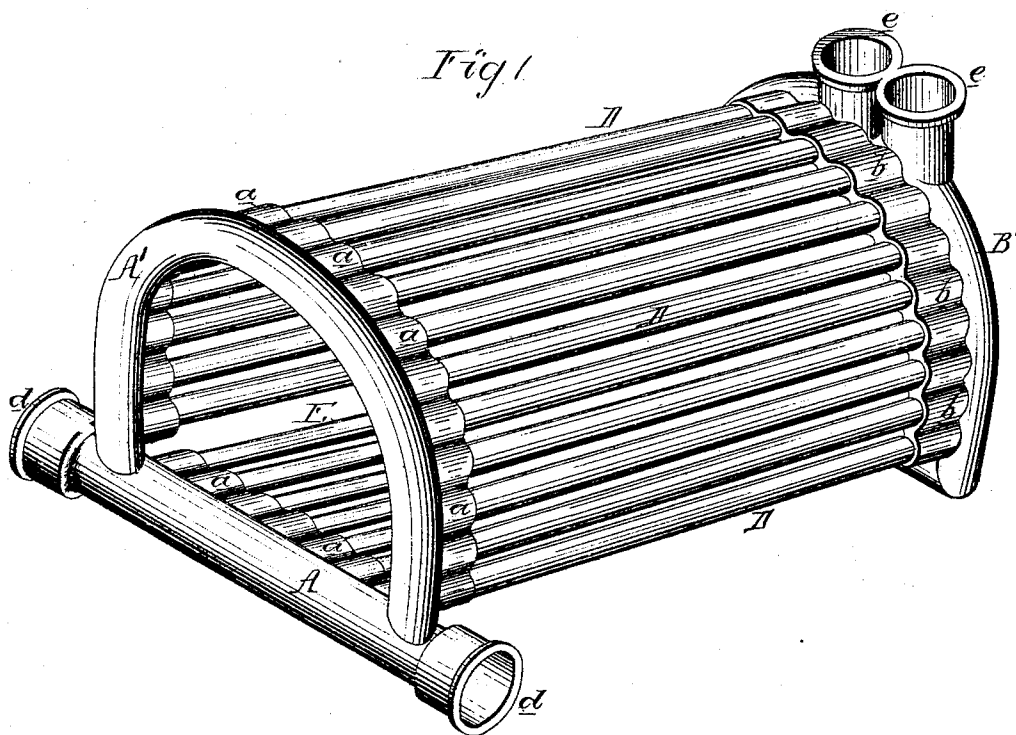


J. DICK.
WATER-HEATER.

No. 175,948.

Patented April 11, 1876.



Witnesses
Harry Howson
Harry Smith

John Dick
by his Attorneys
Howson and son

UNITED STATES PATENT OFFICE.

JOHN DICK, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN WATER-HEATERS.

Specification forming part of Letters Patent No. **175,948**, dated April 11, 1876; application filed March 10, 1876.

To all whom it may concern :

Be it known that I, JOHN DICK, of Philadelphia, Pennsylvania, have invented an Improved Water-Heater, of which the following is a specification :

The object of my invention is to construct a water-heater of a cheap and simple character, and one by which economy of fuel shall be attained, the heater being especially applicable to the warming of green-houses, although it may be used to advantage in connection with suitable systems of water-pipes for heating buildings generally.

In the accompanying drawing, Figure 1 is a perspective view of my improved water-heater, and Fig. 2 a transverse section of the same.

One end of the heater consists of a horizontal tube, A, and a tube, A', the latter being by preference of the arched form represented, and communicating with the tube A, the ends *d* of which communicate with the water-supply pipes. The opposite end of the heater consists of the horizontal tube B and the tube B', of a form corresponding with the arched tube A, and has at the top one or more branches, *e*, communicating with the distributing-pipes. The horizontal portions A and B of the ends of the heater are connected together by a series of tubes, E, which are fitted into sockets *a* and *b*, and which constitute the grate of the heater, the arched portions of the ends of the latter being similarly connected together by a system of tubes, D. The space within the horizontal and arched series of tubes is the fuel-chamber, and the products of combustion pass between the arched series of tubes and out at the rear of the heater into a suitable chamber, within which it is mounted, which communicates with the chimney. I have found that by introducing the cold water

under pressure at the lower portion of one end of the heater and discharging it at the top of the other head, and by surrounding the fuel with a series of tubes in the manner described, the best results are attained, both as regards the distribution of water through the tubes and the obtaining of an extended heating-surface at the expense of a comparatively small amount of fuel. The sockets *a* are cast on and form a part of the end A A' of the heater, and are connected together by webs so as to impart strength to the structure. In like manner the sockets *b* are cast on and form a part of the end B B' of the heater, the tubes being fitted into the sockets by proper packing or being otherwise secured to the same.

It will be seen that the heater is of very simple construction, and that heaters of different capacities may be constructed according to my invention by altering the length of the series of tubes.

I claim as my invention—

1. The within-described water-heater, consisting of the end casting A A' and corresponding casting B B', combined with and communicating with each other through a series of longitudinal tubes, E, forming the grate, and similar tubes D surrounding the fuel chamber, all substantially as set forth.

2. The combination of the end A A' of the heater and its inlet or inlets *d*, the system of tubes D and E, and the end B B' with outlet or outlets *e* at the top, all substantially as specified.

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

JOHN DICK.

Witnesses:

HARRY HOWSON, Jr.,
HARRY SMITH.