

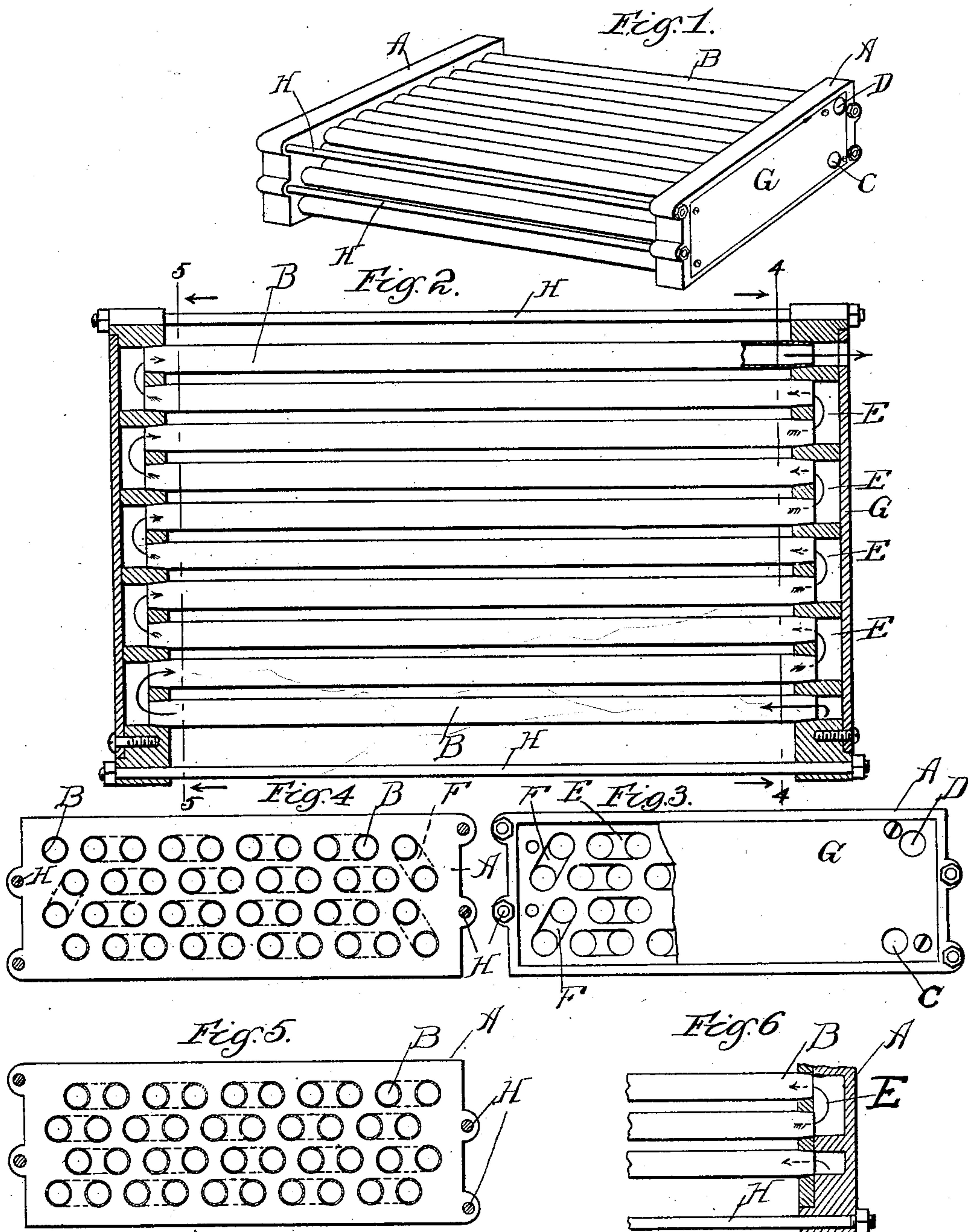
No. 644,065.

Patented Feb. 27, 1900.

A. W. DOWLER.
WATER HEATER.

(Application filed June 9, 1899.)

(No Model.)



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UNITED STATES PATENT OFFICE.

ARTHUR W. DOWLER, OF CHICAGO, ILLINOIS.

WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 644,065, dated February 27, 1900.

Application filed June 9, 1899. Serial No. 719,898. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR W. DOWLER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Water-Heaters, of which the following is a specification.

This invention relates to improvements in water-heaters; but is more especially designed for use as a domestic water-heater for such purposes as heating water for a bath during its passage from the service-pipe into the bath-tub.

The primary object of my invention is to have the heater of such character that any desired number of series of tubes of exceedingly-thin metal may be utilized in such manner as to have an enforced circulation successively through every tube in the heater, such tubes being so disposed and in such number as to absorb the greatest possible amount of heat from a gas or lamp burner or any other equivalent source of heat directed upon the series of tubes.

Another object is to have the heater of such construction that cast-metal heads may be utilized in connection with thin metallic circulating-tubes without screwing or otherwise permanently connecting the heads and tubes, and yet in such manner that the interior of all of the tubes is quickly and easily accessible without separating the heads from the tubes.

These and such other objects as may hereinafter appear are attained by the devices illustrated in the accompanying drawings, in which—

Figure 1 represents a perspective view of a water-heater embodying my invention. Fig. 2 is a horizontal section thereof, showing the device in elevation. Fig. 3 is an end view showing a portion of the head broken away. Fig. 4 is a transverse vertical section on the line 4 4 of Fig. 2. Fig. 5 is a transverse vertical section on the line 5 5 of Fig. 2, and Fig. 6 is an enlarged detail section of one corner of the heater through one set of tubes.

Similar letters of reference indicate the same parts in the several figures of the drawings.

Referring by letter to the accompanying drawings, A indicates the heads, and B the

tubes connecting the heads. The tubes are preferably composed of very thin copper or like metal, so as to more quickly transmit the heat to the water therein, and there may be any desired number of parallel series of tubes, there being in the heater shown in the drawings four parallel series of tubes. The water circulates reversely through these tubes successively, entering, say, at the hole C, which is suitably connected with the service-pipe, and first traversing the entire lower series of tubes, then entering the next series and passing successively through the tubes thereof, and so on until the water emerges in the opening D, to which is suitably connected a hose or other device for delivering the water into the intended receptacle, such as a bath-tub.

The heads are duplicates, excepting as to the holes C and D, so that a description of one will serve for the other. These heads are made of cast metal, preferably rectangular in shape and of sufficient dimensions to provide sockets for the desired number of series of tubes. In each head is formed a series of chambers E, one for each pair of tubes, the head being of course hollow and the tubes fitting into sockets in the inner face thereof opening into the said chambers, so that the water in passing from one tube to another passes through the chamber connecting it to the adjacent tube. The tubes and of course the sockets and chambers in the head are disposed in staggered relation and at the end of each series of sockets, as the chamber F, is obliquely disposed, connecting the end tube of one series with the end tube of the next adjacent series, so that after the water has passed through one series of tubes and chambers it will cross over and traverse the next series of tubes and chambers, and so on until it has passed successively through every tube and chamber in the heater.

For convenience of access to the interior of the heads and the tubes I prefer to provide a cap or covering plate G for the head, having a water-tight joint therewith and secured thereto by screws or otherwise, so that when the plate is removed all the chambers and tubes in the heater are exposed.

In setting up the heater I prefer to have the ends of the tubes slightly tapering and

the walls of the sockets therefor in the heads correspondingly tapered, so that when the tubes are fitted into the heads and the tie-rods H are screwed up tightly a water-tight joint will be effected between the tubes and the heads which cannot be destroyed by expansion or contraction.

I have found in the practical use of a heater constructed in accordance with my invention that by turning the water and heat on simultaneously and allowing the water to flow continuously through the heater into a bath-tub with the water at the initial temperature of about 70° the temperature of the water will be raised sufficiently, so that by the time the bath-tub is full the temperature of all of the water will be sufficiently high for the purposes of a bath. It will thus be seen that with my heater the water is not first heated and afterward turned into a bath-tub, but is actually heated as it flows through the heater continuously and by forced circulation from the service-pipe. Of course the temperature of the water may be greatly varied by varying the force with which the water flows through the heater from the service-pipe by turning the same on with more or less force and volume, or, if desired, an ordinary reducing-valve may be employed in the pipe connection between the heater and the service-pipe.

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

1. In a water-heater, the combination with a pair of heads each provided with two or more series of chambers, the end chamber of

one series being connected with the adjacent series and a corresponding number of series of tubes, each pair of which opens into a chamber in said heads, whereby water entering one end of one of said tubes is caused to circulate alternately in opposite directions through the tubes and to pass through each of the tubes before being discharged, substantially as described.

2. In a water-heater, the combination with a pair of cast heads, each having two or more series of chambers therein, a series of holes in said heads communicating in pairs with said chambers and a cap-plate covering all of said chambers, the end chamber of one series being in open communication with the end chamber of the adjacent series, of a series of tubes fitting the holes in said heads, whereby water entering one of said tubes is caused to circulate in alternately-opposite directions successively through each of said tubes to the point of discharge, substantially as described.

3. In a water-heater, the combination with a pair of heads each provided with two or more series of chambers, the end chamber of one series being diagonally arranged for connection with the adjacent series, and a corresponding number of series of tubes each pair of which enters a chamber in said heads each series of said tubes being arranged in staggered relation to the next adjacent series to facilitate the circulation of heat.

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