

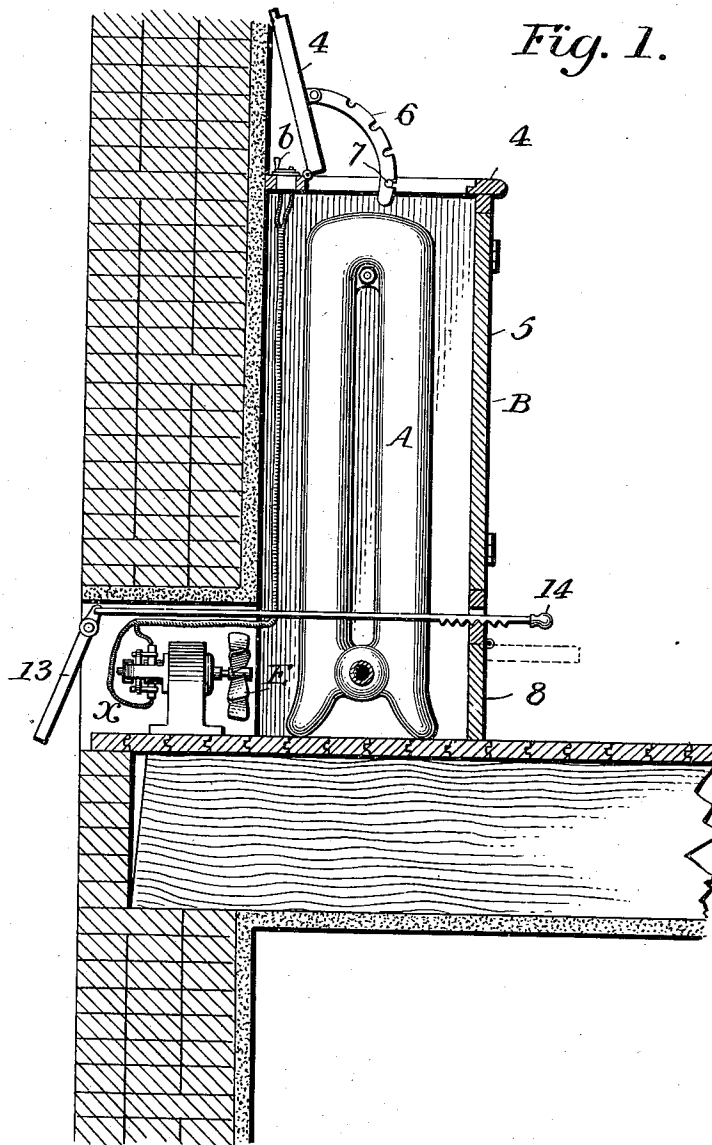
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3 Sheets—Sheet 1.

E. A. CORBIN & C. E. FOSTER.
HEATING AND VENTILATING DEVICE.

No. 593,737.

Patented Nov. 16, 1897.



Witnesses
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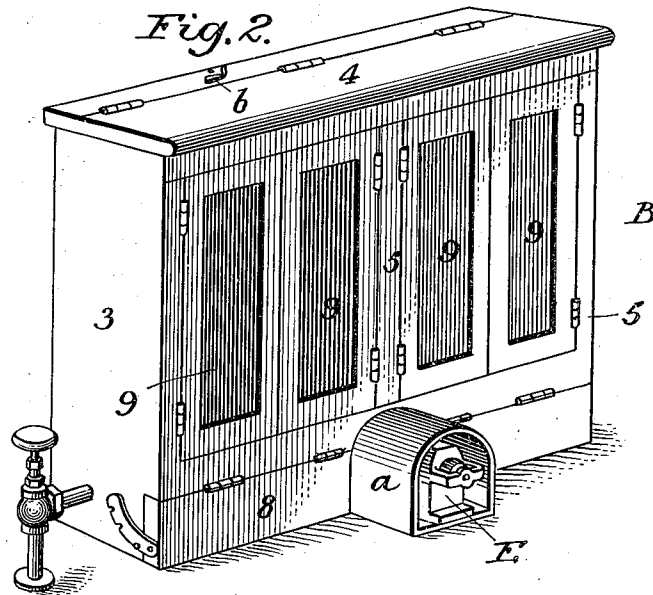
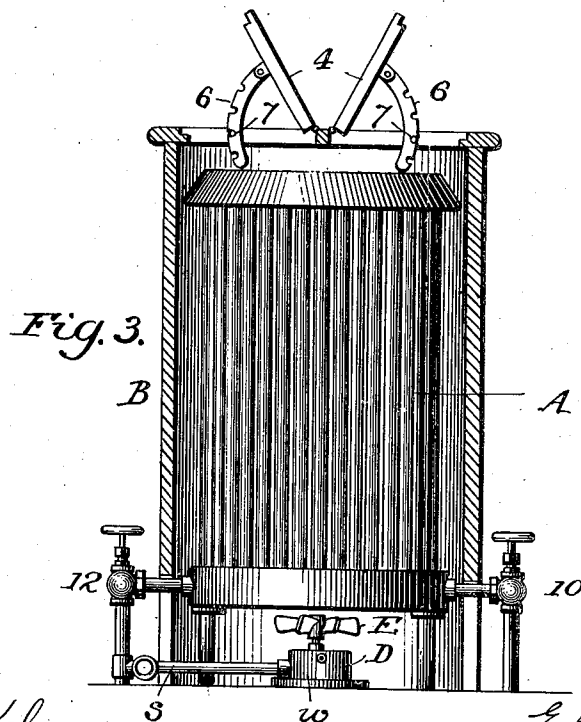
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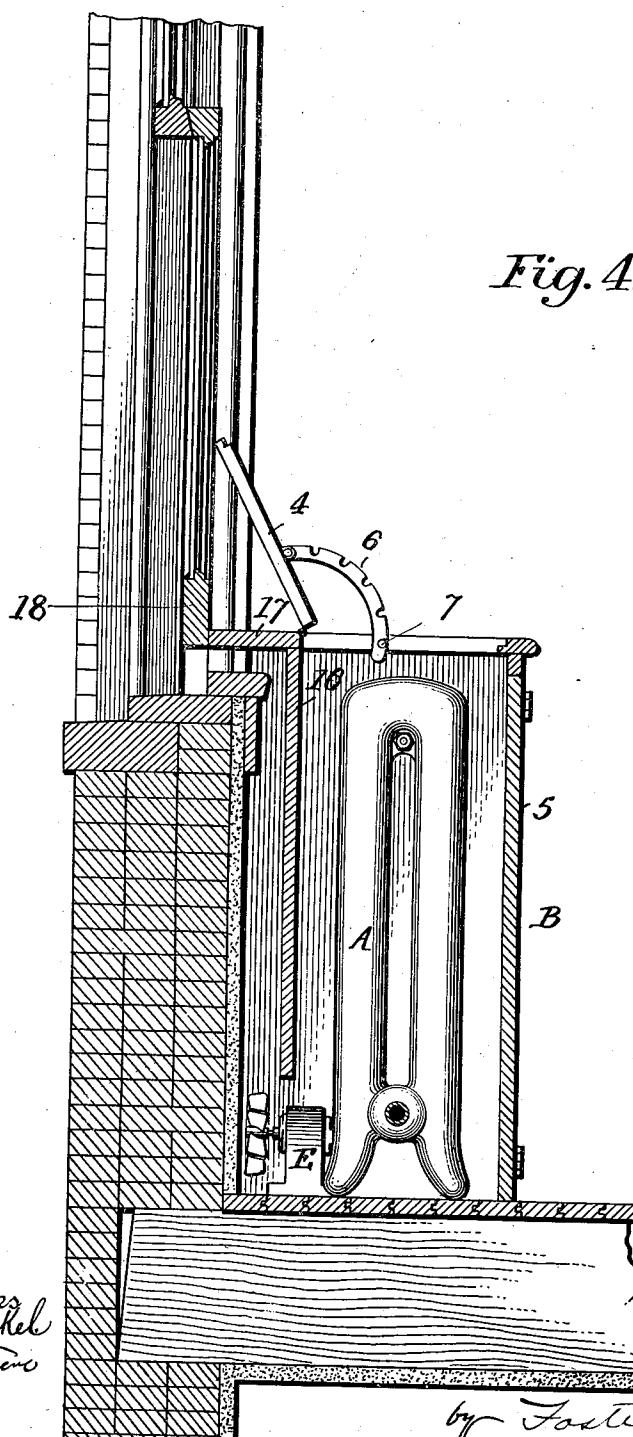
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Fig. 4.



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UNITED STATES PATENT OFFICE.

ELBERT A. CORBIN, OF PHILADELPHIA, PENNSYLVANIA, AND CHARLES E. FOSTER, OF WASHINGTON, DISTRICT OF COLUMBIA.

HEATING AND VENTILATING DEVICE.

SPECIFICATION forming part of Letters Patent No. 593,737, dated November 16, 1897.

Application filed January 24, 1896. Serial No. 576,697. (No model.)

To all whom it may concern:

Be it known that we, ELBERT A. CORBIN, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, and CHARLES E. FOSTER, residing at Washington, in the District of Columbia, citizens of the United States, have invented certain new and useful Improvements in Heating and Ventilating Devices, of which the following is a specification.

Our invention has for its object to improve the heating and regulation of the temperature of living rooms where radiators must be employed; and to this end our invention consists of means for regulating, directing, and controlling the flow of the air over the heated plates of a radiator, as fully set forth hereinafter, and as illustrated in the accompanying drawings, in which—

Figure 1 is a sectional elevation of part of a building, showing a portion of a chamber and radiator therein, with our improvements. Fig. 2 is a perspective view illustrating one form of radiator-casing. Fig. 3 is a sectional elevation showing another form of radiator and casing. Fig. 4 is a sectional elevation through part of a building illustrating different means for directing the external air onto the radiator.

A A represent steam, hot-water, or other radiators of any suitable construction, form, and dimensions, that shown in Figs. 1 and 4 being rectangular in its general outline, while that shown in Fig. 3 is cylindrical.

A very serious objection to the use of radiators in the heating of buildings results from the difficulty of moderating the excessive heat during moderate weather. As ordinarily arranged and employed, radiators, and especially steam-radiators, are supplied with heating fluid at all times nearly of the same temperature, so that when but little heat is required during moderate weather the increase of temperature resulting from the radiator is excessive, demanding either that the heating fluid be cut off altogether or that the windows or doors of the chamber be opened, so that as a common result the temperature of the chambers is never kept uniform, is frequently either too hot or too cold, and vexa-

tious attention to the heating apparatus is demanded. To overcome this, various regulating appliances have been employed, the only effectual ones of which are expensive and require generally complicated attachments.

We have discovered that the desired regulation of the temperature may be secured by providing the radiator in each chamber with a casing capable of being closed, so as practically to cut off any circulation of air in the chamber over the heated plates of the radiator or of being more or less opened to permit or promote such circulation. Such casings may be constructed in different ways and of different forms and of different material. As shown in Figs. 1 and 2, where the radiator A is parallel with the wall of the room and adjacent thereto the casing B may be formed of side pieces 3 3, a top piece 4, and a front 5. The top piece or some portion of the casing at or adjacent to the top should be movable, so as to be closed as to wholly inclose the radiator, or opened to permit air to pass upward therefrom, and there should be some means for permitting the colder air at or near the floor to pass to the lower portion of the radiator. As shown, the top 4 is hinged and is provided with a suitable rack 6, engaging a pin 7, so that the top may be lifted to a greater or less extent, while the casing is either permanently open at the bottom or a bottom portion 8 of the front is also hinged and provided with a rack and pin, so that it may be opened to a desired extent or closed tightly. We also find it advantageous to make the front piece 5 movable in whole or in part—for instance, by providing it with hinged doors 9, as shown, which may be opened or closed. By closing the top and front the radiator will be entirely covered, so that during moderate weather (which is still so cold, as to require a small degree of heat) the radiator may be so fully covered that it will have but little heating effect; but this effect may be increased by slightly opening the top opening or both the top and bottom openings, according to the amount of heat required. When the cold is very severe, by fully uncovering the upper and lower openings the

cold air at the bottom of the room is directed to the lower portion of the radiator and passing rapidly upward through the casing escapes, creating a current of such force as to facilitate the circulation of air in the room and the better heating thereof. When it is desired to secure the advantages of direct radiation of heat into the room, the doors 9 may be opened.

10 In the construction shown in Fig. 3 where the radiator is cylindrical the casing B is also cylindrical. As it would be objectionable in many cases to have to open the casing for the purpose of manipulating the valves 10 12, we prefer to extend the casing downward between the radiator and the valves, as shown, thereby permitting the manipulating of the valves from the outside.

Another objection which has proved to be incident to heating rooms by means of radiators is that the portion of the room in which the radiator is arranged will frequently be overheated, while more distant portions receive but little heat from the radiator. While this may be and has been partially overcome by arranging radiators centrally in rooms, such arrangement is often objectionable. We have discovered that it is practicable to maintain a temperature almost uniform throughout a room, even with the radiator arranged at one end or side, by forcing an artificial current of air across the radiator. Thus, as illustrated in Fig. 2, an electric fan E is arranged adjacent to the floor, so as to draw the cold air from the floor and discharge it against the face of the radiator, from which it rises rapidly, and when a casing B is employed the air passes upward through and is confined by the casing, so as to form a rapid current over the plates of the radiator, drawing in the colder air from the floor through the opening at the bottom of the casing, and we have found that by this means the temperature of a room may be raised from 12° to 15° in as many minutes, when otherwise it would not be practicable to heat the rooms to the same extent in several hours. When the fan is employed with a casing of the character shown in Fig. 2, the latter may be provided with an extension *a*, covering the fan, and a circuit closer and breaker *b* may be arranged upon the top or other part of the casing, or adjacent thereto, so as to close and open the circuit communicating with the motor. In the construction shown in Fig. 3 the fan is arranged directly below the radiator.

While an improved heating effect is obtained by forcibly driving the air of the room over the plates of the radiator, as described, there still remains the objection always incident to heating rooms by means of radiators arranged therein that the air becomes more impure as time passes, so that this mode of heating is frequently attended with deleterious results to the health of the occupants of the rooms. To overcome this objection, we

provide means whereby the heater arranged within the room, as usual, may, instead of being supplied with air from the room itself, be supplied with fresh air from the outside of the building. Thus, as shown in Fig. 1, an opening *x* is made in the wall of the building adjacent to the bottom of the heater, and this opening is provided with a shutter or valve 13, which may be opened or closed by means of a rod 14 and held in any desired position to regulate the inflow of air. When a casing B is used, the opening *x* may communicate with the bottom of the said casing and thereby the flow of air directly into the room is prevented, so that every particle of fresh air must first pass over the plates of the heater. The flow of the air may be insured and promoted and a thorough circulation within the chamber secured by arranging the fan E so as to direct the air from the opening *x* over the plates of the heater. Where it is not practicable to perforate the wall of the building, a flue for the inward passage of the air from the outside may be formed by means of a plate 16, extending upward a short distance from the wall to a cross-plate 17, arranged above the sill of the window, so as to make contact with the side of the sash 18, when the latter is slightly raised, as shown in Fig. 4, so that the air will pass below the sash and downward below the lower edge of the plate 16 to the bottom of the heater, which is arranged adjacent to said plate. In such case the fan E may be arranged to direct the air from below the lower edge of the plate 16 onto the radiator. Where steam is used as the heating fluid, the steam from the radiator or its supply-pipe may be used for propelling the fan. In Fig. 3 we show a rotary steam-motor supplied with steam for the radiator supply-pipe through a pipe *s*. Where it is desirable to send the heat to the floor, as is often requisite, the direction of the fan may be reversed.

It will be obvious that the same arrangements as above described will produce like results in connection with railway-cars, the fan being arranged to direct the air into or from the chamber or casing inclosing the stove or other heat-radiator.

Without limiting ourselves to the precise construction and arrangements of parts shown, we claim as our invention—

1. The combination with a radiator situated in an apartment or room, of a casing inclosing the radiator and provided with a fan-opening, and a fan arranged at said opening, the said casing being adapted to be thrown open at the top thereof, substantially as described.

2. The combination with a radiator situated in an apartment or room, of a casing having a fan-opening and inclosing the radiator and adapted to be thrown open at the side, and a fan located at the opening, the said casing being also adapted to be thrown open inde-

pendently at or near both the top and bottom portions thereof, substantially as described.

3. A casing adapted to be applied to a radiator as arranged in a fixed position in a room to be heated, to inclose the said radiator, and provided with inlet and outlet openings arranged respectively at the bottom and top thereof to both communicate with said room, a fan arranged to direct the air through one of the openings into the casing and force it through the casing to the other opening,

and a motor for operating the fan, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

ELBERT A. CORBIN.
CHARLES E. FOSTER.

Witnesses:

W. CLARENCE DUVALL,
G. P. KRAMER.