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

(11) **EP 1 983 269 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 158(3) EPC

(43) Date of publication:
22.10.2008 Bulletin 2008/43

(21) Application number: **07713777.6**

(22) Date of filing: **02.02.2007**

(51) Int Cl.:
F24F 1/00 *(2006.01)*

(86) International application number:
PCT/JP2007/051777

(87) International publication number:
WO 2007/088963 (09.08.2007 Gazette 2007/32)

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR

(30) Priority: **03.02.2006 JP 2006026571**

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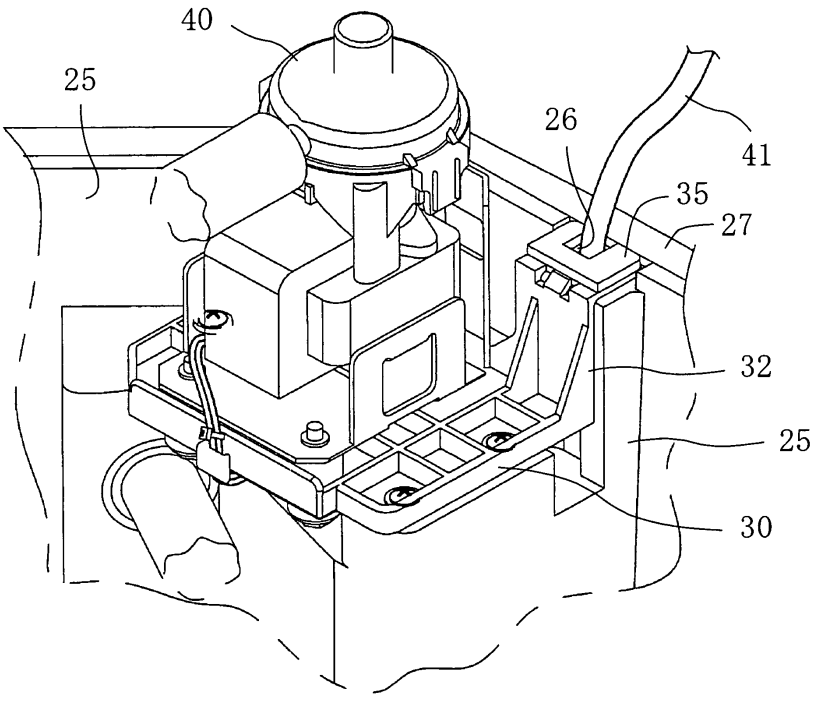
(54) **AIR CONDITIONER**

(57) A mounting bracket **(30)** for mounting a drain pump **(40)** to a heat insulator **(25)** is integrated with a lid element **(32)** for blocking an opening of a wire receiving groove **(26).** When the mounting bracket **(30)** is mounted to the heat insulator **(25),** a wire **(41)** extending from the drain pump **(40)** is held between the wire receiving groove **(26)** and the lid element **(32).**

FIG.6



EP 1 983 269 A1

Description

TECHNICAL FIELD

[0001] The present invention relates to an air conditioning system. In particular, it relates to a technology for surely holding a wire extending from an electrical component in a wire receiving groove.

BACKGROUND ART

[0002] In general, a ceiling air conditioning system is provided by embedding an air conditioning system body in a hole formed in a ceiling of a room and attaching a decorative panel to the air conditioning system body to cover the hole. A casing of the air conditioning system body includes therein a substantially annular heat exchanger, an air blower provided in the center of the heat exchanger with a suction side directed downward and a discharge side directed to the side surface of the heat exchanger and a bell mouth made of a synthetic resin arranged on the suction side of the air blower (cf. Patent Literature 1).

[0003] An electrical component such as a drain pump or a float switch is arranged between an inner circumferential wall of the casing and the substantially annular heat exchanger.

[0004] A heat insulator is arranged along the inner circumferential wall of the casing and the electrical component is mounted to the heat insulator by a mounting bracket. A wire extending from the electrical component is held in a wire receiving groove formed in the surface of the heat insulator and routed toward a drain pan.

[Patent Literature 1] Japanese Unexamined Patent Publication No. 2000-257905

DISCLOSURE OF THE INVENTION

PROBLEM THAT THE INVENTION IS TO SOLVE

[0005] Even if the wire extending from the electrical component is held in the wire receiving groove, the wire may come off the wire receiving groove if it is yanked by a worker during assembly. Then, the wire may move in the system and become a nuisance. In the end, the wire may bring about adverse effect such as break.

[0006] With the foregoing in mind, the present invention has been achieved. An object of the invention is to prevent the wire extending from the electrical component from coming off the wire receiving groove.

MEANS OF SOLVING THE PROBLEM

[0007] In order to achieve the object, according to the present invention, a lid element blocking an opening of the wire receiving groove is integrated with a mounting bracket of an electrical component.

[0008] According to a first aspect of the invention, an air conditioning system includes a casing **(10);** a heat insulator **(25)** provided along an inner circumferential wall of the casing **(10);** a substantially annular heat exchanger **(8)** arranged in the casing **(10);** and a mounting bracket **(30)** for mounting an electrical component **(50)** to the heat insulator **(25)** to arrange the electrical component **(50)** between the heat exchanger **(8)** and the heat insulator **(25).**

[0009] A wire receiving groove **(26)** for holding a wire **(41)** extending from the electrical component **(50)** therein is formed in the surface of the heat insulator **(25).** A lid element **(32)** extending along the wire receiving groove **(26)** to block an opening of the wire receiving groove **(26)** and fix the wire **(41)** is integrated with the mounting bracket **(30).** Further, the wire **(41)** of the electrical component **(50)** is held between the wire receiving groove **(26)** and the lid element **(32)** when the mounting bracket **(30)** is mounted to the heat insulator **(25).**

[0010] In the air conditioning system according to the first aspect of the invention, the lid element **(32)** is integrated with the mounting bracket **(30).** When the mounting bracket **(30)** is mounted to the heat insulator **(25),** the wire **(41)** of the electrical component **(50)** is held between the wire receiving groove **(26)** and the lid element **(32).** Therefore, even if the wire **(41)** is yanked by a worker during assembly, the wire **(41)** does not come off the wire receiving groove **(26)** and the risk of adverse effect such as break is eliminated. Since the lid element **(32)** is integrated with the mounting bracket **(30),** the opening of the wire receiving groove **(26)** is blocked by the lid element **(32)** simultaneously when the mounting bracket **(30)** is mounted to the heat insulator **(25).** This improves working efficiency.

[0011] According to a second aspect of the invention related to the first aspect of the invention, the lid element (32) has, at a tip thereof, a control element **(33)** controlling the position of the wire **(41)** of the electrical component **(50)** such that the wire **(41)** is situated substantially in the center of the wire receiving groove **(26).**

[0012] In the air conditioning system according to the second aspect of the invention, the wire **(41)** of the electrical component **(50)** is situated substantially in the center of the wire receiving groove **(26)** by the control element **(33)** provided at the tip of the lid element **(32).** As the wire **(41)** is situated substantially in the center of the wire receiving groove **(26),** a defect such as a twist of the wire **(41)** in the wire receiving groove **(26)** is eliminated.

[0013] According to a third aspect of the invention related to the second aspect of the invention, the air conditioning system further includes a drain pan **(22)** for retaining condensate water produced in the heat exchanger **(8),** wherein a sealing element **(35)** is adhered to the surface of the control element **(33)** to seal a gap between the drain pan **(22)** and the control element **(33)**

[0014] In the air conditioning system according to the third aspect of the invention, the gap between the drain pan **(22)** and the control element **(33)** is sealed by the sealing element **(35)** adhered to the control element **(33).**

Therefore, a joint between the drain pan **(22)** and the heat insulator **(25)** where the air which went through the heat exchange is likely to leak out is sealed. Thus, decrease in heat exchange efficiency is effectively restrained.

[0015] According to a fourth aspect of the invention related to any one of the first to third aspects of the invention, the electrical component **(50)** is a drain pump **(40).**

[0016] In the air conditioning system according to the fourth aspect of the invention, a drain pump **(40)** is used as the electrical component **(50).** Therefore, the prevention of detachment of the wire **(41)** from the wire receiving groove **(26)** is achieved simultaneously when the drain pump **(40)** for discharging condensate water retained in the drain pan **(22)** is mounted.

[0017] According to a fifth aspect of the invention related to any one of the first to third aspects of the invention, the electrical component **(50)** is a water level detector **(45)** for detecting the level of condensate water.

[0018] In the air conditioning system according to the fifth aspect of the invention, a water level detector **(45)** such as a float switch is used as the electrical component **(50).** Therefore, the prevention of detachment of the wire **(41)** from the wire receiving groove **(26)** is achieved simultaneously when the water level detector **(45)** for detecting the level of condensate water retained in the drain pan **(22)** is mounted.

EFFECT OF THE INVENTION

[0019] As described above, the present invention makes it possible to prevent the wire **(41)** from coming off the wire receiving groove **(26)** even if the wire **(41)** is yanked by a worker during assembly and eliminate the risk of adverse effect such as break. Since the lid element **(32)** is integrated with the mounting bracket **(30),** the opening of the wire receiving groove **(26)** is blocked by the lid element **(32)** simultaneously when the mounting bracket **(30)** is mounted to the heat insulator **(25).** This improves the working efficiency.

[0020] According to the second aspect of the invention, the wire **(41)** is situated substantially in the center of the wire receiving groove **(26).** Therefore, a defect such as a twist of the wire **(41)** in the wire receiving groove **(26)** is eliminated.

[0021] According to the third aspect of the invention, a joint between the drain pan **(22)** and the heat insulator **(25)** where the air which went through the heat exchange is likely to leak out is sealed. Thus, decrease in heat exchange efficiency is effectively restrained.

[0022] According to the fourth aspect of the invention, the prevention of the detachment of the wire **(41)** from the wire receiving groove **(26)** is achieved simultaneously when the drain pump **(40)** for discharging condensate water retained in the drain pan **(22)** is mounted.

[0023] According to the fifth aspect of the invention, the prevention of the detachment of the wire **(41)** from the wire receiving groove **(26)** is achieved simultaneously when the water level detector **(45)** for detecting the level of condensate water retained in the drain pan **(22)** is mounted.

BRIEF DESCRIPTION OF DRAWINGS

[0024]

[FIG. **1**]
FIG. **1** is a sectional view illustrating the structure of an air conditioning system according to an embodiment of the present invention.
[FIG. **2**]
FIG. **2** is a perspective view illustrating the structure of a mounting element.
[FIG. **3**]
FIG. **3** is a plan view illustrating the shape of part of a heat insulator to which an electrical component is mounted.
[FIG. **4**]
FIG. **4** is a plan view illustrating the structure of a drain pump and a mounting bracket.
[FIG. **5**]
FIG. **5** is a side view illustrating the structure of the drain pump and the mounting bracket.
[FIG. **6**]
FIG. **6** is a perspective view illustrating how the drain pump is mounted.
[FIG. **7**]
FIG. **7** is a plan view illustrating the structure of a float switch and a mounting bracket.
[FIG. **8**]
FIG. **8** is a side view illustrating the structure of the float switch and the mounting bracket.
[FIG. **9**]
FIG. **9** is a perspective view illustrating how the float switch is mounted.

EXPLANATION OF REFERENCE NUMERALS

[0025]

8	Heat exchanger
10	Casing
22	Drain pan
25	Heat insulator
26	Wire receiving groove
30	Mounting bracket
32	Lid element
33	Control element
35	Sealing element
40	Drain pump
41	Wire
45	Float switch (water level detector)
50	Electrical component

BEST MODE FOR CARRYING OUT THE INVENTION

[0026] Hereinafter, an embodiment of the present invention is described in detail with reference to the drawings. The description of the preferred embodiment is provided only for explanation purpose and does not limit the present invention, an object to which the present invention is applied and use of the invention.

[0027] FIG. **1** shows the structure of a ceiling air conditioning system according to an embodiment of the present invention. The air conditioning system includes a casing **(10)** containing various components therein. The casing **(10)** is formed of a casing body **(11)** and a decorative panel **(12)** arranged below the casing body **(11).**

[0028] The casing body **(11)** is a box-shaped body having an opening at the bottom which is substantially rectangular when viewed from below (four corners of the opening are chamfered in the form of letter C, i.e., the opening is substantially in the form of an octagon including alternately arranged long sides and short sides). The casing body is fixed to a ceiling wall **(C)** of an air conditioned room by fixing brackets (not shown) such that the opening is opposed to an opening formed in the ceiling wall **(C).**

[0029] The decorative panel **(12)** is fixed to the bottom edge of the casing body **(11)** to cover the openings of the casing body **(11)** and the ceiling wall **(C).** The decorative panel **(12)** is a plate which is substantially rectangular when viewed from below. The decorative panel **(12)** includes a suction port **(2)** arranged substantially in the center thereof to suck air in the air conditioned room and four discharge ports **(3)** arranged at the edge of the decorative panel **(12)** in one-to-one correspondence with the four sides of the decorative panel **(12)** to discharge air in the casing body **(11)** to the air conditioned room. The suction port **(2)** is a substantially square opening and each of the discharge ports **(3)** is a substantially oblong opening elongated along the corresponding side.

[0030] The suction port **(2)** includes a suction grille **(4)** and a filter **(5)** for removing dust in the air sucked through the suction port **(2).** Each of the discharge ports **(3)** includes a flap **(6)** which is rotated by a motor (not shown) about a lengthwise axis of the discharge port **(3).** The rotation of the flap **(6)** makes it possible to change the direction of air blown from the discharge port **(3)** into the air conditioned room.

[0031] In the casing body **(11),** a centrifugal fan **(F)** is provided to function as an air blower which sucks the air in the air conditioned room into the casing body **(11)** through the suction port **(2)** and radially blows the air and a substantially annular heat exchanger **(8)** arranged to surround the centrifugal fan **(F).**

[0032] The heat exchanger **(8)** is hanged from a top plate **(11a)** of the casing **(10)** (a closed top of the casing body (11)) by a plurality of mounting elements **(15).**

[0033] Each of the mounting elements **(15)** includes a base **(15a),** a mounting part **(15b)** formed by bending one of the ends of the base **(15a)** close to the top plate **(11a)** of the casing **(10)** and a supporting part **(15c)** formed by bending the other end of the base in the form of letter U when viewed in section to support the heat exchanger **(8)** by receiving the bottom of the heat exchanger **(8)** fitted therein.

[0034] The mounting elements **(15)** are arranged at intervals along the circumference of the heat exchanger **(8).** The mounting parts **(15b)** are fixed to the top plate **(11a)** of the casing **(10)** with screws inserted from below. As the heat exchanger **(8)** is supported by the supporting parts **(15c),** the weight of the heat exchanger **(8)** is distributed onto the supporting parts **(15)** to achieve well-balanced support.

[0035] As shown in FIG. 2, one of the mounting elements **(15)** includes a connection part **(15d)** which is branched from the base **(15a)** and has a bent end. The connection part **(15d)** is electrically connected to an electrical component box **(16)** such as a switch box to provide a ground path. The connection part **(15d)** is provided with a positioning projection **(15e)** extending toward the electrical component box **(16).** The positioning projection **(15e)** is chamfered for smooth insertion in a positioning hole **(16a)** of the electrical component box **(16)** as described later.

[0036] The heat exchanger **(8)** is a cross-fin tube type heat exchanger curved to surround the centrifugal fan **(F)** and connected to an outdoor unit (not shown) placed outside through a refrigerant pipe. The heat exchanger **(8)** functions as an evaporator which evaporates a refrigerant flowing inside during a cooling operation, whereas it functions as a condenser which condenses the refrigerant flowing inside during a heating operation.

[0037] The heat exchanger **(8)** is adapted to exchange heat with air which is sucked into the casing body **(11)** through the suction port **(2)** and blown from a fan rotor **(7)** of the centrifugal fan **(F).** Thus, the heat exchanger **(8)** cools the air during the cooling operation or heats the air during the heating operation.

[0038] A drain pan **(22)** for retaining condensate water produced as a result of condensation of moisture in the air in the heat exchanger **(8)** is provided below the heat exchanger **(8).**

[0039] Further, a bell mouth **(20)** which guides the air sucked through the suction port **(2)** to the inside of the casing **(10)** is provided on the side of the centrifugal fan **(F)** close to the suction port **(2).**

[0040] A recess **(20a)** is formed in the bottom surface of the bell mouth **(20)** to receive the electrical component box **(16)** therein.

[0041] In the ceiling of the recess **(20a),** an opening **(20b)** is formed to be opposed to the connection part **(15d)** of the mounting element **(15).** When the electrical component box **(16)** is fitted in the recess **(20a),** a positioning hole **(16a)** formed in the electrical component box **(16)** to be engaged with the positioning projection of the mounting element **(15)** is seen from the top face of the bell mouth **(20).**

[0042] When the connection part **(15d)** of the mounting element **(15)** is inserted in the opening **(20b)** of the bell mouth **(20)** and the positioning projection **(15e)** of the connection part **(15d)** is engaged with the positioning hole **(16a)** of the electrical component box **(16),** the connection part **(15d)** and the electrical component box **(16)** are connected. The top plate **(11a)** of the casing **(10),** the mounting elements **(15)** and the electrical component box **(16)** are made of a conductive material.

[0043] Since a ground path from the electrical component box **(16)** to the top plate **(11a)** of the casing **(10)** is established by the mounting elements **(15),** there is no need of routing a ground wire. Further, as the electrical component box **(21)** is supported on the top plate **(11a)** of the casing **(10)** by the mounting elements **(15),** strength of the resulting product is improved.

[0044] Now, a feature of the present embodiment is explained. To be more specific, how to mount an electrical component **(50)** and how to route a wire **(41)** extending from the electrical component **(50)** are described in detail.

[0045] FIG. **3** is a plan view illustrating the shape of part of a heat insulator **(25)** to which the electrical component **(50)** is mounted. As shown in FIG. **3,** the heat insulator **(25)** is provided along the inner circumferential wall of the casing body **(11)** and the top plate **(11a)** of the casing **(10)** between the inner circumferential wall of the casing body **(11)** and the heat exchanger **(8).** Specifically, the heat insulator **(25)** is made of expanded polystyrene.

[0046] The electrical component **(50)** is mounted to the heat insulator **(25)** provided on the top plate **(11a)** of the casing **(10),** in particular part of the heat insulator **(25)** which is bulged as compared with other part. Reinforcement plates **(28)** are embedded in parts of the surface of the bulged part corresponding to screw holes **(31a)** of a mounting bracket (30) described later.

[0047] A sealing element **(27)** is adhered to a top face of the heat insulator **(25)** provided along the inner circumferential wall of the casing body **(11).** The sealing element **(27)** is adapted to seal a gap between the heat insulator **(25)** and the drain pan **(22)** when the drain pan **(22)** is mounted to the casing body **(11).**

[0048] FIG. **4** is a plan view illustrating the structure of a drain pump **(40)** as the electrical component **(50)** and a mounting bracket **(30).** FIG. **5** is a side view illustrating the structure of the drain pump **(40)** and the mounting bracket **(30).**

[0049] As shown in FIG. **4** and FIG. **5,** the mounting bracket **(30)** includes a rectangular parallelepiped-shaped body **(31)** supporting the drain pump **(40)** placed thereon, a lid element **(32)** rising substantially vertically from a corner of the body **(31)** to block an opening of the wire receiving groove **(26)** of the heat insulator **(25)** and a control element **(33)** bifurcated outwardly from the tip of the lid element **(32)** substantially in the form of letter U when viewed in plan.

[0050] The body **(31)** is provided with screw holes **(31a)** for fastening the body to the reinforcement plates **(28)** embedded in the bulged part of the heat insulator **(25).**

[0051] A wire **(41)** extending from the drain pump **(40)** is routed along the lengthwise direction of the lid element **(32)** to penetrate the U-shaped control element **(33).** The wire **(41)** is bound to the lid element **(32)** by a binding band **(34).** Thus, the mounting bracket **(30),** the drain pump **(40)** and the wire **(41)** are integrated in to a single unit.

[0052] The control element **(33)** is adapted to control the position of the wire **(41)** such that the wire **(41)** is situated substantially in the center of the wire receiving groove **(26).** A sealing element **(35)** is adhered to the surface of the control element **(33)** to seal a gap between the drain pan **(22)** and the control element **(33).**

[0053] FIG. **6** is a perspective view illustrating how the drain pump **(40)** is mounted to the heat insulator **(25).** As shown in FIG. **6,** the drain pump **(40)** is mounted to the heat insulator **(25)** by the mounting bracket **(30).** In this state, the wire **(41)** is fitted in the wire receiving groove **(26)** formed in the heat insulator **(25)** and the opening of the wire receiving groove **(26)** is blocked by the lid element **(32).** The control element **(33)** provided at the tip of the lid element **(32)** is adapted to seat on the top face of the heat insulator **(25)** arranged along the inner circumferential wall of the casing body **(11).**

[0054] FIG. **7** is a plan view illustrating the structure of a water level detector, i.e., a float switch **(45)** as the electrical component **(50)** and the mounting bracket **(30).** FIG. **8** is a side view illustrating the structure of the float switch **(45)** and the mounting bracket **(30).**

[0055] The structure of the mounting bracket **(30)** is substantially the same as the case where the drain pump **(40)** is used as the electrical component as shown in FIG. **4** and FIG. **5.** Specifically, the mounting bracket **(30)** includes a body **(31)** supporting the float switch **(45)** placed thereon, a lid element **(32)** blocking the opening of the wire receiving groove **(26)** of the heat insulator **(25)** and a U-shaped control element **(33)** provided at the tip of the lid element **(32).**

[0056] The wire **(41)** is routed to penetrate the U-shaped control element **(33)** and bound to the lid element **(32)** by a binding band **(34).** Thus, the mounting bracket **(30),** the float switch **(45)** and the wire **(41)** are integrated into a single unit.

[0057] FIG. **9** is a perspective view illustrating how the float switch **(45)** is mounted to the heat insulator **(25).** As shown in FIG. **9,** the float switch **(45)** is mounted to the heat insulator **(25)** by the mounting bracket **(30).** In this state, the wire **(41)** is fitted in the wire receiving groove **(26)** formed in the heat insulator **(25)** and the opening of the wire receiving groove **(26)** is blocked by the lid element **(32).** The control element **(33)** provided at the tip of the lid element **(32)** is adapted to seat on the top face of the heat insulator **(25)** arranged along the inner circumferential wall of the casing body **(11).**

[0058] In the air conditioning system of the present em-

bodiment as described above, the lid element **(32)** is integrated with the mounting bracket **(30).** When the mounting bracket **(30)** is mounted to the heat insulator **(25),** the wire **(41)** of the electrical component **(50)** is held between the wire receiving groove **(26)** and the lid element **(32).** That is, the wire **(41)** is held in the wire receiving groove **(26)** simultaneously when the mounting bracket **(30)** is mounted to the heat insulator **(25).**

[0059] As a result, there is no need of performing the process of mounting of the drain pump **(40)** and the process of routing of the wire **(41)** separately. For example, there is no need of blocking the opening of the groove with the lid element **(32)** after the wire **(41)** is fitted in the wire receiving groove **(26).** This improves the working efficiency.

[0060] Since the opening of the wire receiving groove **(26)** is blocked by the lid element **(32),** the wire **(41)** is prevented from coming off the wire receiving groove **(26)** even if the wire **(41)** is yanked by a worker during assembly. Therefore, the wire will not move in the system and become a nuisance. Further, the risk of break is also eliminated.

[0061] In the present embodiment, the drain pump **(40)** or the float switch **(45)** is used as the electrical component **(50)** and the lid element **(32)** is integrated with the mounting bracket **(30)** for mounting the drain pump **(40)** or the float switch **(45).** Other than this, the lid element may be integrated with a mounting bracket for mounting various kinds of sensors.

INDUSTRIAL APPLICABILITY

[0062] As described above, the present invention provides a highly practical effect, i.e., the wire extending from the electrical component is prevented from coming off the wire receiving groove. Therefore, the present invention is significantly useful and industrially applicable.

Claims

1. An air conditioning system comprising:

a casing **(10);**
a heat insulator **(25)** provided along an inner circumferential wall of the casing **(10)**;
a substantially annular heat exchanger **(8)** arranged in the casing **(10);** and
a mounting bracket **(30)** for mounting an electrical component **(50)** to the heat insulator **(25)** to arrange the electrical component **(50)** between the heat exchanger **(8)** and the heat insulator **(25),** wherein
a wire receiving groove **(26)** for holding a wire **(41)** extending from the electrical component **(50)** therein is formed in the surface of the heat insulator **(25),**
a lid element **(32)** extending along the wire receiving groove **(26)** to block an opening of the wire receiving groove **(26)** and fix the wire **(41)** is integrated with the mounting bracket **(30)** and the wire **(41)** of the electrical component **(50)** is held between the wire receiving groove **(26)** and the lid element **(32)** when the mounting bracket **(30)** is mounted to the heat insulator **(25).**

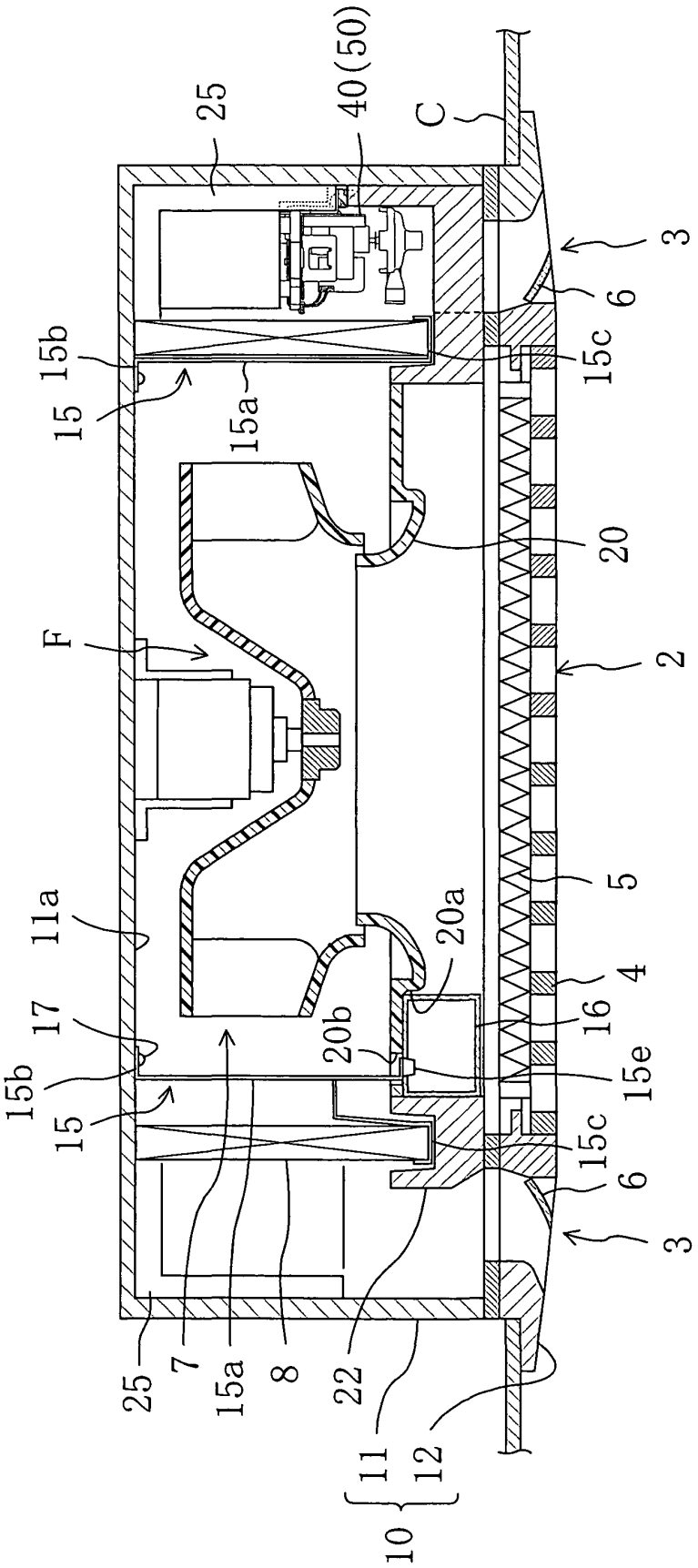
2. The air conditioning system of Claim 1, wherein the lid element **(32)** has, at a tip thereof, a control element **(33)** controlling the position of the wire **(41)** of the electrical component **(50)** such that the wire **(41)** is situated substantially in the center of the wire receiving groove **(26).**

3. The air conditioning system of Claim 2, further comprising a drain pan **(22)** for retaining condensate water produced in the heat exchanger **(8),** wherein a sealing element **(35)** is adhered to the surface of the control element **(33)** to seal a gap between the drain pan (22) and the control element (33).

4. The air conditioning system of Claim 1, wherein the electrical component **(50)** is a drain pump **(40).**

5. The air conditioning system of Claim 1, wherein the electrical component **(50)** is a water level detector **(45)** for detecting the level of condensate water.

FIG.1


25
40(50)
C
3
6
15c
15b
15
15a
20
F
2
5
11a
20a
17
4
16
20b
15b
15e
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6
3
25
7
15a
8
22
11
12
10

FIG.2

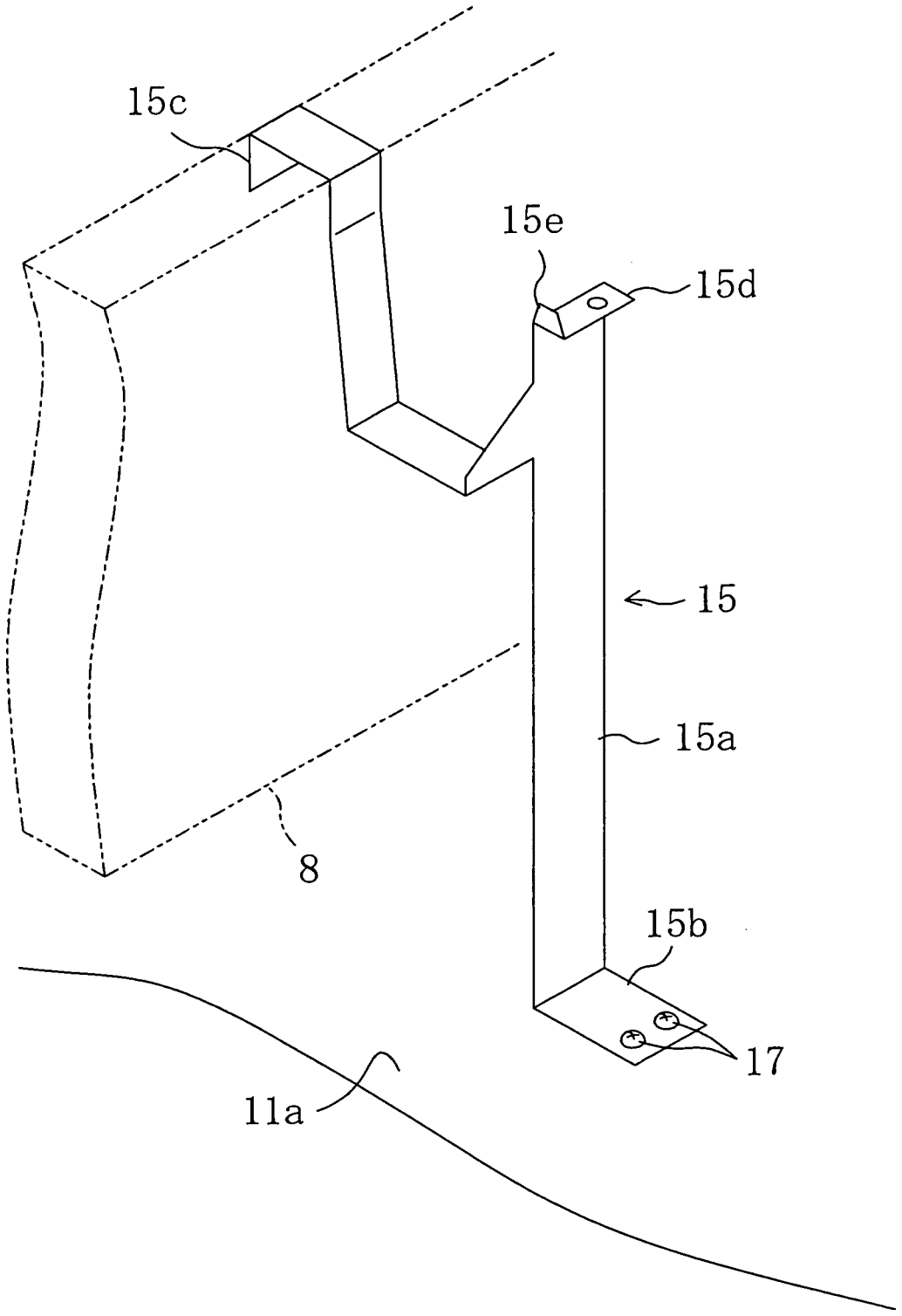


FIG.3

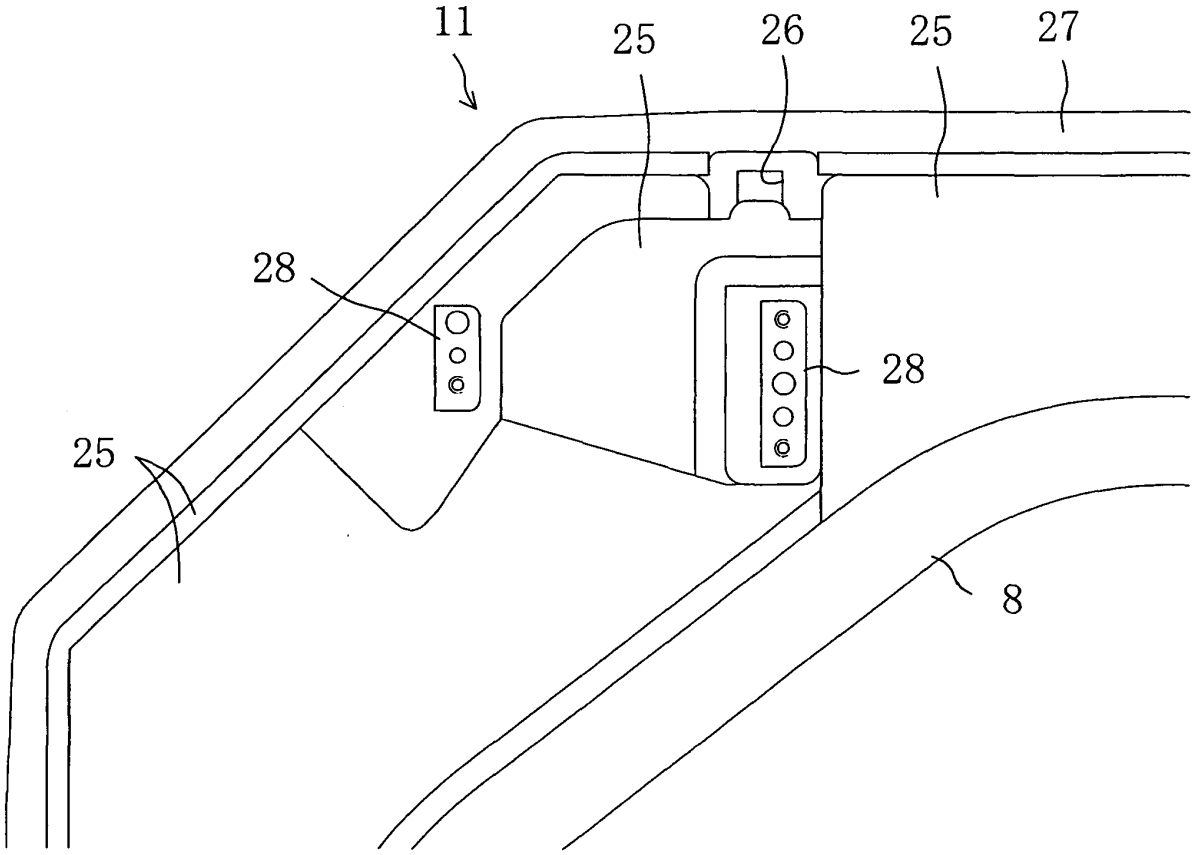


FIG.4

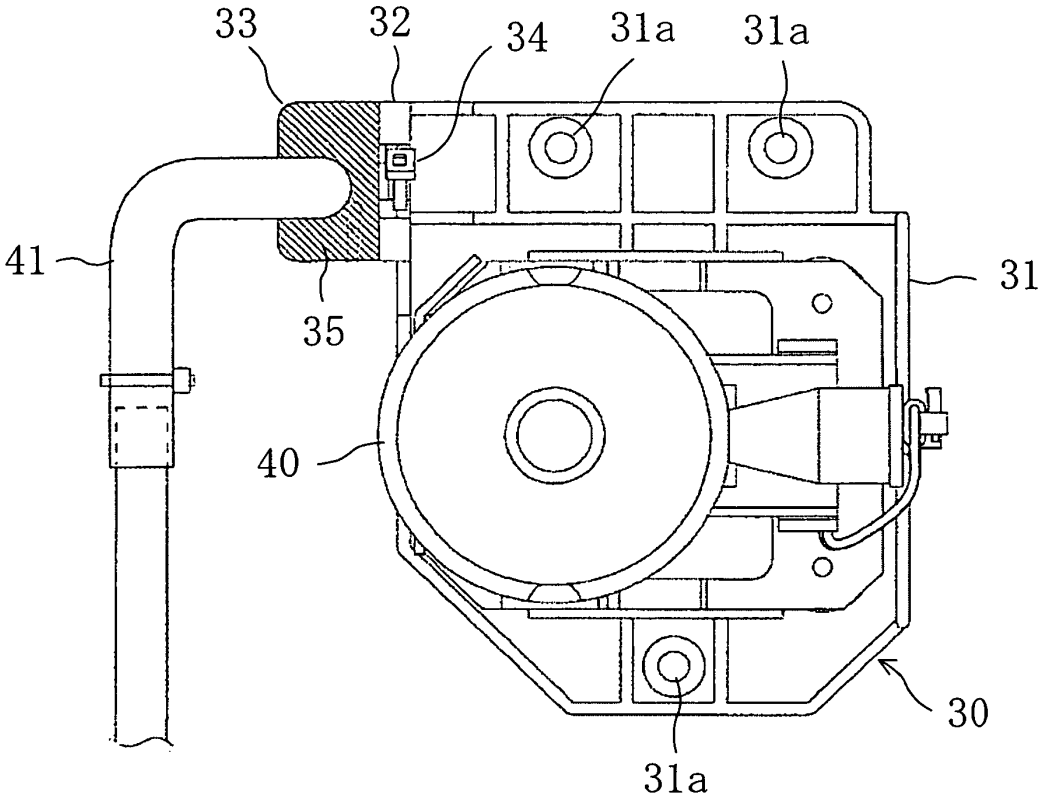


FIG.5

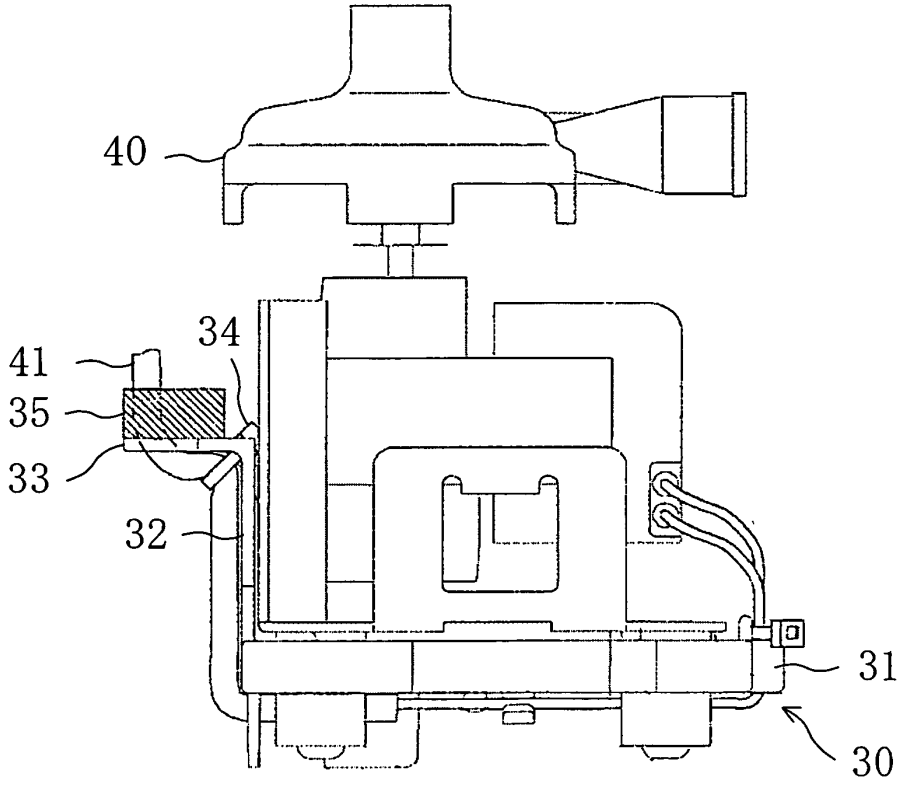


FIG.6

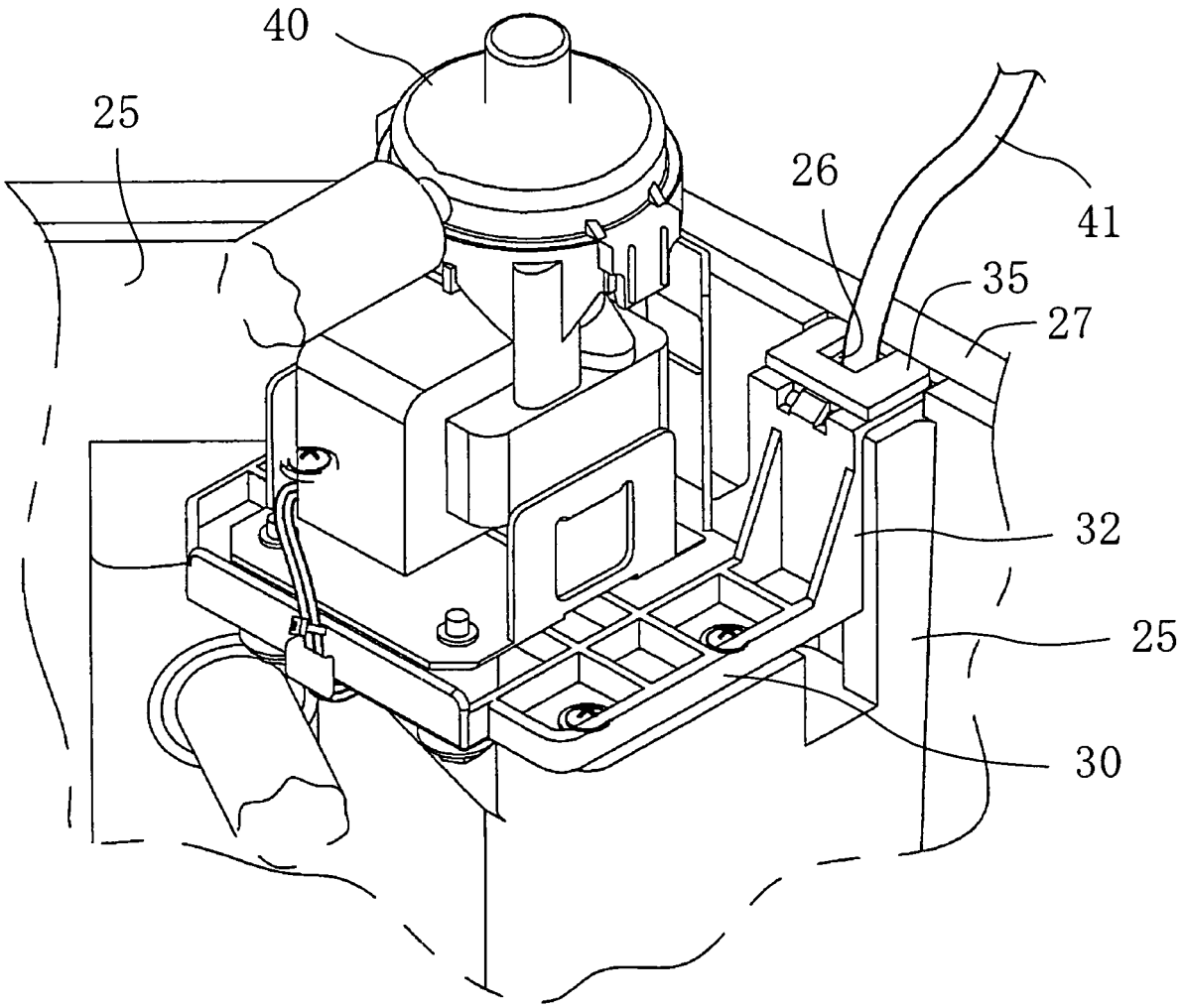


FIG.7

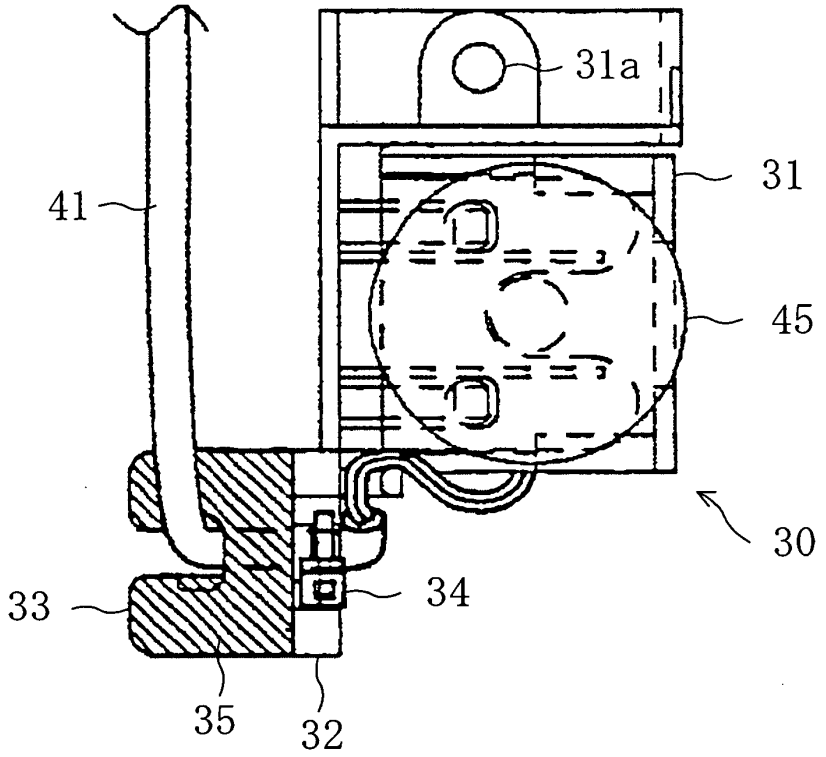


FIG.8

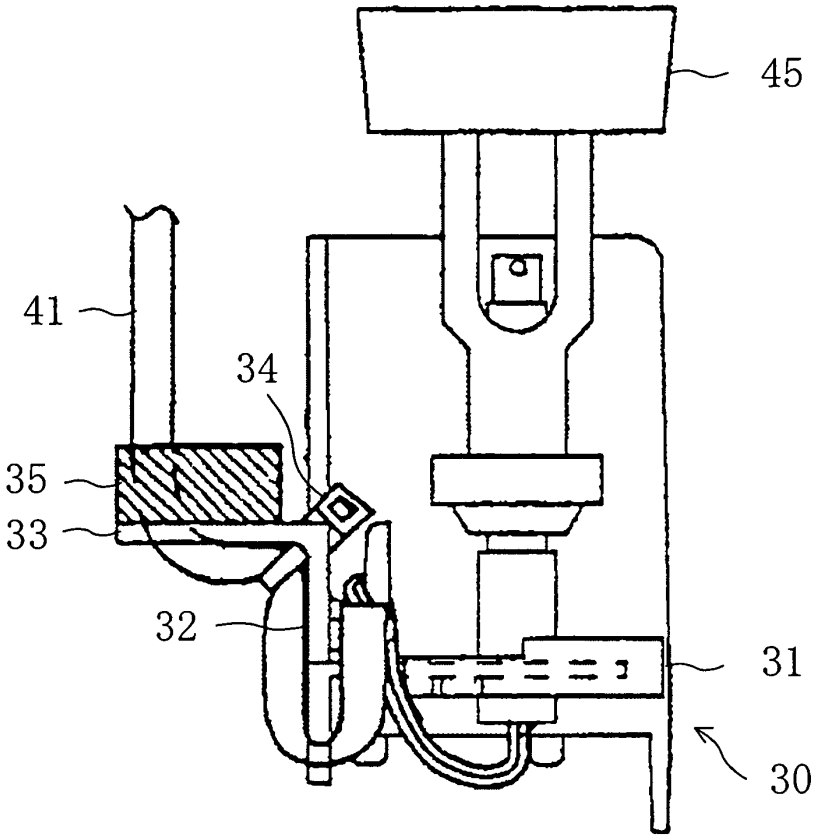
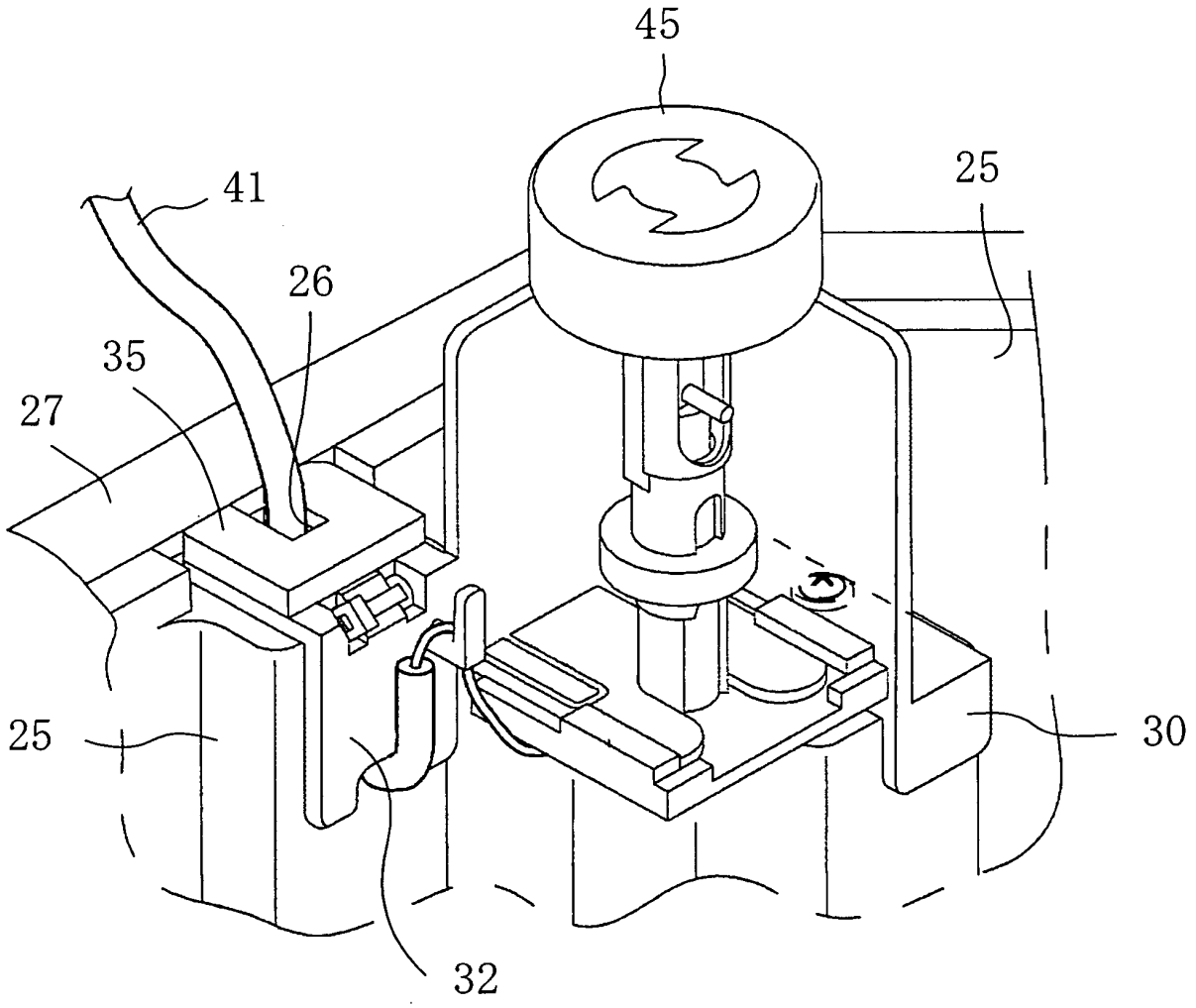


FIG.9



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2007/051777

A. CLASSIFICATION OF SUBJECT MATTER
F24F1/00(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)
F24F1/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2007
Kokai Jitsuyo Shinan Koho 1971-2007 Toroku Jitsuyo Shinan Koho 1994-2007

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.
A	JP 2000-257905 A (Fujitsu General Ltd.), 22 September, 2000 (22.09.00), All pages (Family: none)	1-5
A	JP 7-198156 A (Sanyo Electric Co., Ltd.), 01 August, 1995 (01.08.95), All pages (Family: none)	1-5
A	JP 7-239134 A (Sanyo Electric Co., Ltd.), 12 September, 1995 (12.09.95), All pages (Family: none)	1-5

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

* Special categories of cited documents:
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"P" document published prior to the international filing date but later than the priority date claimed
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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
18 April, 2007 (18.04.07)	01 May, 2007 (01.05.07)
Name and mailing address of the ISA/ Japanese Patent Office	Authorized officer
Facsimile No.	Telephone No.

Form PCT/ISA/210 (second sheet) (April 2005)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2000257905 A **[0004]**