



HITCHINGS & COMPANY

UNITED STATES BOILER PATENTS

CIBSE Heritage Group

C. F. HITCHINGS.

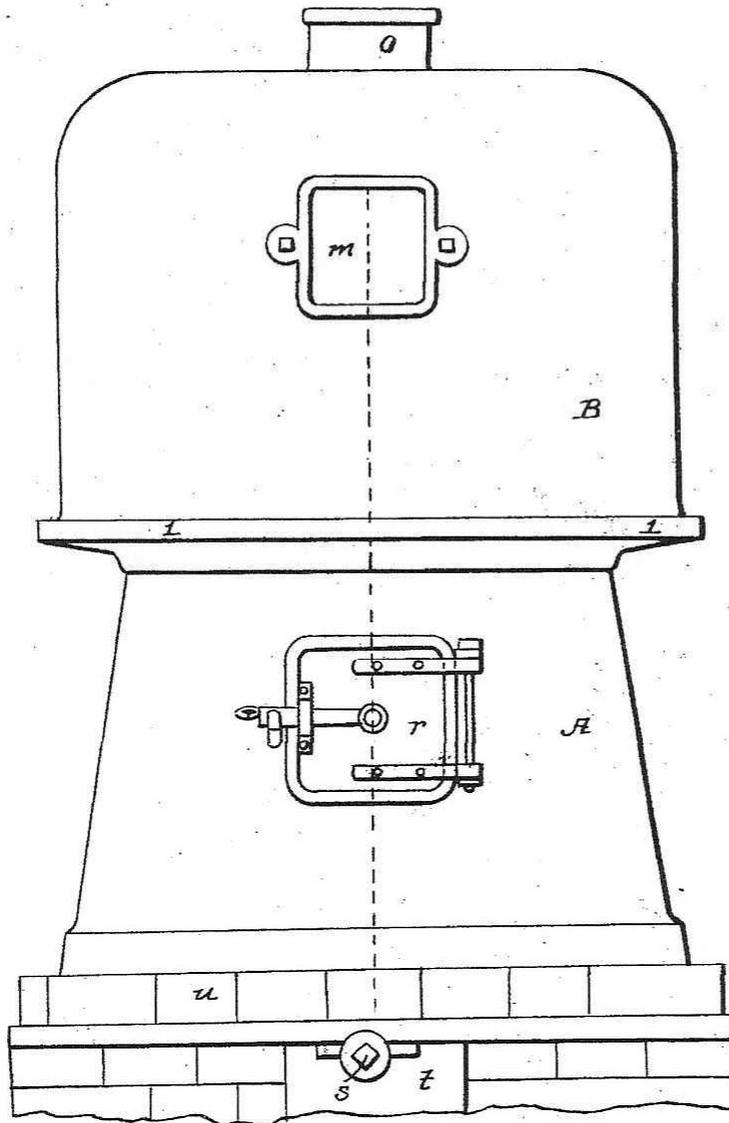
3 Sheets—Sheet 1.

Steam Heater.

No. 28,272.

Patented May 15, 1860.

Fig. 1.

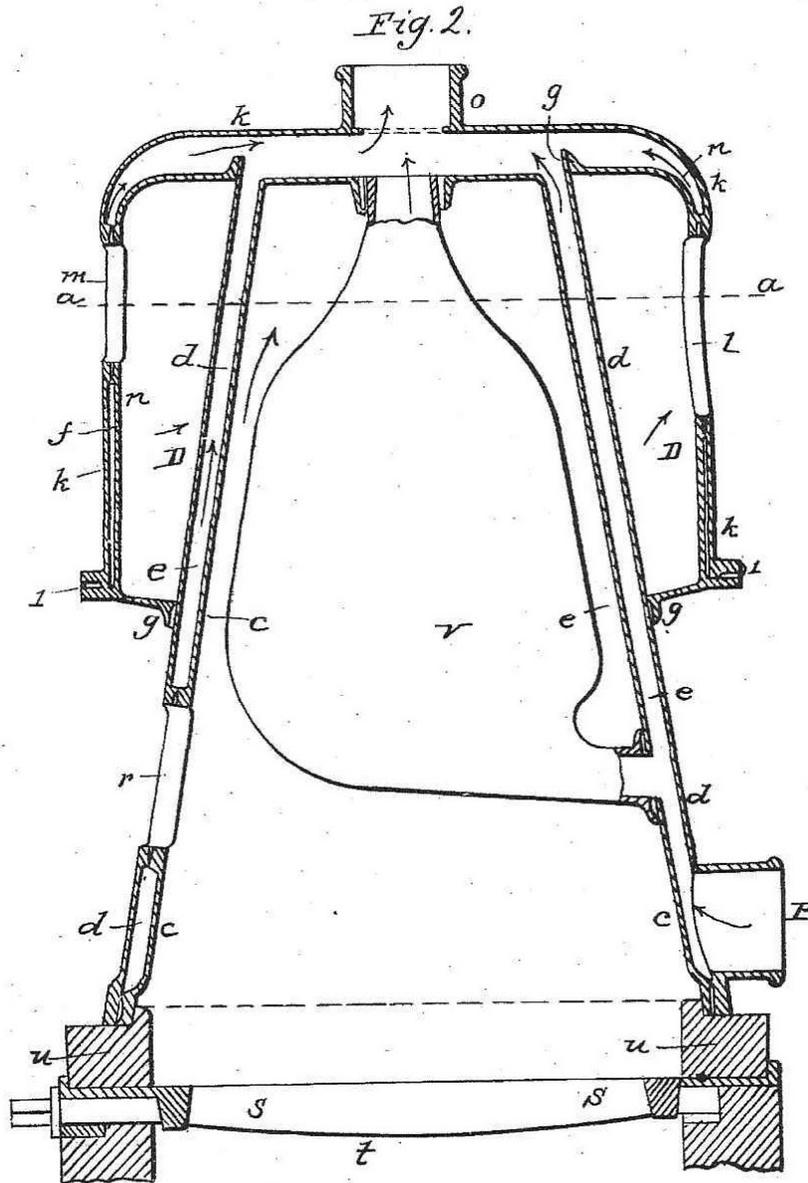


C. F. HITCHINGS.

Steam Heater.

No. 28,272.

Patented May 15, 1860.

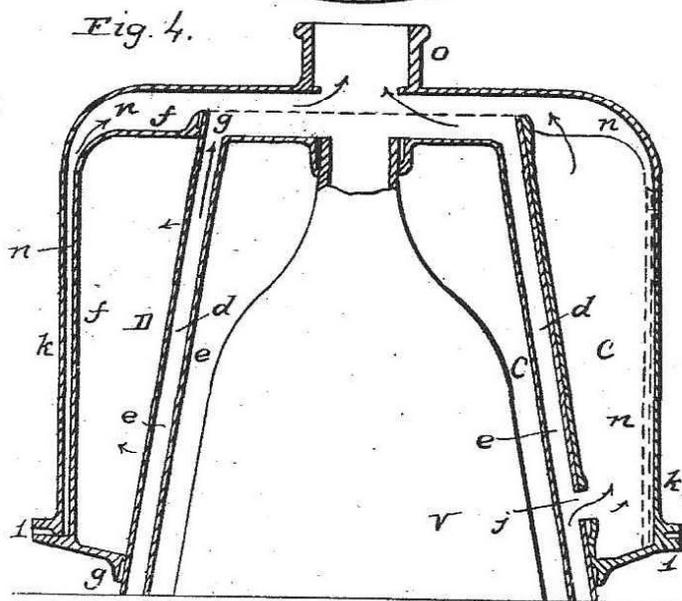
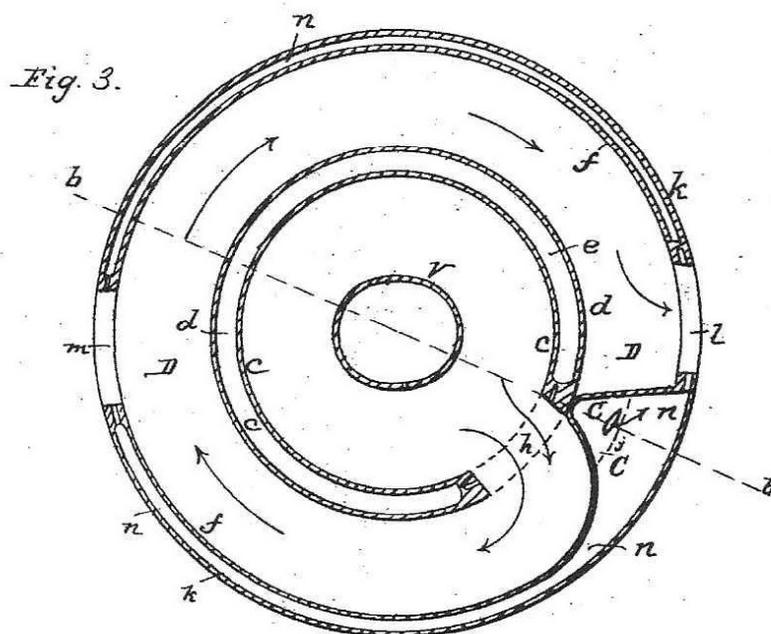


C. F. HITCHINGS.

Steam Heater.

No. 28,272.

Patented May 15, 1860.



UNITED STATES PATENT OFFICE.

CHARLES F. HITCHINGS, OF NEW YORK, N. Y.

BOILER FOR HEATING BUILDINGS.

Specification of Letters Patent No. 28,272, dated May 15, 1860.

To all whom it may concern:

Be it known that I, CHAS. F. HITCHINGS, of the city, county, and State of New York, have invented a new and useful Improvement on Vertical Conical or Cylindrical Boilers for Warming Buildings with Hot Water; and I do declare that the following is a full and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon.

The nature of my invention consists in providing an annular water jacketed chamber, of any suitable metal, connected with water passages to and inclosing the upper part of boiler, forming an annular flue or passage between the outer shell of the boiler and the inner shell of the chamber, through which the flame and heated gases are forced to pass in their escape from the fire chamber to the chimney by which means, without altering the size or shape of the fire chamber I expose nearly double the amount of heating surface which absorbs the heat that would otherwise pass up the chimney rendering the boiler more effective and economizing fuel.

The form selected to illustrate my improvement is that of A. E. Hitchings' conical boiler, but the same may be applied to a vertical cylindrical boiler under similar conditions.

Figure 1, is a front elevation; Fig. 2, a vertical section at right angles to Fig. 1; Fig. 3, a sectional plan at *a, a*, Fig. 2; Fig. 4, a vertical section of the upper part through *b, b*, Fig. 3.

Similar letters of reference indicate corresponding parts in the several figures.

A is the boiler, *c, c*, being the inside shell or fire chamber, *d, d* the outside shell of the boiler made without a top, *e, e* the water space between the inner and outer shells.

B is the water jacketed chamber, which may be of any required height and of such diameter as to leave the passage or flue D between it and the outer shell *d, d* of the boiler, *f, f* the inner shell of the chamber. The upper and lower ends of this shell are contracted to suit the diameter of the outer shell of the boiler to which it is jointed at *g, g*, the upper joint being water tight.

C, C is the diaphragm formed by an indentation in one side of the inner shell *f, f* of the chamber, of such depth and shape as to

touch the outer shell of the boiler throughout the whole height of the inner shell *f, f* for the purpose of closing the flue at that point and forcing the flame and heated gases emitted from the fire chamber at the opening *h*, to pass around and play on the surfaces of the outer shell of the boiler and on the inner shell of the chamber and pass out through the opening *i* in the chamber to the chimney. The width of the diaphragm in contact with the outer shell of the boiler is increased at the lower part, and the water passage *j* made through it and the outer shell *d, d* of the boiler at that point for the passage of water to supply the circulation through the water spaces of the chamber B.

l, l is the outer shell of chamber B which is bolted and jointed to the inner shell *f, f* at the flange *l, l*, at the smoke outlet *i* and at the arm hole *m, n, n* the water spaces between the inner and outer shells of the chamber B, *i* the outlet for smoke, to be provided with a suitable connection to the chimney, *m* the arm hole for the convenience of cleaning the flue D, *o* the socket to receive the flow pipe, *p* the socket to receive the return pipe, *r* the fire door, *s* the fire grate, *t* ash pit, *u u* fire brick, *v* the flat sided water chamber.

The water in circulation enters at a low temperature at the pipe *p* is distributed through the water spaces *e, e*, of the boiler and by the passage *j* through the water spaces *n, n* of the chamber and as it becomes heated rises by reason of its lightness and passes out at the pipe *o*.

I do not claim a cylindrical or conical boiler, nor any system of flues or water passages within such boiler.

What I do claim as my invention and desire to secure by Letters Patent is—

1. The water jacketed chamber B in combination with a vertical cylindrical or conical boiler, inclosing the flue D between the inner shell *f, f* of the chamber B, and the outer shell *d, d* of the boiler A, for the purpose and in the manner substantially as set forth.

2. The diaphragm C, C formed by an indentation in the inner shell *f, f* of the chamber B or its equivalent for the purpose set forth.

CHAS. F. HITCHINGS.

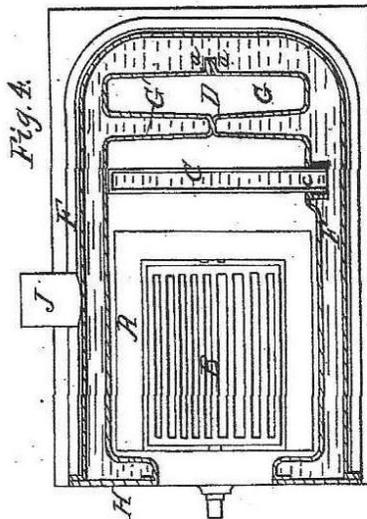
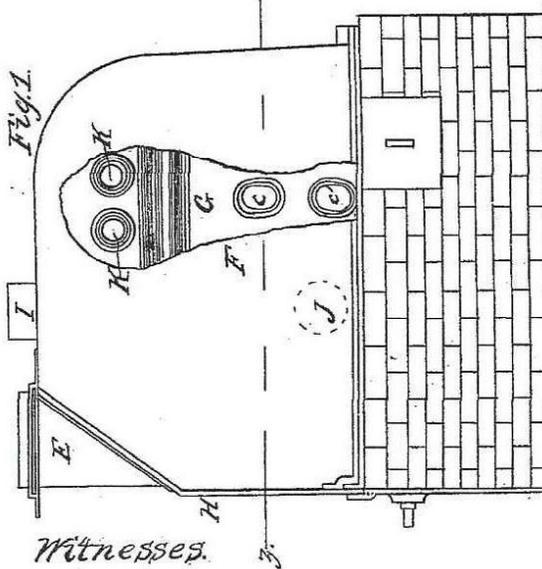
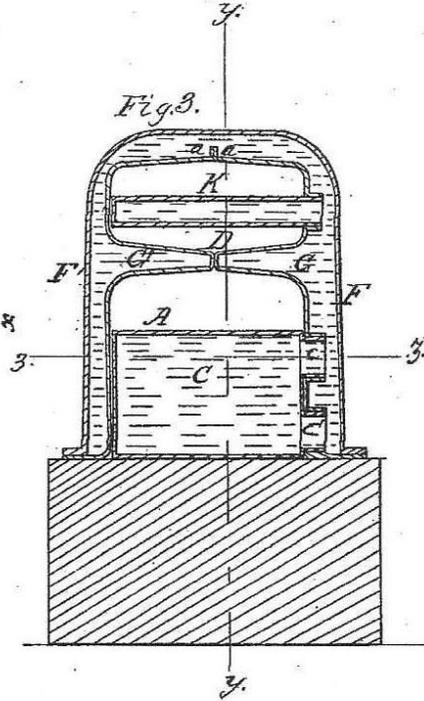
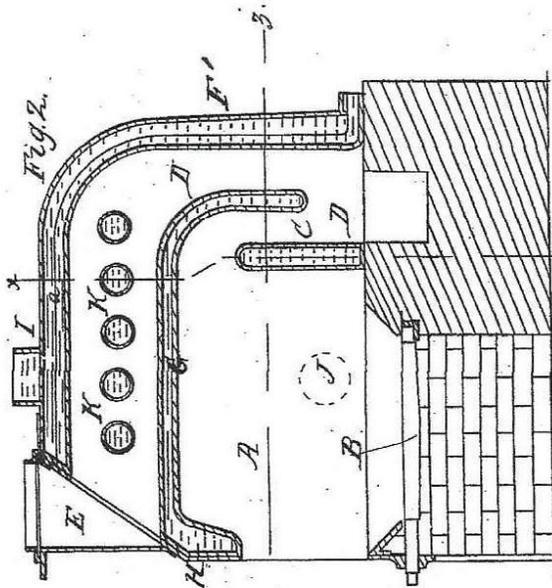
Witnesses:

THOMAS H. KING,
A. E. HITCHINGS.

*C. F. Hitchings,
Steam-Boiler Fire-Box.*

No 67,053.

Patented July 23, 1867.



Witnesses.

*McCormick
S. Reed*

Inventor.

Chas. H. Hitchings

United States Patent Office.

CHARLES F. HITCHINGS, OF NEW YORK, N. Y.

Letters Patent No. 67,053, dated July 23, 1867.

BOILER FOR HEATING BUILDINGS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, CHARLES F. HITCHINGS, of the city, county, and State of New York, have invented a certain new and useful Improvement in Boilers for Heating Buildings, and other purposes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, forming part of this specification, and in which—

Figure 1 represents a side elevation (partly broken or sectional) of a water-heating apparatus constructed according to my invention.

Figure 2, a longitudinal vertical section of the same through the line *yy* in fig. 3.

Figure 3, a transverse section thereof through the line *xx* in fig. 2; and

Figure 4, a horizontal section through the line *zz* in fig. 2.

Like letters indicate corresponding parts throughout the several figures.

The nature of my invention consists, firstly, in a boiler for heating buildings, the body of which is constructed in halves or two cast-metal sections, forming, when united, a vertical joint, projecting into or within the water space, and constituting the fire-chamber and return-flue, the same being made with internally-projecting water-courses or chambers that meet, but are preferably disunited, and the upper and lower outside surfaces of which form the crown to the fire-box or chamber and lower face of the return flue. Said invention also consists in a novel attachment or connection of the water-bridge at the back of the fire-chamber to one side only of the body or case, by means of upper and lower branches, establishing a circulation within said bridge; and furthermore, my invention consists in an arrangement of water pipes or tubes within the return-flue, crosswise of the same, and connected only at their one end with the body or case, with which, at said end, they are in open communication.

By this, my improvement, there is not only economy and convenience of handling in the construction of the boiler, but its durability is enhanced by the protection given to the joints and freedom for expansion or contraction of its parts without straining the structure, also every facility afforded for cleaning or repair, and other advantages attained.

Referring to the accompanying drawing, A represents the fire-box or chamber of the boiler. B its grate, beneath which is arranged the ash-pit. C the water-bridge at back of the fire-chamber. D the smoke pipe or flue, which, commencing at a suitable distance in rear of the bridge C, and dipping slightly below the top edge thereof, afterwards forms an ascent and return passage to or towards the front of the boiler, where it joins a flue or chimney, E. This fire-chamber A and return-flue D are made up of one and the same casting or castings, which constitute the body or case of the boiler, and is formed of two similar or hollow-like castings, F F', constituting water-sides, back, and top, to the apparatus, and by means of internally-projecting water-chambers G G', composing the crown to the fire-chamber and inner and lower surfaces to the return-flue. These chambers G G' are branches, the one from the one shell or casting F, and the other from the other shell or casting F', meeting, or nearly so, at their inner edges, but preferably not joined, so as to relieve the structure of strain and objectionable joint. The two shells F F' may be secured to each other by bolts passing through flanges *a a* along the vertical division of the body, as formed by the shells F F', and arranged to project within the water-space of said body, so as to be protected from the action of the fire. The front plate or face H to the boiler may or may not be separately secured to the body. The formation of the fire-chamber and return-flue by one and the same casting or castings affords great facility in the construction, handling, or transportation and erection of the apparatus. I is the flow pipe for the water, and J the return pipe therefor in establishing the necessary circulation for such water-heating purpose as it may be proposed to apply the boiler. The water-bridge C, though extending across or nearly across the back of the fire-chamber, is only connected with one side, shell, or division of the body, to prevent strain on the structure by expansion; and such connection is furthermore established by upper and lower branches *c c'*, that induce circulation of the water in the bridge to the better preservation of the same and uniformity of temperature throughout or with the contiguous or remaining body of water. Branching also from the one division or shell of the body, with which they are made to communicate, being closed at their opposite ends, are water tubes K, arranged in one or more rows to project across the return-flue D, so as to be acted upon by the escaping smoke and heated gases. Being con-

nected to only one division or half of the body, and loose from the other half thereof, said tubes exercise, in expanding, no straining effect upon the structure.

A water-heating apparatus constructed as described will not only be economical to build, but effective and durable, free from choking or lodgment of soot and dirt, and offering every facility for repair, should such be necessary.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The fire-chamber A and return-flue D of the boiler, constructed of two hollow shells or divisions F F', united by a vertical joint, as described, and having projecting chambers G G', arranged to form the crown to the fire-box and lower surface to the return-flue, substantially as specified.

2. The water-bridge C, connected and communicating, by upper and lower branches, with the one side or half of the body of the boiler, but loose or detached from the other half or division thereof, essentially as described.

3. The water tubes K, arranged to cross the return-flue, and connected and communicating with but the one-half or division of the water body or case of the boiler, as herein set forth.

CHAS. F. HITCHINGS.

Witnesses:

J. W. COOMES,

G. W. REED.

A. E. Hitchings.
Hot Water Apps.

N^o 5,418

Patented Jan. 25, 1848.

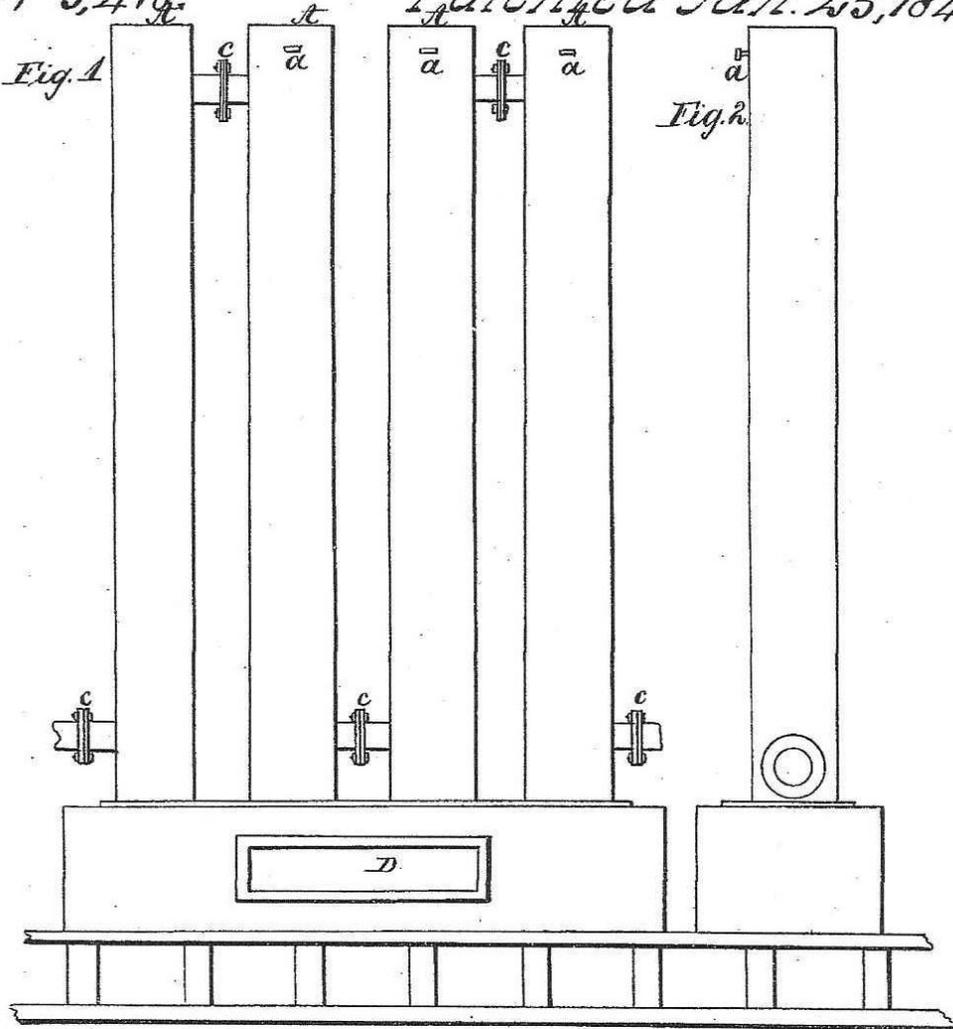
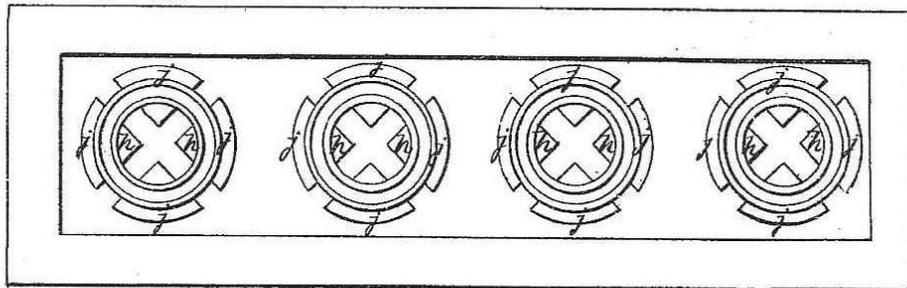


Fig. 3.

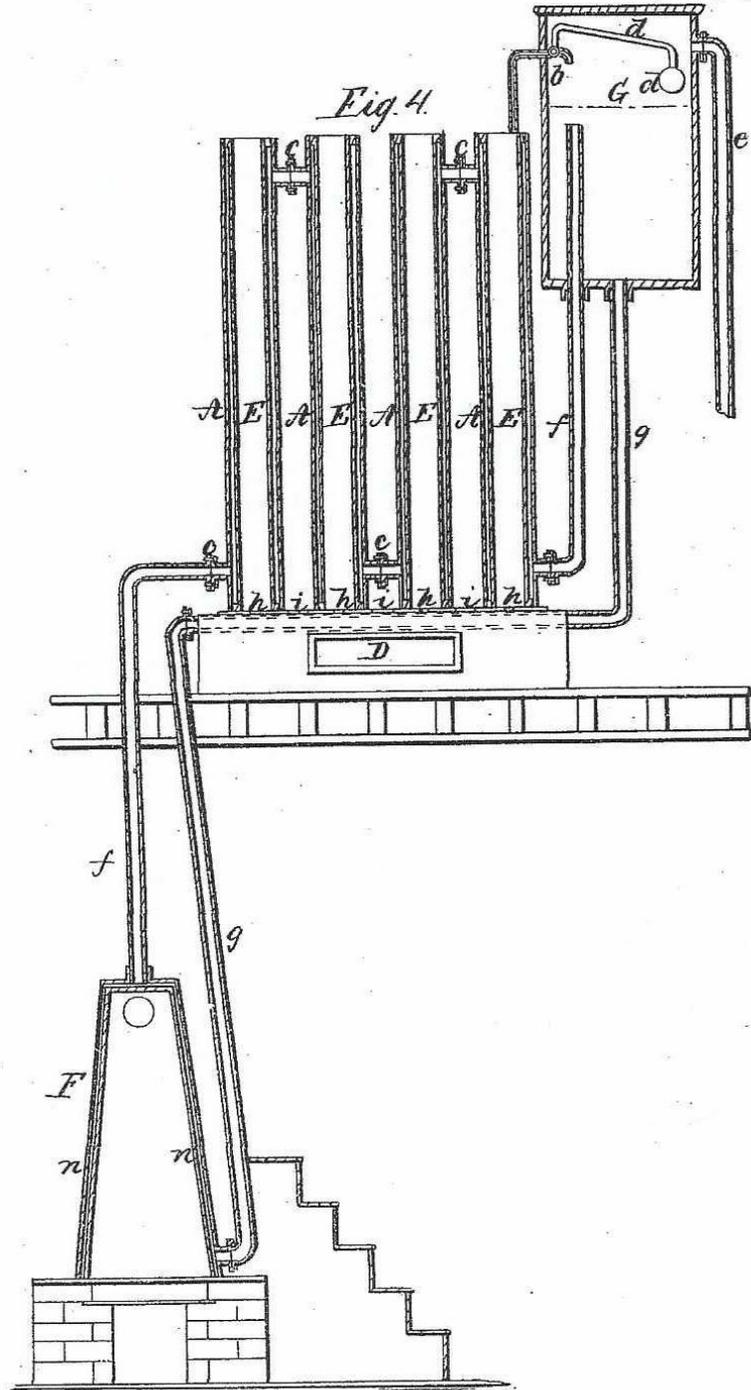


A. E. Hitchings.

Hot Water App'is.

N^o 5,418.

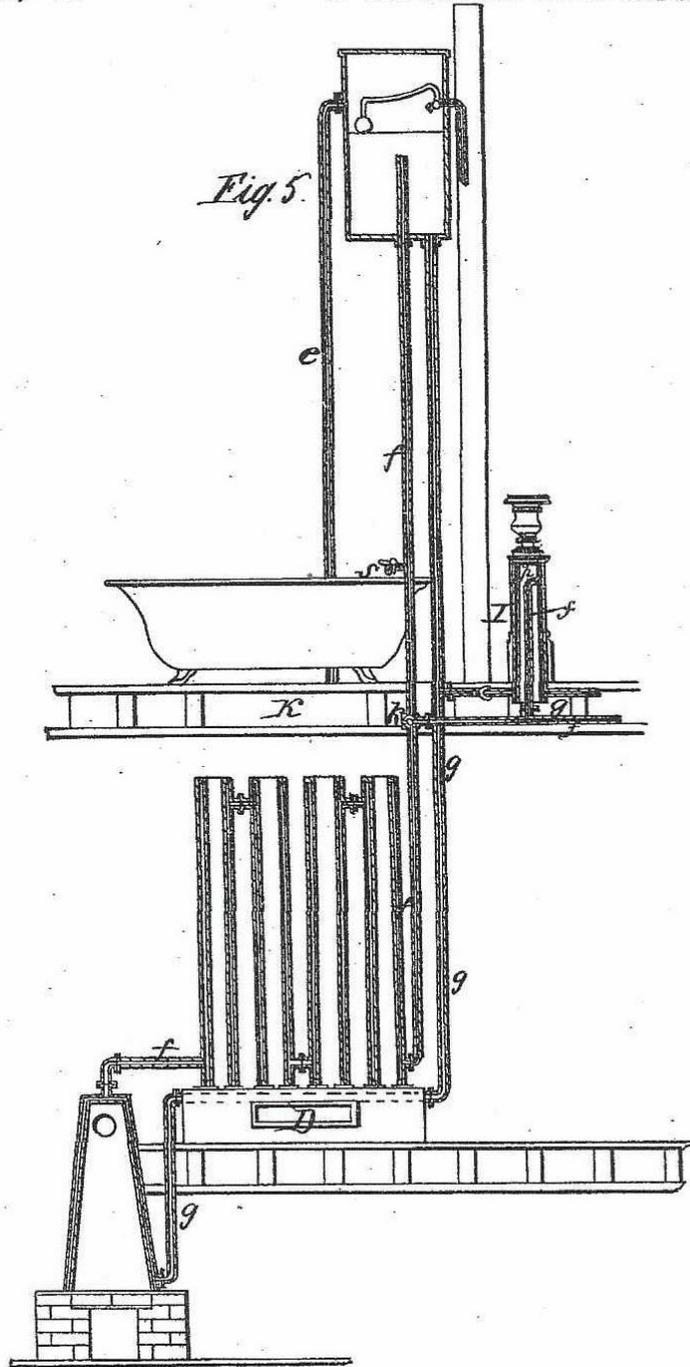
Patented Jan. 25, 1848.



A. E. Hitchings.
Hot Water App's.

N^o 5,418.

Patented Jan. 25, 1848.



Sheet 4, 4 Sheets.

A. E. Hitchings.
Hot Water App's.

N^o 5,418.

Patented Jan. 25, 1848.

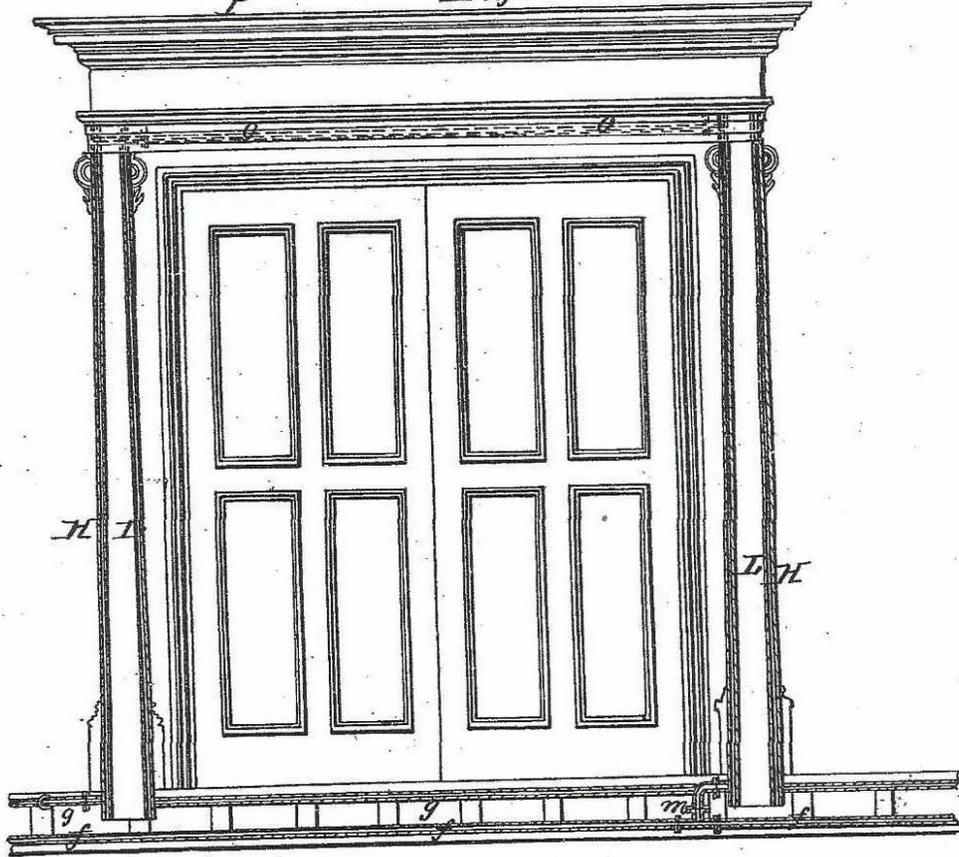
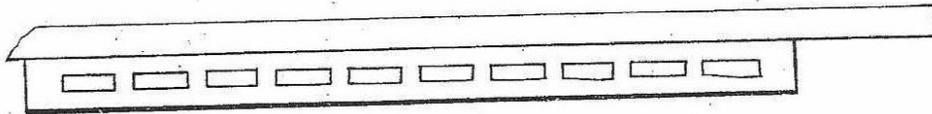


Fig. 7.



UNITED STATES PATENT OFFICE.

ANTHONY E. HITCHINGS, OF NEW YORK COUNTY, NEW YORK.

HOT-WATER APPARATUS FOR HEATING BUILDINGS.

Specification of Letters Patent No. 5,418, dated January 25, 1848.

To all whom it may concern:

Be it known that I, ANTHONY E. HITCHINGS, in the county of New York and State of New York, have invented a new and improved mode of heating buildings, either private or public, conservatories, or any other inclosure where heat is required, with hot water below the temperature of boiling; and I do hereby declare the following is a full and exact description.

The nature of my invention consists in providing a series of double cylinders connected together first at top and then at bottom and both ends of the series with a boiler so that the water heated in the boiler shall ascend in the space between the two first cylinders down between the second set then up between the third set and so on to the end and then delivered to the boiler, the circulating force given to the water by heat being sufficient to enable it to ascend and descend more than once. Each set of double pipes or cylinders is thus constituted a heater that radiates heat from the two surfaces. Instead of making these round they may be of any other form.

To prevent accidents from overheating of the water, and to keep it at its proper level, I have applied a ball cock and waste pipe to the reservoir.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

Figure 1 represents several cylinders as A, A, A, &c., standing on an air box B and connected with each other above and below by the pipes c, c, c, c, through which the water passes from one cylinder to the other. a, a, a, &c., are screw plugs to allow the air to escape when charging the cylinders with water. D is an opening in the box through which the cold air is supplied to be heated by the cylinders. Fig. 2 is an end view of Fig. 1. Fig. 3, is a ground plan of the same. Fig. 4, represents a longitudinal vertical section of the apparatus with the manner of operation, &c.

A, A, A, &c., are the outside cylinders; E, E, E, E, the inside cylinders.

F is the boiler by which the water is heated, which may be seen at n, n; when hot it passes up the pipe f into the cylinder, A, and between it and the cylinder E around which it circulates, and is forced to the top, and through the pipe c to the second cylinder, down this and through connecting pipe

to the third, and then to the fourth, or as many as may be used, from the last it is forced into the reservoir, G, which is filled a few inches above the pipe, from here the water escapes down the return pipe, g, through the air box into the lower side of the boiler, where it is again heated and performs the same revolution as we have just described.

G, is the reservoir filled with water to about 6 inches above the top of the hot water flow pipe, f.

b is a cold water supply pipe, d, d, a ball cock attached. When the water becomes heated to boiling temperature, it swells in the reservoir, rises up, and flows out through the waste pipe e then immediately falls below its former water line, and with it the ball and lever d which opens the cock in the supply pipe b and lets it in upon that already in the reservoir, filling it up to its former line, furnishing always an even head of water, and by reducing its temperature preventing the possible accumulation of steam.

In the ordinary manner of heating houses by water a single pipe is used filled with a solid column of water as at f by this method the cylinder can only radiate heat from the outside, besides the expense delay and trouble of heating such an immense body of water, as is needed to supply the requisite warmth. The superior advantages of the improvement I propose will readily be seen by referring to Fig. 4. D, is an opening in the air box by which the cold air is drawn from the street, it then passes through the openings h, h, h, h, up the inside of the cylinders, and escapes hot out of the top into the building. i, i, i, are openings on the outside of the cylinders by which the remainder of the air is heated that does not ascend the inside of the column, as may be seen by referring to the ground plan.

Accurate calculations have convinced me that three times the amount of heat, and nearly three times the radiating surface can be obtained with the same amount of water or area of pipe with my apparatus as with that now in operation.

Figs. 5 and 6 are the sections of a house with the boiler pipes, &c., showing the manner in which I intend to arrange them. Fig. 6 is the interior of a room with folding doors, and on each side of them, and in the corners of the room are cast iron columns as at H,

H, I, I. Smaller columns are fitted on the inside of these as L, L, p, p, between which there is a space of about $\frac{1}{2}$ to $\frac{3}{4}$ of an inch for the water to circulate. On this same floor
5 may be seen a bath which may be supplied with hot water, by turning the three way cock k and the smaller cock s attached to the pipe f.

To describe the full operation, let Fig. 5
10 represent the lower story or basement of a house, with the same arrangement of cylinders and pipes on a smaller scale as at Fig. 4. The water rises up the pipe f to the three way cock k', from there it passes under the
15 floor, and by the small bend m to the second columns L, H; between these it flows to the top, and then through the connecting pipe o, o, to the first column, down this and through the return pipe g, g, until it again
20 finds its way to the boiler. In the corners are smaller columns fitted up in the same manner as those we have described. The hot water flows into the column through a smaller branch of the pipe, f, then down and
25 out to the return pipe g. A space between the floors and around the pipes is inclosed from the opening K by which the air is supplied from the lower story or the street, and ascends through the column L, L, and out
30 of the top of the cornice P, P, which is pierced with small vents to allow the air to escape into the room as may be seen in the ground plan Fig. 7.

Suppose single columns and pipes had
35 been used, it may easily be seen what an immense quantity of water is needed to supply them, and how slow must be its circulation;

indeed I question if the single columns and pipes could be used at all with the arrangement I have just described.

I am aware that buildings have been heated by causing the water from a boiler to ascend and descend through pipes to be delivered to the bottom of the boiler, but in these plans the water has only been made to
45 ascend and then descend, and I am also aware that heated air has been carried through between two cylinders that heat might be radiated from the inner and outer surfaces, and therefore I do not claim these
50 as my invention, but

What I claim as my invention, and for which I desire to secure Letters Patent, is—

The plan of radiating heat by hot water which circulates from a boiler and back to it,
55 and in its circuit passes up and down two or more times through a series of heaters each consisting of two tubes one within the other, the water passing between the two that the outer and inner surfaces of the heaters may
60 radiate heat, and these being so combined as to receive the water from the boiler at one end of the series while the other end gives it out to the boiler and the series of heaters being so connected as to require the water to
65 ascend in one, descend the second, ascend in the third and so on through the series, by the connection of the two ends of the series with the boiler, substantially as described.

ANTHONY ELLIS HITCHINGS.

Witnesses:

CHARLES F. HITCHINGS,
I. W. BAILEY.