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(11) **EP 1 653 160 A1**

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

(43) Date of publication:
03.05.2006 Bulletin 2006/18

(51) Int Cl.:
F24F 5/00 (1968.09) F25B 41/00 (1968.09)

(21) Application number: **04746826.9**

(86) International application number:
PCT/JP2004/009357

(22) Date of filing: **25.06.2004**

(87) International publication number:
WO 2005/003639 (13.01.2005 Gazette 2005/02)

(84) Designated Contracting States:
ES GR IT

(30) Priority: **01.07.2003 JP 2003189349**

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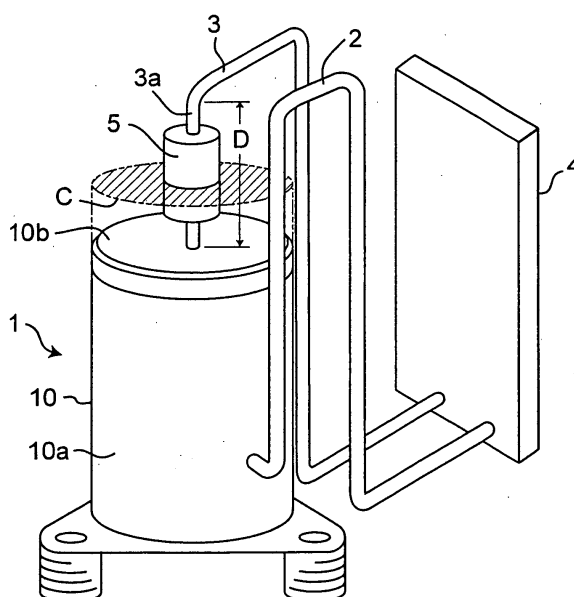
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(54) **OUTDOOR UNIT FOR AIR CONDITIONER**

(57) An outdoor unit for an air-conditioner includes a compressor (1), a heat exchanger (4) connected with the compressor (1) by a suction pipe (2) and a discharge pipe (3) and a muffler (5) mounted on the discharge pipe

(3) so as to be disposed above the compressor (1) and inside an outer contour (C) of a casing (10) of the compressor (1), with the outer contour (C) being defined when the compressor (1) is observed from above.

Fig. 1



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Description

Technical Field

[0001] The present invention relates to reduction of vibrating stress of a discharge pipe during operation of a compressor in an outdoor unit for an air-conditioner.

Background Art

[0002] In conventional outdoor units for heat exchangers, it has been a common practice that a muffler for reducing noises from a compressor is mounted on a discharge pipe connecting the compressor and a heat exchanger so as to be disposed at a side of the compressor.

[0003] Fig. 2 shows a piping arrangement around a vertical type cylindrical compressor 51 in a prior art outdoor unit for an air-conditioner described in, for example, Japanese Patent Laid-Open Publication No. 9-196514 (1997). In Fig. 2, a suction pipe 52 and a discharge pipe 53 are connected between the compressor 51 and a heat exchanger 54, while a muffler 55 having a diameter and a mass larger than those of the discharge pipe 53 is mounted in the course of the discharge pipe 53 at a side of the compressor 51 so as to reduce noises produced by impactive flow of refrigerant gas from the compressor 51.

[0004] In the prior art arrangement of Fig. 2, since vibrations of the compressor 51 generated by its operation are transmitted to the discharge pipe 53, the discharge pipe 53 is also vibrated. However, since the large-mass muffler 55 mounted on the discharge pipe 53 is disposed away from an axis of the compressor 51 acting as a vibration source, moment of inertia of the discharge pipe 53 tends to increase its vibrating stress. In order to prevent the discharge pipe 53 from being damaged by this vibrating stress, a countermeasure for damping vibrations of the discharge pipe 53 should be taken in which the muffler 55 and the suction pipe 52 are coupled with each other by a coupling member 60 as shown in Fig. 2. Meanwhile, as an alternative countermeasure, a yield strength of the discharge pipe 53 against the vibrating stress should be raised by increasing a wall thickness of the discharge pipe 53. As a result, in the prior art outdoor unit for the heat exchanger 54, such problems arise that use of the vibration damping coupling member 60 or increase of the wall thickness of the discharge pipe 53 raises its production cost and enlarges its installation area.

Disclosure of Invention

[0005] The present invention has for its object to provide, with a view to eliminating the above mentioned drawbacks of prior art, an outdoor unit for an air-conditioner, in which vibrating stress of a discharge pipe during operation of a compressor can be reduced by an inexpensive arrangement and an installation area of the outdoor unit can be reduced.

[0006] In order to accomplish this object, an outdoor unit for an air-conditioner according to the present invention includes a compressor, a heat exchanger connected with the compressor by a suction pipe and a discharge pipe and a muffler mounted on the discharge pipe so as to be disposed above the compressor and inside an outer contour of a casing of the compressor, with the outer contour being defined when the compressor is observed from above.

Brief Description of Drawings

[0007]

Fig. 1 is a perspective view showing a piping arrangement around a compressor of an outdoor unit for an air-conditioner according to one embodiment of the present invention.

Fig. 2 is a perspective view showing a piping arrangement around a compressor of a prior art outdoor unit for an air-conditioner.

Best Mode for Carrying Out the Invention

[0008] Hereinafter, an outdoor unit for an air-conditioner according to one embodiment of the present invention is described with reference to Fig. 1. Fig. 1 shows a piping arrangement around a vertical type compressor 1 in which an axis of a cylindrical casing 10 extends vertically. This outdoor unit further includes a heat exchanger 4 connected with the compressor 1 by a suction pipe 2 and a discharge pipe 3 and a muffler 5 for reducing noises produced by impactive flow of refrigerant gas from the compressor 1, which has a diameter larger than that of the discharge pipe 3. The suction pipe 2 is connected with a lower portion of a cylindrical side face 10a of the casing 10 of the compressor 1. Meanwhile, the discharge pipe 3 is connected with a central portion of a circular upper face 10b of the casing 10 of the compressor 1 and rises vertically upwardly, as a central vertical portion 3a, from the central portion of the upper face 10b through a predetermined distance D.

[0009] In contrast with a prior art arrangement of Fig. 2 in which a muffler is mounted in the course of a discharge pipe at a side of a compressor, the muffler 5 of this outdoor unit for the air-conditioner is mounted on the central vertical portion 3a of the discharge pipe 3 rising vertically upwardly from the central portion of the upper face 10b of the casing 10 of the compressor 1 so as to be disposed above the compressor 1 and inside a circular outer contour C of the casing 10 of the compressor 1, which outer contour C is defined when the compressor 1 is observed from above.

[0010] In the above described arrangement of the outdoor unit for the air-conditioner, since the muffler 5 is mounted on the central vertical portion 3a of the discharge pipe 3 rising vertically upwardly from the central portion of the upper face 10b of the casing 10 of the com-

pressor 1, the muffler 5 is disposed close to the axis of the compressor 1 acting as a vibration source. Thus, even if the muffler 5 has a large mass, moment of inertia of the muffler 5, which is produced by vibrations of the compressor 1, is reduced, so that it is possible to restrain increase of vibrating stress of the discharge pipe 3 caused by mounting the muffler 5 on the discharge pipe 3.

[0011] As is apparent from the forgoing description of the outdoor unit for the air-conditioner in the present invention, since the muffler 5 is mounted on the central vertical portion 3a of the discharge pipe 3 rising vertically upwardly from the central portion of the circular upper face 10b of the casing 10 of the compressor 1 so as to be disposed above the compressor 1 and inside the circular outer contour C of the casing 10 of the compressor 1, which outer contour C is defined when the compressor 1 is observed from above, the muffler 5 is disposed close to the axis of the compressor 1 acting as the vibration source. Hence, moment of inertia of the muffler 5, which is produced by vibrations of the compressor 1, is reduced, so that it is possible to restrain increase of vibrating stress of the discharge pipe 3 caused by mounting the muffler 5 on the discharge pipe 3.

[0012] Consequently, in the outdoor unit for the air-conditioner in the present invention, since the conventional need for using a vibration damping coupling member or increasing a wall thickness of the discharge pipe in order to reduce vibrating stress of the discharge pipe during operation of the compressor is eliminated, such marked effects are gained that the vibrating stress of the discharge pipe during operation of the compressor can be reduced at low cost and an installation area of the outdoor unit can be reduced.

Claims

1. An outdoor unit for an air-conditioner comprising:

a compressor (1);
a heat exchanger (4) which is connected with the compressor (1) by a suction pipe (2) and a discharge pipe (3); and
a muffler (5) which is mounted on the discharge pipe (3) so as to be disposed above the compressor (1) and inside an outer contour (C) of a casing (10) of the compressor (1), with the outer contour (C) being defined when the compressor (1) is observed from above.

2. The outer unit as claimed in Claim 1, wherein the compressor (1) is a vertical type compressor.

Amended claims under Art. 19.1 PCT

1. Amended) An outdoor unit for an air-conditioner comprising:

a compressor (1);
a heat exchanger (4) which is connected with the compressor (1) by a suction pipe (2) and a discharge pipe (3) extending upwardly from a substantially central portion of an upper face (10b) of the compressor (1); and
a muffler (5) which is mounted on the discharge pipe (3) so as to be disposed above the compressor (1) and inside an outer contour (C) of a casing (10) of the compressor (1), with the outer contour (C) being defined when the compressor (1) is observed from above.

2. The outer unit as claimed in Claim 1, wherein the compressor (1) is a vertical type compressor.

Fig. 1

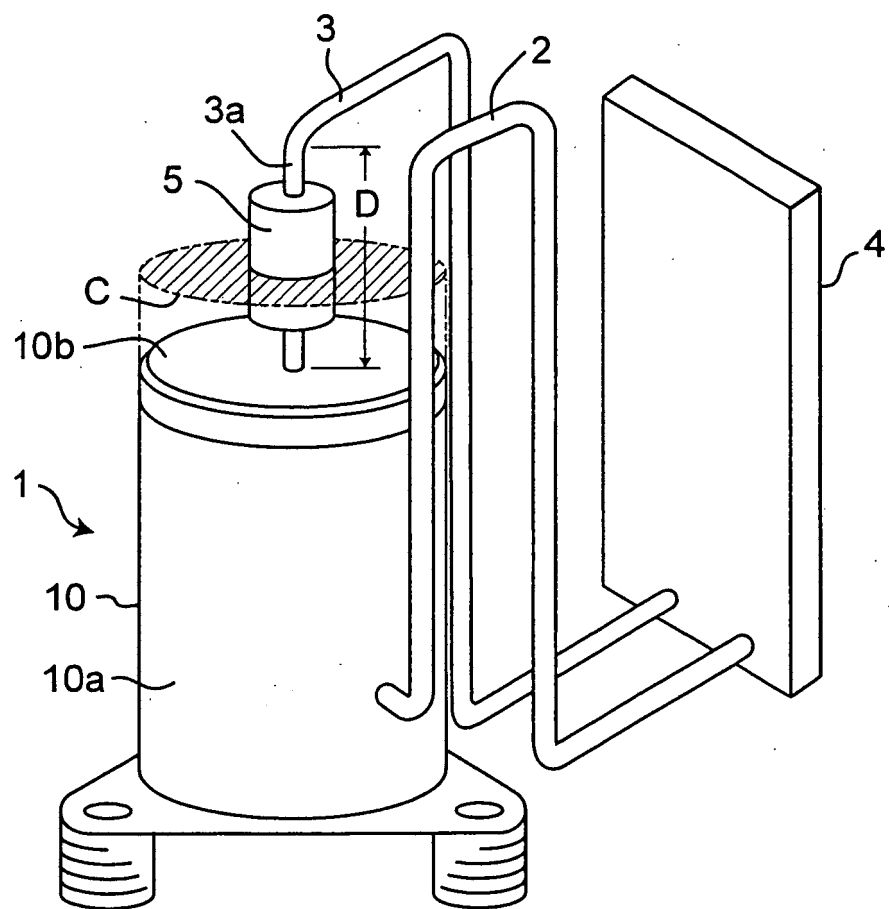
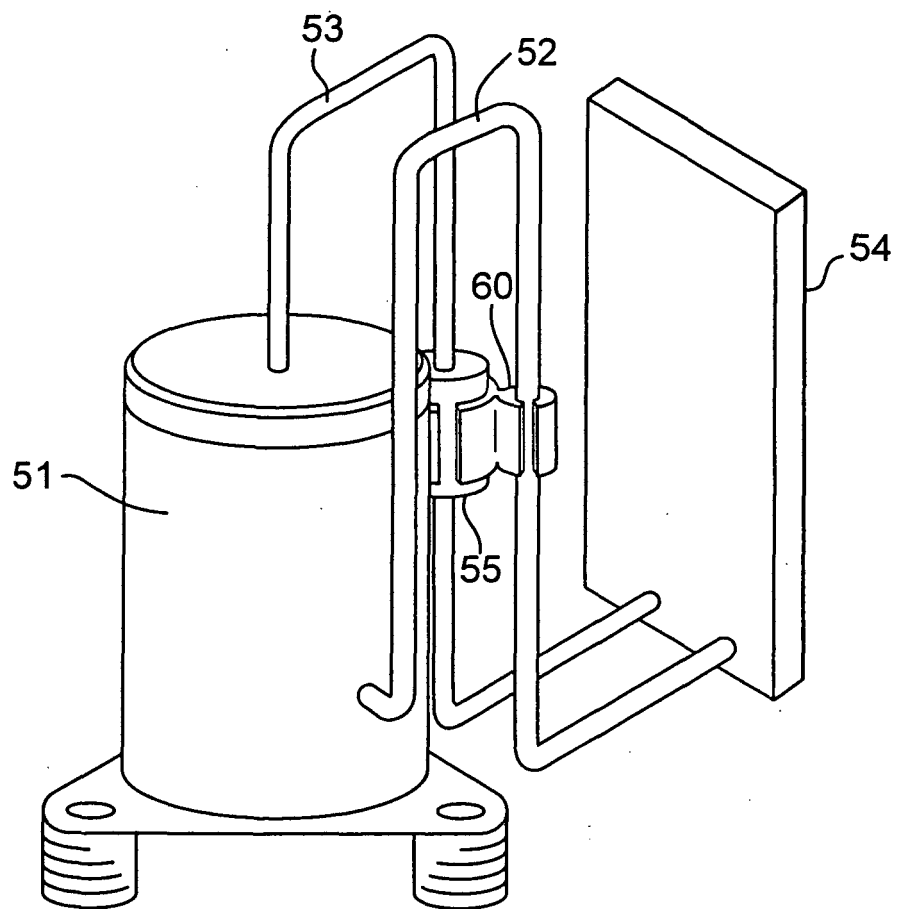


Fig.2 PRIOR ART



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2004/009357

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl⁷ F24F5/00, F25B41/00

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.Cl⁷ F24F5/00, F25B41/00, F04B39/00

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

Jitsuyo Shinan Koho 1922-1996 Toroku Jitsuyo Shinan Koho 1994-2004

Kokai Jitsuyo Shinan Koho 1971-2004 Jitsuyo Shinan Toroku Koho 1996-2004

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.
X	JP 2001-295764 A (Daikin Industries, Ltd.), 26 October, 2001 (26.10.01), Par. Nos. [0002] to [0004]; Fig. 2 (Family: none)	1, 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

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"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

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"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
28 September, 2004 (28.09.04)

Date of mailing of the international search report
12 October, 2004 (12.10.04)

Name and mailing address of the ISA/
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