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

(11) EP 0 834 707 A1

(12) EUROPEAN PATENT APPLICATION

published in accordance with Art. 158(3) EPC

(43) Date of publication:
08.04.1998 Bulletin 1998/15

(21) Application number: **97917444.8**

(22) Date of filing: **21.04.1997**

(51) Int. Cl.[6]: **F24F 5/00**

(86) International application number:
PCT/JP97/01360

(87) International publication number:
WO 97/40324 (30.10.1997 Gazette 1997/46)

(84) Designated Contracting States:
ES FR GR IT

(30) Priority: **23.04.1996 JP 123909/96**

(71) Applicant:
Mitsubishi Heavy Industries, Ltd.
Tokyo 100 (JP)

(72) Inventors:
- **YAMAGAMI, Katsuji,**
  Mitsubishi Heavy Ind., Ltd
  Nishi-kasugai-gun, Aichi-ken 452 (JP)
- **ITOH, Kenji,**
  Mitsubishi Heavy Ind., Ltd
  Nishi-kasugai-gun, Aichi-ken 452 (JP)
- **OKAMURA, Kumiko,**
  Mitsubishi Heavy Ind., Ltd
  Nishi-kasugai-gun, Aichi-ken 452 (JP)
- **TAKASU, Eizou,**
  Churyo Engineering Co., Ltd.
  Nakamura-ku, Nagoya-shi, Aichi-ken, 453 (JP)

(74) Representative:
Pochart, François et al
Cabinet Hirsch-Desrousseaux-Pochart,
34 rue de Bassano
75008 Paris (FR)

(54) OUTDOOR UNIT FOR SEPARATE TYPE AIR-CONDITIONERS

(57) In an outdoor unit for a split type air conditioner in which an operation valve bracket 9 is provided with operation valves 4a and 4b to each of which a refrigerant pipe running from an indoor unit is connected, when the refrigerant pipe is connected to or disconnected from the operation valve 4a, 4b, the work can be performed easily and rapidly.

A recess 20 for providing a clearance between the operation valve bracket 9 and an operation nut 4c for the operation valve 4a, 4b is formed in the operation valve bracket 9.

FIG. 1A

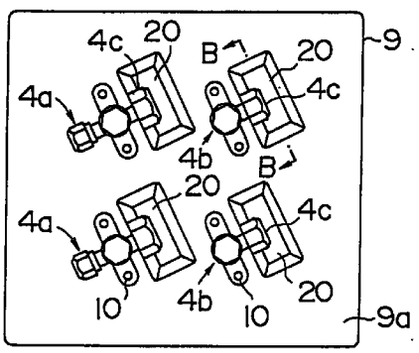
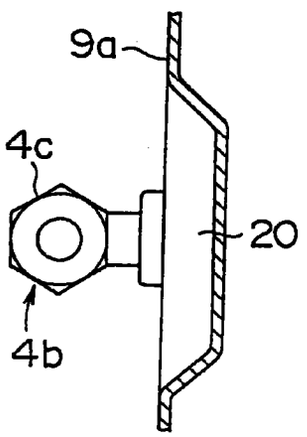


FIG. 1B



EP 0 834 707 A1

Description

Technical Field

The present invention relates to an outdoor unit for a split type air conditioner.

Background Art

FIG. 3 shows an example of a conventional split type air conditioner.

An outdoor unit 1 is installed outside a room, and an indoor unit 2 is installed in the room. Then, with a service panel 7 being removed, a liquid refrigerant pipe 3a and gas refrigerant pipe 3b, which run from the indoor unit 2, are connected to operation valves 4a and 4b, respectively, and a control signal line 5 is connected to a terminal 6, by which the outdoor unit and indoor unit are connected to each other.

In the case where two indoor units 2 are connected to one outdoor unit 1, two liquid-side operation valves 4a to each of which the liquid refrigerant pipe 3a is connected and two gas-side operation valves 4b to each of which the gas refrigerant pipe 3b is connected are fixed to an attaching surface 9a of an operation valve bracket 9 with screws 10, as shown in FIG. 2.

In the aforementioned conventional air conditioner, when the liquid refrigerant pipe 3a and gas refrigerant pipe 3b are connected to or disconnected from the liquid-side operation valve 4a and gas-side operation valve 4b, respectively, an operation nut for each valve must be turned. However, since the attaching surface 9a of the operation valve bracket 9 is flat, the distance between the operation nut 4c and the attaching surface 9a is short, so that a closed wrench cannot be used.

Therefore, a monkey wrench or spanner has been used. However, since the turning angle thereof is small, much labor and time are required.

Disclosure of the Invention

The present invention was made to solve the above problem, and an object thereof is to provide an outdoor unit for a split type air conditioner, in which an operation valve bracket is provided and operation valves to each of which a refrigerant pipe running from an indoor unit is connected are installed on this operation valve bracket, characterized in that a recess for providing a clearance between the operation valve bracket and an operation nut for the operation valve is formed in the operation valve bracket.

The outdoor unit for a split type air conditioner is also characterized in that the recess is formed so as to have dimensions such that at least a closed wrench can be inserted.

Brief Description of the Drawings

FIG. 1 shows an embodiment of the present invention; FIG. 1(A) is a front view of an operation valve bracket, and FIG. 1(B) is a sectional view taken along the line B-B of FIG. 1(A);

FIG. 2 shows a conventional operation valve bracket; FIG. 2(A) is a front view thereof, and FIG. 2(B) is a view taken in the direction of the arrows along the line B-B of FIG. 2(A); and

FIG. 3 is a perspective view of a conventional split type air conditioner.

Best Mode for Carrying Out the Invention

An embodiment of the present invention is shown in FIG. 1. FIG. 1(A) is a front view of an operation valve bracket, and FIG. 1(B) is a sectional view taken along the line B-B of FIG. 1(A).

An operation valve bracket 9 is formed with recesses 20 for providing a clearance between the operation valve bracket 9 and an operation nut 4c at portions corresponding to the operation nut 4c for each liquid-side operation valve 4a and gas-side operation valve 4b.

It is desirable that this recess 20 have dimensions such that at least a closed wrench can be inserted.

The configuration except for the recess 20 is the same as the conventional one shown in FIGS. 2 and 3. In FIG. 1, therefore, the same reference numerals are applied to the same elements as those shown in FIGS. 2 and 3, and the explanation of these elements is omitted.

When a liquid refrigerant pipe 3a and gas refrigerant pipe 3b are connected to or disconnected from the liquid-side operation valve 4a and gas-side operation valve 4b, respectively, an operation nut 4c can be turned by inserting a closed wrench, monkey wrench, spanner, or the like in the recess 20.

At this time, since the clearance between the operation nut 4c and the bottom surface of the recess 20 is large, a closed wrench can be used. Also, when a monkey wrench or spanner is used, the turning angle can be made large, so that the operation nut 4c can be turned easily and rapidly.

Industrial Applicability

According to the present invention, since the recess for providing a clearance between the operation valve bracket and the operation nut for operation valve is formed in the operation valve bracket, in the case where the refrigerant pipe running from the indoor unit is connected to or disconnected from the operation valve, when a monkey wrench or spanner is used, the turning angle thereof can be made large, so that the operation nut can be turned easily and rapidly.

If the recess is formed so as to have dimensions

such that at least a closed wrench can be used, the operation nut can be turned by using a closed wrench.

Claims

1. An outdoor unit for a split type air conditioner, in which an operation valve bracket is provided and operation valves to each of which a refrigerant pipe running from an indoor unit is connected are installed on said operation valve bracket, characterized in that

   a recess for providing a clearance between said operation valve bracket and an operation nut for said operation valve is formed in said operation valve bracket.

2. An outdoor unit for a split type air conditioner according to claim 1, wherein said recess is formed so as to have dimensions such that at least a closed wrench can be inserted.

FIG. 1A

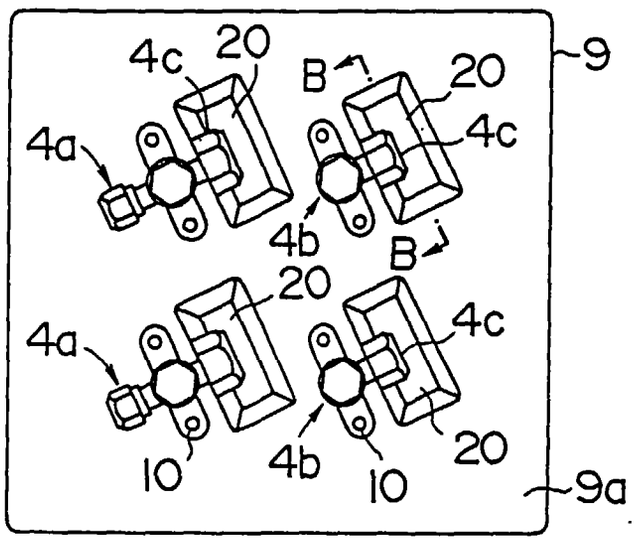


FIG. 1B

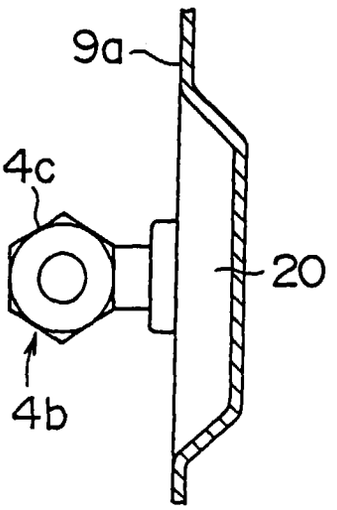


FIG. 2A

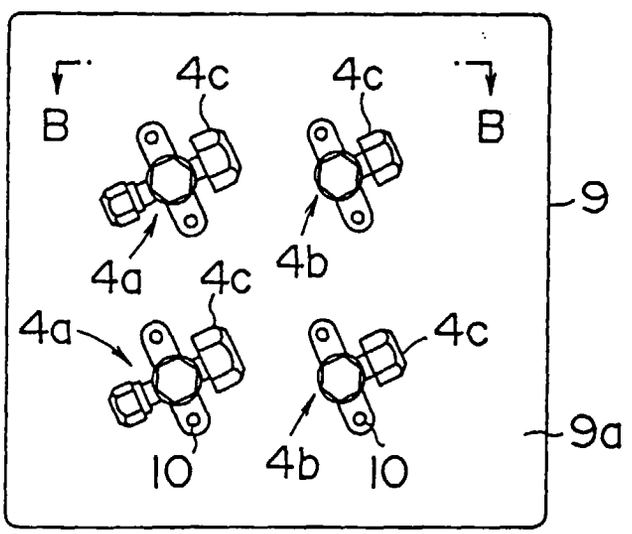


FIG. 2B

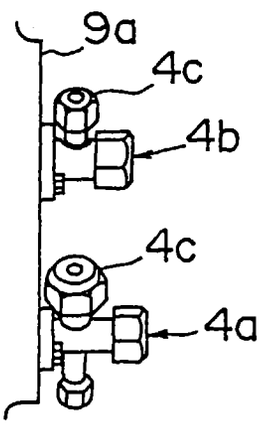
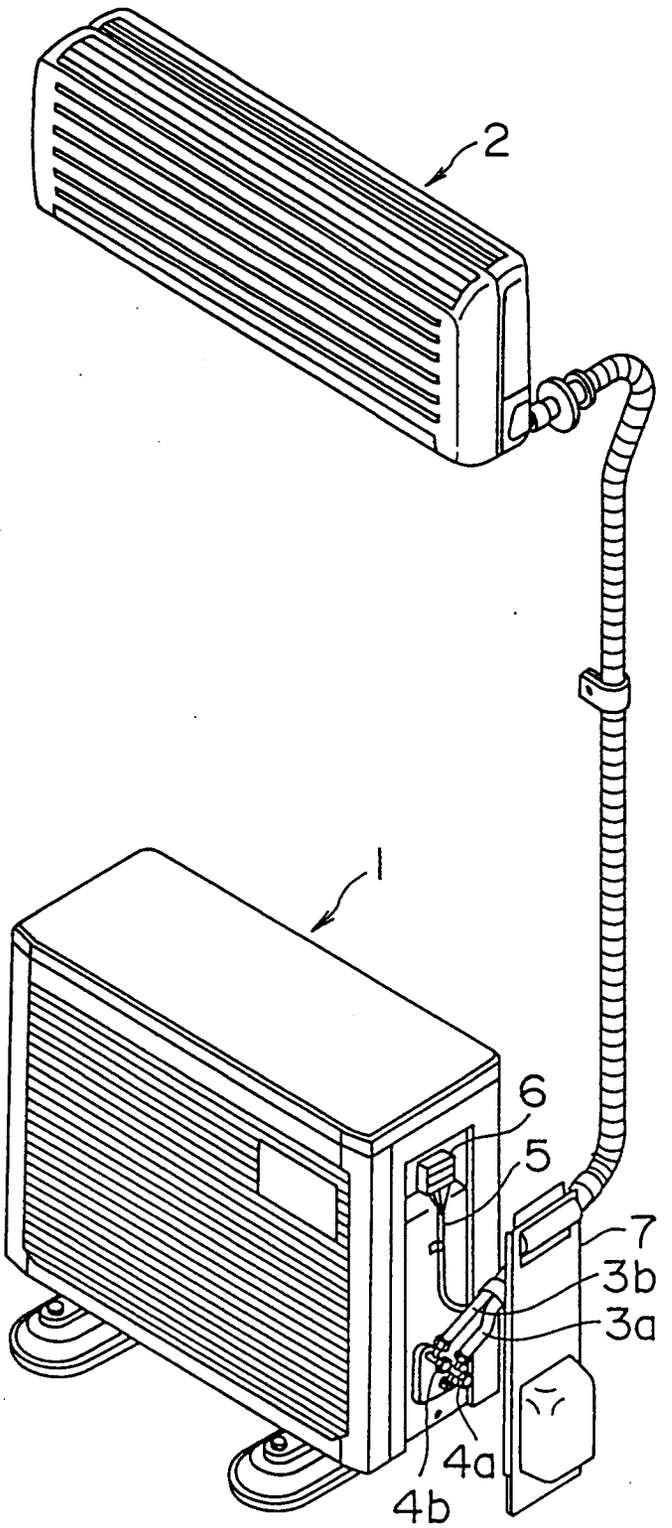


FIG. 3



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP97/01360

A. CLASSIFICATION OF SUBJECT MATTER
Int. Cl^6 F24F5/00

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^6 F24F5/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1940 - 1997
Kokai Jitsuyo Shinan Koho 1971 - 1997

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	JP, 7-151358, A (Toshiba Corp.), June 13, 1995 (13. 06. 95), Fig. 1 (Family: none)	1
Y	JP, 6-84224, A (Toshiba Corp.), December 2, 1994 (02. 12. 94), Fig. 1 (Family: none)	1
Y	JP, 6-74492, A (Toshiba A.V.E. K.K.), March 15, 1994 (15. 03. 94), Fig. 3 (Family: none)	1
Y	JP, 7-31844, Y (Western Trading Co., Ltd.), July 26, 1995 (26. 07. 95), Fig. 3 (Family: none)	1
Y	JP, 59-167665, U (Haruyuki Ito), November 9, 1984 (09. 11. 84), Fig. 6 (Family: none)	2

☐ 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 document 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	Date of mailing of the international search report
July 16, 1997 (16. 07. 97)	July 29, 1997 (29. 07. 97)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (July 1992)