

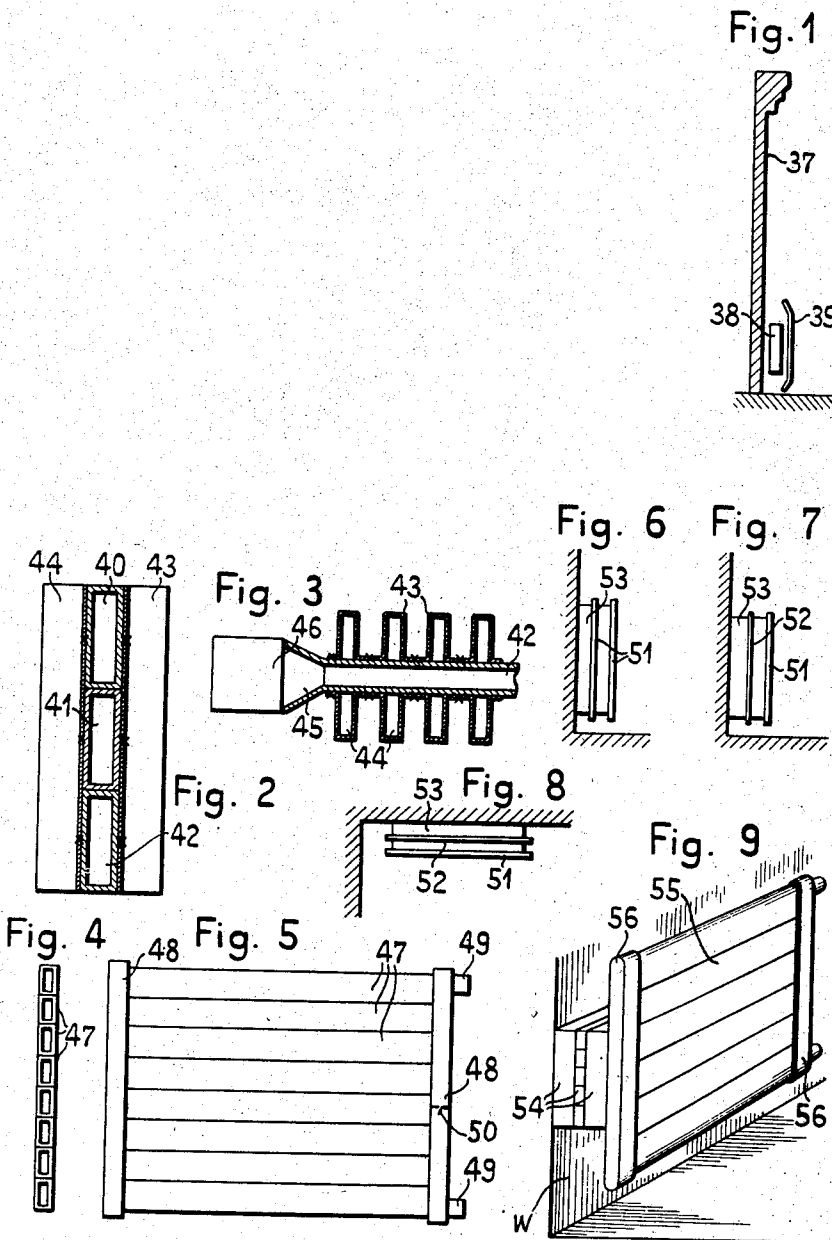
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HEATING OR COOLING BUILDINGS

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HEATING OR COOLING BUILDINGS

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1 Claim. (Cl. 257—136)

The present invention relates to an arrangement for heating or cooling buildings and consists essentially in that heating elements in the form of convectors or radiators or both types are arranged on walls, ceilings, along ceiling or floor edges behind screenings, air inlets and outlets being to cause air currents to circulate within the range of the heating elements and screenings.

Further features of the invention will become apparent from the claim and the following description taken in conjunction with the accompanying drawing which illustrates by way of example some preferred forms of embodiment incorporating the inventive concept.

Fig. 1 shows my invention as applied to the heating of a wall of a room;

Figs. 2 and 3 show details of convector modifications;

Figs. 4 and 5 represent a flat-tube radiator designed as a heating wall;

Figs. 6 to 8 are different arrangements of the heating wall according to Figs. 4 and 5;

Fig. 9 shows the combination of a convector with a heating wall as structural unit.

Convection radiators for room heating have hitherto as a rule been mounted on a room wall at a slight distance from the floor. This arrangement of the heating entails serious drawbacks in the heating effect. Such arranged convection radiators will by up-draft produce and air current, draw the colder heavy room air along the floor and bring about circulation causing this room air to move at occupant level. The air movement, however, draws dust with it and one feels "dry air," a common objection made to conventional central heating devices. This phenomenon is particularly assisted by the fact that the floor edges beneath the radiator are often very dusty.

A warming of the floor will not be obtained by the air current, but only by heat radiation from the room ceiling, and the air current itself causes a ventilation effect on the person with corresponding withdrawal of heat. Summarizing, it may be stated that the arrangement of radiators on the wall at a slight distance from the floor is objectionable both from the point of view of heat technology as well as from the hygienic one, if there is a convection producer.

According to the embodiment as in Fig. 1, a warm air current is caused to sweep across a surface 37 at occupant level. The surface is warmed by heat transfer from the air, and it in turn heats the room by radiation.

The convector 38 is heated by any suitable thermal source, for example electric or liquid media means, and the air is warmed and led to the surface 37 by means of the screen 39 so that warm air will pass across it. The surface warmed by heat transfer from the air radiates heat into the room and warms it.

Figs. 2 and 3 illustrate the structure of a convector in its details, as may be used with advantage in the examples.

The items 40, 41 and 42 are superimposed rectangular tubes, and members 43 and 44 are corrugated sheets serv-

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ing as air channels and are spot-welded electrically to said tubes at the crossed points. 45 indicates a collector interconnecting the tubes 40, 41, 42 and fitted with a connecting branch 46.

In the embodiment as in Figs. 4 and 5 there is a radiator designed as a flat heating wall and characterized in that the flat tubes 47, set on edge to each other and carrying the heating medium, open into vertical tubes 48. The connecting branch to the heating wall is designated 49, and 50 marks a separation of the vertical tube 48 to ensure circulation of the heating fluid.

Figs. 6, 7 and 8 illustrate different arrangements of the heating wall in the room, 51 designating the heating walls, 52 designating the insulating plates, and 53 designating the attaching means for securing the heating walls to the room surfaces.

The back of the heating wall may also be formed by an insulating plate adapted to prevent heat dissipation from the heating wall to the rear. Two or more such heating walls may be disposed parallel to each other and in spaced relationship, so that the foremost one dissipates heat into the room by radiation, while the rear assists in a chimney action which causes air convection. A preferred arrangement of the heating wall consists also in that the same is arranged parallel to a plate of heat-insulating material and at a distance away from it. The heating wall warms by radiation the surface of the insulating plate, which, together with the heating wall, causes air convection. The purpose of the insulating plate is to effect at the same time a reduced penetration of heat into the wall located behind it. To this effect the wall has also the insulating plate mounted at a distance therefrom. Another preferred arrangement of the heating wall is that parallel to the room ceiling and at a distance therefrom so that its front radiates into the room, and the rear wall warms the ceiling surface by radiation. In the space between heating wall and ceiling, a movement of air will be produced which in turn serves to warm the ceiling. In this application an insulating plate is arranged appropriately between heating wall and room ceiling.

Further, an embodiment for ceiling heating may also be provided by means of heaters in the upper half of the room underneath the ceiling, which embodiment is characterized by the arrangement of said heaters with respect to the surfaces of greatest cooling for producing a higher ceiling temperature in the neighborhood of these surfaces than in the middle of the ceiling.

According to the preferred embodiment of my invention disclosed in Fig. 9, a heater is provided which consists in a combination of a convector 54 with a flat-tube radiator 55 as heating wall. The convector and the heating plate can be passed through by a heating fluid which warms both the convector and the plate. A preferred effect of the heater consists in that the plate 55 serves not only for screening the convector 54, but also for forming a shaft for the convection effect of the convector. The plate is preferably constituted by flat tubes lying one over the other and opening at their ends into collectors 56 for the heating medium. The supply of the heating medium to the convector may take place through the same collectors. The design of the convector may preferably be such as illustrated in Figs. 2 and 3. The heater 54, 55 is mounted on a room wall W, the plate 55 forming together with the room wall an air shaft contributing to the convection effect of the convector 54.

The unit 54, 55, 56 may advantageously also consist in that the heating wall 55, 56, whose flat tubes are passed through by a medium, includes lamellae directly welded thereon such as shown for instance in Fig. 3 at 43, 44. The lamellae are thereby only arranged on

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one side of the plate or wall 55, 56, i. e. on the side facing the room wall. The lamellae are moreover preferably arranged on a portion of the heating wall 55, 56, i. e. in the lower portion thereof.

What I claim is:

Apparatus for conducting temperature-modifying fluids for the heating or cooling of a room having a flat wall surface and a floor surface comprising a heating panel arranged parallel to and spaced from the wall surface, said heating panel consisting of a plurality of horizontal tubes of rectangular cross-section arranged in side-by-side superposed aligned relationship with the shorter sides of adjacent tubes being contiguous, said tubes lying in a vertical plane parallel to and spaced from said room wall surface, the lower edge of said heating panel being spaced from said floor surface, and a vertical collector tube arranged at each end of and in communication with said flat tubes; and a horizontal convector positioned intermediate said heating panel and its associated wall surface and being in communication with said vertical collector tubes, said convector having a vertical dimension which is less than the vertical dimension of said heating panel and being positioned vertically intermediate the upper and lower ends thereof, said convector consisting of a plurality of horizontal tubes of rectangular cross-section arranged in side-by-side superposed aligned relationship in a vertical plane with the shorter sides of adjacent tubes being contiguous, and a corrugated metal

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sheet secured on each side of said convector tubes intermediate the heating panel and the convector tubes on one side and the wall surface and the convector tubes on the other side, the corrugations of said sheets extending in the vertical direction along the entire height of the convector, the crests of the corrugations of one of said sheets being secured to said heating panel and the crests of the corrugations of the other of said sheets being secured to the wall surface, whereby said heating panel forms an open-ended vertical shaft along the associated wall surface to direct a convection flow of heated air vertically along the entire wall surface toward the upper portion thereof.

References Cited in the file of this patent

UNITED STATES PATENTS

1,884,098	Modine	Oct. 25, 1932
1,937,774	Naylor	Dec. 5, 1933
2,044,832	Child	June 23, 1936
2,375,556	Hupp	May 8, 1945
2,467,935	Harper	Apr. 19, 1949
2,651,504	Gundrum et al.	Sept. 8, 1953
2,739,792	Blum	Mar. 27, 1956

FOREIGN PATENTS

146,882	Sweden	Sept. 7, 1954
366,770	Great Britain	Feb. 11, 1932