(No Model.)

W. BURLINGAME.

HOT WATER HEATING APPARATUS.

No. 280,908. Patented July 10, 1883.

Fig. 1.

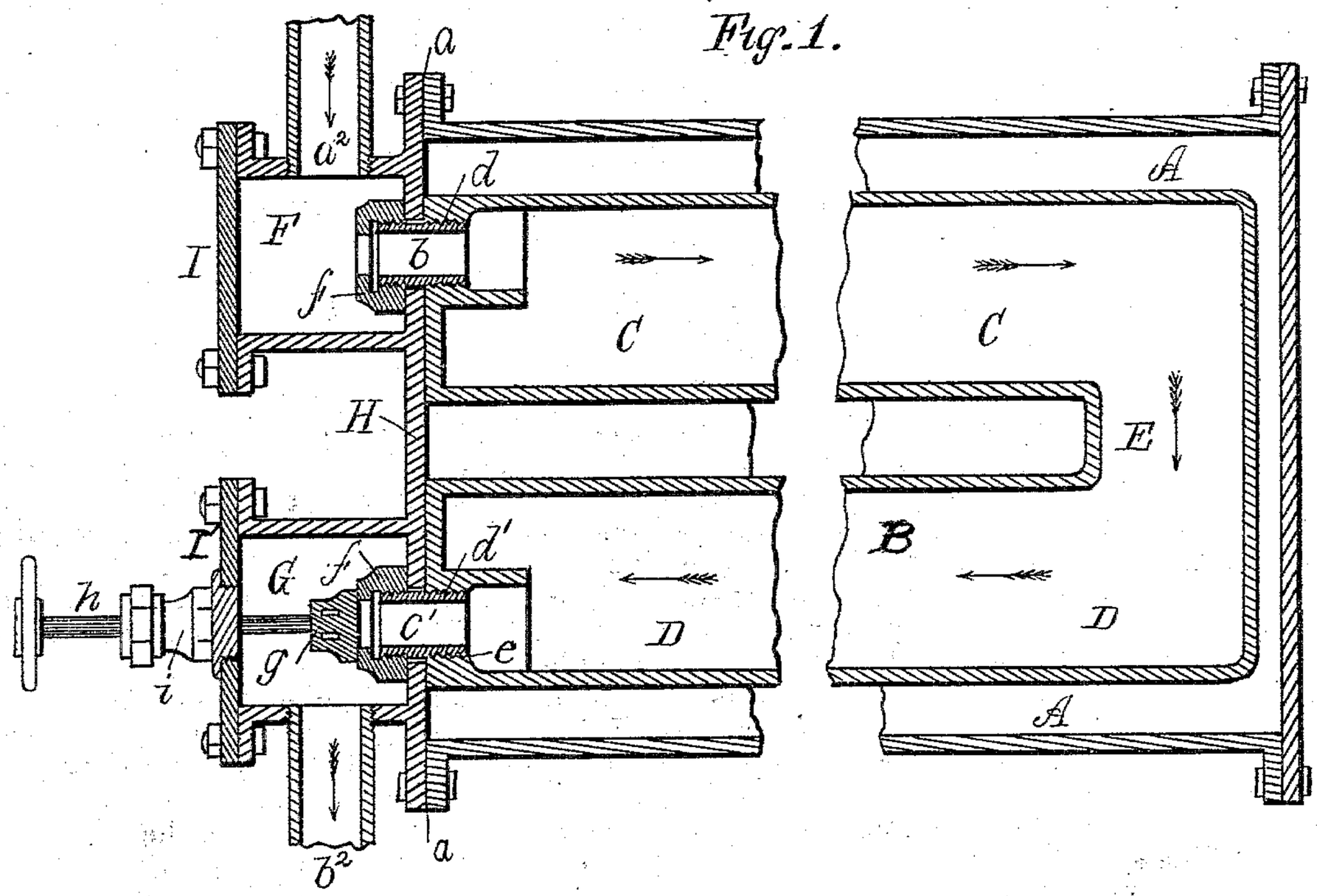


Fig. 2.

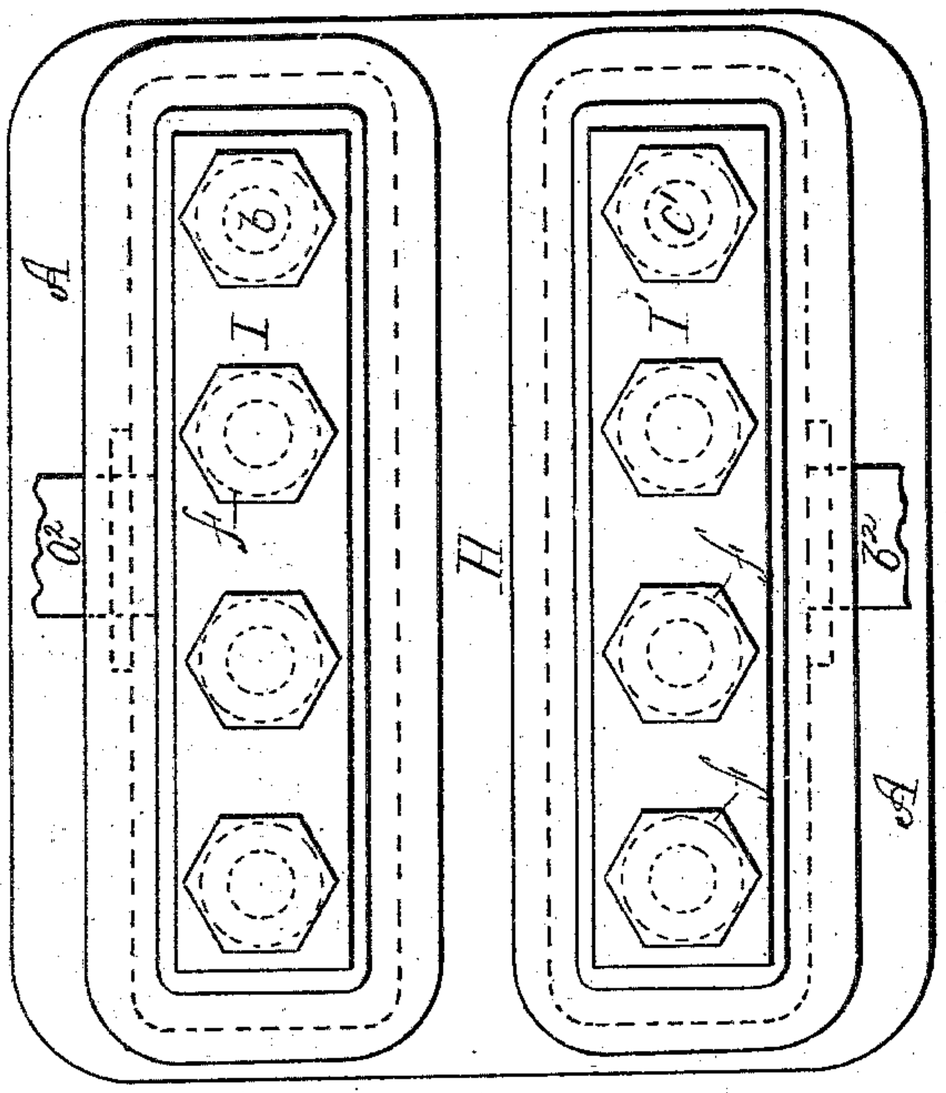
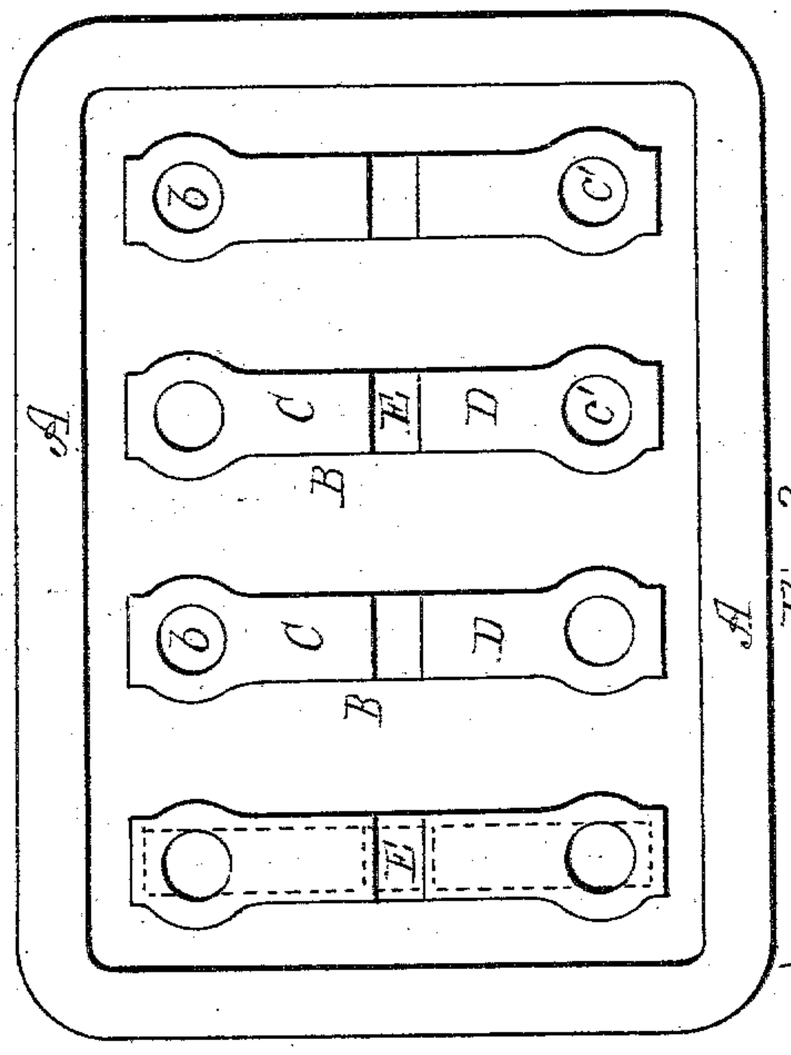


Fig. 3.



Witnesses.
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UNITED STATES PATENT OFFICE.

WILLIAM BURLINGAME, OF EXETER, NEW HAMPSHIRE.

HOT-WATER HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 280,908, dated July 10, 1883.

Application filed September 22, 1882. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM BURLINGAME, a citizen of the United States, residing at Exeter, in the county of Rockingham and State of New Hampshire, have invented certain new and useful Improvements in Hot-Water Heating Apparatus; and I do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to apparatus for heating apartments or structures by hot water, my improvements pertaining especially to the construction of the hollow boxes or shells which constitute receivers for the steam, and to transmit the heat of such steam to the water contained in the circulating-pipes.

The object of my invention is to provide means for regulating instantly and effectually the amount of steam required to perform the labor demanded; and it consists in a heater composed of a series of boxes suitably united together and connected at top and bottom by a common steam supply and exhaust passage, and in providing each box with an independent inlet and exhaust port connecting, respectively, with such passages, the upper being always open, which is the inlet-port, and with which each box is provided, the lower or exhaust being provided with a valve operated from the outside of such box, and the whole being as hereinafter explained.

The drawings accompanying this specification represent, in Figure 1, a central longitudinal section of a heating apparatus containing my improvements; Fig. 2, a front elevation with the plates I I′ removed, while Fig. 3 is an end elevation, showing the outer shell and the boxes contained therein.

Heretofore in the construction of these heaters a series of hollow boxes have been connected with a feed-pipe governed by a single valve to control the admission of live steam; hence the entire number of boxes must necessarily always be in use, and as a consequence the governing of the temperature of the apartment or structure is difficult, for the reason that considerable time is requisite to reduce the temperature, and, in addition to this, fuel is wasted by the heating of the entire apparatus, when a portion would be ample to impart the desired amount of heat.

Reference being had to the drawings before named, A will be seen to represent a thin rectangular closed box or shell of cast-iron, which constitutes the body of each individual heater of the apparatus, this box or shell being closed on all sides to contain water, and connected at its rear end with the pipes employed for distributing the water heated in the box.

Within the box or shell A, I dispose one or more of the steam receiving and circulating drums B, each of which consists of two horizontal parallel pipes or branches, C D, disposed one above the other, and connected at their rear ends by a vertical intercommunicating branch or leg, E. One of the boxes A with its inclosed drum or drums B, constitutes an entire heating apparatus of small capacity. When it is desired to increase the capacity of such apparatus, two or more of these boxes A, are to be placed side by side parallel with each other, the number of boxes thus aggregated being determined by the maximum amount of heat demanded. The drums B have no direct communication with each other, but each communicates by the front end of its upper branch, C, with a common steam-supply chamber, F, while their lower portion, D, connects at its front end or outlet with a common exhaust-chamber, G. These chambers F and G are formed as follows: H represents a flat plate adapted to cover and close the front end of the box A with a tight joint, as shown at *a*, and is firmly bolted to such box. Upon the front of this plate H, I cast the two horizontal boxes or chambers, the chamber F being in a plane with the upper branches, C, of the drums B and the chamber G with the lower branches, D, of such drums, the chamber F being the live-steam or supply chamber, and communicating with the interior of each branch C by an inlet-port, *b*, (composed of a nipple, *d*, as hereinafter explained,) while the lower chamber, G, is the exhaust-chamber, and communicates with the interior of each branch D by an escape or exhaust port, *c′*, (composed, also, of a nipple, *d′*, to be explained,) each chamber F G

being covered and tightly closed by a flat plate, I or I′, securely bolted to its walls, and the chamber F being provided with a steam-inlet port, a^2, while the chamber G has an exhaust-port, b^2.

To secure the front end of the lower branch, D, of each drum to the front plate, H, I employ a nipple, d', having a screw-threaded periphery, e, and I screw one end of this nipple into the mouth of said branch D, the body of the nipple passing loosely through the plate H and into the exhaust-chamber G, and having a tubular cap or nut, f, screwed upon it, and down upon the said plate. The outer end of the cap or nut f constitutes a valve-seat with which a valve, g, operates, such valve being swiveled to the inner end of a horizontal stem, h, which protrudes outward through the cap-plate I′ of the chamber G, and a stuffing-box, i, contained therein.

To secure the front end of the upper branch, C, of each drum to the front plate, H, of the water receiver or box A, I employ the screw-threaded nipple d and open nut f, as before explained, such nipple passing loosely through the lower part of the plate H; but I preferably omit the valve g, as I prefer to govern the supply of steam to each drum at the outlet rather than the inlet, though I do not confine myself to such arrangement.

The operation of the above apparatus is as follows, it being understood that live steam is supplied to the chamber F through its port a^2, and, for example, all the valves g open: Steam enters the upper branch, C, of each drum through its port b and traverses the entire drum in the direction shown by the arrows in Fig. 1, imparting its heat to the water in the hollow tank A in its passage through the drum, and exhausting by way of the outlet-port b^2, which connects with the water-space of the boiler, and by which the condense water in the lower branch, D, is returned to such boiler. Should too much heat be generated by the entire number of drums, one or more of the valves g are to be closed, which estops circulation of steam through the drum thus cut off and permits a portion of such drum to fill with condense water. The drums which remain open to the common steam-chamber F continue their functions unaffected by the cutting off of the others.

Though I have shown the governing-valve g as applied to the outlet or exhaust port of each drum, it may be connected with the upper drum, and the supply of steam governed thereat; or a valve may be employed at both points. As before stated, I prefer to govern the steam at the outlet of the drum rather than the inlet, for the reason that if the outlet is at all times open the exhaust-steam from the entire number of active drums can get access to the interior of the inactive drum. By governing the admission of steam at the outlet the lower part of the drum cut off soon fills with condense water, which estops circulation of live steam, while at the same time exhaust-steam from the open drum is prevented from entering the drum thus closed.

It will thus be seen that the capacity of the heater is regulated to the demands upon it by simply opening or closing one or more cocks, and in supplying a greenhouse or other structure with it, it is only essential that a sufficient number of sections shall be grouped together to meet the extreme demand for heat. Anything below this is obtained by shutting off one or more sections.

I claim—

1. The common steam-supply chamber F and the common steam-exhaust chamber G, in combination with the water-box A, to which they are attached, the drums B within said chamber, the tubular nipples b and c, which make communication between said chambers and said drums, the valves g, which are adapted to close said communication at one end thereof, and the caps f, each of which serves as a nut for one of said nipples and as a seat for one of said valves, as set forth.

2. A cap, f, serving both as a nut and a valve-seat, in combination with valve g, screw-threaded nipple c', drum D, screw-threaded to engage therewith, and tubular fastenings for the supply end of said drum, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM BURLINGAME.

Witnesses:
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THOS. T. BAILEY.