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(19) **United States**(12) **Patent Application Publication****Nam et al.**(10) **Pub. No.: US 2006/0222545 A1**(43) **Pub. Date:****Oct. 5, 2006**(54) **FIXED SCROLL OF SCROLL COMPRESSOR****Publication Classification**(75) Inventors: **Jung-won Nam**, Seoul (KR);
Byung-kil Yoo, Seoul (KR)(51) **Int. Cl.****F01C 1/02** (2006.01)**F04C 2/00** (2006.01)(52) **U.S. Cl.** **418/55.1**

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ABSTRACT

Disclosed herein is a scroll compressor, and more particularly, a fixed scroll of the scroll compressor which can allow part of gaseous refrigerant to be smoothly introduced into a compression chamber while preventing introduction of the remaining gaseous refrigerant that is heated in the compressor. The fixed scroll includes a scroll body having an involuted wrap to define a compression chamber therein and provided, around a lower end thereof, with a mounting flange to be arranged on an upper surface of a main frame, and an interceptive suction portion configured to guide part of the gaseous refrigerant, that is directed upward along the main frame, into the compression chamber while preventing introduction of the remaining gaseous refrigerant that is circulated around the scroll body.

(73) Assignee: **LG Electronics Inc.**(21) Appl. No.: **11/213,005**(22) Filed: **Aug. 26, 2005**(30) **Foreign Application Priority Data**

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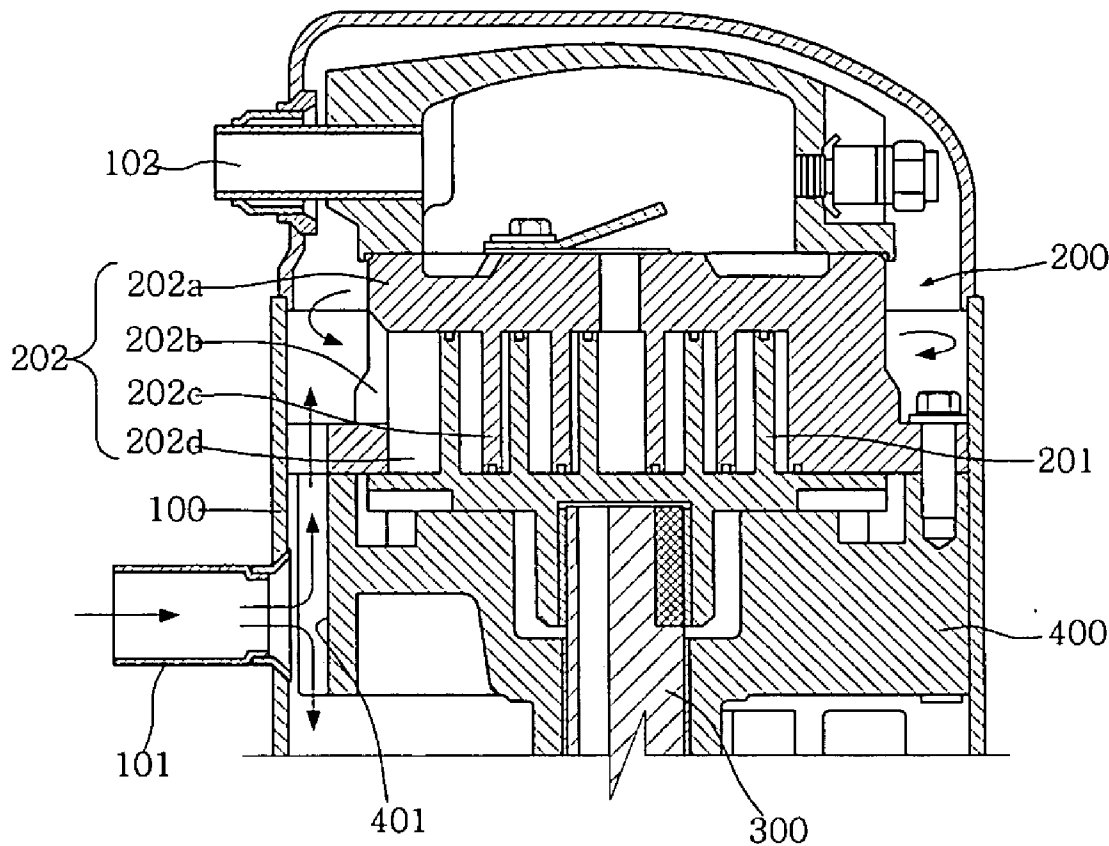


FIG. 1

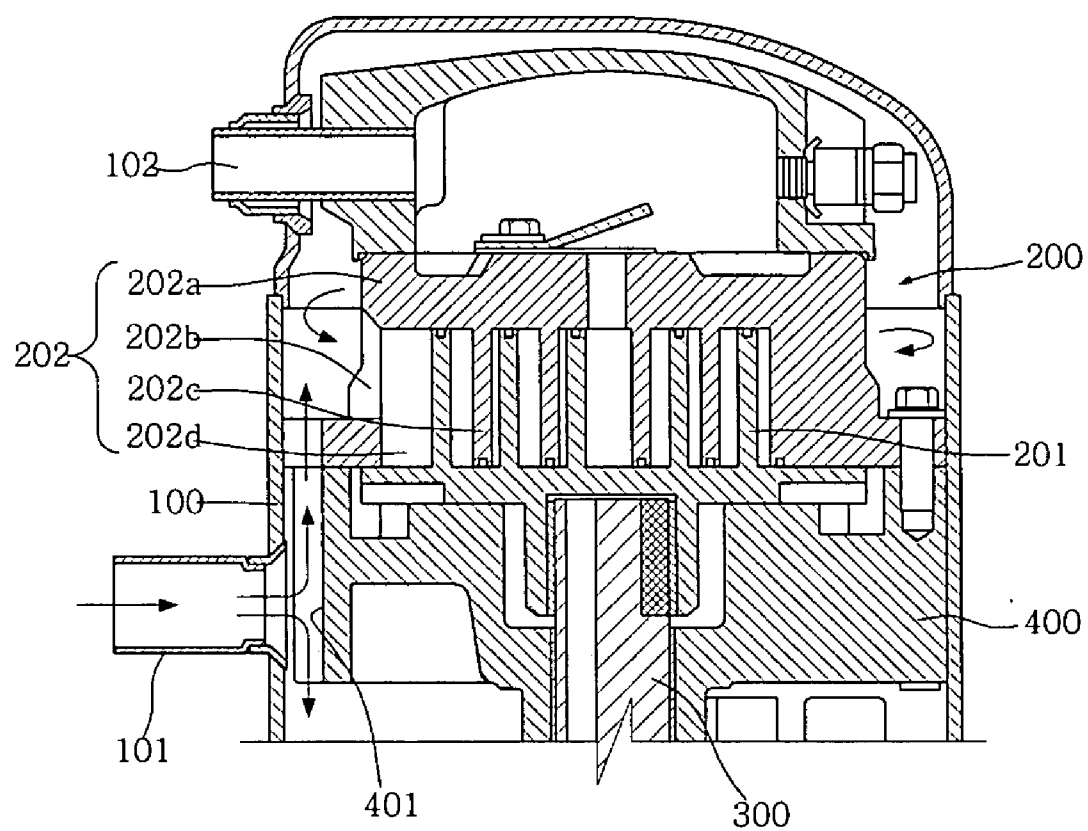


FIG. 2

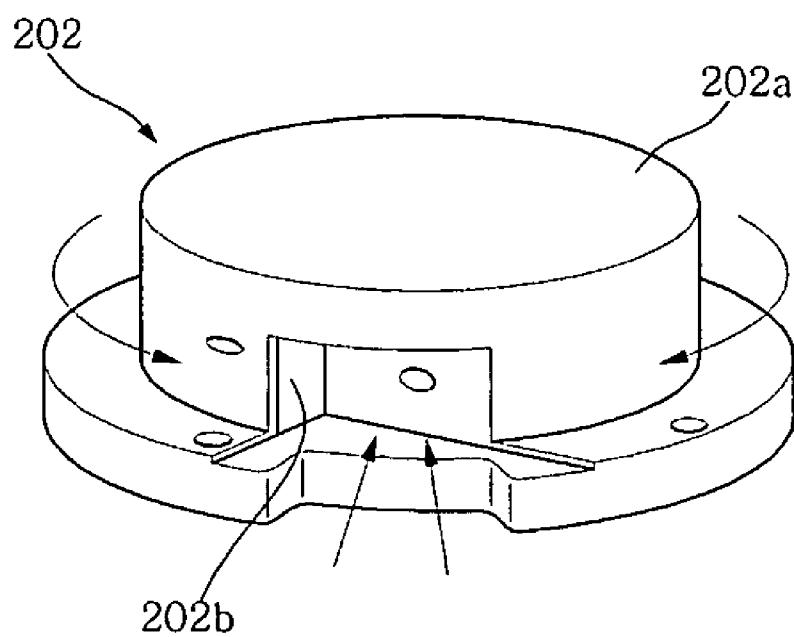


FIG.3

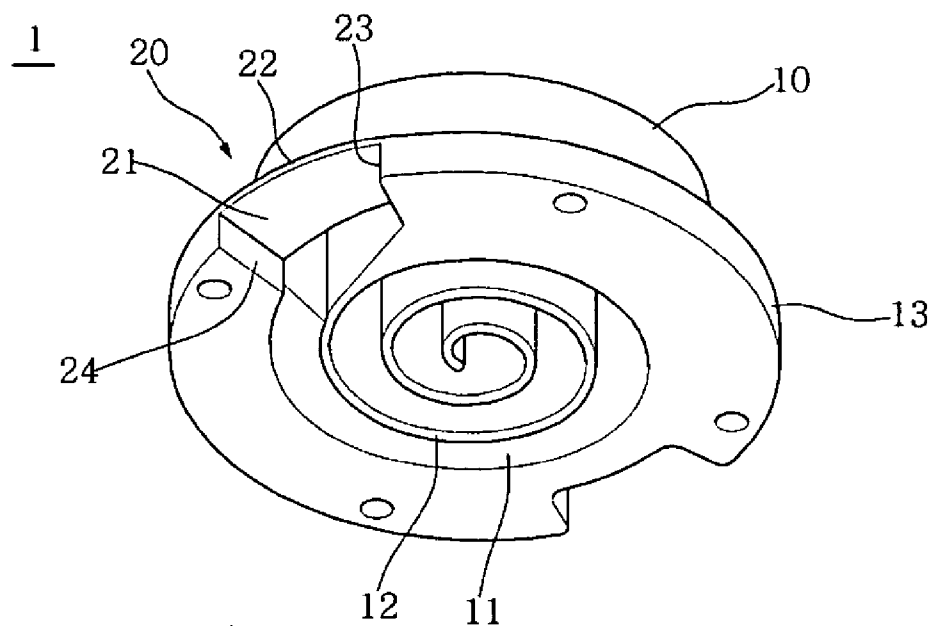


FIG.4

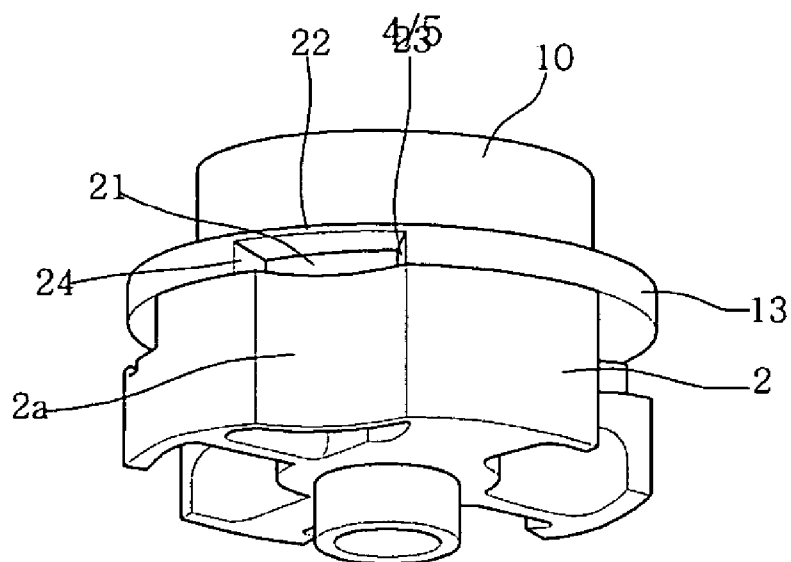
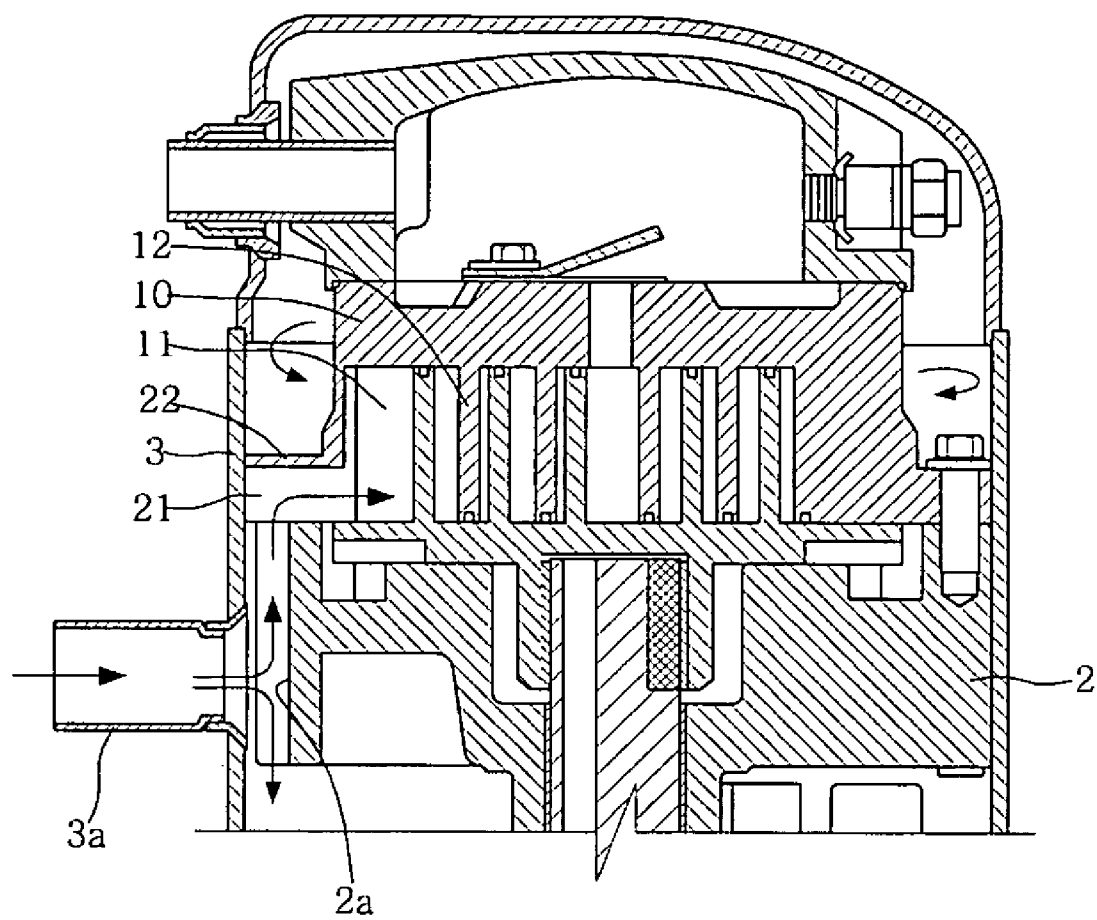


FIG.5



FIXED SCROLL OF SCROLL COMPRESSOR

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] Pursuant to 35 U.S.C. § 119(a), this application claims the benefit of earlier filing date and right of priority to Korean Patent Application No. 10-2005-0026583, filed on Mar. 30, 2005, the content of which is hereby incorporated by reference herein in its entirety.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to a scroll compressor, and more particularly, to a fixed scroll of a scroll compressor which can allow gaseous refrigerant, that is introduced into a compressor shell via a suction pipe, to be directly introduced into a compression chamber without being heated.

[0004] 2. Description of the Related Art

[0005] **FIG. 1** is a longitudinal sectional view illustrating important parts of a conventional scroll compressor. **FIG. 2** is a perspective view illustrating a fixed scroll of **FIG. 1**.

[0006] Arrows shown in **FIGS. 1 and 2** indicate a flow direction of suctioned gaseous refrigerant.

[0007] As shown in **FIGS. 1 and 2**, the conventional scroll compressor includes a shell **100** defining a sealed space therein and provided with a suction pipe **101** and a discharge pipe **102**, a compression unit **200** arranged in an upper portion of the shell **100** and adapted to compress gaseous refrigerant, and a crankshaft **300** supported by main and sub frames in the shell **100** and adapted to drive the compression unit **200** when it is rotated by a drive unit.

[0008] The compression unit **200** includes an orbiting scroll **201** arranged on an upper surface of a main frame **400** in the shell **100** while being coupled to an upper end of the crankshaft **300**, and a fixed scroll **202** arranged on the upper surface of the main frame **400** to be engaged with the orbiting scroll **201** such that a compression chamber is defined between the scrolls **201** and **202**. With this configuration, when the orbiting scroll **201** performs an orbiting motion in accordance with rotation of the crankshaft **300**, gaseous refrigerant is introduced into the compression chamber defined between the scrolls **201** and **202** to thereby being compressed therein.

[0009] In the scroll compressor configured as stated above, as the gaseous refrigerant, that is introduced into the shell **100** via the suction pipe **101**, strikes a suction baffle **401** formed at one side of the main frame **400**, part of the gaseous refrigerant is directed upward toward the compression unit **200**, and the remaining gaseous refrigerant is directed downward to be circulated inside the shell **100**.

[0010] The part of the gaseous refrigerant, upwardly guided against the suction baffle **401**, is introduced into a compression chamber **202d** defined in a wrap **202c** via a suction port **202b** formed at one side of a scroll body **202a**. On the other hand, the remaining gaseous refrigerant, downwardly guided against the suction baffle **401**, is heated while being circulated inside the shell **100**. After that, the heated gaseous refrigerant is directed upward to thereby be circu-

lated around the scroll body **202a** as designated by arrows of **FIG. 2**. In this way, the heated gaseous refrigerant is finally guided to the suction port **202b**.

[0011] The conventional scroll compressor configured as stated above, however, has a problem that suctioned gaseous refrigerant, that strikes the suction baffle, is not introduced directly into the compression chamber, but is circulated along an outer circumference of the scroll body, resulting in ineffective introduction of the gaseous refrigerant into the compression chamber.

[0012] Further, the conventional scroll compressor causes heated gaseous refrigerant to be introduced into the compression chamber after being circulated along the outer circumference of the scroll body. This considerably degrades the volumetric efficiency of the compressor, resulting in deterioration in the overall performance of the compressor.

SUMMARY OF THE INVENTION

[0013] Therefore, the present invention has been made in view of the above problems, and it is an object of the present invention to provide a fixed scroll of a scroll compressor which can allow suctioned gaseous refrigerant to be effectively introduced into a compression chamber while preventing introduction of gaseous refrigerant that is heated in the compressor.

[0014] It is another object of the present invention to provide a fixed scroll of a scroll compressor which can achieve smooth introduction of suctioned gaseous refrigerant into a compression chamber while preventing introduction of heated gaseous refrigerant via a simple deformation in the shape of the fixed scroll without requiring installation of an additional member.

[0015] In accordance with the present invention, the above and other objects can be accomplished by the provision of a fixed scroll of a scroll compressor comprising: a scroll body having an involuted wrap to define a compression chamber therein; a mounting flange formed along an outer circumference of a lower end of the scroll body to be arranged on an upper surface of a main frame; and an interceptive suction portion configured to guide gaseous refrigerant, that is directed upward along the main frame, into the compression chamber defined in the scroll body.

[0016] Preferably, the interceptive suction portion may include a barrier and a suction passage formed by cutting out part of a lower portion of the mounting flange, the suction passage communicating with the compression chamber defined in the scroll body.

[0017] Preferably, the suction baffle, having a concave shape, may extend to the interceptive suction portion.

[0018] Preferably, one side of the suction passage may form a first inclined surface that is successively extended from a distal end of the wrap by a predetermined inclination to guide the gaseous refrigerant into the compression chamber through the suction passage.

[0019] Preferably, the other side of the suction passage may form a second inclined surface that is inclined relative to the wrap by a predetermined inclination to guide the gaseous refrigerant into the compression chamber through the suction passage.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] The above and other objects, features and other advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

[0021] **FIG. 1** is a longitudinal sectional view illustrating important parts of a conventional scroll compressor;

[0022] **FIG. 2** is a perspective view illustrating a fixed scroll of **FIG. 1**;

[0023] **FIG. 3** is a bottom perspective view of a fixed scroll in accordance with the present invention;

[0024] **FIG. 4** is a perspective view illustrating the fixed scroll of **FIG. 3**, which is coupled to a main frame; and

[0025] **FIG. 5** is a longitudinal sectional view illustrating the introduction of refrigerant in accordance with the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0026] Now, a preferred embodiment of the present invention will be explained with reference to the accompanying drawings.

[0027] **FIG. 3** is a bottom perspective view of a fixed scroll in accordance with the present invention. **FIG. 4** is a perspective view illustrating the fixed scroll of **FIG. 3**, which is coupled to a main frame.

[0028] As shown in **FIGS. 3 and 4**, the fixed scroll 1 of a scroll compressor includes a scroll body 10 arranged on an upper surface of a main frame 2 and defining a compression chamber 11 therein, and an interceptive suction portion 20 formed at the scroll body 10 to guide gaseous refrigerant into the compression chamber 11.

[0029] The scroll body 10 has an involuted wrap 12 to define the compression chamber 11 therein, and a mounting flange 13 formed around a lower end of the scroll body 10 to be mounted on the upper surface of the main frame 2.

[0030] The interceptive suction portion 20 serves to guide only suctioned gaseous refrigerant, that is directed upward from a suction baffle 2a formed at one side of the main frame 2, into the compression chamber 11 while preventing the remaining gaseous refrigerant, that is circulated around the scroll body 10, from being introduced into the compression chamber 11. Here, the suction baffle 2a has a concave shape and is configured to extend to the interceptive suction portion 20. The interceptive suction portion 20 includes a barrier remained after cutting out part of a lower portion of the mounting flange 13 formed around the scroll body 10 to form a suction passage 21 at a position corresponding to an upper end of the suction baffle 2a. The suction passage 21 is configured to communicate with the compression chamber 11.

[0031] With the interceptive suction portion 20 configured as stated above, the gaseous refrigerant, that is upwardly directed against the suction baffle 2a formed at one side of the main frame 2, strikes the barrier 22 to thereby be directly introduced into the compression chamber 11 via the suction passage 21. Also, the barrier 22 prevents heated gaseous

refrigerant, that is circulated around the scroll body 10, from being introduced into the suction passage 21.

[0032] One side of the suction passage 21 forms an inclined surface 23 that is successively extended from a distal end of the wrap 12 by a predetermined inclination. The other side of the suction passage 21 also forms an inclined surface 24 that is inclined relative to the inclined surface 23 by a predetermined inclination.

[0033] The inclined surfaces 23 and 24 serve to allow the gaseous refrigerant to be more smoothly guided from the suction baffle 2a of the main frame 2 into the compression chamber 11 defined in the scroll body 10 via the suction passage 21.

[0034] **FIG. 5** is a longitudinal sectional view illustrating the introduction of the gaseous refrigerant in accordance with the present invention.

[0035] As shown in **FIG. 5**, the suctioned gaseous refrigerant, which is introduced into a shell 3 via a suction pipe 3a provided at the shell 3, is directed upward by means of the suction baffle 2a of the main frame 2 that is arranged to face the suction pipe 3a. The upwardly directed gaseous refrigerant strikes the barrier 22, thereby being introduced into the compression chamber 11 of the wrap 12 formed at the scroll body 10 by way of the suction passage 21.

[0036] On the other hand, the remaining gaseous refrigerant, which is directed downwardly against the suction baffle 2a, is heated while being circulated in the compressor. Then, the heated gaseous refrigerant is directed upward and is circulated around the scroll body 10. In this case, the heated gaseous refrigerant is unable to be introduced into the compression chamber 11 because of the barrier 22 that blocks a passage to the suction passage 21. As a result, the interceptive suction portion 20 of the present invention allows the gaseous refrigerant, that is suctioned into the shell 3 and strikes the suction baffle 2a, to be directly introduced into the compression chamber 11 by means of the barrier 22 and the suction passage 21 while completely preventing the introduction of the gaseous refrigerant that is heated in the shell 3.

[0037] As apparent from the above description, the present invention provides a fixed scroll of a scroll compressor which can allow suctioned gaseous refrigerant to be smoothly introduced into a compression chamber while completely preventing introduction of the remaining gaseous refrigerant that is heated in the compressor, thereby achieving more stable introduction of the gaseous refrigerant and improving the volumetric efficiency of the compressor to achieve an improved compressor performance.

[0038] Further, according to the present invention, the fixed scroll easily achieves effective introduction of suctioned gaseous refrigerant into the compression chamber while completely preventing introduction of heated gaseous refrigerant via a simple deformation in the shape of the fixed scroll without requiring installation of an additional member. This has the effect of simplifying the manufacturing process of the compressor and reducing manufacturing costs thereof.

[0039] Although the preferred embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifi-

cations, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

What is claimed is:

1. A fixed scroll of a scroll compressor comprising:
 - a scroll body having an involuted wrap to define a compression chamber therein;
 - a mounting flange formed along an outer circumference of a lower end of the scroll body; and
 - an interceptive suction portion formed at one side of the mounting flange and adapted to guide gaseous refrigerant, that is directed upward along a main frame, into the compression chamber.
2. The fixed scroll as set forth in claim 1, wherein the interceptive suction portion includes a barrier and a suction passage formed by cutting out part of a lower portion of the mounting flange, the suction passage communicating with the compression chamber defined in the scroll body.
3. The fixed scroll as set forth in claim 2, wherein one side of the suction passage forms a first inclined surface that is successively extended from a distal end of the wrap by a predetermined inclination to guide the gaseous refrigerant into the compression chamber through the suction passage.
4. The fixed scroll as set forth in claim 3, wherein the other side of the suction passage forms a second inclined surface that is inclined relative to the wrap by a predetermined inclination to guide the gaseous refrigerant into the compression chamber through the suction passage.
5. A compression unit of a scroll compressor comprising:
 - a fixed scroll having an involuted wrap to define a compression chamber therein;
 - an orbiting scroll configured to be engaged with the fixed scroll to allow gaseous refrigerant, introduced into the compression chamber, to be compressed in accordance with an orbiting motion of the orbiting scroll;
 - a mounting flange formed around a lower end of the fixed scroll to be arranged on an upper surface of a main frame; and
 - an interceptive suction portion formed at the fixed scroll to guide the gaseous refrigerant, that is upwardly directed along the main frame, into the compression chamber.
6. The compression unit as set forth in claim 5, wherein a suction baffle is formed at one side of the main frame to allow the suctioned gaseous refrigerant to strike the suction baffle to thereby be partially directed into the compression chamber.
7. The compression unit as set forth in claim 6, wherein the suction baffle, having a concave shape, extends to the interceptive suction portion.
8. The compression unit as set forth in claim 5, wherein the interceptive suction portion includes a barrier and a suction passage formed by cutting out part of a lower portion of the mounting flange, the suction passage communicating with the compression chamber.

9. The compression unit as set forth in claim 8, wherein one side of the suction passage forms a first inclined surface that is successively extended from a distal end of the wrap by a predetermined inclination to guide the gaseous refrigerant into the compression chamber through the suction passage.

10. The compression unit as set forth in claim 9, wherein the other side of the suction passage forms a second inclined surface that is inclined relative to the wrap by a predetermined inclination to guide the gaseous refrigerant into the compression chamber through the suction passage.

11. A scroll compressor comprising:

a sealed shell provided with a suction pipe and a discharge pipe;

a crankshaft arranged in the shell while being supported by main and sub frames;

a compression unit coupled to the crankshaft and adapted to compress gaseous refrigerant that is suctioned via the suction pipe; and

an interceptive suction portion formed at the compression unit to allow the suctioned gaseous refrigerant to strike a suction baffle formed at the main frame to thereby be partially introduced into a compression chamber defined in the compression unit.

12. The scroll compressor as set forth in claim 11, wherein the compression unit includes:

a fixed scroll having an involuted wrap to define the compression chamber therein;

an orbiting scroll configured to be engaged with the fixed scroll to allow the gaseous refrigerant, introduced into the compression chamber, to be compressed in accordance with an orbiting motion of the orbiting scroll; and

a mounting flange formed around a lower end of the fixed scroll to be arranged on an upper surface of the main frame.

13. The scroll compressor as set forth in claim 11, wherein the suction baffle, having a concave shape, extends to the interceptive suction portion.

14. The scroll compressor as set forth in claim 12, wherein the interceptive suction portion includes a barrier and a suction passage formed by cutting out part of a lower portion of the mounting flange, the suction passage communicating with the compression chamber.

15. The scroll compressor as set forth in claim 14, wherein one side of the suction passage forms a first inclined surface that is successively extended from a distal end of the wrap by a predetermined inclination to guide the gaseous refrigerant into the compression chamber through the suction passage.

16. The scroll compressor as set forth in claim 15, wherein the other side of the suction passage forms a second inclined surface that is inclined relative to the wrap by a predetermined inclination to guide the gaseous refrigerant into the compression chamber through the suction passage.

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