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OUTLET UNIT FOR VENTILATING PLANTS

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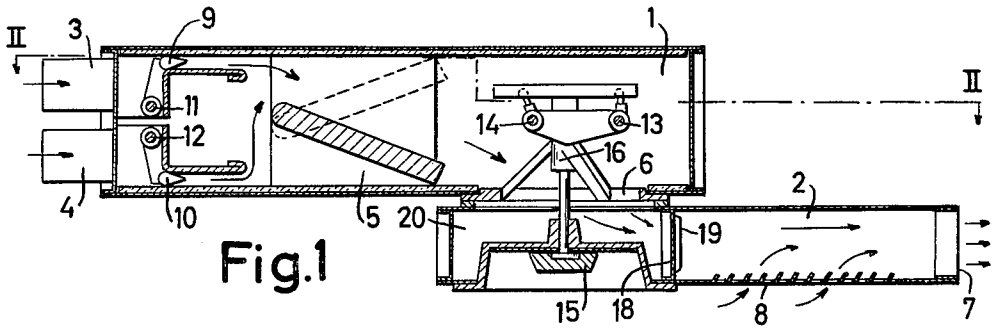


Fig.1

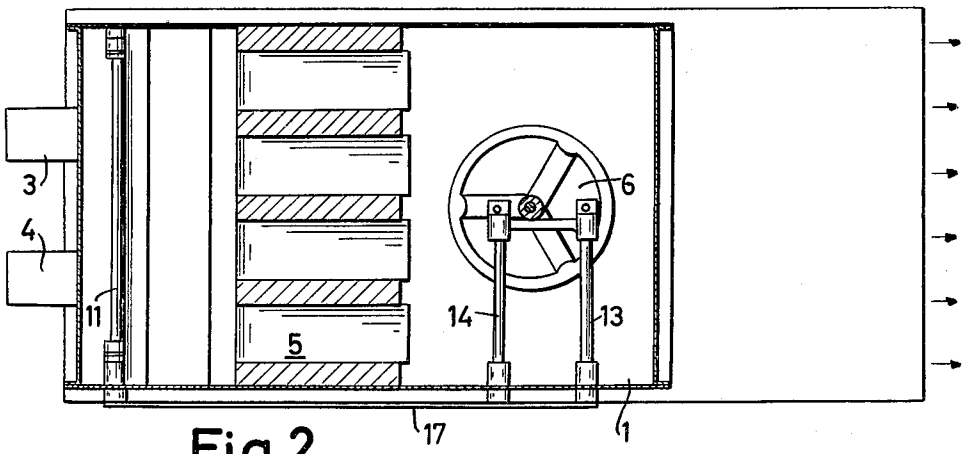


Fig.2

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OUTLET UNIT FOR VENTILATING PLANTS

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This invention relates to an outlet unit for ventilating plants, especially those in which fresh air is supplied at a pressure and velocity sufficient to cause circulation of the room air through induction.

In such outlet devices the aggregate stream of recirculated room air and supplied fresh air discharged through the outlet slots will have a fairly defined extent and direction, and though the relatively large amount of sucked in room air and the thorough mixing of secondary and primary air in the unit itself prevent excessive local velocities it will, nevertheless, be important that the stream of air discharged from the outlet may be directed in the desired way in relation to the walls of the room. Normally this will not cause any difficulty in comparatively large rooms in buildings, whereas it may prove difficult to secure satisfactory circulation in small or irregularly shaped spaces, particularly in means of transportation, for instance in ship's cabins, when standard types of units are employed. Finally, it may in certain cases be desirable to have different patterns of circulation in the same room at different times.

With a view to attaining the aforementioned object this invention provides an outlet device of the type described, consisting of two parts which are rotatably interconnected, the one part, to which the fresh air supply is connected, containing regulating devices for the air supply, whereas the other part is divided by a transverse partition with nozzle orifices into a plenum chamber into which the air enters from the first part, and an induction chamber provided with room air inlets in one or more side walls and outlet openings for the mixture of room air and supply air in the end wall opposite to the partition.

This outlet design makes it possible to lead the mixture of room air and supply air in any desired direction without the necessity of altering the position of more than one part of the outlet unit, and without interfering with the supply air connections, whereby the necessity of having movable supply air connections with the consequent risk of leakages is obviated. Thus, it will be possible, through the use of prefabricated standard parts, to secure the desired pattern of circulation under any kind of installation conditions by the proper adjustment of the part of the unit which contains the induction chamber and outlet openings for the discharged air.

With a special view to marine applications the stationary part of the unit may appropriately be made in the shape of a flat, prismatic box, dimensioned for location between deck beams below the ceiling of cabins, the other part of the unit, which is rotatably attached to the under surface of the box, being free to move in a horizontal plane immediately below the lower edge of the deck beams.

The unit would thus occupy the least possible amount of useful space, and the circulation of air might be adjusted once and for all during the installation or at any time during the operation of the unit to flow in any desired direction by turning the swivelling part of the unit which moves freely under the ceiling. Incidentally, the embodiment may appropriately incorporate a fixed spider mounted axially in the opening of the stationary part communicating with the swivelling part, this spider being provided with a hub forming an axis of rotation for the movable part and fitted with operating controls for the air regulating mechanisms projecting through the movable part.

This arrangement secures that the air regulating devices always remain in place without variation of the setting, irrespective of any movement of the swivelling part.

The invention is illustrated by the drawings showing an embodiment in which

FIG. 1 gives a partially schematic, longitudinal section through an outlet unit according to the invention, designed for marine application, and

FIG. 2 is a section along line II—II in FIG. 1.

As illustrated in the drawings, the outlet unit comprises a first box-like enclosure **1** to be mounted in fixed position in a room which is to be ventilated and having separate hot and cold air inlet ducts **3** and **4** entering one end of the enclosure, the top, opposite end, and side walls of the enclosure being closed. In order to control the proportions of hot and cold air entering the enclosure **1** from the ducts **3** and **4**, respectively, two valves **9** and **10**, controlled by rotation of corresponding shafts **13** and **14** are mounted in the inner ends of the inlet ducts, respectively. Also, to reduce noise caused by the flow of air through the valves, a sound trap **5** composed, for example, of a transverse row of adjacent vanes sloping alternately upwardly and downwardly from the center of the enclosure may be included in the outlet unit.

Near the opposite end of the enclosure **1** an annular rim **6** is mounted in a corresponding circular opening in the bottom surface of the enclosure and three spoke-like legs affixed to the rim converge upwardly and inwardly therefrom to support a hub member **16** centrally of the opening, thus forming a spider. Another box-like enclosure **2** is mounted for rotation about the opening in the bottom surface of the enclosure **1** by a vertical shaft extending downwardly from the hub **16** and a cap member at the lower end of the shaft having an annular flange extending outwardly to support the lower wall of the enclosure **2**. A circular opening in the top of the rotatable enclosure communicates with the opening in the fixed enclosure and an annular gasket surrounding these openings prevents leakage of air through this connection while permitting rotation of the enclosure **2** with respect to the fixed enclosure **1**. Thus, in order to direct air to any particular area of a room the enclosure **2** can be turned, as by hand for example, to the required orientation.

A transverse partition **18** closes off the pivoted end of the enclosure **2** to divide the enclosure into a plenum chamber **20** receiving air at relatively high pressure and an induction chamber at the end opposite the pivoted mounting. A plurality of orifices in the partition **18**, such as the vertical slots **19** shown in the drawings, direct primary air at relatively high velocity from the plenum chamber **20** into the induction chamber and toward outlet openings **7** at the opposite end of the enclosure. At the bottom wall of the induction chamber an inlet grille **8** permits air from the room to be drawn in by induction and mixed with the stream of primary air from the slots **19**, the mixture of room air and primary air then being discharged through the outlet openings **7** at relatively low velocity.

In order to operate the valves **9** and **10** from a position within the room a control knob **15**, connected through a shaft within the hub **16** and through a conventional pivoted linkage, turns two adjusting shafts **13** and **14** which are linked to the valve shafts **11** and **12** through two connecting rods **17**, respectively, only one of which is visible in FIG. 2.

The detailed design of these regulating mechanisms is of no consequence as far as the invention is concerned, and the supply of primary air may comprise hot air only or cold air only, depending on the design of the ventilating plant in question.

The stationary box **1** may contain heat exchange devices in the shape of heating or cooling coils, the regu-

lating mechanisms of which may be arranged in a similar manner as the schematically illustrated operating controls 15.

What I claim is:

1. A ventilating system comprising a fixed enclosure arranged to receive air under pressure and having an opening in one wall, a second generally oblong enclosure having a corresponding opening in one side wall and adjacent to one end, said one side wall being located parallel and adjacent to said one wall of the fixed enclosure with the corresponding openings in alignment, support means between the fixed enclosure and the second enclosure for supporting the second enclosure for rotation relative to the fixed enclosure about an axis perpendicular to the two openings so that the second enclosure communicates with the fixed enclosure through the two openings, outlet means at the other end of the second enclosure to direct air received from the first enclosure away from the axis of rotation, a transverse partition in the second enclosure dividing this enclosure into a plenum chamber communicating with the fixed enclosure and an induction chamber communicating with the outlet means and having a plurality of orifices to direct air from the plenum chamber toward the outlet means, and a grille in one side of the induction chamber to permit air to be drawn in from outside the second enclosure by induction.

2. A ventilating system comprising a fixed enclosure arranged to receive both hot and cold air under pressure and having an opening in one wall, valve means for controlling the amounts of hot and cold air entering the enclosure, a sound trap positioned within the fixed enclosure between the valve means and the opening, a second generally oblong enclosure having a corresponding opening in one side wall and adjacent to one end, said one side wall being located parallel and adjacent to said one wall of the fixed enclosure with the corresponding openings in alignment, support means between the fixed enclosure and the second enclosure for supporting the second enclosure for rotation relative to the fixed enclosure about an axis perpendicular to the two openings so that the second enclosure communicates with the fixed enclosure through the two openings, outlet means at the other end of the second enclosure to direct air received from the first enclosure away from the axis of rotation, a transverse partition in the second enclosure dividing this enclosure into a plenum chamber communicating with the fixed enclosure and an induction chamber communicating with the outlet means and having a plurality of orifices to direct air from the plenum chamber toward the outlet means, and a grille in one side of the induction chamber to permit air to be drawn in from outside the second enclosure by induction.

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