E. F. OSBORNE.

Steam-Radiator.

No. 165,118. Patented June 29, 1875.

Fig. 1.

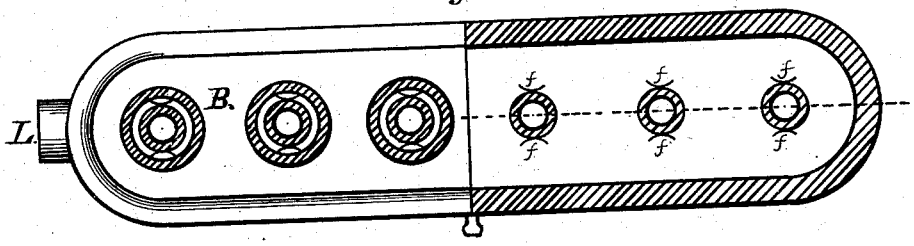


Fig. 2.

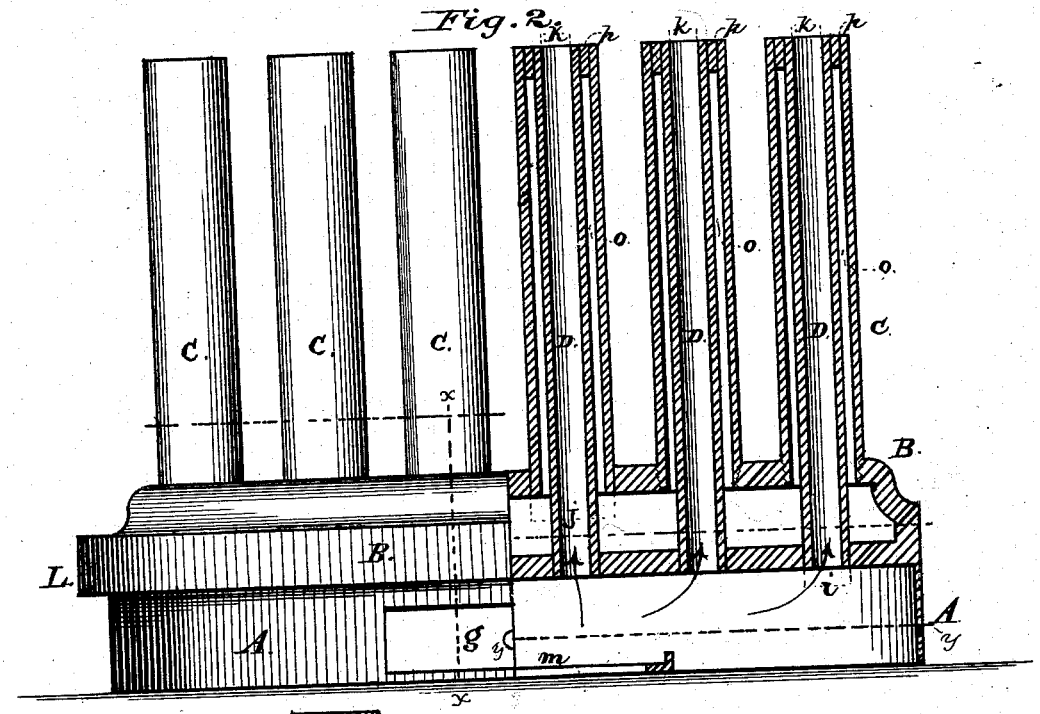


Fig. 5.

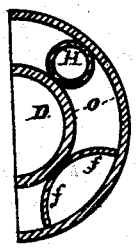


Fig. 3.

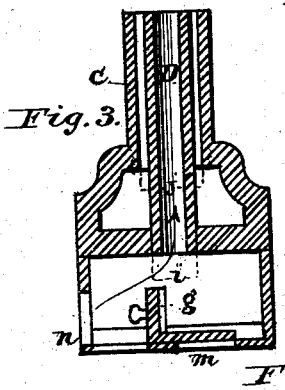


Fig. 4.

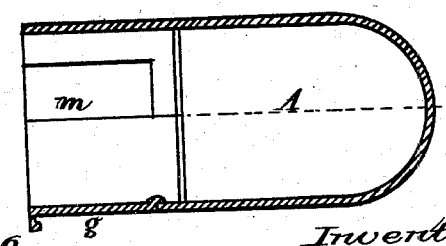
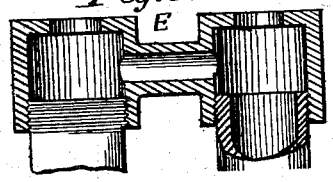


Fig. 6.



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UNITED STATES PATENT OFFICE.

EUGENE F. OSBORNE, OF ST. PAUL, MINNESOTA.

IMPROVEMENT IN STEAM-RADIATORS.

Specification forming part of Letters Patent No. **165,118**, dated June 29, 1875; application filed May 31, 1875.

To all whom it may concern:

Be it known that I, EUGENE FLORENCE OSBORNE, of St. Paul, State of Minnesota, have invented certain Improvements in Steam-Heaters, of which the following is a specification:

The object of this invention is to provide an improved steam or hot-water radiator, which shall radiate the heat from its outside, and at the same time heat a current of air drawn from the external atmosphere, or the lower part of the apartment in which the radiator is situated, and discharge said heated air into the room, for the purpose of heating and ventilating the same.

My invention consists in the combination, in a steam-heater, of inner and outer tubes, having the intervening space between the two divided into passages for creating a circulation of the steam in said intervening space, as will be fully hereinafter described.

In the drawings, Figure 1 represents partly a top view and partly a horizontal section of my apparatus. Fig. 2 represents partly an elevation and partly a vertical section of the same. Fig. 3 represents a vertical section through the line *x x* of Fig. 2. Fig. 4 represents a horizontal section through the line *y y* of Fig. 2. Fig. 5 represents a horizontal section of the series of radiating and air tubes, showing the diaphragms and tubes in the annular space between the two; and Fig. 6 represents a detached view of the return-bend, for connecting the radiating-tubes together in pairs.

The letter A represents a metallic box or chest, forming the base of the apparatus, which communicates with the external atmosphere by means of an opening, *m*, below, and with the room in which the apparatus is placed by means of an opening, *n*, at one side. On the bottom of said chest or box, directly over the opening *m*, is arranged a sliding damper, *g*, bent at right angles in front. The horizontal portion of said damper serves as a door for regulating the admission of air into the opening *m*, while the perpendicular portion forms a door for regulating the admission through the opening *n*, the two being arranged in such manner that when one opening is closed the other will be entirely opened, and, when in any intermediate position, the air will be admitted, in equal or varying quantities, through both, by this means providing for regulating the quantity of external and internal air admitted to a nicety, by one and the same damper. From the top of the chest A extends a series of vertical tubes or flues, D, which are secured in apertures therein by expanding, or in any other suitable manner. B represents a steam or hot-water chest or box situated directly above the chest A, from which extends a series of tubes, C, surrounding the tubes D of the chest A. The tubes C are somewhat larger than the tubes D, leaving an annular space between the two for the circulation of steam, and they are secured in their apertures by screw-threads or otherwise. The tubes C and D are flush at their tops, and are united by means of an annular ring, *p*, of metal, securely closing the annular space. Instead, however, of being thus united, the tubes C may be connected together by means of a return-bend, E, Fig. 6. In this case, however, the tubes D have to be made somewhat longer than the tubes C, so as to project above them. The tubes C are formed with right and left screws at opposite ends, the upper ends being screwed into the caps F F of the return-bend E, and the lower ends into the apertures in the steam-chest, as usual. The upper ends of the inner tubes D are expanded into the openings in the caps of the bend F in the usual manner. Within the annular chambers formed by the pipes C and D are arranged a series of diaphragms, *f*, or tubes H, extending from a point near the bottom of the chest B nearly to the top of the annular chamber between the tubes, to divide said chambers and provide for the circulation of the steam. The steam-chest B is provided with suitable connections for establishing communication with the steam-generator and withdrawing the water of condensation from the same.

The boxes A and B are formed of cast-iron, in one piece or separately, as may be desired, the radiating-tubes and air-tubes usually formed of wrought-iron or other metal of like nature.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

The combination, in a steam-heater, of the exterior tubes C and the interior tubes D, having the intervening chamber or space between the two divided into a series of passages, for creating a circulation of steam in the said space, substantially as and for the purpose described.

EUGENE FLORENCE OSBORNE.

Witnesses:

HARVEY OFFICER,

C. H. WOODWARD.