

June 6, 1967

C. F. GRASER
AIR CONDITIONER

3,323,319

Filed Feb. 8, 1966

2 Sheets-Sheet 1

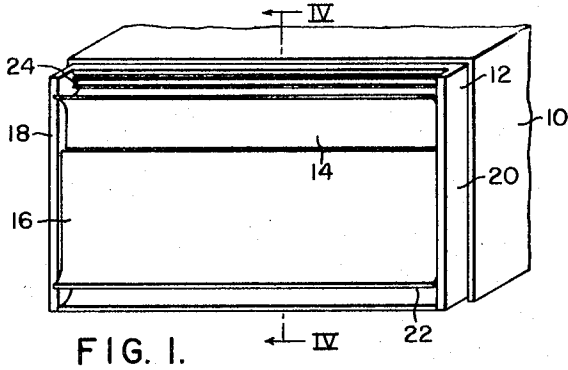


FIG. 1.

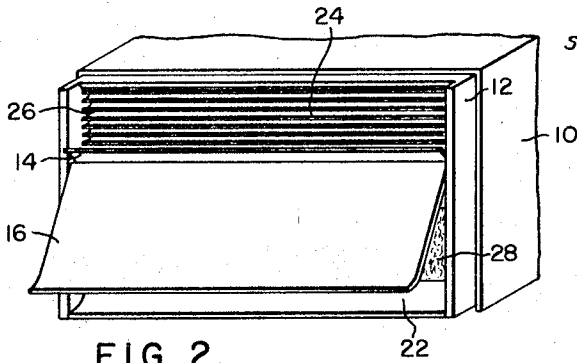


FIG. 2.

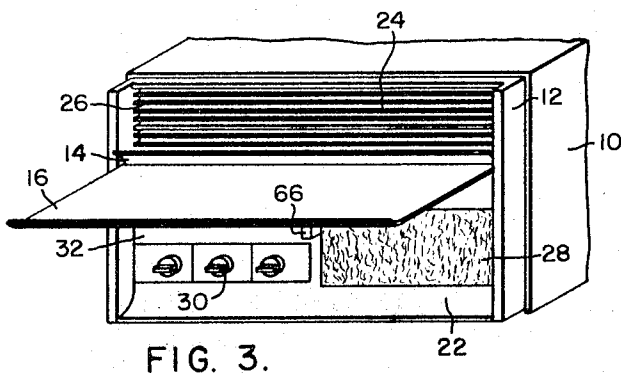


FIG. 3.

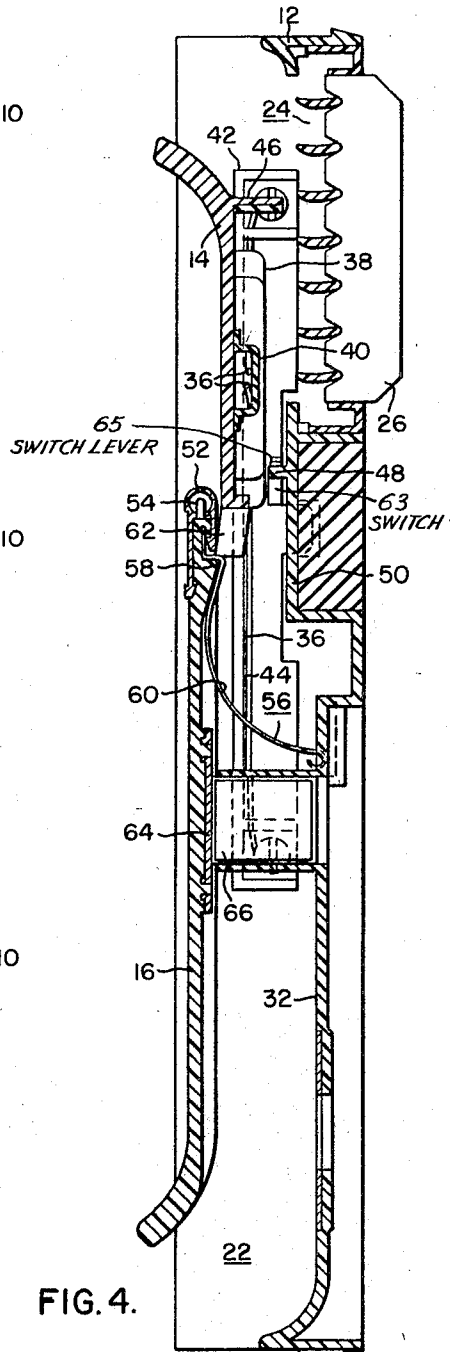


FIG. 4.

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2 Sheets-Sheet 2

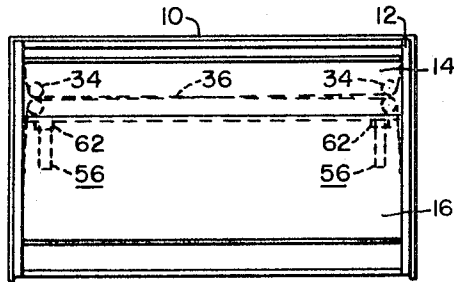


FIG. 5.

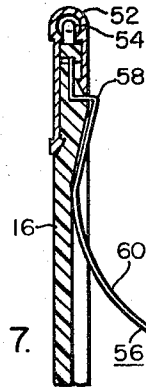


FIG. 7.

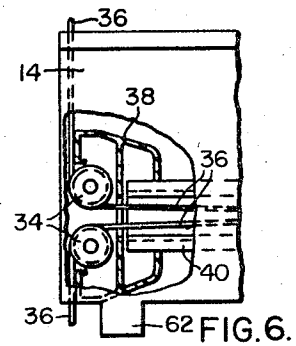


FIG. 6.

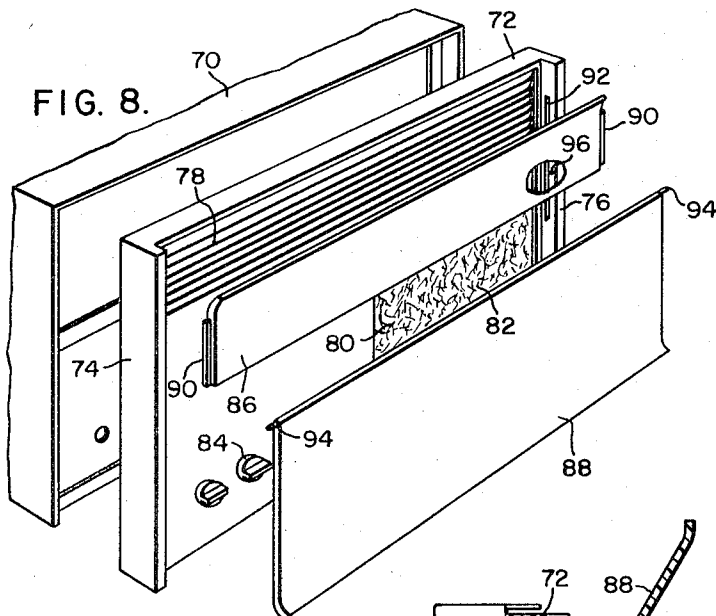


FIG. 8.

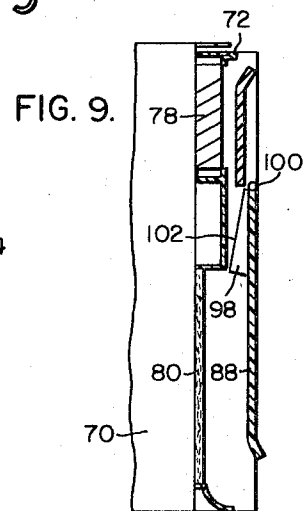


FIG. 9.

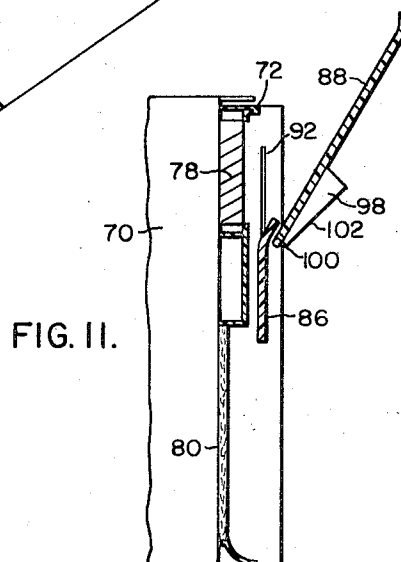


FIG. 11.

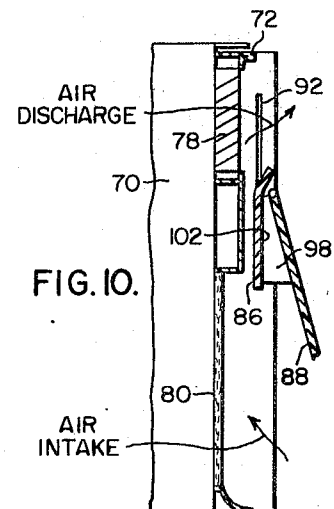


FIG. 10.

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AIR CONDITIONER

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Filed Feb. 8, 1966, Ser. No. 525,910

9 Claims. (Cl. 62-262)

ABSTRACT OF THE DISCLOSURE

Front assembly structure in which an upper panel for covering and alternately uncovering the outlet may be slid up or down in accordance with positioning of a lower panel located in front of the inlet and pivoted along its top portion, the lowered position of the upper panel holding the lower panel in a forwardly pivoted position to permit the entrance of room air into the inlet, and the upper position of the upper panel permitting the lower panel to pivot rearwardly to a closed position over the inlet.

This invention relates generally to room air conditioners, and particularly to a front assembly therefor.

An object of the invention is the provision of a panel front arrangement adapted to provide a pleasing appearance, and which satisfactorily meets the operational requirements such as providing proper air flow patterns, permitting access for control and maintenance operations, and being relatively simply manipulated between closed and open positions by the user.

The arrangement according to the invention, as embodied in an assembly for use with the room air conditioner having an upper conditioned air outlet, and a lower room air inlet on the front face of the air conditioner, generally comprises: an upper panel mounted for vertically sliding movement from an upper position generally blocking the conditioned air outlet, to a lower position generally exposing the outlet; and a lower panel pivotally mounted along its top edge for swinging movement forwardly from a closed position to an open position adapted to admit room air to the room air inlet. The top panel slides downwardly behind the upper portion of the lower panel, and cam means engaged by the upper panel in its lower position maintains the lower panel in its forwardly-pivoted open position. Additionally, the cam means are arranged so that when the upper panel is raised to a closed position and the lower panel is closed, the cam means supports the upper panel in its closed position.

An explanation of the invention, as embodied in an arrangement currently preferred, and which includes numerous details contributed to in a substantial degree by another, will process in connection with the accompanying drawing, wherein:

FIGURE 1 is an isometric view of the face of the room air conditioner provided with a panel arrangement according to the invention, and in which the panels are in closed positions;

FIG. 2 is an isometric view similar to FIG. 1 but showing the panels in their normal operating positions;

FIG. 3 is an isometric view similar to FIGS. 1 and 2, but showing the lower panel in a raised position to yield access to the control means and filter;

FIG. 4 is a vertical sectional view corresponding to one taken along the lines IV-IV of FIG. 1;

FIG. 5 is a front elevational view of the front assembly and including a partly schematic representation of certain elements in broken lines;

FIG. 6 is a partly broken elevational view of one end of the upper panel;

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FIG. 7 is a vertical sectional view of the upper portion of the lower panel;

FIG. 8 is an exploded isometric view of an alternative arrangement embodying the invention;

FIG. 9 is a partly schematic, vertical sectional view of the alternative arrangement with the panels in a closed position;

FIG. 10 is a vertical sectional view of the alternative arrangement with the panels in an open, normally operative position; and

FIG. 11 is a vertical sectional view of the alternative arrangement with the lower panel swung upwardly to yield access to the lower portion of the face of the air conditioner.

The room face of the air conditioner is shown in FIGS. 1-3 with the panel arrangement in FIG. 1 being in a closed (i.e., inoperative) position, in FIG. 2 in an open (normally operative) position, and in FIG. 3 with the panels in an open, operative position but with the lower panel raised to give access to parts therebehind.

The air conditioner casing 10 has the conventional, generally rectangular box-shape and has a room face which receives a rectangular frame 12 which supports the front panel arrangement. The top panel 14 and the bottom panel 16 are connected at their side edges to the side members 18 and 20 of the frame 12 in a manner which will be described in detail hereinafter.

The components inside the air conditioner casing 10 are generally conventional and include a conventional refrigeration system and air moving means (neither of which are shown). The air flow pattern is into the room air inlet 22 in the lower portion of the casing front face, through the internal conditioning elements, and out of the conditioned air outlet 24 (when open) extending horizontally across the upper portion of the front face of the casing.

An adjustable grill assembly 26 is mounted in the conditioned air outlet in the space immediately behind the panel 14 and is fully visible in FIGS. 2 and 3. An air filter 28 is disposed against the air entering face of an evaporator (not shown) and is partially visible in FIGS. 2 and 3. Control knobs 30 are mounted on a stationary panel 32 at the left side of the evaporator and air filter 28 as shown in FIG. 3. Access to the control knobs, and air filter for maintenance, is gained by pivoting the lower panel 16 upwardly as shown in FIG. 3.

The suspension of the top panel 14 for its vertical movement is accomplished in the best mode now contemplated by a cable and pulley arrangement diagrammatically not shown in FIG. 5 in broken lines. A pair of wheels 34 is rotatably secured against the rear face of the top panel 14 adjacent each end thereof. Two cables 36 are arranged with their opposite ends secured to opposite ones of the side members 18 and 20 of the frame 12, and extend in taut condition around wheels 34 at diagonally opposite positions at the opposite ends of the panel 14.

The wheels are generally enclosed in a chamber formed between the rear face of the panel 14, and a wheel cover 38 (FIG. 4 and 6) secured to the rear face of the panel 14. A cover 40 for the flight of the cables between the wheels at opposite ends of the panel 14 is also provided on the rear face of the panel. To stabilize the panel 14 in its various positions, a guide member 42, which includes a vertical, inwardly-open track 44 for the vertical run of the cables 36, is provided and secured against the inner faces of the respectively opposite side members 18 and 20 of the frame 12.

The preferred means for limiting movement of the upper panel 14 in a downward direction is shown in FIG. 4. The upper panel 14 is provided with a rearwardly-projecting horizontal flange 46. When the upper panel is

dropped, the flange engages a forwardly-projecting horizontal flange 48 on the front face of mullion 50. The mullion extends horizontally between the opposite side members 18 and 20 of the frame 12 and is the general divider at the front between the air inlet 22 and outlet 24.

The lower panel 16 is hinged along its upper edge for forwardly swinging movement to the positions shown in FIGS. 2 and 3. Referring again to FIGS. 4-7, the top edge of the lower panel is formed to receive a plastic snap-on rail 52 which captures an outwardly-projecting hinge pin 54 at each end of the panel. These pins project at opposite ends of the panel into bearing apertures provided in the respectively opposite side members 18 and 20 of the frame 12.

The rails 52 also secure a pair of leaf springs against the rear face of the panel 16. The springs are shaped in longitudinal section as best shown in FIGS. 4 and 7. Each leaf spring 56 includes an upper end captured by the rail 52, a rearwardly-projecting shoulder 58, and a curved portion 60 terminating in a free end. The purpose of the shoulder 58 is to provide support for the upper panel 14 when the lower panel 16 is in its closed position. To this end, the lower edge of the upper panel 14 is provided with a downwardly and forwardly inclined tab 62 aligned in a vertical direction with each spring 56. The tab 62, as shown in FIG. 4, rests upon shoulder 58 when the panel 14 is in its closed position. When the lower panel 16 is pulled forwardly at its bottom edge, the spring 56 is also pivoted so that the tab slips off the spring shoulder and the upper panel 14 may descend upon its cable suspension to the lower position at which the flange 46 engages the stop 48. With the panel 14 in its lowered position the tab 62 engages the arcuate portion 60 of the spring when the lower panel 16 is released from the grasp of the user. The engagement of the tab against the spring holds the lower panel in its angularly-displaced, open position as shown in FIG. 2, for normal operation. An electrical interlock switch 63 responsive to the position of the upper panel for controlling energization of the air conditioner, and preventing energization when the upper panel is not fully seated in its lowered position, may also be provided in connection with the stop means 48 by locating the switch actuating member 65 in a position projecting above the stop means.

When it is desired to place the front panels of the air conditioner in a closed position, the upper panel 14 is grasped by the user and elevated upon its cable suspension system to its uppermost position. This permits the lower panel 16 to pivot rearwardly to its closed position shown in FIGS. 1 and 4, and places the spring shoulder 58 below the tab 62 to hold up the upper panel 14.

Magnetic means may conveniently be used to insure that the lower panel 16 is held in the plane of the frame 12 in the closed position of the panels. To this end the rear face of the panel 16 is provided with a steel plate 64 secured thereto and a permanent magnet 66 (FIGS. 3 and 4) is carried on the stationary panel 32 at the side of the room air inlet in a position to register with the steel plate when the panel 16 is closed. This pulls and holds the lower panel tightly closed.

The use of the springs 56 as a part of the cam means is presently preferred because of their yieldable nature. Thus, when the panels are in an open position, the springs can yield if the panel 16 is inadvertently or purposely forced backwardly toward the face of the air conditioner, and no damage to the suspension system of the panels occurs.

As noted before, numerous details of structure described in connection with the FIGS. 1-7 embodiments have been contributed by another, and are the best mode now contemplated of carrying out the invention. However, it will be appreciated that the inventive concept is applicable to modified forms of somewhat simpler character as shown in FIGS. 8-11, for example.

The arrangement shown in FIGS. 8-11 is similar in

many respects to the arrangement shown in 1-7. The air conditioner includes the conventional casing 70, a front frame 72 having side members 74 and 76, an upper conditioned air outlet 78, a lower room air inlet 80, covered with a suitable filter 82, and control means 84 at the side of the room air inlet 80. The upper, vertically-slidable panel is designated 86 and the lower, hinged panel is designated 88.

The upper panel 86 is supported for its vertical sliding movement by means of outwardly-projecting tongues 90 at its ends. The tongues are received in the vertical slots 92 in each of the side pieces 74 and 76 of the frame. The lower panel 88 is hingedly supported by means of horizontally projecting pins 94 at opposite ends of the panel top edge, the pins being received by the bearing holes 96 in the inner faces of the frame side members 74 and 76.

The cam means relating the positions of the upper and lower panels 86 and 88 to each other is best shown in FIGS. 9-11. The cam means takes the form of generally triangular flanges 98 projecting rearwardly from the end edges of the lower panel 88. The cam surface engaged by the upper panel 86 includes an upper shoulder 100 and a sloped rear edge 102. With the panels in a closed position as shown in FIG. 9, the bottom edge of the upper panel 86 rests upon the shoulder 100 and prevents the upper panel from sliding downwardly. When the panels are to be moved to their open position as shown in FIG. 10, the lower panel is pulled forwardly at its bottom edge so that its upper panel 86 disengages from the shoulder 100 and drops to its position as shown in FIG. 10. In this position, the rear edge 102 abuts the front face of the upper panel 86 and maintains the lower panel 88 in its angularly displaced forward position. When it is desired to return the panels to a closed position, the upper panel 86 is grasped along its upper edge and pulled upwardly to a position which permits the lower panel 88 to be returned to its closed position in which it lies generally in the plane of the frame.

The means for stopping the downward movement of the upper panel 86 may be accomplished by the forwardly inclined top edge of the upper panel 86 resting upon the upward edge of the lower panel 88, or may be accomplished by means of the tongue 90 on the upper panel 86 engaging the bottom end of the slots 92. When access to the controls or to the air filter is desired, the lower panel 88 may be swung upwardly toward a position as shown in FIG. 11, which gives access to those parts usually hidden behind the lower panel 88.

I claim as my invention:

1. A front assembly for a room air conditioner having a lower room air inlet and an upper conditioned air outlet defined on the room face of said conditioner, comprising:
 - an upper front panel generally coextensive in area with said outlet;
 - means mounting said upper front panel for substantially vertical sliding movement from an upper position covering said outlet to a lower position exposing said outlet;
 - a lower front panel covering said inlet;
 - means mounting said lower panel for pivotal movement in a forward direction about its top portion; and
 - means for holding said lower panel in a first forwardly pivoted position when said upper panel is in its said lower position.
2. A front assembly according to claim 1 wherein:
 - said holding means includes cam means carried by said lower panel for engagement by said upper panel in its lower position to hold said lower panel in an angularly displaced forward position.
3. A front assembly as specified in claim 1 wherein:
 - said front assembly includes frame means having op-

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posite, facing, vertically-disposed side members adapted to receive said panels therebetween; and said upper and lower panels are supported from said side members.

4. A front assembly according to claim 2 wherein: 5
said cam means includes shoulder means adapted to support said upper panel in said upper closed position when said lower panel is in a closed position.
5. A front assembly according to claim 2 including: 10
stop means adapted to be engaged by said upper panel in said lower position, said stop means being independent of said cam means.
6. A front assembly according to claim 2 wherein: 15
said cam means is releasably engaged by said upper panel to permit angular displacement of said lower panel to a second forwardly pivotal position substantially beyond said first forwardly pivoted position.
7. A front assembly according to claim 2 wherein: 20
said cam means comprise cam edges projecting rearwardly from the rear face of said lower panel and

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being of incrementally greater thickness from front-to-rear in a descending direction.

8. A front assembly according to claim 3 wherein: 25
said side members include vertical slot means therein; and
said upper panel includes tongue means at each end projecting into said slot means.
9. A front assembly according to claim 1 including: 30
means responsive to movement of said upper panel to and away from said lower position for controlling energization of said air conditioner.

References Cited

UNITED STATES PATENTS

2,737,781	3/1956	Gelfand	62—267
2,858,678	11/1958	Rose	62—267
3,159,983	12/1964	Metcalfe	62—262
3,274,919	9/1966	Wegman	62—262

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