

W. WASHBURN.

Radiator.

No. 43,810.

Patented Aug. 9, 1864.

Fig. 5.

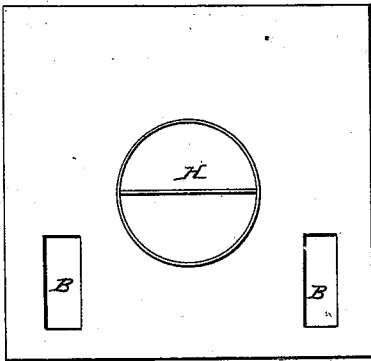


Fig. 4.

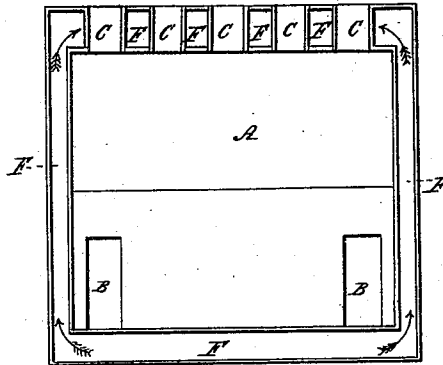


Fig. 6.

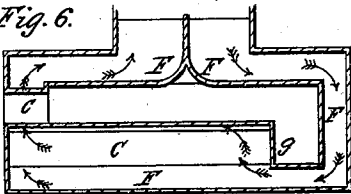


Fig. 3.

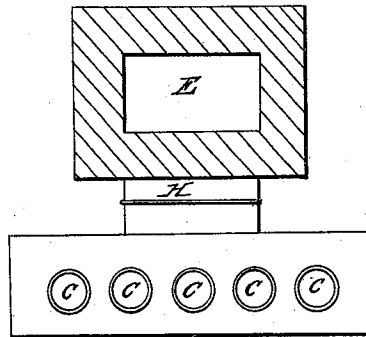


Fig. 7.

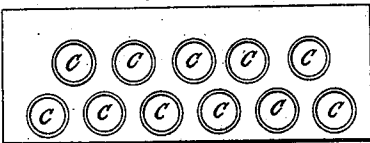


Fig. 1.

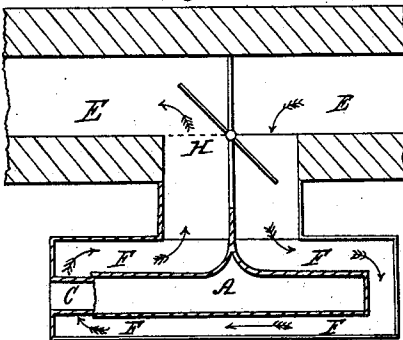
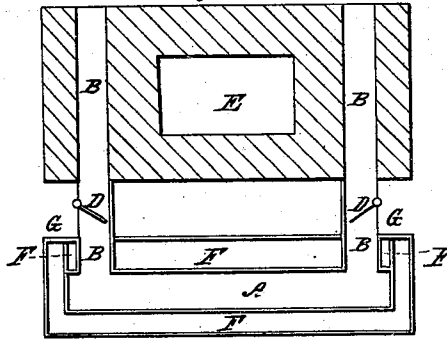


Fig. 2.



Witnesses:

Albert H. Brown
Geo. W. Park

Inventor:

William Washburn

UNITED STATES PATENT OFFICE.

WILLIAM WASHBURN, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN RADIATORS.

Specification forming part of Letters Patent No. **43,810**, dated August 9, 1864.

To, all whom it may concern:

Be it known that I, WILLIAM WASHBURN, of Boston, in the county of Suffolk and Commonwealth of Massachusetts, have invented a new and useful Improvement in Heat-Radiators, the object of which is to warm apartments adjacent to or above any room or apartment in which a fire is kept, by using for that purpose the surplus heat contained in the smoke and vapor produced by combustion which would otherwise escape with the smoke and vapor into the chimney; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of my said improvement, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a vertical transverse section through the middle of the improved radiator and the flue to which it is attached. Fig. 2 is a horizontal section of the improved radiator and flue near the bottom of the radiator. Fig. 3 is a plan of the top of the improved radiator, showing also a horizontal section of the flue and an outline of the reverse-draft flue which connects the radiator with the flue of the chimney. Fig. 4 is a vertical longitudinal section through the middle of the improved radiator. Fig. 5 is an elevation of the rear of the improved radiator, (side next the chimney,) showing a section of the reverse-draft flue H.

The same letter refers in all the drawings to the same part of the radiator.

A is an interior chamber. B B are air-passages connecting the chamber A with the external air outside the building either by passing directly through the wall of the house or into small flues in the chimney. C C, &c., are tubes inserted into the top of the improved radiator, connecting the chamber A with the air of the room. D D are valves by which the air-passages B B may be closed at pleasure. E is the principal flue of the chimney, to which the radiator is attached. F is the smoke-flue of the radiator, surrounding the chamber A on all sides. G G are openings by which the chamber A communicates with the air of the room when the air-passages B B are closed by the valves D D. These openings are in turn closed by the valves D D when the air-passages B B are opened. H is the reverse-draft flue, connecting the radiator with the flue of the chimney, the construction and operation

of which are fully set forth in the schedule annexed to the Letters Patent issued to Joseph H. Davis on the 31st day of July, A. D. 1860, for improvements in heat-radiators, to which reference is made.

The walls of the chamber A of the air-passages B B, and of the tubes C C, &c., may be constructed of the same material as the external walls of the radiator—viz., sheet-iron, cast-iron, sheet-copper, or any other substance suitable for radiating heat.

The operation of my improvement is as follows: The smoke and vapor pass into my improved radiator in the same manner as into the radiator invented and patented by Joseph H. Davis, as aforesaid, and their course through the flue F is similar to their course around the diagonal partition described in said patent. (See arrows in the accompanying drawings.) The smoke and vapor return to the flue of the chimney in the same manner as in said patent; but the effect of this circulation of smoke and vapor through the flue F in my improvement is very different from the effect obtained from the corresponding circulation through the flues in said Davis's patent, for the chamber A, being almost completely enveloped by the heated smoke and vapor, and being in a position to receive the direct contact of the current of smoke and vapor as they pass into and through the radiator, its walls are heated much hotter than the external walls of the radiator, so that this inner radiating-surface (the walls of the chamber and of the tubes C C, &c.) will warm and even boil water, while the outer radiating-surface (the only radiating-surface used in the improvements of said Davis) is not so much heated as to injure the person, the clothes, the house, or its furniture. The effect of this interior heat is to produce a current of warm air upward from the chamber A through the tubes C C, &c., into the air of the room, and also as a consequence another current of cool air into the chamber A through the air-passages B B from the external air, or through the openings G G from the lower and cooler strata of air in the room.

The valves D D have a double office, first, to close the openings G G while the chamber A communicates with the external air through the air-passages B B; and, secondly, to close the air-passages B B while the chamber A communicates with the lower strata of air in

the room through the openings G G. These valves can be readily thrown into either position by swinging on a hinge, or otherwise, as convenience or necessity may require.

Figs. 6 and 7 are introduced to show how the construction of my improvement may be modified when the volume of smoke and vapor is so great that more room in the flue F and a corresponding increase in the inner radiating-surface is required, or when, in order to warm a large room, or any other circumstance, it is desirable to obtain a larger inner radiating-surface. Fig. 6 is a vertical transverse section of this style of radiator, and Fig. 7 is a plan of its top. It is thicker than the form already described, to give more room for the flue F and the chamber A, and it has two rows of tubes, C C, &c. One row of these tubes is made to extend downward to and unite with an offset, I, in the chamber A, giving by the length of this row of tubes and their cylindrical form a large increase of the inner radiating-surface.

The peculiar advantages of my improvement are these: Without any increase of the external dimensions of the radiator its radiating-surface is greatly increased and its effective heating power more than doubled—that is, its capability for accomplishing its intended

purpose, the economy of heat is duplicated, the current through the interior chamber, A, secures an equal and diffused heat through all parts of the room, while unpleasant local heat from the external radiating-surface becomes unnecessary, and is avoided, while, perhaps, the principal advantage is, that the current through the interior chamber secures a temperate and wholesome ventilation from the external air or a grateful and purifying circulation of the air of the room.

Having thus described my improvement in heat-radiators, I will state my claim as follows:

I do not claim any portion of the invention described in the schedule annexed to the Letters Patent of Joseph H. Davis, hereinbefore referred to; but

What I do claim as my invention, and desire to have secured to me by Letters Patent, is—

In combination, the chamber A, tubes C C, &c., and the air-passages B B, with the openings G G, substantially as herein described.

WILLIAM WASHBURN.

Witnesses:

GEO. W. PARK,
ALBERT W. BROWN.