

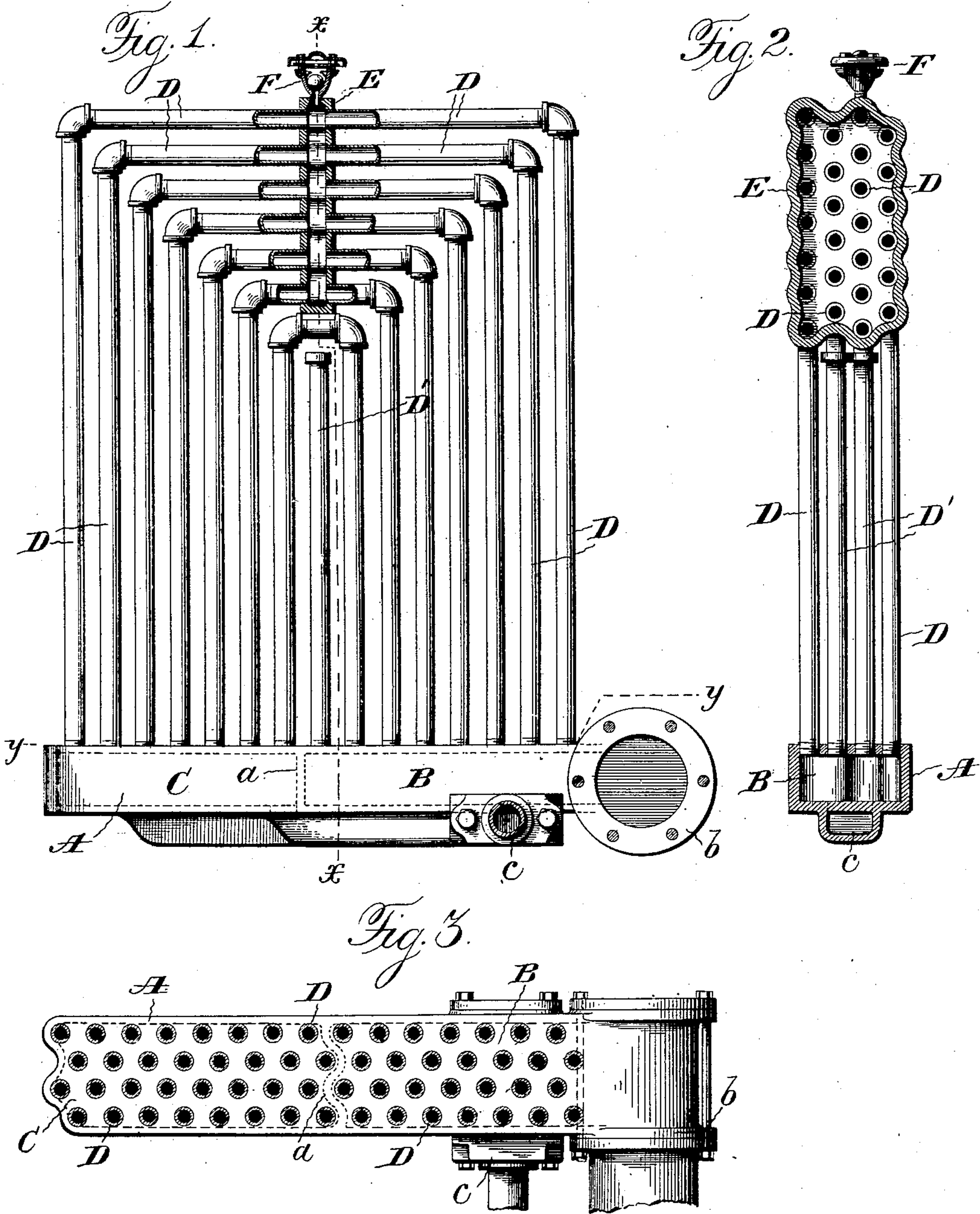
No. 710,994.

Patented Oct. 14, 1902.

C. H. PALMER & C. A. CARLSON.  
HEATER SECTION OR RADIATOR.

(Application filed Jan. 11, 1899.)

(No Model.)



Witnesses:  
Jas. E. Hutchinson.  
Henry C. Hazard.

Inventors:  
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Prindle and Russell, their Attys.



# UNITED STATES PATENT OFFICE.

CHARLES H. PALMER AND CARL A. CARLSON, OF BARBERTON, OHIO, ASSIGNORS TO THE DIAMOND MATCH COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

## HEATER-SECTION OR RADIATOR.

SPECIFICATION forming part of Letters Patent No. 710,994, dated October 14, 1902.

Application filed January 11, 1899. Serial No. 701,857. (No model.)

*To all whom it may concern:*

Be it known that we, CHARLES H. PALMER and CARL A. CARLSON, of Barberton, in the county of Summit, and in the State of Ohio, have jointly invented certain new and useful Improvements in Heater-Sections or Radiators; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a view, partly in side elevation and partly in section, of a steam-radiator embodying our invention. Fig. 2 is a vertical section on the line  $x x$  of Fig. 1, and Fig. 3 is a horizontal section on the line  $y y$  of Fig. 1.

Letters of like name and kind refer to like parts in each of the figures.

The object of our invention is to insure the complete expulsion of air from heater-sections or radiators when the heating medium is introduced therein; and to this end said invention consists in a heater-section or radiator having the construction substantially as hereinafter specified.

In the accompanying drawings we illustrate our invention as adapted to a steam-radiator. Said radiator has a hollow or chambered base A, divided into two compartments B and C by a transverse partition  $a$ , the chamber B being the one to which the steam is delivered and provided with a flanged inlet  $b$  for connection with a supply-pipe, and the chamber C being the outlet for steam and water of condensation and provided with a flanged outlet  $c$  for connection with a discharge-pipe.

Attached to the upper side of the base A are several ranks or series of pipes D and D, each of which comprises two vertical members that are connected at their lower ends with the respective chambers B and C and a horizontal member that connects said vertical members at their upper ends. There may thus through each pipe be a circulation from the chamber B to the chamber C. The like pipe members of each rank or series lie parallel with each other, and hence from the outermost pipe inward the vertical and horizontal members become gradually shorter. To effect the discharge or expulsion of air from every pipe D upon the admission of steam to the radiator, we provide a chamber with which every one of the pipes D are in communication, into which the air will pass and from

which it may be discharged. Preferably an automatically-operating air-relieving valve is applied to the chamber to cause the automatic discharge of air therefrom. As shown in the drawings, the horizontal members of the pipes D and D are each connected at or near their longitudinal centers to the side walls of the chamber E, such being the most desirable place to locate the latter. Said horizontal members are each composed of two pipe sections or lengths whose inner ends are secured in openings in the chamber-walls, so that there is free communication between them and the chamber. Applied to an opening in the top wall of the chamber is an automatically-acting air-valve F of usual or any desired construction to effect the automatic discharge of air from the chamber.

Steam being admitted to the radiator, it will drive the air ahead of it in every pipe D into the air-chamber E, and the air will escape thence through the valve F. No pipe D can therefore be air-bound, and steam has full access to every part of each pipe and perfect circulation through the radiator.

As there is room between the two vertical members of the innermost pipe D for a single pipe, such a pipe D' is placed therein, whose lower end communicates with the compartment B and whose upper end is closed.

Having thus described our invention, what we claim is—

A heater-section or radiator, consisting of a base having two non-communicating chambers therein, said chambers being, respectively, adapted to be connected with steam supply and exhaust pipes, two series of vertical pipes, each of the pipes of which communicates with one of such chambers, horizontal pipes, each of which connects the upper ends of pipes of each of said series, an air-chamber communicating with all of said horizontal pipes at or near their central portions, and means for permitting the escape of air from such chamber.

In testimony that we claim the foregoing we have hereunto set our hands this 17th day of December, A. D. 1898.

CHARLES H. PALMER.  
CARL A. CARLSON.

Witnesses:

TOM F. PALMER,  
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