

(No Model.)

2 Sheets—Sheet 1.

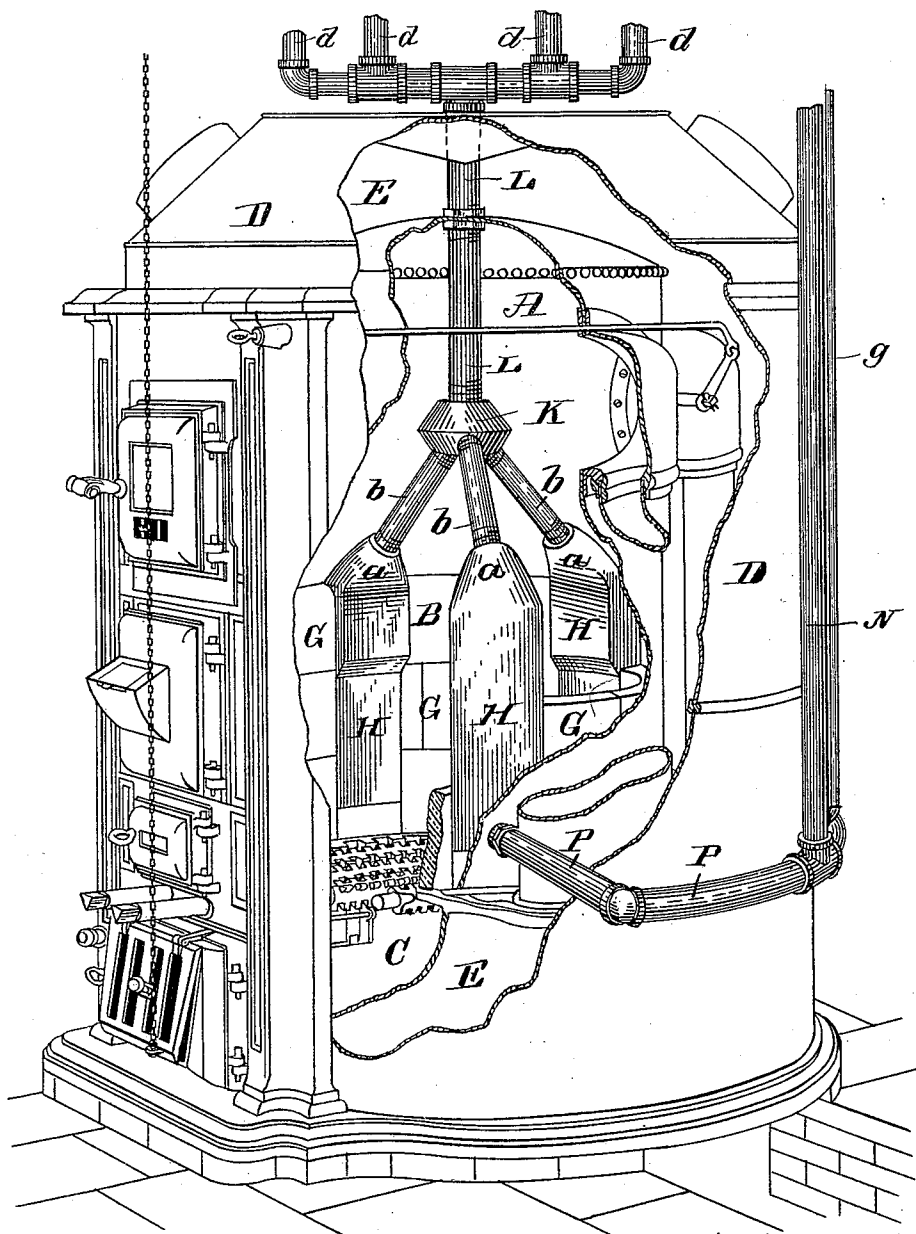
H. A. TINKHAM.

WATER HEATING ATTACHMENT FOR HOT AIR FURNACES.

No. 470,267.

Patented Mar. 8, 1892.

Fig. 1.



WITNESSES.

R. H. Marsh.
Henry W. Fiken.

INVENTOR.

Howard A. Tinkham
By W. E. Schenck
Att'y

(No Model.)

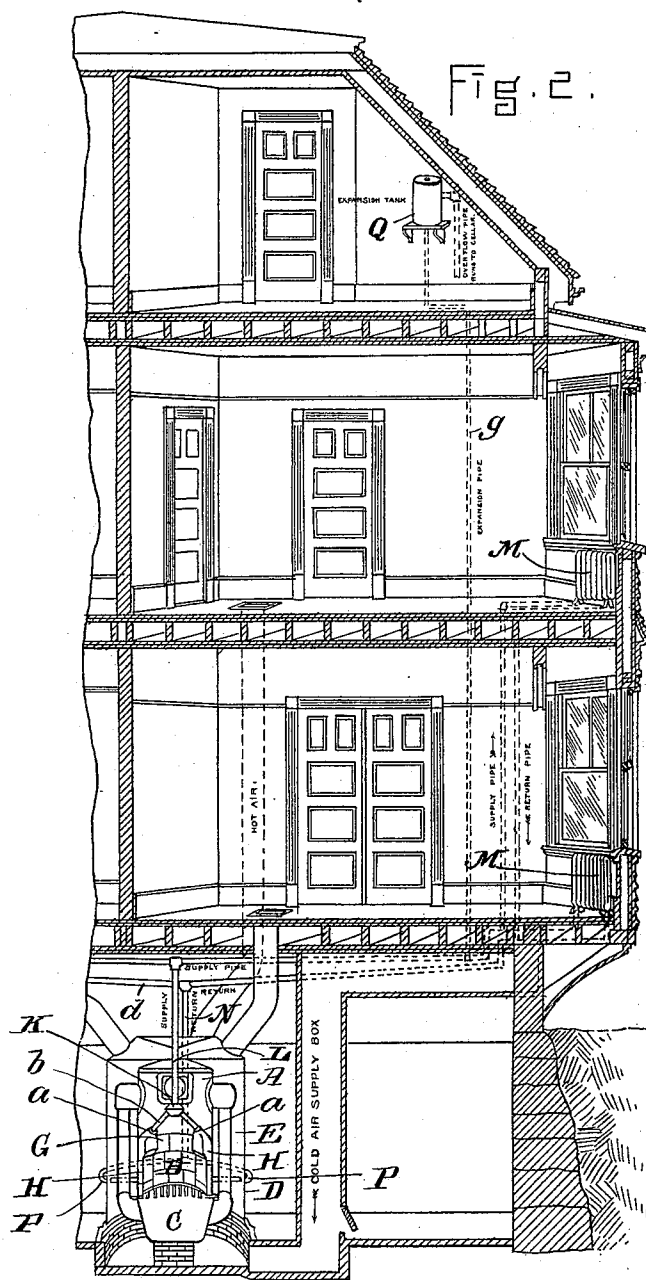
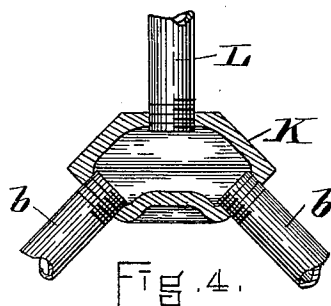
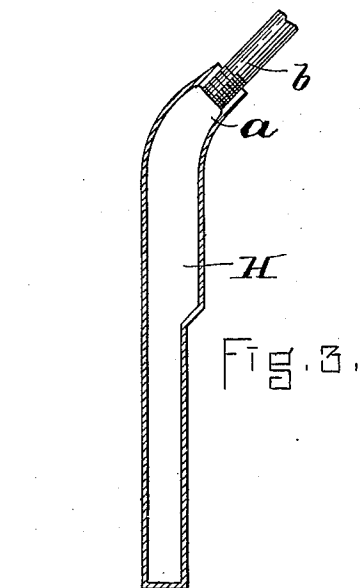
2 Sheets—Sheet 2.

H. A. TINKHAM.

WATER HEATING ATTACHMENT FOR HOT AIR FURNACES.

No. 470,267.

Patented Mar. 8, 1892.



WITNESSES.

R. Henry Marsh.
Harry H. Finken

INVENTOR.

Howard A. Tinkham
by J. E. Tschernach *Atty*

UNITED STATES PATENT OFFICE.

HOWARD A. TINKHAM, OF NORTON, MASSACHUSETTS.

WATER-HEATING ATTACHMENT FOR HOT-AIR FURNACES.

SPECIFICATION forming part of Letters Patent No. 470,267, dated March 8, 1892.

Application filed June 15, 1891. Serial No. 396,372. (No model.)

To all whom it may concern:

Be it known that I, HOWARD A. TINKHAM, a citizen of the United States, residing at Norton, in the county of Bristol and State of Massachusetts, have invented certain Improvements in Water-Heating Attachments for Hot-Air Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making
10 part of this specification, in which—

Figure 1 is a perspective view of a hot-air furnace having my improved water-heating attachment applied thereto, one side being broken away to show the interior construction. Fig. 2 is a view, on a reduced scale, illustrating a hot-air furnace provided with my improved water-heating attachment connected with hot-water radiators in an ordinary dwelling. Fig. 3 is a vertical section of
15 one of the hollow removable metallic sections which form a portion of the lining of the fire-pot. Fig. 4 is a sectional detail of the hollow disk or hub placed centrally within the combustion-chamber.

My invention relates to an improvement in water-heating attachments for hot-air furnaces; and it has for its object to render the circulation much more rapid, to greatly facilitate repairs, and to enable the area of water-heating surface within the fire-pot to be increased or diminished in accordance with the number of rooms or space which it may be desired to heat by hot-water circulation.

To this end my invention consists in a hot-air furnace provided with a fire-pot having a lining composed of fire-brick and hollow removable water-heating metallic sections alternating therewith, said metallic sections being arranged vertically within said
20 fire-pot without reducing its diameter, and being so constructed as to permit of their being readily removed or replaced through the feed-door of the furnace for repairs or other purposes, combined with a hollow disk or hub placed within the combustion-chamber over the center of the fire-pot and connected with said metallic water-heating sections by upwardly and inwardly inclined pipes, a vertical pipe extending from the said hollow disk or hub up through the dome and connected
25 by a suitable flow pipe or pipes with a radiator or radiators in a room or rooms above, a

return pipe or pipes connecting said radiator or radiators with said metallic water-heating sections, and a supply-tank located above the highest radiator and connected with the return pipe or pipes, as hereinafter fully set forth, and specifically pointed out in the
55 claims.

In the said drawings, A represents the dome or combustion-chamber of a hot-air furnace; B, the fire-pot; C, the ash-pit; D, the outer casing, and E the hot-air chamber, from the upper portion of which extend the ordinary hot-air pipes to the apartments to be
60 warmed, all being of ordinary and well-known construction, and forming no part of my present invention.

The fire-pot B is provided with a lining composed partially of fire-brick G and partially of hollow removable water-heating sections or receptacles H, formed of cast-iron or other suitable metal, and of such size as to permit them to be readily removed and replaced through the feed-door of the furnace, the water-heating sections and fire-brick alternating,
65 as shown. The hollow metallic sections H are of substantially the same width and thickness as the fire-bricks G, but are preferably made of greater length, being arranged vertically, as shown, and resting upon the lower layer of fire-bricks, which form a complete circle at the grate, the water-sections and fire-brick alternating above, as shown, making the circle complete without in any manner reducing the diameter of the fire-pot, which is of the same size at the top as at the grate, by which construction good combustion is insured and an even fire maintained indefinitely with the smallest possible amount of fuel.
70

Each of the water-sections H is provided at its upper end with an inwardly-curved or inclined neck *a*, cast integral therewith and interiorly screw-threaded, as seen in Fig. 3, for the reception of the lower threaded end of a pipe *b*. These pipes *b* are inclined inwardly and upwardly at an angle of forty-five degrees or thereabout, each one extending in a straight line to a hollow disk or hub K, placed centrally within the combustion-chamber or dome A, all of the water-sections being thus connected with the said hollow hub K, from the top of which rises a vertical pipe L, which passes with a gas-tight joint
75
80
85
90
95
100

through the top of the dome A, above which it is united with the flow or supply pipes *d*, leading to the radiators M in the apartments above, as shown in Fig. 2. The return-pipes from the radiators are all connected with a vertical return-pipe N, connected with a horizontal pipe P, which latter pipe is connected with each water-section H near its bottom. An expansion-tank Q, Fig. 2, placed in a convenient location above the highest radiator, supplies the water through the expansion-pipe *g* to the water-heating sections, said pipe *g* being connected with the return-pipe N, as seen in Fig. 1. The hollow hub K, which receives the water from the water-sections H, being placed directly over the fire, receives the full benefit of all the products of combustion, and its bottom is preferably made concave, as seen in Fig. 4, to retain the heat as long as possible in contact therewith. By thus providing the upper end of each water-section with a neck *a*, curved or inclined inwardly to correspond with the angle of the pipe *b*, which connects it with a hollow hub K, I am enabled to dispense with screw-couplings and elbows, thus simplifying the construction and reducing the liability of leakage.

By the employment of inclined pipes *b*, connecting the water-sections H with a central hollow hub or disk having a vertical pipe leading therefrom to the supply-pipes, as shown, many important advantages are gained, as it will be obvious that the circulation will be more rapid and subject to less friction than where the pipes from the water-sections rise vertically and are connected with a horizontal pipe above, which latter construction is objectionable, as the sudden change from a vertical to a horizontal direction retards and interferes with the free and rapid circulation of the water, whereas with my construction the movement of the water is in a generally-upward direction, in accordance with its natural movement when heated, the rapid circulation thus secured materially increasing the heating capabilities of the apparatus without corresponding increase in the amount of fuel consumed. Any desired number of these hollow metallic water-heating sections H may be employed in accordance with the number of rooms or space which it may be desired to heat by hot-water circulation, and if at any time it should be desired to dispense with the use of hot water as an auxiliary means of heating these metallic sections can, by reason of their size and shape, be easily removed through the feed-door of the furnace and be replaced by ordinary fire-bricks, which will readily fit into the places left vacant by the said hollow sections. This capability of removing and replacing the hollow sections through the feed-door will also be found to be of great advantage in making repairs in case of breakage or leakage, or for the purpose of cleansing, as the necessity of taking the furnace apart is thus avoided and a material saving in time and labor thereby

effected, and, furthermore, these hollow water-heating sections in no wise diminish the size or fuel-holding capacity of the fire-pot or in any way interfere with the proper working of the furnace so far as relates to its heating by means of hot air, the general construction of the furnace, with the exception of the water-heating device, being similar to that of any hot-air furnace having a fire-brick lining.

A furnace constructed as above described will readily heat by hot-water circulation distant rooms that cannot be easily reached by hot-air pipes, and it is obvious that a hot-water radiator may be used in connection with a hot-air register in case an apartment should be so large as to require an auxiliary heater, which will often be found a great convenience.

I am aware that furnaces have been provided with hollow metallic water-heating sections forming a portion of the lining of the fire-pot and having water-circulating pipes connected therewith, and therefore make no broad claim to such construction, my invention differing therefrom and being limited to the novel construction and combination of parts shown, whereby a more rapid, perfect, and economical circulation of the hot water through the radiator or radiators is effected than with the construction now in common use.

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

1. In a hot-air furnace, a fire-pot having a lining composed partly of fire-brick and partly of one or more hollow removable metallic water-heating sections H, arranged vertically within said fire-pot and of such size as to permit of their passage through the feed-door of the furnace, said sections H being provided at their upper ends with inwardly curved or inclined screw-threaded necks *a*, in combination with a hollow disk or hub K, placed with the combustion-chamber over the center of the fire-pot, the upwardly and inwardly inclined pipes *b*, extending directly from the said water-heating sections to said central disk or hub K, a vertical pipe L, extending from the hub K up through the dome, suitable flow and return pipes connected with said metallic water heating sections and with the supply or radiator or radiators, and a water-supply pipe connected with the supply-tank and with the return-pipe, all constructed and operating substantially as set forth.

2. In a hot-air furnace, a fire-pot composed of fire-brick and alternating hollow metallic water-heating sections H, adapted to be removed or replaced through the feed-door of the furnace, said sections H being provided at their upper ends with inwardly curved or inclined screw-threaded necks *a* and resting at their lower ends upon the fire-bricks, which form a complete circle at the grate, in combination with a hollow disk or hub K, arranged centrally within the combustion-chamber, the upwardly and inwardly inclined pipes *b*, connecting said water-heating sections H

with the hollow hub K, the vertical pipe L, extending from the hub K through the dome A and connected with the pipe or pipes leading to the radiator or radiators, the return-pipe connected with the radiator or radiators and with the water-heating sections, and the water-supply pipe *g*, leading from a supply-tank to the return-pipe, all constructed and arranged to operate substantially as set forth.

3. In a hot-air furnace, a hollow removable water-heating section H, forming a portion of the lining of the fire-pot, as described, said section being provided at its upper end with an inwardly curved or inclined neck *a*, screw-threaded for attachment to the end of an upwardly and inwardly inclined pipe *b*, extending from said neck *a* to the central hollow disk or hub K, substantially as set forth.

4. In a hot-air furnace, the combination of a hollow removable water-heating section H, forming a portion of the lining of the fire-pot, as described, and provided at its upper end with an inwardly curved or inclined neck *a*, made integral therewith and screw-threaded, the hollow disk or hub K, placed centrally within the combustion-chamber, and an inwardly and upwardly inclined pipe *b*, extending in a direct line from the neck *a* of said hollow water-heating section to the hollow hub K, substantially as set forth.

Witness my hand this 12th day of June, A. D. 1891.

HOWARD A. TINKHAM.

In presence of—

P. E. TESCHEMACHER,

HARRY W. AIKEN.