United States Patent [19]

Ring

[11] **3,713,376**

[45] **Jan. 30, 1973**

[54] **AIR-CONDITIONER AIR-DIRECTING MEANS**

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[73] Assignee: **General Electric Company,** Louisville, Ky.

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[21] Appl. No.: **126,504**

[52] **U.S. Cl.** **98/110,** 98/94, 62/262

[51] **Int. Cl.** **F24f 13/00**

[58] **Field of Search** .....98/110, 88 L, 40 VM, 99 A, 98/121, 94

[56] **References Cited**

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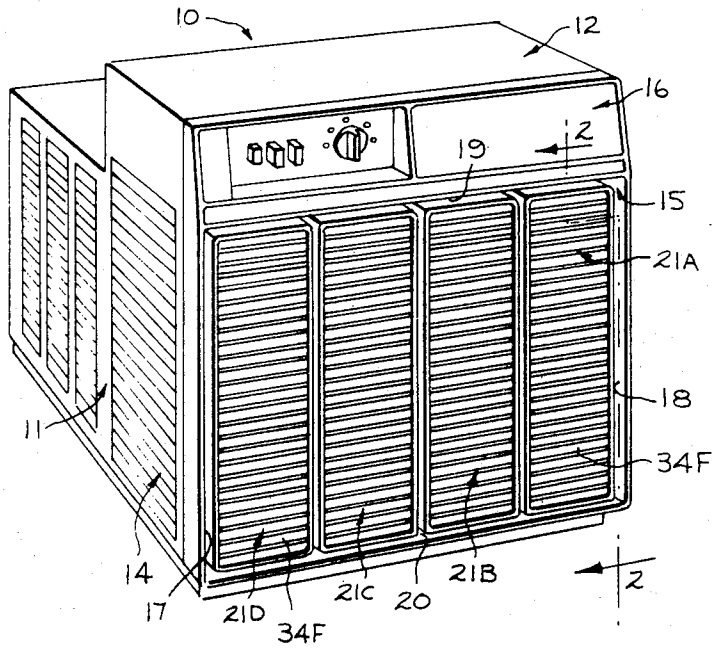
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Primary Examiner—Meyer Perlin
Assistant Examiner—Ronald C. Capossela
Attorney—Francis H. Boos, Jr., Frank L. Neuhauser, Oscar B. Waddell, Joseph B. Forman and Walter E. Kule

[57] **ABSTRACT**

This invention provides improved means for directing the flow of conditioned air from an air-conditioner. The improved air-directing means are adapted to be mounted in a conditioned-air discharge opening from an air-conditioner and readily removed therefrom. They include at least one nozzle-like member which has two opposite ends and an axle on each of them. The axles are journalled for pivotal movement relative to the opening in bearings provided on opposite edges of the opening. At least one of the bearings is slotted to permit easy insertion and removal of one of the axles into and from it. Resilient fastener means are provided for releasably retaining the axle in the slotted bearing.

1 Claim, 7 Drawing Figures



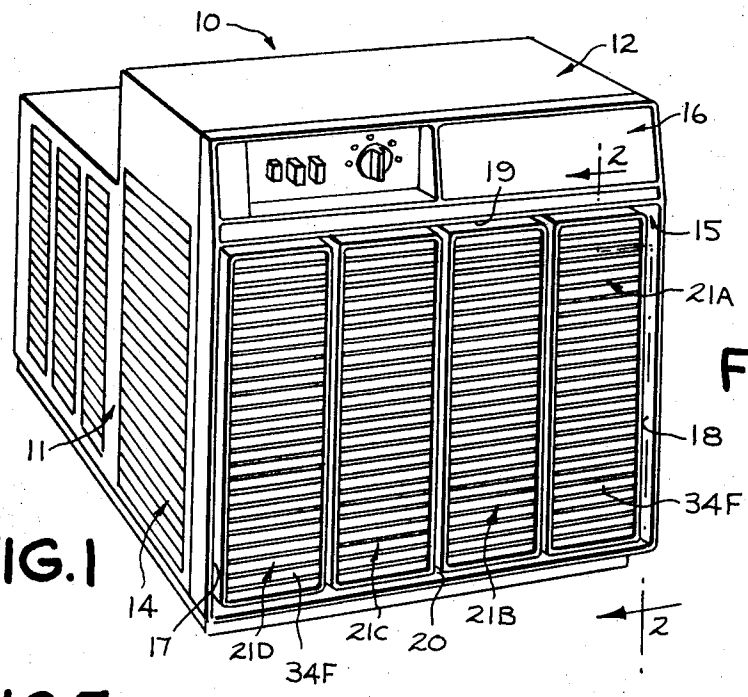


FIG. 1

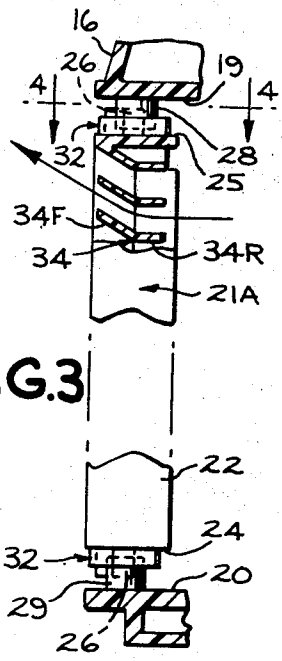


FIG. 3

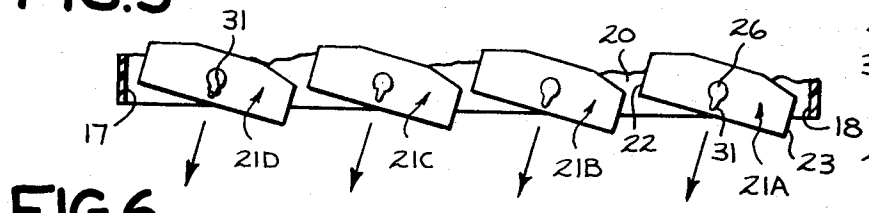


FIG. 5

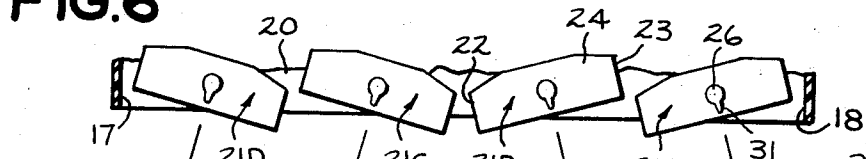


FIG. 6

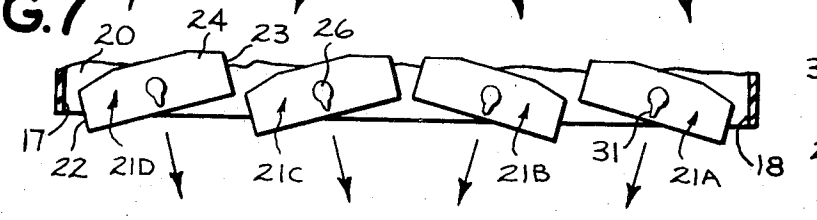


FIG. 7

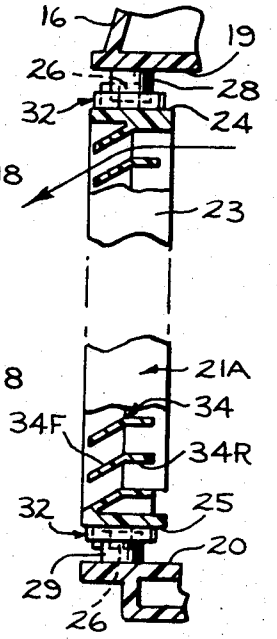


FIG. 2

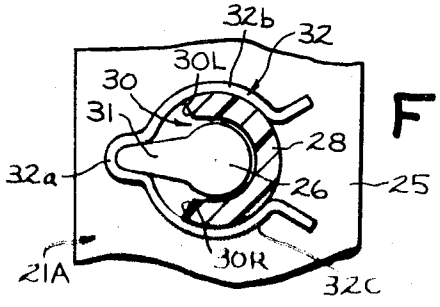


FIG. 4

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AIR-CONDITIONER AIR-DIRECTING MEANS

BACKGROUND OF THE INVENTION

This invention relates to air-conditioning apparatus and, more particularly, to improved means for variably directing conditioned-air discharge from self-contained air conditioning units that are especially adapted to be mounted in a window or other opening in the wall of a building.

Such self-contained air-conditioning units are frequently employed to condition the air within a single residential room or confined space and are widely referred to as "room air-conditioners." Conventionally, such room air-conditioners include casing means mountable within an opening into a room, air-conditioning means mounted within the casing, and blower means mounted within the casing for drawing air from the room into the casing and proximate to the air-conditioning means for conditioning thereby and then discharging the thus conditioned air to the room.

Usually, only one such air-conditioner is mounted in each room, with its conditioned-air discharge opening positioned in the interior wall of the room to be served by the air-conditioner. Because the location of the air-conditioner unit is frequently dependent upon the location of available window space in the room, it is often impossible to position the unit in a location which will produce optimum distribution of the conditioned-air that is discharged from it.

In the past it has been conventional to provide such air conditioners with one or more vertically arranged conditioned-air discharge openings and to mount air-directing means, such as manually adjustable louvers or louvered members, on such air-conditioners for variably deflecting and directing the discharge conditioned-air stream so as to establish a diverse air flow pattern within the space to be conditioned. Frequently, these air-directing means have been permanently mounted to the air-conditioner for pivotal movement relative to the discharge opening. Typical forms of these permanently pivotally mounted air-directing means are described in U.S. Pat. Nos. 2,786,407 - Sarles et al and 3,180,246 - Johnson. Other forms of these air-directing means, such as described in U.S. Pat. No. 3,111,075 - Hoyle et al, have been removably mounted on the air-conditioner in track means, but not for pivotal movement relative to the discharge opening. While such prior-art means have achieved their intended purposes, they have the disadvantages of being either complex and expensive in construction or inflexible in movement.

SUMMARY OF THE INVENTION

The present invention is particularly concerned with providing improved conditioned-air directing means for air-conditioners of the aforedescribed type. Basically, this is accomplished by providing air-directing means including at least one nozzle-like member that can be readily pivotally mounted to and dismounted from the air-conditioner. The member has two opposite ends each having an axle. These axles are journalled for pivotal movement relative to the discharge opening in bearings provided on opposite edges of the opening. At least one of the bearings is slotted to permit easy insertion and removal of one of the axles into and from it. Resilient fastener means are provided for releasably retaining the axle in the slotted bearing.

Preferably, the discharge opening is generally vertically arranged and the nozzle-like member includes fixed louvers that are arranged to deflect air discharging therethrough generally downwardly when its axles are vertically journalled in the bearings in a first position, but will deflect the air discharging therethrough generally upwardly when its axles are reversed and vertically journalled in the bearings in a second position inverted from the first position. With this arrangement, all of the louvers can be inexpensively formed in fixed positions in the air-directing member. The horizontal or left-right directional angle of air discharging through the member can be easily selectively varied by manually pivoting the member about its vertically journalled axles. The vertical or up-down direction of air discharging through the member can be readily selectively varied between generally upward and generally downward by removing the member from the air-conditioner, inverting or reversing its axled ends, and remounting it to the air-conditioner.

BRIEF DESCRIPTION OF THE DRAWING

The present invention is illustrated in the accompanying drawing, wherein:

FIG. 1 is a somewhat schematic front or room side elevational perspective view of a room air-conditioner incorporating a presently preferred embodiment of the improved conditioned-air discharge directing means provided in accordance with the present invention;

FIG. 2 is an enlarged, partly-broken, fragmentary sectional view taken along line 2—2 of FIG. 1 showing one of the readily removable air-directing members vertically journalled in the conditioned-air discharge opening bearings in a first position wherein the fixed louvers will cause air passing through it to be directed generally downwardly;

FIG. 3 is a view similar to FIG. 2, but showing the air directing member with its axled ends reversed or inverted and remounted in a second position in the opening wherein its fixed louvers will deflect the discharging air generally upwardly;

FIG. 4 is an enlarged fragmentary sectional view taken along line 4—4 of FIG. 3 showing in detail the construction of the air-directing member axle, the slotted bearing receiving the axle, and the resilient fastener means for releasably retaining the axle in the bearing;

FIG. 5 is an enlarged fragmentary schematic horizontal sectional view looking down on the top ends of the air-directing members and showing them pivoted about their vertically arranged axles into first positions causing the discharging conditioned-air to be directed leftwardly from the opening;

FIG. 6 is a view similar to FIG. 5 but showing the air-directing members pivoted about their axles into other positions causing the discharging air to be directed both leftwardly and rightwardly away from the opening center; and

FIG. 7 is a view similar to FIGS. 5 and 6 but showing the members pivoted around their vertically arranged axles into yet other positions to direct the discharging air toward the center of the opening.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawing and, more particularly, to FIG. 1 thereof, there is illustrated a self-contained air-conditioning unit **10** incorporating a presently preferred form of conditioned-air discharge directing means provided in accordance with the present invention.

The air-conditioner **10** includes a hollow casing **11** that is adapted to be mounted in an opening into a room, such as can be provided by a window or the like, and has a front portion **12** that faces interiorly of the room.

The casing **11** houses conventional main operating components of the air-conditioner **10**. These conventional components include air-conditioning means, such as cooling means, heating means, filtering means, and the like, and blower means for drawing air from the room into the casing **11** and proximate to the air-conditioning means for conditioning thereby and then discharging the thus conditioned-air to the room. Since the conventional components are of well-known construction and interconnection, their illustration has been omitted in the interest of clarity and brevity.

The air-conditioner **10** has room air-intake means including a fixed-louvered opening **14** in the side of the casing front portion **12** and a generally rectangular conditioned-air discharge opening **15** that is generally vertically arranged in its front wall **16** and is defined by two opposite left and right side edges **17** and **18** and two opposite upper and lower edges **19** and **20**. With this arrangement, air is drawn by blower means from the room and into the air-conditioner casing **11** through the air-intake opening **14** and proximate to the air-conditioning means for conditioning thereby, and the thus conditioned air is then discharged to the room via the air-discharge opening **15**.

In particular accordance with the present invention, the direction of conditioned air passing through the discharge opening **15** and into the room is controlled by a plurality of air-directing members **21A–D** that are mounted in the discharge opening **15** for ready removal therefrom.

The four air directing members **21A–D** are substantially identical to one another. As best shown in FIGS. **1–4**, each of the members **21A–D** is a generally rectangular nozzle-like member having a border comprised of two opposite spaced apart side walls **22** and **23** connected by two opposite spaced apart end walls **24** and **25**. The side walls **22** and **23** are slightly shorter than the height of the discharge opening **15**, while the end walls **24** and **25** are slightly shorter than one-fourth of the width of the discharge opening **15**.

Each of the air-directing members **21A–D** is provided with a pair of axles **26** that are integrally formed with and respectively protrude from the outer surfaces of the end walls **24** and **25**. The axles **26** of each of the members **21A-D** are vertically journalled in four sets of vertically arranged opposed bearings, including upper bearings **28** and lower bearings **29** that are horizontally spaced apart along and preferably integrally formed with the upper and lower edges **19** and **20** of the discharge opening **15**. As illustrated in detail in FIG. **4**, at least the upper ones of these four sets of bearings **28** are slotted to provide a notch **30** opening radially toward the room to permit easy insertion and removal of the axles **26** into and from the bearings. Preferably, the lower bearings **29** are similarly slotted. Pivotal rotation of the axles **26** within the bearings and, consequently, the left-right pivotal movement of each of the air-directing members **21A–D** relative to the discharge opening **15** is limited by a stop member **31** that extends radially forward from each of the axles **26** and is adapted to engage the opposite vertical edges **30L** and **30R** of the notch **30**.

Also, resilient fastener means are provided in the form of a generally hair-pin shaped retainer clip **32** for releasably retaining the axles **26** in the split bearings. Each resilient retainer clip **32** has a bight portion **32a** formed to releasably and slidably engage the radially outermost portion of the axle stop member **31** which protrudes radially forwardly through the split bearing notch **30**, while the legs **32*b*** and **32*c*** of the retainer clip **32** releasably and slidably grasp the generally circular bearing outer periphery.

Each of the air-directing members **21A–D** can be inexpensively formed, as by molding from a suitable plastic compound, and as particularly shown in FIGS. **2** and **3**, each preferably has integrally formed with it plural, spaced apart, fixed louvers **34**. These fixed louvers **34** extend transversely between the member side walls **22** and **23** and each louver **34** includes a rear portion **34R** which is arranged substantially parallel to the member end walls **24** and **25**. Each of the louvers **34** also has a front portion **34F** that is connected to the louver rear portion **34R** but is canted or angled therefrom toward one of the member end walls **25**.

Thus, with one of the air-directing members **21A** arranged in a first position (FIG. **2**) with its axles **26** vertically journalled in the bearings **28** and **29** and with the one member end wall **25** located adjacent to the lower edge **20** of the discharge opening **15**, conditioned-air discharging through the member **21A** will be deflected generally downwardly in a first direction by the louvers **34**. This first position is particularly desirable in the cooler months of the year when the air-conditioner is primarily used for heating the room air, since the downward deflection of the conditioned-air that is provided by the louvers **34** acts to overcome the natural tendency of the heated conditioned air to rise toward the upper part of the room.

However, by removing the resilient retainer clip **32**, dismounting the member **21A** from the air-conditioner **10** by pulling its axle **26** radially forwardly through the bearing notch **30**, inverting the member 180° to reverse its axled ends **24** and **25**, remounting the member to the air-conditioner **10** by passing its axle **26** radially rearwardly through the split bearing notch **30**, and re-installing the retainer clip **32** the member can be readily vertically journalled in the bearings **28** and **29** in a second position (FIG. **3**) with the one member end wall **25** located adjacent the upper edge **19** of the discharge opening **15**. In this second position, conditioned-air discharging through the member **21A** will be deflected generally upwardly in a second direction. This second position is particularly desirable in the warmer months of the year when the air-conditioner **10** is primarily used for cooling the room air, since the upward deflection of the conditioned-air that is provided by the louvers **34** acts to overcome the natural tendency of cool

conditioned-air to descend toward the lower part of the room.

As further shown in FIGS. 5–7, the horizontal or left-right directional angle of air discharging through each of the four members 21A–D is controlled by deflection of the air by their side walls 22 and 23. It can be easily selectively varied by manually pivoting each of the air-directing members 21A–D individually about its vertically journalled axis 26, regardless of whether the individual member is journalled in its first position (FIG. 2) or in its inverted or reversed second position (FIG. 3).

FIG. 5 is a view looking down on the air-directing members 21A–D showing them all pivoted about their vertically arranged axles 26 into first positions causing the discharging conditioned-air to be directed generally leftwardly from the discharge opening 15.

FIG. 6 is a view similar to FIG. 5 but showing two of the air-directing members 21A and 21B pivoted rightwardly about their axles 26 and the other two of the air-directing members 21C and 21D pivoted leftwardly around their axles 26 into positions causing the discharging conditioned-air to be generally directed both leftwardly and rightwardly away from the center of the discharge opening 15.

FIG. 7 is a view similar to FIGS. 5 and 6 but shows two of the air directing members 21A and 21B pivoted left-wardly about their vertically arranged axles 26 in the other two air directing members 21C and 21D pivoted rightwardly about their vertically arranged axles 26 into yet other positions to direct the discharging conditioned-air toward the center of the discharge opening 15.

Of course, the angular positioning of each of the air-directing members 21A–D as related to the upper and lower edges 19 and 20 of the discharge opening 15 and, consequently, the horizontal directional angle of conditioned air discharging from the opening 15 can be widely varied, being limited only by the engagement of the axle stop member 31 with the vertically arranged edges 30L and 30R of the bearing notch or slot 30.

The vertical or up-down directional angle of the conditioned-air discharging through the opening 15 can be varied from a condition wherein all of the members 21A–D are arranged in the aforedescribed first position (FIG. 2) such that all of the discharging air will be directed generally downwardly from the opening, to an opposite extreme wherein all four of the air-directing members 21A–D are arranged in the aforedescribed second position (FIG. 3) such that all of the air discharging from the opening 15 will be directed generally upwardly. Of course, some of the members 21A–D could be arranged in the first position, while others could be arranged in the second position, such that three-fourths or one-half of the air discharging from the opening 15 could be directed upwardly of downwardly.

It should be apparent to those skilled in the art that while there has been described what, at present, it considered to be a preferred embodiment of this invention in accordance with the Patent Statutes, changes may be made in the disclosed apparatus that actually departing from the true spirit and scope of this invention. It is, therefore, intended that the appended claims shall cover such modifications and applications that may not depart from the true spirit and scope of the present invention.

What is claimed is:

1. Improved means for directing conditioned-air discharge from a wall-mountable self-contained air-conditioning unit, comprising:

a. means defining a generally vertically arranged conditioned-air discharge opening from said unit;

b. air-directing means mountable in said opening for ready removal therefrom,

c. said air-directing means including plural nozzle-like members,

d. each of said members having two opposite ends and a pair of axles with each of said ends having one of said axles;

e. plural sets of vertically arranged opposed bearings horizontally spaced along the upper and lower edges of said opening for respectively receiving and journalling said pairs of axles therein such that said members can be pivotally moved relative to said opening independently of one another about a vertical axis,

f. said bearings being slotted to permit easy insertion and removal of said axles into and from them; and

g. resilient fastener means for releasably retaining said axles in said slotted bearings,

h. said members having fixed louvers that are arranged to deflect air discharging therethrough generally downwardly when said axles are vertically journalled in said bearings in a first position, but will deflect air discharging therethrough generally upwardly when said axles are vertically journalled in said bearings in a second position inverted from said first position.

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