(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 543 619 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
25.09.2019 Bulletin 2019/39

(21) Application number: **18792290.1**

(22) Date of filing: **16.03.2018**

(51) Int Cl.:
F24F 13/20 *(2006.01)*

(86) International application number:
PCT/JP2018/010372

(87) International publication number:
WO 2018/198585 (01.11.2018 Gazette 2018/44)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **28.04.2017 JP 2017090445**

(71) Applicant: **Mitsubishi Heavy Industries Thermal Systems, Ltd.**
Tokyo 108-8215 (JP)

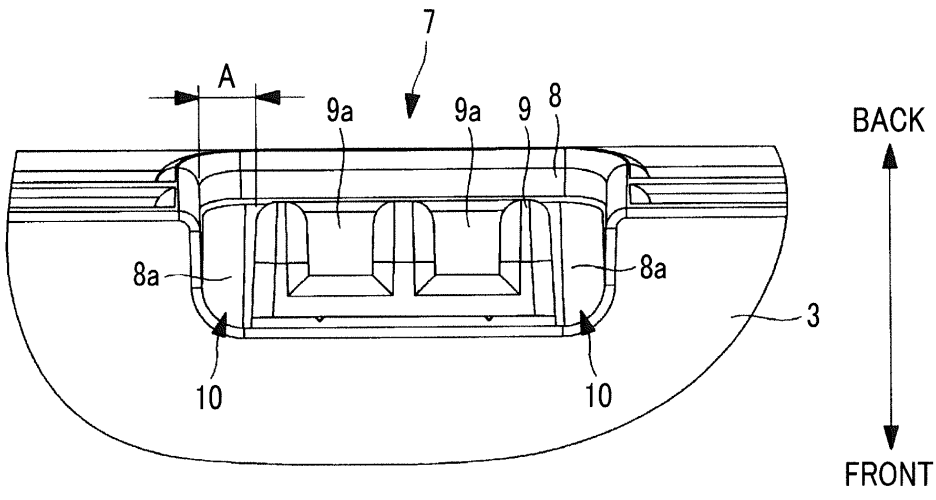
(72) Inventors:
- **UNO, Naomichi**
  Tokyo 108-8215 (JP)
- **TAKANO, Masashi**
  Tokyo 108-8215 (JP)

(74) Representative: **Henkel, Breuer & Partner Patentanwälte**
Maximiliansplatz 21
80333 München (DE)

(54) INDOOR UNIT FOR AIR CONDITIONING DEVICE

(57) The present invention is provided with: a base plate (3) to be fixed to an indoor wall surface; a front panel to be fixed to the base plate (3); and a detachable fixing unit (7) that is provided between the top part of the base plate (3) and the top part of the front panel. The fixing unit (7) is provided with: a recess (8) that is provided in the base plate (3), is depressed downward, and in which an insertion hole is formed; and claw parts (9) provided in the front panel and inserted into the insertion hole to advance into and engage with the recess (8). The recess (8) has a bottom surface (8a) that can be felt between the claw parts (9) inserted in the recess (8).

FIG. 3



EP 3 543 619 A1

Description

Technical Field

[0001] The present invention relates to an indoor unit for an air conditioning device that has a structure in which a front panel is fixed to a base plate.

Background Art

[0002] A case of an indoor unit for an air conditioning device is detachable due to fixing operation and maintenance operation. For example, a configuration where a front panel of a main body case is attached or detached is disclosed in PTL 1.

Citation List

Patent Literature

[0003] [PTL 1] Japanese Unexamined Patent Application Publication No. 2007-147118

Summary of Invention

Technical Problem

[0004] However, unlike the configuration of PTL 1, in a case of fixing a base plate, which is fixed to an indoor wall surface, to a front panel, a fixing portion provided on upper portions of the base plate and the front panel is used. A recessed portion that is provided in the base plate, is sunken downwards, and has an insertion hole formed therein and a claw portion that is provided on the front panel and engages with the recessed portion by being inserted into the insertion hole and advanced into the recessed portion are used as the fixing portion.

[0005] Since the fixing portion exists on the upper portions of the base plate and the front panel, visibility is poor, and an operator needs to perform operation by fumbling. For this reason, there is a possibility that the claw portion is mistakenly removed without knowing that it is in a fixed state where the claw portion of the fixing portion is inserted in the recessed portion or a released state where the claw portion is not inserted in the recessed portion, and the front panel falls at an unexpected timing.

[0006] In addition, in some cases, out of a plurality of fixing portions, a fixing portion of which a claw portion is inserted and fixed to a recessed portion, and a fixing portion, of which a claw portion is not inserted in a recessed portion and which is set as a dummy without being used as a fixing portion, are provided according to a model of an indoor unit. For example, in a case where a front panel is a heavy model, operation, in which a large number of fixing portions of which claw portions are inserted and fixed to recessed portions, compared to a case where the front panel is a light model, is performed (that is, the light model has a large number of fixing portions used as dummies). In such a case, it is required for an operator to reliably recognize whether or not the claw portions are inserted in the recessed portions of the fixing portions by touching.

[0007] The present invention is devised in view of such circumstances, and an object thereof is to provide an indoor unit for an air conditioning device that can reliably recognize the existence of a claw portion even in a case where a fixing portion that is attached or detached to or from a base plate and a front panel is provided on upper portions of a base plate and a front panel.

Solution to Problem

[0008] In order to solve the problem, an indoor unit for an air conditioning device of the present invention adopts the following means.

[0009] That is, according to an aspect of the present invention, there is provided an indoor unit for an air conditioning device including a base plate fixed to an indoor wall surface, a front panel fixed to the base plate, and a detachable fixing portion that is provided between an upper portion of the base plate and an upper portion of the front panel. The fixing portion includes a recessed portion that is provided in any one of the base plate and the front panel, is sunken downwards, and has an insertion hole formed therein, and a claw portion that is provided on the other one of the base plate and the front panel and engages with the recessed portion by being inserted into the insertion hole and being advanced into the recessed portion. The recessed portion has a bottom surface that is capable of being touched between the claw portion inserted in the recessed portion and the recessed portion.

[0010] By inserting and engaging the claw portion with the insertion hole provided in the recessed portion of the fixing portion, the base plate is detachably fixed to the front panel. Since the bottom surface is provided in the recessed portion such that an operator can touch between the inserted claw portion and the bottom surface by a finger, the operator can recognize a step between the bottom surface and the claw portion by touching, and can check the existence of the claw portion. Therefore, even in a case where the fixing portion that attaches or detaches the base plate to or from the front panel is provided on the upper portions of the base plate and the front panel and thus it is difficult for the operator to see the fixing portion, the existence of the claw portion can be reliably recognized.

[0011] According to another aspect of the present invention, there is provided an indoor unit for an air conditioning device including a base plate fixed to an indoor wall surface, a front panel fixed to the base plate, and a detachable fixing portion that is provided between an upper portion of the base plate and an upper portion of the front panel. The fixing portion includes a recessed portion that is provided in any one of the base plate and the front panel, is sunken downwards, and has an insertion hole formed therein, and a claw portion that is provided on the

other one of the base plate and the front panel and engages with the recessed portion by being inserted into the insertion hole and being advanced into the recessed portion. A recess or a protruding portion is provided on an upper surface of the claw portion.

[0012] By inserting and engaging the claw portion with the insertion hole provided in the recessed portion of the fixing portion, the base plate is detachably fixed to the front panel. Since the recess or the protruding portion is provided on the upper surface of the claw portion, an operator can recognize a step of the recess or the protruding portion by touching, and the existence of the claw portion can be checked. Therefore, even in a case where the fixing portion that attaches or detaches the base plate to or from the front panel is provided on the upper portions of the base plate and the front panel and thus it is difficult for the operator to see the fixing portion, the existence of the claw portion can be reliably recognized.

[0013] In the indoor unit for an air conditioning device according to the aspect of the present invention, a plurality of the fixing portions are provided. The claw portion is disposed in the recessed portion of at least one of the plurality of fixing portions. The claw portion is not disposed in the recessed portion of the other fixing portion.

[0014] At least one of the plurality of fixing portions has the claw portion disposed in the recessed portion, and the other fixing portion does not have the claw portion disposed in the recessed portion. Therefore, a combination of the claw portion and the recessed portion can be changed according to a model of an indoor unit. For example, in a case of a heavy model, a large number of the claw portions are engaged with the recessed portions compared to a case of a light model. Since an operator can differentiate the fixing portion where the claw portion exists from the fixing portion where the claw portion does not exist even in such a case, the operator does not make a mistake in operation even when a model differs.

Advantageous Effects of Invention

[0015] Since the bottom surface is provided in the recessed portion such that the bottom surface can be touched between the claw portion inserted in the recessed portion and the recessed portion, the existence of the claw portion can be reliably recognized even in a case where the fixing portion that attaches or detaches the base plate to or from the front panel is provided on the upper portions of the base plate and the front panel.

Brief Description of Drawings

[0016]

Fig. 1 is a perspective view illustrating an indoor unit for an air conditioning device according to an embodiment of the present invention.

Fig. 2 is a plan view of the indoor unit of Fig. 1 seen from above.

Fig. 3 is a partially enlarged view illustrating a state where a claw portion is inserted in a recessed portion.

Fig. 4 is a partially enlarged view illustrating a state where the claw portion is not inserted in the recessed portion.

Fig. 5 is a plan view illustrating the claw portion.

Description of Embodiments

[0017] Hereinafter, an embodiment according to the present invention will be described with reference to the drawings.

[0018] Fig. 1 illustrates an appearance of an indoor unit 1 of an air conditioning device. The indoor unit 1 is a wall-hanging type, sucks indoor air from above, and blows air after air conditioning indoors from below. The indoor unit 1 is connected to an outdoor unit (not illustrated), receives supply of a refrigerant compressed by the outdoor unit, and adjusts indoor air so as to have a predetermined temperature by means of an indoor heat exchanger provided inside the indoor unit 1.

[0019] The indoor unit 1 includes a base plate 3 fixed to an indoor wall surface and a front panel 5 that is positioned in front of the base plate 3 and is detachably fixed to the base plate 3.

[0020] Fig. 2 is a plan view of the indoor unit 1 seen from above. In Fig. 2, an indoor wall surface side is the back. A plurality of fixing portions 7 are provided on a wall surface side of the indoor unit 1 along a width direction of the indoor unit 1 (a right-and-left direction in Fig. 2). In the embodiment, five fixing portions 7, including a first fixing portion 7a, a second fixing portion 7b, a third fixing portion 7c, a fourth fixing portion 7d, and a fifth fixing portion 7e, are provided from the left in Fig. 2. It is evident that the number of the fixing portions 7 is not limited thereto, and there may be six or more fixing portions.

[0021] When the indoor unit 1 is seen from the front, the fixing portions 7 are positioned on the back side and an upper side of the indoor unit 1. Therefore, the fixing portions 7 are positioned at positions having poor visibility for an operator accessing from below. For this reason, the operator accesses the fixing portions 7 by fumbling.

[0022] As illustrated in Fig. 3, each of the fixing portions 7 includes a recessed portion 8 provided on an upper side of the base plate 3 and a claw portion 9 provided on the front panel 5. Fig. 4 illustrates the recessed portion 8 in which the claw portion 9 does not exist, and Fig. 5 illustrates only the claw portion 9.

[0023] A bottom surface 8a sunken downwards from an upper surface of the base plate 3 is formed in the recessed portion 8. In the middle in a width direction of the bottom surface 8a, there is a flat surface. An insertion hole 8b into which the claw portion 9 can be inserted is provided on a front side of the recessed portion 8.

[0024] The claw portion 9 is provided to protrude from an end surface of an upper portion of the front panel 5

on a base plate 3 side toward the base plate 3. In plan view as in Fig. 3, the claw portion 9 has a substantially rectangular shape of which a width is large. When attached, the claw portion 9 is disposed over the flat surface of the bottom surface 8a of the recessed portion 8. A latching portion (not illustrated) is provided on a lower surface of the claw portion 9, and engages with a latched portion on the base plate 3 side. This engagement is not released by pressing an upper surface of the claw portion 9.

[0025] A gap 10 having a dimension A that allows an operator to put a finger inside and touch is provided between a side of the claw portion 9 and a side portion of the recessed portion 8. The dimension A is set to 2 mm to 5 mm. The gap 10 allows the operator to recognize a step between the bottom surface 8a of the recessed portion 8 and the claw portion 9 by touching. The gap 10 may be provided on each of both sides of the claw portion 9 as in Fig. 3, or may be provided on only one side of the claw portion 9.

[0026] Two protruding portions 9a arranged in the width direction are provided on the upper surface of the claw portion 9. Top surfaces of the protruding portions 9a are flat surfaces. The protruding portions 9a each have a shape that allows an operator to recognize a step by touching. The number of the protruding portions 9a may be three or more, or may be only one. In addition, sunken recesses may be provided instead of the protruding portions 9a.

[0027] As illustrated in Fig. 2, the claw portion 9 is not inserted and fixed to all of the recessed portions 8 of the fixing portions 7. In Fig. 2, the claw portion 9 is not inserted in the third fixing portion 7c. That is, the claw portion 9 is not included at a position corresponding to the third fixing portion 7c on the front panel 5. The claw portion 9 is inserted in each of the other fixing portions 7, that is, the first fixing portion 7a, the second fixing portion 7b, the fourth fixing portion 7d, and the fifth fixing portion 7e. Therefore, the claw portion 9 is provided at each of positions corresponding to the fixing portions 7a, 7b, 7d, and 7e on the front panel 5. Such a configuration is adopted in order to use the base plate 3 in common and to appropriately use the front panel 5 according to a model. For example, in a case of a heavy model, a large number of the claw portions 9 are provided on the front panel 5 compared to a case of a light model. Therefore, in the case of the light model, for example, the claw portions 9 are provided only at positions corresponding to three fixing portions including the first fixing portion 7a, the third fixing portion 7c, and the fifth fixing portion 7e.

[0028] In the aforementioned indoor unit 1, the following operation effects can be achieved.

[0029] Since the bottom surface 8a is provided such that an operator can touch between the claw portion 9 inserted in the recessed portion 8 of the fixing portion 7 and the bottom surface by a finger, the operator can recognize the step between the bottom surface 8a and the claw portion 9 by touching, and can check the existence of the claw portion 9. Therefore, even in a case where the fixing portions 7 that attach or detach the base plate 3 to or from the front panel 5 are provided on upper portions of the base plate 3 and the front panel 5 and thus it is difficult for the operator to see the fixing portions, the existence of the claw portions 9 can be reliably recognized.

[0030] Since the protruding portions 9a are provided on the upper surface of the claw portion 9, an operator can recognize the steps of the protruding portions 9a by touching, and the existence of the claw portion 9 can be checked. Therefore, even in a case where the fixing portions 7 that attach or detach the base plate 3 to or from the front panel 5 are provided on the upper portions of the base plate 3 and the front panel 5 and thus it is difficult for the operator to see the fixing portions, the existence of the claw portions 9 can be reliably recognized.

[0031] A combination of the claw portion 9 and the recessed portion 8 is changed according to a model of the indoor unit 1 such that at least one of the plurality of fixing portions 7 has the claw portion 9 disposed in the recessed portion 8 and the other fixing portions 7 do not have the claw portions 9 disposed in the recessed portions 8. Specifically, in the case of the heavy model, a large number of the claw portions 9 are engaged with the recessed portions 8 compared to the case of the light model. Since an operator can differentiate the fixing portion 7 where the claw portion 9 exists from the fixing portions 7 where the claw portions do not exist even in such a case, the operator does not make a mistake in operation even when a model differs.

[0032] Although a configuration where the recessed portions 8 are provided in the base plate 3 and the claw portions 9 are provided on the front panel 5 is adopted in the aforementioned embodiment, a configuration where the claw portions 9 are provided on the base plate 3 and the recessed portions 8 are provided in the front panel 5 may be adopted.

Reference Signs List

[0033]

1: indoor unit
3: base plate
5: front panel
7: fixing portion
8: recessed portion
8a: bottom surface
8b: insertion hole
9: claw portion
9a: protruding portion

Claims

1. An indoor unit for an air conditioning device, comprising:

a base plate fixed to an indoor wall surface;
a front panel fixed to the base plate; and
a detachable fixing portion that is provided between an upper portion of the base plate and an upper portion of the front panel,
wherein the fixing portion includes a recessed portion that is provided in any one of the base plate and the front panel, is sunken downwards, and has an insertion hole formed therein, and a claw portion that is provided on the other one of the base plate and the front panel and engages with the recessed portion by being inserted into the insertion hole and being advanced into the recessed portion, and
the recessed portion has a bottom surface that is capable of being touched between the claw portion inserted in the recessed portion and the recessed portion.

2. An indoor unit for an air conditioning device, comprising:

a base plate fixed to an indoor wall surface;
a front panel fixed to the base plate; and
a detachable fixing portion that is provided between an upper portion of the base plate and an upper portion of the front panel,
wherein the fixing portion includes a recessed portion that is provided in any one of the base plate and the front panel, is sunken downwards, and has an insertion hole formed therein, and a claw portion that is provided on the other one of the base plate and the front panel and engages with the recessed portion by being inserted into the insertion hole and being advanced into the recessed portion, and
a recess or a protruding portion is provided on an upper surface of the claw portion.

3. The indoor unit for an air conditioning device according to Claim 1 or 2,
wherein a plurality of the fixing portions are provided, the claw portion is disposed in the recessed portion of at least one of the plurality of fixing portions, and the claw portion is not disposed in the recessed portion of the other fixing portion.

FIG. 1

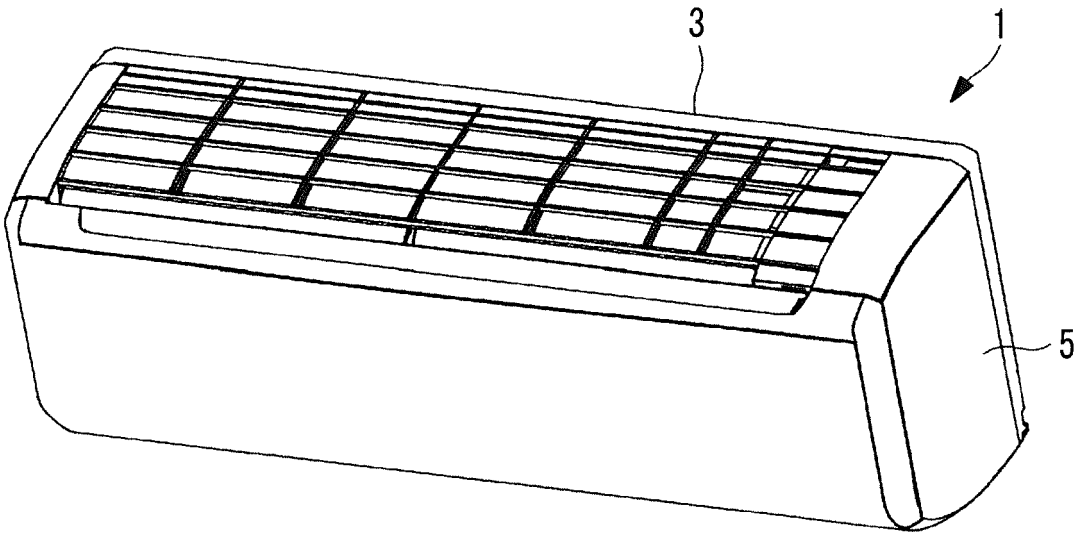


FIG. 2

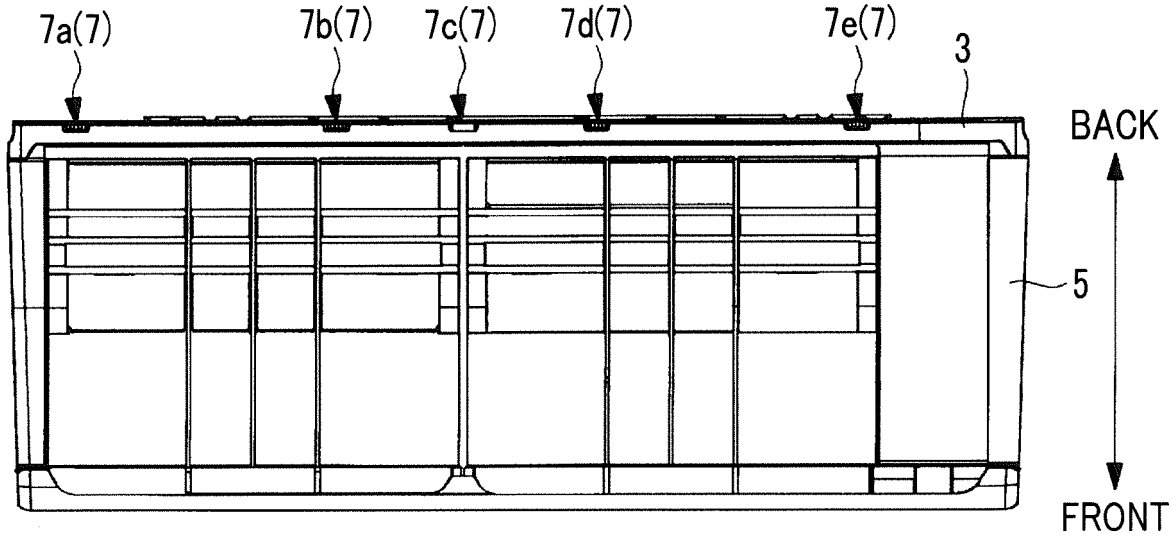


FIG. 3

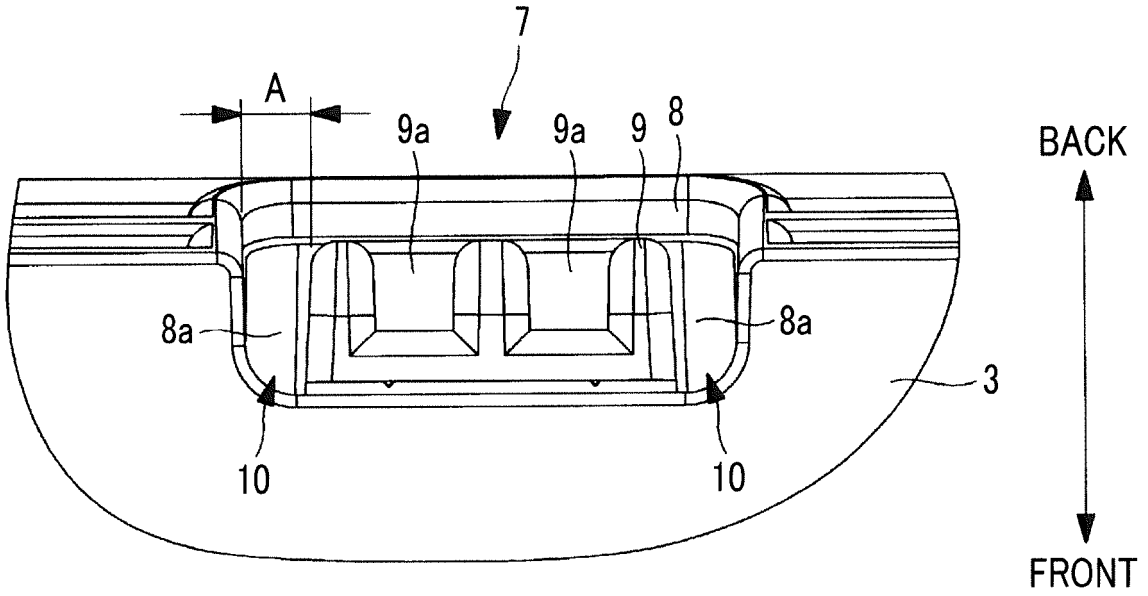


FIG. 4

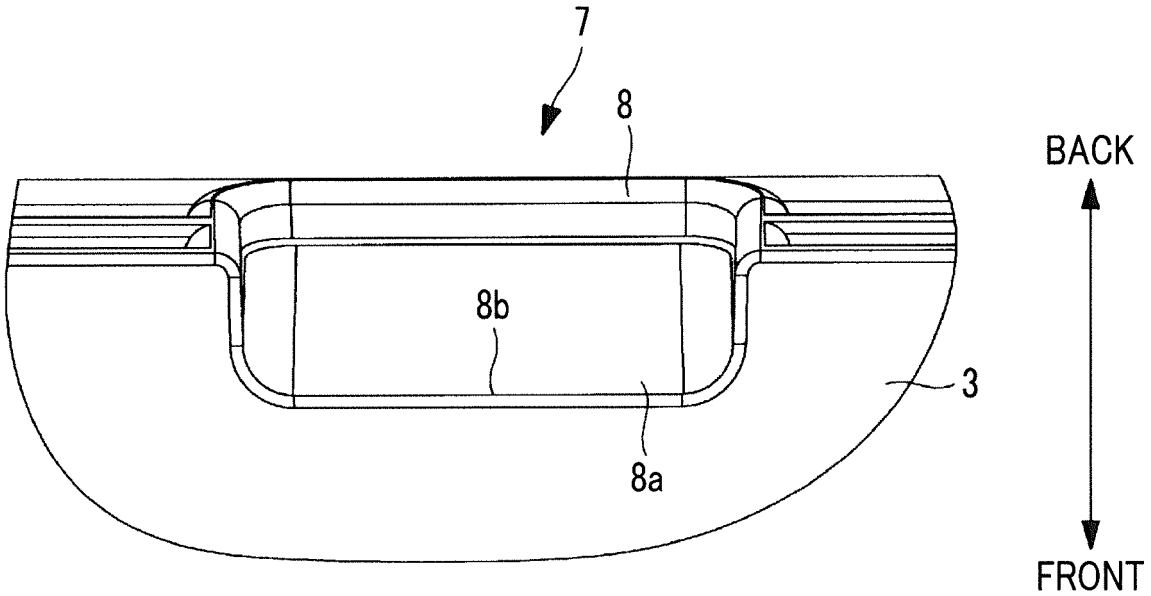
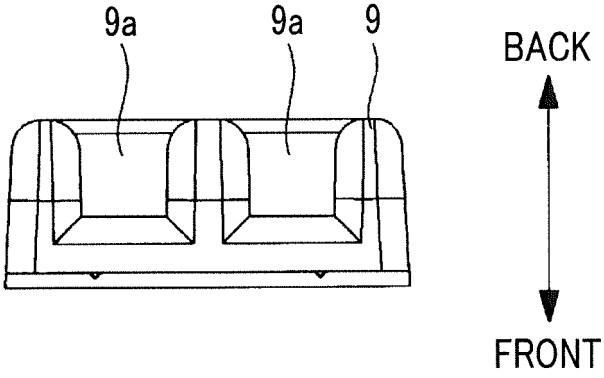


FIG. 5



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2018/010372

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl. F24F13/20(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
Int.Cl. F24F13/20

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Published examined utility model applications of Japan	1922-1996
Published unexamined utility model applications of Japan	1971-2018
Registered utility model specifications of Japan	1996-2018
Published registered utility model applications of Japan	1994-2018

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 109904/1990 (Laid-open No. 068925/1992) (MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.) 18 June 1992, specification, page 4, line 5 to page 5, line 1, fig. 1-4 (Family: none)	1-3
Y	JP 2001-201087 A (MITSUBISHI HEAVY INDUSTRIES, LTD.) 27 July 2001, paragraphs [0006]-[0007], [0009]-[0010], [0025], fig. 1-3 (Family: none)	1-3

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search 31 May 2018 (31.05.2018)	Date of mailing of the international search report 12 June 2018 (12.06.2018)
Name and mailing address of the ISA/ Japan Patent Office 3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2018/010372

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2011-064353 A (SHARP CORP.) 31 March 2011, paragraphs [0010], [0029]-[0039], fig. 6-7 (Family: none)	1,3
Y	JP 2002-013800 A (MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.) 18 January 2002, paragraphs [0010], [0029]-[0047], [0059], fig. 1-2, 4 & EP 1150075 A1, paragraphs [0021]-[0037], [0045], fig. 1-2, 4 & CN 1321863 A	3
A	JP 06-011150 A (HITACHI, LTD.) 21 January 1994, entire text, all drawings (Family: none)	1-3
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 39793/1977 (Laid-open No. 154506/1979) (TOKYO SHIBAURA ELECTRIC CO., LTD.) 18 June 1979, entire text, all drawings & US 4240264 A1 & AU 4183778 A	1-3

Form PCT/ISA/210 (continuation of second sheet) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- JP 2007147118 A **[0003]**