

(No Model.)

S. TAPLIN.
HOT WATER CIRCULATING HEATER.

No. 580,435.

Patented Apr. 13, 1897.

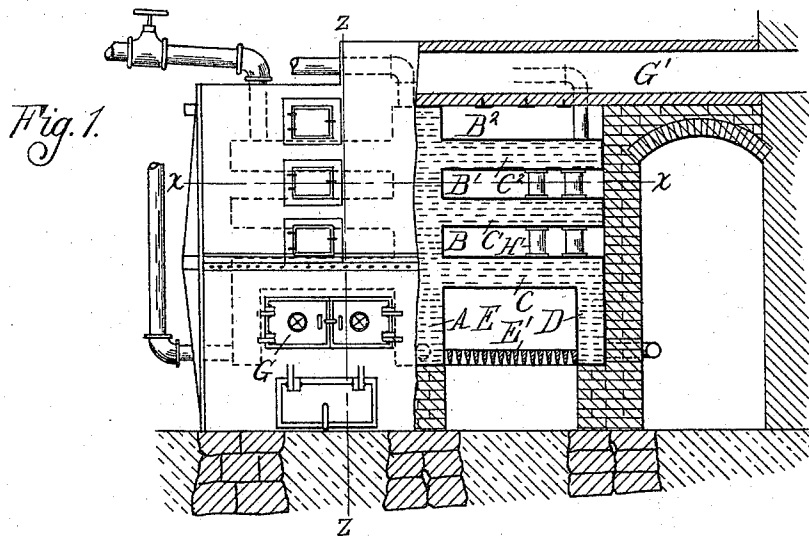


Fig. 3.

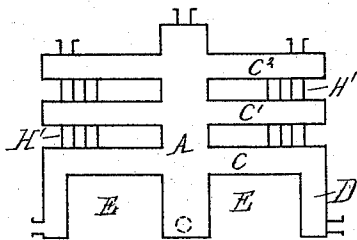


Fig. 4.

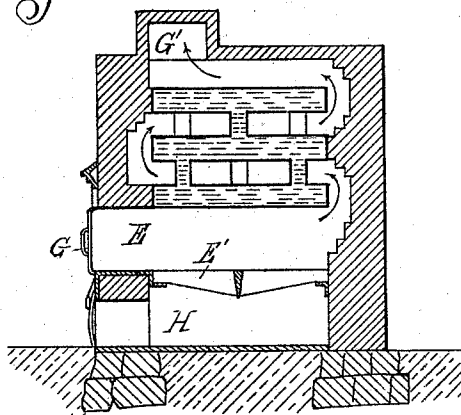
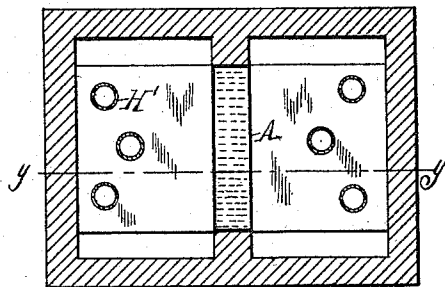


Fig. 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

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HOT-WATER-CIRCULATING HEATER.

SPECIFICATION forming part of Letters Patent No. 580,435, dated April 13, 1897.

Application filed December 14, 1896. Serial No. 616,714. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN TAPLIN, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Hot - Water - Circulating Heaters, of which the following is a specification, reference being had therein to the accompanying drawings.

The object of the invention is to make a heater which, while especially adapted for heating large areas in which even and moderate temperature has to be maintained at all times, such as in greenhouses and like structures, permits the use of cheap fuel, such as slag-coal, and at the same time requires less attention than is usually required, all as more fully hereinafter described, and shown in the drawings, in which—

Figure 1 is a front elevation. Fig. 2 is a horizontal section on line *x x*. Fig. 3 is a vertical section of the heater detached on line *y y*, Fig. 2; and Fig. 4 is a vertical cross-section on line *z z*, Fig. 1.

The heater is inclosed in an outer setting of brick, which is divided into two entirely separate and independent heating-chambers by means of a central transverse water-column A. This central water-column is intersected by horizontal transverse water-chambers, which form upon opposite sides a series of like transverse water-sections C C' C², which project into the heating-chambers and communicate into the central column.

The lowest one of each series of transverse water-sections is provided with a dependent water-leg D, thereby forming in connection with the central column the sides and top of two separate and independent combustion-chambers E, each of which is provided with the usual grate E, a furnace-door G, and an ash-pit H below the grate, all arranged in any desired manner. The transverse water-sections divide each heating-chamber into a vertical series of horizontal smoke-flues, and in connection therewith the brick setting is so constructed as to connect these flues alternately in front and rear in such manner that the products of combustion from one furnace-chamber have to travel successively through all the flues on one side of the central water-column, and those of the other furnace cor-

respondingly traverse successively all the flues on the other side of the central water-column, and thence the two sets of flues are suitably united into a common exit-flue into a chimney.

As shown in the drawings, there are three flues B B' B², formed on each side of the central column by the sections C C' C²; and the course of the products of combustion is indicated by the arrows, (G being the exit-flue,) which unitedly carry the products into the chimney. The horizontal transverse water-sections on each side further communicate with each other through vertical connections H, which are placed near the outer end and permit the circulation of the water from the top of the lower section into the bottom of the next one above, and these connections are preferably staggered, so that they are not directly in vertical line with each other.

The setting may be constructed of brick or of any suitable material and in any preferred manner which will accomplish the object in view and afford facilities for cleaning the interior from ashes and soot, and the heater may be constructed of cast-iron or boiler-iron, or partly of one and partly of the other, and the transverse sections may be increased or diminished in number or size, as the duty desired of the heater may dictate.

The connections for the circulating system of pipes may be made in any desired manner. As shown, the return-pipes are preferably connected into the outside water-legs and into the water-leg of the central column, and the outgoing connections may be made from the top of the central column and from the top of the uppermost lateral water-sections.

In practice it will be seen that while the construction is relatively simple it affords comparatively a very large heating-surface, and the internal circulation is ample and free in a horizontal as well as in a lateral and vertical direction. The water, therefore, will circulate very freely and be quickly heated, thus affording the very best conditions for producing and maintaining a mild and even heat, as required in heating greenhouses, conservatories, and like places, for which it is also specifically adapted on account of its form and relative dimensions, which easily admit of a heat distribution on the ground

for producing a desirable bottom heat and of using a large number of independent circulating branches, as the connections can be made at distant points of the heater, so that these branches will not rob each other.

The principal advantage of the heater, however, lies in its having the two independent furnaces and heating-chambers. This not only permits of the utmost economy of fuel, but also greatly reduces the attendance required for maintaining the fires. To this end I use the cheapest kind of fuel, such as the refuse from coal or screening, and this, if of sufficient good quality, I mix to a large extent with some inert substance, such as clay, to make it slow burning. After starting a good fire in one furnace I fill the furnace completely with this cheap fuel, enough to insure its burning for twenty-four hours, more or less, and while the combustion in this furnace is about at its height I start the fire in the other furnace. In this manner while one fire is gradually burning out the other to an equal degree increases in giving out heat, and thus I have in the aggregate always an equal amount of heat given out by the two furnaces together, thus maintaining an even circulation, while at the same time each fire may be left to burn out entirely until the last unit of heat is obtained from it, when the debris is removed to start a new fire. The principal attendance required is thus only in building, alternately, a new fire every twelve hours, more or less, according to circumstances, and this materially lessens the cost of attendance and fuel heretofore required in heating greenhouses and the like. Incidentally to this mode of using cheap and slow-burning fuel the debris is valuable for greenhouse work on account of its admixture with clay or earth, while the debris from ordinary fuel would be of little or no use.

It will be understood that slow-burning fuel cannot be burned in the usual manner, as the fire must be left undisturbed, and thus it is obvious that without the construction of heater herein described this economical mode of heating could not be used.

The saving of fuel with my invention does not only result from the use of cheap fuel, but also from its complete combustion, whereas in the ordinary way of heating the admission of large quantities of air and fresh fuel produces smoke, and much waste is produced

from the poking and constant removal of hot ashes and cinders which is required to keep an even fire.

What I claim as my invention is—

1. The combination with an inclosing casing or setting, of a water-heater therein formed with a central chamber extending across and dividing the casing into distinct heating-chambers, and a plurality of laterally-extending chambers in each heating-chamber communicating each with the other and with the central water-chamber and situated one above the other, whereby is formed in each heating-chamber a plurality of smoke-flues communicating with each other alternately at opposite ends of the heating-chambers, and a smoke-exit flue, substantially as described.

2. The combination with an inclosing casing or setting, of a water-heater therein formed with a narrow central chamber extending across the casing and dividing the latter into distinct heating-chambers, and a plurality of horizontal shallow chambers in each heating-chamber, each communicating with the other and with the central water-chamber, and situated one above the other, whereby is formed in each heating-chamber a plurality of horizontal smoke-flues communicating with each other by means of passages formed in the casing around the ends of the horizontal water-chambers, and an exit smoke-flue, substantially as described.

3. The combination with an inclosing setting or casing, of a water-heater therein comprising a vertical narrow central chamber extending across the casing and dividing the latter into distinct heating-chambers, and a plurality of shallow horizontal water-chambers communicating with each other and with the central chamber and extending into each heating-chamber one above the other, whereby is formed in each heating-chamber a plurality of horizontal smoke-flues communicating at their ends, and water-legs depending from the lowermost horizontal water-chambers forming in connection with the horizontal vertical chambers the sides and top of two furnace-chambers.

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

STEPHEN TAPLIN.

Witnesses:

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T. TAPLIN.