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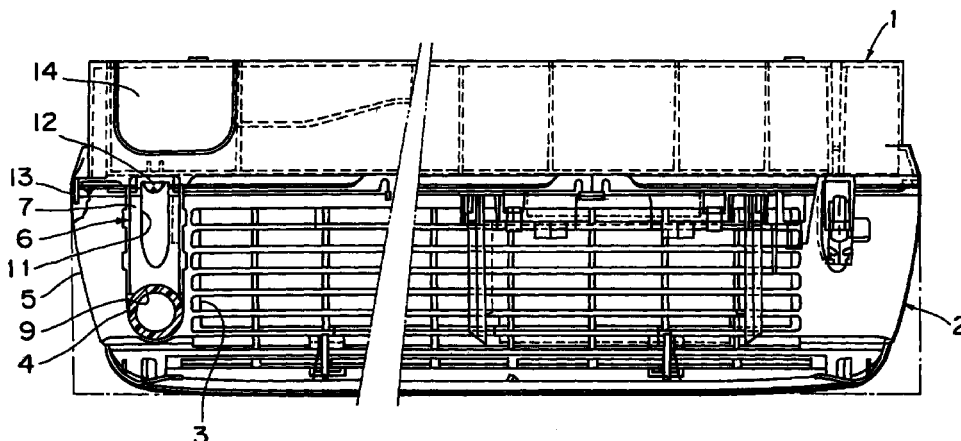
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(54) Front panel of air conditioner

(57) A front panel (2) has a suction opening (3) and is installed on a front surface of the body (1) of the air conditioner accommodating a fan and a heat exchanger. The front panel (2) has a front panel body (5) and a separable member (6) that can be cut off from the front panel body (5) to take out the drain hose (4) to the outside. The separable member 6 has a sealing portion (7) that extends from a portion thereof in contact with the body (1) and can be fixed to the body (1) with a screw (12) and a hose-corresponding portion (8) form-

ing a hole (9) into which the drain hose (4) is inserted when the hose-corresponding portion (8) is cut off from a front end of the sealing portion (7). Thus, indoor air is prevented from being sucked into the body (1) of the air conditioner from a drain hose (4) insertion portion and the front panel (2) is allowed to be removably installed on the body (1) of the air conditioner, with keeping the drain hose (4) connected with the body.

Fig. 1



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Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a front panel of an indoor air conditioner that can be used as a wall-mounting type, a ceiling-embedding type, and a ceiling-hanging type.

[0002] An indoor air conditioner of the wall-mounting type generally has a body which accommodates a fan and a heat exchanger and a rear surface of which is fixed to a wall; and a front panel which is installed on a front surface of the body and has a suction opening and a blow-off opening both communicating with the inside of the body. Provided below the heat exchanger accommodated in the body is a drain pan receiving waterdrop that is formed on the heat exchanger and drops therefrom. Connected with a bottom portion of the drain pan is a drain hose extending downward vertically in penetration through a bottom portion of the body to discharge water stored in the drain pan to the outside.

[0003] An indoor air conditioner of the ceiling-embedding type meanwhile has a body which accommodates a fan and a heat exchanger horizontally and is installed horizontally in the ceiling; and a front panel which is installed on a lower surface of the body such that the front panel covers an opening of the ceiling and has a suction opening and a blow-off opening both communicating with the inside of the body. A drain hose is connected with a bottom portion of a drain pan provided below the heat exchanger accommodated in the body, such that the drain hose extends vertically downward from the drain pan. The drain hose then bends perpendicularly in penetration through the front panel horizontally and through a side surface of the front panel to discharge water stored in the drain pan to the outside.

[0004] In addition, there is an indoor air conditioner of a type that can be used as both the vertical wall-mounting type and the horizontal ceiling-embedding type by designing the relative arrangements of the fan, the heat exchanger, and the drain pan accommodated respectively in the body of the air conditioner and also the configuration of the heat exchanger and the drain pan.

[0005] The above conventional air conditioner that can be used as both the wall-mounting type and the ceiling-embedding type has the following problem: When the air conditioner is used as the vertical wall-mounting type, the drain hose extends from the bottom portion of the drain pan vertically downward in penetration through the bottom portion of the body of the air conditioner. However, if this air conditioner is used as the horizontal ceiling-embedding type, the drain hose cannot be used as it is because it extends horizontally from a side wall of the drain pan. In order to use the drain hose for this purpose, a hole for vertical use on the side wall of the drain pan is sealed and a hole for horizontal use is formed at the lowest position of the bottom

portion of the drain pan for connecting the drain hose. The connected drain hose is then bent perpendicularly, as described above and inserted horizontally through the front panel and then taken out to the outside by penetrating it through the side surface of the front panel.

[0006] However, the above method has a problem at the drain hose penetration position of the side surface of the front panel. That is, in the case where the side wall of the front panel is cut out from the upper end of the side wall in contact with the body of the air conditioner such that the cut-off portion has a width equal to the diameter of the drain hose and a length equal to the length of the vertical portion of the drain hose, namely, the length of the drain hose from the bottom portion of the drain pan to the bent position, the front panel can be removably installed on the body of the air conditioner advantageously, with keeping the drain hose attached to the body. However, indoor air is sucked into the body from a cutout portion formed above the drain hose without the air passing through a filter. Thus, dust penetrates into the body as a problem. When a hole having a diameter equal to that of the drain hose is formed at only a drain hose insertion portion of the side wall of the front panel, indoor air can be prevented from being sucked into the body. However, in this construction, the front panel cannot be removed from the body unless the drain hose is removed from the body. Thus, it is disadvantageously necessary to make complicated inspection and maintenance of the inside of the body.

SUMMARY OF THE INVENTION

[0007] Therefore, the object of the present invention is to provide a front panel of an air conditioner capable of preventing air from being sucked into the body through a drain hose insertion position of the front panel and allowing the front panel to be removably installed on the body with keeping the drain hose attached thereto to facilitate internal inspection and maintenance of the body of the air conditioner after installation of the front panel by making a drain hose insertion portion of a front panel be re-usably cut off.

[0008] In order to achieve the object, there is provided a front panel of an air conditioner a body of which accommodates a fan and a heat exchanger, installed on a front surface of the body of said air conditioner and having a suction opening communicating with an inside of said body, wherein

the front panel has a front panel body and a separable member that can be cut off from the front panel body of the front panel to take out a drain hose to the outside, and

the separable member has a sealing portion that extends from a portion in contact with the body of the air conditioner and can be fixed to the body of the air conditioner; and a hose-corresponding portion forming a hole into which the drain hose is

inserted when the hose-corresponding portion is cut off from a front end of the sealing portion.

[0009] In the case where the air conditioner of the present invention is used as the horizontal ceiling-embedding type, the separable member is cut off from the front panel body. Then, the portion of the separable member corresponding to the drain hose (hereinafter referred to hose-corresponding portion) is cut off from the front end of the sealing portion of the separated separable member. Thereafter, while the drain hose extending from the body of the air conditioner is being inserted into the cutout portion formed as a result of the cut-off of the separable member from the front panel body, the front panel is installed on the body of the air conditioner. Then, the sealing portion from which the hose-corresponding portion is removed is inserted into the cutout portion exposed above the drain hose. Then, the sealing portion is fixed to the body of the air conditioner.

[0010] Otherwise, after the hose-corresponding portion is cut off from the front end of the sealing portion of the separable member, the rear-end portion (base portion) of the sealing portion is fixed to the body of the air conditioner, with the front end of the sealing portion in contact with the drain hose extending from the body of the air conditioner. Then, while the drain hose and the sealing portion are being inserted into the cutout portion of the front panel body formed as a result of the cut-off of the separable member from the front panel body, the front panel is installed on the body of the air conditioner.

[0011] The cutout portion of the front panel body formed as a result of the cut-off of the separable member from the front panel body extends from the portion that contacts the body of the air conditioner. The cutout portion of the front panel body resulted from the separated separable member other than the drain hose insertion portion is covered with the sealing portion. Therefore, indoor air is not sucked into the body of the air conditioner from the drain hose insertion portion of the front panel body. Further, the front panel can be removably installed on the body of the air conditioner, with keeping the drain hose connected with the body of the air conditioner. Consequently, it is easy to make internal inspection and maintenance of the body of the air conditioner after installation of the air conditioner.

[0012] Therefore, the air conditioner can be used not only as the wall-mounting type but also the ceiling-embedding type or the ceiling-hanging type. In the case where the air conditioner is used as the ceiling-embedding type or the ceiling-hanging type, indoor air can be prevented from being sucked into the body of the air conditioner from the drain hose insertion portion of the front panel body. Therefore, dust does not penetrate into the body of the air conditioner. Further, it is easy to removably install the front panel on the body of the air conditioner, with keeping the drain hose connected with the drain pan in the body of the air conditioner. Consequently, it is easy to make inspection and maintenance

of the body of the air conditioner after the installation thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The present invention will become more fully understood from the detailed description given hereinbelow and the accompanying drawings which are given by way of illustration only, and thus are not limitative of the present invention, and wherein:

Fig. 1 is a side view showing an air conditioner having a front panel of the present invention and installed as a ceiling-embedding type; and

Fig. 2 is a side view showing the detail of a separable member of the front panel shown in Fig. 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0014] The present invention will be described below in detail with reference to embodiments shown in the drawings.

[0015] Fig. 1 is a side view showing an example of a front panel of an air conditioner installed horizontally as the ceiling-embedding type. The air conditioner includes a body 1 horizontally accommodating an unshown fan and an unshown heat exchanger and installed horizontally in a ceiling; and a front panel 2 having a suction opening 3 communicating with the inside of the body 1 and installed on a lower surface of the body 1 such that the front panel 2 covers an unshown opening of the ceiling.

[0016] The front panel 2 has a front panel body 5 and a separable member 6 which can be cut off from the front panel body 5 to take out to the outside a drain hose 4 whose one end is connected with an unshown drain pan provided below the heat exchanger in the body 1. The separable member 6 has a sealing portion 7 extending downward from a portion in contact with the body 1 and a hose-corresponding portion 8 (see Fig. 2B) forming a hole 9 into which the drain hose 4 is inserted when the hose-corresponding portion 8 is cut off from a front end of the sealing portion 7.

[0017] As shown in Fig. 2A, the separable member 6 is configured by an unpenetrable groove comprising two parallel lines with a distance equal to the diameter of the drain hose 4 and a semicircular line between the front ends of the parallel lines. The separable member 6 is provided on a side of the front panel body 5 adjacent to the suction opening 3. When the front panel 2 is used for a air conditioner of the ceiling-embedding type, the separable member 6 can be cut off easily from the front panel body 5 with a nipper or the like, as shown in Fig. 2B. The hose-corresponding portion 8 is configured by also a semicircular unpenetrable groove 10 formed at a front end of the sealing portion 7 such that the semicircular unpenetrable groove 10 forms together with the

former semicircular line of unpenetrable groove a circle, as shown in Fig. 2B. The hose-corresponding portion 8 can be easily cut off from the front-end portion of the sealing portion 7 with a nipper or the like, as shown in Fig. 2C. Formed in the vicinity of a rear-end portion of the sealing portion 7 is a concave portion 11 for fixing the sealing portion 7 to the body 1 with a screw 12 to be tightened into the concave portion 11 from the outside, as shown in Fig. 2C.

[0018] As is shown only left side of the front panel partially broken in Fig. 1, a claw 13 for fixing the front panel 2 to the body 1 is provided at each of left and right ends of the front surface of the body 1. The front panel 2 can be attached on the body 1 by merely pressing up the front panel 2 against the left and right claws 13 from below and removed therefrom by merely pulling down the front panel 2.

[0019] The front panel 2 of the air conditioner having the above construction is used in the following manner.

[0020] In the case where the body 1 is installed horizontally in the ceiling, the lower surface of the body 1 is flush with an unshown opening of the ceiling and exposed to the outside.

[0021] A user cuts off the separable member 6 from the front panel body 5 of the front panel 2 to be attached with a nipper or the like, as shown in Fig. 2A. Then, the circular hose-corresponding portion 8 shown in Fig. 2B is cut off from the front end of the sealing portion 7 of the separated separable member 6 with a nipper or the like. Thereafter, the rear-end portion (base portion) of the sealing portion 7 is fixed to the body 1 with the screw 12 inserted into the concave portion 11, as shown in Fig. 2C, with the semicircular concave portion 9 formed at the front end of the sealing portion 7 in contact with the drain hose 4 extending from the drain pan (not shown) accommodated in the body 1 as shown in Fig. 1. Finally, as shown in Fig. 1, while the user is inserting the drain hose 4 and the sealing portion 7 in contact therewith into a cutout portion (see Fig. 2A) of the front panel body 5 formed as a result of the cut-off of the separable member 6 from the front panel body 5, the user presses left and right end portions of the inner wall of the front panel 2 upward respectively against the claw 13 provided at the left and right ends of the body 1 to fix the front panel 2 to the body 1.

[0022] In the case where the air conditioner is used as the wall-mounting type by vertically installing the body 1 on an indoor wall, the user does not cut off the separable member 6 from the body 5 but fixes the front panel 2 to the body 1 through the claw 13. The drain hose which is now connected with the other hole for vertical use of the drain pan in the body 1, is taken out to the outside through a hole formed on a bottom plate 14 (see Fig. 1) of the body 1 after removing the closing lid of the hole.

[0023] In the front panel 2 of the air conditioner having the above construction, the separable member 6

that can be cut off from the front panel body 5 extends from the portion in contact with the body 1 of the air conditioner. The cutout portion of the front panel body 5 resulted from the separated separable member 6 other than the drain hose insertion portion can be covered with the sealing portion 7 fixed to the body 1 with the screw 12. Therefore, the air conditioner can be used not only as the vertical wall-mounting type but also the horizontal ceiling-embedding type or the horizontal ceiling-hanging type. In the case where the air conditioner is used as the ceiling-embedding type or the ceiling-hanging type, indoor air is not sucked into the body 1 from the drain hose insertion portion of the front panel body 5. Therefore, dust does not penetrate into the body 1. Further, it is easy to removably install the front panel 2 on the body 1, with keeping the drain hose 4 connected with the drain pan in the body 1. Consequently, it is easy to make internal inspection and maintenance of the body 1 after installation of the air conditioner.

[0024] In the embodiment, the claw 13 for fixing the front panel 2 to the body 1 is provided at the left and right ends of the front surface of the body 1. Thus, the embodiment has an advantage that the front panel 2 can be removably installed on the body 1 by one touch operation.

[0025] The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications as would be obvious to one skilled in the art are intended to be included within the scope of the following claims.

Claims

1. A front panel of an air conditioner a body (1) of which accommodates a fan and a heat exchanger, installed on a front surface of the body (1) of said air conditioner and having a suction opening (3) communicating with an inside of said body (1), wherein

the front panel (2) has a front panel body (5) and a separable member (6) that can be cut off from the front panel body (5) of the front panel (2) to take out a drain hose (4) to the outside, and

the separable member (6) has a sealing portion (7) that extends from a portion in contact with the body (1) of the air conditioner and can be fixed to the body (1) of the air conditioner; and a hose-corresponding portion (8) forming a hole (9) into which the drain hose (4) is inserted when the hose-corresponding portion (8) is cut off from a front end of the sealing portion (7).

Fig. 1

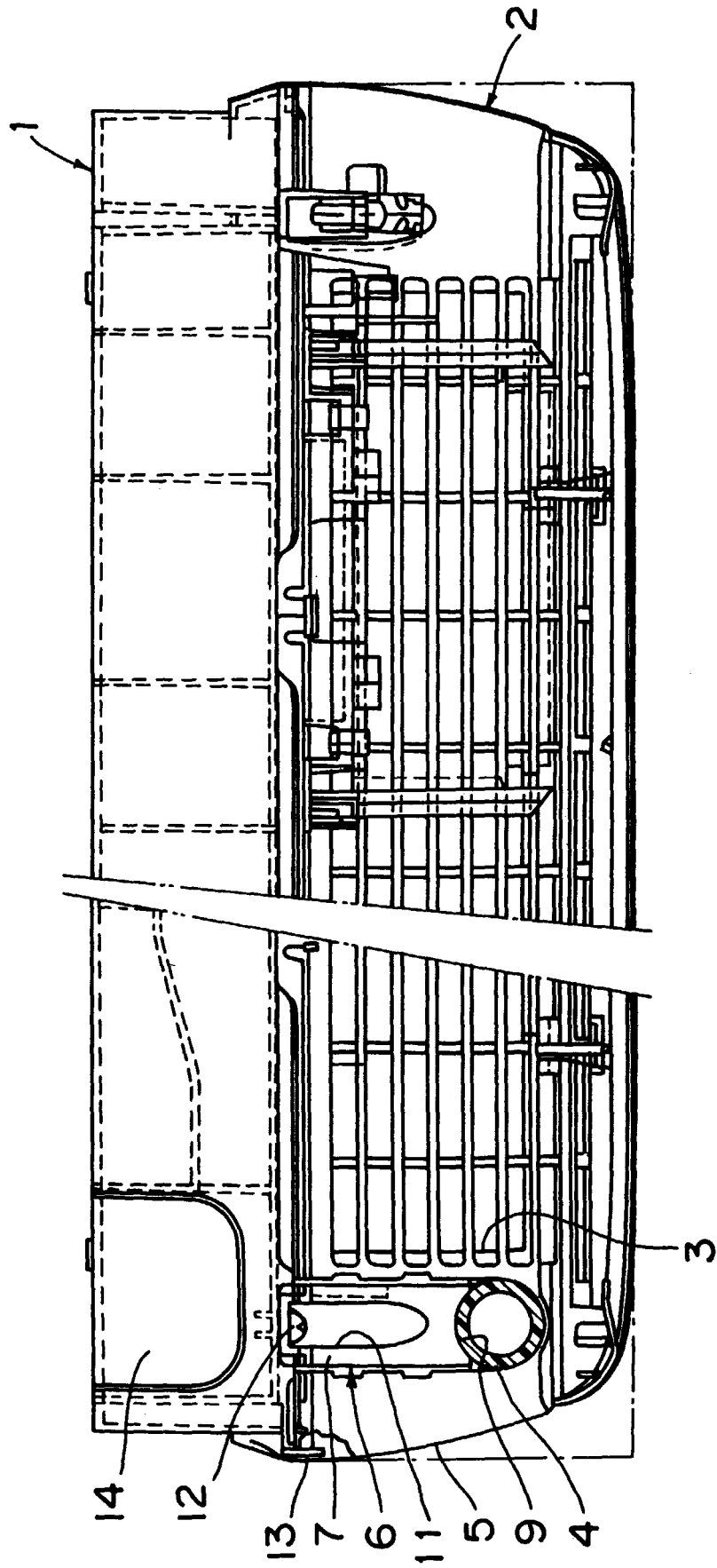


Fig. 2A

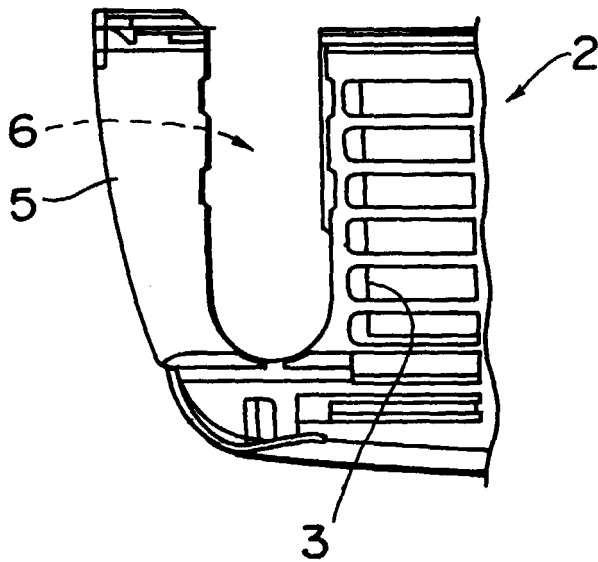


Fig. 2B

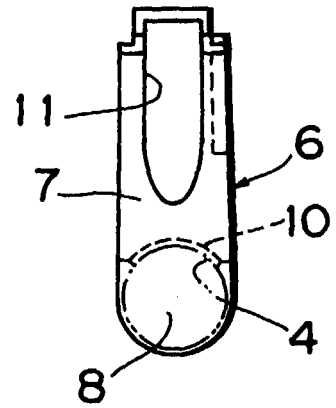


Fig. 2C

