

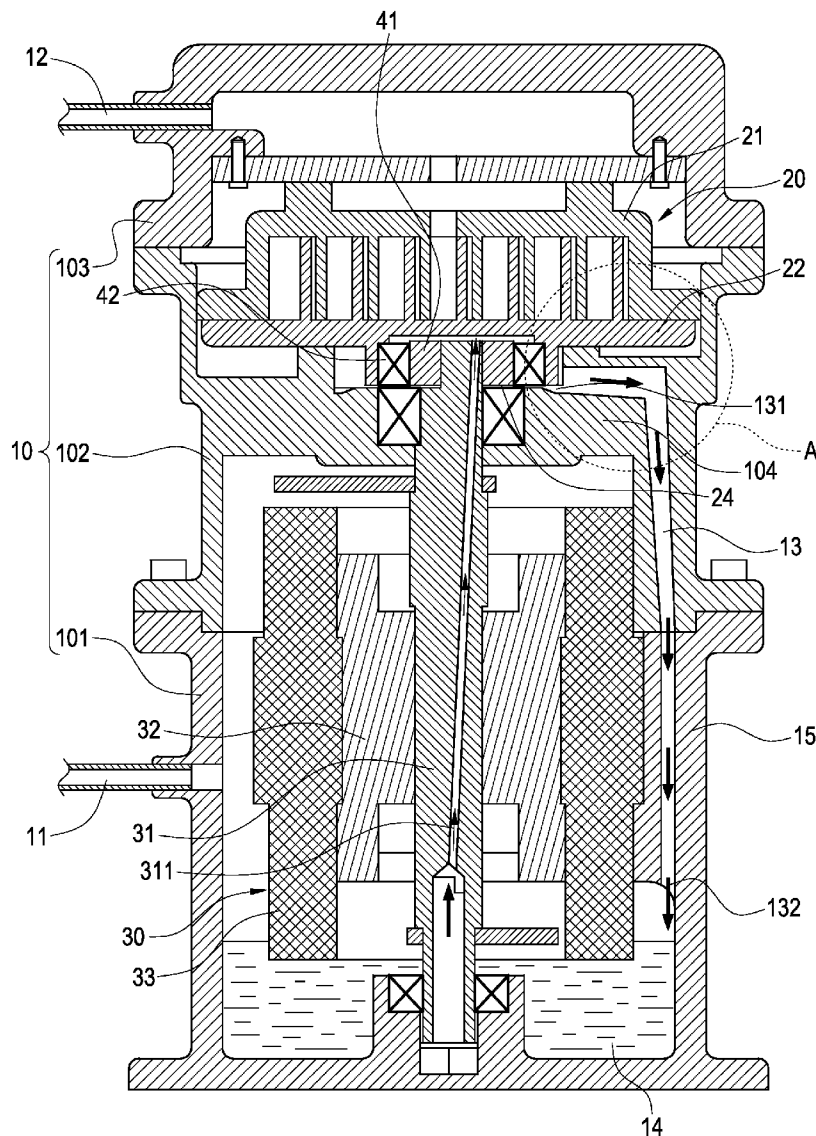


US 20090148328A1

(19) **United States**(12) **Patent Application Publication**
YEH et al.(10) **Pub. No.: US 2009/0148328 A1**(43) **Pub. Date: Jun. 11, 2009**(54) **LUBRICANT BACKFLOW STRUCTURE OF COMPRESSOR****Publication Classification**(76) Inventors: **Chung-Hung YEH**, Sijhih City (TW); **Kai-Wei Lin**, Sijhih City (TW); **Wei-Ting Hsu**, Sijhih City (TW); **Hsun-An Li**, Sijhih City (TW)(51) **Int. Cl.**
F04C 27/00 (2006.01)(52) **U.S. Cl.** **418/55.6; 418/142**(57) **ABSTRACT**

A lubricant backflow structure of a compressor includes a casing, a scrolling set, and a transmission mechanism. An oil tank is arranged under the casing, an internally longitudinal wall of which is formed as an oil backflow passage, an inlet of which is corresponded to one side of the scrolling set for receiving a lubricant, and an outlet of which is formed above the oil tank. Thereby, when a working fluid (e.g. refrigerant) enters into the casing, it won't mix with the lubricant therein, capable of reducing oil consumption and enhancing thermally exchanging efficiency of the system.

Correspondence Address:
HDLS Patent & Trademark Services
P.O. BOX 220746
CHANTILLY, VA 20153-0746 (US)

(21) Appl. No.: **11/951,687**(22) Filed: **Dec. 6, 2007**

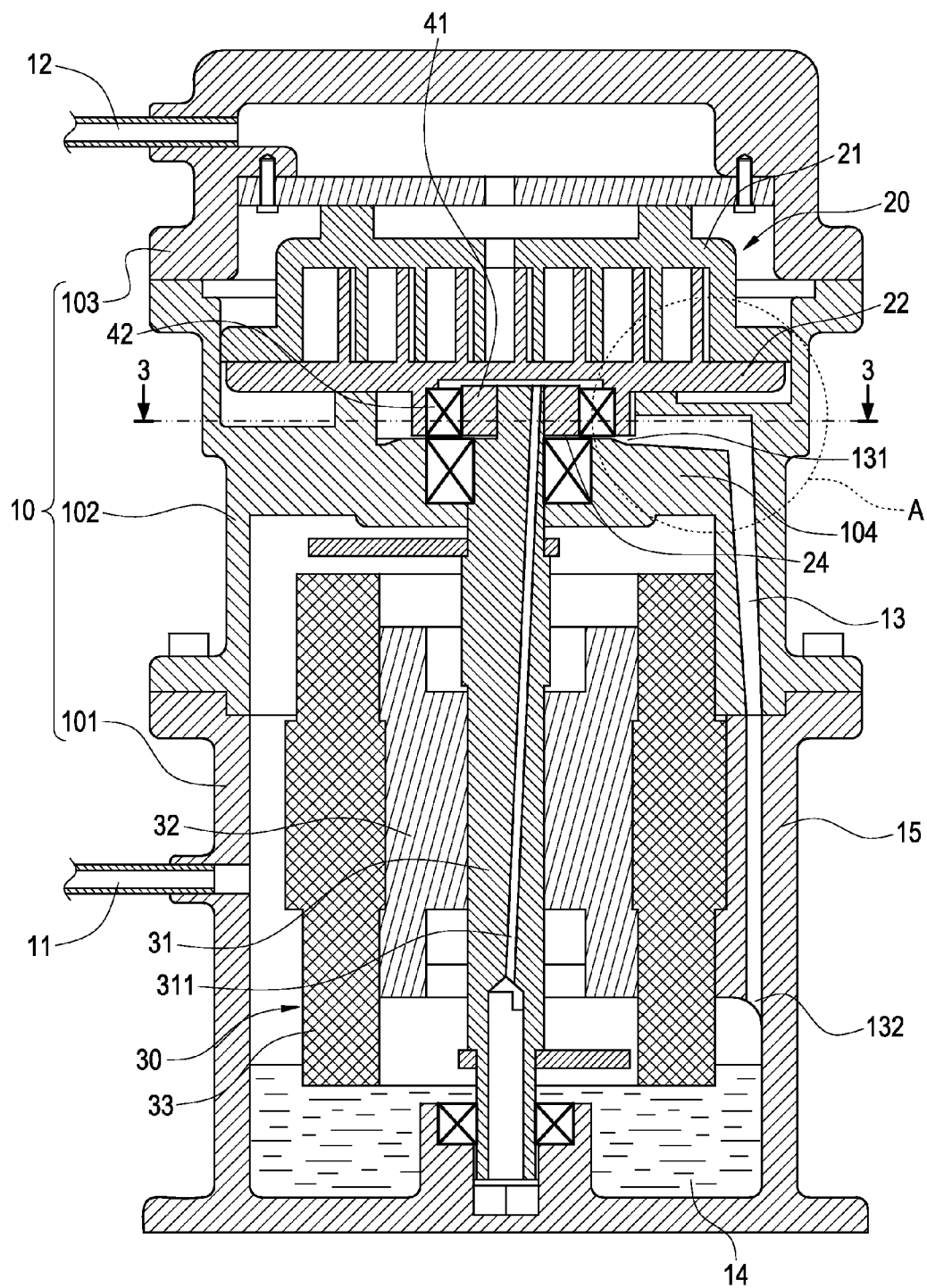


FIG.1

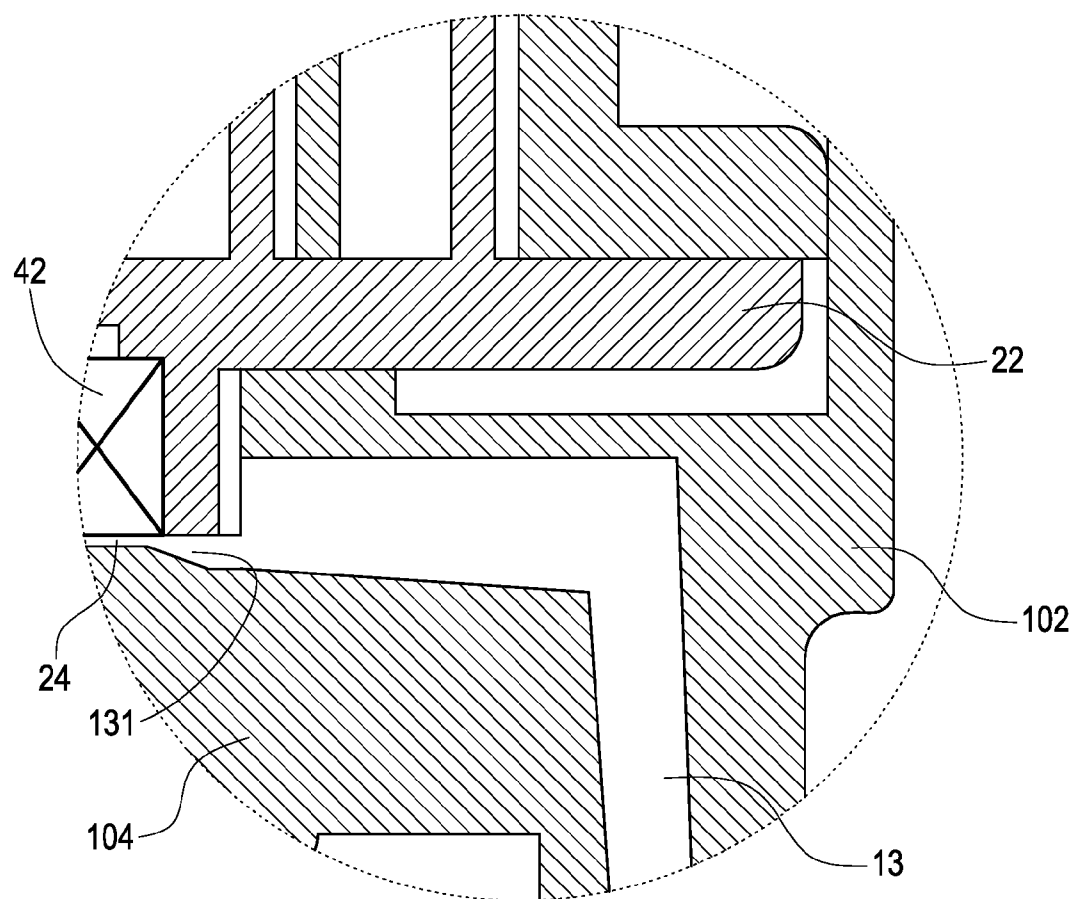


FIG.2

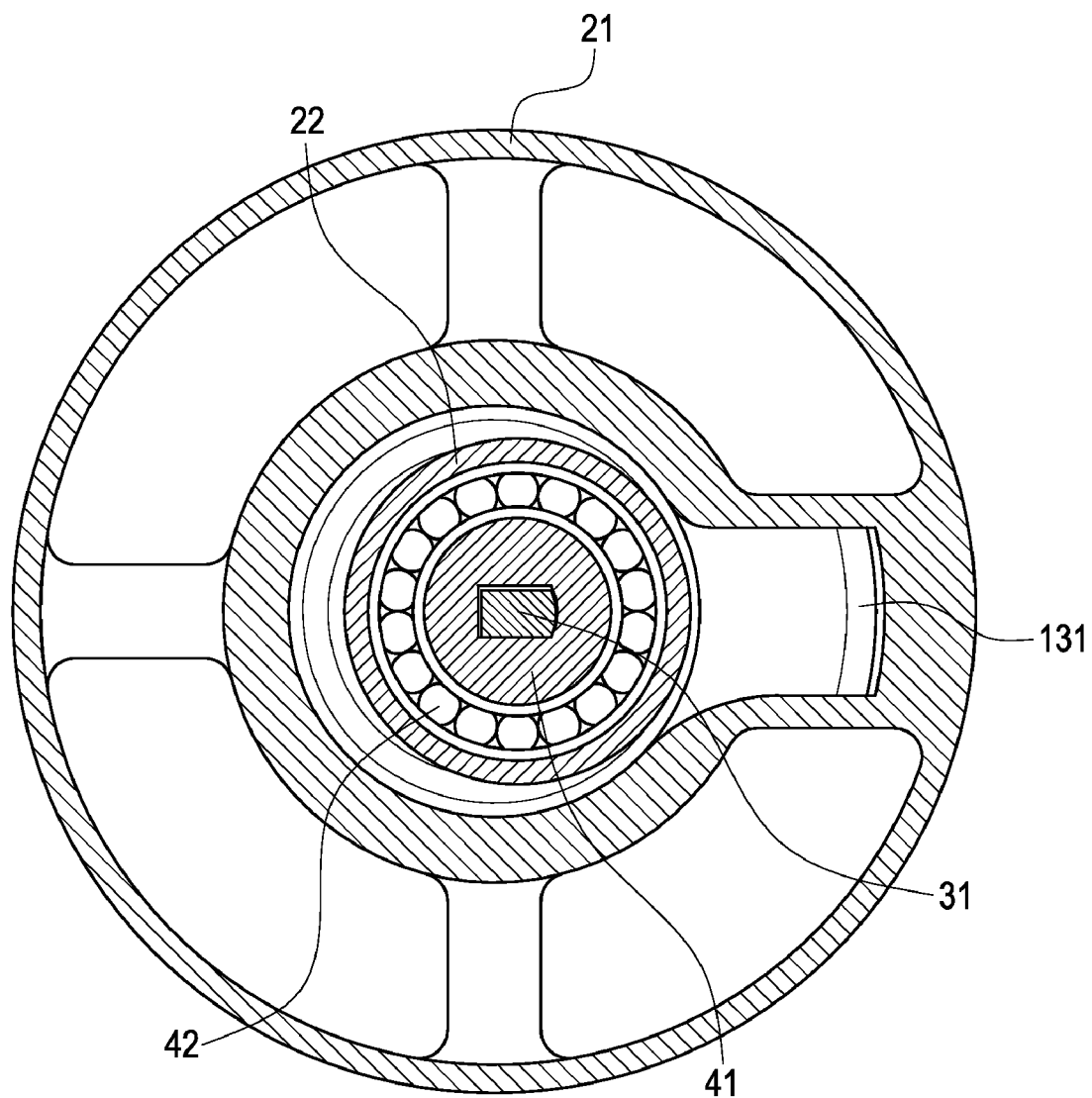


FIG.3

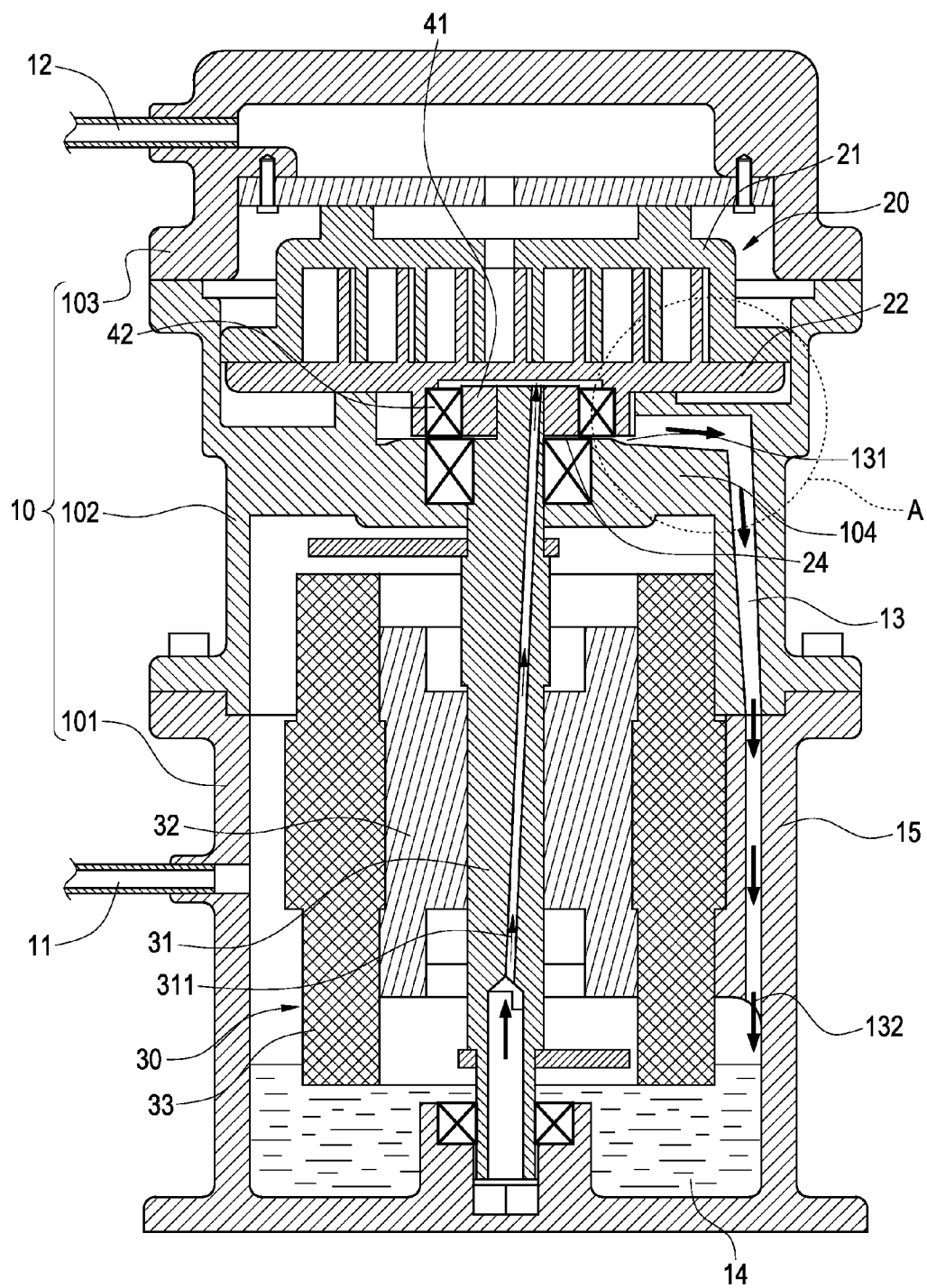


FIG.4

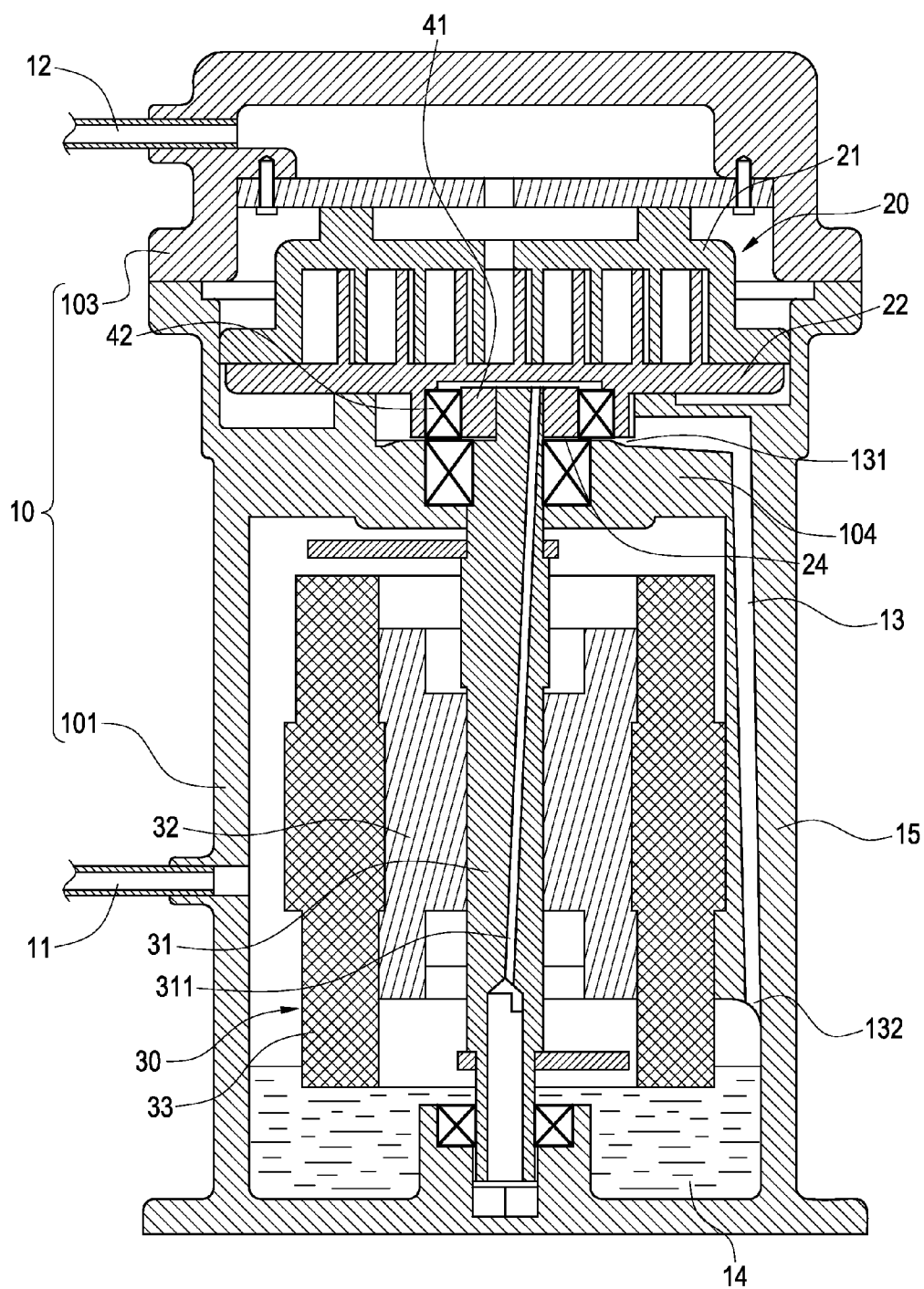


FIG.5

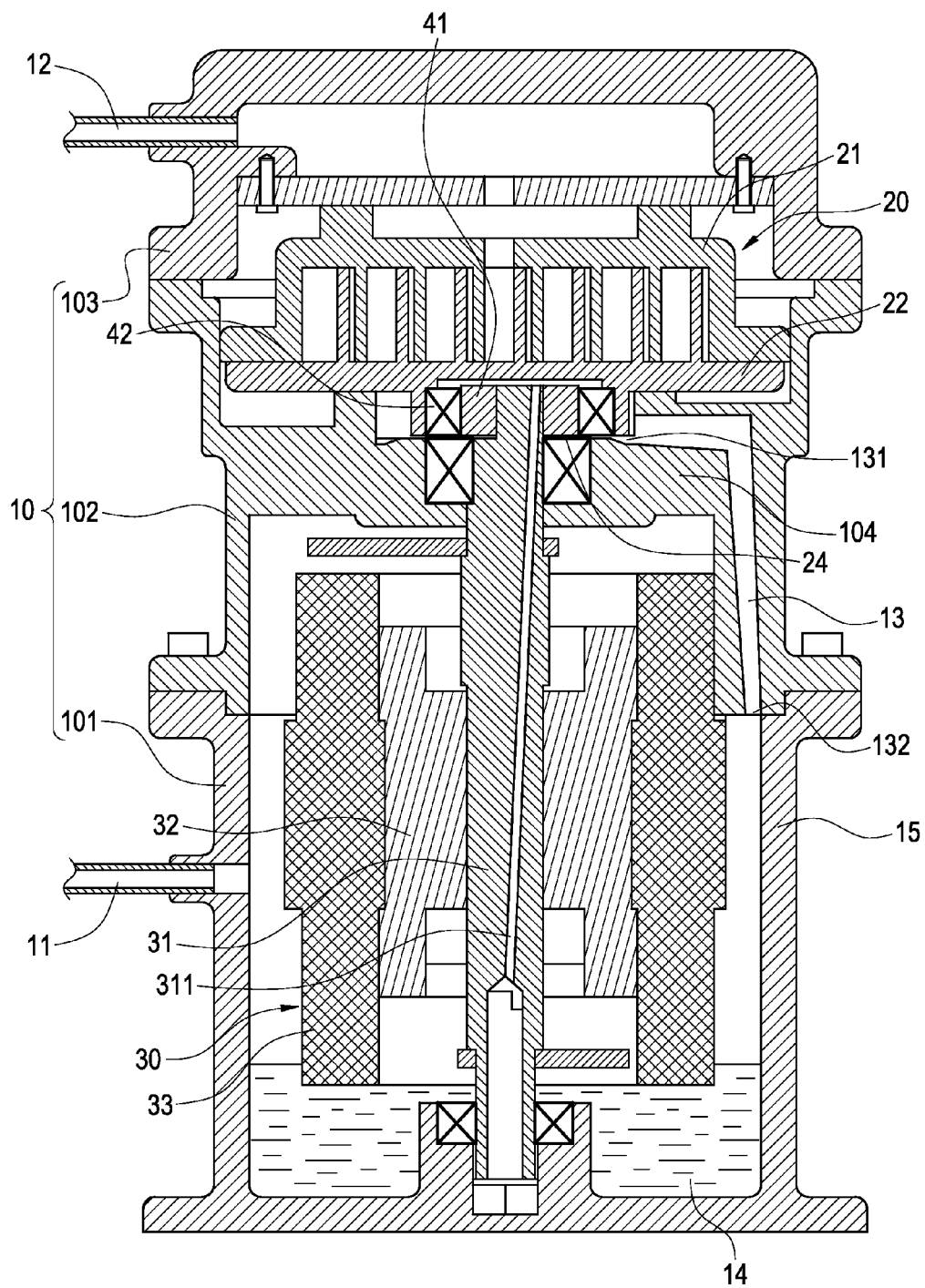


FIG. 6

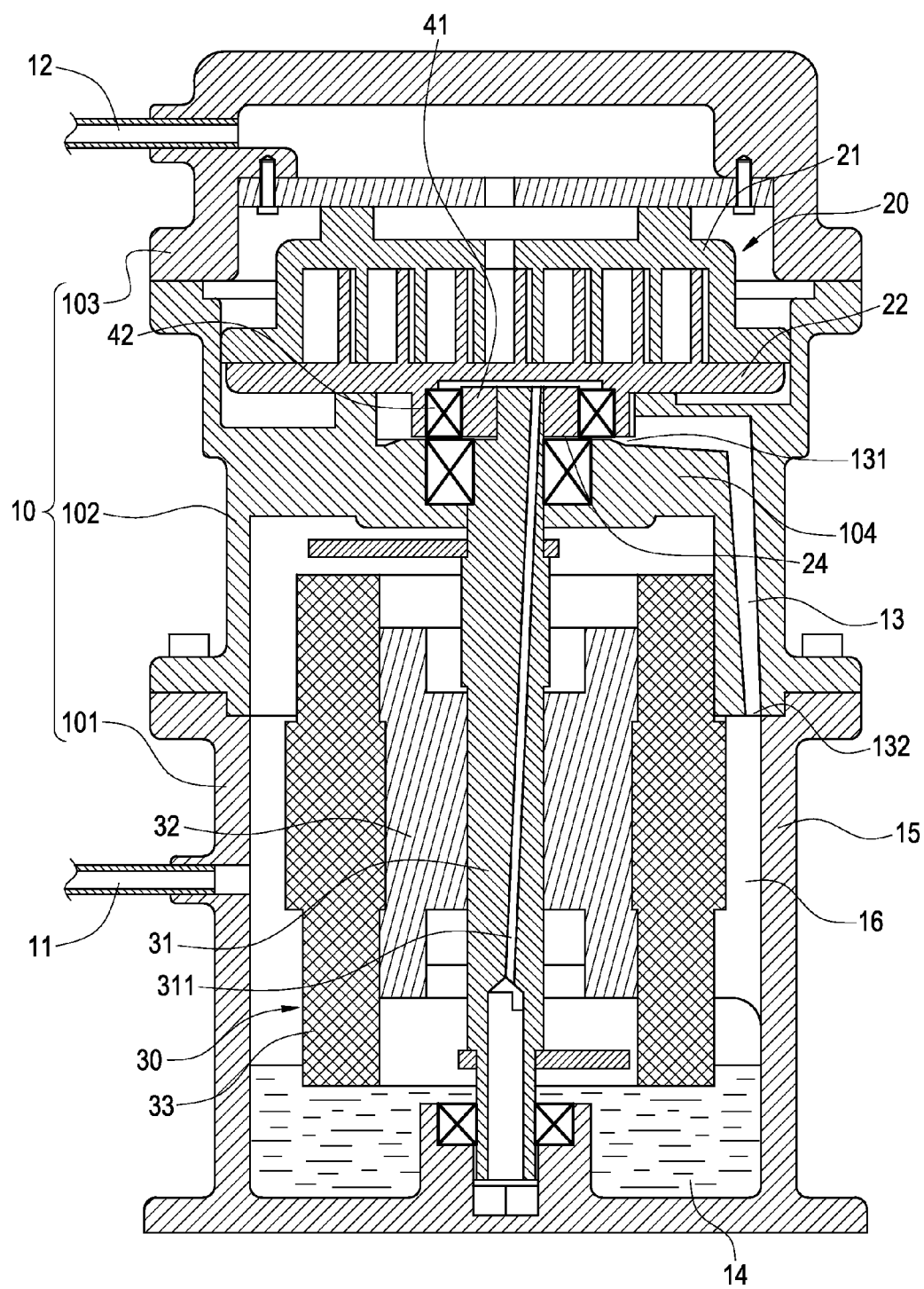


FIG.7

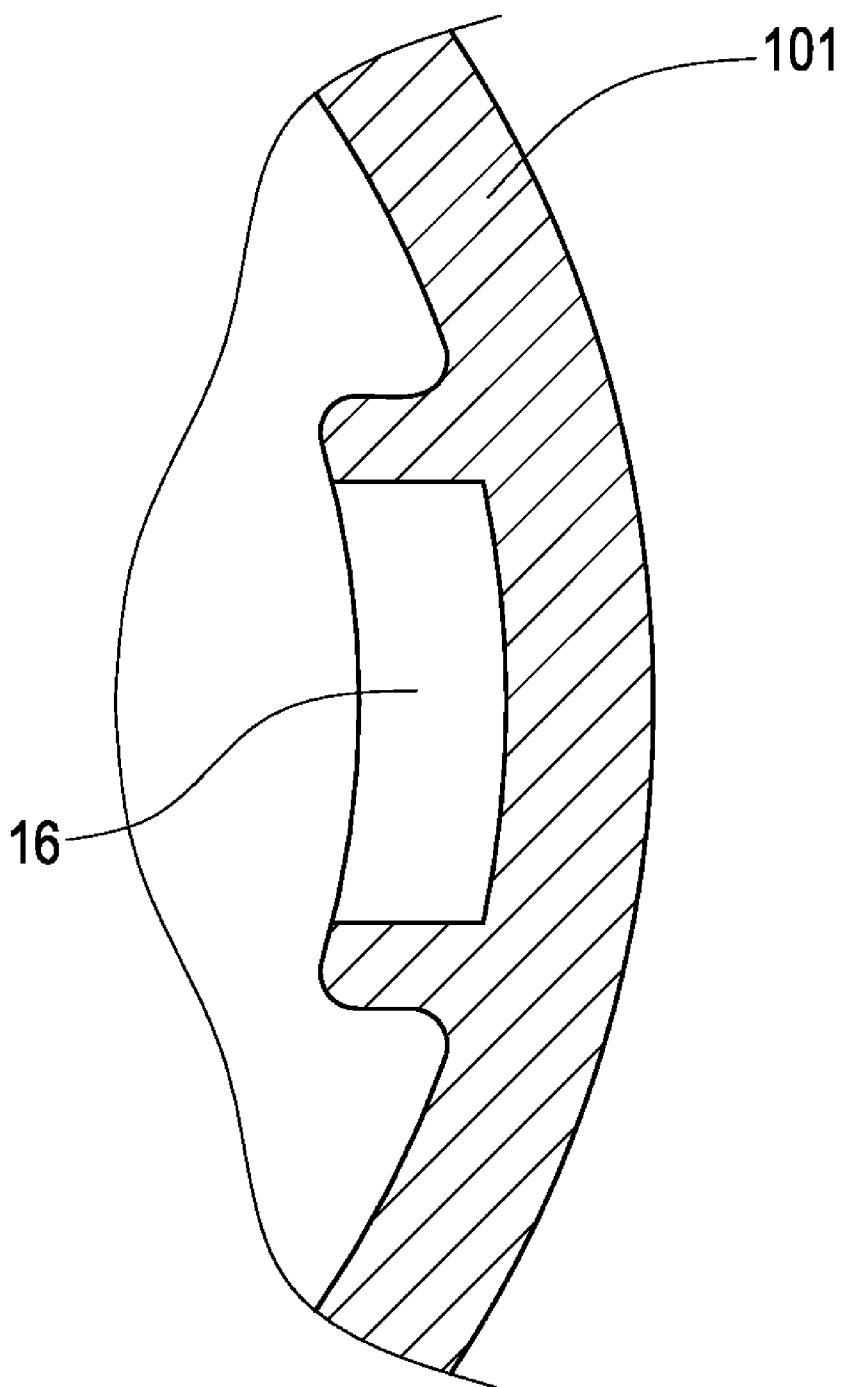


FIG.8

LUBRICANT BACKFLOW STRUCTURE OF COMPRESSOR

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention generally relates to a backflow structure, in particular, to a lubricant backflow structure for a compressor.

[0003] 2. Description of Prior Art

[0004] In general, a scroll compressor internally has several compressing and transmitting elements, each of which will generate friction when being operated. In order to avoid the compressor's elements from friction during their moving and compressing processes, it is necessary to add lubricant into an internal fluid of the compressor, providing each element's frictional face with the functions of lubrication and sealing. However, if the fluid contains too many oil molecular, the oil consumption of the compressor will increase, deteriorating the efficiency of the machinery. Therefore, how to efficiently reduce the oil consumption and promote the efficiency of the machinery has become an important issue for relative persons who are engaged in such career.

[0005] A conventional oil vapor recovering structure for compressor is disclosed in a ROC patent publication No. M263485, which is characterized in that an oil stopping plate is arranged in a passage of working fluid backflow, making a lubricant vapor in the working fluid condensed and attached on a surface of the oil stopping plate. The condensed and attached lubricant then flows into an oil tank by means of gravity force to achieve a lubricant recovery. However, there is a problem occurred from such arrangement. First, the fluid mixed with lubricant and refrigerant entering from the backflow passage is stopped by the oil stopping plate, and these fluids enter into an oil tank in the bottom of the compressor in a going down and going up manner, such that the oil stored in the tank is interfered to splash up oil molecular, which is mixed with the refrigerant again to be sucked into the compressing room and to be compressed. Therefore, it greatly increases the oil consumption of the compressor, and the going up fluid directly impacts the lubricant going down. The mixing of refrigerant and lubricant will also increase the oil consumption of the compressor significantly, consequently, lowering down the thermal efficiency of the machinery.

[0006] Accordingly, aiming to solve aforementioned shortcomings, after a substantially devoted study, in cooperation with the application of relatively academic principles, the inventor has at last proposed the present invention that is designed reasonably to possess the capability to improve the prior arts significantly.

SUMMARY OF THE INVENTION

[0007] The invention is mainly to provide a lubricant backflow structure of compressor by forming an oil backflow passage in the longitudinal wall of a casing for enhancing the recovery efficiency, when a scroll compressor is being operated.

[0008] The invention is to provide a lubricant backflow structure of compressor for enhancing a lubricant's recovery efficiency. The compressor includes a casing, a scrolling set, and a transmitting mechanism. In the meantime, an oil tank is arranged at a bottom of the casing. An interior of a longitudinal wall of the casing is configured as an oil backflow

passage, an inlet of which is corresponded to one side of the scrolling set for receiving the lubricant, and an outlet of which is formed above the oil tank.

BRIEF DESCRIPTION OF DRAWING

[0009] The features of the invention believed to be novel are set forth with particularity in the appended claims. The invention itself, however, may be best understood by reference to the following detailed description of the invention, which describes a number of exemplary embodiments of the invention, taken in conjunction with the accompanying drawings, in which:

[0010] FIG. 1 is a side-sectional view of a first preferable embodiment of the invention;

[0011] FIG. 2 is a side-sectional view locally enlarging an oil backflow passage of the first preferable embodiment of the invention;

[0012] FIG. 3 is a top-sectional view of the first preferable embodiment of the invention;

[0013] FIG. 4 is a side-sectional view of the first preferable embodiment of the invention during an operating period;

[0014] FIG. 5 is a side-sectional view of a second preferable embodiment of the invention;

[0015] FIG. 6 is a side-sectional view of a third preferable embodiment of the invention;

[0016] FIG. 7 is a side-sectional view of a fourth preferable embodiment of the invention; and

[0017] FIG. 8 is a top-sectional view locally enlarging an oil backflow passage of the fourth preferable embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0018] In cooperation with attached drawings, the technical contents and detailed description of the present invention are described thereafter according to a number of preferable embodiments, being not used to limit its executing scope. Any equivalent variation and modification made according to appended claims is all covered by the claims claimed by the present invention.

[0019] Please refer to FIG. 1 through FIG. 4, which respectively show a side-sectional view of a first preferable embodiment of the invention, a side-sectional view locally enlarging an oil backflow passage of the first preferable embodiment of the invention, a top-sectional view of the first preferable embodiment of the invention during an operating period. The invention is to provide a lubricant backflow structure of compressor. The compressor includes a casing 10, a scrolling set 20, and a transmitting mechanism 30, in which the casing 10 is constructed by a lower casing 101, a middle casing 102, and an upper casing 103. A main bearing seat 104 is formed by extending an interior of the middle casing 102. A bottom of the casing 10 has an oil tank for storing a lubricant. The upper casing 103 has an inlet 11, while the lower casing 101 has an outlet 12. The inlet 11 is located below the scrolling set 20 for transporting a working fluid with low pressure. The outlet 12 is located above the scrolling set 20 for transporting a working fluid compressed to be with high pressure. The scrolling set 20 has a static scroll 21 and a rotary scroll 22, both of which may make a rotational motion relatively to compress a working fluid.

[0020] The transmitting mechanism 30 includes a transmitting axle 31, a rotor 32 connected to an outside of the trans-

mitting axle, and a stator **33** arranged to an outside of the rotor **32**. By means of the rotor **32** and the stator **33**, the transmitting mechanism **30** rotates the transmitting axle **31**, which is for driving the rotary scroll **22** to be rotated. In the lubricant backflow structure of the compressor, an oil backflow passage **13** is formed at the interior of a longitudinal wall **15** of the lower casing **101** and the middle casing **102**, an inlet **131** of which is corresponded to one side of the scrolling set **20** for receiving a lubricant, and an outlet **132** of which is formed below the inlet **11** and above the oil tank **14** without impinging lubricant when the working fluid (e.g. refrigerant) enters into oil tank **14** from the inlet **11**, thereby, the oil consumption being able to be saved. The inlet **131** of the oil backflow passage **13** is constructed by a gap **24** between the rotary scroll **22** and the main bearing seat **104**.

[0021] When the compressor is operated, the lubricant in the oil tank **14** goes up via an inclined oil passage **311** in the transmitting axle **31**. After lubricating the scrolling set **20**, the lubricant is recovered by applying a gap **24** as the inlet **131** of the oil backflow passage **13**, and the recovery lubricant then flows down along the oil backflow passage **13**, and finally flows back to the oil tank **14** via the outlet **132**. Furthermore, when there is too many oil in the inclined oil passage **311**, a relatively rotational motion between the rotary scroll **22** and the static scroll **21** will make the lubricant flow into the outlet **131** from an inner wall of the static scroll **21**, as shown in FIG. 3. In the meantime, an inner wall of the rotary scroll **22** is fitted with a bearing, an inner wall of which is fitted with an eccentric bushing **41**, which is fitted into the transmitting axle **31**, which may actuate the rotary scroll **22** to be rotated, when the transmitting axle **31** is rotated.

[0022] Please refer to FIG. 5, which is a side-sectional view of a second preferable embodiment of the invention. In this case, the casing **10** is constructed by a lower casing **101** and an upper casing **103**. In the meantime, an interior of a longitudinal wall **15** of the lower casing **101** is formed as an oil backflow passage **13**.

[0023] Again, please refer to FIG. 3, which is a side-sectional view of a third preferable embodiment of the invention. In this case, a casing **10** is constructed by a lower casing **101**, a middle casing **102**, and an upper casing **103**. In the meantime, an interior of a longitudinal wall **15** of the middle casing **102** is formed as an oil backflow passage **13**, an outlet **132** of which is located at a bottom of the middle casing **102**.

[0024] At last, please refer to FIG. 7 and FIG. 8, which respectively are a side-sectional view of a fourth preferable embodiment of the invention and a top-sectional view locally enlarging an oil backflow passage of the fourth preferable embodiment of the invention. In this case, a casing **10** is constructed by a lowering casing **101**, a middle casing **102**,

and an upper casing **103**. In the meantime, an interior of a longitudinal wall **15** of the middle casing **102** is formed as an oil backflow passage **13**, an outlet **132** of which is located at a bottom of the middle casing **102**. In addition, when the lower casing **101** is die-cast, a longitudinal wall **15** of the lower casing **101** may be formed as a passage **16**, which also has a backflow function for a lubricant; thereby, there is no any other machining process needed, and the additional cost may be saved.

[0025] Summarizing aforementioned description, the invention is an indispensably novel structure for a compressor indeed, which may positively reach the expected usage objective for solving the drawbacks of the prior arts, and which extremely possesses the innovation and progressiveness to completely fulfill the applying merits of new type patent, according to which the invention is thereby applied. Please examine the application carefully and grant it as a formal patent for protecting the rights of the inventor.

[0026] However, the aforementioned description is only a preferable embodiment according to the present invention, being not used to limit the patent scope of the invention, so equivalently structural variation made to the contents of the present invention, for example, description and drawings, is all covered by the claims claimed thereafter.

What is claimed is:

1. A lubricant backflow structure of compressor, the compressor including a casing, a scrolling set, and a transmitting mechanism, a bottom of the casing having an oil tank, characterized in that an interior of a longitudinal wall of the casing is formed as an oil backflow passage, an inlet of which is corresponded to one side of the scrolling set for receiving a lubricant, and an outlet of which is formed above the oil tank.
2. The lubricant backflow structure of compressor according to claim 1, wherein the casing includes:
 - a lower casing;
 - a middle casing, connected above the lower casing; and
 - an upper casing, connected above the middle casing, and wherein the oil backflow passage is respectively formed in the middle casing and the lower casing.
3. The lubricant backflow structure of compressor according to claim 1, wherein the casing includes a lower casing and an upper casing connected above the lower casing, and wherein the oil backflow passage is formed in the lower casing.
4. The lubricant backflow structure of compressor according to claim 1, wherein the casing has an inlet, at a lower position of which an outlet of the oil backflow passage is formed.

* * * * *