(No Model.) 2 Sheets—Sheet 1.

C. S. HOOD.

RADIATOR FOR HOT AIR FURNACES AND STOVES.

No. 302,489. Patented July 22, 1884.

Fig. 1.

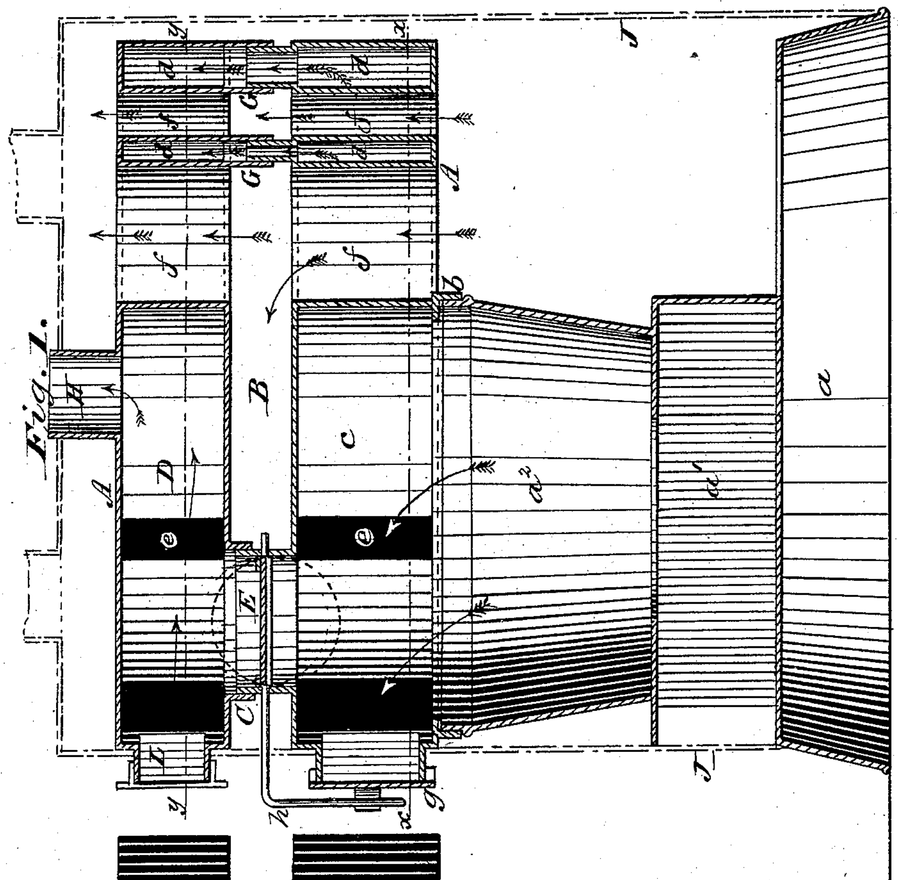


Fig. 5.

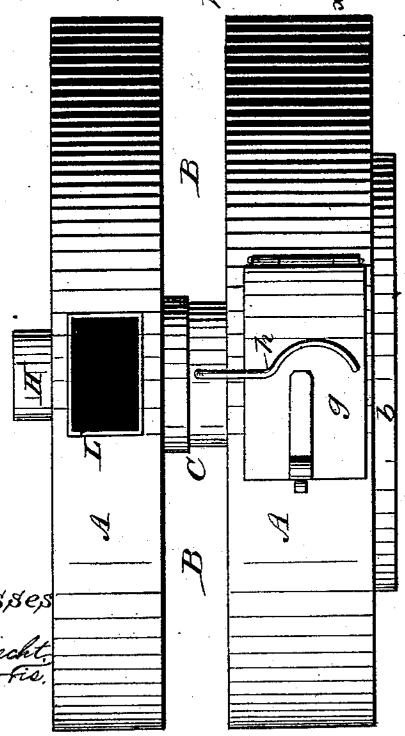
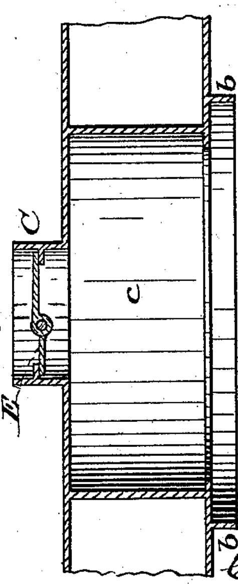


Fig. 4.



Witnesses

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Inventor:

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Att'ys.

(No Model.) 2 Sheets—Sheet 2.

C. S. HOOD.

RADIATOR FOR HOT AIR FURNACES AND STOVES.

No. 302,489. Patented July 22, 1884.

Fig. 2.

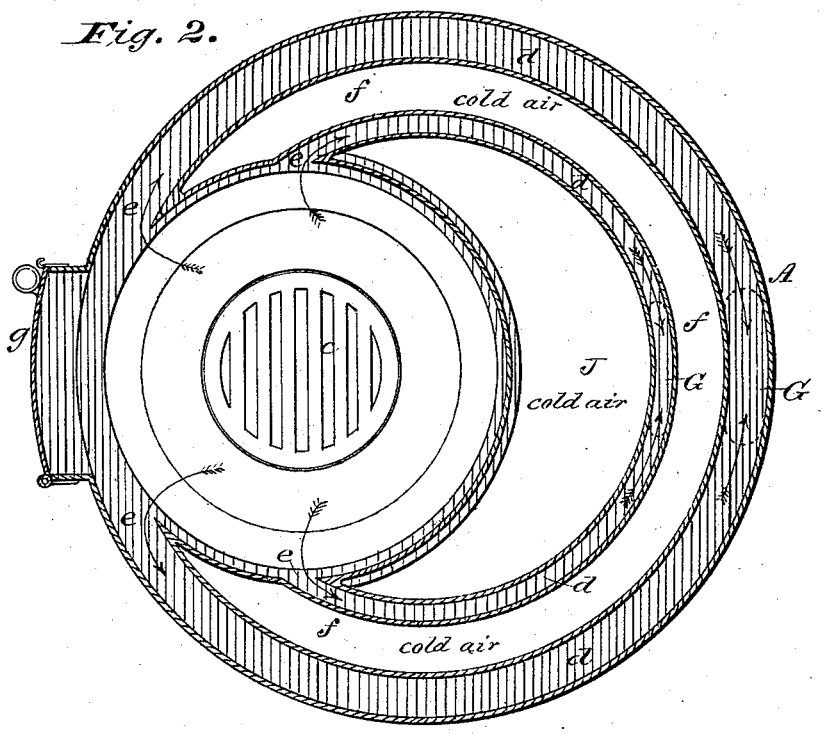
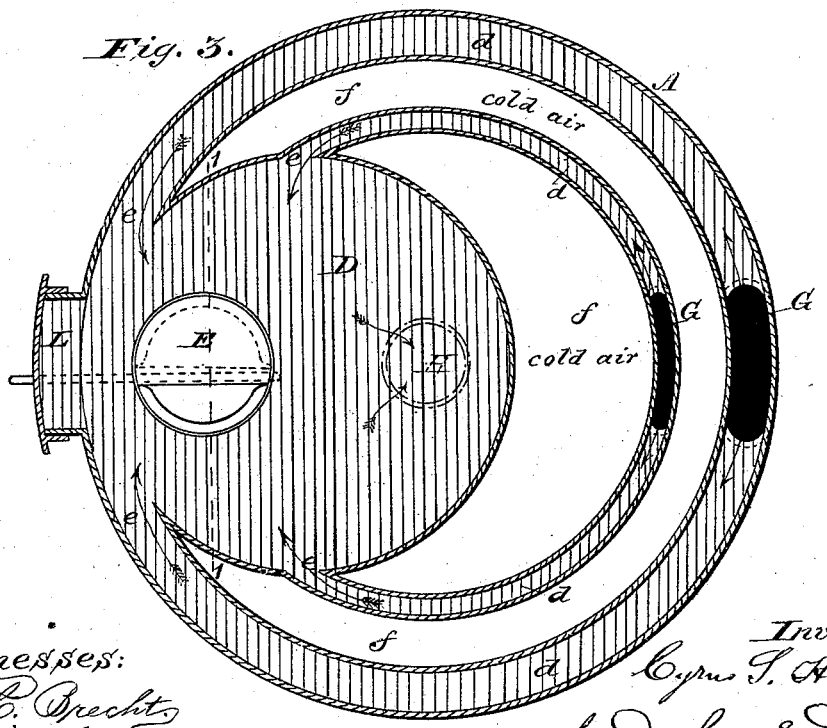


Fig. 3.



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UNITED STATES PATENT OFFICE.

CYRUS S. HOOD, OF CORNING, NEW YORK.

RADIATOR FOR HOT-AIR FURNACES AND STOVES.

SPECIFICATION forming part of Letters Patent No. 302,489, dated July 22, 1884.

Application filed January 28, 1884. (No model.)

To all whom it may concern:

Be it known that I, CYRUS S. HOOD, a citizen of the United States, residing at Corning, in the county of Steuben and State of New York, have invented new and useful Improvements in Radiators for Hot-Air Furnaces and Stoves, of which the following is a specification.

My invention relates to hot-air furnaces and heating-drums in which concentric fire-flues receive and discharge the products of combustion and give out their heat in intervening open spaces for heating air passing through said spaces in contact with the walls of said fire-flues.

My invention comprehends a ring radiator or heating-drum having crescent-shaped fire-flues, crescent-shaped intervening air-heating spaces, and a chamber having an eccentric relation to said fire-flues and a concentric relation to the fire-pot, into which chamber the crescent fire-flues open at their points or horns at the opposite sides of said chamber, whereby the products of combustion have a free passage from the fire-pot into the crescent flues. The air has a free passage through the open crescent-shaped spaces, and the heat is concentrated upon the air with much better effect than if the fire-flues were arranged concentric with the fire-pot and communicated with the combustion-chamber at one point only. The feed-door opens into the radiator-chamber at a point centrally between the horns of the crescent-shaped fire-flues, and gives the advantage of an easy feed of the coal, better access to the fire, and renders it much easier for cleaning the grate and for removing the ashes when the radiator is combined with an inclosing-case standing close to the fire-pot. The radiator is preferably composed of two or more separate and distinct radiators, of ring form, placed one above the other, each having a smoke-chamber having a concentric relation to the fire-pot, and crescent-shaped fire-flues having an eccentric relation to the smoke-chamber, with which the horns of said crescent flues communicate. The said ring-radiators are separated from each other by an open horizontal air-space intersecting the vertical air-spaces between the crescent fire-flues, which latter communicate with each other at the full of the crescent to give an indirect draft. The smoke-chambers have a valved communication to give a direct draft, so that the air is heated in the horizontal space between the ring-radiators, in the spaces between the crescent fire-flues, and by the entire outside surfaces of the ring-radiators, giving the greatest possible amount of heat-radiating surface in a small compass.

My invention consists in arranging such a ring-radiator of separate sections in eccentric relation to the fire-pot, so that the chamber of the lower radiator or section will receive the products of combustion and communicate through the crescent fire-flues with the upper crescent fire-flues and the smoke-chamber of the upper radiator or section.

My invention also embraces matters of construction and of combination which will be specifically pointed out in the claims. The ring-radiator is preferably set directly upon the fire-pot, thus dispensing with the usual dome; and the construction of the radiator is preferably such that the products of combustion pass through the crescent flues from the front to the rear and back again to the front; but the ring-radiator may be arranged upon the dome, so long as it has concentric smoke-chambers and crescent-shaped fire-flues having their horns opening into the said smoke-chambers.

Referring to the accompanying drawings, Figure 1 represents a vertical section of a hot-air furnace embracing my invention; Fig. 2, a horizontal section of the same on the line *x x* of Fig. 1; Fig. 3, a similar section on the line *y y* of Fig. 1; Fig. 4, a vertical section on the line 1 1 of Fig. 3, and Fig. 5 a front elevation of the ring-radiators.

The base *a*, ash-pit *a'*, and fire-pot a^2 may be of any suitable form and construction. As shown, the radiator A is arranged directly upon the fire-pot, being provided with a collar, *b*, which fits the fire-pot tightly, and may be secured thereto in any suitable manner. The collar *b* forms the base of a rising smoke-chamber, *c*, with which are combined crescent-shaped fire-flues *d*, extending from the opposite sides back of the said chamber, the horns or points *e* of the crescent flues *d* opening into the smoke-chamber, and together with it form a ring-radiator, the smoke-chamber *c* whereof is concentric with the fire-pot, while the cres-

cent flues form the intervening air-spaces, *f*, and have an eccentric relation to the rising smoke-chamber. The inner crescent fire-flue opens into the sides of the smoke-chamber at points about diametrical thereof, while the outer crescent fire-flue forms the lower ring-radiator, has the front feed-door, *g*, and opens into said smoke-chamber in front of the openings of the inner crescent fire-flue. The feed-door casing projects from the outer ring-radiator, and extends through an opening in the inclosing-case J, so that the feed-opening is directly at the wall of the fire-pot. A similar ring-radiator, A, is arranged above and separated from the lower one by a horizontal air-space, B, the two being connected at the front by a short vertical pipe, C, which opens into the lower rising smoke-chamber, *c*, and into the top exit smoke-chamber, D, and thus provides for a direct draft from the fire-pot by means of a damper, E, placed in said pipe. The crescent-shaped fire-flues are connected at their full or rear sides, preferably by short flat pipes G, and thus give the indirect draft from the fire-pot, through the lower into the upper crescent fire-flues, into the upper smoke-chamber, D, with which the smoke-pipe connects at the top at H. The separate and distinct ring-radiators, each having a circular smoke-chamber, and each having eccentrically-arranged therewith narrow fire-flues standing in vertical lines, form the intervening vertical air-flues and the intervening horizontal air-space intersecting said vertical air-spaces, thus allowing a free circulation of the air to be heated between and in contact with the vertical walls of the fire-flues and in the space B between the radiators.

The damper E is mounted upon a pivot placed to one side of its center, so as to allow it to be opened by the pressure of the gas in the combustion-chamber when such pressure becomes great enough, and thus relieve the furnace, the damper closing automatically after the pressure is relieved. The handle *h* of the damper is curved, and has such relation to the feed-door *g* that in opening the latter it will bear upon the handle and also upon the damper by turning or raising its curved handle *h*, and thus allow for the direct escape of the gas from the combustion-chamber when feeding coal. This feature of an automatically opening and closing damper is described and claimed in an application for a patent filed by me September 25, 1883, Serial No. 107,346, and is not, therefore, claimed herein, except in connection with the separate and distinct ring-radiators herein described, having separate smoke-chambers and communicating crescent-shaped fire-flues.

My improved radiator or heating-drum may be used directly upon the top of a stove having its upper end open and fitting the chamber of the eccentric fire-flues, for warming the apartment within which it may be placed. When used with an air-heating furnace, it is inclosed by a case, J, having suitable provision for the inlet of the air to be heated, and suitable pipes for conducting the hot air to the apartments to be warmed. The heat and products of combustion enter the horns of the lower crescent fire-flues at the opposite sides of the rising chamber, and travel around in the crescents, meet at the rear or full thereof, and rise through the short tubes G and travel around the upper crescents to the front into the top exit-chamber, D, as shown by the arrows. Any desired number of ring-radiators may be used so long as they are connected and arranged in the relation described to each other and to the fire-pot. The top exit smoke-chamber, D, has an opening, L, at the front, the casing of which extends through the inclosing-case, and is covered by a removable cap for cleaning out said chamber. When a single radiator is used, it should be divided into flues by a horizontal partition, the heat then traveling back, and returns to the front above said partition and the damper.

I have described the fire-flues and the intervening air-spaces as being of crescent form, and they may be so made; but the fire-flues are shown as segments of circles joining the opposite sides of the smoke-chamber.

I claim—

1. A ring heating-drum or radiator having crescent-shaped fire-flues, intervening air-spaces, and a smoke-chamber placed eccentrically in relation to said flues, and communicating on opposite sides with the horns of the crescents, said chamber having a concentric relation to the fire-pot and receiving the products of combustion therefrom.

2. A ring heating-drum or radiator having crescent-shaped fire-flues, intervening air-spaces, and a smoke-chamber communicating with the horns of the crescents on its opposite sides, and having the feed-door arranged between the horns of the outer crescent flue in the outer ring-wall of said chamber.

3. A ring heating-drum or radiator having a rising smoke-chamber, two or more crescent-shaped fire-flues having eccentric relation to the smoke-chamber, communicating therewith at their horns, and forming intervening air-flues, said chamber having a feed-door arranged between the horns, a valved top opening and receiving the products of combustion.

4. A heating-drum or radiator composed of two or more superimposed separate and distinct ring-sections, each having a smoke-chamber, two or more crescent-shaped fire-flues communicating with said chamber at their horns, the said chambers communicating by a valved pipe, the said fire-flues communicating at their rear, and vertical air-flues intersected by an air-flue separating the said ring-sections.

5. The combination of the fire-pot and the inclosing-case of a hot-air furnace with a ring-radiator having a chamber concentric with the fire-pot, and two or more crescent-shaped fire-flues having eccentric relation to said chamber, and one or more similar superim-

posed ring-radiators, the chambers and fire-flues communicating substantially as described.

6. The combination, with a fire-pot, of a radiator or heating-drum having a rising and an exit chamber concentric therewith, crescent-shaped fire-flues communicating with said chambers and with each other, having eccentric relation to said chambers, the said fire-flues forming crescent-shaped air-flues, intersecting with a horizontal air-space dividing the radiator into separate horizontal communicating ring-sections.

7. A heating-drum or radiator having superimposed horizontal ring-sections, each having a smoke-chamber, and crescent-shaped fire-flues communicating at their horns with said chambers and with each other, the said chambers having a valved communication, as herein set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CYRUS S. HOOD.

Witnesses:
EMIL R. STASCH,
ED. HOOD.