

(No Model.)

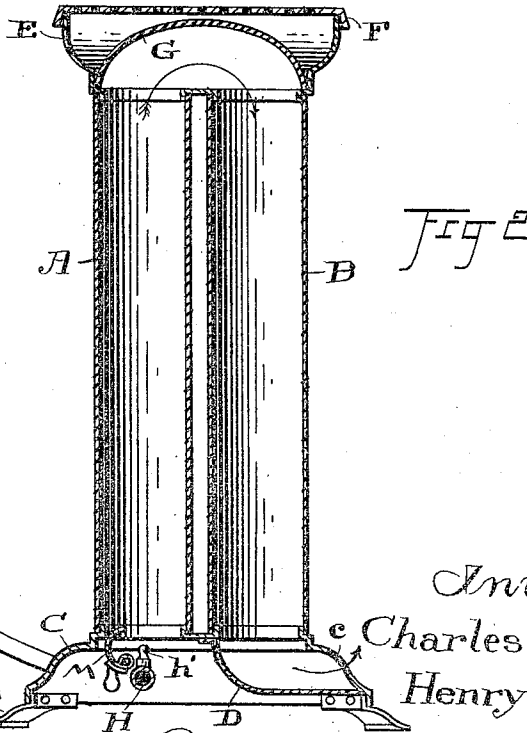
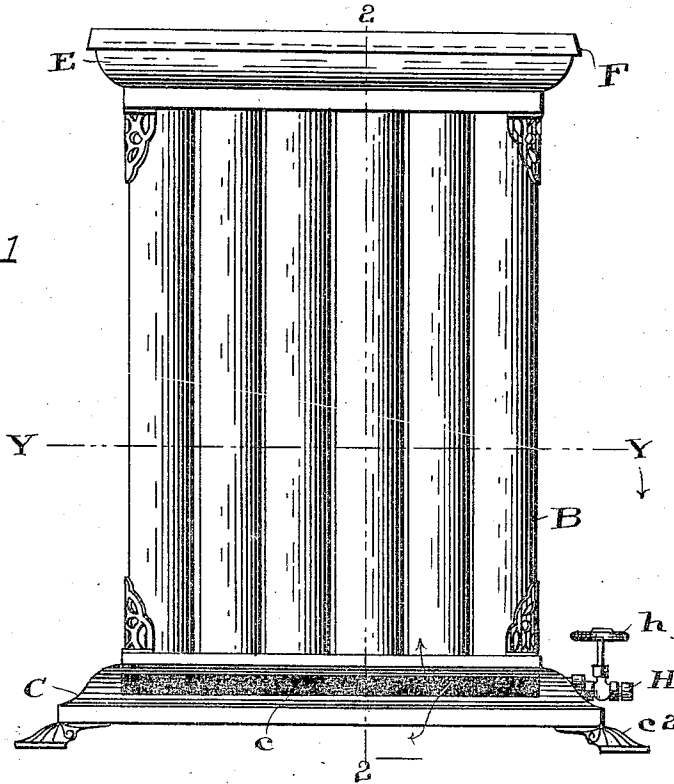
2 Sheets—Sheet 1.

C. I. DANGLER & H. RUPPEL.
HEAT RADIATOR.

No. 521,139.

Patented June 5, 1894.

Fig 1



Attest

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Charles I. Dangler

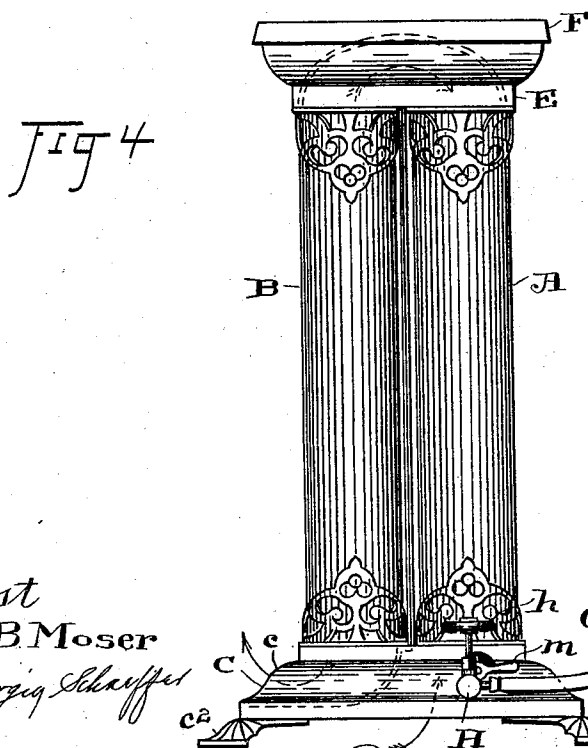
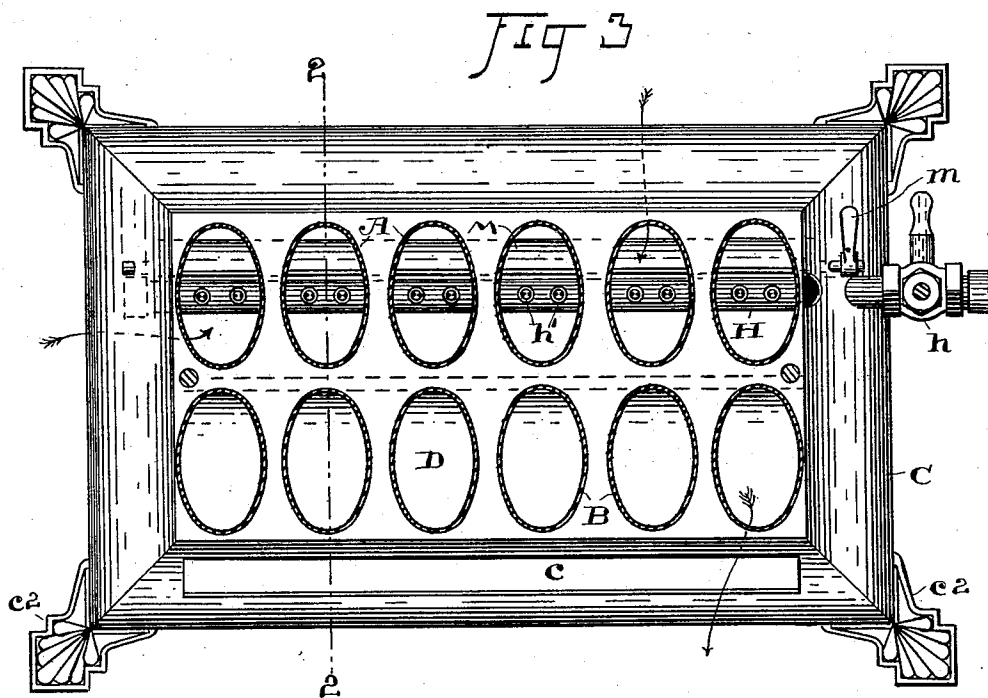
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UNITED STATES PATENT OFFICE.

CHARLES I. DANGLER AND HENRY RUPPEL, OF CLEVELAND, OHIO.

HEAT-RADIATOR.

SPECIFICATION forming part of Letters Patent No. 521,139, dated June 5, 1894.

Application filed April 6, 1893. Serial No. 469,241. (No model.)

To all whom it may concern:

Be it known that we, CHARLES I. DANGLER and HENRY RUPPEL, citizens of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Heat-Radiators; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to heat radiators, and the object of the invention is to produce a radiator which has a greatly enlarged radiating surface and both its inlet and its discharge openings located at the base thereof, all substantially as shown and described and particularly pointed out in the claim. In radiators of this general character, in which gas is used for heating, it has been the invariable practice, so far as we are aware, to provide the discharge openings or outlets about the top, but we have discovered that for perfect radiation and distribution of the heat it is much more desirable to have the heat travel on a long circuit in the radiator, after the manner substantially as herein shown and described, and then to discharge what remains at or about the base of the radiator directly into the surrounding atmosphere or apartment to be heated. It of course will follow that the greater proportion of heat will pass off through radiation, but it also occurs that a very decided current of hot air is established, especially after the radiator becomes well heated, which discharges through the outlets at the base. This not only provides for the delivery of heat about the floor of the room where the colder atmosphere always is found, but it makes a very excellent arrangement for warming the feet.

In the accompanying drawings, Figure 1 is a side elevation of a radiator fashioned according to our invention, and Fig. 2 is a cross section thereof on a line corresponding to 2, 2, Fig. 1. Fig. 3 is a cross section of the radiator on line y, y , Fig. 1, to disclose the relation of the circulating tubes or pipes to each other, and the position of the gas supply pipe therein at the base of the radiator. Fig. 4 is an end elevation of the radiator looking in from the right of Fig. 3.

The radiator herein shown and described is provided with two series of tubes A and B, respectively, shown here as oval in cross section, though they may have any other suitable shape or form, and arranged in parallel series. In this instance the radiator is provided with six tubes of each kind but it may have one or more tubes in each series, according as a larger or smaller radiator is desired. These tubes are arranged with suitable space between them so that each shall be free to radiate heat which will pass off into the room, and they are set upon a suitable base C which may be made as ornamental as taste or fashion may require. This base is further constructed with special reference to the novel character of this radiator, being open at its bottom to the outside air along beneath the series of burner or induction tubes A, so as to supply an abundance of air for combustion, and to establish the necessary circulation of air in the radiator, and on the other side the said base is closed beneath the tubes B by the curved plate, or its equivalent, D, so as to form a continuous channel through said tubes B, and beneath the same to discharge at the side of said base through the outlet passages or openings c at the front of the radiator. This plate or wall D may be a separate part or a part of the base C, and is continuous from end to end of the said base so as to come beneath all of the down tubes B and deflect the air outward through the holes c . The base is supported above the floor by feet c^2 at the corners and this also enables air to pass freely into the space beneath the radiator.

E represents the top or cap of the radiator, constructed with a diaphragm having openings or flanged seats for the tubes A and B similarly to those of the base, or in an equivalent way, and having an open-work and preferably ornamental covering plate F surmounting the said top. A chamber is thus formed within the said top in which we place a transversely curved plate G, which rests at its edges upon the shoulders e at the base of the cap E, and is bent or curved sufficiently to carry its center so far above the upper ends of the tubes A and B as to form a free circulation from one set of tubes to the other. This bowed plate G extends the full length of the

radiator and makes the space beneath the same a common space for air from all the tubes A to the tubes B.

Gas is supplied to the radiator by means of the pipe H, having a suitable valve *h* to control the supply, and one or more jets *h'* at intervals on said pipe located beneath the center of the tubes A. It will be seen that these jets are so arranged as to come at about a level with the entrance of the tube A at the bottom, where they are supplied with an abundance of air to produce perfect combustion. Air circulation or movement is of course immediately established in the pipes A and B when the gas is turned on and the jets *h'* are lighted, and the draft is up through the tube A, across the top of the radiator beneath plate G, and thence into the tubes B and down and out at the base of the radiator. By this construction and arrangement of parts a complete circuit of the radiator up and down its entire depth is made by the air, and heat is not only given off by radiation over the entire distance thus traveled, but the heat that is not thus radiated passes out in a steady volume through the openings *c* at the base.

Separate elbows might be used at top and bottom for connecting tubes A and B instead of the return sheet metal plates D and G, but the present construction is more simple and equally serviceable.

To start the burner we have a novel arrangement which enables us to light all the jets simultaneously from the outside of the radiator as soon as the gas is turned on. This arrangement consists in the transversely curved plate M, seen in cross section Fig. 2, having pivots at its ends and lower edge and adapted to be turned up over the jets *h'* in such position and relation that the said plate forms a hood, resembling an inverted trough, to confine the gas. The gas will then run along between the jets, and a light applied at one end of the

hood will instantly flash across to the other end and light all the jets at once. Then the hood is allowed to drop back to uncovering position, as seen in Fig. 2, and the gravity handle *m* facilitates and insures this movement. A suitable stop prevents the hood from coming down upon the jets *h'*.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

As a new article of manufacture, the within described air heater and radiator, consisting of a base having two parallel series of openings through its bottom and a passage through the front of the base for the escape of heated air, in combination with combined induction and combustion tubes in the rear series of openings and eduction tubes in the front series of openings, the tubes in both series being of substantially equal cross-section, and all the tubes exposed to the outside atmosphere to radiate the heat into the room, gas burners at the lower ends of the induction and combustion tubes, a curved deflector beneath the eduction tubes to direct the heated air through the said outlet passage in the base, and a cap over both series of tubes and constructed with a continuous chamber common to all the tubes and formed by a diaphragm having openings for both sets of tubes, and a dome convex in cross-section and closed against the escape of air, whereby the air ascending and heated in one set of tubes is caused to cross in said chamber and descend in the other set of tubes and is discharged at the floor, substantially as set forth.

Witness our hands to the foregoing specification this 27th day of March, 1893.

CHARLES I. DANGLER.
HENRY RUPPEL.

Witnesses:

H. T. FISHER,
GEORGIA SCHAEFFER.