Oct. 29, 1957 H. F. LATHROP 2,811,093

DEFLECTOR VANE

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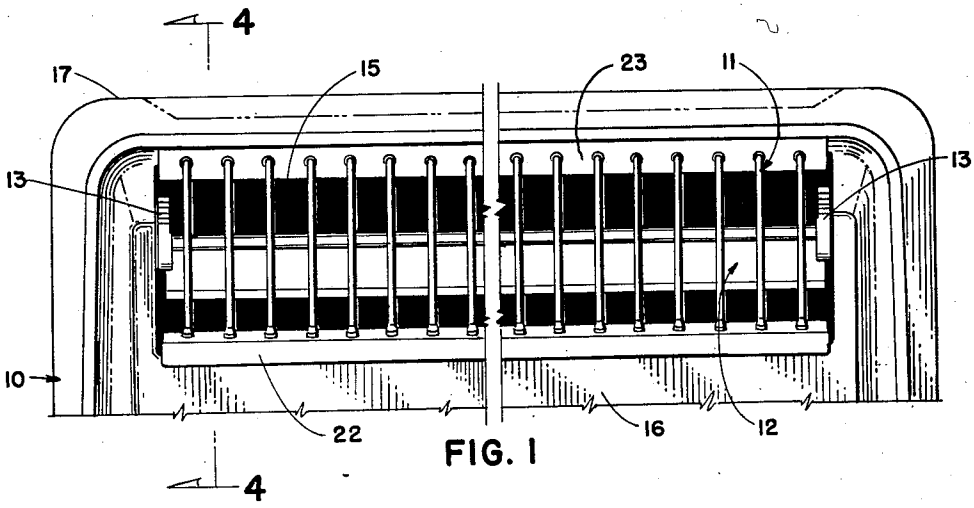


FIG. 1

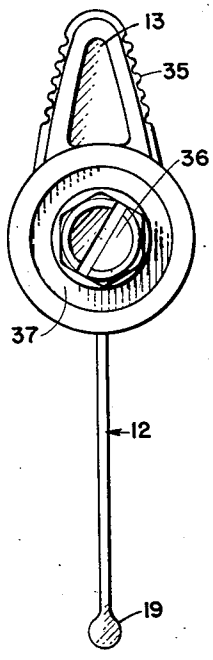


FIG. 2

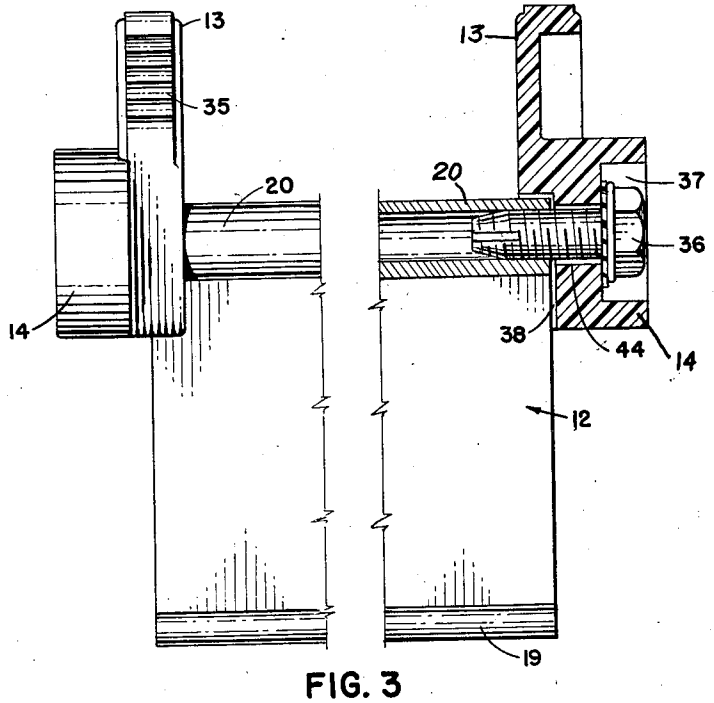


FIG. 3

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FIG. 4

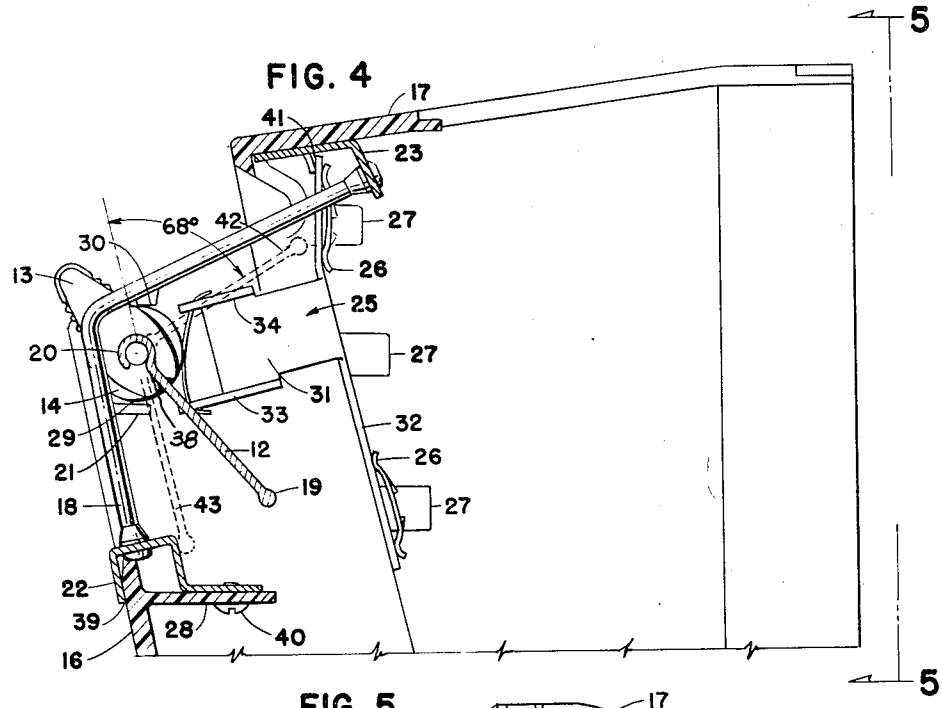
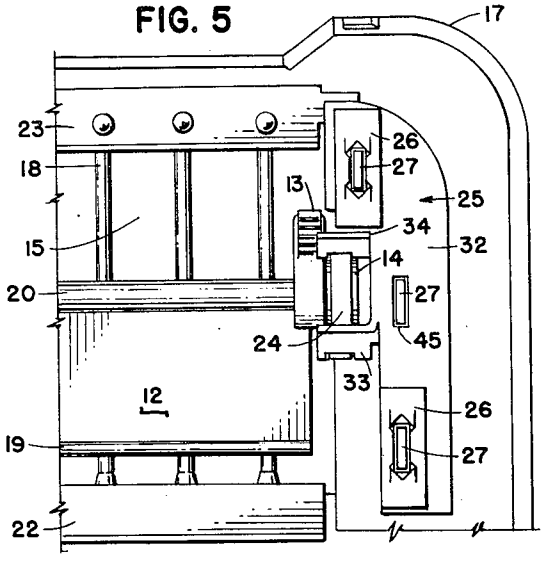


FIG. 5



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DEFLECTOR VANE

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7 Claims. (Cl. 98—40)

This invention relates to air conditioning and ventilating apparatus and more particularly to a structure for controlling the flow of the conditioned air into the room or other enclosure which is being ventilated.

This invention, comprises a deflector vane with finger tab controls, in combination with a wire grill bent in substantially a 90 degree angle and is especially adaptable for use on the top front portion of room air conditioners or similar ventilating apparatus. It is, of course, well known in the ventilating and air conditioning art to change the course of the air flow by means of horizontal or vertical vanes positioned in the path thereof, and to have air outlets for the conditioned air flowing from a room air conditioner on the front vertical portion of the air conditioner which extends within the room or enclosure. It is also well known in the prior art to provide an opening in the top horizontal portion of the air conditioning apparatus which extends within the room for permitting the conditioned air to flow into the enclosure.

The present invention provides a single vane structure which permits the air to flow at any desired angle from an opening at the junction between vertical and horizontal walls of a plenum chamber or the like. This avoids the limitations which are inherent in either a horizontal opening or in a vertical opening by itself. By means of the present novel outlet opening and grill structure, it is possible to control selectively the flow of the conditioned air through a wide range of exit directions relative to the chamber. Thus, the conditioned air may be made to flow horizontally into the room for direct cooling or it may be forced in a substantially vertical direction for indirect cooling of the air within the room.

As noted above, prior art structures for control of the air flow may be generally described into two broad classifications—devices which cause the air to flow in a direction substantially perpendicular to the plane described by the front vertical surface of the air conditioner, and devices which cause the air to flow in a direction substantially parallel to the plane described by the front vertical surface of the air conditioner. In structures having an opening at the intersection of the top and front walls, it is conventional to use a plurality of vanes or air deflectors to change the direction of the conditioned air.

The instant invention provides a great improvement over conventional air distribution devices by its simplicity wherein only one deflector vane is utilized in combination with an opening to provide an extremely flexible ventilating system. According to the invention the single large vane is positioned in the path of the conditioned air flowing from the room air conditioner. It is pivoted about one horizontal edge placed adjacent the junction between the front and top walls and by moving the vane about its horizontal edge, the flow of air may be directed from a downward path to a substantially vertical path with any variation between. The deflector vane is sufficiently large to change the direction of the air flow from the room air conditioner unit, as distinguished from vanes known in the prior art which merely cause a turbulence or a "bump"

in the normal direction of air flow. The vane is provided with non-obvious, finger tip controls on either end. To change the direction of the air flow, the user needs merely to change the position of the single deflector vane until the desired mixture and the combination of air flow is obtained. With this single vane in combination with the substantially 270 degree external opening relative to the vane pivot axis at the corner between the top and front of a room air conditioner, it is possible to have a part of the air flow horizontally into the room and another part follow a vertical path or a downward path. Thus, the present invention has provided for the first time a single air control device comprising a wide vane which permits the flow of air to be controlled selectively in two directions simultaneously, separately or with any number of combinations varying from a downward direction to a substantially vertical direction.

It is, therefore, an object of the present invention to provide a novel means for controlling the flow of air from a ventilating apparatus.

It is also an object of this invention to provide an opening along the front top portion of a ventilator thereby permitting air to flow in any direction from an opening described by an arc of 270 degrees.

It is a further object of this invention to provide a single vane for controlling the direction of air flow and which is pivoted about a horizontal edge adjacent the corner between a pair of open walls.

Still another object is to provide a deflector vane which is comparatively large and hinged about one horizontal edge.

Yet another object is to provide an air flow control whereby the air may be directed from a downward position up to a substantially vertical direction.

Still another object is to provide a structure for controlling the flow of air comprising in combination a single deflector vane with a horizontal and vertical opening.

Still a further object of this invention is to provide a single vane for controlling the flow of air with direct control means attached thereto.

It is still another object of this invention to provide a single deflector vane which may be controlled from either end.

Still other and further objects of the present invention will become apparent to those skilled in the art from a consideration of the attached drawings in which a preferred embodiment is shown by way of illustration only.

In the drawing:

Figure 1 is a front view of the discharge opening and grill structure of a unit air conditioner and deflector vane;

Figure 2 is an end view of the single deflector vane;

Figure 3 is a side view and partial sectional view of the single deflector vane and finger tip control;

Figure 4 is a fragmentary sectional view taken along the line 4—4 of Figure 1; and

Figure 5 is a fragmentary sectional view taken along line 5—5 of Figure 4.

As shown in the drawings:

As shown in Figure 1 a cabinet **10** is provided in which conventional air conditioning apparatus is mounted, comprising a condenser and an evaporator, and a compressor for circulating the refrigerant throughout the system.

The present invention is concerned with the interior top portion of the air conditioner cabinet **10** having a front wall **16**, a top wall **17**, and a discharge outlet **15** at the intersection of said walls. Within the discharge outlet **15** a wire grill **11** is positioned, as will more fully appear below.

As shown, a deflector vane **12** is horizontally disposed in the discharge outlet **15** behind the wire grill **11**. At either end of the deflector vane **12** a finger tip control

knob 13 is secured thereto and provides for selectively positioning the deflector vane.

The grill 11 is composed of a horizontal bottom support channel 22 and a top horizontal support 23 with horizontally spaced wires 18 spaced uniformly along the length thereof with their ends rigidly attached to the supports. In a preferred embodiment of my invention the bottom support channel 22 abuts the front wall 16 of the cabinet 10 at 39 and rests on an inwardly protruding flange 28. The top support angle 23 is juxtaposed with the interior of top wall 17 and rigidly secured relative thereto. The rigidification supplied by the members 18 of the grill structure provides a support structure for the front of the air conditioner cabinet 10 and at the same time provides for the maximum flow of air into the room. The grill 11 is held in position by means of screws 40, and down-turned flange 41 of the top support angle 23, said downturned flange 41 abutting deflector hinge bracket 25 and being maintained in position thereby.

It is to be noted in Figure 4 that the discharge outlet 15 comprises an opening at the front wall 16 and the top wall 17 of the air conditioner cabinet 10 and that the deflector vane 12 is pivoted about its edge on an axis adjacent the line of intersection of the walls if extended. Thus air being discharged from the air conditioner may be directed in any one of a number of directions varying from a slightly downward direction to a substantially vertical direction as further set forth below.

As shown in Figures 3 and 4, the main portion of deflector vane 12 is a substantially flat oblong aluminum extrusion with a structural reinforcing bead 19 at one longitudinal edge thereof, and an arcuate longitudinally extending structural eye portion 20 at the opposite longitudinal edge formed to receive a thread cutting screw 36. At each end of the deflector vane a finger control knob 13 is secured for selectively positioning the deflector vane 12.

Each finger tip control knob 13 is composed of a finger grasping surface 35, and a circular recess 37 to receive the head of screw 36. The cylindrical hub or flange 14 surrounding the recess 37 provides an annular bearing surface when the deflector vane is in position for use. Each knob 13 has an aperture 44 therein centrally located relative to the bearing surface 14. As shown in Figures 2 and 3 a self tapping or thread cutting screw 36 is inserted through aperture 44 and threaded into the eye portion 20 of the deflector vane 12. A slot 38 is provided in that portion of the finger tip control knob 13 which is opposite the finger tip 35 and opposed to recess 37. Into this slot 38 the eye 20 and the adjacent end edge portion of the deflector vane 12 are positioned, thus permitting the vane to extend into the knob 13. This provides an operative unit comprising the two finger tip control knobs and the deflector vane 12 even though screws 36 may become slightly loose. Further, the eye 20 is firmly supported by the material of the knobs 13, thereby preventing splitting of the eye during installation and use of the knobs.

As shown in Figures 4 and 5 the deflector vane 12 assembled with the control knob 13 on either end thereof is horizontally positioned in the discharge outlet 15. The cylindrical hub 14 of each control knob 13 seats on a lower upwardly and forwardly inclined flange 21, as shown at 29, and contacts an upper boss 30, adjacent the corresponding end of vane 12. A deflector hinge bracket 25 having an arm 31 projecting forward and having laterally bent flanges 33 and 34 thereon carrying a spring 24 is provided to exert pressure on the bearing surface 14 such that the deflector vane 12 is resiliently positioned in the discharge outlet 15. The deflector hinge bracket 25 has a substantially vertical flat surface 32 in which there are three apertures 45, and through which extend molded protrusions 27 forming a part of the cabinet wall. The deflector hinge bracket 25 is securely positioned by means of spring clips 26 which are forced into wedging contact with protrusions 27. As indicated before, this deflector hinge bracket abuts downturned flange 41 of the top angle support 23 and thus holds the top portion of the grill in position.

The flange 21 and boss 30 at each end of vane 12 provide a forwardly converging passage into which the hub 14 of knob 13 is urged by spring 24, which holds the bearing surface of hub 14 in pressure contact with flange 21 and boss 30, as will be clear from what has been said. The spring 24 exerts a sufficient pressure on bearing surface 14 of control knob 13 to provide an automatic positioning means for the deflector vane 12. The force exerted by spring 24 is such that the deflector vane 12 may be manually moved by either control knob 13 without binding but at the same time remaining in a fixed adjusted position as selected by the user.

In operation the deflector vane may be positioned in any one of a number of various positions varying from a top position of the vane as indicated in dotted lines at 42 to the bottom position of the deflector vane 12 as indicated in dotted lines at 43. It is to be noted that by the use of a single properly positioned deflector vane only, I have provided a single means of directing the conditioned air into a room in any direction varying from a downward direction to a substantially vertical direction. When the deflector vane 12 is in a position as indicated at 43, the air is directed substantially vertically into the room from its initial substantially horizontal flow direction. Similarly when the deflector vane is in position as indicated at 42, some of the conditioned air is directed in a downward direction and the other conditioned air enters the room in a substantially horizontal direction. If it is desired that all the air enter the room horizontally, the deflector vane merely need be positioned with its plane of greatest area in a horizontal position. Thus, it may be seen, that with a single deflector vane I have provided a means for directing conditioned air into a room in any direction and with any desired air mixture thereby providing direct and indirect air conditioning means with the same simple device.

While the form of embodiment of the invention at hand as herein disclosed constitutes a preferred form, it is to be understood that other forms may be adapted without departing from the scope of the claims which follow.

I claim as my invention:

1. In combination with a cabinet having an air conditioning apparatus mounted therein for cooling and conditioning air, an opening in said cabinet at the intersection of a pair of substantially horizontal and vertical walls, a grill positioned in the combined horizontal and vertical opening, said grill comprising a plurality of wires in horizontal spaced relation, a horizontally extending support channel at both ends of said wires, said wires perpendicularly attached to said horizontally extending support channel at said ends, a single deflector vane horizontally positioned for rotation in spaced relation behind said grill structure, finger tip control means on either end of said deflector vane and each having an operating lever extending through the grill structure at either end thereof for rotating said vane, and means for maintaining said control means in adjusted angular position, whereby the conditioned air from within said cabinet may be selectively directed without the cabinet between said wires.

2. An operator and support for a vane having an axially extending enlarged rib portion having an opening therein and an end edge comprising a cylindrical body portion, a laterally extending protrusion integral with said body portion remote from one end thereof, an axial bore through said body portion, a cylindrical recess at the end of said bore opposite said one end and a radial slot extending laterally from said recess whereby the end of said vane may be extended into said body portion with said rib portion in said recess and secured therein by a fastener extending from said one end through said bore into said opening in said rib portion and whereby the said end edge is positioned in said slot thereby transferring rotation of said body to said vane by the sides of said slot.

3. A deflector vane comprising a substantially flat oblong member having along one lengthwise edge thereof a reinforcing eye element, an adjusting knob comprising a cylindrical hub having a concentric bore and provided with a substantially radial recess extending from said bore, said recess receiving said eye element and the adjacent end edge portion of said vane, and a securing member passing through said bore and secured in said eye member effective for securing said vane to said knob for turning movement therewith, said hub providing an annular bearing surface for mounting said vane for turning movement about the axis of said hub.

4. In combination with a deflector vane for positioning in an opening in a cabinet having an air conditioning apparatus mounted therein, a finger tip control means at one end of said vane comprising a cylindrical hub with a blunt gripping projection integral therewith, said hub having a concentric recess extending from its outer face and a concentric bore extending from said recess and being provided at its inner face with a substantially radial slot extending from said bore, the adjacent end edge of said vane extending into said slot and having an opening aligned with said bore, and a headed securing member extending through said bore into said opening in said vane effective for securing the latter in said slot with the head of said member seated in said recess.

5. In combination with a deflector vane for positioning in an opening in a cabinet having an air conditioning apparatus mounted therein, a finger tip control means at one end of said vane comprising a cylindrical hub with a blunt gripping projection integral therewith, said hub having a concentric bore extending therethrough and being provided at its inner face with a substantially radial slot extending from said bore, the adjacent end edge of said vane extending into said slot and having an opening aligned with said bore, and a securing member extending through said bore into said opening in said vane effective for securing the latter in said slot.

6. In combination with a cabinet having a substantially horizontal top wall and a substantially vertical front wall and provided with a substantially oblong air outlet opening extending into the adjacent portions of said walls, a substantially flat oblong deflector vane extending lengthwise of said opening, means adjacent the ends of said

opening comprising upper and lower members defining between them forwardly converging passages, coaxial adjusting knobs secured on the ends of said vane respectively comprising a cylindrical hub of a diameter greater than the distance between said upper and lower members of the respective passages, said hubs being disposed between said upper and lower members, and means yieldingly urging said hubs forwardly in said passages in pressure contact with said upper and lower members effective in cooperation therewith for supporting said vane for turning movement about the axis of said hubs and holding it in adjustment about such axis.

7. In combination with a cabinet having a substantially oblong air outlet opening, a deflector vane controlling said opening, means adjacent the ends of said opening comprising upper and lower members defining between them passages converging toward said opening, coaxial adjusting knobs secured on the ends of said vane respectively comprising a cylindrical hub of a diameter greater than the distance between said upper and lower members of the respective passages, said hubs being disposed between said upper and lower members, and means yieldingly urging said hubs forwardly in said passages in pressure contact with said upper and lower members effective in cooperation therewith for supporting said vane for turning movement about the axis of said hubs and holding it in adjustment about such axis.

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