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HEATING APPARATUS OF THE CLOSED TYPE

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The invention relates to a heating apparatus of the closed type, having a body in the shape of a flat box standing on one of its narrow sides, in the lower part of which a burner is mounted, more specifically a burner for gas or liquid fuel, the said box communicating on the one hand with an air-supply duct for the burner, extending beyond the space to be heated, and having on the other hand connected therewith a flue gas exhaust duct located near the air-supply duct and passing to the outside. Heating apparatus of this type are known.

In the known apparatus the object is to cause the hot flue gases leaving the burner to rise vertically as a column and to keep this column clear of the wall of the said box. In this way the flue gases reach the top plate of the said box without their temperature having appreciably decreased, and it is only then that they enter into heat exchange with the walls of the box. This results in a cooling of the gases, owing to which they tend (through increasing specific gravity, due to higher density) to sink to the bottom, and to reach the low exhaust opening and flow off. In this way the requisite draught in the apparatus is obtained. It may be considered a drawback that the top plate of the box is thus heated to the highest temperature, namely, from the point of view of heating a room. Another drawback consists in that the cooling gases also have to flow down along the front and side walls of the box, but, once they have arrived at the bottom, will have difficulty in reaching the exhaust opening in the rear wall of the box because the column of the hot rising gases forms an obstruction.

The invention has for its object to obtain a different flow of the gases inside the box, which obviates the above mentioned drawbacks.

To achieve this object, according to the invention a horizontal partition extends in the box above the burner and at a level not below the horizontal division between air-supply duct and flue gas exhaust duct, openings being left between the terminal edges of this partition and the lateral end walls of the box at least large enough for the exhaust of flue gases.

The column of the rising hot gases is therefore deflected laterally as soon as it has formed above the burner, and conducted to the narrow vertical walls of the box. The hot gases will thus give off heat to the narrow vertical sides immediately as they begin to rise, and can then, deflecting inwardly without encountering any obstruction, reach the exhaust opening in the middle of the rear wall of the box. During this deflection the gases give off their heat to the large vertical sides of the box. Thus the gases cannot fall back onto the burner. Also, no gases can enter the exhaust duct immediately after leaving the burner, which means that the gases are compelled to travel a long distance in the apparatus before they reach the exhaust conduit, in consequence of which the exhaust temperature can be kept low.

In practice it is found that according to the invention not only may a very good draught be attained in the apparatus, but also the temperature distribution over the

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sides of the box will be more uniform than in the known types of heating apparatus. No loss of heat owing to heat transmission by hot gases to places of a lower temperature is possible.

5 With reference to the drawing an embodiment of the invention will now be described.

Fig. 1 is a cross-sectional elevation of a heating apparatus according to the invention.

10 Fig. 2 is a cross-sectional elevation of this heating apparatus taken on line II—II of Fig. 1.

Fig. 3 is a cross-section along III—III in Fig. 2.

The apparatus consists of a closed box 1, formed by a front plate 2 and a rear plate 3, narrow end walls 4, a bottom plate 5, and a top plate 6.

15 The horizontal duct D having a supply passage 7 and an exhaust passage 8 is connected to the flange 9 extending peripherally from the rectangular opening in the rear plate 3 of the box 1. The air-supply passage 7 as well as the exhaust passage 8 for the flue gases are divided 20 vertically, along the longitudinal plane of symmetry, into two halves by a longitudinal partition 10. The part 10' of this longitudinal partition extends into the box 1 of the heating apparatus, while the downwardly directed part 10'' of this partition extends almost to the bottom 25 plate 5 and divides the vertical part of the air-supply passage into two halves.

At the free end of the supply and the exhaust passage there is positioned a grid 11, which consists of a number of plates extending some depth into the sleeve formed 30 by the exhaust passage 8 and the supply passage 7.

A weir-shaped narrowing-plate 12 has been fitted in the exhaust passage 8, so that for the exhaust gases a narrower free passage is formed than for the fresh air to be supplied. By this means the exhaust gases are 35 throttled before escaping into the open air.

In the heating apparatus itself a plate 14 has been fitted above the burner tube 13; this plate extends horizontally and has a slot 15. This slot 15 extends to or 40 almost to the narrow end walls 4 of the box 1. Downwardly directed reinforcing strips 16 have been provided along the edge of this slot 15.

Above this first plate 14 a horizontal baffle plate 17 has been provided, which on the left and the right, adjacent the narrow end walls 4 of the box 1, leaves openings 18 for the rising flue gases. The baffle plate 17 is 45 connected at its ends to the front plate 2 and the rear plate 3, and is also connected to the common horizontal partition 23 between the supply passage 7 and the exhaust passage 8.

50 The supply of air to the burner further takes place through a vertical passage formed by plate 19 and the lateral plates 20. The plate 19 and the lateral plates 20 are connected to the baffle plate 17 and terminate adjacent and spaced from the bottom plate 5. The lateral 55 plates 20 form a connection between the plate 19 and the rear plate 3.

It is not necessary for the vertical passage for the supply of air to the burners to be located inside the box 1. It may also be located outside this box, the air 60 for combustion then being conducted to the burner through this passage outside the box 1.

Extending between the plate 14 and the baffle plate 17 is the vertical partition 21, which divides the space above the burner into two halves. In this partition 21 65 there has been provided an opening 22, which allows movement of the air above the burner tube if this is necessary for equalization of the pressure.

From the space above the baffle plate 17 the flue gases finally escape through the exhaust opening 8.

70 The exhaust passage 8 may, if required, extend slightly further from the wall of the building than the passage 7 for the supply of the air for combustion.

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What I claim is:

1. A wall-mounted closed-type heating apparatus comprising a rectangular box having closed top and bottom walls, a closed front plate, a pair of closed side plates, and a rear plate, said front and rear plates having greater horizontal widths than said side plates, said rear plate having an opening therein centrally located with respect to said side plates and arranged vertically below the centerline between said top and bottom walls; a horizontal duct extending rearwardly outwardly from the rear plate opening; means in said duct dividing the same into an air supply passage and an exhaust passage, said dividing means including a horizontal partition plate having a forward end portion extending partially within said box; a fuel burner positioned within said box below the rear wall opening and spaced above said box bottom wall; conduit means for conducting air from said supply passage to an elevation beneath said burner comprising a first vertical plate in said box parallel to and spaced from said box rear wall, the lower extremity of said vertical plate terminating adjacent and spaced from the bottom wall of said box and the upper end of said plate being connected to the portion of said horizontal partition which extends into said box, and a pair of vertical lateral plates arranged at right angles to said first vertical plate, said lateral plates being parallel to and spaced from said box side plates and secured at their forward edges to the vertical edges of said first vertical plate and at their rear edges to said rear wall; and a horizontal planar baffle plate transversely arranged in said box above said burner, the front edge of said baffle plate being con-

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tiguous with the box front plate and the lateral edges of said baffle plate terminating adjacent but spaced from the box side walls, whereby the flue gases produced by said burner will be deflected laterally by said baffle plate to heat the vertical side walls of said closed-type heating box.

2. Heating apparatus as defined in claim 1 wherein a rear portion of said baffle plate is contiguous with the end portion of said horizontal partition which extends partially within said box.

3. Heating apparatus as defined in claim 2 wherein the burner is positioned below the horizontal baffle plate to an extent that the tips of the burner flames will just touch the lower surface of the horizontal baffle plate.

4. Heating apparatus as defined in claim 1 wherein said burner is horizontally arranged with the longitudinal axis thereof parallel to the rear wall of said box, and further including a horizontal plate intermediate said burner and said baffle plate, said horizontal plate having a slot therein extending directly above and parallel to said burner.

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