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(54) **INTAKE AIR DISTRIBUTION APPARATUS AND COMPRESSOR COMPRISING SAME**

(57) An intake air distribution apparatus and a compressor comprising same. The intake air distribution apparatus (100) comprises a flow guide unit (120); the flow guide unit (120) is configured to guide a part of a fluid entering a housing of the compressor (10) to flow along a predetermined route; the flow guide unit (120) comprises a body (121); an inlet channel (150) and an outlet channel (125) are provided in the body (121); the inlet channel (150) is configured to introduce part of the fluid in the housing of the compressor (10) into the flow guide unit (120); the outlet channel (125) is configured to enable part of the fluid to flow out in a predetermined azimuthal orientation. The intake air distribution apparatus can effectively introduce the fluid to a required area by means of the flow guide unit (120), such that an oil circulation rate is controlled, and components in the required area can be cooled.

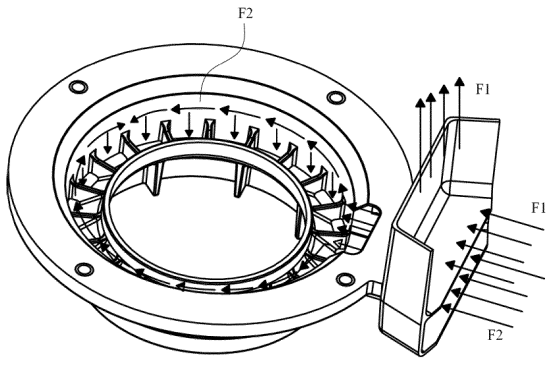

FIG.2

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Description

[0001] This application claims the benefit of priorities to the following two Chinese patent applications,

1) Chinese Patent Application No. 202110937279.6, titled "INTAKE DISTRIBUTION DEVICE AND COMPRESSOR COMPRISING SAME", filed with the China National Intellectual Property Administration on August 16, 2021; and

2) Chinese Patent Application No. 202121917161.9, titled "INTAKE DISTRIBUTION DEVICE AND COMPRESSOR COMPRISING SAME", filed with the China National Intellectual Property Administration on August 16, 2021.

[0002] These applications are incorporated herein by reference.

FIELD

[0003] The present disclosure relates to an intake distribution device, which is horizontally arranged along a longitudinal direction and an axial direction of the intake distribution device.

BACKGROUND

[0004] The contents of this section only provide background information related to the present disclosure, which is not necessarily the prior art.

[0005] A compressor includes a compression mechanism for compressing a working fluid, a main bearing seat for supporting the compression mechanism, a motor for driving the compression mechanism, a housing body for accommodating the compression mechanism and the motor, and an intake joint arranged on the housing body for introducing the working fluid. The working fluid enters the housing body of the compressor through the intake joint, flows in the housing body, and enters the compression mechanism through a suction chamber of the compression mechanism for compression. The compressed working fluid is discharged from the compressor.

[0006] During the operation of the compressor, when the working fluid flows in the housing body of the compressor, lubricating oil is discharged from the compressor along with the working fluid, which is generally undesirable. In addition, a temperature of individual components of the compressor gradually rises with the operation time, which adversely affects the service life of the component and is also undesirable.

[0007] Therefore, it is desirable in the art to provide an intake distribution device that can properly distribute and/or direct the working fluid.

SUMMARY

[0008] In view of the above problems, an object of the present application is to provide an intake distribution device, which can effectively guide the fluid to a required area so as to cool a high-temperature component in the required area, and prevent the working fluid from contacting with lubricating oil to a certain extent.

[0009] Another object of the present application is to provide a compressor including the above intake distribution device, which can have an improved oil circulation rate and can effectively improve a working efficiency of the compressor.

[0010] According to an aspect of the present disclosure, an intake distribution device is provided. The intake distribution device includes a flow guide unit. The flow guide unit is configured to guide a part of a fluid entering a housing of the compressor to flow along a predetermined route. The flow guide unit includes a body, and an inlet channel and an outlet channel are provided in the body. The inlet channel is configured to introduce a part of the fluid in the housing of the compressor into the flow guide unit, and the outlet channel is configured to enable a part of the fluid to flow out in a predetermined orientation.

[0011] In the intake distribution device according to the present disclosure, by providing the flow guide unit, a part of the fluid can be more accurately and effectively directed to a required area, e.g., an area where some high-temperature components need to be cooled. In addition, the flow guide unit can guide the fluid to flow along the predetermined route, and prevent the fluid from contacting with lubricating oil, thereby controlling the oil circulation rate.

[0012] In some examples, the intake distribution device further includes a flow dividing unit. The flow dividing unit is configured to divide the fluid introduced into the housing of the compressor into a first fluid portion and a second fluid portion. The flow dividing unit includes a base and a partition plate, and the partition plate divides the base into a first base and a second base. A first channel for the first fluid portion is defined by the partition plate and the first base, and a second channel for the second fluid portion is defined by the partition plate and the second base. The inlet channel of the flow guide unit is located downstream of the second channel so as to guide the second fluid portion to flow along the predetermined route. The intake distribution device can distribute the fluid properly by means of the partition plate, thereby better controlling the flow of the fluid and the oil circulation rate.

[0013] In some examples, the flow dividing unit and the flow guide unit are formed into one piece, or the flow dividing unit and the flow guide unit are separately formed.

[0014] In some examples, the base of the flow dividing unit includes a back plate, side plates extending from two sides of the back plate, and a bottom plate extending

from a lower side of the back plate. The partition plate extends transversely to the back plate and the side plates, the second channel is defined between the partition plate and the bottom plate, and an outlet of the second channel is provided in the back plate.

[0015] In some examples, the base of the flow dividing unit is hollow cylindrical. The first base and the second base, separated by the partition plate, of the base each have an arc-shaped cross section.

[0016] In some examples, the first channel and the second channel have a same input end. An axial length of the first base extending from the input end is smaller than an axial length of the second base extending from the input end.

[0017] In some examples, the body is annular, and multiple outlet channels are arranged in a circumferential direction.

[0018] In some examples, the body includes an inner circumferential side wall and an outer circumferential side wall. Multiple outlet channels are defined in an annular space between the inner circumferential side wall and the outer circumferential side wall. The inlet channel extends through the outer circumferential side wall.

[0019] In some examples, the flow guide unit further includes a connecting portion extending radially outward from the outer circumferential side wall. The inlet channel extends through the connecting portion.

[0020] In some examples, the flow guide unit further includes a flange extending radially outward from the outer circumferential side wall.

[0021] In some examples, the flow guide unit further includes a protrusion extending radially inward from the inner circumferential side wall.

[0022] In some examples, the flow guide unit further includes a cylindrical cover radially outside the outer circumferential side wall.

[0023] In some examples, multiple ribs are provided between the inner circumferential side wall and the outer circumferential side wall in a circumferential direction. The multiple outlet channels are defined by the multiple ribs, the inner circumferential side wall and the outer circumferential side wall.

[0024] In some examples, an annular bottom wall is provided between the inner circumferential side wall and the outer circumferential side wall. The outlet channel has a discharge opening, and the discharge opening is provided in the annular bottom wall or the outer circumferential side wall.

[0025] In some examples, the closer the outlet channel is to the inlet channel in the circumferential direction, the smaller the discharge flow area is.

[0026] According to another aspect of the present disclosure, a compressor including the above intake distribution device is provided. The compressor further includes: a housing provided thereon with an intake port at which an intake joint is mounted; a compression mechanism located in the housing and configured to compress a fluid sucked in through a suction chamber; a motor configured to drive the compression mechanism, and including a stator fixed to the housing and a rotor located radially inside the stator; and a bearing seat located between the compression mechanism and the motor, and configured to support the compression mechanism. The intake distribution device is arranged at the intake port to guide a part of the fluid introduced into the housing to flow above the motor.

[0027] In some examples, along a direction of a central axis of the intake port, a partition plate of a flow dividing unit of the intake distribution device is at least partially projected in a flow region of the intake joint so as to divide the fluid introduced into the housing into a first fluid portion and a second fluid portion.

[0028] In some examples, the flow guide unit is located between the bearing seat and the motor, and is configured to guide the second fluid portion to flow over a winding of the stator.

[0029] In some examples, in a radial direction, a discharge opening of the outlet channel of the flow guide unit is located radially outside the rotor.

[0030] In some examples, a cylindrical cover of the flow guide unit is located radially outside the outlet channel and is located radially outside the winding in the radial direction.

[0031] In some examples, the flow dividing unit is fixed to the bearing seat, the housing or the intake joint; and/or the flow guide unit is fixed to the bearing seat, the housing or the stator.

[0032] In some examples, along the direction of the central axis of the intake port, a gap is formed between the flow dividing unit and the intake joint, and the gap is less than one fifth of a minimum inner diameter of the intake joint.

[0033] From the following detailed description, other application fields of the present disclosure will become more apparent. It should be understood that, although these detailed descriptions and specific examples show preferred embodiments of the present disclosure, these detailed descriptions and specific examples are intended to achieve the purpose of illustrative description, rather than to limit the present disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0034] The features and advantages of one or more embodiments of the present disclosure will become more readily understood from the following description with reference to the accompanying drawings. In the drawings:

FIG. 1 is a longitudinal sectional view of a scroll compressor having an intake distribution device according to an embodiment of the present disclosure;

FIG. 2 is a schematic view showing flow of gas through the intake distribution device in FIG. 1;

FIGS. 3A to 3E are schematic perspective views, a

plan top view, a schematic revolved sectional view taken along line L1-L1 in FIG. 3C and a partially schematic mounting view of the intake distribution device in FIGS. 1 and 2 respectively;

FIGS. 4A to 4D are schematic views of various examples of outlet channels of the intake distribution device;

FIGS. 5A to 5E are a schematic perspective view, a plan top view, a schematic sectional view taken along line G-G in FIG. 5B, a partially schematic enlarged view, and a partially schematic mounting view of an intake distribution device according to another embodiment of the present disclosure respectively;

FIGS. 6A to 6C are a schematic perspective view, a longitudinal sectional view and a schematic mounting view of an intake distribution device according to another embodiment of the present disclosure respectively;

FIG. 7A is a longitudinal sectional view of the scroll compressor having an intake distribution device according to another embodiment of the present disclosure;

FIGS. 7B and 7C are a schematic perspective view and a plan top view of a flow dividing unit of the intake distribution device in FIG. 7A respectively;

FIGS. 7D to 7F are a schematic perspective view, a plan top view and a schematic revolved sectional view, taken along line A-A in FIG. 7E, of a flow guide unit of the intake distribution device in FIG. 7A respectively;

FIG. 8A is a longitudinal sectional view of the scroll compressor having an intake distribution device according to another embodiment of the present disclosure; and

FIGS. 8B and 8C are a schematic perspective view and a schematic side view of a flow dividing unit of the intake distribution device in FIG. 8A respectively.

[0035] It should be understood that, in all these figures, the corresponding reference numerals indicate similar or corresponding parts and features.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0036] Exemplary embodiments will now be described more comprehensively with reference to the accompanying drawings.

[0037] Exemplary embodiments are provided so that the present disclosure will be thorough and will more fully convey the scope to those skilled in the art. Many specific details such as examples of specific components, devices, and methods are described to provide a thorough understanding of various embodiments of the present disclosure. It will be clear to those skilled in the art that the exemplary embodiments may be implemented in many different forms without using specific details, none of which should be construed as limiting the scope of the present disclosure. In some exemplary embodiments, well-known processes, well-known device structures, and well-known technologies are not described in detail.

[0038] A scroll compressor according to an embodiment of the present disclosure will be described below with reference to FIG. 1. FIG. 1 is a longitudinal sectional view of a scroll compressor 10 having an intake distribution device 100 according to an embodiment of the present disclosure.

[0039] As shown in FIG. 1, the scroll compressor 10 includes a substantially cylindrical housing body 11, a top cover 12 and a bottom cover 13. The top cover 12 and the bottom cover 13 are respectively located at two ends of the housing body 11. A sealing internal space is defined by the housing body 11, the top cover 12 and the bottom cover 13 which form a housing of the scroll compressor 10. An intake port 15 is arranged on the housing (specifically, the housing body 11 in the example shown in FIG. 1), and an intake joint 17 is mounted in the intake port 15, so as to introduce a low-temperature and low-pressure working fluid (for example, a refrigerant) into the closed internal space of the scroll compressor 10.

[0040] The scroll compressor 10 further includes a scroll compression mechanism CM accommodated in the housing. The scroll compression mechanism CM has a suction chamber. The low-temperature and low-pressure working fluid entering the housing is sucked into the suction chamber, and then becomes a high-temperature and high-pressure working fluid after being compressed by a series of compression chambers. Finally, the high-temperature and high-pressure working fluid is discharged from the scroll compressor 10. The scroll compression mechanism CM is a conventional scroll compression mechanism, so it will not be described in detail herein.

[0041] The scroll compressor 10 further includes a motor 31 accommodated in the housing. The motor 31 is configured to drive the scroll compression mechanism CM. The motor 31 includes a stator 34 fixed to the housing (specifically, the housing body 11 in the example shown in FIG. 1) and a rotor 32 located radially inside the stator 34. The rotor 32 is fixedly mounted to a drive shaft 41, so as to drive the drive shaft 41 to rotate together, and then the drive shaft 41 drives a movable scroll member of the scroll compression mechanism CM to orbit. During the operation of the scroll compressor 10, various components of the motor generate heat, especially a winding 36 on the stator 34.

[0042] The scroll compressor 10 further includes a bearing seat 21. The bearing seat 21 is located between the scroll compression mechanism CM and the motor

31. A bearing 51 is provided between the bearing seat 21 and the drive shaft 41. Therefore, the drive shaft 41 and the scroll compression mechanism CM are rotatably supported on the bearing seat 21.

[0043] The scroll compressor 10 further includes an intake distribution device 100. The intake distribution device 100 is arranged at the intake port 15, and is configured to divide the fluid introduced through the intake joint 17 into a first fluid portion and a second fluid portion in an appropriate ratio. The first fluid portion flows into the suction chamber of the scroll compression mechanism CM in a shortest path. The second fluid portion is guided to flow over the motor 31 to cool the motor 31.

[0044] FIG. 2 is a schematic view showing flow of gas through the intake distribution device in FIG. 1. As shown in FIG. 2, the first fluid portion F1 flows upward toward the scroll compression mechanism CM after being divided. The second fluid portion F2 flows radially inward toward the drive shaft 41, then flows along the annular channel, and finally flows downward toward the motor 31.

[0045] The intake distribution device 100 shown in FIGS. 1 and 2 will be described in detail with reference to FIGS. 3A to 3E. FIGS. 3A to 3E are schematic perspective views, a plan top view, a revolved sectional view and a partially schematic mounting view of the intake distribution device 100 in FIGS. 1 and 2 respectively.

[0046] The intake distribution device 100 includes a flow dividing unit 110 and a flow guide unit 120. The flow dividing unit 110 is configured to divide the introduced fluid into a first fluid portion F1 and a second fluid portion F2. The flow guide unit 120 is configured to direct the second fluid portion F2 to flow in a predetermined route, specifically, guide the second fluid portion F2 to flow over the winding 36 of the motor 31 in the example shown in FIG. 1. In the example shown in FIGS. 3A to 3E, the flow dividing unit 110 and the flow guide unit 120 are formed as one piece. For example, the intake distribution device 100 may be formed by injection molding.

[0047] The flow dividing unit 110 includes a base 111 and a partition plate 112. The base 111 of the flow dividing unit 110 includes a back plate 101, side plates 103 and 104 extending from two sides of the back plate 101, and a bottom plate 102 extending from a lower side of the back plate 101. The partition plate 112 extends transversely to the back plate 101 and the side plates 103 and 104, and divides the back plate 101 and the side plates 103 and 104 into an upper portion and a lower portion. Upper portions of the back plate 101 and the side plates 103 and 104 form a first base, and a first channel C1 with an open end for the first fluid portion F1 is defined by the partition plate 112 and the first base. Lower portions of the back plate 101 and the side plates 103 and 104 together with the bottom plate 102 form a second base, and a second channel C2 for the second fluid portion F2 is defined by the partition plate 112 and the second base. An outlet 106 of the second channel C2 is provided in the back plate 101. The flow guide unit 120 is located downstream of the second channel C2. In this way, the second fluid portion F2 can flow through the outlet 106 into the flow guide unit 120 at the downstream side.

[0048] Referring to FIG. 1, when the intake distribution device 100 is mounted in the scroll compressor 10, along a direction of a central axis of the intake port 15, the partition plate 112 is at least partially projected in a flow region of the intake joint 17. In other words, in the direction of the central axis of the intake port 15, both the first channel C1 and the second channel C2 have portions overlapping with the internal flow region of the intake joint 17. By changing the position or shape of the partition plate 112, the ratio of the first fluid portion F1 to the second fluid portion F2 can be changed accordingly. If the overlapping portion of the first channel C1 and the internal flow region of the intake joint 17 increases, the first fluid portion F 1 increases. If the overlapping portion of the second channel C2 and the internal flow region of the intake joint 17 increases, the second fluid portion F2 increases. Therefore, the position or structure of the partition plate 112 may be designed according to the required ratio of the first fluid portion F 1 to the second fluid portion F2.

[0049] The flow guide unit 120 is located between the bearing seat 21 and the motor 31, so as to direct the fluid above the motor 31. The flow guide unit includes a body 121. An inlet channel 150 and an outlet channel 125 are provided in the body 121. The inlet channel 150 is configured to be in communication with the second channel C2 to introduce the second fluid portion F2. The outlet channel 125 is configured to allow the second fluid portion F2 to flow out in a predetermined orientation, for example, toward the winding 36 of the motor 31 in the example shown in the figures.

[0050] The body 121 is substantially annular, and includes an inner circumferential side wall 124 and an outer circumferential side wall 122. An annular flow channel is defined between the inner circumferential side wall 124 and the outer circumferential side wall 122. Multiple ribs 123 may be provided between the inner circumferential side wall 124 and the outer circumferential side wall 122 in a circumferential direction. In this way, multiple outlet channels 125 are defined by the inner circumferential side wall 124, the outer circumferential side wall 122 and the ribs 123.

[0051] A connecting portion 151 may be provided between the flow dividing unit 110 and the flow guide unit 120. The connecting portion 151 extends radially outward from the outer circumferential side wall 122, such as to be in communication with the second channel C2. The inlet channel 150 extends through the connecting portion 151 and the outer circumferential side wall 122.

[0052] The second fluid portion F2 from the second channel C2 enters the annular flow channel defined between the inner circumferential side wall 124 and the outer circumferential side wall 122 through the inlet channel 150, and is sprayed above the motor 31 through the multiple outlet channels 125 arranged in the circumferential direction so as to cool the motor 31.

[0053] In the example shown in FIGS. 3A to 3D, the outer circumferential side wall 122 is substantially straight and cylindrical, and the inner circumferential side wall 124 has multiple sections with different diameters, so that the size and orientation of the outlets of the outlet channels 125 can be controlled, thereby controlling the amount and orientation of the discharged second fluid portion F2.

[0054] In a radial direction, a discharge opening of the outlet channel 125 of the flow guide unit 120 may be located radially outside the rotor 32. In this way, the fluid discharged through the outlet channel 125 can be separated from the lubricating oil thrown from the drive shaft 41, and the fluid can be guided to the winding 36 of the stator 34 so as to cool the winding 36.

[0055] The flow guide unit 120 may further include a flange 131 extending radially outward from the outer circumferential side wall 122. A hole 132 may be provided in the flange 131 to receive fasteners, so as to mount or fix the flow guide unit 120. Referring to FIG. 3E, a threaded hole 22 is provided in the bearing seat 21. A screw 90 may be inserted into the hole 132 of the flow guide unit 120 and threadedly engaged with the threaded hole 22 of the bearing seat 21, thereby fixedly mounting the flow guide unit 120 (the intake distribution device 100) to the bearing seat 21.

[0056] Since the intake distribution device 100 is mounted to the bearing seat 21, it is advantageous that a gap is formed between the flow dividing unit 110 of the intake distribution device 100 and the intake joint 17 along the direction of the central axis of the intake port 15, so as to avoid mounting interference. Preferably, the gap is less than one fifth of a minimum inner diameter of the intake joint 17. In this way, not only mounting interference can be avoided, but also excessive fluid can be prevented from flowing through the radial outer side of the motor 31 through the gap to disturb or carry more lubricating oil.

[0057] The inventor tested the scroll compressor 10 mounted with the intake distribution device 100 according to the present disclosure. When the scroll compressor without the intake distribution device according to the present disclosure operates at a low rotation speed, a temperature of the motor is 310F (Fahrenheit). In contrast, the scroll compressor 10 according to the present disclosure can reduce the temperature of the motor to 220F when it operates at the same low rotation speed. In addition, the scroll compressor according to the present disclosure can significantly improve the working efficiency of the scroll compressor, for example, the IEER (comprehensive energy efficiency ratio) can reach 29.9. At a rotation speed of 6000RPM (revolutions per minute), an oil circulation rate of the scroll compressor according to the present disclosure can be reduced to 3.0% or less.

[0058] It should be understood that the structures of parts of the intake distribution device 100 should not be limited to the specific examples shown the figures, but may be changed as needs, as long as the functions described herein are implemented. For example, various examples of outlet channels of the intake distribution device are shown in FIGS. 4A to 4D.

[0059] In FIG. 4A, both the inner circumferential side wall 124 and the outer circumferential side wall 122 are in the shape of straight cylinders. An annular bottom wall 171 is provided between the inner circumferential side wall 124 and the outer circumferential side wall 122, and the ribs 123 in FIGS. 3A to 3D are omitted. Multiple discharge openings 125a are provided in the annular bottom wall 171. The multiple discharge openings 125a may be uniformly arranged in the circumferential direction and may have the same size and shape.

[0060] The example in FIG. 4B is different from the example in FIG. 4A in that, the multiple discharge openings 125a are provided in the outer circumferential side wall 122, rather than in the annular bottom wall 171.

[0061] The example in FIG. 4C is similar to the example in FIGS. 3A to 3D. The multiple outlet channels 125c are defined by the inner circumferential side wall 124, the outer circumferential side wall 122, and the ribs 123 arranged between the inner circumferential side wall 124 and the outer circumferential side wall 122. The example in FIG. 4C is different from the example in FIGS. 3A to 3D in that, both the inner circumferential side wall 124 and the outer circumferential side wall 122 are in the shape of straight cylinders, so that the outlet channels 125c have a substantially constant flow area, and the fluid flows downward from the outlet channels 125c.

[0062] The example in FIG. 4D is different from the example in FIG. 4A in that, the discharge openings 125d1 to 125d4 of the outlet channels have different discharge flow areas. The discharge openings 125d1 to 125d4 are away from the connecting portion 151 (i.e., the inlet channel 150) in a listed sequence. The discharge opening 125d1 is close to the inlet channel 150. The discharge opening 125d2 is farther away from the inlet channel 150 than the discharge opening 125d1. The discharge opening 125d3 is farther away from the inlet channel 150 than the discharge opening 125d2. The discharge opening 125d4 is opposite to the discharge opening 125d1 and is farthest away from the inlet channel 150. The discharge flow areas of the discharge openings 125d1 to 125d4 gradually increase. In other words, the closer the outlet channel is to the inlet channel 150 in the circumferential direction, the smaller the discharge flow area is.

[0063] FIGS. 5A to 5E are a schematic perspective view, a plan top view, a schematic sectional view taken along line G-G in FIG. 5B, a partially schematic enlarged view, and a partially schematic mounting view of an intake distribution device 200 according to another embodiment of the present disclosure respectively.

[0064] The difference between the intake distribution device 200 in FIGS. 5A to 5E and the intake distribution device 100 in FIGS. 3A to 3E lies in different mounting structures. As shown in FIGS. 5A to 5E, the flow guide unit 220 includes a protrusion 241 (or may be referred to as a hook portion) extending radially inward from the inner circumferential side wall 224. Multiple protrusions

241 may be uniformly distributed in the circumferential direction. The outer circumferential side wall 222 of the flow guide unit 220 is not provided with the flange as shown in FIGS. 3A to 3C,

[0065] Referring to FIG. 5E, recesses 24 are provided on the bearing seat 24 to receive the protrusions 241. When the intake distribution device 200 is mounted, the intake distribution device 200 is pushed toward the bearing seat 21. When the protrusions 241 are engaged in the recesses 24, the intake distribution device 200 is mounted in place.

[0066] The flow dividing unit 210, the connecting portion 251, the ribs 223 and the outlet channels 225 shown in FIGS. 5A to 5E are similar to the corresponding parts in FIGS. 3A to 3E, so detailed descriptions are omitted herein.

[0067] FIGS. 6A to 6C are a schematic perspective view, a longitudinal sectional view and a schematic mounting view of an intake distribution device 300 according to another embodiment of the present disclosure respectively.

[0068] The intake distribution device 300 in FIGS. 6A to 6C is different from the intake distribution device 100 in FIGS. 3A to 3E in that, the flow guide unit 320 further includes a cover 381 extending downward from the flange 382. The cover 381 is substantially cylindrical. The cover 381 is located radially outside the outer circumferential side wall 322, surrounds the outlet channels 325, and is located radially outside the winding 36, so as to prevent the fluid discharged from the outlet channels 325 between the outer circumferential side wall 322 and the inner circumferential side wall 324 from flowing to the region radially outside the motor 31. In addition, the cover 381 may be fixed to the stator 34, thereby mounting the intake distribution device 300.

[0069] The flow dividing unit 310, the connecting portion 351, and the outlet channels 325 shown in FIGS. 6A to 6C are similar to the corresponding parts in FIGS. 3A to 3E, so detailed descriptions are omitted herein.

[0070] FIG. 7A is a longitudinal sectional view of a scroll compressor having an intake distribution device 400 according to another embodiment of the present disclosure. The intake distribution device 400 in FIG. 7A is different from the intake distribution devices 100 to 300 in that, the flow dividing unit 410 and the flow guide unit 420 have split structures. The flow dividing unit 410 and the flow guide unit 420 are separately formed and mounted at different parts of the scroll compressor.

[0071] FIGS. 7B and 7C are a schematic perspective view and a plan top view of the flow dividing unit 410 of the intake distribution device 400 in FIG. 7A.

[0072] The flow dividing unit 410 in FIGS. 7B and 7C is similar to the flow dividing unit 110 in FIGS. 3A to 3D. Specifically, the flow dividing unit 410 includes a base 411 and a partition plate 412. The base 411 of the flow dividing unit 410 includes a back plate 401, side plates 403 and 404 extending from two sides of the back plate 401, and a bottom plate 402 extending from a lower side of the back plate 401. The partition plate 412 extends transversely to the back plate 401 and the side plates 403 and 404, and divides the back plate 401 and the side plates 403 and 404 into an upper portion and a lower portion, thereby forming a first channel and a second channel. An outlet 406 of the second channel is defined on the back plate 401.

[0073] The flow dividing unit 410 in FIGS. 7B and 7C is different from the flow dividing unit 110 in FIGS. 3A to 3D in that, the back plate 401 is arc-shaped and an end surface of the partition plate 412 is correspondingly arc-shaped. It should be understood that the structure of the flow dividing unit can be changed as required and should not be limited to the specific examples shown in the figures.

[0074] FIGS. 7D to 7F are a schematic perspective view, a plan top view and a schematic revolved sectional view, taken along line A-A in FIG. 7E, of the flow guide unit 420 of the intake distribution device 400 in FIG. 7A respectively. As shown, the flow guide unit 420 is similar to the flow guide unit 320 in FIGS. 6A to 6C. Specifically, the flow guide unit 420 has a cover 481 extending downward from the flange 482. The cover 481 is located radially outside the outer circumferential side wall 422. The inner circumferential side wall 424 is located radially inside the outer circumferential side wall 422 and, together with the outer circumferential side wall 422, defines an outlet channel 425 for discharging the fluid.

[0075] The flow guide unit 420 is different from the flow guide unit 320 in that, the structure of the inlet channel 450 is different. The inlet channel 450 is in the form of a recess with an upward opening, rather than a closed channel. When the intake distribution device 400 is mounted in place, the inlet channel 450 is defined by both the flange 482 and the bearing seat 21. Therefore, the structure of the inlet channel can be changed according to the actual situation, and is not necessarily limited to the specific examples shown in the figures.

[0076] It should be understood that the intake distribution device according to the present disclosure is not limited to the specific examples illustrated in the drawings. For example, the intake distribution device may only have the flow guide unit. A part of the fluid entering the housing of the compressor is effectively guided by the flow guide unit to flow above the motor, so as to cool the motor. In addition, since a part of the fluid at the intake port is directly guided by the flow guide unit to flow over the motor, the part of the fluid can be prevented from contacting with the lubricating oil. In the conventional compressor without a flow guide unit, a part of the fluid entering the housing of the compressor generally flows downward along the housing, contacts with the lubricating oil in an oil pool at the bottom of the housing, and then carries more lubricating oil to the compression mechanism. Therefore, the lubricating oil in the conventional compressor gradually decreases, and more lubricating oil enters other components outside the compressor, thus affecting the efficiency of other components and reducing the efficiency of

the whole compressor system.

[0077] FIG. 8A is a longitudinal sectional view of a scroll compressor having an intake distribution device 500 according to another embodiment of the present disclosure. The intake distribution device 500 in FIG. 8A is similar to the intake distribution device 400 in FIG. 7A in that, the intake distribution device 500 also has a flow dividing unit 510 and a flow guide unit 520 with split structures. The structure of the flow guide unit 520 is similar to the structure of the flow guide unit 420, which is not described in detail herein.

[0078] FIGS. 8B and 8C are a schematic perspective view and a schematic side view of the flow dividing unit 510 of the intake distribution device 500 in FIG. 8A respectively. As shown in FIGS. 8B and 8C, the flow dividing unit 510 has a substantially hollow cylindrical base 511. The partition plate 512 is located in a hollow space of the base 511, and divides the base 511 into an upper arc-shaped base 501 (a first base with an arc-shaped cross section) and a lower arc-shaped base 502 (a second base with an arc-shaped cross section). A first channel C1 is defined by the partition plate 512 and the upper arc-shaped base 501 (the first base). A second channel C2 is defined by the partition plate 512 and the lower arc-shaped base 502 (the second base).

[0079] The first channel C1 and the second channel C2 have a same input end 515, but have different output ends 516 and 517. An axial length of the upper arc-shaped base 501 (the first base) extending from the input end 515 to the output end 516 is smaller than an axial length of the lower arc-shaped base 502 (the second base) extending from the input end 515 to the output end 517. Therefore, the second channel C2 is longer than the first channel C1, which facilitates the introduction of the fluid into the flow guide unit 520.

[0080] In the example shown in FIG. 7A, the flow dividing unit 510 is fixed in the intake joint 17. However, it should be understood that the flow dividing unit 510 may be fixed to the bearing seat 21 or the housing body 11, and is not necessarily limited to the specific example shown in FIG. 7A. Similarly, the flow guide unit 520 may be fixed to the bearing seat 21, the stator 34 or the housing body 11, as long as it can achieve the functions described herein.

[0081] The scroll compressor is taken as an example for description herein. However, it should be understood that the present disclosure can be applied to any other suitable types of compressor.

[0082] Although the present disclosure has been described with reference to exemplary embodiments, it should be understood that the present disclosure is not limited to the specific embodiments described and illustrated herein. Without departing from the scope defined by the claims, those skilled in the art can make various changes to the exemplary embodiments. It should further be understood that, provided that there is no contradiction in technical solutions, the features in the various embodiments can be combined with each other, or can be omitted.

Claims

1. An intake distribution device, comprising:

a flow guide unit configured to guide a part of a fluid entering a housing of a compressor to flow along a predetermined route,
wherein the flow guide unit comprises a body, an inlet channel and an outlet channel are provided in the body, the inlet channel is configured to introduce a part of the fluid in the housing of the compressor into the flow guide unit, and the outlet channel is configured to enable a part of the fluid to flow out in a predetermined orientation.

2. The intake distribution device according to claim 1, further comprising:

a flow dividing unit configured to divide the fluid introduced into the housing of the compressor into a first fluid portion and a second fluid portion,
wherein the flow dividing unit comprises a base and a partition plate, the partition plate divides the base into a first base and a second base, a first channel for the first fluid portion is defined by the partition plate and the first base, and a second channel for the second fluid portion is defined by the partition plate and the second base,
the inlet channel of the flow guide unit is located downstream of the second channel to guide the second fluid portion to flow along the predetermined route.

3. The intake distribution device according to claim 2, wherein the flow dividing unit and the flow guide unit are formed into one piece, or,
the flow dividing unit and the flow guide unit are separately formed.

4. The intake distribution device according to claim 2, wherein the base of the flow dividing unit comprises a back plate, side plates extending from two sides of the back plate, and a bottom plate extending from a lower side of the back plate,

the partition plate extends transversely to the back plate and the side plates,
the second channel is defined between the partition plate and the bottom plate, and an outlet of the second channel is provided in the back plate.

5. The intake distribution device according to claim 2,

wherein the base of the flow dividing unit is hollow cylindrical,
the first base and the second base, separated by the partition plate, of the base each have an arc-shaped cross section.

6. The intake distribution device according to claim 5, wherein the first channel and the second channel have a same input end,
an axial length of the first base extending from the input end is smaller than an axial length of the second base extending from the input end.

7. The intake distribution device according to any one of claims 1 to 6, wherein the body is annular,
and a plurality of outlet channels are arranged in a circumferential direction.

8. The intake distribution device according to claim 7, wherein the body comprises an inner circumferential side wall and an outer circumferential side wall,

a plurality of outlet channels are defined in an annular space between the inner circumferential side wall and the outer circumferential side wall, and the inlet channel extends through the outer circumferential side wall.

9. The intake distribution device according to claim 8, wherein the flow guide unit further comprises a connecting portion extending radially outward from the outer circumferential side wall,
and the inlet channel extends through the connecting portion.

10. The intake distribution device according to claim 8, wherein the flow guide unit further comprises a flange extending radially outward from the outer circumferential side wall.

11. The intake distribution device according to claim 8, wherein the flow guide unit further comprises a protrusion extending radially inward from the inner circumferential side wall.

12. The intake distribution device according to claim 8, wherein the flow guide unit further comprises a cylindrical cover radially outside the outer circumferential side wall.

13. The intake distribution device according to any one of claims 8 to 12, wherein a plurality of ribs are provided between the inner circumferential side wall and the outer circumferential side wall in the circumferential direction,
the plurality of outlet channels are defined by the plurality of ribs, the inner circumferential side wall and the outer circumferential side wall.

14. The intake distribution device according to any one of claims 8 to 12, wherein an annular bottom wall is provided between the inner circumferential side wall and the outer circumferential side wall,
the outlet channel has a discharge opening arranged on the annular bottom wall or the outer circumferential side wall.

15. A compressor comprising the intake distribution device according to any one of claims 1 to 14, wherein the compressor further comprises:

a housing provided thereon with an intake port at which an intake joint is mounted;
a compression mechanism located in the housing and configured to compress a fluid sucked in through a suction chamber;
a motor configured to drive the compression mechanism, and comprising a stator fixed to the housing and a rotor located radially inside the stator; and
a bearing seat located between the compression mechanism and the motor, and configured to support the compression mechanism,
wherein the intake distribution device is arranged at the intake port to guide a part of the fluid introduced into the housing to flow over the motor.

16. The compressor according to claim 15, wherein along a direction of a central axis of the intake port, a partition plate of a flow dividing unit of the intake distribution device is at least partially projected in a flow region of the intake joint to divide the fluid introduced into the housing into a first fluid portion and a second fluid portion.

17. The compressor according to claim 16, wherein the flow guide unit is located between the bearing seat and the motor, and is configured to guide the second fluid portion to flow over a winding of the stator.

18. The compressor according to claim 17, wherein in a radial direction, a discharge opening of the outlet channel of the flow guide unit is located radially outside the rotor.

19. The compressor according to claim 18, wherein a cylindrical cover of the flow guide unit is located radially outside the outlet channel and is located radially outside the winding in the radial direction.

20. The compressor according to any one of claims 16 to 19, wherein the flow dividing unit is fixed to the bearing seat, the housing or the intake j oint; and/or, the flow guide unit is fixed to the bearing seat, the housing or the stator.

21. The compressor according to any one of claims 16 to 19, wherein along the direction of the central axis of the intake port, a gap is formed between the flow dividing unit and the intake j oint, and the gap is less than one fifth of a minimum inner diameter of the intake joint.

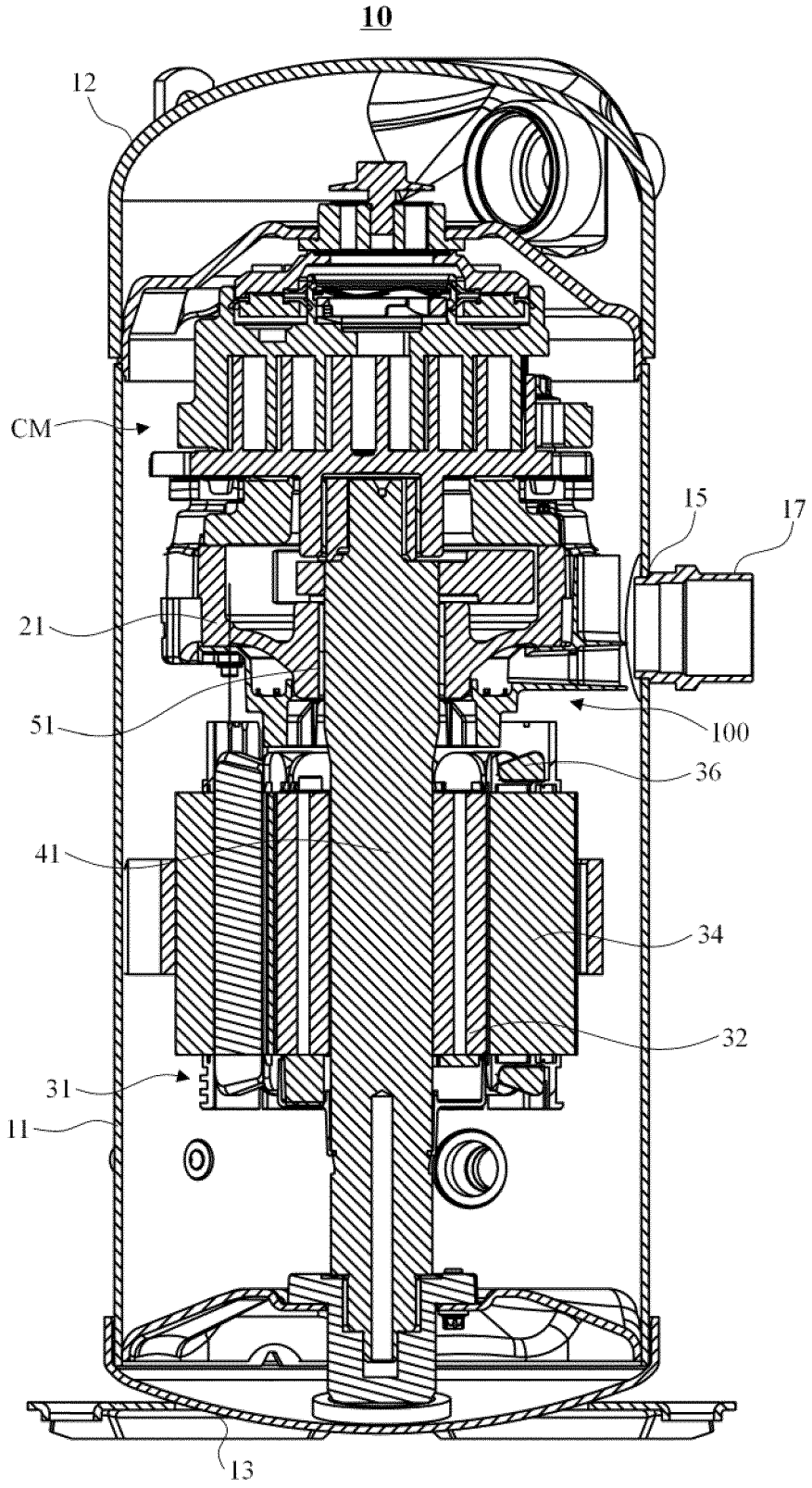


FIG.1

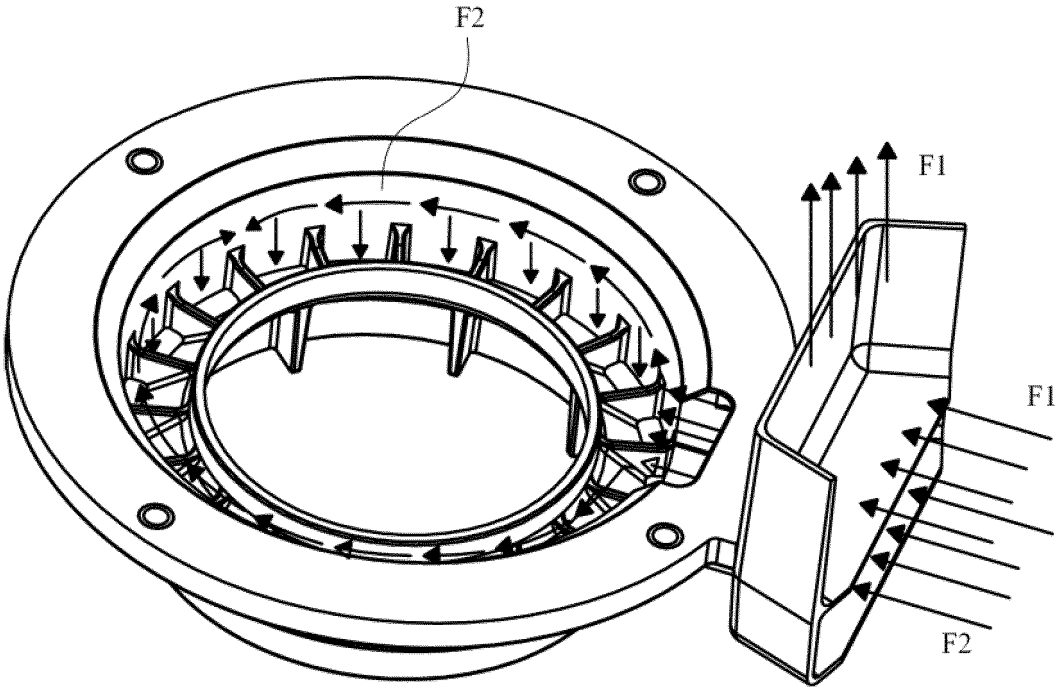
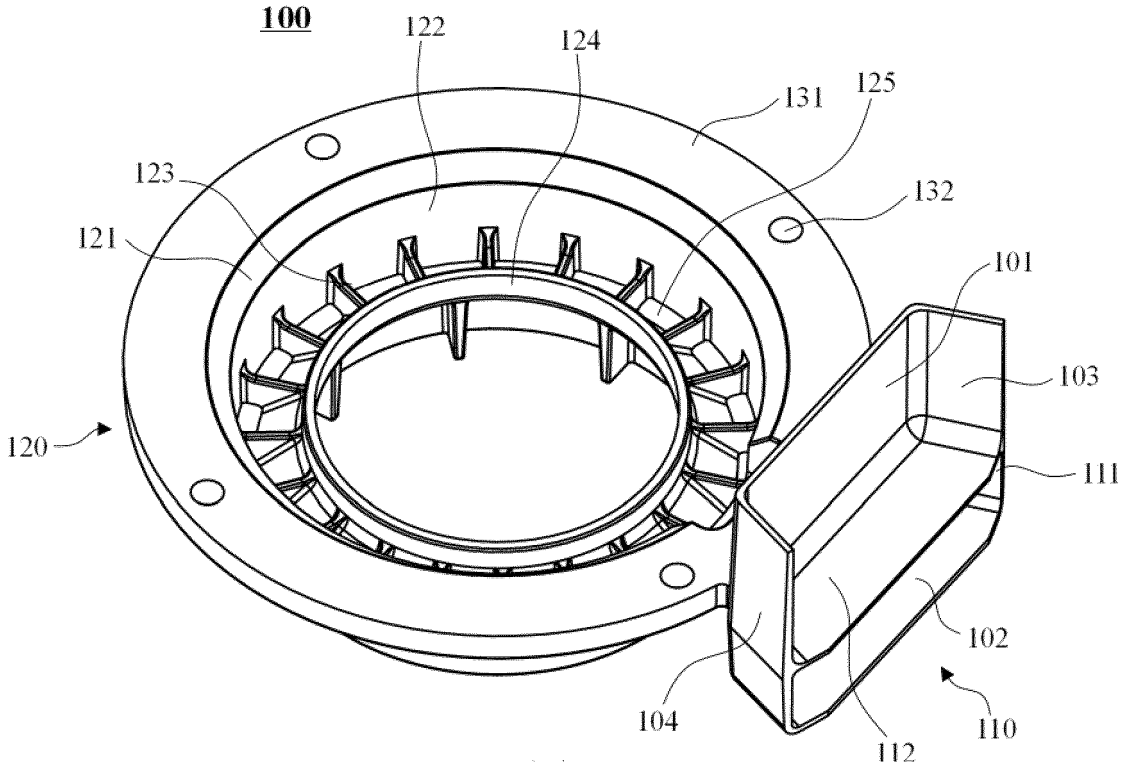


FIG.2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112

FIG.3A

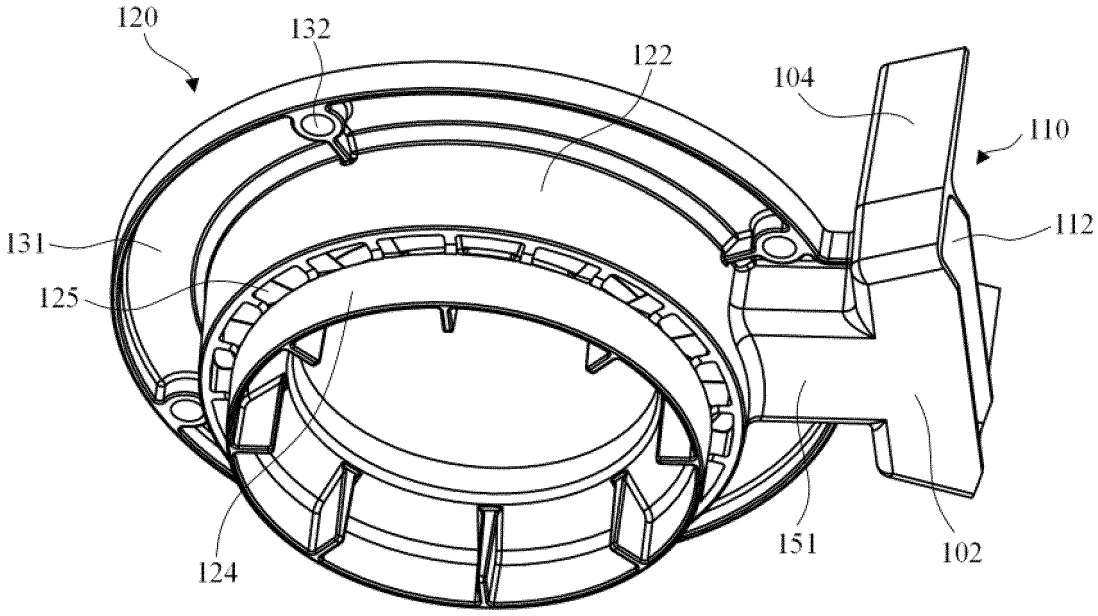
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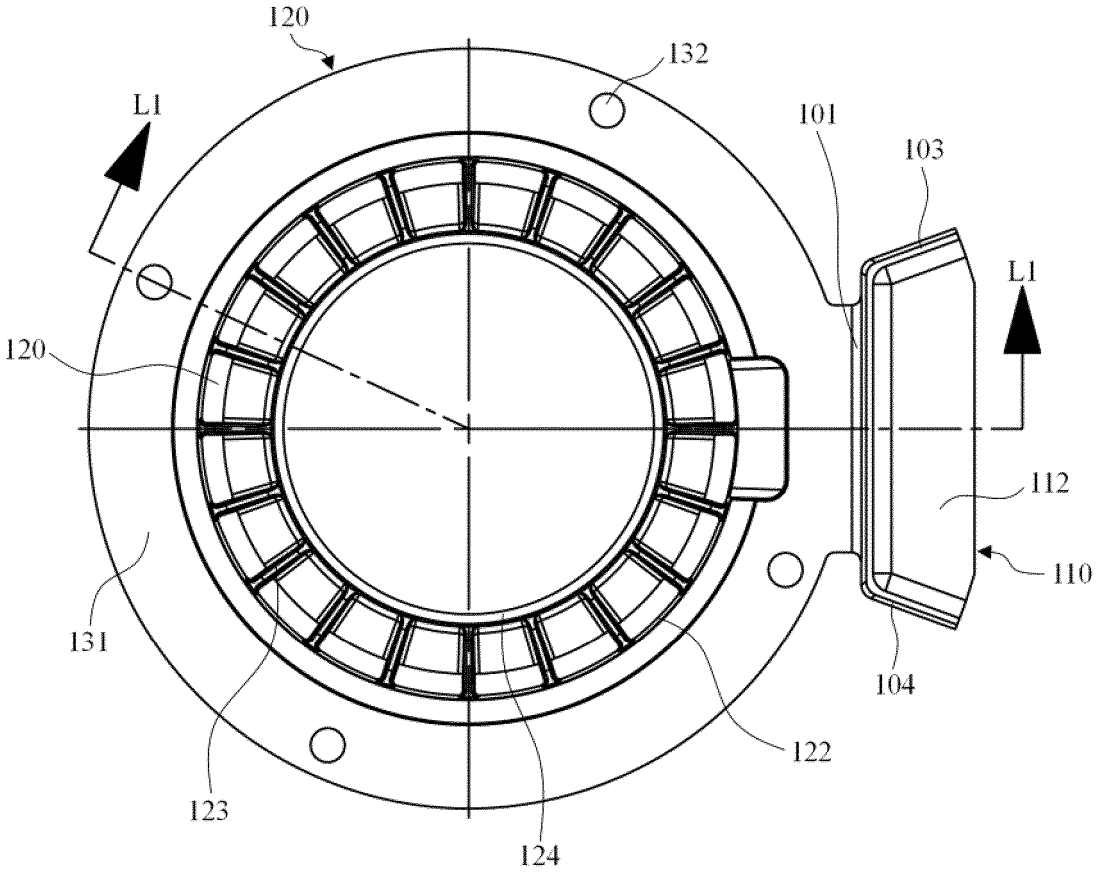
FIG.3B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L1
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103
L1
120
112
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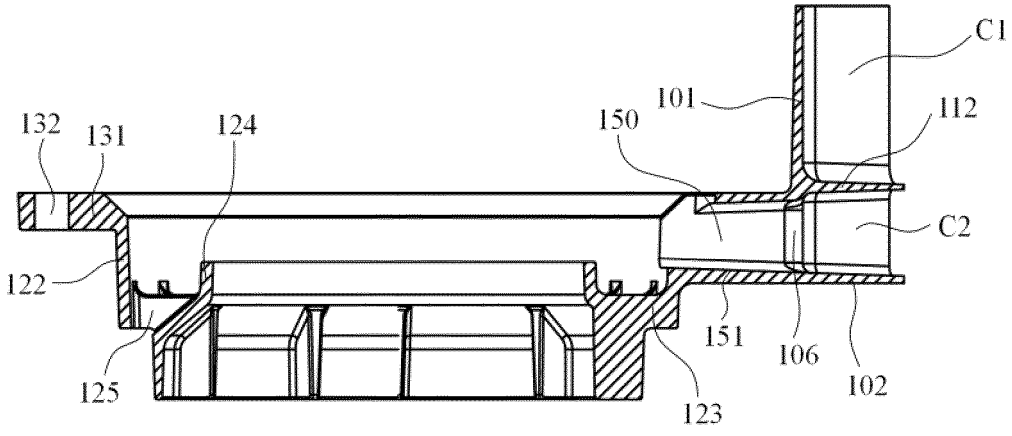
131
104
122
123
124

FIG.3C


C1
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132
131
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C2
122
151
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FIG.3D

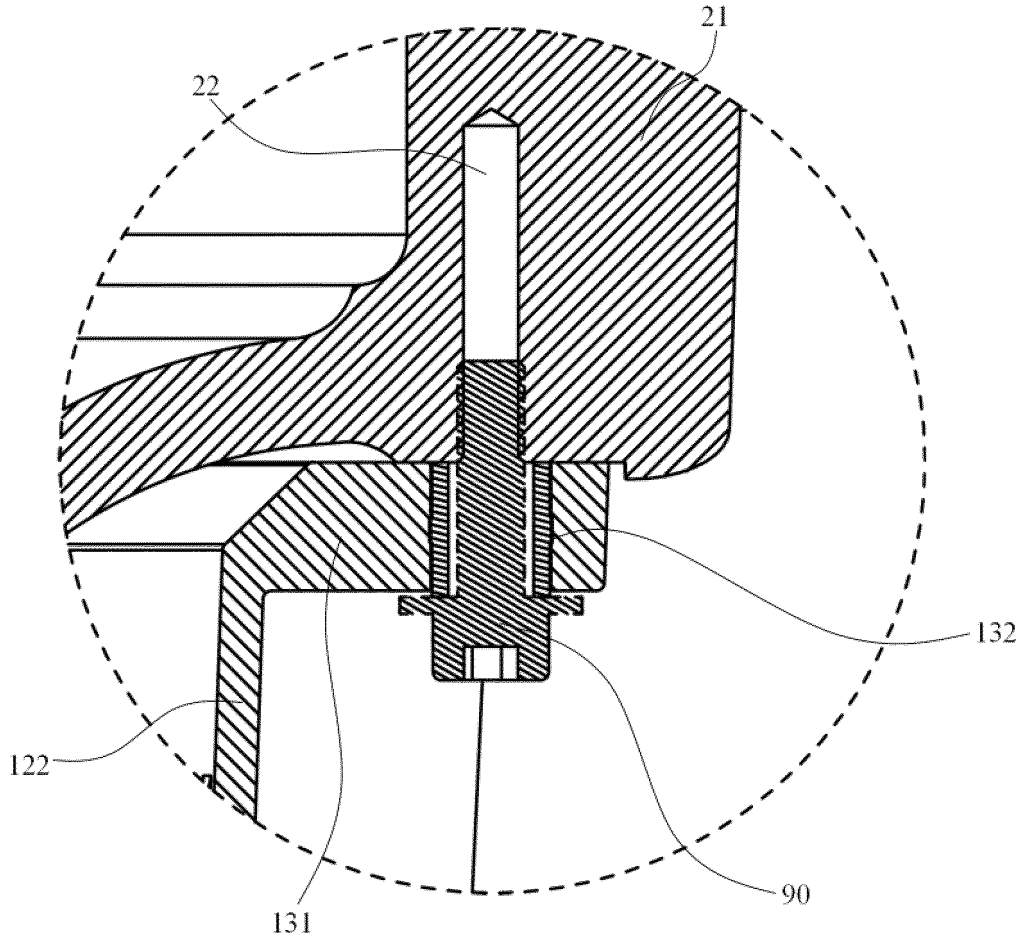

FIG.3E

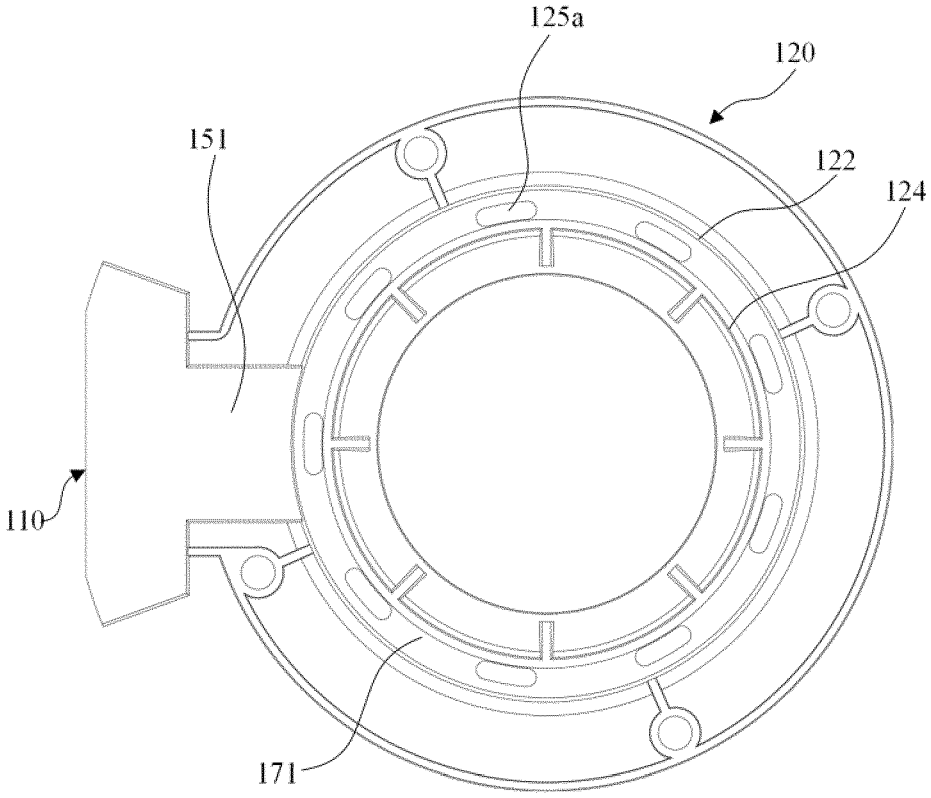

FIG.4A

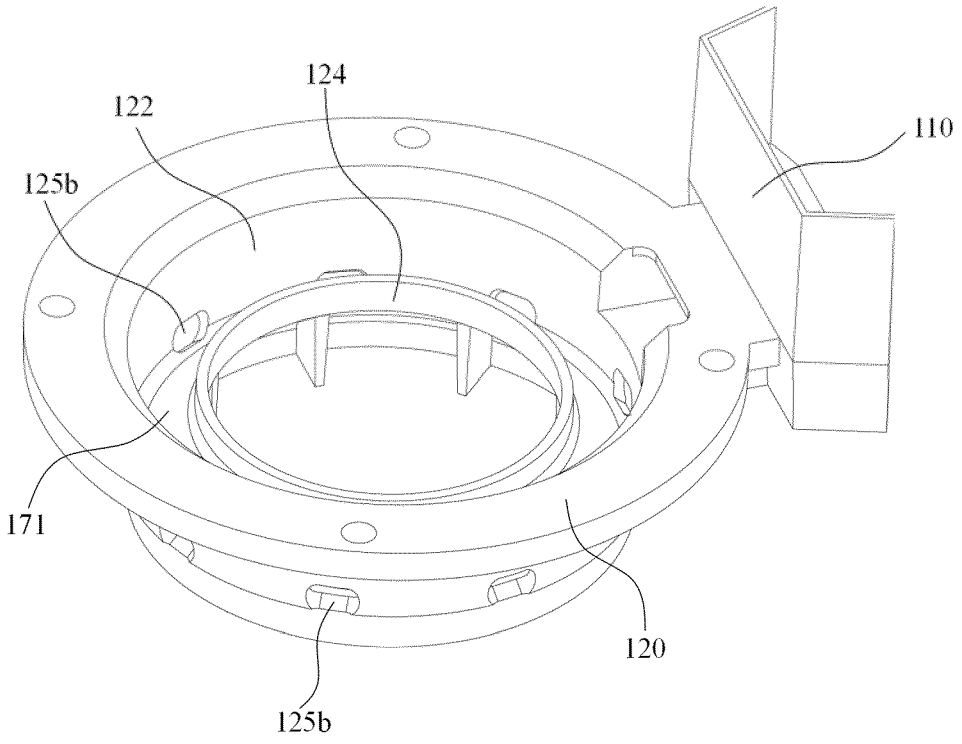

FIG.4B

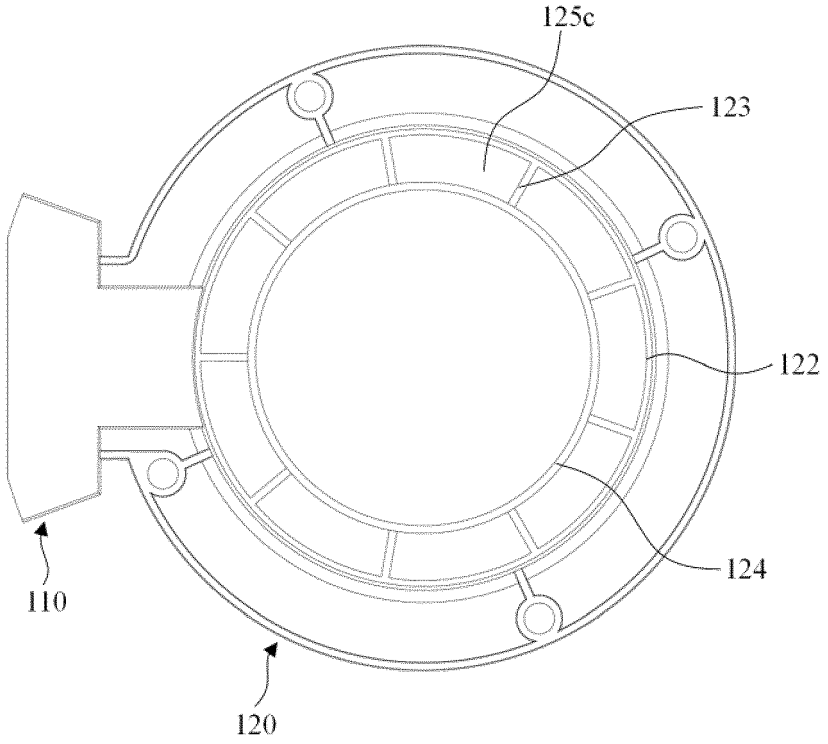
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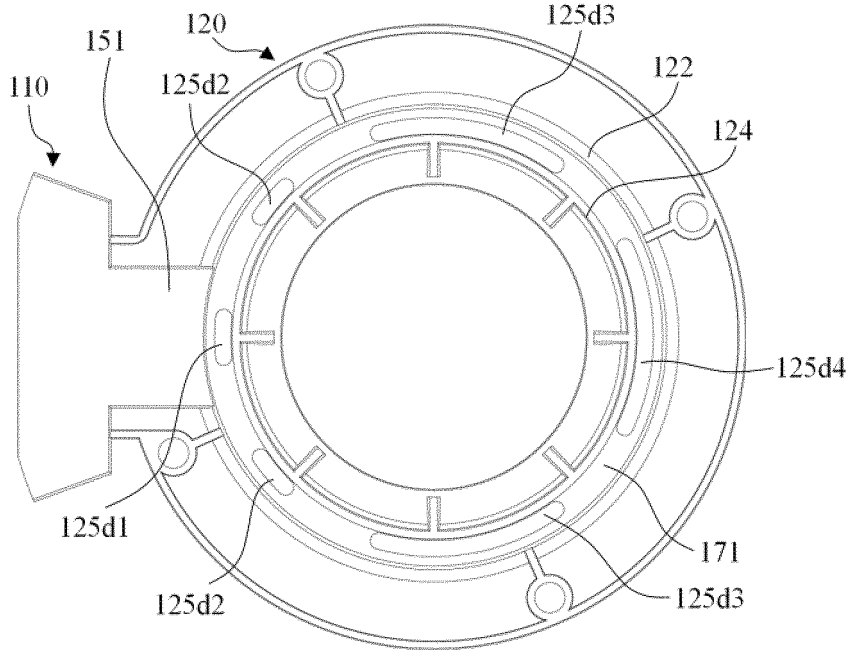
FIG.4C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125d3

FIG.4D

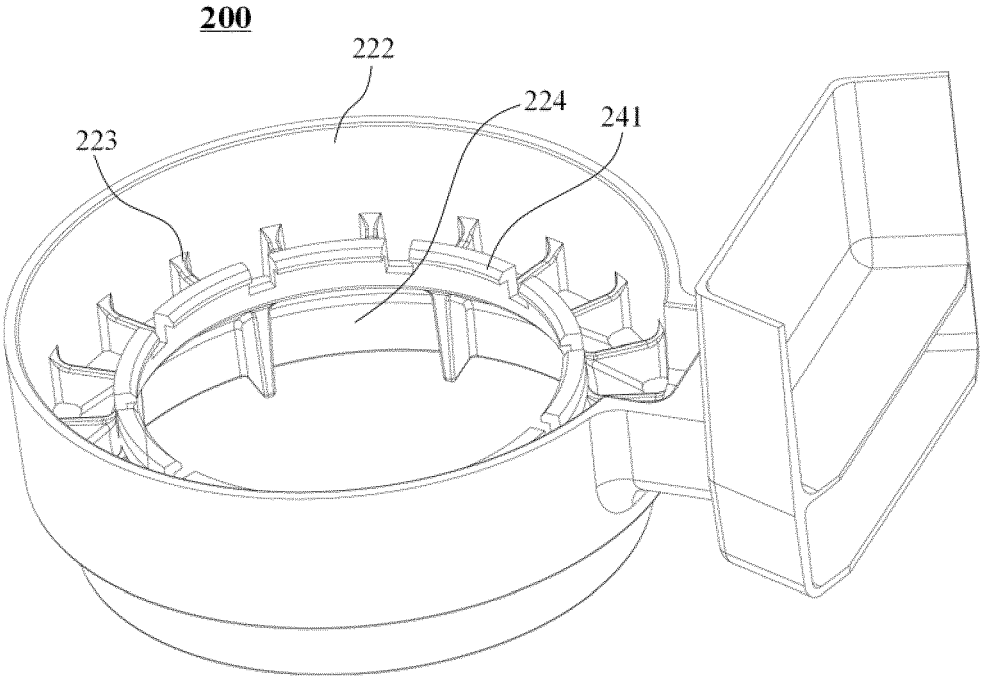

FIG.5A

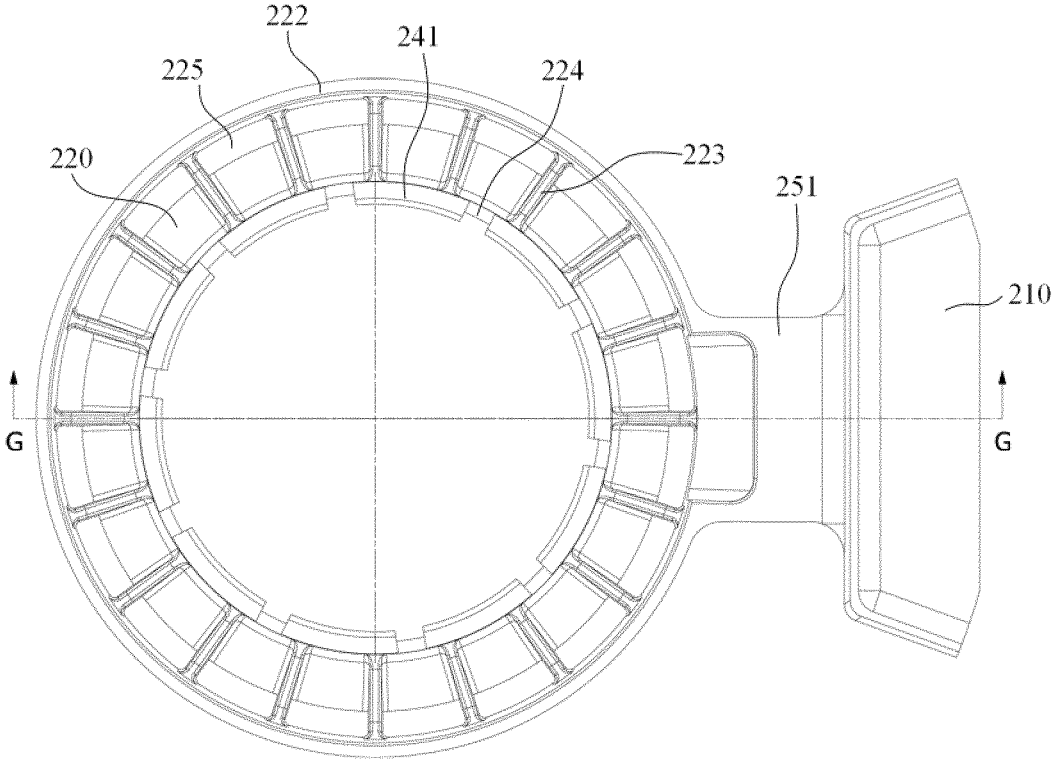

FIG.5B

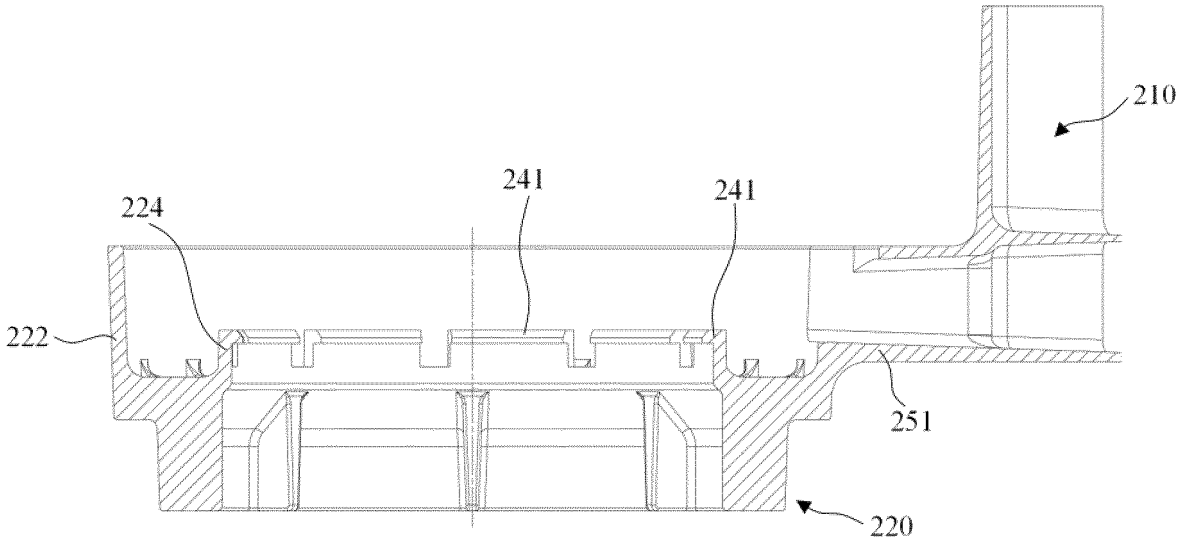

FIG.5C

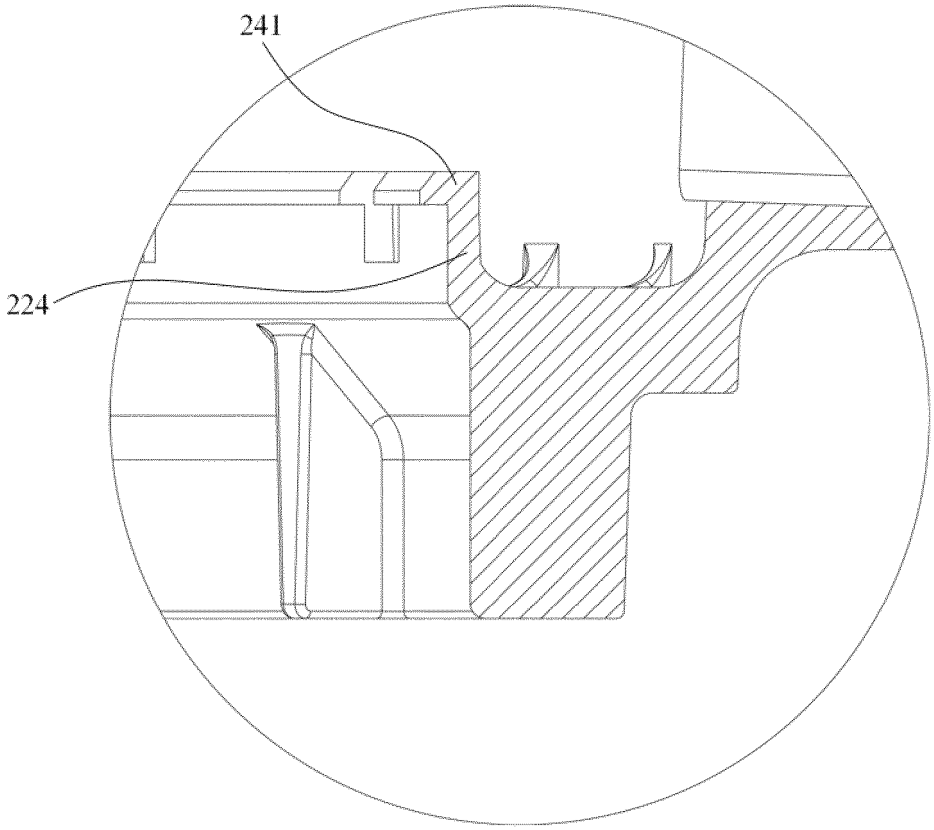

FIG.5D

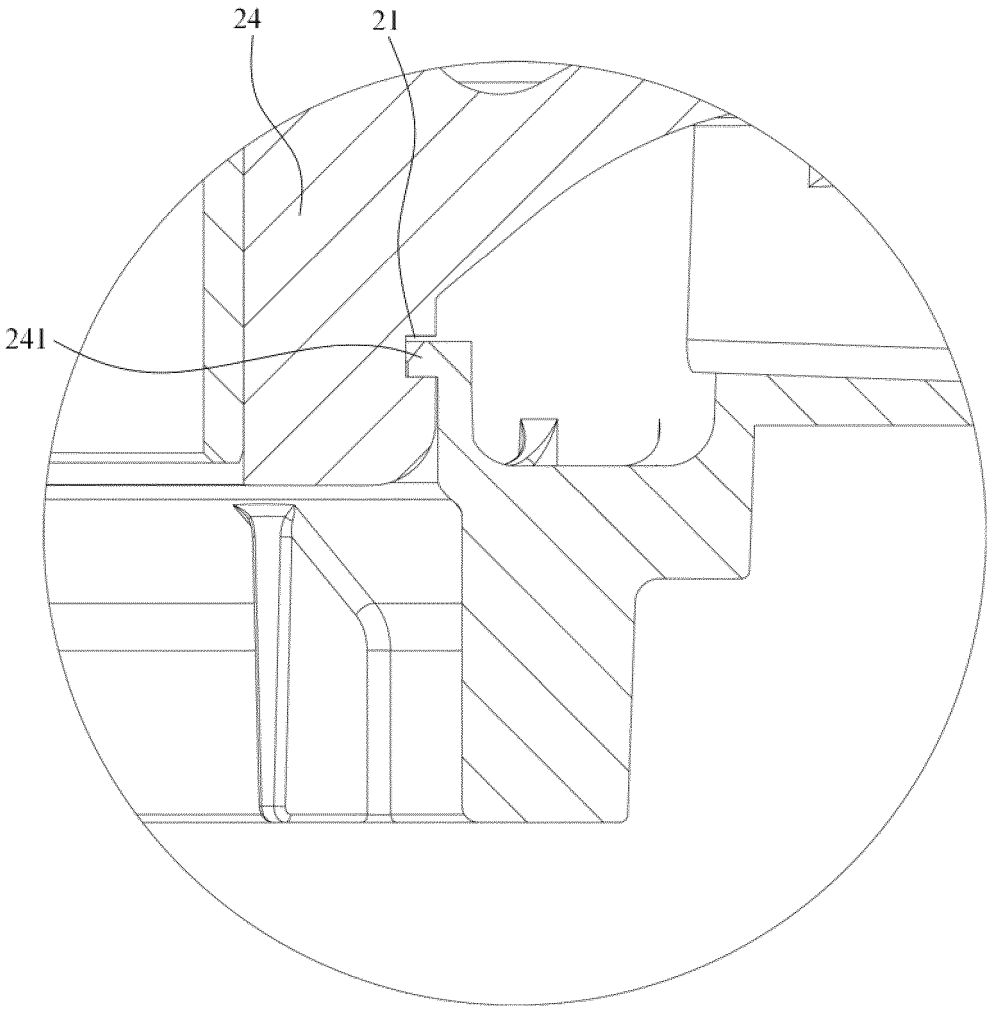

FIG.5E

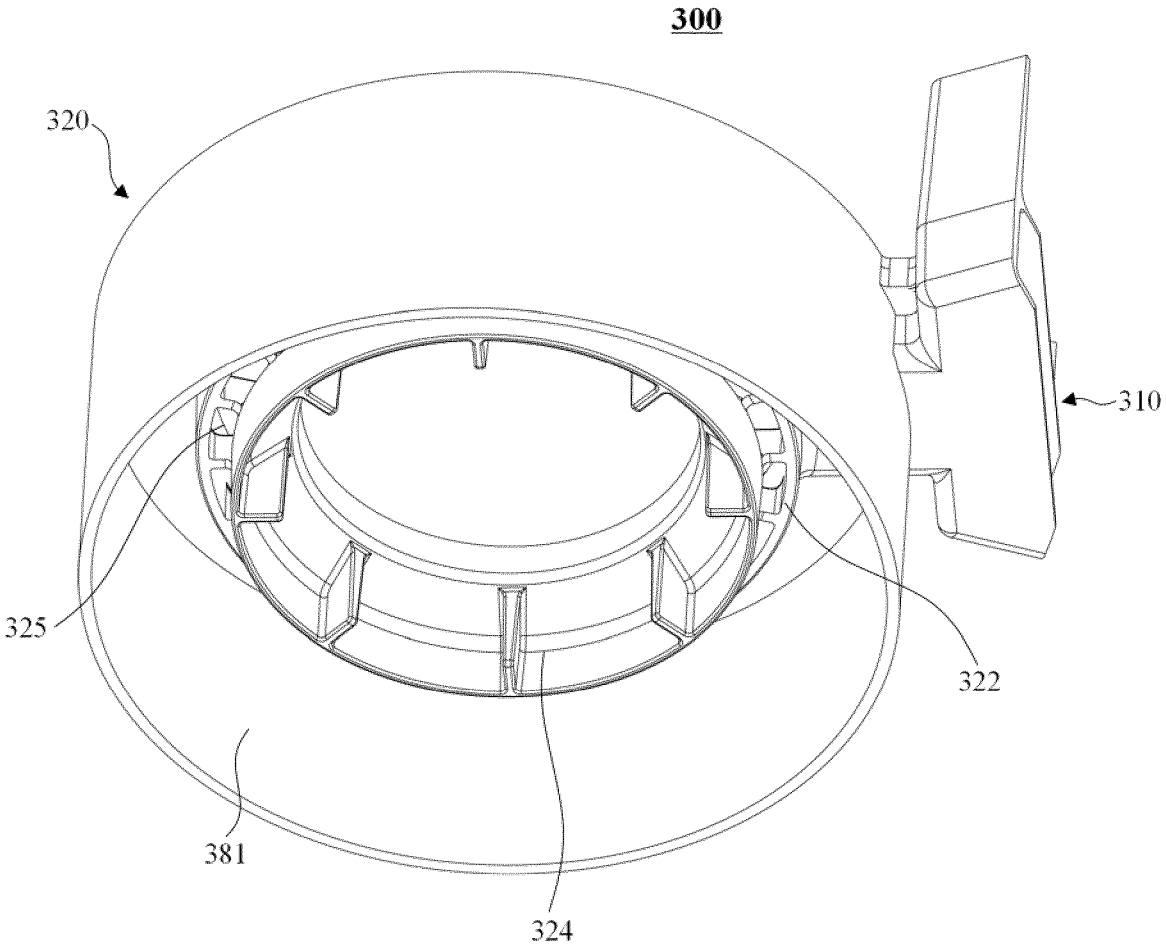

FIG.6A

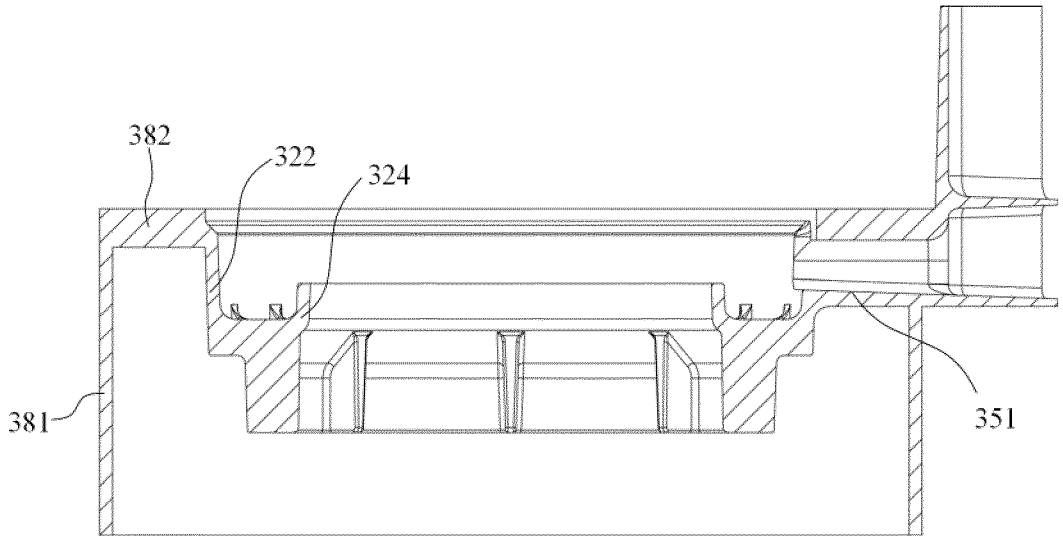

FIG.6B

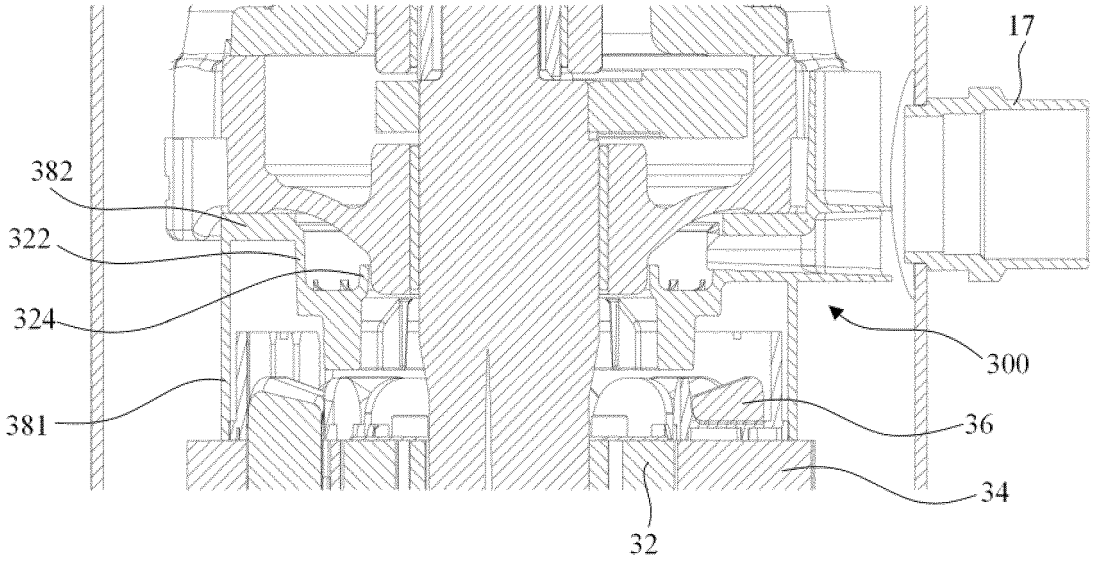

FIG.6C

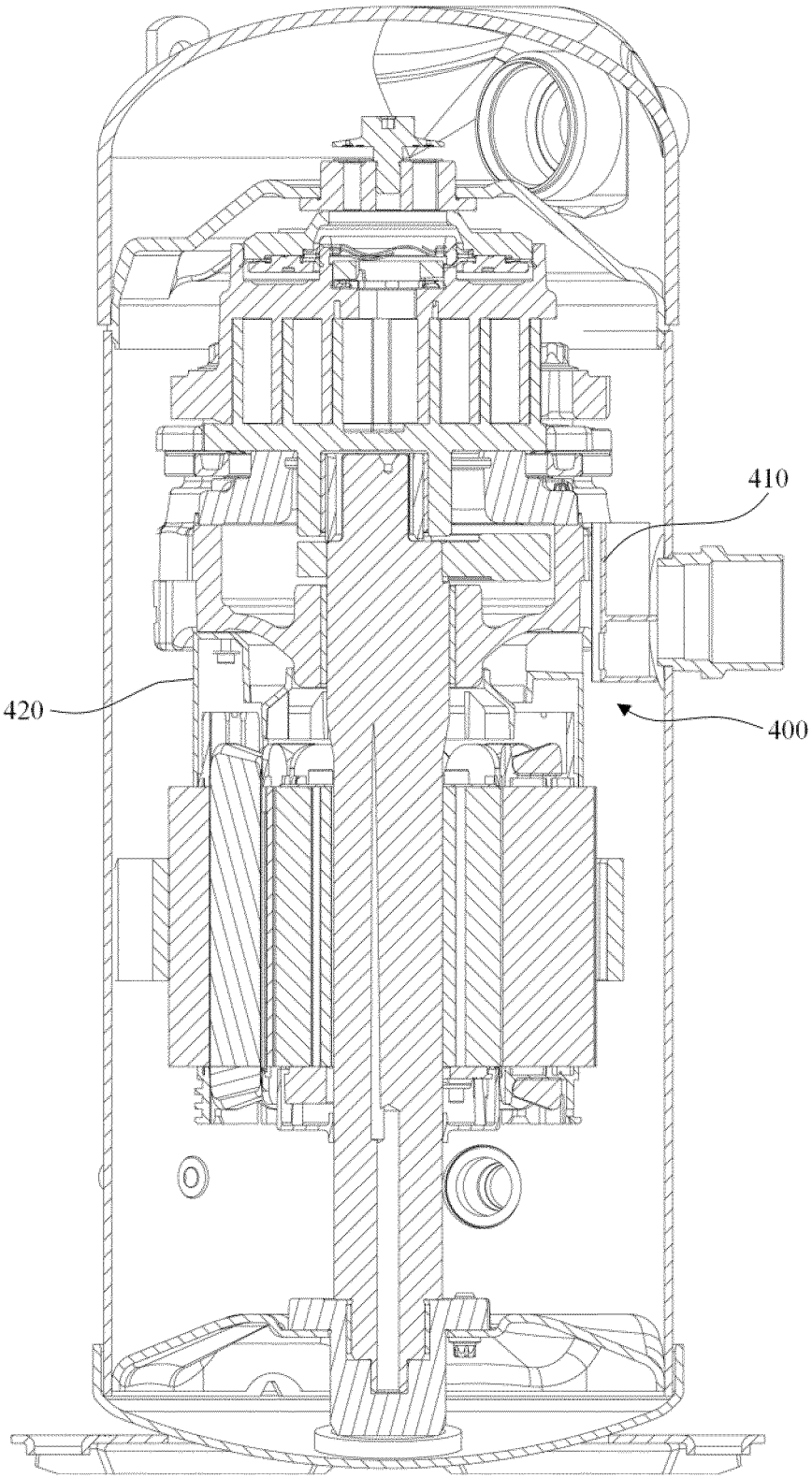

FIG.7A

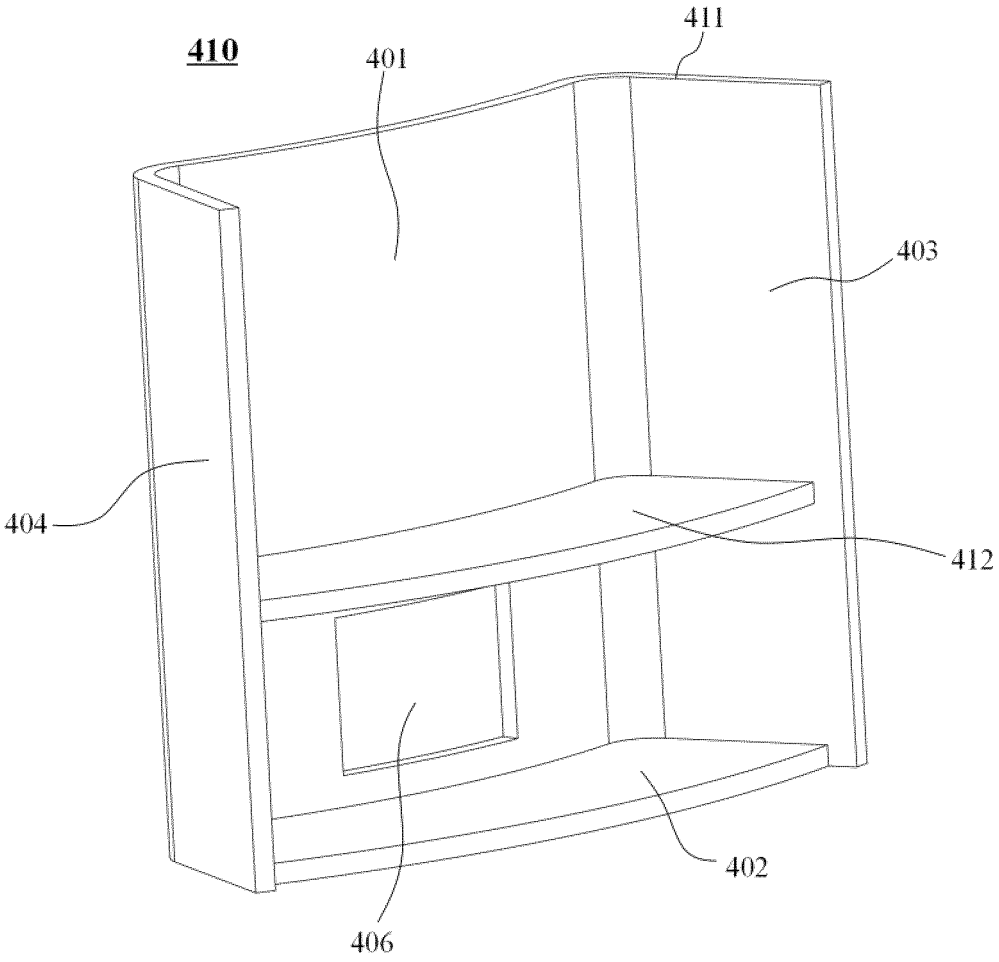

FIG.7B

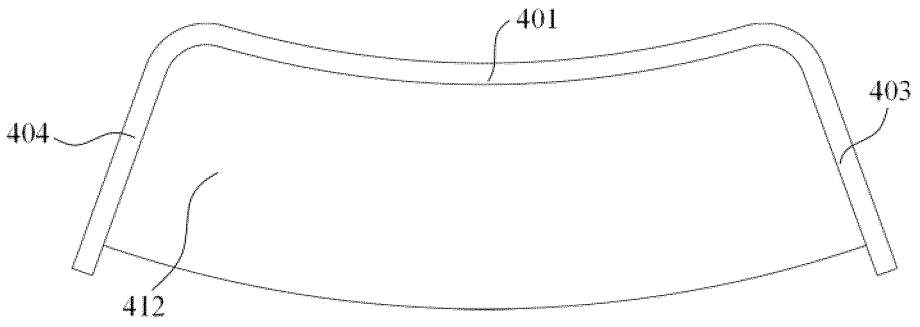

FIG.7C

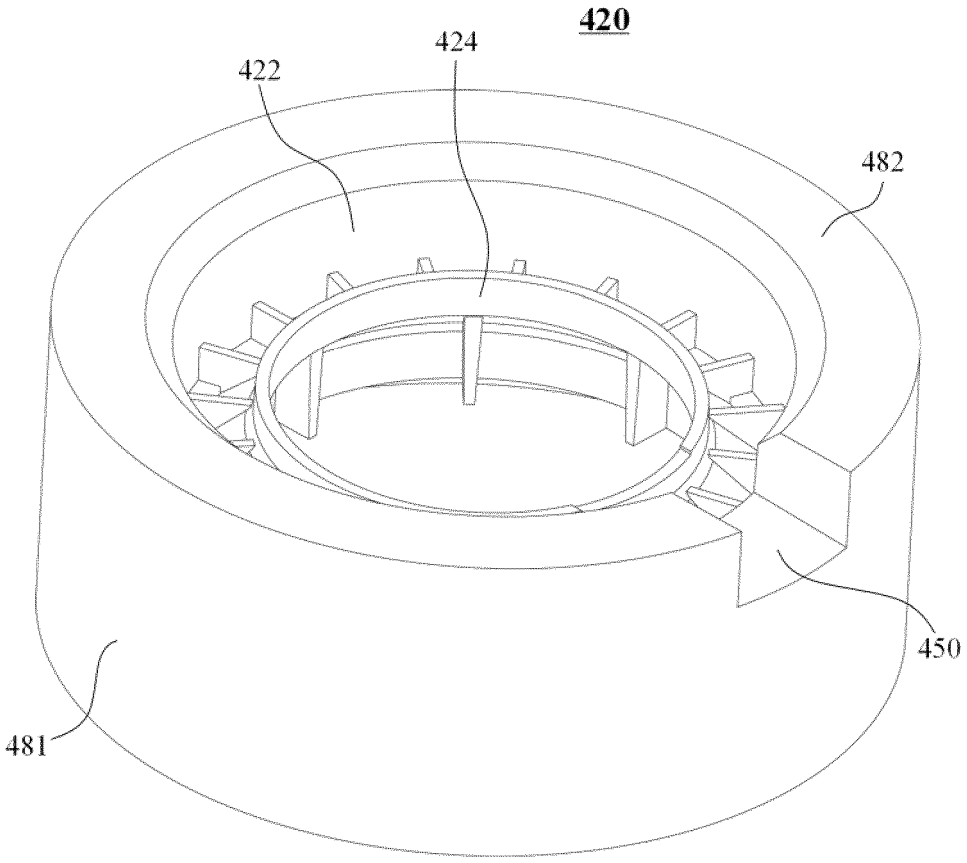

FIG.7D

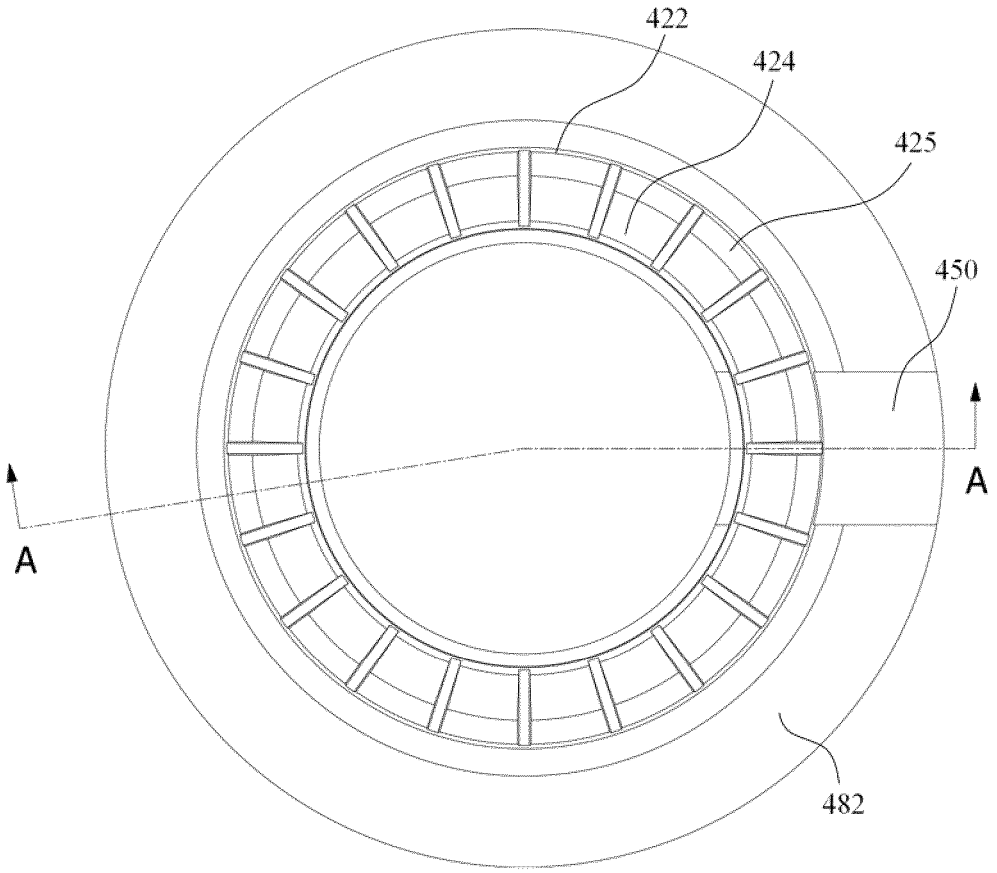

FIG.7E

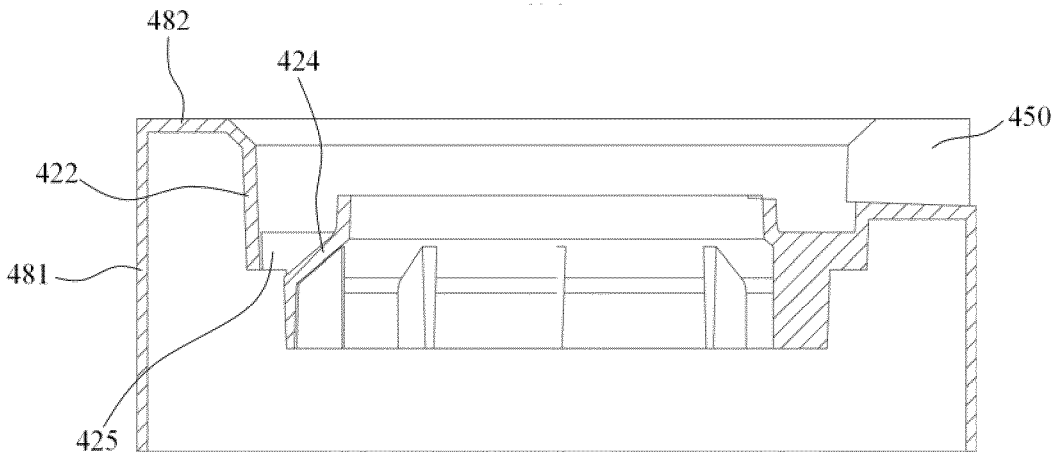

FIG.7F

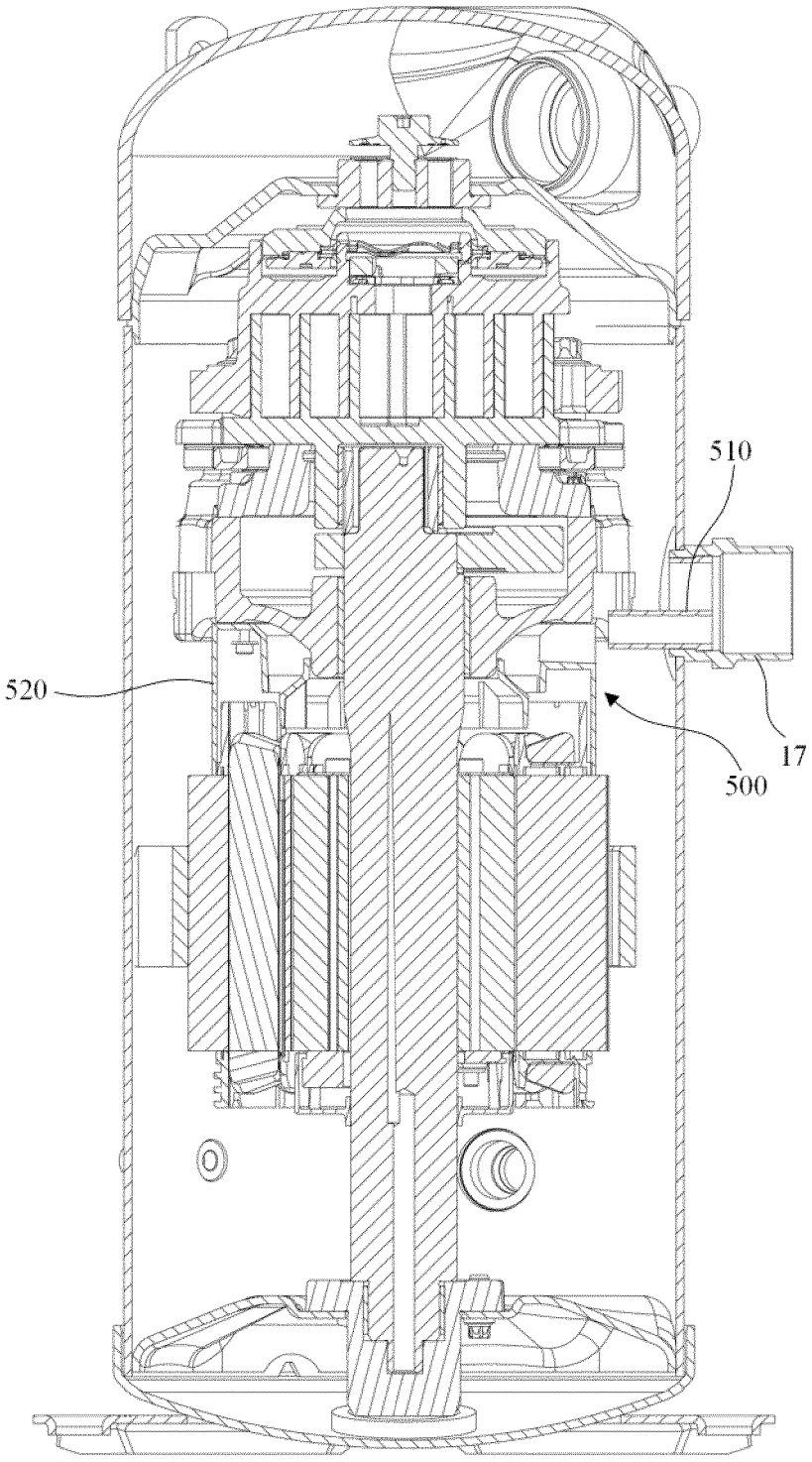

FIG.8A

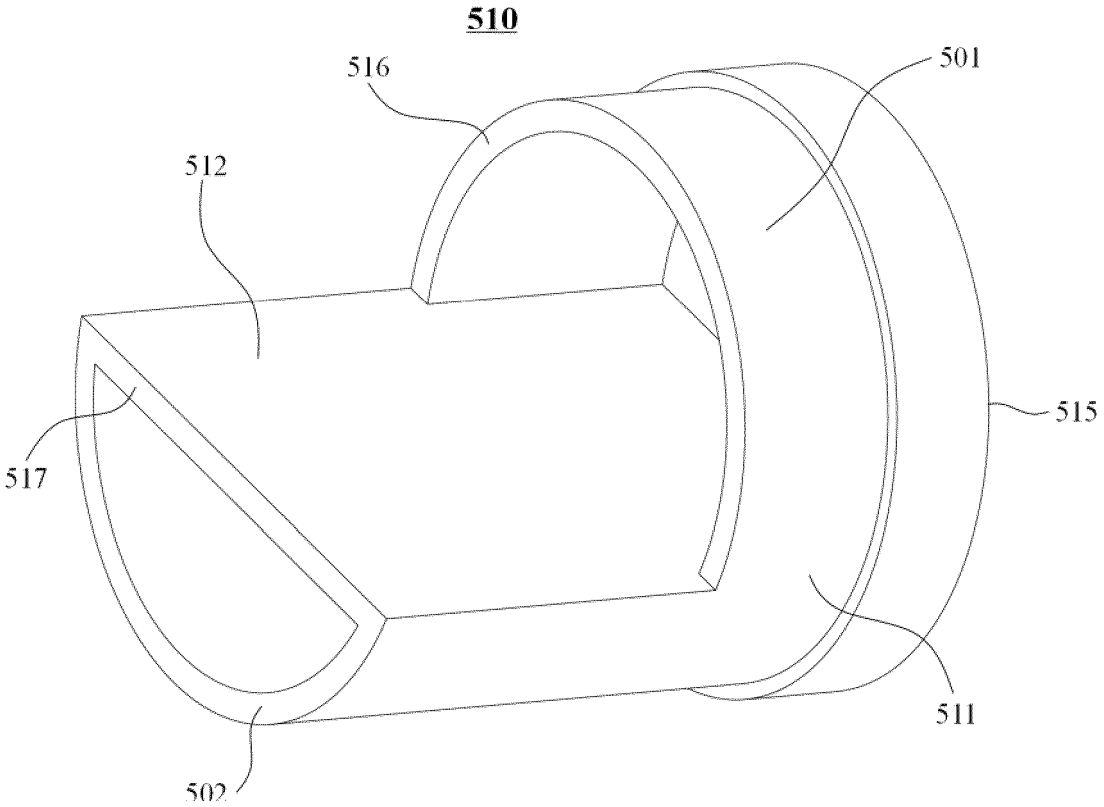

FIG.8B

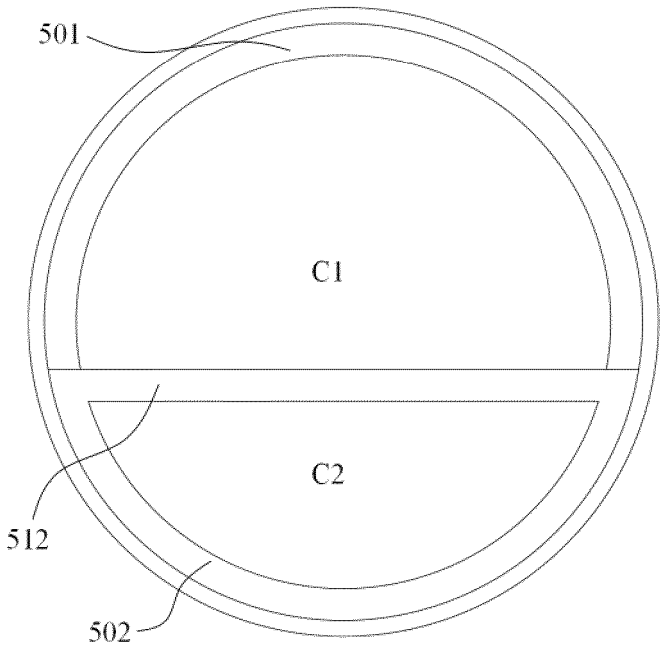

FIG.8C

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/108209

A. CLASSIFICATION OF SUBJECT MATTER

F04C 29/12(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)

F04C

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; CNKI; VEN: 压缩机, 进气, 吸气, 分流, 分配, 冷却, 马达, compressor, inlet, intake, distribut+, divide, cool+, motor

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 215521276 U (EMERSON ENVIRONMENT OPTIMIZATION TECHNOLOGY (SUZHOU) CO., LTD.) 14 January 2022 (2022-01-14) see description, paragraphs [0046]-[0089], and figures 1-8C	1-21
X	CN 103032322 A (EMERSON CLIMATE TECHNOLOGIES, INC.) 10 April 2013 (2013-04-10) see description, paragraphs [0052]-[0098], and figures 1-6	1-21
X	US 6131406 A (BITZER KUEHLMASCHINENBAU GMBH) 17 October 2000 (2000-10-17) see description, column 3, line 52-column 5, line 42, and figures 1-6	1-21
X	US 5007809 A (MITSUBISHI ELECTRIC CORP.) 16 April 1991 (1991-04-16) see description, column 4, line 34-column 5, line 22, and figures 1-2	1-21
A	CN 203201809 U (DAIKIN INDUSTRIES LTD.) 18 September 2013 (2013-09-18) see entire document	1-21
A	CN 1321836 A (DANFSMAN NEUROP) 14 November 2001 (2001-11-14) see entire document	1-21
A	US 2007237664 A1 (LG ELECTRONICS INC.) 11 October 2007 (2007-10-11) see entire document	1-21

☐ 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 application or patent 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
12 October 2022	**02 November 2022**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088, China** Facsimile No. **(86-10)62019451**	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2022/108209

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
CN	215521276	U	14 January 2022	None			
CN	103032322	A	10 April 2013	CN	202926625	U	08 May 2013
				US	2013081710	A1	04 April 2013
				WO	2013048840	A1	04 April 2013
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				DE	59807951	D1	22 May 2003
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				FR	2808308	A1	02 November 2001
				KR	20010098888	A	08 November 2001
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Form PCT/ISA/210 (patent family annex) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 202110937279 **[0001]**
- CN 202121917161 **[0001]**