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(54) **Air conditioner-mounting unit**

(57) A mounting unit for air conditioner (1) to be fixed on wall (15). Mounting board (2) of the unit includes main board (3) and sub board (4). Main board (3) includes flat section (7), locking means (6) for engaging with air conditioner (1) at the top of section (7), and plural fixing slots (9) in section (7). Sub board (4) includes mounting surface (4a), sway-preventing means (4b) formed at the bottom of surface (4a), and plural fixing holes (4c) for

securing the board to wall (15). After sub board (4) is fixed to a predetermined position on main board (3), the whole structure -- mounting unit (2) -- is fastened to wall (15). Such structure can retain air conditioner (1) close to wall (15) without swaying. In addition, the economical usage of materials contributes to a reduced die cost for press working, providing a lightweight mounting unit with easy handling in the installation.

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Description

Field of the Invention

[0001] The present invention relates to an air conditioner-mounting unit, more particularly, relates to the structure of the mounting board holding the indoor unit of an air conditioner when the indoor unit is fixed on the wall.

Background of the Invention

[0002] In the prior art, Japanese Patent Laid-Open No.7-260245 discloses a structure of the mounting board holding the indoor unit of an air conditioner. As shown in Figs. 10 and 11, mounting board 22 for mounting indoor unit 21 is fastened to wall 25 by screws 51a. Indoor unit 21 is hung on board 22 by engaging latch 52 disposed at the top of board 22 with locking portion 53 disposed at the top of the rear surface of indoor unit 21. At the same time, base plate 55 formed at the bottom of indoor unit 21 is fastened to bottom flange 54 of board 22 by screw 51b, keeping the bottom of unit 21 to be steady without swaying.

[0003] Similarly sized to rear dimensions E of indoor unit 21, mounting board 22 has ribs 57 for reinforcement. In addition, board 22 has a plurality of fixing holes 58 therein, through which board 22 is fixed onto wall 25 by screws 51 and 51a. Board 22 is formed from press worked-thin steel plate. Joint piping 56 is arranged at the rear surface of unit 21.

[0004] Such structured conventional board 22, however, is not easily fixed onto wall 25 due to its large dimensions and a significant weight. Besides, board 22 consumes a large amount of materials and considerable die costs for press working caused by its large dimensions.

Summary of the Invention

[0005] The present invention addresses the problems above. It is therefore the object of the present invention to provide an air conditioner-mounting unit being lightweight and easy-handled in installation with the die costs for press working significantly decreased.

[0006] The air conditioner-mounting unit of the present invention includes:

- i) main board to be fixed to the wall, having a first locking means for engaging with the locking section of the air conditioner; and
- ii) sub board to be fixed by the first locking means, having a second locking means preventing the air conditioner from swaying.

[0007] According to the present invention, an applicable mounting unit of another embodiment includes i) main board to be fixed to the wall and ii) sub board con-

nected to a position of the main board. The main board is in the shape of a longitudinally prolonged rectangle, whose longitudinal sides are shorter than the width of the air conditioner to be mounted thereon by engaging with each other. The main board contains a flat section in which a plurality of fixing openings to fix the board itself onto the wall, and a locking means, which is extended from the top of the flat section, for engaging with the air conditioner. On the other hand, the sub board contains mounting surface in which a plurality of fixing holes to fix the sub board itself onto the wall, and a sway-preventing means, which is extended from the lower position of the mounting surface, for retaining the bottom of the air conditioner close to the wall without swaying.

[0008] Such structure with a minimum consumption of materials allows the mounting unit to be lightweight and easy-handled in installation. It also achieves substantial reductions in production costs, followed by a significantly reduced die costs for press working.

Brief Description of the Drawings

[0009] Fig. 1 is a perspective view of the mounting unit in accordance with a preferred embodiment of the present invention.

[0010] Fig. 2 illustrates a section taken along line I - I of Fig. 1, showing a side view, partially broken away, of the state in which the mounting unit holds an air conditioner thereon.

[0011] Fig. 3 is a perspective view indicating the essential part of a mounting unit in accordance with another preferred embodiment of the present invention.

[0012] Fig. 4 is a perspective view of a mounting unit in accordance with still another preferred embodiment of the present invention.

[0013] Fig. 5 is a perspective view of a mounting unit in accordance with yet another preferred embodiment of the present invention.

[0014] Fig. 6 is a perspective view of a mounting unit in accordance with still another preferred embodiment of the present invention.

[0015] Fig. 7 is a section view indicating the essential part of a mounting unit in accordance with still another preferred embodiment of the present invention.

[0016] Fig. 8 is a section view indicating the essential part of a sway-preventing means of a mounting unit in accordance with another preferred embodiment.

[0017] Fig. 9 is a perspective view indicating how to determine the position of a piping hole in accordance with the preferred embodiment of the present invention.

[0018] Fig. 10 is a perspective view of the prior-art mounting unit.

[0019] Fig. 11 shows a side view, partially broken away, of the state in which the mounting unit shown in Fig. 10 holds an air conditioner thereon.

Description of the Preferred Embodiments

[0020] The preferred embodiment of the present invention is described hereinafter with reference to the accompanying drawings.

[0021] Fig. 1 is a perspective view of the mounting unit according to the preferred embodiment of the present invention. Fig. 2 illustrates a section taken along line I-I of Fig. 1, showing a side view, partially broken away, of the state in which the mounting unit holds an air conditioner thereon.

[0022] In Fig. 2, indoor unit 1 of the air conditioner contains air inlet grill 1a and blow-off opening 1b on its front. Dash-double-dot line 1f shown in Fig. 1 indicates the outline in projection of indoor unit 1 onto wall 15.

[0023] Mounting board 2 for mounting indoor unit 1 of a separate-type air conditioner onto wall 15 includes main board 3 and at least one sub board 4. The preferred embodiment shown in Fig. 1 uses two sub boards 4.

[0024] At the rear top of indoor unit 1, locking section 5 is extended from unit 1 to engage with mounting board 2. At the rear bottom of unit 1, hook 1c is extended from unit 1 such that its opening faces to the wall, and its position corresponds to where a locking means of sub board 4 should be located.

[0025] Main board 3 is in the shape of a longitudinally prolonged rectangle, whose longitudinal sides are shorter than the width of the air conditioner. Extended from flat section 7, locking receiver 6 - a first locking means for engaging with locking section 5 - is formed at the top edge of main board 3. In addition, plural projections 8 are disposed on flat section 7 of main board 3 to position sub board 4 properly to main board 3 when joining. Each of projections 8 has at least one fixing hole 10 for fixing sub board 4. Sub board 4 is fitted into projection 8 to get in a right position on the main board 3. With such structure, the mounting surfaces of main board 3 and sub board 4 are nearly leveled off with respect to wall 15. Flat section 7 also has a plurality of fixing slots 9 for fixing main board 3 to wall 15. Although all of slots 9 in main board 3 widthwise extends in Fig. 1, combinations with lengthwise-extending slots are also applicable.

[0026] Sub board 4 includes lengthwise prolonged-rectangular mounting surface 4a and bottom flange 4b extended from the bottom edge of surface 4a, making generally right angle to surface 4a, in the direction opposite to the wall. Locking opening 4d -- a second locking means for locking indoor unit 1 - is disposed in bottom flange 4b so as to engage with hook 1c disposed on indoor unit 1. This structure retains the bottom of indoor unit 1 close to wall 15 without swaying.

[0027] A plurality of fixing holes 4c are disposed in mounting surface 4a of sub board 4 to fix mounting board 2, i.e., the whole unit made of main board 3 and sub board 4 onto wall 15. Furthermore, as shown in the A section -- the section circled with dash-single-dot lines -- in Fig. 2, sub board 4 is designed such that flanging-

provided holes 4e are disposed at the top of sub board 4. When sub board 4 is inserted into projection 8 of main board 3, the flange formed around hole 4 fits with fixing hole 10 disposed in projection 8. This structure can prevent sub board 4 from disengaging from projections 8 of main board 3. For reinforcement, it is preferable that lengthwise-extending ribs (not shown) are disposed on sub board 4.

[0028] Indoor unit 1 and the corresponding outdoor unit (not shown) are connected through joint piping 11. Covered with insulator 12, joint piping 11 on the indoor-side is arranged the place adjacent to the rear frame 1d of unit 1. Hole 13 for leading piping 11 outdoors there-through is drilled in wall 15. Mounting board 2 should be fixed to the wall so that piping 13 remains unobstructed.

[0029] Now will be described how to mount indoor unit 1 onto wall 15 and advantageous points in the installation.

(1) Setting main board 3 properly on the mounting position of indoor unit 1 so that its longitudinal sides stay nearly in a horizontal position, then fastening temporarily board 3 to wall 15 by screws 14a, using two outermost slots 9 close to each of the lengthwise ends of board 3.

(2) Slipping two sub boards 4 upwardly into two outermost projections 8 disposed close to the lengthwise ends of main board 3, as shown in Fig. 1, and fitting flanging hole 4e in sub board 4 with fixing hole 10 disposed in projection 8. This snugly fit prevents sub board 4 from coming-off, allowing an easy installation.

(3) Fastening main board 3 with sub board 4 - mounting board 2 - to wall 15, as shown in A section in Fig. 2, using screw 14b through flanging hole 4e and fixing hole 10. At the same time, fastening sub board 4 to wall 15 with screws 14c through fixing holes 4c disposed in the lower part of sub board 4.

(4) Fastening securely mounting board 2 to wall 15 or standards (not shown) using a sufficient number of screws at proper fastening points for the structure and strength of the wall and the weight of the indoor unit: six screws will usually do for secure installation of mounting board 2. Also providing a secure fastening to any of temporarily fixed positions.

(5) Fitting piping 11 neatly along mounting board 2 to lead it outdoors through piping hole 13. Mounting indoor unit 1 onto board 2 by engaging locking section 5 with locking receiver 6. Finally, connecting piping 11 to the outdoor unit (not shown) completes the installation of indoor unit 1 to wall 15.

[0030] Now will be described the sway-preventing means shown in B section of Fig. 2. Hook 1c, which is disposed at the bottom edge of indoor unit 1, is fitted into indoor unit-locking opening 4d provided in bottom flange 4b of mounting board 2. Engaged with hook 1c, flange 4b with hole 4d works as the preventing means

for retaining the lower part of unit 1 closer to wall 15 without swaying. Therefore, sub board 4 is fastened through fixing hole 4e and preferably two uppermost holes of fixing holes 4c.

[0031] In the case that width L1 of main board 3 and width L2 on sub board 4 are sized generally to be equal, the material used for the boards, for example, thin steel plate can be cut out with a minimum material's waste, promising an improved productivity. The word "width" mentioned above represents the width of the material (i. e., thin steel plate) before processing - before bending process for forming main board 3.

[0032] Besides, projections 8 on main board 3 provide mounting board 2 with a generally leveled surface to be attached to wall 15.

[0033] Now, other preferable embodiments according to the present invention will be described hereinafter.

[0034] Fig. 3 is a perspective view indicating the essential part of a mounting unit in accordance with another preferred embodiment of the present invention. Here will be described another embodiment which employs a holding means for preventing sub board 4 from coming-off to ensure safety and easy handling in the installation, with reference to Fig. 3. According to the embodiment, a pair of ears 3a is struck out from the flat section of main board 3. At the upper section on the lengthwise sides of sub board 4, a pair of notches 4m is formed so as to correspond to each position of ears 3a. As shown in Fig. 3, sub board 4 may also contain widthwise-extending shoulder 4k at the position meeting the lower edge of main board 3, allowing the mounting surface of mounting board 2 to be generally leveled.

[0035] Figs. 4, 5, and 6 are perspective views of mounting boards of various design in accordance with other preferred embodiments of the present invention. Fig. 7 is a section view indicating the essential part of a mounting board in accordance with still another preferred embodiment of the present invention.

[0036] As shown in Fig. 4, each upper section of two sub boards 4 is slipped into two projections 8 disposed at the widthwise middle of main board 3, and then main board 3 with sub board 4 can be fixed to a pillar of a house. In Fig. 5, the upper section of single-piece sub board 4a produced in wide widths is slipped into one of projections 8, which is also widely formed so as to fit with the width of board 4a, disposed at the widthwise middle of main board 3, and then main board 3 with sub board 4a can be fixed to a pillar or wall of a house. Furthermore, as shown in Fig. 6, it is acceptable that sub board 4 is connected to main board 3 by welding or riveting, so as to be a one-piece structure.

[0037] The shape of locking receiver 6 of main board 3 is not necessarily to be the same as that shown in Fig. 1: it may be shaped like two tabs, as shown in Fig. 6, disposed at predetermined positions close to the lengthwise ends, even different shaped tabs are acceptable.

[0038] Fig. 7 shows the position of sub board 4 corresponding to the A section in Fig. 2. As shown in Fig. 7,

forming a deeper flange to hole 4e then swaging tip 4f on board 3 by riveting eliminates extra rivets for joining two boards.

[0039] It is also acceptable that flanged main board 3 is connected with sub board 4 having fixing hole 10 by riveting.

[0040] Fig. 8 is a section view indicating the essential part of a sway-preventing means, which corresponds to the B section in Fig. 2, in accordance with another preferred embodiment. In the preventing means shown in Fig. 8, the base plate of indoor unit 1 is directly fastened upwardly to bottom flange 4b of sub board 4 with screw 14.

[0041] Fig. 9 is a perspective view of the essential part indicating how to determine the position a piping hole to be drilled in the wall. In Fig. 9, insertion 4g and end stopper 4h are formed on board 4 by cut-and-raise process. Insertion 4g accepts, for example, 15-cm straightedge 16 that conforms to the Japanese Industrial Standards (JIS) B7516, while end stopper 4h receives the end of straightedge 16 when it is inserted through insertion 4g. In addition, sub board 4 has various inscriptions 4j on its surface. For example, the inscription indicating the center position of piping 13 will be much help to positioning piping hole when installing or moving the air conditioner.

[0042] Carried into effect in embodiment described above, the present invention has many advantages below.

[0043] The air conditioner-mounting unit according to an embodiment of the present invention includes i) main board to be fixed to the wall, having first locking means for engaging with the locking portion of, for example, the indoor unit of the air conditioner; and ii) sub board to be fixed by the first locking means, having second locking means preventing the air conditioner from swaying. Such structure allows the mounting unit to be lightweight due to an economical use of the material, providing an easy handling in its installation. Furthermore, the reduced material costs automatically lead to a significantly suppressed die costs for press working, resulting substantial reductions in manufacturing costs.

[0044] In an embodiment of the present invention, the sub board is connected with the main board in the manufacturing process removes the procedure for positioning the sub board to the main board in the installation, which achieves an easy and simple mounting.

[0045] In another embodiment of the present invention, the fixing means for fixing the main board to the wall doubles as the joining means for joining the main and sub boards. Such structure makes preparation work simple, since the two boards are not necessary to be connected through the joining procedure such as riveting. Furthermore, the structure provides flexibility in positioning the sub board to the main board because of its no-riveting joint, being adaptable to some differently sized air conditioners.

[0046] In still another embodiment, the main board is

formed such that its height is shorter than half that of the air conditioner. Such structure greatly contributes to a substantially reduced weight, an easy installation and economical usage of materials.

[0047] In yet another embodiment of the present invention, the air conditioner-mounting unit, which is generally used for the indoor unit, includes a main board to be fixed to the wall and sub boards to be fixed to a position on the main board. Shaped in a rectangle whose longitudinal sides being shorter than the width of the indoor unit, the main board contains a flat section having a plurality of fixing openings for fixing the board to the wall, and a locking means, which is extended from the top of the flat section, for engaging with the air conditioner. On the other hand, the sub board contains a mounting surface having a plurality of fixing holes for fixing the sub board to the wall, and a preventing means, which is extended from the bottom edge of the mounting surface, for retaining the bottom of the air conditioner close to the wall without swaying. Such structured unit reduces not only the amount of material consumed but also its weight, promising a simple and easy installation. Furthermore, the reduced material costs automatically lead to a significantly suppressed die costs for press working, resulting substantial reductions in manufacturing costs. As an additional plus, such structure provides unit with the common use of the parts. That is, for an air conditioner with different-sized widths, changing the length of the main board only will do. The sub board can be shared with other units.

[0048] In another embodiment, the sub board is joined with the main board through welding or riveting in the manufacturing process of the mounting board. Such one-piece structure provides the unit with an easy handling when it is fixed to the wall.

[0049] In still another embodiment, the width of the main board before processing is sized to be generally equal to the width of the sub board. The unified dimensions allow the material including thin steel plate to be shared with the two boards, promising a simple and well-structured material control in the manufacturing process of the mounting board.

[0050] In yet another embodiment, the main board contains the positioning means for positioning the sub board to a position on the main board. With the structure, the sub board is easily and quickly positioned to a desired place on the main board in the mounting process.

[0051] In another embodiment, the sub board contains the temporarily joining means for temporarily fixing it to the main board. The joining means promises an easy and brisk installation of the mounting unit, preventing the sub board from coming-off.

[0052] In still another embodiment, the sub board contains the insertion for a straightedge and inscriptions that indicate the measurements relating to the piping position. Such insertion and indications will be a great help to determine the position of the piping hole, with a commercially available metal straightedge that conforms to

JIS, when installing or reinstalling the indoor unit.

[0053] In yet another embodiment, the main board or the sub board is processed, for example, by forming a projection for the main board or a shoulder for the sub board, so that the mounting surface of the mounting board is generally leveled to the wall. This structure provides the mounting unit with a steady and safe mounting since the generally leveled mounting surface snugly fits along the wall.

[0054] In another embodiment, the main board and the sub board can be connected with each other through riveting by providing flanging for the main board and a hole for the sub board, and vice versa. With such structure, the two boards can be joined with each other without additional parts, such as rivets.

Claims

1. A mounting unit for an air conditioner (1), the unit comprising:

- (a) a main board (3) to be fixed to a wall surface (15), having a plurality of fixing openings and a first locking means (6) for engaging with locking section (5) of the air conditioner (1); and
- (b) a sub board (4) separately formed from the main board (3) and to be fixed at a predetermined position in the main board (3), having a second locking means (4d) for retaining the air conditioner (1) close to the wall surface (15) without swaying.

2. The mounting unit for the air conditioner (1) of claim 1 wherein the main board (3) and the sub board (4) are fixed with each other prior to installation.

3. The mounting unit for the air conditioner (1) of claim 1 wherein a fixing means for fixing the main board (3) to the wall surface (15) doubles as a connecting means for connecting the main board (3) and the sub board (4).

4. The mounting unit for the air conditioner (1) of claim 1 wherein a height dimension of the main board (3) is not more than half that of the air conditioner (1).

5. A mounting unit for an air conditioner (1), the unit comprising:

- (a) a main board (3) to be fixed to a wall surface (15), being shaped in a rectangle such that its lengthwise sides are shorter than a width of the air conditioner (1), the main board (3) including:

- (a-1) a flat section (7) having a plurality of fixing openings (9) for fixing the main board (3) to the wall surface (15);

- (a-2) extended from the top of the flat section (7), a locking means (6) for locking the air conditioner (1); and
- (b) a sub board (4) separately formed from the main board (3) and to be fixed to a predetermined position on the main board (3), the sub board (4) including:
- (b-1) a mounting surface (4a) having a plurality of fixing holes (4c) for fixing the sub board (4) to the wall surface (15); and
- (b-2) extended from the bottom of the mounting surface (4a), a preventing means (4b) for retaining the bottom of the air conditioner (1) close to the wall surface (15) without swaying.
6. The mounting unit for the air conditioner (1) of claim 5 wherein the main board (3) and the sub board (4) are fixed with each other prior to installation.
7. The mounting unit for the air conditioner (1) of claim 5 wherein a width of the main board (3) before processing is sized to be generally equal to a width of the sub board (4).
8. The mounting unit for the air conditioner (1) of claim 5 wherein the main board (3) contains a positioning means (8) for positioning the sub board (4) to the main board (3) at the predetermined position.
9. The mounting unit for the air conditioner (1) of claim 5 wherein the main board (3) and the sub board (4) have temporarily joining means (4e) and (10), respectively, for temporarily engaging with each other.
10. The mounting unit for the air conditioner (1) of claim 5 wherein the sub board (4) contains an insertion (4g) for accepting a straightedge (16) for measuring a length from a given position, and the sub board (4) indicating a distance between the given position and a center of piping hole (13).
11. The mounting unit for the air conditioner (1) of claim 5 wherein the main board (3) contains a projection (8) for accepting a flat section at the top of the sub board (4) therein, so that a mounting surface of the main board (3) and the sub board (4) to the wall surface (15) is generally leveled.
12. The mounting unit for the air conditioner (1) of claim 5 wherein the sub board (4) contains a shoulder (4k) for meeting to the predetermined position of the main board (3), so that the mounting surfaces of the main board (3) and the sub board (4) to the wall surface (15) are generally leveled.
13. The mounting unit for the air conditioner (1) of claim 5 wherein the main board (3) and the sub board (4) can be connected with each other through riveting by providing flanging for the main board (3) and a hole for the sub board (4), and vice versa.

FIG. 1

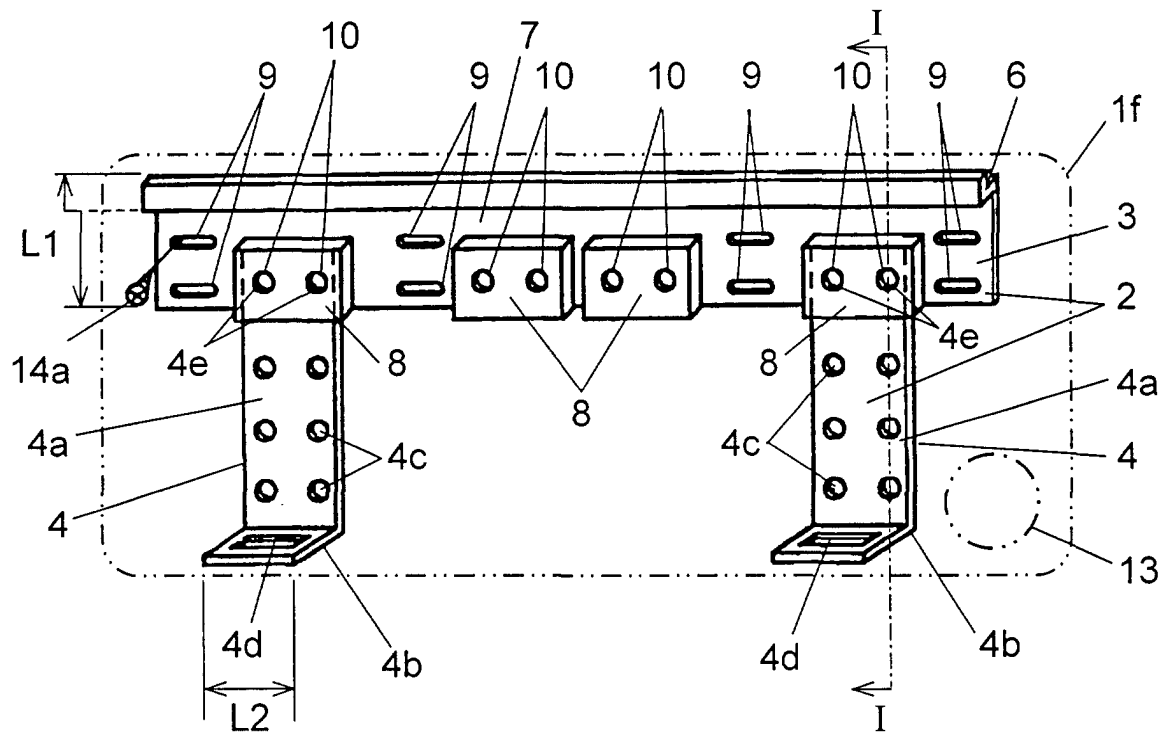


FIG. 2

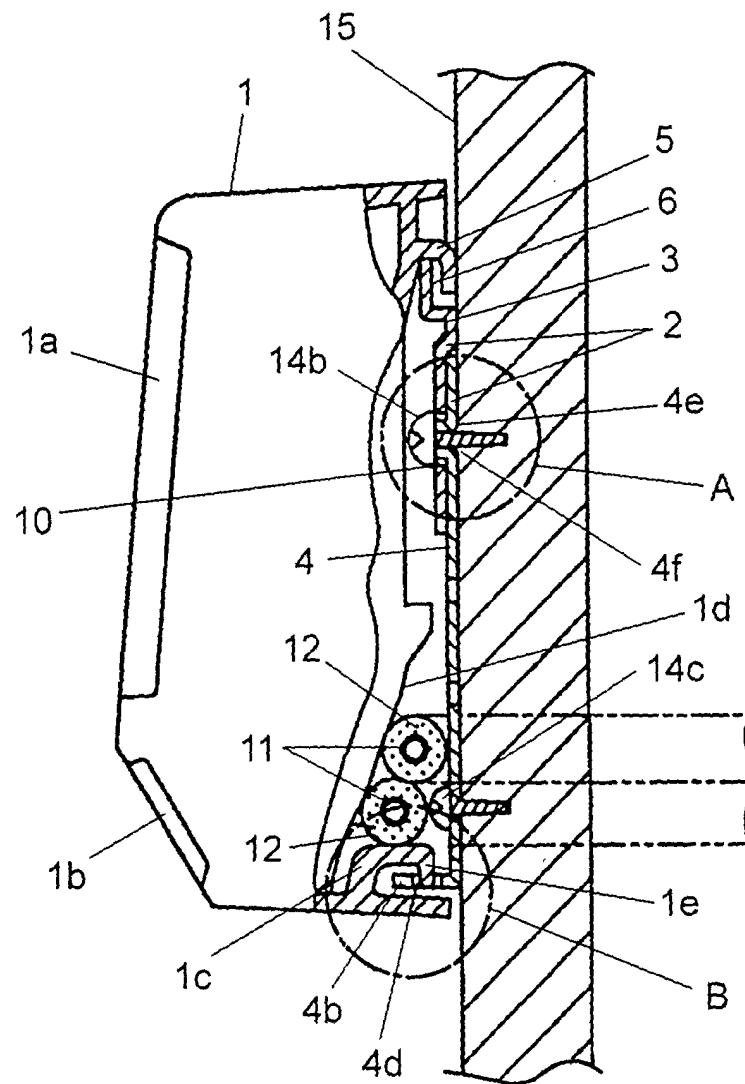


FIG. 3

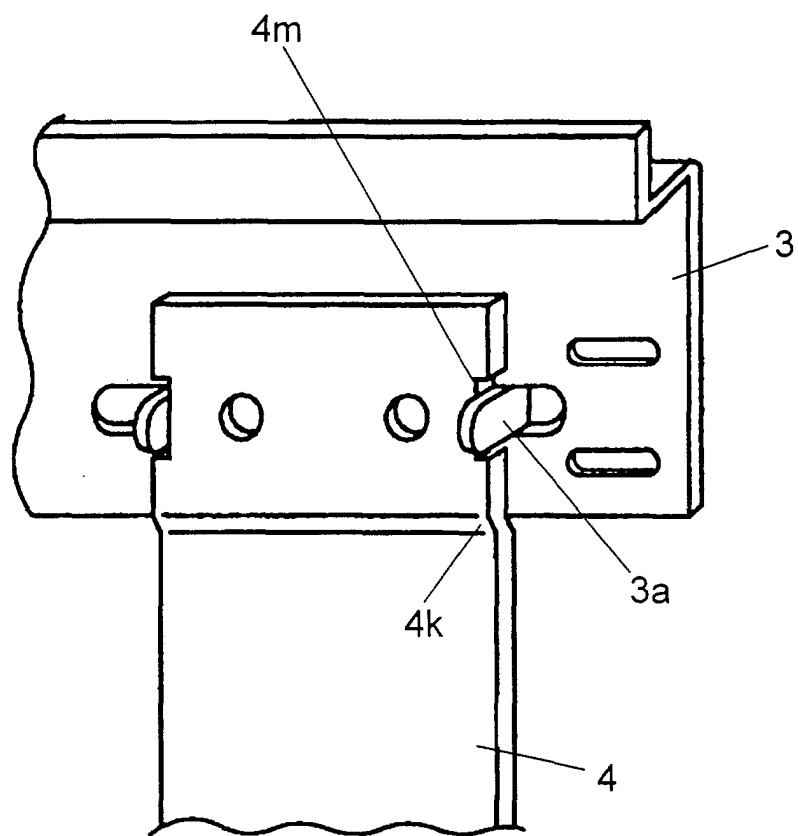


FIG. 4

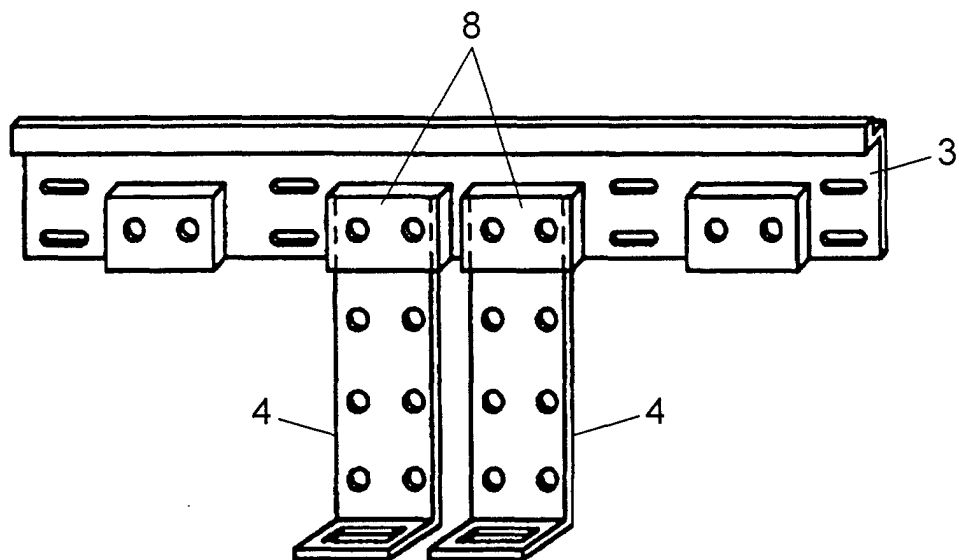


FIG. 5

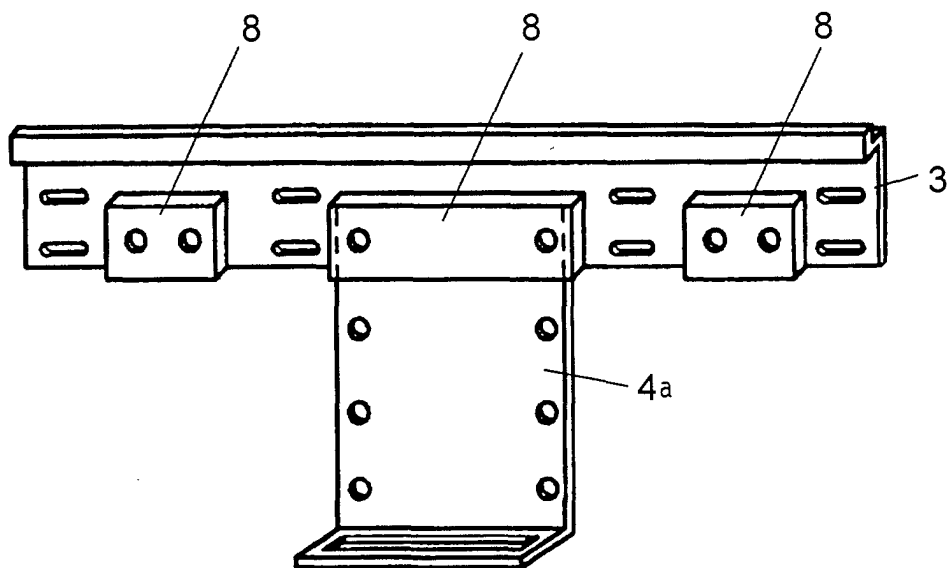


FIG. 6

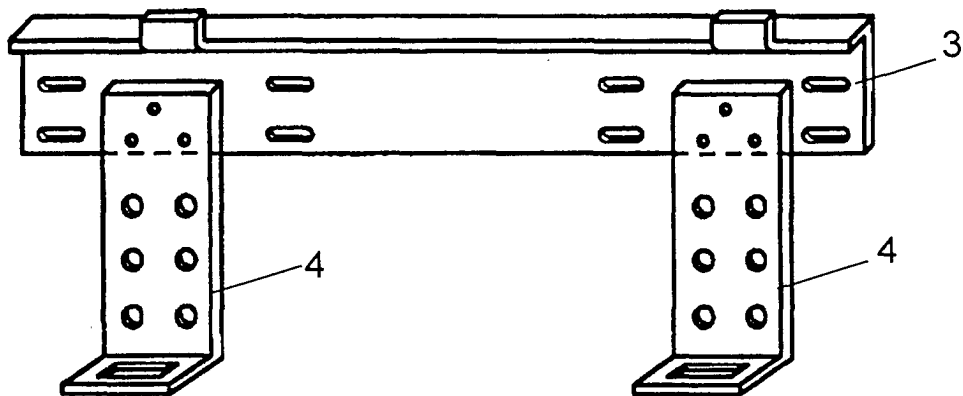


FIG. 7

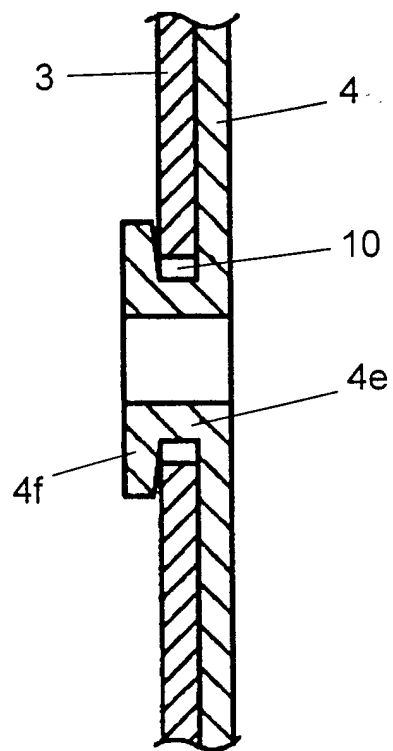


FIG. 8

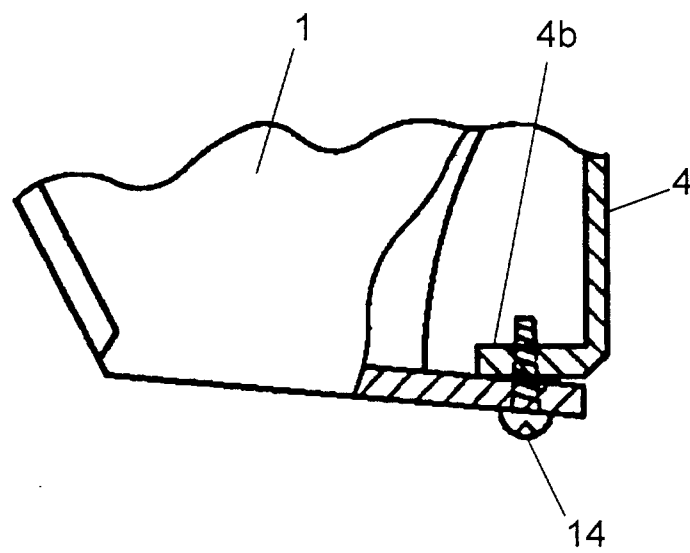


FIG. 9

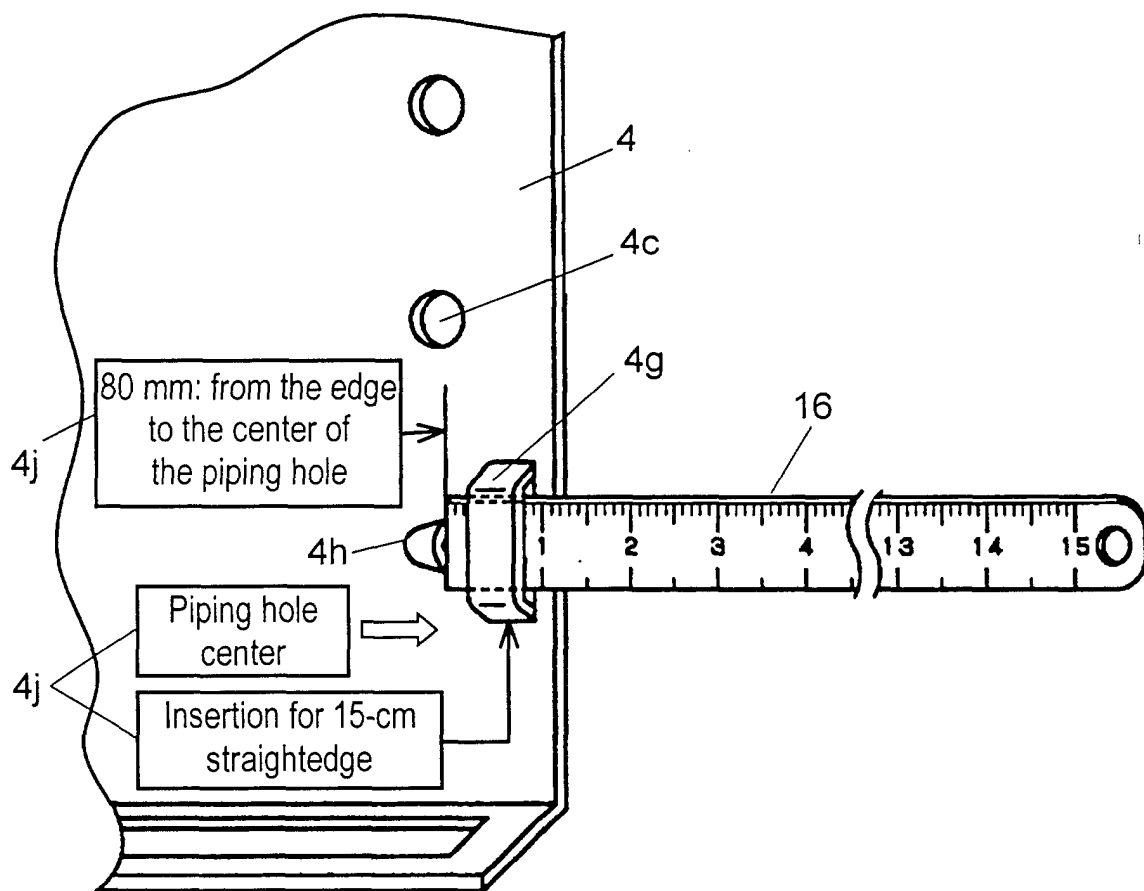


FIG. 10

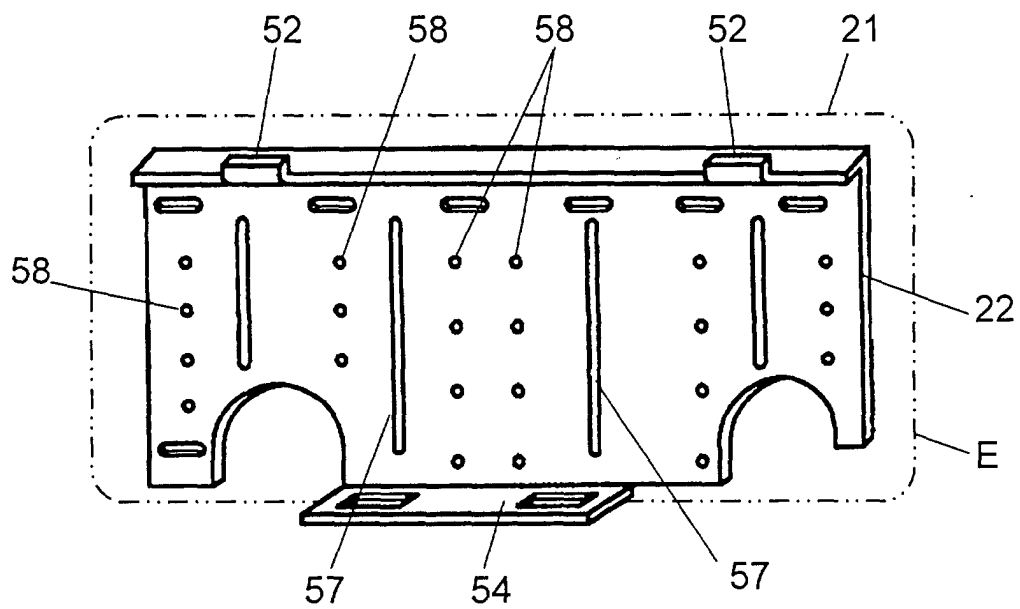
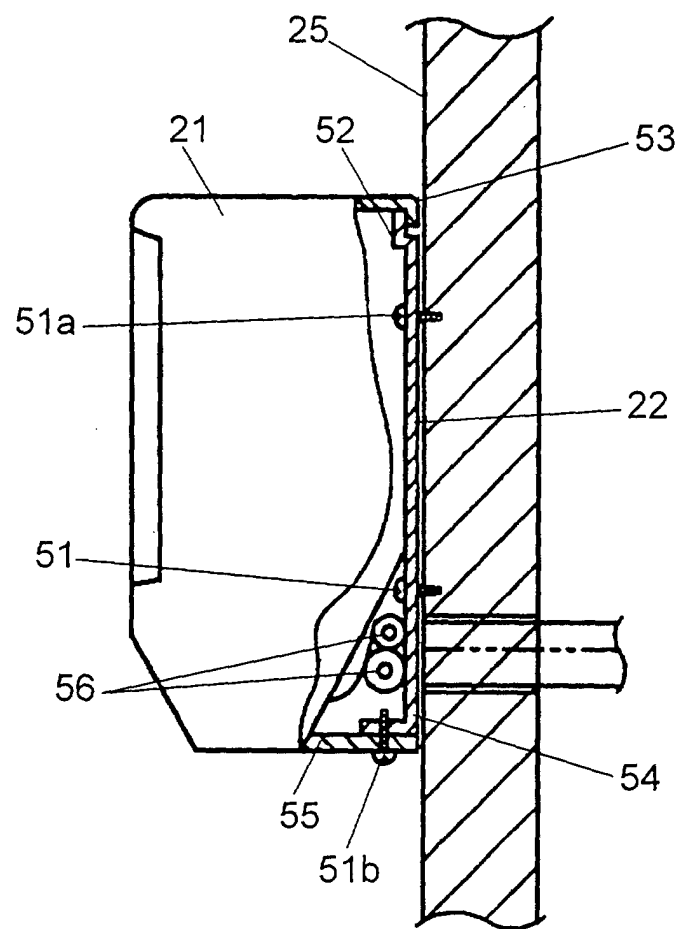


FIG. 11





European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 01 10 9416

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	WO 98 36226 A (HATANO KOJI ; NAKANUMA MITSUO (JP); MATSUSHITA ELECTRIC IND CO LTD) 20 August 1998 (1998-08-20) * the whole document *	1,2	F24F13/32
X	PATENT ABSTRACTS OF JAPAN vol. 1998, no. 09, 31 July 1998 (1998-07-31) & JP 10 096553 A (DAIKIN IND LTD), 14 April 1998 (1998-04-14) * abstract *	5,8	
A	PATENT ABSTRACTS OF JAPAN vol. 017, no. 191 (M-1396), 14 April 1993 (1993-04-14) & JP 04 340032 A (MATSUSHITA SEIKO CO LTD), 26 November 1992 (1992-11-26) * abstract *	1,5	
A	PATENT ABSTRACTS OF JAPAN vol. 1996, no. 05, 31 May 1996 (1996-05-31) & JP 08 014652 A (SANYO ELECTRIC CO LTD), 19 January 1996 (1996-01-19) * abstract *	1,5	TECHNICAL FIELDS SEARCHED (Int.Cl.7) F24F F16M
A	PATENT ABSTRACTS OF JAPAN vol. 010, no. 238 (M-508), 16 August 1986 (1986-08-16) & JP 61 070328 A (HITACHI LTD), 11 April 1986 (1986-04-11) * abstract *	1,5	
		-/--	
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 23 August 2001	Examiner Lienhard, D
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03/02 (P04C01)



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 01 10 9416

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	PATENT ABSTRACTS OF JAPAN vol. 008, no. 100 (M-295), 11 May 1984 (1984-05-11) & JP 59 012238 A (HITACHI SEISAKUSHO KK), 21 January 1984 (1984-01-21) * abstract *	5	
A	PATENT ABSTRACTS OF JAPAN vol. 007, no. 126 (M-219), 31 May 1983 (1983-05-31) & JP 58 043333 A (MATSUSHITA DENKI SANGYO KK), 14 March 1983 (1983-03-14) * abstract *	10	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 23 August 2001	Examiner Lienhard, D
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 01 10 9416

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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23-08-2001

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9836226 A	20-08-1998	JP 10227493 A	25-08-1998
		CN 1217778 A	26-05-1999
		CN 1217778 T	26-05-1999
		US 6135402 A	24-10-2000
JP 10096553 A	14-04-1998	NONE	
JP 04340032 A	26-11-1992	NONE	
JP 08014652 A	19-01-1996	JP 3059887 B	04-07-2000
JP 61070328 A	11-04-1986	JP 1939002 C	09-06-1995
		JP 6065929 B	24-08-1994
JP 59012238 A	21-01-1984	NONE	
JP 58043333 A	14-03-1983	JP 1407150 C	27-10-1987
		JP 62010336 B	05-03-1987

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82