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DOOR MOUNTING FOR A ROOM AIR CONDITIONER DISCHARGE OPENING

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FIG. 1

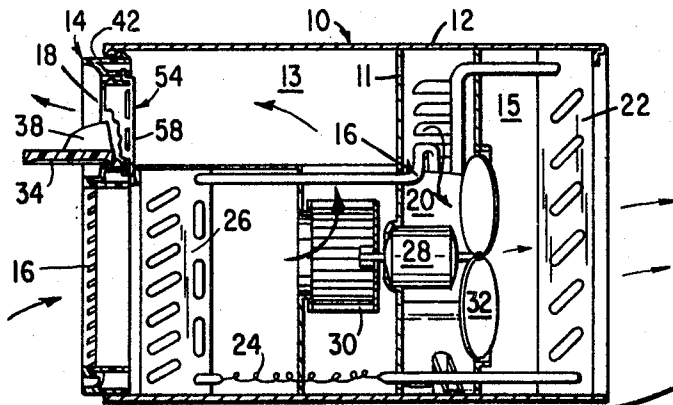


FIG. 2

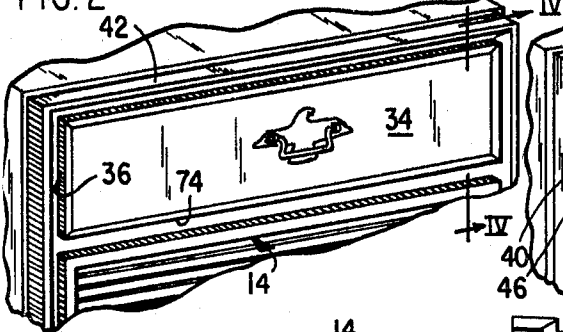


FIG. 3

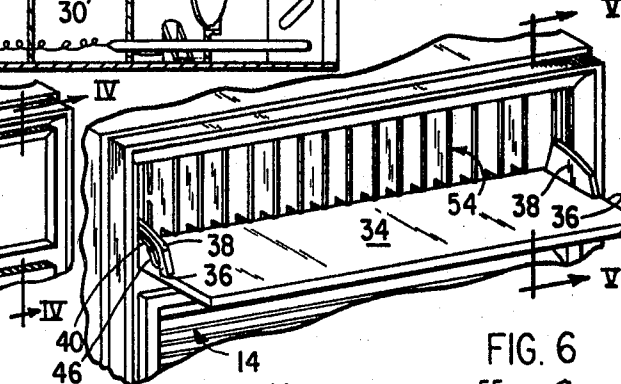


FIG. 4

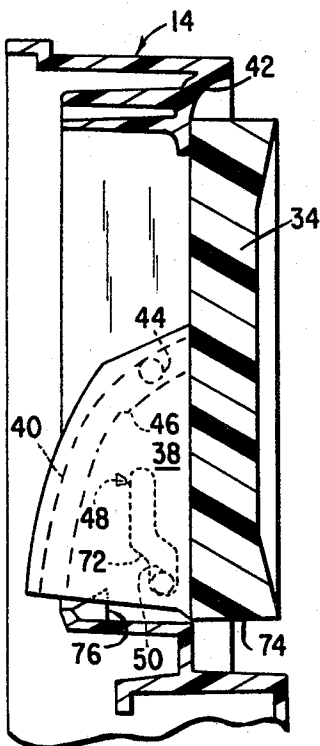


FIG. 6

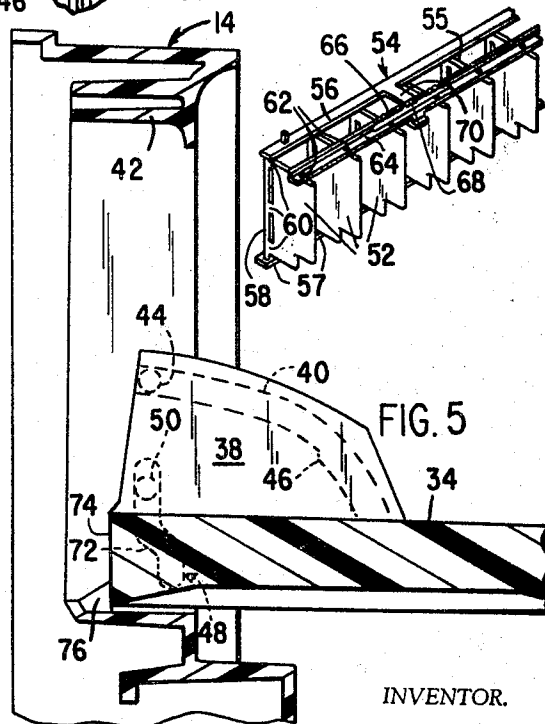
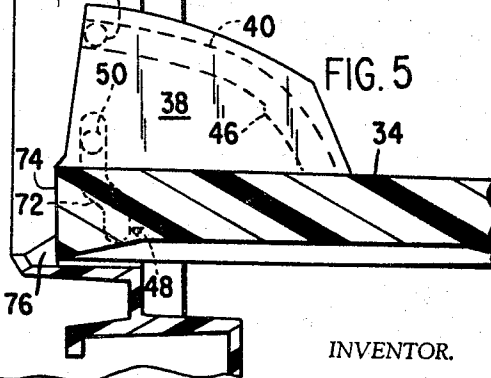


FIG. 5



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DOOR MOUNTING FOR A ROOM AIR CONDITIONER DISCHARGE OPENING

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4 Claims

ABSTRACT OF THE DISCLOSURE

A room air conditioner in which a door covers a discharge opening, the mounting arrangement for the door permitting the door to open part way in response to fan pressure, thus preventing the conditioner being operated with the door closed which might cause icing of the evaporator coil; the mounting arrangement further allows the door to be moved manually toward fully open position. A two part molded guide vane assembly positioned rearwardly of the door is provided to control the direction of the air flow in conjunction with the door.

Background of the invention

This invention relates to a room air conditioner having a door covering the discharge opening and, more particularly, to a mounting arrangement for the door to assure that the door opens at least partially in response to fan pressure thus preventing the conditioner being operated with the door closed which might cause icing of the evaporator coil.

A room air conditioner in which the discharge opening is closed for aesthetic purposes possesses the disadvantage that it may be operated with the user forgetting to open a door closing the discharge outlet. Under such circumstances, ice in substantial depth may form on the evaporator with the possibility of damage to the refrigeration components, while conditioned air is not supplied to the enclosure the unit serves. The provision of controls in the unit to prevent operation of the unit when the door is closed substantially increases the cost of the unit.

The present invention provides a mounting arrangement for such a door which assures that the door will be opened by fan pressure when the unit is operated. The mounting arrangement permits the door to move freely from a closed position to an intermediate open position. At this position, sufficient air flows through the evaporator coil to prevent formation of ice on the coil. From an intermediate position the mounting arrangement permits manual movement of the door to fully open position by merely overcoming slight frictional engagement between the door and the frame. Such frictional engagement serves to retain the door securely at any desired position within the range from the partially open position to fully open position.

An air deflector assembly is mounted rearwardly and independently from the discharge door. The assembly includes a number of movable vanes for controlling the direction of the air stream being discharged through this outlet.

Summary of the invention

This invention relates to a room air conditioning unit in which a door is provided to close the discharge outlet while the unit is inoperative. The door has a novel mounting arrangement allowing the door to open part-way under fan pressure and be held in any set position from the aforementioned part-way open to fully open position.

The mounting arrangement for the door includes rear-

ward projecting flanges, each having a slot and pin. The frame, which borders the discharge outlet, also has a set of slots and pins. The slots in the door flanges receive the pins projecting inwardly in the frame and the pins projecting outwardly from the door flanges are received in the slots in the frame. The slots in the door flanges are so designed to loosely fit the mating pins in the area where the pins occur when the door is in the closed position allowing the door to move freely to a part-way open position under air pressure when the fan is placed in operation. The remaining length of the slot closely fits the mating pin with enough resistance to hold the door in any set position.

The inner surface of the door directs the air upward when the door is in an inclined position and forward when the door is in a horizontal position.

Independent from the door is a plurality of movable guide vanes forming a deflector assembly. The deflector assembly directs the discharge air in the desired flow paths.

Brief description of the drawings

FIGURE 1 is a sectional view of an air conditioning unit in accordance with this invention;

FIGURES 2 and 3 are fragmentary views showing the door closing the discharge outlet in closed and open positions;

FIGURES 4 and 5 are sectional views through the discharge outlet door taken on lines IV—IV and V—V of FIGURES 2 and 3 illustrating the mounting arrangement of the door; and

FIGURE 6 is a fragmentary view in perspective of the deflector assembly.

Description of the preferred embodiment

Referring to the drawings, there is shown in FIGURE 1, a room air conditioner which includes a housing 12 having a decorative panel 14 covering its front face. The panel 14 includes a bottom inlet air section 16 of any desired configuration, shown as horizontal louvers, and a top section forming an air outlet 18. The conditioning unit 10 includes a partition 11 forming an evaporator compartment 13 and a condenser compartment 15. A refrigeration system 16 is provided which includes compressor 20 and condenser coil 22 disposed in compartment 15 and expansion means 24 and evaporator coil 26 disposed in compartment 13. A fan motor 28 drives both evaporator fan 30 and condenser fan 32. Fan 30 passes air through the evaporator coil 26 and fan 32 passes air through the condenser coil 22.

Panel 14, referring to FIGURES 1, 3 and 5, is shown with the discharge outlet door 34 in open position. The door 34 has end portions 36 which continue past the rear surface of the door forming flanges 38. Each flange 38 has a curved slot 40 in the outside surface thereof. The curved slot 40 commences midway the height of the door and curves toward the bottom edge of each flange. The radius between the pin 50, projecting from the flange, and the curved slot 40 varies, the longest radius being closest to the rear surface of the door, the radius gradually shortening until the slot leaves the bottom edge of the flange. The slot 40 has an area in which one side wall of the slot is relieved as shown at 46.

Frame 42 of panel 14 borders the outlet opening 18. Frame 42 carries pins 44 adapted to mate with curved slots 40 on flanges 38. Each slot 40 is sized so that its cooperating pin 44 touches the side walls of the slot 40 in an interference fit. The interference fit between the slot 40 and pin 44 frictionally holds the door in any position. The slots 40 are relieved as shown at 46 (FIGURE 5) providing an area where pin 44 fits loosely in slot 40 to permit door 34 to move freely from closed

position to a partial open position allowing sufficient air to pass through the evaporator coil 26 to avoid ice forming on the evaporator coil when the unit is in operation.

A second slot 48 is provided in each side of the frame 42. Pins 50 are carried by flanges 38 and are adapted to mate with slots 48. As shown, slots 48 have offset portions 72, which set further inwardly from the face of the panel than the remainder of the slot.

Pins 50 and slots 48 cooperate with pins 44 and slots 40 to mount the door in panel 14. Each pin 50 loosely fits within its cooperating slot 48 and serves in guiding the bottom edge of the door as the top edge of the door swings outwardly in an arcuate direction due to the curved slot 40 following pin 44.

When the unit is placed in operation, pressure created by fan 30 moves door 34 toward a partially open position. As the door is moved from this partially open position to fully open horizontal position, the door rises for slot 40 has a varying radius from the pin 50 and gradually shortens. The door rising results in pin 50 moving upwardly in slot 48. As pin 50 moves into offset portion 72 in slot 48, the lower edge 74 of the door moves within the frame of the panel 14 until the door edge 74 abuts stop members 76.

Guide vane assembly 54 is placed in the housing adjacent the door as shown in FIGURES 1, 3 and 6. Guide vane assembly 54 is a two-piece structure comprising a bar 64 and guide vane structure 55. The guide vane structure 55 is an integrally molded unit having top and bottom frame strips 56, 57. Top frame strip 56 has formed, as an integral part thereof, a forward projecting bar 70 to be more fully explained later. A plurality of support posts 58 are interposed between top and bottom frame strips 56, 57. Support posts 58 each have molded thereto a guide vane 52, the guide vanes serving to direct the path of conditioned air being discharged from the unit.

Guide vanes 52 are interconnected with the support post 58 by flexible webs 60 forming hinges. Each guide vane 52 has a pin 62 formed integral therewith, the pin 62 projecting from the top of the guide vane 52 forward of the support posts 58. Bar 64 overlies and has openings therein to receive pins 62 thus interconnecting the vanes. Reciprocating movement of the bar 64 results in synchronous movement of the guide vanes 52. The bar 64 carries on it a plurality of detents 66 which frictionally engage a second set of detents 68 formed on bar 70 projecting from the top frame strip 56. The detents 66, 68 hold the guide vanes 52 in any desired position to direct the leaving air stream.

The present invention provides a mounting arrangement for a door closing the discharge outlet of an air conditioning unit, which assures that the door will not remain in closed position during operation of the unit, thus preventing any substantial ice formation on the evaporator coil. This arrangement is inexpensive to manufacture and thus eliminates the excessive cost of electrical controls to provide a similar function.

While a preferred embodiment of the invention has been described, it should be understood that the invention is not limited thereto but may be otherwise embodied within the scope of the following claims.

I claim:

1. In an air conditioning unit, the combination of a housing, refrigeration mechanism within said housing including an evaporator, a fan for inducing flow of air over said evaporator, said housing including a panel having an air inlet and an air outlet, a door for controlling discharge of air through said outlet, the outlet being formed by top, bottom, and end frame members in said panel,

mounting means for said door includes flanges on opposite ends of said door projecting rearwardly therefrom, each flange having a curved slot therein and a pin projecting from the flange, each end frame member having a slot therein, and a pin projecting from the member, said pins projecting from the end frame members mating with the slots in said flanges and said pins projecting from the door flanges mating with the slots in the end frame members, as said door moves between closed position in the plane of the panel to an open horizontal position, said slots and pins guiding the door so that a portion of said door is recessed within said panel, said mounting means permitting operation of said fan to move the door to a partially open position, and means for controlling the direction of air discharged through the outlet.

2. A unit according to claim 1 wherein said means controlling direction of discharged air comprises a top member and a bottom member, said top member having a bar projecting forward and perpendicular therefrom, a plurality of support posts interposed between said top and bottom members, each post having a guide vane integrally connected thereto, each of said guide vanes having a pin projecting therefrom in spaced relation from its support post, a bar member, said pins being received in openings in said bar member whereby reciprocating movement of said bar member moves said guide vanes, a first series of detents on said bar member, a second series of detents formed on said bar projecting from said top member, said first series of detent mating with said second series of detents to frictionally hold said guide vanes in desired position for directing air discharged through the outlet.

3. A unit according to claim 1 wherein each of the curved slots in the door flanges is relieved in a predetermined area allowing a loose fit with its mating pin to permit the fan to move the door to a partially open position, the remainder of each curved slot being in an interference fit with the mating pin, so that upon start-up of said fan, resulting air pressure moves said door from closed position to an intermediate position, opening from said intermediate position is under air pressure being prevented by the interference fit of the pins within the slots, and means are provided for guiding the lower edge of said door within said frame members.

4. A unit according to claim 3 wherein each of the slots in said end frame members mates with a pin projecting outwardly from said flanges on the door, said slots in said end frame members having a portion offset into said housing, said curved slots in the door flanges having a varying radius from said pins in the door flanges so that as the door moves from a closed position in the plane of the face of the housing to an open horizontal position the curved slots move along said pins in the end frame members shortening the distance between said curved slots and said pins in said flanges moving said pins in the door flanges upwardly in the slots in the end frame members and moving the door inwardly within said housing as the end frame pins continue into the offset portions of the slots in the end frame members.

References Cited

UNITED STATES PATENTS

3,274,919	9/1966	Wegman	62—262
3,354,809	11/1967	Orr	98—94

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