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3,422,888

AIR DISTRIBUTION TERMINAL

Filed June 29, 1967

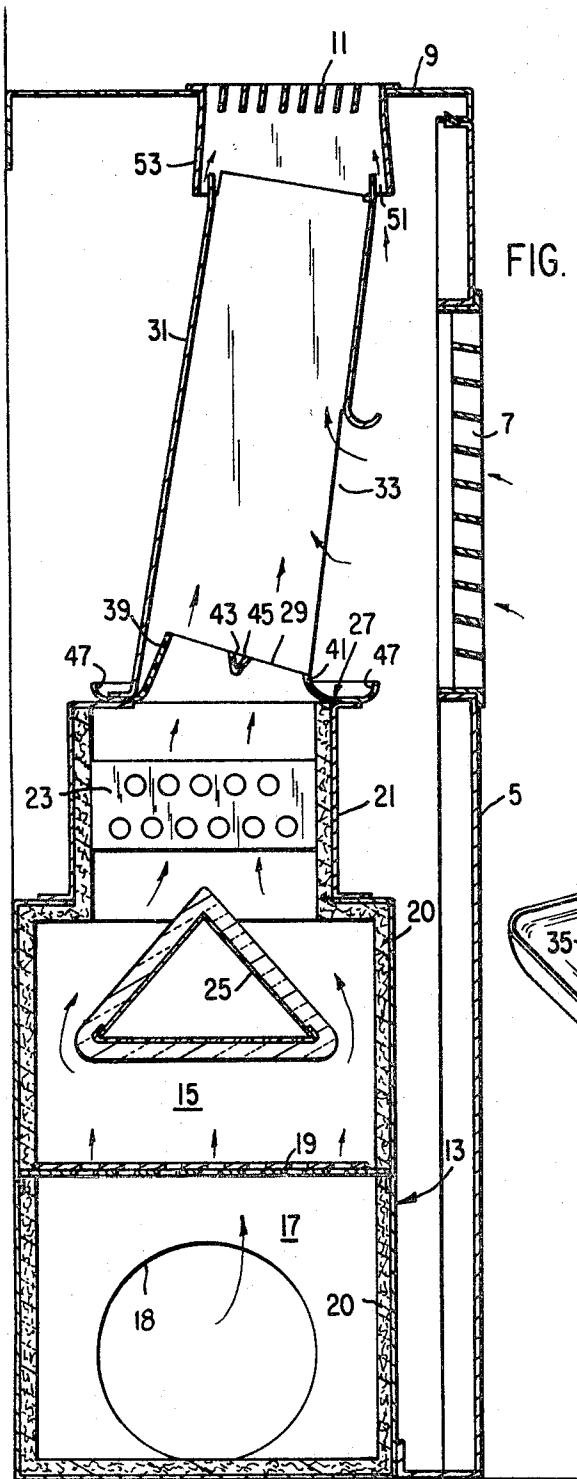


FIG. 1

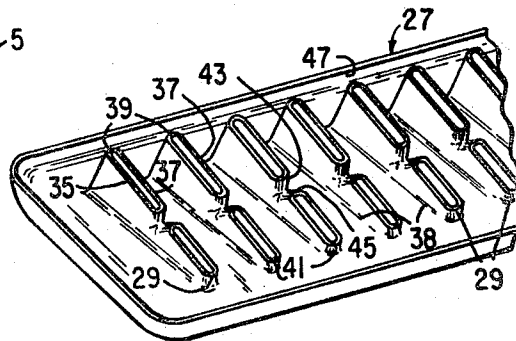


FIG. 2

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AIR DISTRIBUTION TERMINAL

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8 Claims

ABSTRACT OF THE DISCLOSURE

A room terminal for use in an air conditioning system employing reheat coils in the terminal to compensate for varying loads in the area served thereby. The unit is provided with a nozzle sheet for discharging the tempered air through a stack for inducing room air therethrough for further tempering the conditioned air.

Background of the invention

This invention relates to air conditioning units. More particularly, this invention relates to air conditioning units of the reheat type wherein air is conditioned at a central station and distributed to a plurality of air conditioning units for discharge into the area served by the units. A heat exchanger supplied with a conditioning medium is provided in each unit to temper the air flowing therethrough. By controlling the flow of conditioning medium according to the cooling load on the area being conditioned, the temperature of the area can be closely maintained at the desired level. For peak system efficiency, it is desirable to supply a minimal volume of conditioned air to the area being conditioned. To maximize unit efficiency while minimizing conditioned air volume, the conditioned air must be supplied at low temperatures. However, if extremely low temperature air were to be discharged into the conditioned area, problems would be encountered in attempting to mix the discharged air with room air sufficiently to prevent cold drafts in the area from causing discomfort to the occupants thereof.

Summary of the invention

In accordance with the preferred embodiment of this invention, an air conditioning terminal is provided for receiving conditioned air from a central source and discharging it through a balancing damper, tempering coils, and then through novel discharge nozzles arranged for inducing room air into a stack portion of the unit to cause mixing of the conditioned air and room air so that the air discharged from the unit is warmed sufficiently to minimize cold drafts in the area being conditioned.

Brief description of the drawing

FIGURE 1 is a sectional end view of a vertical reheat type room terminal; and

FIGURE 2 is a partial perspective view of the nozzle plate of our invention.

Description of the preferred embodiment

Referring to the drawings, there is illustrated a room terminal forming part of an air conditioning system of the kind used in large office buildings. The unit is generally known as a blow-through reheat unit and includes a casing comprising a front panel 5 provided with a room air inlet grille 7 and a top panel 9 having a mixed air outlet grille 11 therein. Within the casing there is provided a first enclosure 13, divided into a top plenum 15 and bottom plenum 17 by a sliding plate balancing damper 19. An inlet 18 is provided in the enclosure 13 to provide conditioned air from a central source (not shown) to bottom plenum 17. A second enclosure or tempering chamber 21, in communication with top plenum 15 is provided

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with a tempering coil 23 for passage of a heat exchange medium such as hot water therethrough. The first and second enclosures are lined with sound attenuating material 20 such as glass fiber blanket which also acts as insulation to minimize condensation on the enclosures. A triangularly shaped sound absorbing baffle 25 such as disclosed in application Ser. No. 649,942 filed concurrently with this application is disposed in top plenum 15 between damper 19 and chamber 21.

Discharge nozzle sheet 27 having a plurality of double nozzle rows 29 directs the tempered, conditioned air through mixing stack 31, thereby inducing room air to flow through opening 33 in stack 31 and mix with tempered air before being discharged into the room through discharge grille 11. Referring more particularly to the nozzle sheet, it can be seen that the nozzle pairs are comprised of relatively flat triangular shaped opposed upstanding walls 35 and 37 joined to the nozzle sheet by radius 38. The sides 35 and 37 are connected at their ends by generally curved upstanding end sections 39 and 41. A central V-shaped portion having curved walls 43 and 45 forms a partition to provide two nozzles from each pair of upstanding walls. This central partition results in two air streams from each nozzle, thereby increasing the induction interface between primary air and room air to improve mixing therebetween. The nozzle sheet has a curved lip 47 formed about its periphery to collect condensation that might form on the outside of stack 31 and on discharge nozzle sheet 27 due to the temperature variation between the cold air flowing through the unit and the warm room air. A space 51 is provided between the four sides of stack 31 and downwardly extending portions 53 of discharge grille 11. The discharge of air from stack 31 induces a flow of warm room air through space 51 thereby providing a warm blanket of air along downwardly extending portions 53 to insulate the top panel 9 from the cool air discharged from the unit to prevent condensation from forming thereon.

The smooth contours of the nozzle sheet and the stack result in a unit especially suitable for use in hospital installations due to the ease with which the external surface of the nozzle sheet and the stack surfaces may be sanitized. The design of the nozzles also results in efficient mixing of the conditioned and room air to prevent drafts in the area being conditioned.

While we have described a preferred embodiment of the invention, it is to be understood the invention is not limited thereto but may be otherwise embodied within the scope of the following claims.

We claim:

1. A room terminal for use in an air conditioning system comprising:
 - a first enclosure adapted for connection to a source of conditioned air;
 - a second enclosure communicating with said first enclosure;
 - heat exchange means disposed in said second enclosure for tempering the conditioned air passing therethrough from said first enclosure;
 - nozzle means associated with said second enclosure for discharging the tempered air therefrom; and
 - a mixing stack associated with said nozzle means for passage of air discharged from said nozzle means, said stack being oriented so as to prevent impingement of discharge air thereon, said stack having an opening therein along a surface defined by the edge of the air streams discharged from said nozzle means so as to cause room air to be induced into said stack by the air streams for mixing room air and conditioned air to further temper the conditioned air before it is discharged into the room.

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2. A room terminal according to claim 1 further including:

a casing having a top panel and a front panel associated therewith, said top panel being adapted for discharge of air into the room;

a room air inlet grille disposed in the front panel of said casing for admission of air into said casing for induction through said stack;

means associated with said top panel and said stack for inducing room air therebetween to produce a blanket of room air to insulate the top panel of said casing from the air discharged from said stack.

3. A room terminal according to claim 2 wherein said means includes a discharge grille disposed in said top panel, said grille having downwardly extending grille portions overlying the top edge of said stack so as to provide a space between said stack and said portions for induction of air therebetween.

4. A room terminal according to claim 1 further including a sliding plate damper dividing said first enclosure into a top plenum in communication with said second enclosure and a bottom plenum adapted for connection to a source of conditioned air, said damper being adjustable to regulate the quantity of air flowing through the unit.

5. A room terminal according to claim 1 wherein said nozzle means comprises a generally rectangular flat nozzle sheet having an up-turned flange along the periphery thereof, said nozzle sheet having a plurality of parallel paired nozzles formed therein, each of said nozzle pairs having generally triangularly shaped opposed upstanding walls formed on said nozzle sheet for discharge of air therebetween, said upstanding walls being joined to each other at the ends thereof by generally curved upstanding end sections, each of said nozzle pairs having a generally U-shaped partition between the upstanding walls thereof midway between the ends to form the two nozzles com-

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prising the nozzle pair, the nozzle orifices lying in a plane disposed at an angle to the plane of the nozzle sheet, the axis of said mixing stack being disposed perpendicular to the plane containing the nozzle orifices.

6. Air discharge means for use in an air conditioning room terminal comprising:

a nozzle sheet;

said nozzle sheet including a generally flat panel having a plurality of parallel nozzles formed therein, each of said nozzles having opposed upstanding walls formed on said nozzle sheet for discharge of air therebetween, said upstanding walls being joined to each other at the ends thereof by generally curved upstanding end sections.

7. Air discharge means according to claim 6 wherein said parallel nozzles have a generally U-shaped partition between the upstanding walls midway between the ends thereof to form two nozzles from each pair of opposed upstanding walls.

8. Air discharge means according to claim 6 wherein said opposed upstanding walls have a generally triangular shape, the nozzle orifices thereby lying in a plane disposed at an angle to the plane of the nozzle sheet.

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U.S. Cl. X.R.

98—38, 40