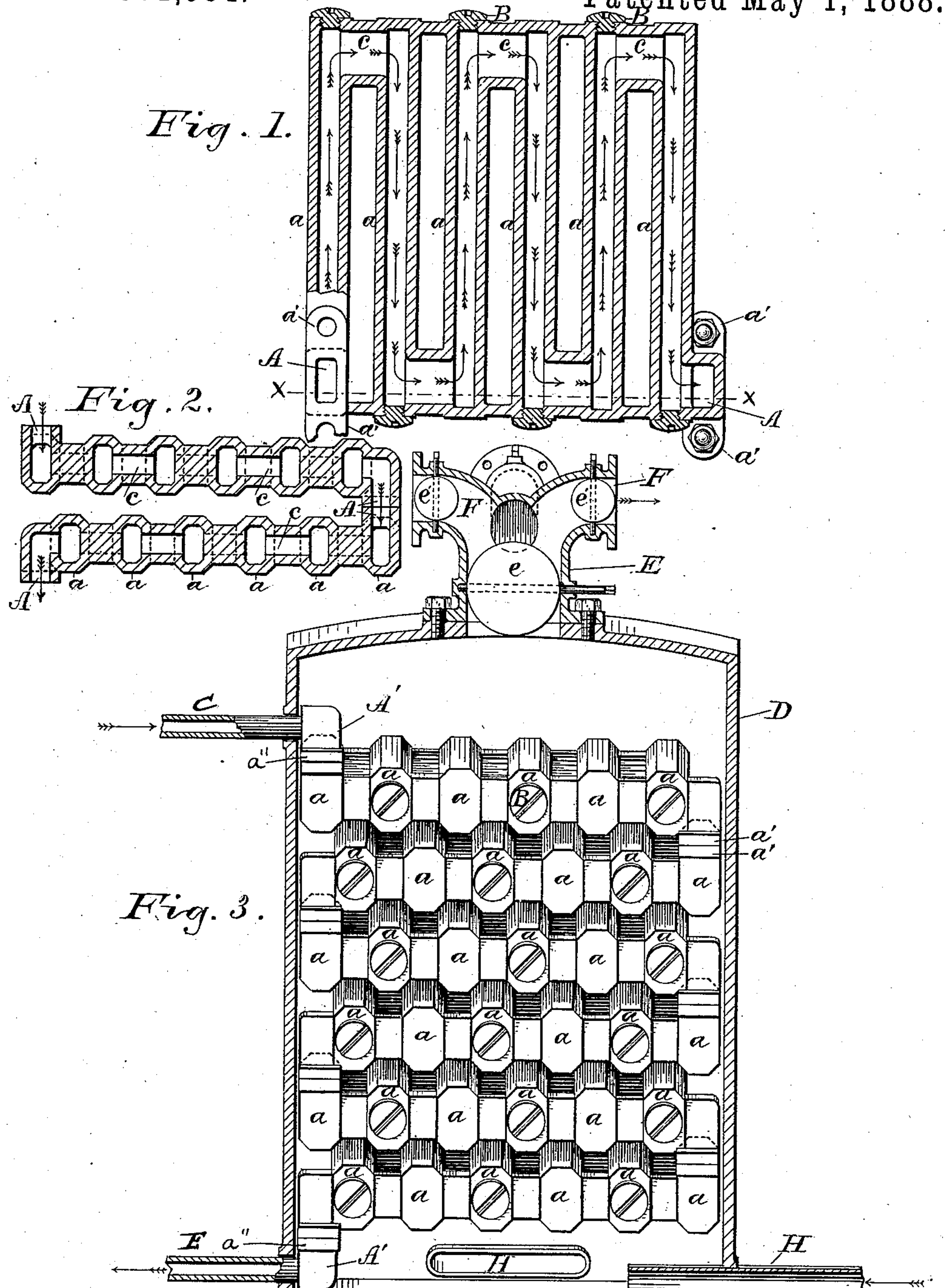
(No Model.)

W. W. CANFIELD.

RADIATOR FOR STEAM OR HOT WATER.

No. 381,984. Patented May 1, 1888.



WITNESSES:

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WILLIAM W. CANFIELD, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE NATIONAL HEATING COMPANY, OF SAME PLACE.

RADIATOR FOR STEAM OR HOT WATER.

SPECIFICATION forming part of Letters Patent No. 381,984, dated May 1, 1888.

Application filed November 18, 1887. Serial No. 255,462. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. CANFIELD, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Radiators for Steam or Hot Water, of which the following is a specification.

My invention is an improvement in steam and hot-water radiators; and it consists of the construction, arrangement, and combination of parts, hereinafter described and claimed.

In the following description reference is to be had to the accompanying drawings, forming part of this specification, in which the same letter of reference indicates like or equivalent parts wherever found, and in which—

Figure 1 represents a central longitudinal section of a single section of my radiator; Fig. 2, a transverse section of two sections of my radiator, taken on the line X X of Fig. 1, showing the manner in which the steam or water passes from one section of the radiator into another when two or more are used. Fig. 3 is a perspective view of a series of my radiator-sections united in a hot-air furnace, the furnace-casing being shown in section.

In the construction of this radiator I have endeavored to keep in view the advantage of producing one capable of being used both for steam and hot water, and having as few joints as possible, such being always liable to break, and also adding much to the cost of construction. Another object was to so construct or model a radiator-section composed of a series of hollow radiator-bars cast in a single piece, through all of which the steam or water could circulate, that any number of said sections, all of which were formed in the same, or a similar mold, could be united into a bank or series, as shown in Fig. 3 of the drawings, in such a manner that the number of joints would only equal the number of the sections united.

In Fig. 1 is shown in central longitudinal section a radiator consisting of a number of hollow bars, *a*, connected at each end, as at *a'*, and provided with communicating ports *c* at alternate ends, as shown in Figs. 1 and 2, in such a manner as to permit the steam or water to pass through the entire length of each and every hollow bar constituting the section. Small holes will be cast at alternate ends, through which the sand core may be removed, and these openings may be closed by ornamental screw-plugs B, and thus one complete connection established.

At one end of each of the side bars or tubes is formed an opening or port, A, as shown in Figs. 1 and 2, the walls of which are provided with flanges, by which two or more of the sections may be united, as shown in Figs. 2 and 3. Other forms of joint or coupling may be substituted for this, however, without departing from the spirit of my invention. It will be seen that one of said openings, when the section is in a horizontal position, opens upward and the other downward, and that by simply reversing the alternate sections any number thereof may be united, as shown in Figs. 2 and 3, and that the pipes for the supply and return of steam or hot water may be attached to one of the ports A at the ends of the upper and lower sections by means of couplings A', provided with flanges *a''*, similar to those found on the radiator-sections and indicated by *a'*. The heating medium (steam or hot water) will be admitted to the radiator by means of a supply-pipe, C, and escape by means of a return-pipe, E. The joints or coupling for the different sections of the radiator may be ground and packed in the usual way, and the usual escape-valves for the air may be provided wherever necessary.

D is a hot-air furnace-casing provided with a dome, E, a damper or regulator, *e*, and passage F, having dampers or regulators *e'*, the said dome, with its passages and dampers or regulators, being similar in all respects to that shown in my application No. 251,685, filed October 7, 1887. Air-conduits H are provided, by which air is admitted to the lower part of the casing D.

It will be seen on examination that one of the ports A is formed on the top of the end of one of the said bars or tubes of the radiator-sections and the other through and by means of a lug or shoulder extending out from the side of the opposite side bar. With this construction, when two or more of the sections are united, as shown in Figs. 2 and 3, the hol-

low bars of each successive lower section are situated in the plane passing centrally and vertically through the space between the bars of the section immediately above. In other words, all the hollow bars and all the spaces between the same in each alternate section are in the same plane, constituting a staggered arrangement thereof.

The course of the air when admitted to the bottom of the casing is broken and irregular, it being kept in contact with the surface of the bars and compelled to pass entirely around the same in each successive section, instead of passing vertically up through or between a series of bars arranged in vertical planes, as is usual in this class of heaters, and the greatest possible amount of heat is thus imparted thereto. My invention, however, is not limited to this specific arrangment, as it is evident that the sections and the means by which two or more of them are united may be so formed that the hollow bars will be in the same vertical plane when a number of the sections are united, as in Figs. 2 and 3, without departing from the spirit of the invention.

Of course any desired number of sections may be employed, and the bars of the sections may be of any size deemed preferable and arranged as close together as may be desired, as may also the sections. The greater the number of bars and the closer they and the sections are together the greater will be the capacity of the heater, care alone being taken to provide sufficient space between the bars to admit of a certain and free circulation of the air.

Having fully described my invention, its construction and operation, I claim, and desire to secure by Letters Patent of the United States, the following:

1. The combination of a series of radiator-sections, each of which is cast in a single piece, composed of a series of hollow bars, the space within the bars communicating at alternate ends, and the side bars having ingress and egress ports for the heating medium so formed that any number of said sections may be banked by uniting the ports, and when so united the bars of the different sections will be staggered or arranged so that the bars of each successive lower section will be situated in the plane passing vertically through the space between the bars of the section next above it, substantially as shown and described.

2. A radiator-section consisting of a series of hollow bars cast in a single piece, the space within the bars communicating at alternate ends, one of the side bars having a port on one end thereof opening in a direction at right angles to a plane passing longitudinally through the bars of the section, and the opposite side bar having a port formed in a shoulder or lug attached or formed on the side thereof and opening in a direction opposite to that of the first-named port, both of said ports being on the same end of the radiator-section, substantially as shown and described.

Signed at New York, in the county of New York and State of New York, this 16th day of November, A. D. 1887.

WM. W. CANFIELD.

Witnesses:
W. EGAN,
D. ELWELL.