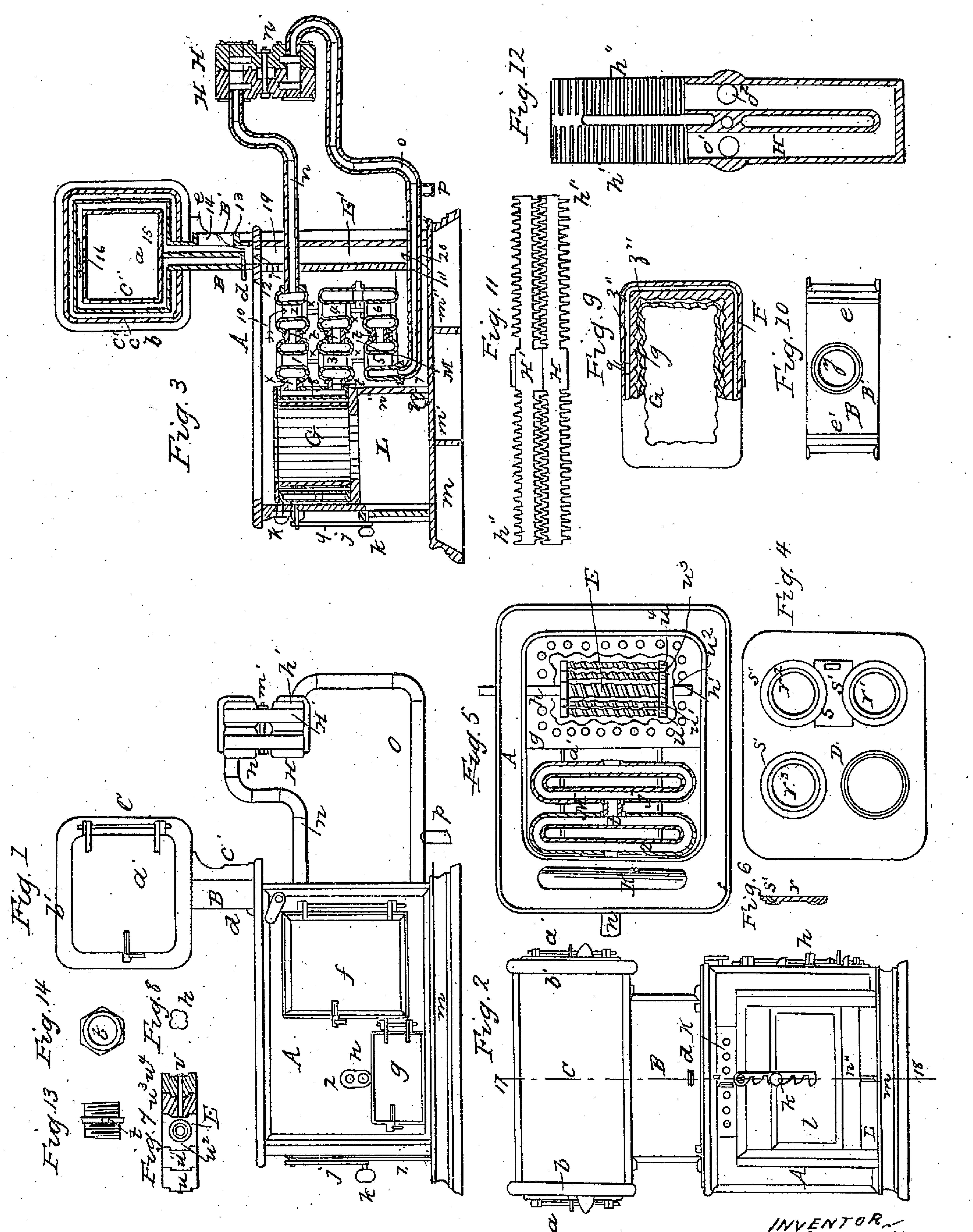
H. HOWARD.

Steam Heater.

No. 97,402. Patented Nov. 30, 1869.



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HENRY HOWARD, OF SPRINGFIELD, MASSACHUSETTS.

Letters Patent No. 97,402, *dated November* 30, 1869; *antedated November* 20, 1869.

COMBINED STOVE AND WATER-HEATER.

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, HENRY HOWARD, of Springfield, in the county of Hampden, and State of Massachusetts, have made and invented a new and useful Combined Stove and Hot-Water Heating-Apparatus; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a side elevation;

Figure 2, a front elevation;

Figure 3, a vertical section through lines 17 and 18;

Figure 4, the removable top of the stove;

Figure 5, a plan of the stove, the top, the oven, the fire-box, and the funnel being removed, and the heating-pipes 1 and 2 horizontally sectioned;

Figure 6, a vertical section through the centre of cover *r*, showing the groove *s'*;

Figure 7, an end elevation of the grate, showing its dovetail connections;

Figure 8, an elevation of the inner end of grate-spindle *h*;

Figure 9, a sectional plan of the boiler and removable fire-box;

Figure 10, an elevation of the rear of the funnel B, showing the pipe-connection B';

Figure 11, an edge elevation of two radiators stacked, showing the meshing of the ribs *h'' h''*;

Figure 12, a sectional side elevation of a single radiator;

Figure 13, a side elevation of one of the "right-and-left" connection-nipples; and

Figure 14, an end elevation of the same.

The object of my invention is to provide a combined cooking and heating-apparatus, adapted more especially to basement-built houses in cities, whereby, and from the same fire, the ordinary cooking may be done, and a constant supply of water heated, and caused to circulate through pipes and radiators, so as to warm the various compartments of the house, when necessary; while, by a slight change in the arrangement of the stove, nearly all heat may be diverted from the water-pipes, and utilized in cooking, without very materially raising the temperature of the kitchen.

The following explanation, in connection with the accompanying drawings, will enable those skilled in the art to practise my invention.

The part marked A represents the body of the stove, provided around the bottom with a stout rim, *m*, instead of legs, which rim is designed to rest on a hearth of brick, tile, or cement. Across the bottom of the stove run girders, *m' m''*, to strengthen the same, for the support of the superstructure.

l is the vertically-sliding front-door of the ash-box L, held at various points of elevation by the swinging ratchet *j* and pin *k*, which latter is attached to the door *l*.

K is the ordinary horizontally-sliding cold-air damper, by which the draught may be graduated.

D, fig. 4, is the removable top of the stove, so made to facilitate arranging and repairing the inner parts of the stove.

r r^1 *r*^{2} *r*^{3} are the circle-covers, formed as usual, except that I continue the groove *s'* quite around the circle, instead of confining it to one spot, that the "lifter" may be inserted in the groove at any point, and the cover always readily removed.

S is that part to be removed, in connection with covers *r*^{1} and *r*^{2}, when a "wash-boiler" is to be applied.

B is the funnel, whereon rests the "elevated" oven C.

b b' are the door-frames or ends of the oven, to which *a a'* are the ordinary doors.

B' is the circular lip, whereby the smoke or stove-pipe is connected.

c c' are rests or braces for the better support of the oven C.

g is a small side-door, communicating with the ash-box L.

f is a larger side-door, communicating with the heating-chamber M.

n'' is a partition separating the ash-box L from the heating-chamber M.

Below partition *n''* there is a narrow aperture, 7, through which are cleaned out the ashes and debris that gradually collect at the bottom of chamber M.

q is a narrow slide or trap closing aperture 7.

I constitutes the grate-frame and bottom of the fire-box, and is pierced by holes, and arranged as in figs. 3 and 5.

E is the grate, made up of separate bars, *u u*^{1}, &c., which bars are corrugated by a spiral groove, as in fig. 5, while at opposite ends they are connected by an ordinary dovetail, and thus secured by passing a pin, *v*, horizontally through the series, as in fig. 7, to prevent relative displacement, which construction and arrangement give strength and openness to the grate, and at the same time allow each of the several bars to expand and contract without injury or reference to the others.

h h' are the grate-spindles, of which *h'* is but a continuation of the central grate-bar *u*^{2}, while the inner end of *h* is formed as in fig. 8, to prevent its rolling in the grate, where it is held by the forked piece *i*, in combination with a groove around such spindle.

F represents the boiler, and in winter constitutes the fire-box. I make it of an oblong form, corrugated inside, and open at top and bottom, figs. 3 and 9. The four walls of boiler F are hollow, and form a complete and continuous shell, open only at the two points where connected with heating-pipes 1 and 3.

I make the inner and outer plates *z' z''*, of boiler F, about two inches apart, midway from top to bottom. I provide a horizontal partition, 8, dividing the boiler into two compartments, connected only by the narrow opening 9 near the centre of the front side, so that water introduced into the boiler from either of the rear openings must circulate quite around the fire to the front, pass through opening 9, in partition 8, and again circulate around the fire, to find its way out of the other rear opening.

G is a removable fire-box, corrugated, and provided at the top with a thin rim, and placed in summer inside of F, to shield it from heat.

e' is a partition near the rear of the stove, provided at top and bottom with horizontal apertures, 19 and 20. Aperture 19 is closed by an ordinary vibrating damper, *e*, and when so closed, heat from the fire-box is forced in the directions indicated by arrows 10 and 11.

When damper *e* is tilted against the back of the stove, as shown by the dotted outline in fig. 3, heat from the fire-box takes the direction indicated by arrow 12, without materially affecting chamber M, or the pipes therein.

The oven C is made up of three cases, C C' C''. The space of about one inch between the outside and middle cases C C', I fill with a paste of plaster of Paris and water, by pouring the same, mixed as thickly as will readily run, between such cases, and allowing it to harden there, and the plaster being a non-conductor of heat, the temperature of the oven may be easily raised without materially affecting that of the kitchen. The space of about two inches between the middle case and oven proper, C' C'', constitutes the flue around the same.

y' is a vertical partition through funnel B, and *d* is a sliding damper at the bottom of the same, which damper, when arranged as in fig. 3, allows the heat to escape in the direction indicated by arrow 13, but when such damper is pushed back against the rear of funnel B, then the heat is compelled to traverse the direction indicated by arrows 15, 16, and 14.

The parts marked 1, 2, 3, 4, 5, and 6, figs. 3 and 5, are pipes, in which, after leaving boiler F, the water is heated while on its passage to and from the radiators H H', each of which pipes performs a circuit, and is connected at opposite sides by a "right-and-left" connection-nipple, *t*, with other pipes, or with boiler F, and another pipe. The two lower pipes, 5 and 6, rest on bridges, *w w'*, and those above are held in position by pins or rests, *x x*, &c.

H H' are the radiators, whereon the ribs *h'' h''* are so arranged as to "break joints" on opposite faces, fig. 11, while on opposite sides of the same face they stand the thickness of a rib out of line, fig. 12; and I thus arrange ribs, *h'' h''*, for the purpose of retarding and more thoroughly heating the air that passes between such radiators, stacked as in fig. 11, and held together by a central bolt, *n'*.

I make the body of the radiators H H' hollow, as in fig. 12, thereby compelling the water to circulate around and through the same. Through each radiator are connection-apertures, o^1 o^2, around which apertures, on the respective faces of the radiators, are male and female seats, fitted to each other, as in fig. 3.

The practical operation of my invention is as follows:

I connect any convenient number of radiators, properly stacked and arranged, to the heating-pipes 2 and 5, by means of ordinary pipes, *n* and *o*, taking care that the bottom of the radiators be at least as high as the top of boiler F, and that pipes, *n* and *o*, enter such radiators from opposite sides, and at the top and bottom respectively, as in fig. 3. Each radiator having four apertures, it will be necessary to close one of such apertures in each of the outside radiators.

And further, I connect pipe *o* to an aqueduct leading from an ordinary reservoir of water outside of the house, or to a reservoir of water in the upper part of the house, by means of pipe P, and let water flow in freely, filling pipes, boiler, and radiators, which are thus kept full only by pressure from the fountain-head; for, mere water filling the apparatus thus confined, heat and expansion would burst the pipes or connections.

The apparatus being properly supplied with water, if a fire be started in boiler F, and damper *e* arranged as in fig. 3, the water is heated first in the boiler, and then in pipes 1, 2, &c., but immediately the water is heated it naturally begins to rise, and passes out of the boiler F, circulates around and through pipes 1 and 2, thence through pipe *n* into the radiators H H'. Becoming cool, it sinks back through pipe *o*, and into pipe 5, where, warming, it passes through pipes 5 and 6, 4 and 3, and thus back into the lower compartment of the boiler; but partition 8 compels the water to flow quite around to the front before it can rise through the opening 9, when it again flows back and re-enters pipe 1, and thus continues to circulate.

In summer, when heat is to be avoided as much as possible, I place the box or lining G inside the boiler F, and tilt the damper *e* back, by which arrangement the water in the boiler and pipes is but little heated, while the non-conducting casing of the oven prevents superfluous heat to a great extent.

I consider a principal feature of my invention, the combination of a removable fire-box lining, G, with a fire-box boiler, F.

For cooking-purposes the operation of my stove is the same as other stoves. The hollow parts herein described, I cast on cores. The other parts are cast and connected in the ordinary manner.

Having thus described the construction and operation of my combined stove and heating-apparatus,

What I claim therein as new, and desired to secure by Letters Patent, is—

1. The boiler F, constructed with partition 8 and aperture 9, substantially as herein described.

2. The dumping-grate E, composed of a series of separate bars *u u*, &c., connected laterally by a dove-tail device, and secured at one end by a rod, V, as herein specified.

3. The stove-cover *r*, provided with a continuous groove *s'*, as herein specified.

4. The removable fire-box or lining G, made of any suitable material, in combination with the boiler F, substantially as herein specified.

5. The radiator H, provided with two connection-apertures o^1 o^2, and connecting-bolt *n'*, arranged, with reference to pipes *n* and *o*, as herein specified.

6. The series of heating-pipes 1, 2, &c., when constructed and arranged, with reference to pipes *n* and *o*, and to the boiler F, as herein specified.

7. The central partition *y'*, in combination with the funnel B, horizontally-sliding damper *d*, oven and casings C C' C'', as herein specified.

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Witnesses:

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