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

(11) EP 4 290 077 A1

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
13.12.2023 Bulletin 2023/50

(21) Application number: **23762130.5**

(22) Date of filing: **04.04.2023**

(51) International Patent Classification (IPC):
***F04C 18/02** (2006.01)* ***F04C 29/02** (2006.01)*

(86) International application number:
PCT/CN2023/086304

(87) International publication number:
WO 2023/207536 (02.11.2023 Gazette 2023/44)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
KH MA MD TN

(30) Priority: **28.04.2022 CN 202210471516**

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(54) FIXED SCROLL APPLIED TO SCROLL COMPRESSOR, AND SCROLL COMPRESSOR

(57) Provided are a stationary scroll (100) applied in a scroll compressor (300) and the scroll compressor (300). The stationary scroll (100) includes: a scroll body (10) defining a working medium flow groove (11) with an open end; a scroll wrap (12) disposed within the working medium flow groove (11) to form a scroll chamber (15); a closed annular oil supply groove (13) formed on the scroll body (10) and surrounding the open end of the working medium flow groove (11). The oil supply groove (13) is adapted to be in communication with an oil outlet hole (20) of an orbiting scroll (200) of the scroll compressor (300).

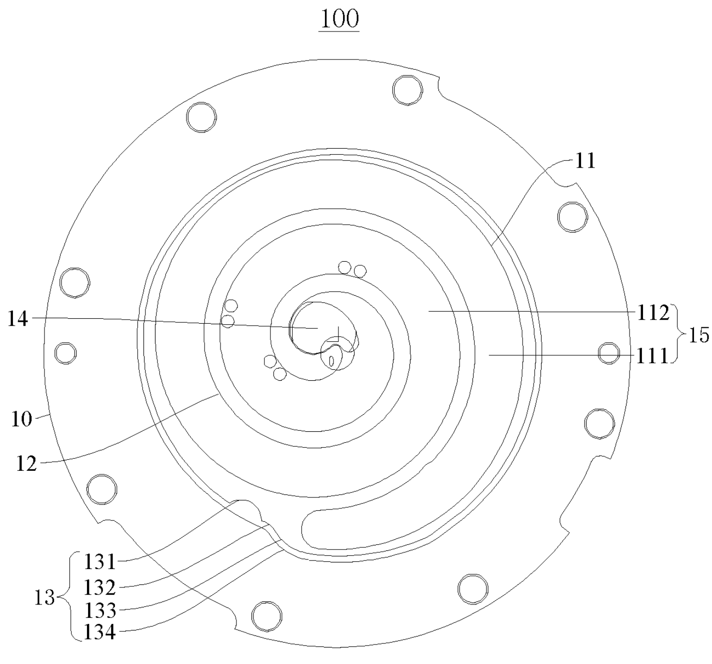

FIG. 1

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Description

FIELD

[0001] The present disclosure relates to the field of compressors, and more particularly, to a stationary scroll applied in a scroll compressor and a scroll compressor having the stationary scroll applied in the scroll compressor.

BACKGROUND

[0002] In the related art, the existing scroll compressor comprises a stationary scroll, an orbiting scroll, and a crankshaft. The orbiting scroll is mounted on the crankshaft, and the orbiting scroll is assembled with the stationary scroll and is movable relative to the stationary scroll. When the scroll compressor is operated, the crankshaft performs an eccentric motion, and the orbiting scroll performs a revolution motion, to achieve suction, compression, and exhaust of the compressor. After the stationary scroll and the orbiting scroll are assembled together, the stationary scroll and the orbiting scroll are brought into contact with each other. When the orbiting scroll rotates, only the orbiting scroll operates to passively lubricate a contact surface between the stationary scroll and the orbiting scroll with oil. However, the lubricating oil between the stationary scroll and the orbiting scroll is less, and an oil film cannot be formed between the stationary scroll and the orbiting scroll, which easily leads to serious wear of the contact surface between the stationary scroll and the orbiting scroll. As a result, service life of the stationary scroll and the orbiting scroll would be affected. In addition, no reliable seal can be formed between the stationary scroll and the orbiting scroll, and a large pressure difference will be generated between a pressure in the back pressure chamber of the compressor and a suction pressure. In this way, the back pressure may leak to a working medium flow groove through a gap between the orbiting scroll and the stationary scroll, which leads a working medium to be repeatedly compressed, resulting in an increase in a power of the scroll compressor and a decrease in energy efficiency of the scroll compressor.

SUMMARY

[0003] The present disclosure is intended to solve at least to some extent one of the technical problems in the related art.

[0004] To this end, an object of the present disclosure is to propose a stationary scroll for a scroll compressor. By forming a closed annular oil supply groove, contact surfaces between an orbiting scroll and a stationary scroll can be sufficiently lubricated. As a result, wear between the orbiting scroll and the stationary scroll can be reduced to achieve a complete sealing between a working medium flow groove and a back pressure chamber. Therefore, an increase in a power of the scroll compressor can be avoided, and thus energy efficiency and performance of the scroll compressor can be improved.

[0005] Another object of the present disclosure is to provide a scroll compressor.

[0006] A stationary scroll for a scroll compressor according to an embodiment of the present disclosure comprises: a scroll body defining a working medium flow groove with an open end; a scroll wrap disposed within the working medium flow groove to form a scroll chamber; and a closed annular oil supply groove formed on the scroll body and surrounding an open end of the working medium flow groove. The oil supply groove is adapted to be in communication with an oil outlet hole of an orbiting scroll of the scroll compressor.

[0007] With the stationary scroll for the scroll compressor according to the embodiment of the present disclosure, by forming the closed annular oil supply groove, contact surfaces between the orbiting scroll and the stationary scroll can be sufficiently lubricated by the lubricating oil to reduce the wear between the orbiting scroll and the stationary scroll. In addition, the closed annular oil supply groove can provide the complete sealing between the working medium flow groove and the back pressure chamber to avoid leakage of the back pressure into the working medium flow groove through a gap at the contact end surfaces of the orbiting scroll and the stationary scroll, which in turn prevents the working medium being repeatedly compressed. As a result, an increase in the power of the scroll compressor can be avoided. Therefore, the energy efficiency and the performance of the scroll compressor can be improved.

[0008] In some embodiments of the present disclosure, an inner side wall of the oil supply groove is spaced apart from the working medium flow groove in a radial direction of the stationary scroll.

[0009] In some embodiments of the present disclosure, a spacing between the inner side wall of the oil supply groove and the working medium flow groove is A, wherein $1 \text{ mm} < A$.

[0010] In some embodiments of the present disclosure, an open end of the oil supply groove is adapted to be covered with the orbiting scroll.

[0011] In some embodiments of the present disclosure, a width of the oil supply groove is B, wherein $1.2 \text{ mm} \leq B \leq 2 \text{ mm}$.

[0012] In some embodiments of the present disclosure, a depth of the oil supply groove is C, wherein $0.5 \text{ mm} \leq C \leq 1.8 \text{ mm}$.

[0013] In some embodiments of the present disclosure, in a radial direction of the stationary scroll, an inner side wall of the oil supply groove has a recess recessed towards an inner side of the scroll body and adapted to be in communication with the oil outlet hole.

[0014] In some embodiments of the present disclosure, the recess is formed as an arc-shaped recess.

[0015] In some embodiments of the present disclosure, the oil supply groove has a recessed segment recessed towards a radial inner side of the scroll body, the recessed segment abutting on the recess.

[0016] In some embodiments of the present disclosure, the recessed segment is formed as an arc-shaped segment.

[0017] A scroll compressor according to an embodiment of the present disclosure comprises the stationary scroll for the scroll compressor as described above.

[0018] Additional aspects and advantages of the present disclosure will be set forth in part in the description which follows and, in part, will be obvious from the description, or may be learned by practice of the present disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019]

FIG. 1 is a schematic view of a stationary scroll according to an embodiment of the present disclosure;
FIG. 2 is a schematic view of an orbiting scroll according to an embodiment of the present disclosure;
FIG. 3 is a schematic view of an assembly of an orbiting scroll and a stationary scroll according to an embodiment of the present disclosure;
FIG. 4 is a sectional view of a scroll compressor according to an embodiment of the present disclosure; and
FIG. 5 is an enlarged view at part D in FIG. 4.

DESCRIPTION OF EMBODIMENTS

[0020] Reference will now be made in detail to the embodiments of the present disclosure, examples of which are illustrated in the accompanying drawings, whereinin the same or similar reference numerals denote the same or similar elements or elements having the same or similar functions throughout. The embodiments described below with reference to the drawings are illustrative only, and are intended only to explain the present disclosure and are not to be construed as limiting the present disclosure.

[0021] A stationary scroll 100 according to an embodiment of the present disclosure will be described below with reference to FIGS. 1 to 5. The stationary scroll 100 may be for a scroll compressor 300, and the present disclosure is not limited thereto. The stationary scroll 100 may be also for other devices requiring the stationary scroll 100. The present disclosure will be described with reference to the stationary scroll 100 for a scroll compressor 300.

[0022] As shown in FIGS. 1 to 5, a stationary scroll 100 according to an embodiment of the present disclosure comprises a scroll body 10, a scroll wrap 12, and a closed annular oil supply groove 13. The scroll body 10 defines a working medium flow groove 11 with an open end. The scroll wrap 12 is disposed within the working medium flow groove 11 to form a scroll chamber. The working medium flow groove 11 may be divided into a working medium inlet chamber 111 and a working medium compression chamber 112 by the scroll wrap 12. The working medium inlet chamber 111 and the working medium compression chamber 112 constitute the scroll chamber. Further, the scroll body 10 has a working medium inlet and a working medium outlet 14. The scroll chamber is in communication with both the working medium inlet and the working medium outlet 14. The working medium inlet chamber 111 communicates the working medium inlet and the working medium compression chamber 112. The working medium outlet 14 is in communication with the working medium compression chamber 112. Further, as shown in FIG. 1, the scroll wrap 12 is constructed as a scroll-shaped plate-like structure, and the scroll wrap 12 can divide the working medium flow groove 11 into an arc-shaped working medium inlet chamber 111 and a scroll-shaped working medium compression chamber 112 by arranging the scroll wrap 12 in the working medium flow groove 11. The working medium inlet chamber 111 and the working medium compression chamber 112 are working medium flow channels. A working medium flows into the working medium inlet chamber 111 through the working medium inlet. The working medium in the working medium inlet chamber 111 flows into the working medium compression chamber 112 along the working medium inlet chamber 111, and finally flows out of the working medium outlet 14.

[0023] The closed annular oil supply groove 13 is formed around the open end of the working medium flow groove 11 on the scroll body 10. The oil supply groove 13 is adapted to be in communication with an oil outlet hole 20 of the orbiting scroll 200 of the scroll compressor 300. Through a cooperation between the oil supply groove 13 and the oil outlet hole 20, a lubricating oil flows into the oil supply groove 13 from the oil outlet hole 20 to sufficiently lubricate a contact surface between the orbiting scroll 200 and the stationary scroll 100.

[0024] Specifically, as shown in FIGS. 1, 4 and 5, during an operation of the scroll compressor 300, a crankshaft 301 of the scroll compressor 300 rotates, and the lubricating oil in an oil sump 302 of the scroll compressor 300 is delivered to the oil outlet hole 20 of the orbiting scroll 200 through an oil supply channel 303 of the crankshaft 301 under a coupling action of a pressure difference. When the orbiting scroll 200 moves relative to the stationary scroll 100 to communicate the oil outlet hole 20 and the oil supply groove 13, the lubricating oil flows into the oil supply groove 13 from the oil outlet hole 20. As a result, the lubricating oil is delivered between the orbiting scroll 200 and the stationary scroll 100 to provide sufficient lubrication for contact end surfaces of the orbiting scroll 200 and the stationary scroll 100, thereby reducing a friction force between the contact end surfaces of the orbiting scroll 200 and the stationary scroll 100. Therefore, a normal operation between the orbiting scroll 200 and the stationary scroll 100 can be ensured, and the wear between the orbiting scroll 200 and the stationary scroll 100 can be reduced, thereby prolonging the service life of the orbiting scroll 200 and the stationary scroll 100.

[0025] In addition, by constructing the oil supply groove 13 into the closed annular structure, after the lubricating oil flows into the oil supply groove 13 from the oil outlet hole 20, the lubricating oil is simultaneously supplied in both directions along the oil supply groove 13, ensuring that sufficient lubricating oil is present in a region wherein the orbiting scroll 200 and the stationary scroll 100 are in contact with each other, which in turn avoids dry friction between the contact end surfaces of the orbiting scroll 200 and the stationary scroll 100 due to insufficient oil supply. Meanwhile, by constructing the oil supply groove 13 as the closed annular structure, after the lubricating oil flows into the oil supply groove 13 from the oil outlet hole 20, when the oil supply groove 13 is filled with the lubricating oil, there is a predetermined pressure in the oil supply groove 13, an oil film is easily formed between the contact surfaces of the orbiting scroll 200 and the stationary scroll 100. In this case, the oil film can separate the working medium flow groove 11 from the back pressure chamber 21, to realize a complete sealing between the working medium flow groove 11 and a back pressure chamber 21. Therefore, it is possible to avoid the leakage of the back pressure into the working medium flow groove 11 through a gap between the contact end surfaces of the orbiting scroll 200 and the stationary scroll 100, to prevent the power of the scroll compressor 300 from increasing due to repeated compression of the working medium. Thus, the energy efficiency of the scroll compressor 300 can be enhanced to improve the performance of the scroll compressor 300.

[0026] Thus, by forming the closed annular oil supply groove 13, the lubrication of the whole region between the orbiting scroll 200 and the stationary scroll 100 can be achieved, thereby avoiding the dry friction at the contact end surfaces of the orbiting scroll 200 and the stationary scroll 100. As a result, a friction force between the orbiting scroll 200 and the stationary scroll 100 can be reduced, thereby improving the operating performance of the scroll compressor 300. Further, after the lubricating oil flows into the oil supply groove 13 through the oil outlet hole 20, the closed annular oil supply groove 13 can provide bidirectional supply of the lubricating oil, ensuring that the lubricating oil is present in the whole region between the orbiting scroll 200 and the stationary scroll 100 in a circumferential direction. In addition, the lubricating oil in the oil supply groove 13 can separate the working medium compression chamber 112 from the back pressure chamber 21, to achieve a complete sealing between the working medium compression chamber 112 and the back pressure chamber 21. As a result, it is possible to avoid the leakage of the back pressure into the working medium compression chamber 112 through the gap between the contact end surfaces of the orbiting scroll 200 and the stationary scroll 100, to prevent the power of the scroll compressor 300 from increasing due to the repeated compression of the working medium. Therefore, the performance of the scroll compressor 300 can be improved.

[0027] In some embodiments of the present disclosure, as shown in FIG. 1, in a radial direction of the stationary scroll 100, an inner sidewall 133 of the oil supply groove 13 is spaced apart from the working medium flow groove 11. As shown in FIG. 1, the oil supply groove 13 extends in the circumferential direction of the stationary scroll 100. The oil supply groove 13 is a closed annular groove formed around the open end of the working medium flow groove 11. In a radial direction of the stationary scroll 100, by spacing the inner side wall 133 of the oil supply groove 13 apart from the working medium flow groove 11, a predetermined distance is generated between the inner side wall 133 of the oil supply groove 13 and the working medium flow groove 11. After the lubricating oil flows into the oil supply groove 13 from the oil outlet hole 20, the complete sealing between the working medium flow groove 11 and the back pressure chamber 21 can be ensured, which in turn avoids the leakage of the back pressure into the working medium flow groove 11 through the gap between the contact end surfaces of the orbiting scroll 200 and the stationary scroll 100, to further prevent the power of the scroll compressor 300 from increasing due to the repeated compression of the working medium. Therefore, the energy efficiency and the performance of the scroll compressor 300 can be further improved.

[0028] In some embodiments of the present disclosure, as shown in FIG. 1, a spacing between the inner side wall 133 of the oil supply groove 13 and the working medium flow groove 11 is A, wherein $1\ \text{mm} \leq A$. It should be noted that in the radial direction of the stationary scroll 100, the inner side wall 133 of the oil supply groove 13 is spaced apart from the working medium flow groove 11, and the spacing between the inner side wall 133 of the oil supply groove 13 and the working medium flow groove 11 is greater than or equal to 1 mm. Further, the greater the spacing between the inner side wall 133 of the oil supply groove 13 and the working medium flow groove 11 is, the better the sealing performance between the working medium flow groove 11 and the back pressure chamber 21 after the lubricating oil flows into the oil supply groove 13 from the oil outlet hole 20 is. In contrast, the smaller the spacing between the inner side wall 133 of the oil supply groove 13 and the working medium flow groove 11 is, which results in smaller amount of the lubricating oil between the orbiting scroll 200 and the stationary scroll 100, the poorer the sealing performance between the orbiting scroll 200 and the stationary scroll 100 is. In the present disclosure, by setting the spacing between the inner side wall 133 of the oil supply groove 13 and the working medium flow groove 11 to be greater than or equal to 1 mm, it is possible to ensure that there is a sufficient spacing between the inner side wall 133 of the oil supply groove 13 and the working medium flow groove 11, and sufficient lubricating oil can be supplied between the contact surfaces of the orbiting scroll 200 and the stationary scroll 100. As a result, the sealing performance between the working medium flow groove 11 and the back pressure chamber 21 can be better ensured. It should be noted that in the circumferential direction of the stationary scroll 100, the spacing between the inner side wall 133 of the oil supply groove 13 and the working medium flow groove 11 may be variable or constant. In the circumferential direction of the stationary scroll 100, the spacing between the inner side wall 133 of the oil supply groove 13 and the working medium flow groove 11 at each region may be set as desired as long as a minimum spacing between the inner side wall 133 of the oil supply groove 13 and the working medium flow groove 11 is 1 mm.

[0029] Further, by generating the predetermined spacing between the inner side wall 133 of the oil supply groove 13 and the working medium flow groove 11, the dry friction between the contact surfaces of the orbiting scroll 200 and the stationary scroll 100 due to the leakage of the lubricating oil can be avoided, which may result in wear of the contact surfaces of the orbiting scroll 200 and the stationary scroll 100. Therefore, the service life of the stationary scroll 100 and the orbiting scroll 200 can be prolonged.

[0030] In some embodiments of the present disclosure, as shown in FIG. 1, the open end of oil supply groove 13 is adapted to be covered with the orbiting scroll 200. Further, when the scroll compressor 300 is placed in the orientation shown in FIG. 4, after the orbiting scroll 200 and the stationary scroll 100 are assembled together, the orbiting scroll 200 is located below the stationary scroll 100, and the scroll wrap of the orbiting scroll 200 extends into the working medium flow groove 11. Further, the oil supply groove 13 is formed on a lower surface of the scroll body 10, and a lower end of the oil supply groove 13 is opened. In the radial direction of the stationary scroll 100, the outer side wall 134 of the oil supply groove 13 is located inside the orbiting scroll 200, and the orbiting scroll 200 covers the open end of the oil supply groove 13. During the operation of the orbiting scroll 200, the orbiting scroll 200 can cover the open end of the oil supply groove 13 in real time, to avoid communication between the oil supply groove 13 and the back pressure chamber 21. After the lubricating oil flows into the oil supply groove 13 from the oil outlet hole 20, the leakage of the lubricating oil in the oil supply groove 13 can be avoided. Therefore, it is possible to ensure that the contact surfaces between the stationary scroll 100 and the orbiting scroll 200 can be sufficiently lubricated with the lubricating oil in the oil supply groove 13.

[0031] Further, in the radial direction of the stationary scroll 100, a spacing between the outer side wall 134 of the oil supply groove 13 and the outer edge of the orbiting scroll 200 is greater than or equal to 1 mm. In this way, it can be ensured that the outer side wall 134 of the oil supply groove 13 is located inside the orbiting scroll 200 in the radial direction of the stationary scroll 100, and the lubricating oil in the oil supply groove 13 can separate the oil supply groove 13 from the back pressure chamber 21, effectively avoiding the leakage of the lubricating oil in the oil supply groove 13. In addition, the greater the spacing between the outer side wall 134 of the oil supply groove 13 and the back pressure chamber 21 is, the better the sealing performance between the oil supply groove 13 and the back pressure chamber 21 is. In contrast, the smaller the spacing between the outer side wall 134 of the oil supply groove 13 and the back pressure chamber 21 is, the worse the sealing performance between the oil supply groove 13 and the back pressure chamber 21 is. By setting the spacing between the outer side wall 134 of the oil supply groove 13 and the outer edge of the orbiting scroll 200 to be greater than or equal to 1 mm, it is ensured that the oil supply groove 13 does not communicate with the back pressure chamber 21 during the operation of the orbiting scroll 200, to avoid the dry friction between the contact surface of the orbiting scroll 200 and the stationary scroll 100 due to the leakage of the lubricating oil, to reduce the wear between the contact surfaces of the orbiting scroll 200 and the stationary scroll 100. Therefore, the service life of the stationary scroll 100 and the orbiting scroll 200 can be further prolonged.

[0032] Further, by setting the predetermined spacing between the inner side wall 133 of the oil supply groove 13 and the working medium flow groove 11 and covering the open end of the oil supply groove 13 with the orbiting scroll 200, the lubricating oil in the oil supply groove 13 can space the working medium flow groove 11 apart from the back pressure chamber 21, to achieve the complete sealing between the working medium flow groove 11 and the back pressure chamber 21. As a result, it is possible to avoid the leakage of the back pressure into the working medium flow groove 11 through the gap between the end surfaces of the orbiting scroll 200 and the stationary scroll 100, to prevent the working medium from being repeatedly compressed. Therefore, the power of the scroll compressor 300 can be reduced, and the working performance of the scroll compressor 300 can be improved.

[0033] In some embodiments of the present disclosure, as shown in FIG. 1, a width of the oil supply groove 13 is B, wherein 1.2 mm $\leq$ B $\leq$ 2 mm. In the radial direction of the stationary scroll 100, the width of the oil supply groove 13 is B. For example: B is a value of 1.2 mm, 1.5 mm, 2 mm, or the like. It should be noted that the greater the width of the oil supply groove 13 is, the greater the amount of the lubricating oil in the oil supply groove 13 is, the greater the contact area of the lubricating oil with the orbiting scroll 200 and the stationary scroll 100. As a result, the lubricated region of the oil supply groove 13 can be extended, thereby improving the lubricating effect of the oil supply groove 13. In contrast, the smaller the width of the oil supply groove 13 is, the smaller the amount of the lubricating oil in the oil supply groove 13 is, the smaller the contact area of the lubricating oil with the orbiting scroll 200 and the stationary scroll 100. As a result, the lubricated region is reduced, thereby weakening the lubricating effect of the oil supply groove 13. In the present disclosure, by setting the width of the oil supply groove 13 to be B, the lubricating oil of an appropriate amount will be present in the oil supply groove 13. In this way, it is possible to ensure that the working medium flow groove 11 is spaced apart from the back pressure chamber 21 while ensuring that the orbiting scroll 200 and the stationary scroll 100 can be sufficiently lubricated, thereby achieving the complete sealing between the working medium flow groove 11 and the back pressure chamber 21. It should be noted that the width of the oil supply groove 13 may be set based on actual usage requirements of the scroll compressor 300.

[0034] In some embodiments of the present disclosure, as shown in FIG. 1, a depth of the oil supply groove 13 is C, wherein 0.5 mm $\leq$ C $\leq$ 1.8 mm. For example, C is a value of 0.5 mm, 1.5 mm, 1.8 mm, and the like. In the axial direction of the scroll body 10, the oil supply groove 13 is recessed towards an inner side of the scroll body 10. An end of the oil supply groove 13 close to the orbiting scroll 200 is opened to form the oil supply groove 13 with a depth C. It should be noted that the greater the depth of the oil supply groove 13 is, the greater the amount of lubricating oil contained in the oil supply groove 13 is. As a result, the sufficient lubricating oil can be supplied between the contact end surfaces of the orbiting scroll 200 and the stationary scroll 100. In contrast, the smaller the depth of the oil supply groove 13 is, the smaller the amount of lubricating oil contained in the oil supply groove 13 is. As a result, sufficient lubricating oil cannot be supplied between the contact end surfaces of the orbiting scroll 200 and the stationary scroll 100, which may result in the dry friction between the contact surfaces of the orbiting scroll 200 and the stationary scroll 100, thereby resulting in local abnormal wear. In the present disclosure, by setting the depth of the oil supply groove 13 to be C, the lubricating oil of an appropriate amount in the oil supply groove 13 can be ensured. Further, it is possible to ensure that the working medium flow groove 11 is spaced apart from the back pressure chamber 21 while ensuring the orbiting scroll 200 and the stationary scroll 100 can be sufficiently lubricated, thereby achieving the complete sealing between the working medium flow groove 11 and the back pressure chamber 21. It should be noted that the depth of the oil supply groove 13 may be set based on the actual usage requirements of the scroll compressor 300.

[0035] In some embodiments of the present disclosure, as shown in FIGS. 1 and 2, in the radial direction of the stationary scroll 100, the inner side wall 133 of the oil supply groove 13 has a recess 131 recessed towards the inner side of the scroll body 10. The recess 131 is adapted to be in communication with the oil outlet hole 20. When the orbiting scroll 200 and the stationary scroll 100 are assembled together, the oil supply groove 13 is located above the oil outlet hole 20. During the operation of the orbiting scroll 200, when the orbiting scroll 200 is operated until the oil outlet hole 20 is brought into communication with the oil supply groove 13, the lubricating oil flows into the oil supply groove 13 through the oil outlet hole 20. By forming the recess 131 recessed towards the inner side of the scroll body 10 on the inner side wall 133 of the oil supply groove 13, during the operation of the orbiting scroll 200, the oil outlet hole 20 can be in communication with the recess 131, and the lubricating oil can thus flow into the recess 131 through the oil outlet hole 20. As a result, an oil supply from the recess 131 to the oil supply groove 13 can be realized. With this arrangement, a duration during which the oil outlet hole 20 is in communication with the oil supply groove 13 can be increased, and thus the duration can be prolonged, which in turn ensures sufficient oil supply to the oil supply groove 13. Further, the lubricating effect between the orbiting scroll 200 and the stationary scroll 100 can be enhanced, and the sealing effect between the orbiting scroll 200 and the stationary scroll 100 can be also enhanced.

[0036] In some embodiments of the present disclosure, as shown in FIG. 1, the recess 131 is formed as an arc-shaped recess. Further, the recess 131 is constructed as a semi-circular arc-shaped recess recessed towards the inner side of the scroll body 10. After the lubricating oil flows into the semi-circular arc-shaped recess through the oil outlet hole 20, the lubricating oil is uniformly divided into the oil supply grooves 13 on two sides through an arc-shaped surface of the arc-shaped recess, to achieve uniform oil supply to the oil supply groove 13 in two directions, ensuring oil supply in the whole region between the orbiting scroll 200 and the stationary scroll 100. At the same time, the complete sealing between the working medium flow groove 11 and the back pressure chamber 21 can be realized, to avoid the leakage of the back pressure into the working medium flow groove 11 through the gap between the end surfaces of the orbiting scroll 200 and the stationary scroll 100. Therefore, the performance of the scroll compressor 300 can be enhanced. In addition, by constructing the recess 131 as the arc-shaped recess, it is possible to further increase the duration during which the oil outlet hole 20 is in communication with the oil supply groove 13, thereby further ensuring sufficient oil supply to the oil supply groove 13. Therefore, the lubricating effect between the orbiting scroll 200 and the stationary scroll 100 can be further improved.

[0037] In some embodiments of the present disclosure, as shown in FIG. 1, the oil supply groove 13 has a recessed segment 132 recessed towards the radial inner side of the scroll body 10, and the recessed segment 132 abuts on the recess 131. Further, in the circumferential direction of the scroll body 10, at least one side of the recess 131 is provided with the recessed segment 132. That is, the recessed segment 132 may be provided only on one side of the recess 131, and the recessed segment 132 may also be provided on two sides of the recess 131. By providing the recessed segment 132 recessed towards the radial inner side of the scroll body 10 to allow the recessed segment 132 to abut on the recess 131, it is possible to ensure that an interface formed at the connection between the recess 131 and the oil supply groove 13 has no a sharp portion, which facilitates the flow of the lubricating oil from the recess 131 into the oil supply groove 13. As a result, the lubricating oil can smoothly flow at the oil supply groove 13. In addition, it is also possible to avoiding the wear due to the sharp portion formed at the connection between the recess 131 and the oil supply groove 13.

[0038] In some embodiments of the present disclosure, as shown in FIG. 1, the recessed segment 132 is formed as an arc-shaped segment. With this arrangement, the recess 131 can be in communication with the oil supply groove 13 through the arc-shaped segment, effectively ensuring that the interface formed at the connection between the recess 131 and the oil supply groove 13 has no sharp portion, which facilitates the flow of the lubricating oil from the recess 131 into the oil supply groove 13. Therefore, the lubricating oil can smoothly flow in the oil supply groove 13. Further, it is possible to avoid the wear caused due to the sharp portion formed at the connection between the recess 131 and the oil supply groove 13.

[0039] As shown in FIGS. 1 to 5, a scroll compressor 300 according to an embodiment of the present disclosure comprises the stationary scroll 100 according to the above-mentioned embodiment. By forming the closed annular oil supply groove 13, the lubrication of the whole region between the orbiting scroll 200 and the stationary scroll 100 can be achieved, thereby avoiding the dry friction at the contact end surfaces of the orbiting scroll 200 and the stationary scroll 100. As a result, a friction force between the orbiting scroll 200 and the stationary scroll 100 can be reduced, thereby improving the operating performance of the scroll compressor 300. Further, after the lubricating oil flows into the oil supply groove 13 through the oil outlet hole 20, the closed annular oil supply groove 13 can provide bidirectional supply of the lubricating oil, ensuring that the lubricating oil is present in the whole region between the orbiting scroll 200 and the stationary scroll 100 in a circumferential direction. In addition, the lubricating oil in the oil supply groove 13 can separate the working medium compression chamber 112 from the back pressure chamber 21, to achieve the complete sealing between the working medium compression chamber 112 and the back pressure chamber 21. As a result, it is possible to avoid the leakage of the back pressure into the working medium compression chamber 112 through the gap between the contact end surfaces of the orbiting scroll 200 and the stationary scroll 100, to prevent the power of the scroll compressor 300 from increasing due to the repeated compression of the working medium. Therefore, the performance of the scroll compressor 300 can be improved.

[0040] In the description of this specification, references to descriptions of the terms "one embodiment", "some embodiments", "schematic embodiments", "examples", "specific examples", or "some examples", etc. mean that a particular feature, structure, material, or characteristic described in connection with the embodiment or example is included in at least one embodiment or example of the present disclosure. In this specification, schematic representations of the above terms do not necessarily refer to the same embodiment or example. Furthermore, the particular features, structures, materials, or characteristics described may be combined in any suitable manner in any one or more embodiments or examples.

[0041] While embodiments of the present disclosure have been shown and described, it will be appreciated by those skilled in the art that various changes, modifications, substitutions and alterations may be made to these embodiments without departing from the principles and spirit of the present disclosure, the scope of which is defined by the claims and their equivalents.

Claims

1. A stationary scroll for a scroll compressor, wherein the stationary scroll comprising:

    a scroll body defining a working medium flow groove with an open end;
    a scroll wrap disposed within the working medium flow groove to form a scroll chamber; and
    a closed annular oil supply groove formed on the scroll body and surrounding an open end of the working medium flow groove, the oil supply groove being adapted to be in communication with an oil outlet hole of an orbiting scroll of the scroll compressor.

2. The stationary scroll according to claim 1, wherein an inner side wall of the oil supply groove is spaced apart from the working medium flow groove in a radial direction of the stationary scroll.

3. The stationary scroll according to claim 2, wherein a spacing between the inner side wall of the oil supply groove and the working medium flow groove is A, wherein 1 mm $\leq$ A.

4. The stationary scroll according to any one of claims 1 to 3, wherein an open end of the oil supply groove is adapted to be covered with the orbiting scroll.

5. The stationary scroll according to any one of claims 1 to 4, wherein a width of the oil supply groove is B, wherein 1.2 mm $\leq$ B $\leq$ 2 mm.

6. The stationary scroll according to any one of claims 1 to 5, wherein a depth of the oil supply groove is C, wherein 0.5 mm $\leq$ C $\leq$ 1.8 mm.

7. The stationary scroll according to any one of claims

1 to 6, wherein in a radial direction of the stationary scroll, an inner side wall of the oil supply groove has a recess recessed towards an inner side of the scroll body and adapted to be in communication with the oil outlet hole.

8. The stationary scroll according to claim 7, wherein the recess is formed as an arc-shaped recess.

9. The stationary scroll according to claim 7 or 8, wherein the oil supply groove has a recessed segment recessed towards a radial inner side of the scroll body, the recessed segment abutting on the recess.

10. The stationary scroll according to claim 9, wherein the recessed segment is formed as an arc-shaped segment.

11. A scroll compressor, comprising a stationary scroll according to any one of claims 1 to 10.

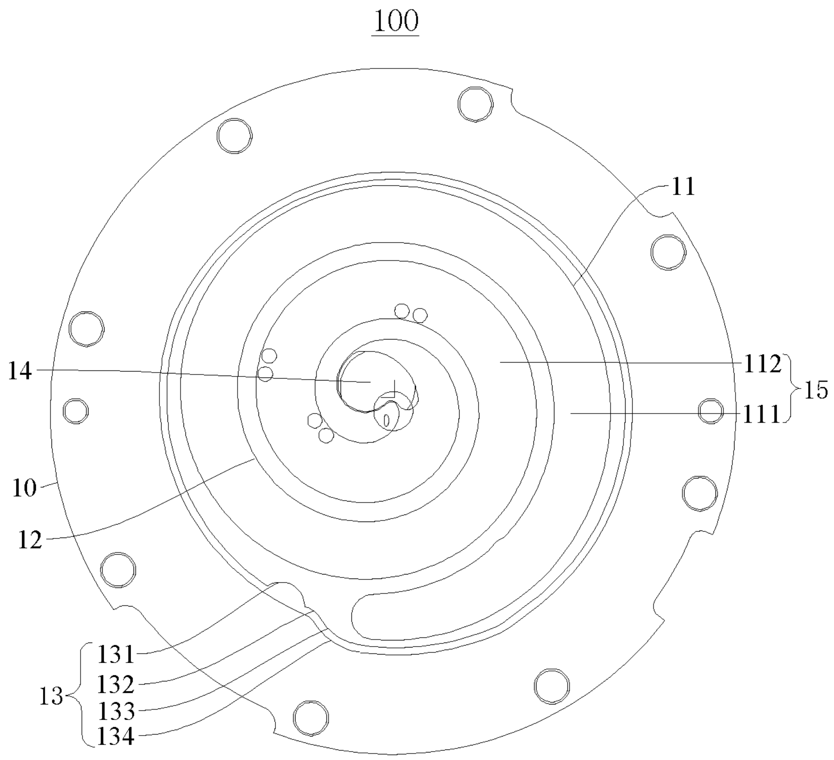

FIG. 1

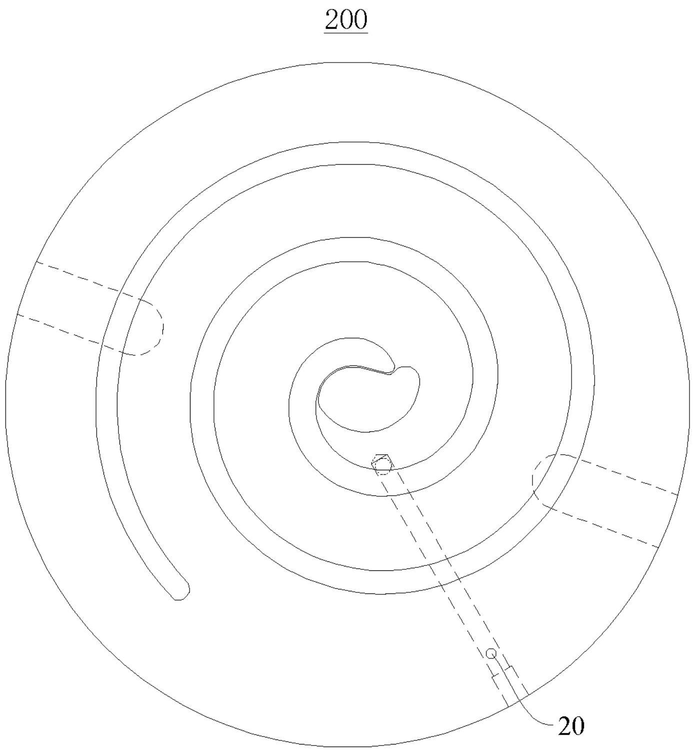

FIG. 2

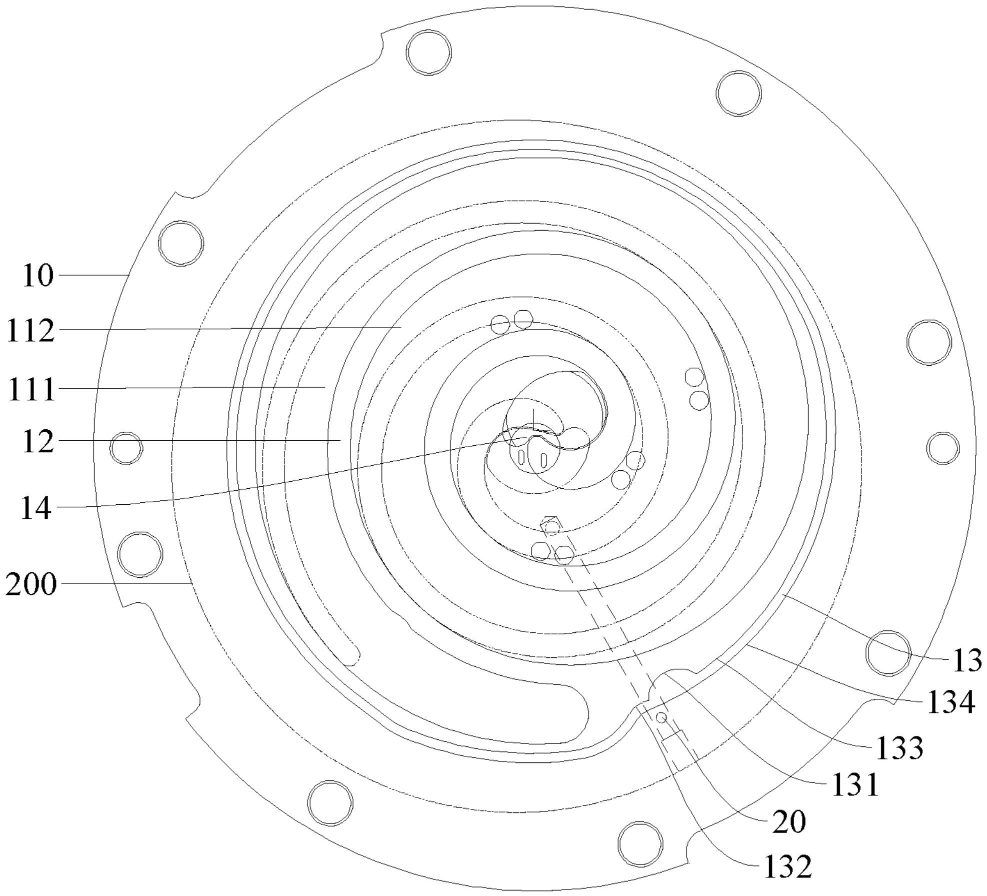

FIG. 3

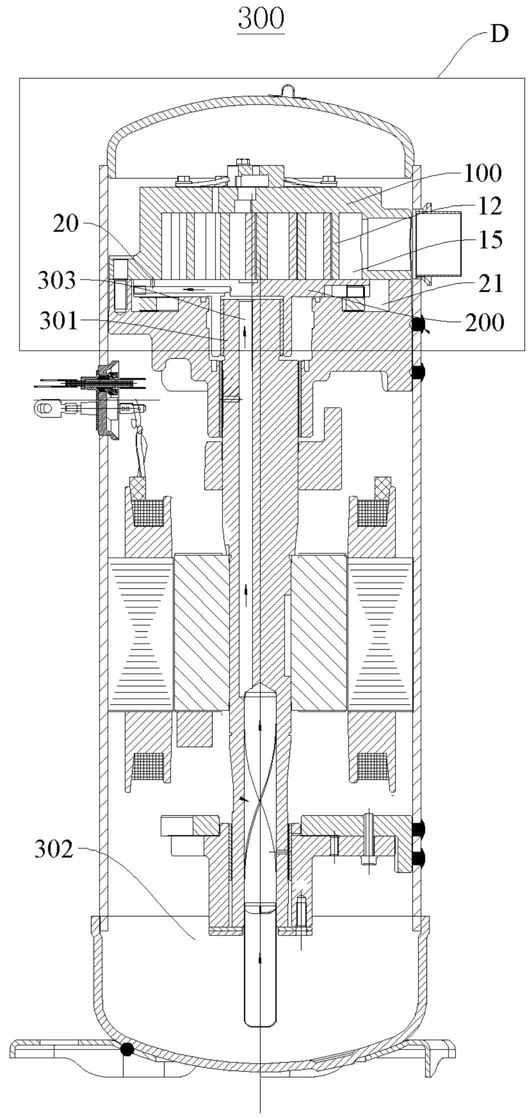

FIG. 4

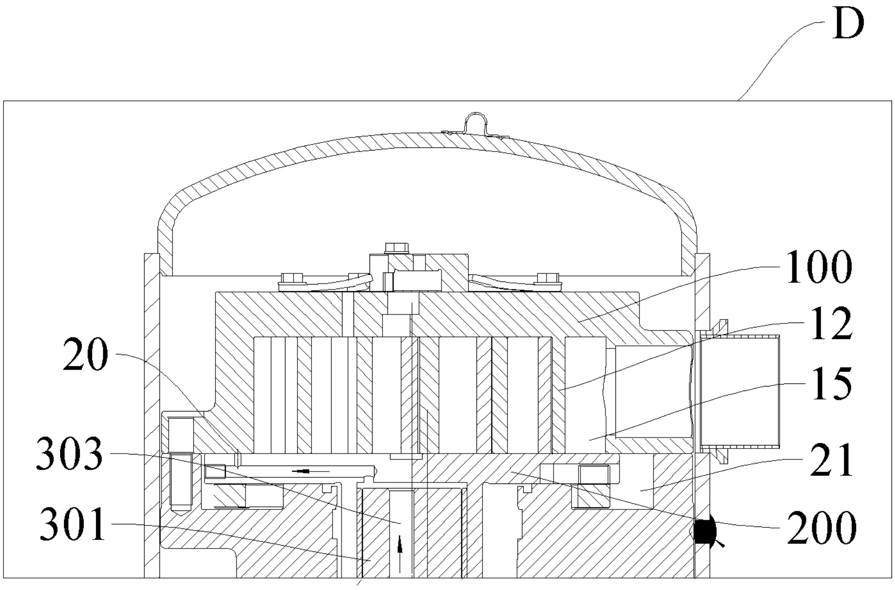

FIG. 5

INTERNATIONAL SEARCH REPORT

International application No. **PCT/CN2023/086304**

A. CLASSIFICATION OF SUBJECT MATTER

F04C18/02(2006.01)i; F04C29/02(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)

IPC: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: 涡旋, 压缩机, 静涡旋盘, 动涡旋盘, 涡旋齿, 供油槽, 闭环形, 敞开, 出油孔, 凹槽; VEN; ENTXT; EPTXT; WOTXT: scroll compressor, oil, lubricate, closed loop, open, groove, Static vortex disk, rotary disk.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 114738273 A (GUANGDONG MEIZHI COMPRESSOR CO., LTD.) 12 July 2022 (2022-07-12) claims 1-11	1-11
X	CN 113864185 A (GUANGDONG MIDEA ENVIRONMENTAL TECHNOLOGY CO., LTD.) 31 December 2021 (2021-12-31) description, paragraphs 29-74, and figures 1-6	1, 2, 4, 11
Y	CN 113864185 A (GUANGDONG MIDEA ENVIRONMENTAL TECHNOLOGY CO., LTD.) 31 December 2021 (2021-12-31) description, paragraphs 29-74, and figures 1-6	3-11
Y	CN 113494459 A (GUANGDONG MIDEA ENVIRONMENTAL TECHNOLOGY CO., LTD.) 12 October 2021 (2021-10-12) description, paragraphs 48-74, and figures 1-11	3-11
X	CN 113775523 A (GUANGDONG MIDEA ENVIRONMENTAL TECHNOLOGY CO., LTD.) 10 December 2021 (2021-12-10) description, paragraphs 36-61, and figures 1-8	1, 2, 4, 11

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

* Special categories of cited documents:
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- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
06 June 2023	**04 July 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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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2023/086304

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN 113775523 A (GUANGDONG MIDEA ENVIRONMENTAL TECHNOLOGY CO., LTD.) 10 December 2021 (2021-12-10) description, paragraphs 36-61, and figures 1-8	3-11
A	CN 110966186 A (GREE GREEN REFRIGERATION TECHNOLOGY CENTER CO., LTD. OF ZHUHAI) 07 April 2020 (2020-04-07) entire document	1-11

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2023/086304

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 114738273 A	12 July 2022	None	
CN 113864185 A	31 December 2021	None	
CN 113494459 A	12 October 2021	CN 113494459 B	17 February 2023
CN 113775523 A	10 December 2021	CN 215927779 U	01 March 2022
CN 110966186 A	07 April 2020	CN 211975385 U	20 November 2020

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