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(54) AIR CONDITIONER INDOOR UNIT AND SPLIT-TYPE AIR CONDITIONER

(57) An air conditioner indoor unit (100) and a split-type air conditioner. The air conditioner indoor unit (100) comprises a chassis (10), an indoor side heat exchanger, a compressor (20), and a first-stage resilient damping structure (30) and a second-stage resilient damping structure (40), wherein the chassis (10) is provided with a first mounting position and a second mounting position; the indoor side heat exchanger is mounted in the first mounting position; the compressor (20) is in communication with the indoor side heat exchanger, mounting feet (21) are provided at the bottom of the compressor (20), and the compressor (20) is arranged in the second mounting position; and the first-stage resilient damping structure (30) is located between the mounting feet (21) and the second-stage resilient damping structure (40), and the second-stage resilient damping structure (40) is located between the first-stage resilient damping structure (30) and the chassis.

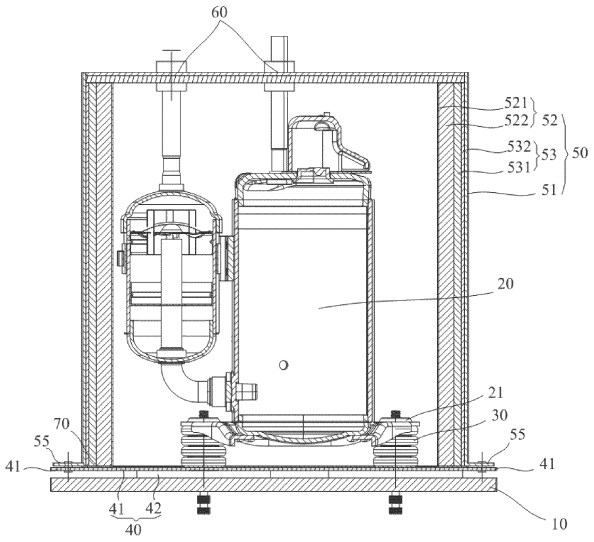

FIG. 3

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Description

[0001] This application claims priority to Chinese Patent Application Nos. 202211194755.0 and 202222581071.8, both filed on September 28, 2022, the entire contents of which are incorporated herein by reference.

TECHNICAL FIELD

[0002] The present application relates to the technical field of air conditioning, and in particular to an air conditioner indoor unit and a split-type air conditioner.

BACKGROUND

[0003] At present, the compressor of split-type air conditioners is basically in the outdoor unit. The compressor compresses the gas refrigerant and makes a lot of noise. Dealing with the noise of the compressor has always been a technical problem for air conditioner manufacturers. In order to allow users to install a lightweight outdoor unit by themselves, the compressor is now moved to the indoor unit. However, for the indoor noise standard requirements, the current single vibration and noise reduction measures for the compressor (such as foot pads, sound insulation cotton, sound insulation enclosure, etc.) are no longer sufficient, so a more efficient vibration and noise reduction solution is needed for the compressor.

SUMMARY

TECHNICAL PROBLEM

[0004] The main objective of the present application is to provide an air conditioner indoor unit, aiming at installing a compressor in the air conditioner indoor unit and reducing the noise generated by the compressor.

TECHNICAL SOLUTION

[0005] In order to achieve the above objective, the present application provides an air conditioner indoor unit, including: a chassis, an indoor heat exchanger, a compressor, a first-stage elastic vibration reduction structure and a second-stage elastic vibration reduction structure.

[0006] In an embodiment, the chassis is provided with a first installation position and a second installation position.

[0007] In an embodiment, the indoor heat exchanger is provided at the first installation position.

[0008] In an embodiment, the compressor is communicated with the indoor heat exchanger, a bottom of the compressor is provided with an installation foot, the compressor is provided at the second installation position, and the installation foot is connected to the chassis.

[0009] In an embodiment, the first-stage elastic vibration reduction structure is provided between the installation foot and the second-stage elastic vibration reduction structure, and the second-stage elastic vibration reduction structure is provided between the first-stage elastic vibration reduction structure and the chassis.

[0010] In an embodiment, the first-stage elastic vibration reduction structure is configured as a rubber pad, a rubber spring, or a rubber-metal composite spring.

[0011] In an embodiment, the air conditioner indoor unit further includes a sound insulation enclosure, and the sound insulation enclosure is sleeved outside the compressor.

[0012] In an embodiment, the second-stage elastic vibration reduction structure includes a partition and an elastic member, the partition is connected to the sound insulation enclosure, the first-stage elastic vibration reduction structure is provided between the installation foot and the partition, and the elastic member is provided between the partition and the chassis.

[0013] In an embodiment, the partition is configured as a metal plate.

[0014] In an embodiment, the elastic member is configured as a rubber block or a spring.

[0015] In an embodiment, the sound insulation enclosure includes an enclosure body, and at least one sound absorption layer and at least one sound insulation layer are provided on an inner surface of the enclosure body.

[0016] In an embodiment, the sound absorption layer includes a first sound absorption layer and a second sound absorption layer, the sound insulation layer includes a first sound insulation layer and a second sound insulation layer, and the first sound absorption layer, the second sound absorption layer, the first sound insulation layer, the second sound insulation layer, and the enclosure body are stacked in sequence.

[0017] In an embodiment, the first sound absorption layer is configured as a micro-perforate layer.

[0018] In an embodiment, a thickness of the micro-perforate layer ranges from 0.2 mm to 1.5 mm.

[0019] In an embodiment, the perforation diameter of the micro-perforate layer ranges from 0.1 mm to 1 mm.

[0020] In an embodiment, the perforation ratio of the micro-perforate layer ranges from 0.5% to 5%.

[0021] In an embodiment, the second sound absorption layer is configured as a fiber, foam, or particle porous sound absorption material layer.

[0022] In an embodiment, the first sound insulation layer is configured as a sound insulation felt layer, a glass layer, or a rubber layer.

[0023] In an embodiment, the second sound insulation layer is configured as a damping material layer.

[0024] In an embodiment, the enclosure body is configured as a metal enclosure body.

[0025] In an embodiment, the sound insulation enclosure is provided with an avoidance hole for a pipeline of the compressor to pass through, and a first seal is provided between the pipeline and the avoidance hole.

[0026] In an embodiment, a second seal is provided between the sound insulation enclosure and the partition.

[0027] In an embodiment, an installation flange is provided on an outer side of the enclosure body, the installation flange and the partition being fixed by bolts, and the installation foot is connected to the chassis by passing through the partition with bolts. Or, the installation foot and the partition are connected by bolts, and the partition is connected to the chassis by bolts.

[0028] The present application further provides an air conditioner outdoor unit and an air conditioner indoor unit. The air conditioner outdoor unit is provided with an outdoor heat exchanger, and the outdoor heat exchanger is communicated with the compressor and an indoor heat exchanger of the air conditioner indoor unit to form a refrigerant circuit.

TECHNICAL EFFECT

[0029] The technical solution of the present application adopts a chassis, an indoor heat exchanger, a compressor, a first-stage elastic vibration reduction structure and a second-stage elastic vibration reduction structure. The chassis has a first installation position and a second installation position; the indoor heat exchanger is installed at the first installation position; the compressor is connected to the indoor heat exchanger, the bottom of the compressor has an installation foot, the compressor is placed at the second installation position, and the installation foot is connected to the chassis; the first-stage elastic vibration reduction structure is located between the installation foot and the second-stage elastic vibration reduction structure, and the second-stage elastic vibration reduction structure is located between the first-stage elastic vibration reduction structure and the chassis. The two-stage vibration reduction effect of the first-stage elastic vibration reduction structure and the second-stage elastic vibration reduction structure can greatly attenuate the vibration of the compressor, thereby reducing the radiation noise of the compressor arranged in the indoor unit of the air conditioner.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030] In order to more clearly illustrate the technical solutions in the embodiments of the present application or in the related art, drawings used in the embodiments or in the related art will be briefly described below. Obviously, the drawings in the following description are only some embodiments of the present application. It will be apparent to those skilled in the art that other figures can be obtained according to the structures shown in the drawings without creative work.

FIG. 1 is a schematic structural diagram of an indoor unit of an air conditioner according to an embodiment of the present application.

FIG. 2 is a schematic structural diagram of an embodiment where a compressor is provided at a sound insulation enclosure and a chassis.

FIG. 3 is a schematic cross-sectional view of A-A in FIG. 2 according to an embodiment of the present application.

FIG. 4 is a schematic cross-sectional view of A-A in FIG. 2 according to another embodiment of the present application.

[0031] Description of reference signs:

Reference signs	Name	Reference signs	Name
100	air conditioner indoor unit	52	sound absorption layer
10	chassis	521	first sound absorption layer
20	compressor	522	second sound absorption layer
21	installation foot	53	sound insulation layer
30	first-stage elastic vibration reduction structure	532	second sound insulation layer

(continued)

Reference signs	Name	Reference signs	Name
40	second-stage elastic vibration reduction structure	531	first sound insulation layer
41	partition	54	avoidance hole
42	elastic member	55	installation flange
50	sound insulation enclosure	60	first seal
51	enclosure body	70	second seal

[0032] The realization of the purposes, functional features and advantages of the present application will be further explained with reference to the accompanying drawings in combination with the embodiments.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0033] The technical solutions in the embodiments of the present application will be clearly and completely described below with reference to the drawings in the embodiments of the present application. Obviously, the described embodiments are only a part of the embodiments of the present application and not all of them. Based on the embodiments in the present application, all other embodiments obtained by those skilled in the art without creative efforts fall within the protection scope of the present application.

[0034] It should be noted that any directional instructions in the embodiments of the present application (such as up, down, left, right, front, rear, etc.) are used merely to explain the relative positional relationships and movements of the components under a specific posture (as shown in the drawings). If the specific posture changes, the directional instructions will correspondingly change as well.

[0035] Additionally, the descriptions of "first" "second" and similar terms in the present application are only for illustrative purposes and should not be understood as indicating or implying relative importance, nor do they imply a specific number of technical features. Therefore, a feature defined as "first" or "second" may explicitly or implicitly include at least one such feature. Furthermore, the term "and/or" in the full text includes three options. Taking "A and/or B" as an example, it includes option A, or option B, or an option that both A and B satisfy. In addition, the technical solutions in the various embodiments can be combined with each other, provided that those skilled in the art can implement such combinations. When technical solutions are contradictory or cannot be implemented when combined, it should be considered that such combinations do not exist and are not within the protection scope of the present application.

[0036] With the improvement of the quality of life, air conditioners have become an indispensable device in family and work life. Split-type air conditioners include indoor units and outdoor units, which are installed indoors and outdoors respectively, and are connected by pipes and wires. A split-type air conditioner typically has one indoor unit paired with one outdoor unit, and it differs from a unitary air conditioner. Indoor units of split-type air conditioners can be wall-mounted, embedded, or floor-standing. They can perform various functions such as cooling, heating, humidifying, dehumidifying, and filtering the air. Generally, split-type air conditioners divide the air conditioner into two parts: the indoor unit and the outdoor unit. The compressor and axial flow fan with relatively large noise are provided in the outdoor unit of the air conditioner. The electrical control circuit components and the indoor side heat exchanger and other indispensable indoor parts are installed in the indoor unit of the air conditioner. The compressor will produce a large noise, and if it is provided at the indoor unit, the user will still find it unbearable, because the existing solutions cannot effectively solve the noise problem caused by placing the compressor in the indoor unit. The conventional split-type air conditioners all adopt the method of external compressor, that is, installed in the outdoor unit of the air conditioner. The compressor noise problem is also the main reason for placing the compressor in the outdoor unit of the air conditioner. However, with the improvement of living standards and the prevalence of high-rise residential areas, the installation process of air conditioners, especially the solution of placing the compressor in the air conditioner outdoor unit, makes the outdoor unit too heavy and inconvenient to install, which requires professional installation and the labor cost is expensive. In some areas, the labor cost is even higher than the cost of the air conditioner. Under such circumstances, if users install the unit themselves in order to save installation costs, it is easy to cause safety accidents.

[0037] In order to allow users to install a lightweight outdoor unit by themselves, the compressor is now moved to the indoor unit. However, for the indoor noise standard requirements, the current vibration and noise reduction measures of the compressor (such as foot pads, sound insulation cotton, sound insulation enclosure, etc.) are no longer sufficient, so a more efficient vibration and noise reduction solution is needed for the compressor. Accordingly, the present application provides a split-type air conditioner, including an air conditioner outdoor unit and an air conditioner indoor unit 100, the air conditioner outdoor unit is provided with an outdoor heat exchanger, and the outdoor heat exchanger is communicated

with the compressor 20 and the indoor heat exchanger of the air conditioner indoor unit 100 to form a refrigerant circuit.

[0038] In order to solve the noise problem caused by the air conditioner indoor unit in which a compressor is arranged, the present application makes an improvement to the air conditioner indoor unit. The compressor is installed in the air conditioner indoor unit, and the noise generated by the compressor is reduced.

[0039] Therefore, the air conditioner indoor unit provided in the present application reduces the vibration noise of the compressor located in the air conditioner indoor unit through the first-stage elastic vibration reduction structure 30 and the second-stage elastic vibration reduction structure 40, and greatly reduces the radiation noise of the compressor arranged in the air conditioner indoor unit.

[0040] As shown in FIG. 1 and FIG. 2, in an embodiment of the present application, the air conditioner indoor unit 100 includes a chassis 10, an indoor heat exchanger, a compressor 20, a first-stage elastic vibration reduction structure 30 and a second-stage elastic vibration reduction structure 40. The chassis 10 is provided with a first installation position and a second installation position; the indoor heat exchanger is installed at the first installation position; the compressor 20 is connected to the indoor heat exchanger, the bottom of the compressor 20 has an installation foot 21, the compressor 20 is provided at the second installation position, and the installation foot 21 is connected to the chassis 10. The first-stage elastic vibration reduction structure 30 is located between the installation foot 21 and the second-stage elastic vibration reduction structure 40, and the second-stage elastic vibration reduction structure 40 is located between the first-stage elastic vibration reduction structure 30 and the chassis 10.

[0041] The air conditioner indoor unit 100 includes a rectangular air conditioner housing, which includes a chassis 10. The indoor heat exchanger, the compressor 20, the first-stage elastic vibration reduction structure 30, and the second-stage elastic vibration reduction structure 40 are all installed on the chassis 10. In order to facilitate movement, universal wheels are provided at the lower part of the chassis 10, and the air conditioner housing is provided with communicated air outlets and air inlets. In other embodiments, the air conditioner indoor unit 100 can be in other forms, such as wall-mounted, embedded, etc.

[0042] The vibration generated by the operation of the compressor 20 is first attenuated by the first-stage elastic vibration reduction structure 30, and then transmitted to the chassis 10 of the indoor unit through the second-stage elastic vibration reduction structure 40. The chassis 10 of the air conditioner indoor unit 100 is generally made of sheet metal and other materials with large mass and high density. Such materials are dense, have small vibrations, are difficult to absorb and transmit sound energy, and have strong reflection energy, so they can block sound propagation or weaken transmitted sound energy.

[0043] As shown in FIG. 1 and FIG. 2, the first-stage elastic vibration reduction structure 30 may be a rubber gasket, a rubber spring, or a composite form of rubber and metal spring, etc. The first-stage elastic vibration reduction structure 30 often adopts a material with a large damping coefficient, and converts mechanical energy into heat energy and dissipates it through friction and mutual displacement between molecules of the damping material, thereby attenuating the vibration of the compressor 20 and further reducing structural vibration noise.

[0044] The first-stage elastic vibration reduction structure 30, the second-stage elastic vibration reduction structure 40 and the chassis 10 are arranged in sequence. The second-stage elastic vibration reduction structure 40 can be made of the same elastic cushion layer, rubber cushion or rubber block as the first-stage elastic vibration reduction structure 30, or can be a different combination, such as the first-stage elastic vibration reduction structure 30 is a rubber spring and the second-stage elastic vibration reduction structure 40 is a rubber block. In order to ensure the vibration reduction effect, a partition 41 can be provided between the two vibration reduction structures.

[0045] In the technical solution of the present application, the air conditioner indoor unit includes a chassis 10, an indoor heat exchanger, a compressor 20, a first-stage elastic vibration reduction structure 30 and a second-stage elastic vibration reduction structure 40. The chassis 10 has a first installation position and a second installation position; the indoor heat exchanger is mounted at the first installation position. The compressor 20 is communicated with the indoor heat exchanger, the bottom of the compressor 20 has an installation foot 21, the compressor 20 is placed at the second installation position, and the installation foot 21 is connected to the chassis 10. The first-stage elastic vibration reduction structure 30 is located between the installation foot 21 and the second-stage elastic vibration reduction structure 40, and the second-stage elastic vibration reduction structure 40 is located between the first-stage elastic vibration reduction structure 30 and the chassis 10. The two-stage vibration reduction effect of the first-stage elastic vibration reduction structure 30 and the second-stage elastic vibration reduction structure 40 can greatly attenuate the vibration of the compressor 20 and reduce structural vibration noise.

[0046] In an embodiment, the first-stage elastic vibration reduction structure 30 is configured as a rubber pad or a rubber spring. The first-stage elastic vibration reduction structure 30 and the chassis 10 are limited by bolts to limit the lateral movement of the compressor 20 on the chassis 10 and give a certain amount of movement in the vertical direction, so as to better attenuate the vibration of the compressor 20.

[0047] As shown in FIG. 1 and FIG. 2, in order to better reduce the noise of the air conditioner compressor 20, the air conditioner indoor unit 100 further includes a sound insulation enclosure 50, which is sleeved outside the compressor 20. The sound insulation enclosure 50 can adopt the damping material. For example, a steel plate of the enclosure body is

located at the outermost side of the sound insulation barrier, a damping layer is provided at the inner side of the steel plate, and a sound absorption layer is provided on the inner side of the damping layer. For another example, a felt material formed by processing is installed on the outer surface of the compressor 20 of the outdoor unit, and an aluminum plate is further pasted on the outer surface of the felt material, so as to be used as the sound insulation enclosure 50.

[0048] In an embodiment, in order to achieve a better two-stage vibration reduction effect, the second-stage elastic vibration reduction structure 40 includes a partition 41 and an elastic member 42, the partition 41 is connected to the sound insulation enclosure 50, the first-stage elastic vibration reduction structure 30 is located between the installation foot 21 and the partition 41, and the elastic member 42 is located between the partition 41 and the chassis 10. The partition 41 serves as an intermediate transition base, and the vibration of the compressor 20 and the sound insulation enclosure 50 is first transmitted to the partition 41 through the first-stage elastic vibration reduction structure 30 (rubber pad or rubber spring) under the installation foot 21 of the compressor 20, and then the vibration of the partition 41 is transmitted to the chassis 10 through the second-stage elastic vibration reduction structure 40 (rubber block or spring). The two vibration insulation effects can greatly attenuate the vibration of the compressor 20 and the sound insulation enclosure 50, and reduce structural vibration noise.

[0049] The partition 41 is made of a material with large mass and high density, such as a metal plate including a steel plate or an aluminum plate, etc. Such a material is dense, has low vibration, is difficult to absorb and transmit sound energy, and has strong reflection energy, so it can block sound propagation or reduce transmitted sound energy.

[0050] In an embodiment, the elastic member 42 is configured as a rubber block or a spring. The first-stage elastic vibration reduction structure 30 and the second-stage elastic vibration reduction structure 40 both use damping materials, and utilize the friction and mutual displacement between the molecules of the damping material to convert mechanical energy into heat energy for dissipation, thereby attenuating the vibration of the sound insulation enclosure 50, the partition 41 and the compressor 20, and further reducing the structural vibration noise.

[0051] In order to ensure the sound insulation effect, the sound insulation enclosure 50 includes an enclosure body 51, and at least one sound absorption layer 52 and at least one sound insulation layer 53 provided at the inner surface of the enclosure body 51.

[0052] The cavity wall of the sound insulation enclosure 50 includes at least one sound absorption layer 52 and at least one sound insulation layer 53 which are sequentially arranged from the inside to the outside.

[0053] Two, three or even more sound absorption layers 52 may be provided, and the sound insulation layer 53 may be provided between two sound absorption layers 52, or between the sound absorption layer 52 and the enclosure body 51, etc.

[0054] As shown in FIG. 1 and FIG. 2, the sound absorption layer 52 includes a first sound absorption layer 521 and a second sound absorption layer 522, the sound insulation layer 53 includes a first sound insulation layer 531 and a second sound insulation layer 532, and the first sound absorption layer 521, the second sound absorption layer 522, the first sound insulation layer 531, the second sound insulation layer 532 and the enclosure body 51 are stacked in sequence.

[0055] In an embodiment, the first sound absorption layer 521 is configured as a micro-perforate layer. The micro-perforate layer can be a thin plate or film (such as a plastic film such as polyvinyl fluoride (PVF), polyvinyl chloride (PVC), or a polycarbonate (PC) board, acrylic board, gypsum board, and a metal plate such as a stainless steel plate, aluminum plate, etc.), and the noise generated by the compressor 20 is converted from sound energy to heat energy through the air in the microporous of the micro-perforate layer and the fiber holes of the second sound absorption layer 522 due to viscosity and friction, and then dissipated.

[0056] In an embodiment, the micro-perforate layer can flexibly design the acoustic impedance value to improve the sound absorption performance of medium and low frequency noise from 300 Hz to 1000 Hz, so that the vibration insulation enclosure has a good noise reduction effect in the full frequency band.

[0057] In an embodiment, the thickness of the micro-perforate layer ranges from 0.2 mm to 1.5 mm, the diameter of the holes in the micro-perforate layer ranges from 0.1 mm to 1 mm, and the perforation ratio of the micro-perforate layer ranges from 0.5 % to 5%. The micro-perforate layer can adjust the acoustic impedance and the resonance frequency by changing its thickness, micro-porous diameter, perforation ratio and the thickness of the second sound absorption layer 522, so as to have good sound absorption performance in the medium and low frequency bands.

[0058] In an embodiment, the second sound absorption layer 522 is configured as a porous sound absorption material layer. The porous sound absorption material layer can be a porous material such as glass fiber, non-woven fiber, needle felt, slag wool, foam plastic, etc. The micro-perforate layer 521 and the second sound absorption layer 522 cooperate to form a good full-band sound absorption composite structure, in which the air will be converted from sound energy to heat energy and then dissipated in the microporous and fiber holes due to viscosity and friction.

[0059] The first sound insulation layer 531 is configured as a sound insulation felt layer, a glass layer or a rubber layer. The enclosure body 51 is configured as a metal cover. Materials with large mass and high density are selected as the sound insulation material layer (such as sound insulation felt, glass, rubber, etc.) and the metal housing layer (such as steel plate, aluminum plate and other metal plates). Such materials are dense, have low vibration, are difficult to absorb and transmit sound energy, and have strong reflection energy, so they can block sound propagation or reduce transmitted sound

energy.

[0060] The second sound insulation layer 532 is configured as a damping material layer. The mechanical energy is converted into heat energy and dissipated through the friction and mutual displacement between the molecules of the damping material, thereby attenuating the vibration of the metal housing layer 51, the partition 41 and the compressor 20, thereby reducing the vibration noise. The damping material layer can be a rubber particle layer or a foam particle layer or an anti-vibration rubber layer, which can achieve a better vibration reduction effect. It can be understood that both rubber materials and foam materials have good viscoelastic properties. When the compressor 20 is working, and the vibration generated by the compressor 20 is transmitted to the damping particles, the mechanical energy is converted into heat energy and dissipated through friction and mutual displacement between the particles since the damping particles have good viscoelasticity, which can minimize the vibration transmission of the compressor 20.

[0061] In an embodiment, the composite sound insulation enclosure 50 structure including the micro-perforate layer 521, the second sound absorption layer 522, the first sound insulation layer 531, the second sound insulation layer 532 and the enclosure body 51 can achieve excellent full-band noise reduction effect.

[0062] In order to further improve the sealing performance, vibration reduction performance and sound insulation performance of the sound insulation enclosure 50 after installation, the sound insulation enclosure 50 is provided with an avoidance hole 54 for the pipeline of the compressor 20 to pass through, and a first seal 60 is provided between the pipeline and the avoidance hole 54.

[0063] As shown in FIG. 1 and FIG. 2, the inlet and outlet pipes of the compressor 20 need to extend from the sound insulation enclosure 50. Due to processing errors or size relationships, there will be a gap between the pipes and the avoidance hole 54. The first seal 60 may be an elastic sealing strip, a sealing ring, or a sealant. Providing the first seal 60 may improve the sealing performance of the sound insulation enclosure 50 after installation, and suppress the vibration of the exhaust pipe and the return pipe from being transmitted to the sound insulation enclosure 50.

[0064] In an embodiment, in order to achieve a better sealing effect, a second seal 70 is provided between the sound insulation enclosure 50 and the partition 41. The second seal 70 can reduce the vibration transmitted from the sound insulation enclosure 50 to the partition 41.

[0065] As shown in FIG. 1 and FIG. 2, the outer side of the enclosure body 51 is provided with an installation flange 55, and the installation flange 55 and the partition 41 are fixed by bolts to cooperate with the second seal 70 to achieve a better sealing effect. In addition, it will make assembly easy, simple to operate, and convenient for rapid assembly of the production line. In other embodiments, an annular groove may be provided on the chassis 10, and the edge of the sound insulation enclosure 50 may be inserted into the annular groove.

[0066] In order to ensure the sealing effect of the sound insulation enclosure 50, the partition 41 is connected to the sound insulation enclosure 50, and an installation flange 55 is provided at the outer side of the enclosure body 51. The installation flange 55 and the partition 41 are fixed by bolts; while the connection between the compressor 20 and the chassis 10, and the connection between the partition 41, the elastic member 42 and the chassis 10 have different solutions.

[0067] In an embodiment, the installation foot 21 is connected to the chassis 10 by bolts passing through the partition 41. The first-stage elastic vibration reduction structure 30 is located between the installation foot 21 and the partition 41. The elastic member 42 is arranged under the installation foot 21, and between the partition 41 and the chassis 10. The elastic member 42 can also be located at other positions to be clamped and fixed by the partition 41 and the chassis 10, or fixed by gluing.

[0068] In another embodiment, the installation foot 21 is connected to the partition 41 by bolts, and the partition 41 is connected to the chassis 10 by bolts, and the first-stage elastic vibration reduction structure 30 is located between the installation foot 21 and the partition 41. In this embodiment, the elastic member 42 can be located between the partition 41 and the chassis 10 and connected to the two by bolts. The elastic member 42 can also be located under the installation foot 21 and pressed by the partition 41 and the chassis 10, or fixed by gluing.

[0069] The above descriptions are only some embodiments of the present application, and do not limit the scope of the present application. Under the inventive concept of the present application, equivalent structural transformations made using the contents of the description and drawings of the present application, or direct/indirect application in other related technical fields, are included in the scope of the present application.

Claims

1. An air conditioner indoor unit, comprising:

a chassis provided with a first installation position and a second installation position;
an indoor heat exchanger provided at the first installation position;
a compressor communicated with the indoor heat exchanger and provided at the second installation position; and
a first-stage elastic vibration reduction structure and a second-stage elastic vibration reduction structure,

wherein:

a bottom of the compressor is provided with an installation foot, and the installation foot is connected to the chassis; and

the first-stage elastic vibration reduction structure is provided between the installation foot and the second-stage elastic vibration reduction structure, and the second-stage elastic vibration reduction structure is provided between the first-stage elastic vibration reduction structure and the chassis.

2. The air conditioner indoor unit according to claim 1, wherein the first-stage elastic vibration reduction structure is configured as a rubber pad, a rubber spring, or a rubber-metal composite spring.

3. The air conditioner indoor unit according to claim 1, further comprising:
a sound insulation enclosure sleeved outside the compressor.

4. The air conditioner indoor unit according to claim 3, wherein the second-stage elastic vibration reduction structure comprises a partition and an elastic member, the partition is connected to the sound insulation enclosure, the first-stage elastic vibration reduction structure is provided between the installation foot and the partition, and the elastic member is provided between the partition and the chassis.

5. The air conditioner indoor unit according to claim 4, wherein the partition is configured as a metal plate; and/or the elastic member is configured as a rubber block or a spring.

6. The air conditioner indoor unit according to claim 3, wherein the sound insulation enclosure comprises an enclosure body, and at least one sound absorption layer and at least one sound insulation layer are provided at an inner surface of the enclosure body.

7. The air conditioner indoor unit according to claim 6, wherein the sound absorption layer comprises a first sound absorption layer and a second sound absorption layer;

the sound insulation layer comprises a first sound insulation layer and a second sound insulation layer; and
the first sound absorption layer, the second sound absorption layer, the first sound insulation layer, the second sound insulation layer, and the enclosure body are stacked in sequence.

8. The air conditioner indoor unit according to claim 7, wherein the first sound absorption layer is configured as a micro-perforate layer.

9. The air conditioner indoor unit according to claim 8, wherein a thickness of the micro-perforate layer ranges from 0.2 mm to 1.5 mm;
and/or, a perforation diameter of the micro-perforate layer ranges from 0.1 mm to 1 mm; and/or, a perforation ratio of the micro-perforate layer ranges from 0.5% to 5%.

10. The air conditioner indoor unit according to claim 7, wherein the second sound absorption layer is configured as a fiber, foam, or particle porous sound absorption material layer;

and/or, the first sound insulation layer is configured as a sound insulation felt layer, a glass layer, or a rubber layer;
and/or, the second sound insulation layer is configured as a damping material layer;
and/or, the enclosure body is configured as a metal enclosure body.

11. The air conditioner indoor unit according to claim 3, wherein the sound insulation enclosure is provided with an avoidance hole for a pipeline of the compressor to pass through, and a first seal is provided between the pipeline and the avoidance hole;

and/or, a second seal is provided between the sound insulation enclosure and the partition;
and/or, an installation flange is provided at an outer side of the enclosure body, the installation flange and the partition are fixed by bolts; wherein

the installation foot is connected to the chassis by passing through the partition with bolts; or
the installation foot and the partition are connected by bolts, and the partition is connected to the chassis by

bolts.

12. A split-type air conditioner, comprising:

an air conditioner outdoor unit; and
the air conditioner indoor unit according to any one of claims 1 to 11,
wherein the air conditioner outdoor unit is provided with an outdoor heat exchanger, and the outdoor heat exchanger is communicated with the compressor and the indoor heat exchanger of the air conditioner indoor unit to form a refrigerant circuit.

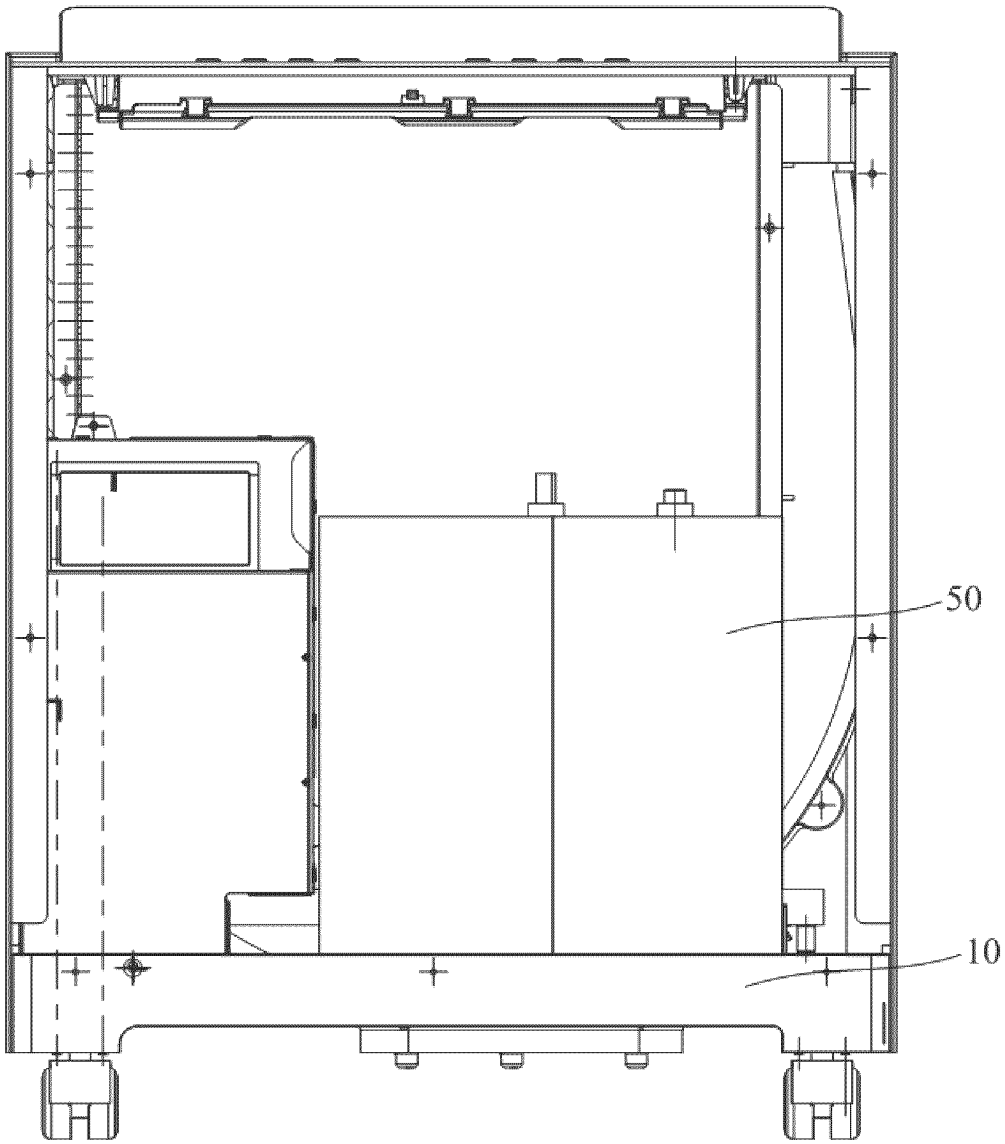

FIG. 1

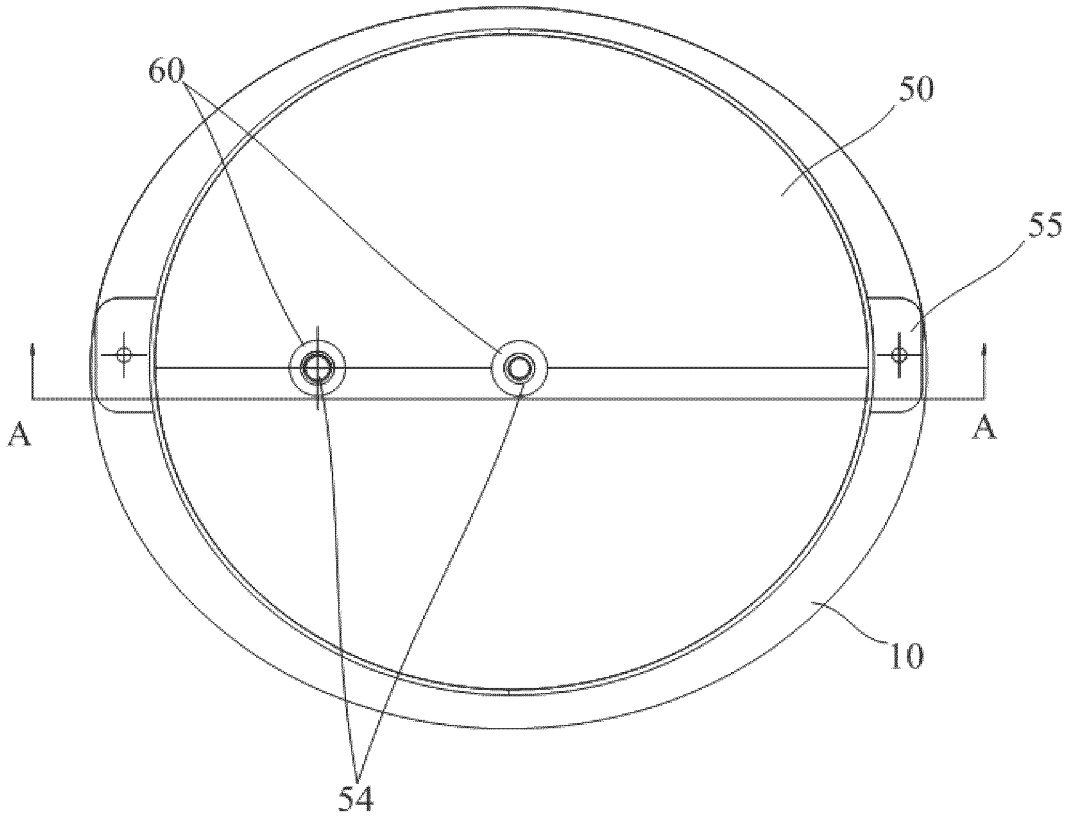

FIG. 2

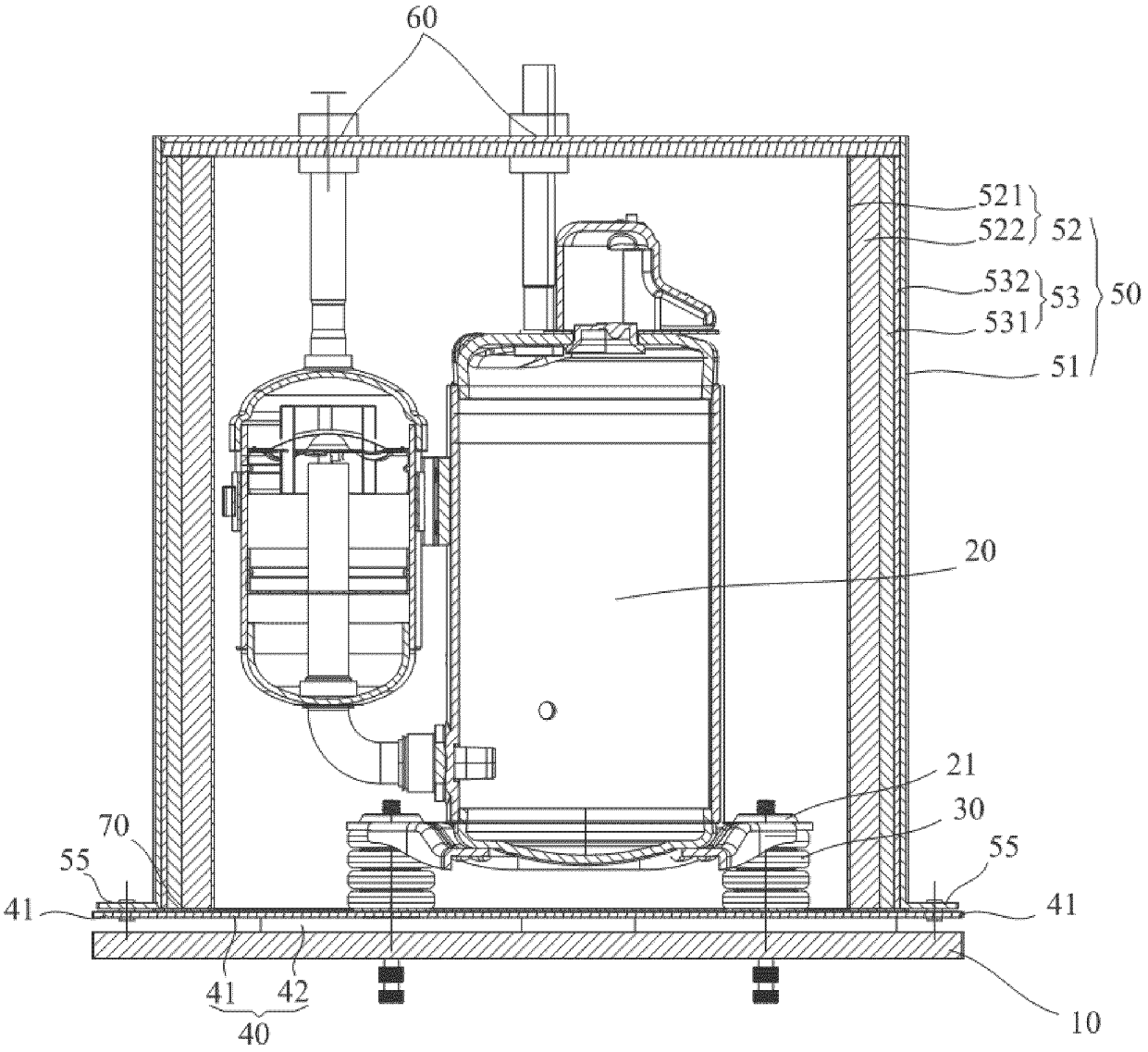

FIG. 3

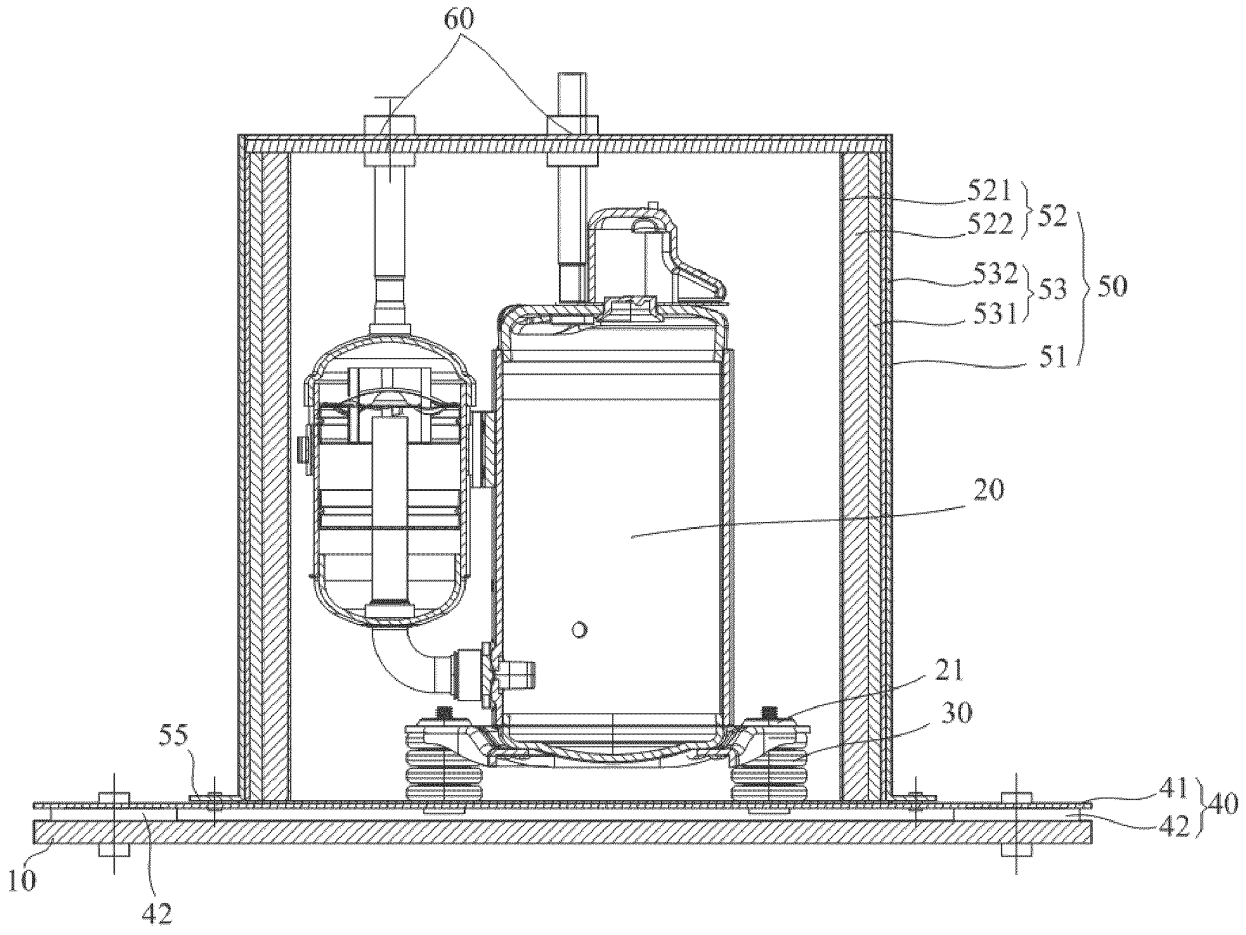

FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/127142

A. CLASSIFICATION OF SUBJECT MATTER

F24F1/0007(2019.01)i;F24F13/24(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)

F24F

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

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

CNTXT, ENTXTC, ENTXT, PATENTICS: 美的, 室内机, 分体式, 压缩机, 减振, 减震, 降噪, 安装位, 二级减振, 二级降噪, 弹簧, midea, indoor, compressor, shock w absorption+, noise w reduction+, installation w position+, spring+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN 217402677 U (WUHU MEIZHI AIR CONDITIONING EQUIPMENT CO., LTD. et al.) 09 September 2022 (2022-09-09) description, paragraphs 33-61, and figures 1-6	1-12
Y	CN 205383765 U (GD MIDEA AIR CONDITIONING EQUIPMENT CO., LTD. et al.) 13 July 2016 (2016-07-13) description, paragraphs 36-50, and figures 1-5	1-12
Y	CN 205372802 U (GD MIDEA AIR CONDITIONING EQUIPMENT CO., LTD. et al.) 06 July 2016 (2016-07-06) specific embodiments	1-12
Y	CN 101063565 A (LG ELECTRONICS (TIANJIN) ELECTRIC APPLIANCE CO., LTD.) 31 October 2007 (2007-10-31) specific embodiments	1-12
A	CN 101182870 A (ZHENG GUOYAO) 21 May 2008 (2008-05-21) entire document	1-12

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

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"P" document published prior to the international filing date but later than the priority date claimed
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"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
12 May 2023	**24 May 2023**

Name and mailing address of the ISA/CN	Authorized officer
China National Intellectual Property Administration (ISA/CN) **China No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088**	Telephone No.

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PCT/CN2022/127142

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	CN 106014922 A (ZHUHAI GREE ELECTRIC APPLIANCES INC.) 12 October 2016 (2016-10-12) entire document	1-12
A	JP 2011052842 A (MITSUBISHI ELECTRIC CORP.) 17 March 2011 (2011-03-17) entire document	1-12

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2022/127142

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 217402677 U	09 September 2022	None	
CN 205383765 U	13 July 2016	None	
CN 205372802 U	06 July 2016	None	
CN 101063565 A	31 October 2007	None	
CN 101182870 A	21 May 2008	None	
CN 103912925 A	09 July 2014	None	
CN 106014922 A	12 October 2016	None	
JP 2011052842 A	17 March 2011	JP 5287614 B2	11 September 2013

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REFERENCES CITED IN THE DESCRIPTION

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