United States Patent

Loyd

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

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[52] **U.S. Cl.** .....**98/94,** 98/121 R, 74/582

[51] **Int. Cl.** **F24f 13/08**

[58] **Field of Search** .....98/40 A, 94, 108, 110, 40 V, 98/40 VM, 121 R, 94 AC; 74/42, 582

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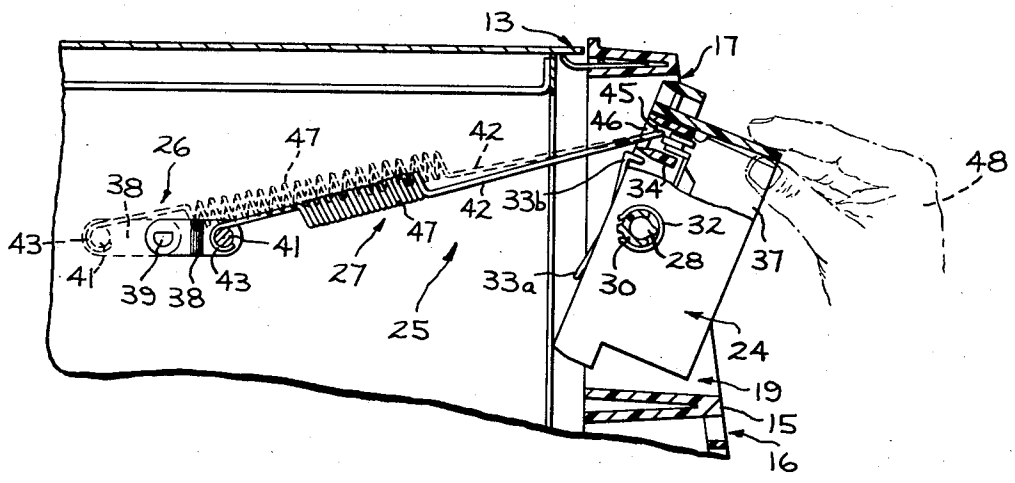
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[57] **ABSTRACT**

This invention provides an improved mechanism for directing the flow of conditioned-air from a room air conditioner. The improved mechanism of the present invention comprises means defining a conditioned-air discharge opening from the air-conditioner, motorized drive means mounted on the air-conditioner, air-directing means mountable in the opening for movement relative thereto by drive means, and yieldable linkage means for drivingly connecting the air-directing means to the drive means such that none of the means will be damaged as a result of obstruction of the driven movement of the air-directing means.

2 Claims, 4 Drawing Figures



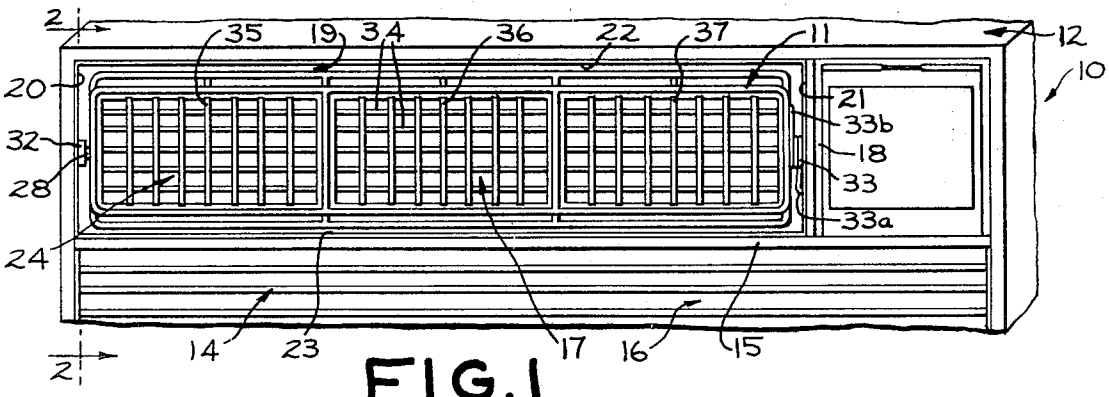


FIG. 1

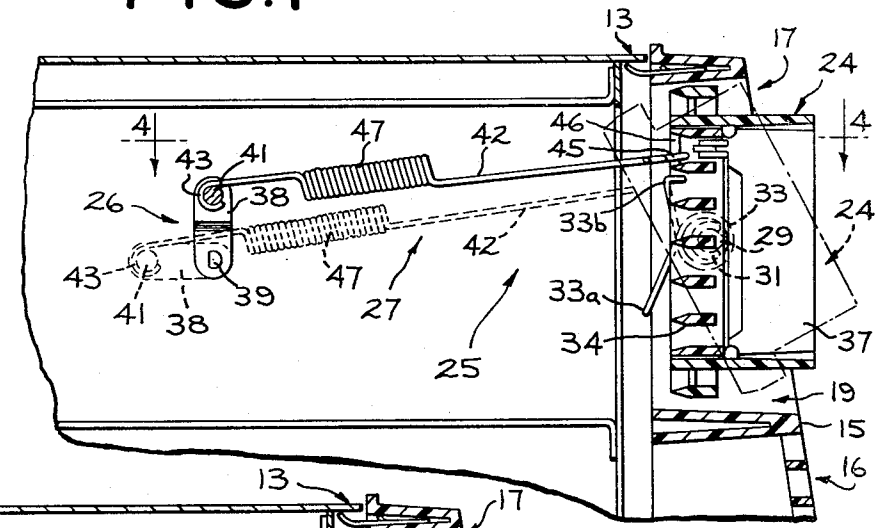


FIG. 2

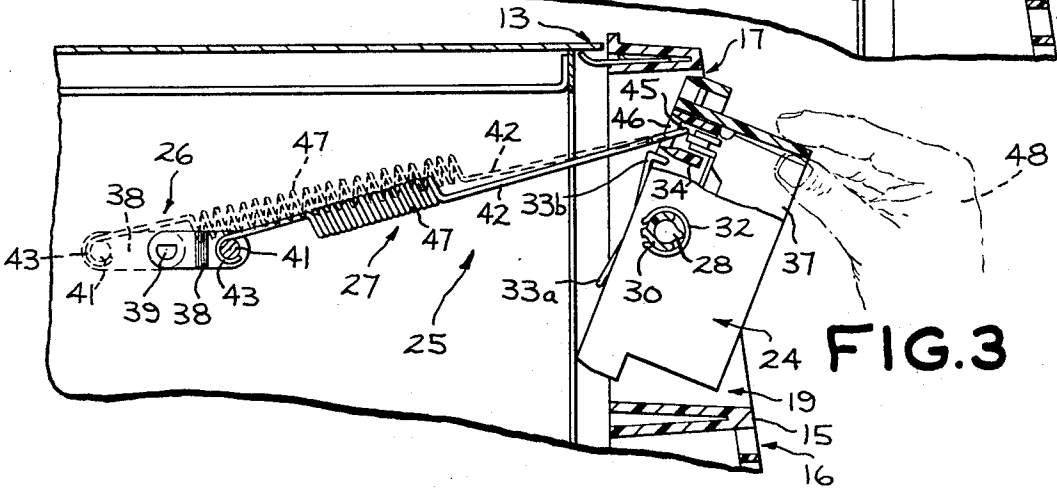


FIG. 3

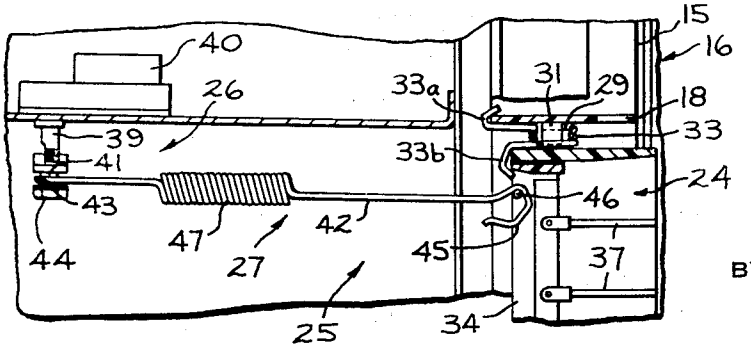


FIG. 4

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AIR-CONDITIONER AIR-DIRECTING MECHANISM

BACKGROUND OF THE INVENTION

This invention relates to air-conditioning apparatus and more particularly, to an improved mechanism for variably directing conditioned-air discharge from self-contained air-conditioning units of the type 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-conditioner means for conditioning thereby and discharging the conditioned air to the room.

Usually, only one such air-conditioner is mounted in each room, with its conditioned-air discharge opening or conduit positioned essentially flush with 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.

Heretofore, it has been common practice to provide the conditioned-air discharge opening of such air-conditioners with mechanisms, such as motor-driven oscillatable louvers, for variably deflecting and directing the conditioned-air discharge stream so as to establish a diverse air flow pattern within the space to be conditioned and thus avoid localized areas of overly conditioned or under-conditioned air. A typical form of such conventional air-directing mechanism is described in U.S. Pat. No. 3,294,007. While such prior-air mechanisms have achieved their intended purposes, they have disadvantages of being of rather complex and expensive in construction and have included rigid linkage means and been subject to damage caused by obstruction of the driven movement of their air-directing louvers.

SUMMARY OF THE INVENTION

The present invention is particularly concerned with providing improvement in conditioned-air directing mechanisms for air-conditioners of the aforedescribed type. Basically, the improved mechanism of the present invention comprises means defining a conditioned-air discharge opening from an air-conditioner, motorized drive means mounted on the air-conditioner, air-directing means mountable in the opening for movement relative thereto by motorized drive means, and yieldable linkage means for drivingly connecting the air-directing means to the drive means such that none of the means will be damaged as a result of obstruction of the movement of the air-directing means.

Preferably, the air-directing means comprises a louvered nozzle mounted in the conditioned-air discharge opening for oscillatory movement relative thereto by drive means including a rotary crank housed within the air-conditioner casing and drivingly connected to the nozzle by a link incorporating a tension spring-like section. The spring-like section is structured to normally remain contracted such that the link usually functions just as a conventional rigid link to drivingly connect the rotary crank to the nozzle and cause it to oscillate. However, should such driven movement of the air-directing nozzle be obstructed, as by a child's hand, a heavy drapery, etc., the spring-like section of the link of the present invention is so constructed to expand sufficiently to allow continued rotation of the driven crank in spite of the obstruction, without causing any damage to any part of the mechanism. Once the obstruction has been removed, the spring-like section of the link is structured to recontract so that the mechanism can then resume normal or "rigid link" operation without requiring any repair.

In accordance with another aspect of the present invention, the means defining the conditioned-air discharge opening and its air-directing means are mounted to the air-conditioner casing by means that facilitate their ready removal therefrom and such removal is further facilitated by the yieldable construction of the linkage means which drivingly connects the air-directing means to its drive means.

BRIEF DESCRIPTION OF THE DRAWING

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

FIG. 1 is a somewhat schematic, fragmentary room-side elevational perspective view of a room air-conditioner incorporating a presently preferred embodiment of the improved conditioned-air discharge directing mechanism that is provided in accordance with the present invention:

FIG. 2 is an enlarged fragmentary sectional view taken along line 2—2 of FIG. 1, with the improved mechanism being shown by solid lines in a first driven position and by shadow lines in a second driven position;

FIG. 3 is a view similar to FIG. 2, but showing the improved mechanism by solid lines in another position and further showing by shadow lines the action of the linkage and drive means upon obstruction of driven movement of the air-directing means; and

FIG. 4 is a fragmentary sectional view taken along line 4—4 of FIG. 2.

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 mechanism 11 that is provided in accordance with the present invention.

The air-conditioner 10 includes a generally hollow box-like casing 12 that is adapted to be mounted in an opening into a room, such as can be provided by a window, or the like, in such a manner that its front portion 13 faces interiorly of the room.

The casing 12 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 12 and proximate to the air-conditioning means for conditioning thereby and then discharging the 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.

As best shown in FIGS. 1–3, the casing 12 has an open front or room-side end 13 that is provided with a foraminous cover or grille 14, which can be readily removed therefrom to permit access to the casing interior. The removable grille 14 is fabricated from a suitable material, such as a molded plastic compound or the like. The grille 14 is divided by a horizontal partition 15 into a lower or air-intake section 16 and an upper-discharge section 17 that is, in turn, further divided by a vertical partition 18.

The air-discharge section 17 has a generally rectangular air-discharge opening 19 defined by left 20 and right 21 edges and top 22 and bottom edges 23. With this arrangement, air is drawn by blower means from the room and into the air-conditioner casing 12 through the grille lower or air-intake section 16 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 outlet 19.

In particular accordance with the present invention, the direction of conditioned-air passing through the discharge opening 19 and into the room is controlled by a unitary air directing member 24 which is mounted in the opening 19 for oscillatory movement relative thereto and comprises an element of an improved mechanism 25, being drivingly connected to drive means 26 thereof by yieldable linkage means 27.

In the illustrated embodiment, the air-directing member 24 comprises a single nozzle or nozzle-like member having a configuration that is complementary to the air-discharge opening 19. The nozzle 24 is mounted in the opening 19 for pivotal movement about a horizontal axis relative thereto by a pair of axles 28 and 29 which protrude from its left and right ends rearward of its gravitational center and are journalled in a complementary pair of split bearings 30 and 31 formed on the left and right edges 20 and 21 of the opening 19. The nozzle axles 28 and 29 are retained in the bearings 30 and 31 by spring clips 32 and 33. The nozzle 24 is provided with banks of louvers including a fixed horizontal bank 34 for controlling the vertical angle of conditioned-air discharge and plural banks of vertical louvers 35, 36 and 37 which may be manually adjusted to control the horizontal angle of conditioned-air discharge.

As best shown in FIGS. 2–4, the drive means 26 of the improved mechanism 27 includes a crank 38 rotated by a crank shaft 39 driven by an electric motor 40 that is mounted within the casing 12 behind the opening 19. The crank 38 carries a crank pin 41 which is mounted eccentrically from the crank shaft 39 and, in particular accordance with the present invention, the crank pin 41 is drivingly connected to the nozzle 24 by the yieldable linkage means 27.

Preferably, the yieldable linkage means 27 comprises a single link 42 having a pair of opposite ends, one end 43 of which is looped and permanently pivotally connected to the crank pin 41 by a nut 44 and the other end 45 of which is hooked and adapted to be readily connected and disconnected to and from a pivot member 46 that is provided on the nozzle 32, and the single link 42 has a tension spring-like section 47 integrally formed with it between its opposite ends 43 and 45.

In the illustrated embodiment, one of the two axle clips 33 is structured to also function as a torsion spring having one of its ends 33a engaged with an edge of the air-discharge opening 19 and its other end 33*b* engaged with the upper portion of the nozzle 24 such that upon forward movement of the crank pin 41 by the drive means 26 the nozzle 24 will be yieldably urged or biased to move about its axles 28 and 29 in a first direction (downward or clockwise as shown in FIGS. 2 and 3) by a predetermined force, including the force provided by the torsion spring-clip 33 and the force provided by gravity.

The tension spring-like section 47 of the link 42 is structured such that it will remain contracted and the link will pivotally connect the nozzle 24 to the drive means 26 and cause the nozzle 24 to be drivingly moved about its axles 28 and 29 in a second direction (upward or counter-clockwise as seen in FIGS. 2 and 3) opposite the first direction upon rearward movement of the crank pin 41 by the motorized drive means 26, unless such driven movement of the nozzle 24 is resisted or opposed by a greater force than the predetermined force provided by the torsion spring-clip 33 and by gravity. But, the spring-like section 47 of the link 42 is also structured such that, in the event such driven movement of the nozzle 24 is obstructed by such a greater force, as by a child holding the nozzle 24 (indicated by a hand 48 in FIG. 3), the weight of a heavy drapery or the like bearing downwardly on the nozzle 24, etc., the spring-like section 47 of the link 42 will expand during rearward movement of the crank pin 41 to permit continued operation of the drive means 26 and rotation of the crank shaft 39 without causing any damage to any part of the mechanism 25. Furthermore, the spring-like section 47 is also structured such that once the obstruction to driven movement of the nozzle 24 is removed, it will then recontract so that the mechanism 25 can resume normal or "rigid-link" operation without requiring any repair. Preferably, the spring-like section 47 of the link 42 is a closed coil during normal unobstructed conditions, but has a spring force which allows it to expand sufficiently under the aforedescribed obstructed conditions.

In accordance with yet another aspect of the present invention, the tension spring-like section 47 of the link 42 is further structured such that it can be expanded without damage sufficiently to facilitate removal of the grille 16 from the open front end of the air-conditioner casing 12 to a point where the hooked end 45 of the yieldable link 42 can be readily manually connected and disconnected to and from the nozzle 24.

It should be apparent to those skilled in the art that while there has been described what, at present, is considered to be the preferred embodiment of this invention in accordance with the Patent Statutes, changes may be made in the disclosed apparatus without 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. An air-conditioner comprising an air outlet,

air-directing means pivotally mounted in said outlet for oscillatory movement about a horizontal axis between upper and lower positions;

spring means biasing said air-directing means to said lower position;

drive means for normally moving said air-directing means to said upper position comprising a motor-driven, rotatable crank arm and tension spring means connecting said arm to said air-directing means;

said tension spring means normally remaining contracted but being yieldable to permit continued rotation of said crank arm in the event said air-directing means is prevented from moving to its said upper position.

2. An air-conditioner according to claim 1 in which said horizontal axis is rearward of the gravitational center of said air directing means.

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