

S. GEROMET

VENT

FIG. 1

FIG. 2

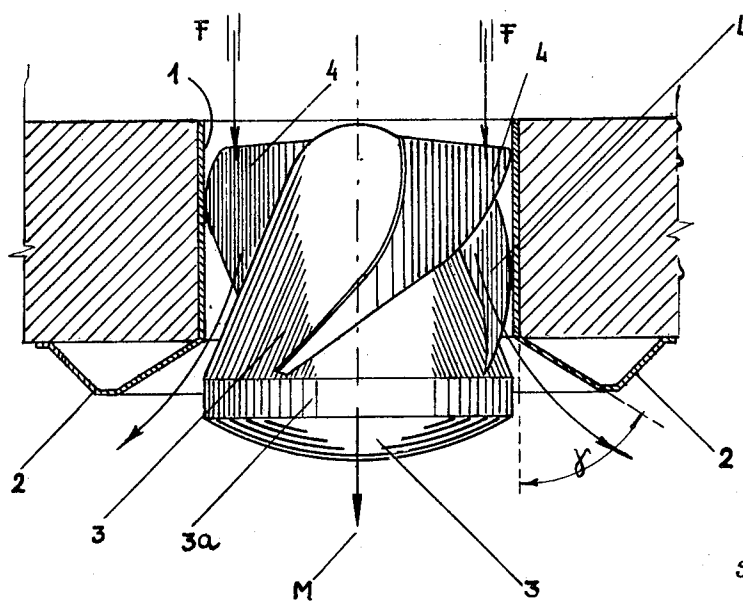


FIG. 3

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1

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VENT

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8 Claims

ABSTRACT OF THE DISCLOSURE

A ventilator comprises a frame defining a cylindrical passage through which air is adapted to flow. A closure member is located in this passage and movable deeper into the same whereby to close the passage against flow of air, and further out of the passage to define with the wall bounding the passage annular gaps whose cross-sectional area increases as the closure member moves farther out of the passage.

BACKGROUND OF THE INVENTION

The present invention relates to a vent, and more particularly to a ventilator for use in effecting the exchange of air in rooms where the ventilator is installed.

It is already known to install vents or ventilators in the walls of rooms so that stale air may escape and fresh air be introduced into a room thus equipped. These ventilators are distinct from fans in that they have no means for inducing the flow of air, as do the blades of a fan. In effect, they are frames which define an opening and a closure means for this opening.

The problem with these known ventilator constructions is twofold, in that on the one hand such conventional devices do not permit an efficient control and variation of the quantity of airflow, while on the other hand, they do not provide for proper admixture of newly-introduced air with the air already present in a room.

The present invention is intended to overcome these problems and to provide an improved vent of the type under discussion.

SUMMARY OF THE INVENTION

A vent comprising, in combination, frame means having an inwardly directed surface bounding a cylindrical passage having spaced axial end portions and being adapted for flow of a fluid therethrough, and a flow-controlling plug member extending into one of the end portions of the passage and being movable axially of the latter between a first position closer to the other of the end portion and in which it completely closes the passage, and a plurality of second positions progressively farther spaced from the other end portion and in which the member defines with the surface respective annular gaps whose cross-sectional area increases with increased spacing of the member from the other end portion.

With a vent constructed according to my invention the drag of air passing therethrough is considerably reduced, thus increasing the airflow. At the same time, the quantity of air passing through the device can be simply and in effect continuously varied, and new air is thoroughly and intimately admixed with air present in the room if, also in accordance with my invention, the device is provided with means for imparting to the incoming air a swirling motion. Also, the adjustability of the device permits setting of the same for maximum desired airflow with minimum air turbulence in the room, even in the vicinity of the ventilator itself.

2

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a front elevation of a ventilator according to the invention, installed in and through a wall;

FIG. 2 is a section on the line II—II of FIG. 1, with the closure member omitted; and

FIG. 3 is a partly sectioned view, taken on the line III—III of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

As clearly shown in FIGURES 1–3, the device according to my invention comprises a frame which defines a tubular seat or passage 1 of substantially elliptic cross-section. The frame is installed through a wall of a room, as best seen in FIG. 3, in which the direction of airflow from the outside into the room is indicated by the arrows F.

The inner end portion of the passage 1 is bounded by a perimetric inner wall surface 2 which flares outwardly and axially away from the passage 1. The surface 2 thus defines an extension of the passage 1.

FIG. 2 shows clearly that the degree of flow of the surface 2 that is the inclination of the same with reference to the longitudinal axis of the passage 1, is different at different circumferential locations. The smallest angle of inclination is to be found at the side which will face the room ceiling when the device is installed.

This angle is indicated in FIG. 2 as the angle α . On the side opposite the one just discussed that is the side facing the flow of the room, the angle of inclination of the surface 2 is identified as the angle β which is greater than α and is assumed in this instance to approach 45°. The angle γ at the sides (see FIG. 3) is still greater and is assumed to approach 60° in the present embodiment.

This configuration of the surface 2 makes it possible to position the device very close to the ceiling S of a room—the distance h shown in FIG 2 being the minimum showing from the ceiling—and assures the most advantageous air distribution in sidewise and in downward direction.

Arranged in the passage 1 coaxially therewith is a closure plug member 3 of substantially paraboloid outline. Due to the configuration of the member 3, coupled with the cross-section of the passage 1, movement of the member 3 deeper into the passage 1 opposite the arrow M (see FIG. 3) will result in complete closure of the passage 1 as is readily evident from FIG. 3.

Movement of the member 3 in the direction of the arrow M, on the other hand, will result in establishment of an annular gap between the head 3a of member 3 and the surface bounding the passage 1, and the cross-sectional area of this gap will be the greater the farther the member 3 is moved in direction of the arrow M. This, then, permits continuous variation of the cross-sectional area of such annular gap, and therefore of the quantity of air which can pass through the device in the direction of the arrows F.

I further provide the outer surface of the member 3, rearwardly of the head 3a, with at least one and preferably with a plurality of radially prejecting air-guide blades 4 which are helically convoluted as seen in FIG. 3. These blades 4 will impart a swirling or twisting motion

3

to air passing through the device, so that such air will spin when entering the room and will thereby be assured of better admixture with air already present in the room.

The blades 4 also serve the purpose of guiding and centering the member 3 in the passage 1 for axial movement therewithin. Further, springs (not shown) or other means can be employed—for instance interposed between member 3 and the wall bounding the passage 1—to stabilize the member 3 and provide some frictional resistance to prevent unintentional movements of the member 3.

It will be understood that each of the elements described above or two or more together, may also find a useful application in other types of devices differing from the types described above.

While the invention has been illustrated and described as embodied in a vent it is not intended to be limited to the details shown since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be protected by Letters Patent is set forth in the appended claims:

1. An air vent for installation in wall means separating an enclosed area from ambient space so as to exchange air between the two through the intermediary of said air vent, comprising in combination, frame means for installation in said wall means and having an inwardly directed surface bounding a cylindrical passage having spaced axial end portions respectively communicating with said area and said ambient space and being adapted for flow of a fluid therethrough; a flow-controlling plug member extending into one of said end portions of said passage and having a cross-sectional area which decreases from said one end portion of said passage so as to create a free passage portion of diverging cross-sectional area, said plug member being movable axially in said passage between a first position closer to the other of said end portions and in which it completely closes said passage, and a plurality of second positions progressively farther spaced from said other end portion and in which said member defines with said surface said free

4

passage portion whose cross-sectional area increases with increased spacing of said member from said other end portions; and fin means provided on said plug member extending into contact with said inwardly directed surface of said passage for guiding said plug member in the same.

2. A vent as defined in claim 1, wherein said flow-controlling plug member has an outer peripheral surface defining a substantially parabolic outline.

3. A vent as defined in claim 1, wherein said plug member is coaxial with said passage.

4. A vent as defined in claim 1 wherein said one end portion of said passage has a cross-sectional area larger than the remainder of said passage, said inwardly directed surface having a perimetric portion bounding said passage in the region of said one end portion and flaring outwardly and in direction away from said other end portion.

5. A vent as defined in claim 4, wherein said perimetric portion of said inwardly directed surface flares outwardly at different degrees at different circumferential locations of said one end portion.

6. A vent as defined in claim 1, wherein said fin means also constitutes fluid-directing means operative for imparting an angular component of movement to fluid flowing through said passage in axial direction of the latter.

7. A vent as defined in claim 5, wherein said perimetric portion flares to a lesser first and a greater second degree at opposite sides of a first axial plane bisecting said passage, and to a greatest third degree at opposite sides of a second axial plane bisecting said passage and extending normal to said first axial plane.

8. A vent as defined in claim 6, wherein said fin means comprises at least one helically convoluted blade projecting substantially radially of said passage.

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