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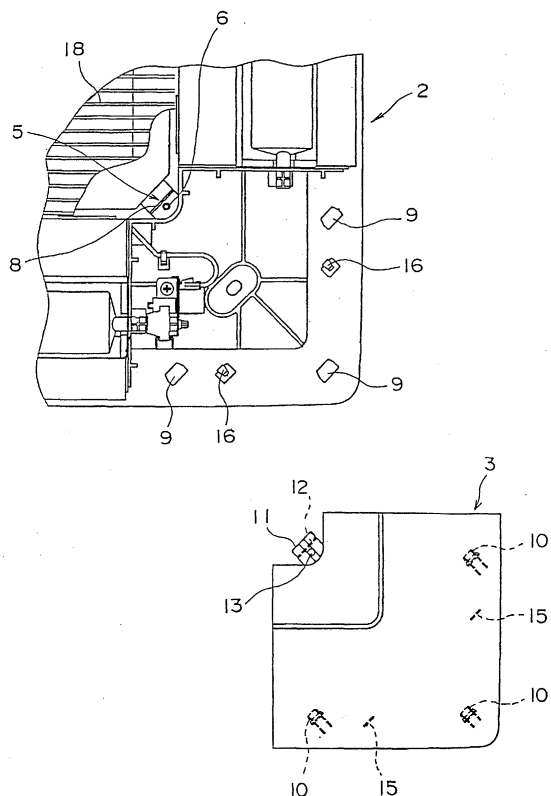
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(54) **Ceiling-embedded air conditioner**

(57) In a ceiling-embedded air conditioner including an air conditioner main body (1); a decorative panel main body (2) attached to the air conditioner main body (1); and corner panels (3) attached to the decorative panel main body (2) and respectively forming design surfaces at corner portions of the decorative panel main body (2), there are provided a screw-fastening portion (200) composed of an engagement portion (11) and an engagement-catching portion (5) that engages with the engagement portion (11); a slide stopping portion (100) composed of a stopping claw (10) and a stopping hole (9) that locks the stopping claw (10); and a hooking portion (300) composed of a hooking rib (15) and an elastic claw portion (16) that hooks the hooking rib (15), between each of the corner panels (3) and the decorative panel main body (2). Consequently, it is possible to provide an inexpensive ceiling-embedded air conditioner that shortens the time needed to attach/remove the corner panels.

FIG. 1



Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a ceiling-embedded air conditioner that is more readily installed by shortening the installation time.

2. Description of the Related Art

[0002] Fig. 3 is an exploded perspective view showing an example of a conventional ceiling-embedded air conditioner. The air conditioner is installed at a high place, and includes an intake opening for taking in indoor air and a blow-off opening for recirculating air inside the room. Reference numeral 1 denotes the main body of the air conditioner, reference numeral 2 denotes the main body of a decorative panel, and reference numeral 4 denotes screws to fasten the decorative panel main body 2 to the air conditioner main body 1. Reference numeral 3 denotes corner panels respectively forming design surfaces at the corner portions of the decorative panel, and each of them is composed of a different member from the air conditioner main body 1 and the decorative panel main body 2.

[0003] Fig. 4 is a plan view showing a major portion of Fig. 3. Fig. 5 is a longitudinal cross section showing an assembled state of Fig. 4. As shown in the drawings, one end of string 20 is fastened to the corner panel 3 with a screw 21 in advance, and the air conditioner is shipped from the factory in this state. Since the decorative panel main body 2 is positioned in the inner region of the corner panels 3 and fastened to the air conditioner main body 1 with the fastening screws 4, the corner panels 3 need to be attached/removed on/from every occasion when the decorative panel main body 2 is installed or when a service is necessary.

[0004] In order to fasten the corner panel 3, the other end of the string 20 is fastened to the decorative panel main body 2 with a screw 22, and stopping claws 10 of the corner panel 3 are locked in corresponding stopping holes 9 made in the decorative panel main body 2. Then, the corner panel 3 is slid in the direction indicated by an arrow, which allows an engagement claw 12 of an engagement portion 11 to engage with an engagement convex portion 8 of an engagement-catching portion 5 provided to the decorative panel main body 2. Under these conditions, the engagement portion 11 is fastened to the engagement-catching portion 5 with a fastening screw 14. The corner panel 3 is removed in the reverse procedure of the above.

[0005] Since the engagement portion 11 used to fasten the corner panel 3 is formed in a region under oily smoke environments due to the presence of a suction grill 18, the engagement portion 11 may be broken while the air conditioner is operating and there is a risk that

the corner panel 3 falls off. Hence, the string 20 is provided to prevent the corner panel 3 from falling off.

[0006] According to the structure of installing the corner panels 3 of the ceiling-embedded air conditioner arranged as above, the operator has to fasten the corner panel 3 to the decorative panel main body 2 with the fastening screw 14 by one hand while holding the corner panel 3 by the other hand, and this raises a problem that the operation is time-consuming. Also, the costs are increased because of the need to provide the string 20 and the like.

SUMMARY OF THE INVENTION

[0007] The present invention was devised to solve the above problems, and therefore, has an object to provide an inexpensive ceiling-embedded air conditioner that shortens the time needed to attach/remove the corner panels.

[0008] A ceiling-embedded air conditioner of the invention includes: an air conditioner main body; a decorative panel main body attached to the air conditioner main body; and corner panels attached to the decorative panel main body and respectively forming design surfaces at corner portions of the decorative panel main body. The air conditioner is further provided with, between each of the corner panels and the decorative panel main body, a screw-fastening portion composed of an engagement portion and an engagement-catching portion that engages with the engagement portion, a slide stopping portion composed of a stopping claw and a stopping hole that locks the stopping claw, and a hooking portion composed of a hooking rib and an elastic claw portion that hooks the hooking rib.

[0009] Also, the ceiling-embedded air conditioner is arranged in such a manner that the hooking rib and a stopping claw of the elastic claw portion are locked with each other after the corner panel is fully slid.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0010] Fig. 1 is a plan view showing an exploded state of a major portion according to one embodiment of the invention. Fig. 2(a) is a longitudinal cross section showing an assembled state of Fig. 1, and Fig. 2(b) is an enlarged view of a portion A of Fig. 2(a) used to explain an operation. With referring to these drawings, reference numeral 1 denotes a main body of a ceiling-embedded air conditioner, reference numeral 2 denotes a decorative panel main body made of plastic, and reference numeral 3 denotes a corner panel forming a design surface at each corner portion of the decorative panel main body 2, also made of plastic.

[0011] Reference numeral 4 denotes a fastening screw inserted into a screw hole made in the decorative panel main body 2 to fasten the decorative panel main body 2 to the air conditioner main body 1. Reference

numeral 5 denotes an engagement-catching portion provided to the decorative panel main body 2. The engagement-catching portion is provided with a boss 7 having a screw hole 6, and an engagement convex portion 8. Reference numeral 9 denotes stopping holes made in the decorative panel main body 2.

[0012] Reference numeral 10 denotes stopping claws shaped like an inverted L and provided to three corners on the back surface of the corner panel 3 on a one-by-one basis. The corner panel 3 is slid after the stopping claws 10 are locked in the corresponding stopping holes 9 in the decorative panel main body 2, which allows the corner panel 3 to be locked in the decorative panel main body 2. Each pair of the stopping claw 10 and the stopping hole 9 forms a slide stopping portions 100.

[0013] Reference numeral 11 denotes an engagement portion provided at the remaining corner portion on the back surface of the corner panel 3, and the engagement portion is provided with an engagement claw 12. The engagement claw 12 engages with the engagement convex portion 8 of the engagement-catching portion 5 of the decorative panel main body 2. The engagement portion 11 is provided with a screw hole 13, and the corner panel 3 is fastened to the decorative panel main body 2 by inserting a fastening screw 14 into the screw hole 13 and the screw hole 6 made in the engagement-catching portion 5. The engagement portion 11 and the engagement-catching portion 5 together form a screw-fastening portion 200.

[0014] Reference numeral 15 denotes hooking ribs respectively provided at, for example, two portions on the back surface of the corner panel 3, and both are positioned inside a triangle formed by linking the three stopping claws 10. Reference numeral 16 denotes elastic claw portions provided on the bottom surface of the decorative panel main body 2 and having an almost L-shaped cross section, and each of them is provided with, at the tip end portion thereof, a hooking claw 17 where the hooking rib 15 of the corner panel 3 is locked as being hooked. Each pair of the hooking rib 15 and the elastic claw portion 16 forms a hooking portion 300. Reference numeral 18 denotes a suction grill.

[0015] An operation of the present embodiment arranged as above will now be explained. Initially, the operator attaches the decorative panel main body 2 to the air conditioner main body 1 with the fastening screws 4. Then, the operator holds the corner panel 3 by his/her hands and inserts the stopping claws 10 of the corner panel 3 into the corresponding stopping holes 9 in the decorative panel main body 2 and slides the corner panel 3 in the direction indicated by an arrow. Consequently, the corner panel 3 is locked into the decorative panel main body 2.

[0016] In this instance, each hooking rib 15 of the corner panel 3 is brought into contact with the corresponding hooking claw 17 of the elastic claw 16 of the decorative panel main body 2 in association with the sliding of the corner panel 3 in the direction indicated by the

arrow. When the corner panel 3 is slid further, as shown in Fig. 2(b), the elastic claw portion 16 undergoes elastic deformation from the position indicated by a solid line to the position indicated by an alternate long and two short dashes line. As the hooking rib 15 moves further in association with the sliding of the corner panel 3, the elastic claw portion 16 restores to the state before the deformation, that is, returns to the position indicated by the solid line, and the hooking rib 15 and the hooking claw 17 of the elastic claw portion 16 are locked with each other, thereby preventing the corner panel 3 from moving in a direction opposite to the direction indicated by the arrow.

[0017] Also, the engagement portion 11 of the corner panel 3 is brought into contact with the engagement-catching portion 5 of the decorative panel main body 2 in association with the sliding of the corner panel 3 in the direction indicated by the arrow. When the corner panel 3 is slid further, the engagement claw 12 of the engagement portion 11 and the engagement convex portion 8 of the engagement-catching portion 5 are engaged with each other.

[0018] After the hooking ribs 15 and the elastic claw portions 16 are locked with each other and the engagement portion 11 and the engagement-catching portion 5 are engaged with each other in this manner, the corner panel 3 is fastened to the decorative panel main body 2 through screw fixation by inserting the fastening screws 14 into the screw holes 13 and 6 in the corner panel 3 and the decorative panel main body 2, respectively. The corner panel 3 is removed in the reverse procedure.

[0019] According to the present embodiment, by locking the hooking ribs 15 and the elastic claw portions 16 with each other, it is possible to shorten the time needed for attachment/removal, etc. Also, in the event that the engagement portion 11 of the corner panel 3 breaks, the corner panel 3 is prevented from falling off, because the elastic claw portions 16 of the corner panel 3 will be neither deformed as indicated by the alternate long and two short dashes line of Fig. 2(b) nor unlocked unless a force as strong as or stronger than the force applied at the time of installation is applied.

[0020] The description above explained a case where the hooking ribs 15 are provided to the corner panel 3 and the elastic claw portions 16 are provided to the decorative panel main body 2. It should be appreciated, however, that the same operation and advantages can be achieved when the hooking ribs 15 are provided to the decorative panel main body 2 and the elastic stopping claws 16 to the corner panel 3.

[0021] As can be clearly understood from the description above, a ceiling-embedded air conditioner of the invention includes: an air conditioner main body; a decorative panel main body attached to the air conditioner main body; and corner panels attached to the decorative panel main body and respectively forming design surfaces at corner portions of the decorative panel main body, and is further provided with, between each of the

corner panels and the decorative panel main body, a screw-fastening portion composed of an engagement portion and an engagement-catching portion that engages with the engagement portion, a slide stopping portion composed of a stopping claw and a stopping hole that locks the stopping claw, and a hooking portion composed of a hooking rib and an elastic claw portion that hooks the hooking rib. Hence, not only can the corner panel be prevented from falling off from the decorative panel main body, but also the time needed to attach/remove the corner panel can be shortened at lower costs.

[0022] Also, the ceiling-embedded air conditioner is arranged in such a manner that the hooking rib and a hooking claw of the elastic claw portion are locked with each other after the corner panel is fully slid. Hence, not only can the corner panel be prevented from falling off from the decorative panel main body, but also the time needed to attach/remove the corner panel can be shortened at lower costs.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023]

Fig. 1 is a plan view showing an exploded state of a major portion according to one embodiment of the present invention;

Fig. 2(a) is a longitudinal cross section showing an assembled state of Fig. 1;

Fig. 2(b) is an enlarged view of a portion A of Fig. 2(a);

Fig. 3 is an exploded perspective view showing an example of a conventional ceiling-embedded air conditioner;

Fig. 4 is a plan view of an exploded state of a major portion of Fig. 3; and

Fig. 5 is a longitudinal cross section showing an assembled state of Fig. 4.

DESCRIPTION OF REFERENCE NUMERALS

[0024] 1 Air conditioner main body, 2 Decorative panel main body, 3 Corner panel, 5 Engagement-catching portion, 9 Stopping hole, 10 Stopping claw, 11 Engagement portion, 15 Hooking rib, 16 Elastic claw portion, 17 Hooking claw, 100 Slide stopping portion, 200 Screw-fastening portion, 300 Hooking portion

Claims

1. A ceiling-embedded air conditioner, including an air conditioner main body (1), a decorative panel main body (2) attached to said air conditioner main body (1), and corner panels (3) attached to said decorative panel main body (2) and respectively forming design surfaces at corner portions of said decorative panel main body (2),

characterized by being provided with, between each of said corner panels (3) and said decorative panel main body (2),

a screw-fastening portion (200) composed of an engagement portion (11) and an engagement-catching portion (5) that engages with said engagement portion (11),

a slide stopping portion (100) composed of a stopping claw (10) and a stopping hole (9) in which said stopping claw (10) is locked, and

a hooking portion (300) composed of a hooking rib (15) and an elastic claw portion (16) on which said hooking rib (15) is hooked.

2. The ceiling-embedded air conditioner according to claim 1, wherein said elastic claw portion (16) is provided with a hooking claw (17), and said hooking rib (15) and said hooking claw (17) of said elastic claw portion (16) are locked with each other after said corner panel (3) is fully slid.

FIG. 1

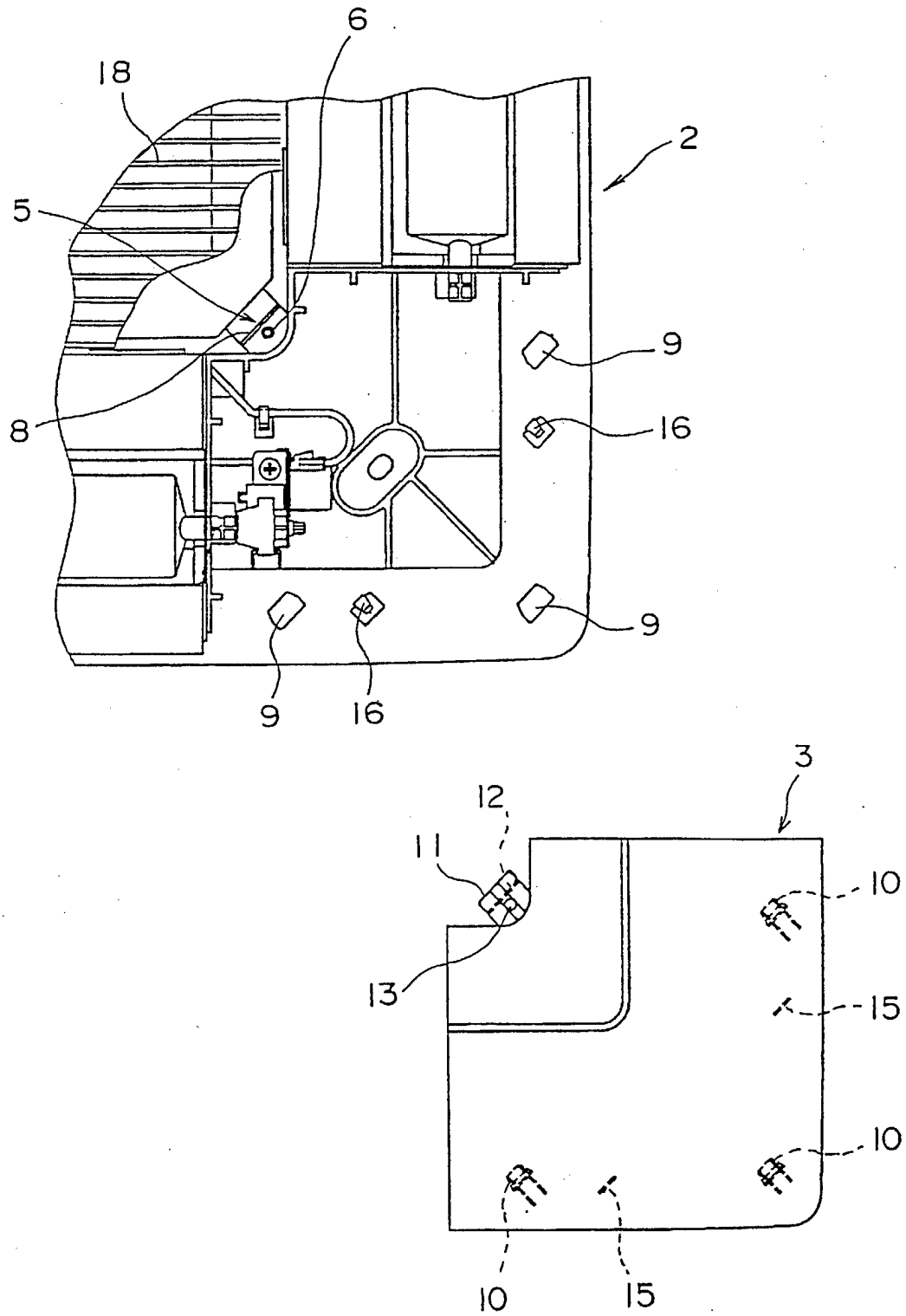


FIG. 2

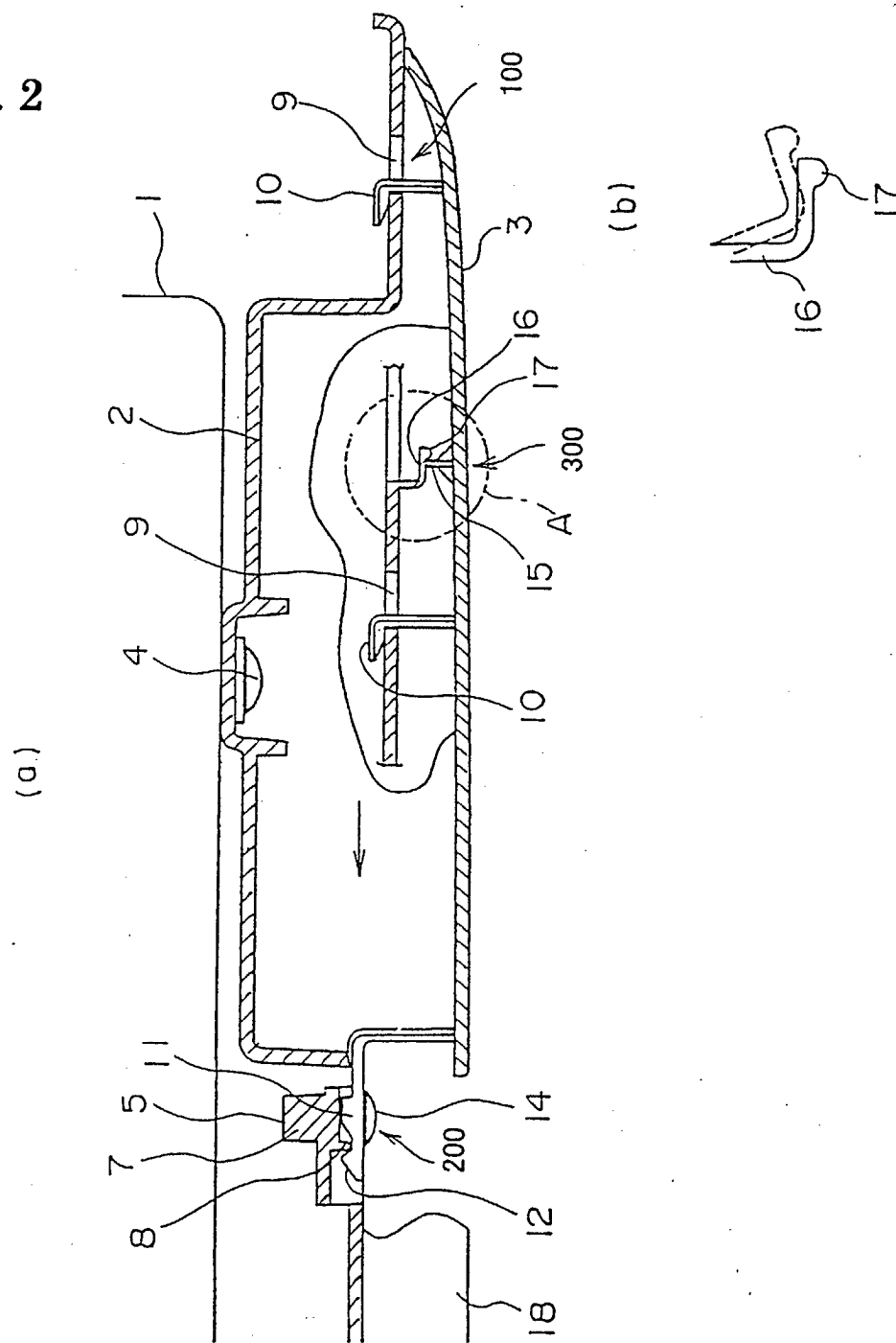


FIG. 3

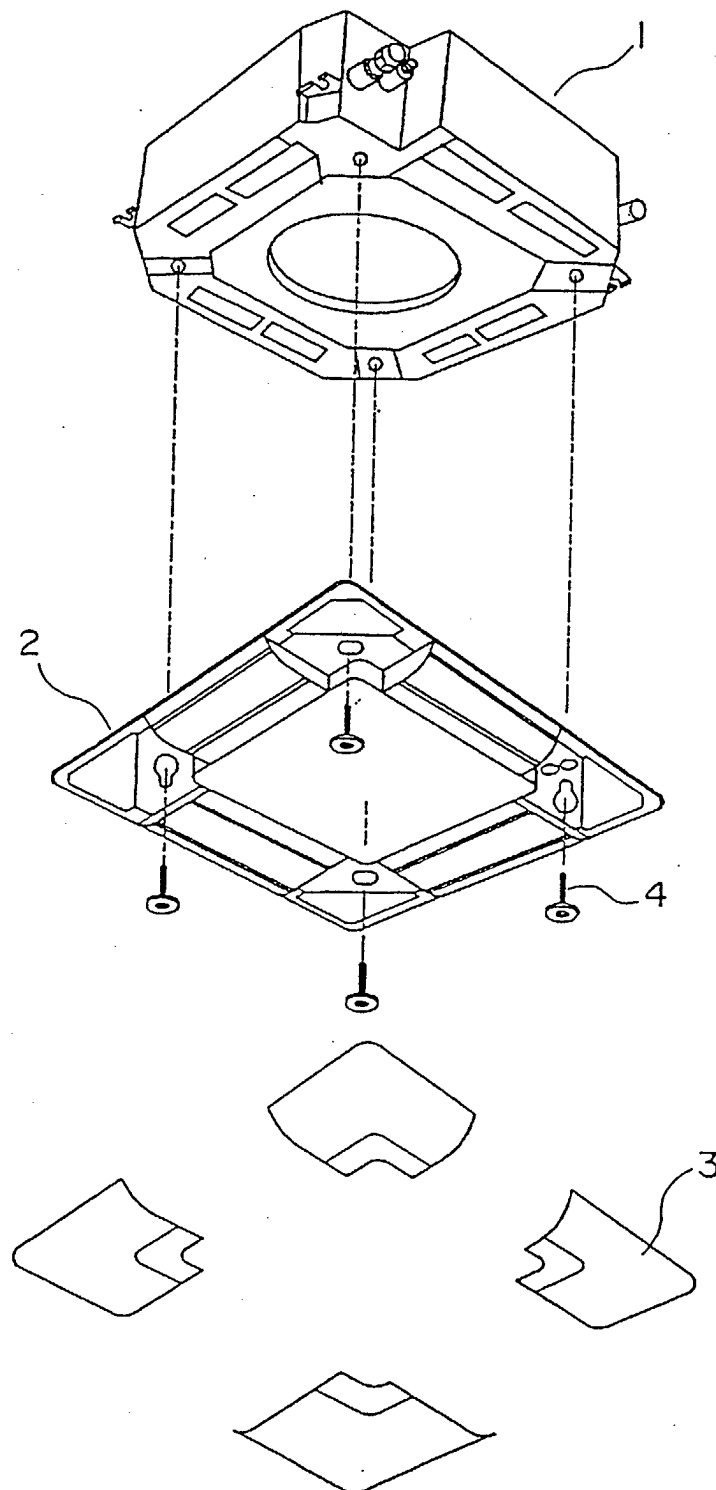


FIG. 4

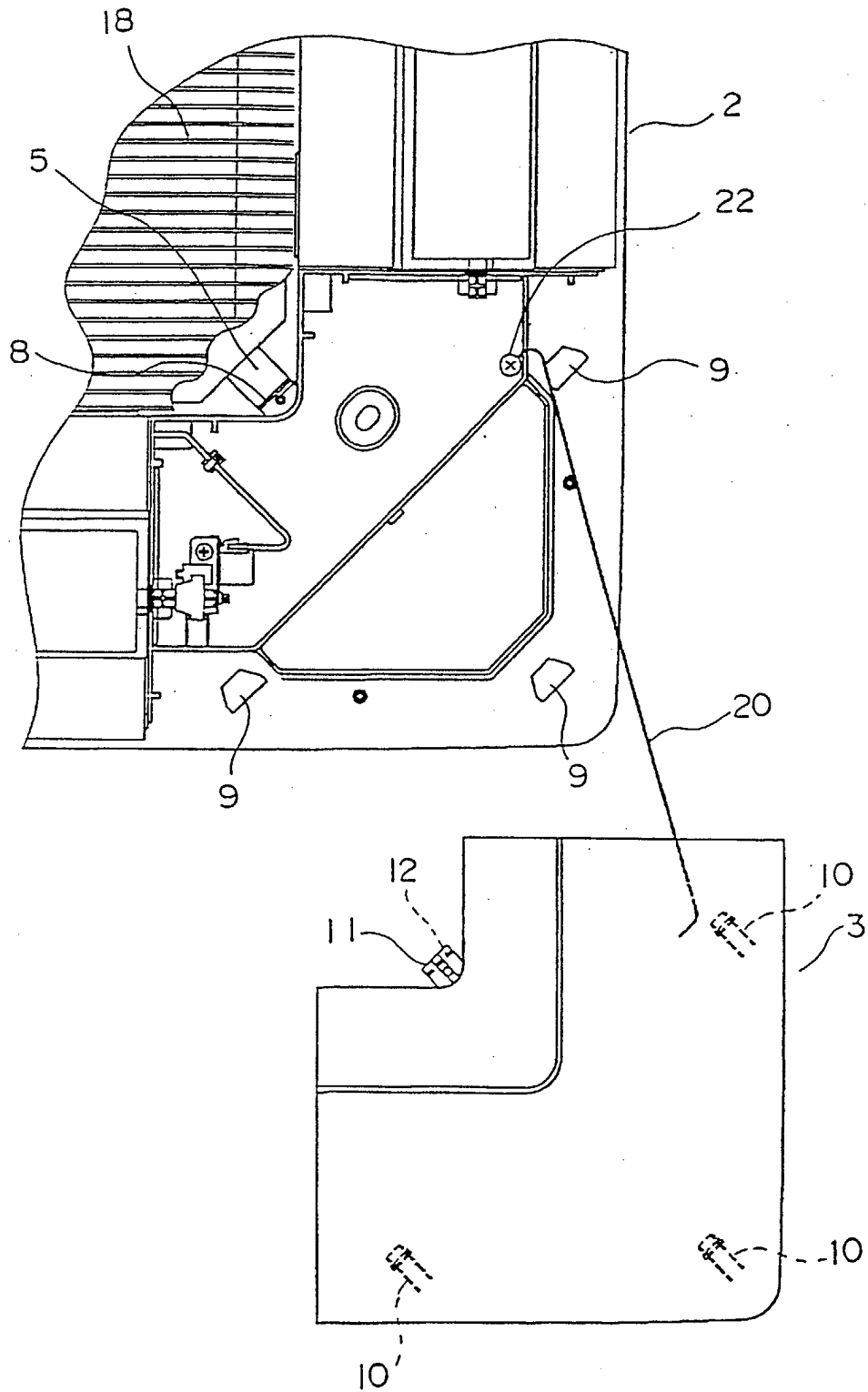
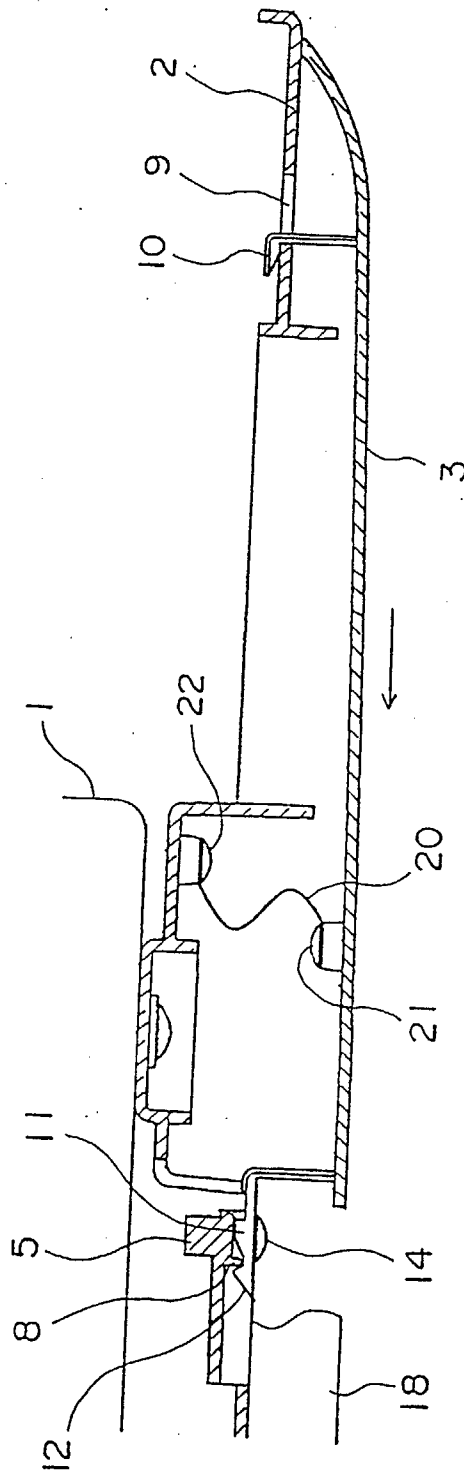


FIG. 5





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EUROPEAN SEARCH REPORT

Application Number
EP 03 25 0130

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EPO FORM 1503 03/02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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