An air conditioning unit is disclosed that includes a frame providing an air passageway, such as an air inlet. A front panel covers the air passageway during normal air conditioning operation. A hinge interconnects the front panel to the frame and is configured to provide open and closed rotational positions of the front panel relative to the frame. In one example, the front panel includes an aperture through which a user control, such as a knob, extends. The front panel can be rotated from the closed position to the open position without removal of the knob. The frame and front panel also includes a latch for securing the front panel to the frame in the closed rotational position.
FRONT PANEL FOR AN AIR CONDITIONING UNIT

BACKGROUND

This disclosure relates to a removable front panel for a room air conditioning unit.

Room air conditioning units include one portion that extends into an interior space of a room and another portion that is exposed to the outside environment. The front side of the air conditioning unit that is exposed to the room includes a front panel and/or louvers including vents that circulate air between the air conditioning unit and the room.

Typically, a control box is provided on the room side of the air conditioning unit and provides user controls that are accessible to a user for controlling operation of the air conditioning unit. In one example air conditioning unit, the front panel includes an aperture through which the user controls such as knobs extend. Typically, the front panel is sealed relative to its supporting frame. The front panel must be removed to provide access to the filter for periodic cleanings or changes. Positioning and removing the front panel relative to the frame during installation or maintenance often results in the front panel becoming broken. For configurations in which the knobs extend through the front panel, the knobs typically must be removed, which over time causes them to become loose.

What is needed is an arrangement for securing the front panel to the frame that is both robust and avoids the need for removing knobs when gaming access to the filter.
SUMMARY

An air conditioning unit is disclosed that includes a frame providing an air passageway, such as an air inlet. A front panel covers the air passageway during normal air conditioning operation. A hinge interconnects the front panel to the frame and is configured to provide open and closed rotational positions of the front panel relative to the frame.

In one example, the front panel includes an aperture through which a user control, such as a knob, extends. The front panel can be rotated from the closed position to the open position without removal of the knob. The frame and front panel also includes a latch for securing the front panel to the frame in the closed rotational position.

These and other features of the disclosure can be best understood from the following specification and drawings, the following of which is a brief description.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is an exploded view of an example air conditioning unit.

Figure 2A is a front elevational view of the unit with a front panel in a closed rotational position and knobs extending through the front panel.

Figure 2B is an exploded view of the front panel and its supporting frame.

Figure 3A is an enlarged perspective view of one portion of a hinge.
Figure 3B is an enlarged perspective view of another portion of the hinge.

Figure 3C is an enlarged cross-sectional view of the hinge portions cooperating with one another in the closed rotational position.

Figure 3D is a cross-sectional view of the hinge in a removal position.

Figure 4A is an enlarged perspective view of one portion of a latch.

Figure 4B is an enlarged perspective view of another portion of the latch.

Figure 4C is an enlarged cross-sectional view of the latch portions engaging one another in the closed rotational position.

DETAILED DESCRIPTION

An air conditioning unit 10 is shown in Figure 1. The unit 10 has a housing that includes a base pan 12 and wrapper 14. The base pan 12 supports a compressor 16 that pumps refrigerant to a condenser 18. An expansion device (not shown) is arranged in a known manner, for example, upstream from the condenser 18. The expanded refrigerant flows to an evaporator 20 before returning to the compressor 16. A motor 24 blows air through the evaporator 20 using a blower 26 to provide cooled air through louvers 22, which are exposed to an interior of a room for example.
A fan 30 is driven by the motor 24 to blow air across the condenser 18 to reject heat from the refrigerant to the outside environment. A condenser orifice or shroud 32 provides a seal between the condenser 18 and the fan 30. In one example, the housing includes a top cover 34 arranged between the shroud 32 and condenser 18 to provide an enclosure about the fan 30. A control box 36 communicates with the compressor 16 and motor 24 in a known manner to provide a desired conditioned air to the room.

Referring to Figures 1 and 2A, in one example, the wrapper 14 includes flanges 38 to which a frame 21 mounts. The frame 21 provides support for the louvers 22 and a front panel 23. Air enters the air conditioning unit 10 through the front panel 23 and exits through the louvers 22 to provide conditioned air to the room. The frame 21 also includes a filter frame 25 for supporting a filter 27.

In the example shown, the front panel 23 includes one or more apertures 40 for providing access to the control box 36 from the room. In one example, the control box 36 includes user controls or knobs 42 that are accessible or extend through the front panel 23 and can be viewed and manipulated from the room. When the control box 36 is located in a desired position relative to the front panel 23, a uniform gap 46 between the front panel 23 and control box 36 and/or knobs 42, which provides an aesthetically pleasing appearance and ensures that any user controls 42 are aligned in a desired manner with indicia 48. The indicia 48 includes, for example, numbers corresponding to a temperature set point or blower speed, which may be provided on the exterior surface 44.
Referring to Figure 2B, the frame 21 and front panel 23 include hinges 62 and latches 64 that cooperate with one another to locate the front panel 23 to the frame 21 in the desired position. Each of the hinges 62 and latches 64 are provided by a portion respectively arranged on the frame 21 and front panel 23 that cooperate with one another to secure the front panel 23 to the frame 21. In the example shown in the Figures, the front panel 23 rotates from a closed position depicted in Figure 2A downward and outward about the hinge 62 to an open position. In the example shown, the front panel 23 has a perimeter that is spaced a distance from the frame 21. The resulting gap provides an air inlet to the unit 10. The distance is provided by the hinges 62 and latches 64, which act as stand-offs.

Referring to Figures 3A-3D, the hinge 62 includes a pocket 50 for receiving an arm 54 provided on the front panel 23. The portion of the hinge 62 provided on the frame 21 provides a recess 60 adjoining the pocket 50. Opposing retaining tabs 52 are arranged within the recess 60. A pivot 56 extends from the arm 54 and is received in the recess 60. The front panel 23 rotates about the pivot 56 between closed rotational and open rotational positions C, O, which is schematically depicted in Figure 3C. The pivot 56 includes a flat 58 having a narrow width 59. The flat 58 can be rotationally oriented such that the flat 58 can slide between the retaining tabs 52 so that the pivot 56 is seated within the recess 60 (Figure 3D). In this manner, the front panel 23 can be inserted and removed from the frame 21 when in this removal position R. The front panel 23 is generally in a horizontal position such that an edge 61 of the arm 54 abuts a shoulder 63 of the pocket 50 when in the open rotational position O, which facilitates easy removal of the filter 27 from the frame 21. The dimensions of the knobs 42 (Figures 1 and 2A) are smaller than the dimensions
of the apertures 40 so that the knobs 42 need not be removed when the front panel is opened. The pockets 50 act, in part, to laterally locate the arms 54 to assist in positioning the front panel 23 relative to the frame to ensure desired alignment of the apertures 40 and knobs 42.

Referring to Figures 4A-4C, the frame 21 includes a boss 66 that is used to receive screws that to fix the unit 10 to the room wall. Referring to Figure 4A, the latch portion on the frame 21 includes lateral walls 68 providing an opening 70. The front panel 23 includes structure (Figure 4B) providing a notch 90 for receiving the lateral walls 68 of the frame 21 for laterally locating the front panel 23 relative to the frame 21.

A first latching member 72 provided on the front panel 23, shown in Figure 4B, includes a protrusion 74. The front panel 23 includes walls 88 that hide the first latching member 72 to provide an aesthetically pleasing appearance. The frame 21 includes a second latch member 76 having a deflectable leg 78 spaced from a lower wall 84 to provide a gap 86. The leg 78 includes a protrusion 82 that provides tapered surfaces 80 that cooperate with the protrusion 74 to deflect the protrusion 82 when the front panel 23 is latched and unlatched relative to the frame 21.

Although example embodiments have been disclosed, a worker of ordinary skill in this art would recognize that certain modifications would come within the scope of the claims. For that reason, the following claims should be studied to determine their true scope and content.
CLAIMS

1. An air conditioning unit comprising:
a frame providing an air passageway;
a front panel covering the air passageway; and
a hinge interconnecting the front panel to the frame and configured
to provide open and closed rotational positions of the front panel relative to the
frame.

2. The air conditioning unit according to claim 1, wherein the
hinge includes first and second portions respectively provided on each of the
frame and the front panel which cooperate with one another to provide the open
and closed rotational positions, one of the portions providing a pocket and the
other of the portions providing an arm received in the pocket.

3. The air conditioning unit according to claim 2, wherein the
arm includes a pivot, and the pocket includes a recess receiving the pivot, the
front panel rotating about the pivot relative to the frame between the open and
closed rotational positions.

4. The air conditioning unit according to claim 3, wherein the
recess includes retaining tabs configured to retain the front panel relative to the
frame in the open position.

5. The air conditioning unit according to claim 4, wherein the
pivot includes a flat, the hinge includes a removal position in which the flat is
aligned between the retaining tabs permitting removal of the front panel relative
to the frame.

6. The air conditioning unit according to claim 1, comprising a user control extending through an aperture in the front panel, the user control smaller than the aperture and configured to remain fixed relative to the frame when rotating the front panel between the open and closed rotational positions.

7. The air conditioning unit according to claim 1, comprising a latch spaced from the hinge.

8. The air conditioning unit according to claim 7, wherein one of the frame and front panel includes a wall surrounding the latch and providing a distance corresponding to a gap between a perimeter of the front panel and the frame.

9. The air conditioning unit according to claim 7, wherein the latch includes first and second latching members with one of the latching members including a deflectable leg cooperating with the other latching member in the closed rotational position.

10. The air conditioning unit according to claim 9, wherein each of the first and second latching members include protrusions engaging one another in an interlocking arrangement in the closed rotational position.

11. The air conditioning unit according to claim 7, wherein a notch is provided by one of the frame and front panel, the notch cooperates with structure on the other of the frame and front panel to laterally locate the front
panel relative to the frame in the closed rotational position.