

Description

This invention relates to scroll-type fluid displacement apparatus.

Scroll-type apparatus have been well known in the prior art. For example, U.S. Patent No. 801,182 discloses a device including two scroll members each having an end plate and a spiroidal or involute spiral element. These scroll members are maintained angularly and radially offset so that both spiral elements interfit to make a plurality of line contacts between spiral curved surfaces thereby to seal off and define at least one pair of fluid pockets. The relative orbital motion of the scroll members shifts the line contact along the spiral curved surfaces and, therefore, the fluid pockets changes in volume. The volume of the fluid pockets increases or decreases dependant on the direction of orbital motion. Therefore, the scroll-type fluid displacement apparatus is applicable to compress, expand or pump fluids.

Another scroll-type unit, which constitutes the State of the Art with regard to the present invention, is disclosed in EP-A-0009350.

The scroll-type fluid displacement apparatus is suited for use as a refrigerant compressor of an automobile air-conditioner. Generally, it is desirable that the compressor should be compact and light in weight. In particular, the refrigerant compressor for an automobile air conditioner is necessarily compact in size and light in weight because the compressor is placed in the engine compartment of an automobile. However, the refrigerant compressor which is placed in an automobile must be connected to a magnetic clutch to transmit the rotary output of the engine. The weight of the magnetic clutch is therefore added to the weight of the compressor to thereby increase the total weight and volume of compressor unit. Accordingly, the apparatus is desired to be further small-sized and lightened in structure.

Furthermore, the apparatus is also desired to be readily assembled and to be lowered in cost.

It is an object of this invention to provide fluid displacement apparatus, suitably a compressor unit of the scroll type, which is compact in size and light in weight. The unit should also be simple in construction and configuration and easy to assemble.

According to the invention there is provided a scroll-type fluid displacement apparatus including a housing having a front end plate member, a fixed scroll member fixedly disposed within said housing and having a first circular end plate means from which a first wrap means extends, an orbiting scroll member having a second circular end plate means from which a second wrap means extends, said first and second wrap means interfitting at an angular offset to make a plurality of line contacts to define at least one pair of sealed off fluid pockets, and a driving means including a drive shaft which penetrates said front end plate member and is rotatably supported thereby to effect orbital

motion of said orbiting scroll member by the rotation of said drive shaft while the rotation of said orbiting scroll member is prevented, whereby said fluid pockets change volume by the orbital motion of said orbiting scroll member, said housing comprising a cup-shaped casing with a cylindrical inner surface and said front end plate member, characterised in that the member has an annular projection which projects from an inner surface thereof and is fitted into an opening of said cup-shaped casing so as to seal off its open end, said fixed scroll member is fixedly disposed within the interior of said cup-shaped casing so that a peripheral surface of said first circular end plate means is fitted against the cylindrical inner surface of said cup-shaped casing so as to provide a fluid tight separation within the interior of said cup-shaped casing between a first chamber including said first wrap means and a second chamber defined between the end surface of said first circular end plate means opposite to the side thereof from which said first wrap means extends and a bottom plate portion of said cup-shaped casing, one only of said first circular end plate means and the bottom plate portion of cup-shaped casing has at least one projection which extends within said second chamber towards the other one of said first circular end plate means and said bottom plate portion, an end surface of said at least one projection fits against an end surface of said other one of said first circular end plate means and said bottom plate portion, and said fixed scroll member is firmly fixed to said cup-shaped casing by screw means inserted through said at least one projection and said bottom plate portion from outside said cup-shaped casing.

The scroll-type compressor disclosed in EP 00 093 50 does not include a front end plate formed with an annular projection. Instead, the end plate has a peripheral step portion, which allows the central part of the end plate to be fitted into the open end of a cup-shaped casing. The height of the step, cannot be made very large since it is restricted by the thickness of the front end plate. If a higher step is formed, a thicker front end plate must be employed. Furthermore, the fixed scroll member in EP 00 093 50 is not non-movably and firmly fixed to the casing but is supported in a manner which allows movement in both a radial and axial direction relative to the casing. Finally, no screws are provided in EP 00 093 50 and the fixed scroll member is supported in a resilient manner, which allows movement from the correct axial and angular position.

First seal ring members are interposed between the end surface of said at least one projection and the inner surface of the bottom portion of said cup-shaped casing for surrounding respective screws, to thereby prevent fluid leakage from inner chamber of the housing to outside of the housing along the screws.

A second seal ring member is placed between the outer peripheral surface of the first end plate

means and the inner wall of the casing. Thereby the inner chamber of the housing is partitioned to front and rear chambers isolated from one another.

It is then possible to use a simple casing formed of press worked steel or aluminum die casting, and the outer shape of the casing is made simple and it is necessary to form any projecting flange for securing constructional parts disposed within the casing. Therefore, the thickness of the wall of casing will be reduced, and size and weight of the compressor unit will be reduced.

In the arrangement of the fluid displacement apparatus, the drive shaft, driving mechanism, rotation preventing/thrust bearing mechanism and orbiting scroll member are inserted in this order onto the front end plate member and are covered by the cup-shaped casing. The fixed scroll member is secured to the cup-shaped casing by screws, and assembly of the compressor unit is readily completed by securing the front end plate member onto the cup-shaped casing.

The invention will now be described, by way of example, with reference to the accompanying drawings, in which:—

Fig. 1 shows a vertical sectional view of a compressor unit of the scroll-type according to an embodiment of this invention;

Fig. 1a is a sectional view of a modification of the embodiment;

Fig. 2 is a perspective view of the fixed scroll member in the embodiment of Fig. 1;

Fig. 3 is an exploded perspective view of the driving mechanism in the embodiment of Fig. 1;

Fig. 4 is an explanatory diagram of the motion of the eccentric bushing in the embodiment of Fig. 1;

Fig. 5 is a perspective view of a rotation preventing mechanism in the embodiment of Fig. 1; and

Fig. 6 is a diagrammatic sectional view illustrating the spiral elements of the fixed and orbiting scroll members.

Referring to Fig. 1, a fluid displacement apparatus in accordance with the present invention, in particular a refrigerant compressor unit 1 of an embodiment of the present invention is shown. The unit 1 includes a compressor housing 10 comprising a front end plate 11 which is, for example, formed of aluminium or aluminium alloy, and a cup-shaped portion 12 which is formed of a press worked steel plate or aluminium die castings. Cup-shaped portion 12 is disposed to one side surface of front end plate 11. An opening 111 is formed in center of front end plate 11 for penetration of a drive shaft 13. An annular projection 112 is formed in rear end surface of front end plate 11 which faces cup-shaped portion 12, and projects concentric with opening 111. Cup-shaped portion 12 has a flange portion 121 which extends radially outward along an opening portion thereof. Annular projection 112 is fitted into the opening portion of cup-shaped portion 12. The end surface of flange

portion 121 is in contact with the rear end surface of front end plate 11 and is fixed to front end plate 11 by a fastening means, for example, bolts-nuts. In this embodiment, as shown in Fig. 1, bolt means 113 is screwed into tapped holes formed in the end surface of front end plate 11 through flange portion 121 of cup-shaped portion 12. Therefore, the opening portion of cup-shaped portion 12 is covered by front end plate 11. An O-ring member 14 is placed between front end plate 11 and flange portion 121 of cup-shaped portion 12; to thereby secure a seal between the fitting or mating surfaces of the end plate 11 and to cup-shaped portion 12. Alternatively, bolt means 113 may be screwed into tapped holes formed in the end surface of cup-shaped portion 12 through front end plate 11 to connect front end plate and cup-shaped portion 12, as shown in Fig. 1a.

Referring to Fig. 1a, cup-shaped portion 12 is formed thick at angularly-spaced portions of its open end wall, as shown at 122. A tapped hole 123 is axially formed in each thick portion 122. A bolt 113 is screwed into each tapped hole 123 through front end plate 11 to fixedly connect front end plate 11 and cup-shaped portion 12. An annular shim 114 is interposed between front end plate 11 and cup-shaped portion 12 to adjust the axial space of the interior of housing 10. O-ring 14 is disposed between the outer surface of annular projection 112 and the inner surface of cup-shaped portion 12.

Front end plate 11 has an annular sleeve portion 17 projecting from the front end surface thereof for surrounding drive shaft 13. In this embodiment as shown in Fig. 1, sleeve portion 17 is formed of steel and is separate from front end plate 11. Therefore, sleeve portion 17 is fixed to the front end surface of front end plate 11 by screws 18, one of which is shown in Fig. 1. Alternatively, the sleeve portion 17 may be formed integral with front end plate 11.

Drive shaft 13 is rotatably supported by sleeve portion 17 through a bearing means 19 disposed within the front end portion of sleeve portion 17. Drive shaft 13 is formed with a disk rotor 15 at its inner end portion, and disk portion 15 is rotatably supported by front end plate 11 through a bearing means 16 disposed within an inner peripheral surface of annular projection 112. Therefore, drive shaft 13 is rotatably supported by the two bearing means 16, 19. A shaft seal assembly 20 is assembled on drive shaft 13 within opening 111 of front end plate 11.

A pulley 22 is rotatably supported by a bearing means 21 which is disposed on outer surface of sleeve portion 17. An electromagnetic annular coil 23 is fixed to the outer surface of sleeve portion 17 by a support plate 159 and is received in an annular cavity 160 of pulley 22. An armature plate 24 is elastically supported on the outer end of drive shaft 13 which extends from sleeve portion 17. A magnetic clutch comprising pulley 22, magnetic coil 23 and armature plate 24 is thereby formed. Thus, drive shaft 13 is driven by

an external drive power source, for example, a motor of a vehicle, through a rotation force transmitting means such as the magnetic clutch.

A fixed scroll member 25, an orbiting scroll member 26, a driving mechanism of orbiting scroll member 26 and a rotation preventing/thrust bearing means of orbiting scroll member 26 are disposed in an inner chamber of cup shaped portion 12. The inner chamber is formed between inner wall of cup shaped portion 12 and front end plate 11.

Fixed scroll member 25 includes a circular end plate 251 and a wrap means or spiral elements 252 affixed to or extending from one major side surface of circular plate 251. Circular plate 251 of fixed scroll member 25 is formed with a plurality of legs 253 axially projecting from a major end surface opposite to the side of the plate 251 from which spiral element 252 extend or are affixed. In the embodiment of this invention as shown in Fig. 2, a wall portion 257 is formed in the area between of each leg 253 for reinforcement of legs 253. An end surface of each leg 253 is fitted against the inner surface of a bottom plate portion 124 of cup shaped portion 12 and fixed to bottom plate portion 124 of cup shaped portion 12 by screws 27 which screw into legs 253 from the outside of bottom plate portion 124.

Legs 253 may be formed on not circular plate 251 but the bottom surface of cup-shaped portion 12. In the arrangement, screws 27 are screwed into circular plate 251 through the legs.

In another modification, a cylindrical body may be formed on either one of circular plate 251 and the bottom surface of cup-shaped portion 12 to project towards the other one. A plurality of screw-tapped holes are formed in the projecting end surface of the cylindrical body at its angular spaced position.

A first sealing member 28 are disposed between the end surface of each leg 253 and the inner surface of bottom plate portion 122, to

thereby prevent fluid leakage along screws 27. Referring to Fig. 2, an annular groove 255 for receiving sealing member 28 and a tapped hole 254 for receiving screw 27 are formed on the end surface of each leg 253. A groove 256 is formed on the outer peripheral surface of circular plate 251 and a second seal ring member 29 is disposed therein to form a seal between the inner surface of cup shaped portion 12 and the outer peripheral portion or surface of circular plate 251. Thus, the inner chamber of cup shaped portion 12 is partitioned into two chambers by circular plate 251, such as a rear chamber 30 in which legs 253 are disposed and a front chamber 31 in which spiral element 251 of fixed scroll member 25 is disposed.

Cup shaped portion 12 is provided with a fluid inlet port 35 and a fluid outlet port 36, which respectively are connected to the front and rear chambers 31, 30. A hole or discharge port 258 is formed through the circular plate 251 at a position near to the center of spiral element 252 and is connected to the fluid pocket of the spiral element center and rear chamber 30.

Orbiting scroll member 26 is disposed in front chamber 31. Orbiting scroll member 26 also comprises a circular end plate 261 and a wrap means or spiral element 262 affixed to or extending from one side surface of circular end plate 261. Spiral element 262 and spiral element 252 of fixed scroll member 25 interfit at angular offset of 180° and a predetermined radial offset. A pair of fluid pockets are thereby defined between spiral elements 252, 262. Orbiting scroll member 26 is connected to the drive mechanism and to the rotation preventing/thrust bearing mechanism. These last two mechanisms effect orbital motion of the orbiting scroll member 26 at a circular radius R_o by rotation of drive shaft 13, to thereby compress fluid passing through the compressor unit.

Generally, radius R_o of orbital motion given by

$$\frac{2(\text{wall thickness of spiral element})}{(\text{pitch of spiral element})}$$

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As seen in Fig. 6, the pitch (P) of the spiral elements can be defined by $2\pi r_g$, where r_g is the involute generating circle radius. The radius of orbital motion R_o is also illustrated in Fig. 6 as a locus of an arbitrary point Q on orbiting scroll member 26. The spiral element 262 is placed radially offset from spiral element 252 of fixed scroll member 25 by the distance R_o . Thereby, orbiting scroll member 26 is allowed to undergo the orbital motion of a radius R_o by the rotation of drive shaft 13. As the orbiting scroll member 26 orbits, line contact between both spiral elements 252 and 262 shifts to the center of the spiral elements along the surface of the spiral elements. Fluid pockets defined between spiral elements 252 and 262 move to the center with a consequent reduction of volume, to thereby compress the fluid in the pockets. Fluid inlet port 35 which is

formed in cup shaped portion 12 is connected to the front chamber 31 and fluid outlet port 36 which is formed on cup shaped portion 12 is connected to rear chamber 30. Therefore, fluid, or refrigerant gas, introduced into front chamber 31 from an external fluid circuit through inlet port 35, is taken into fluid pockets formed between both spiral elements 252 and 262 from outer end portion of the spiral elements. As scroll member 26 orbits, fluid in the fluid pockets is compressed and the compressed fluid is discharged into rear chamber 30 from the fluid pocket of the spiral element center through hole 258, and therefrom, discharged through an outlet port 36 to the external fluid circuit, for example, a cooling circuit.

Referring to Figs. 1 and 3, the driving mechanism of orbiting scroll member 26 will be

described. Drive shaft 13, which is rotatably supported by sleeve portion 17 through bearing means, such as ball bearing 19, is formed with a disk rotor 15. Disk rotor 15 is rotatably supported by front end plate 11 through bearing means, such as ball bearing 16 disposed in the inner peripheral surface of annular projection 112.

A crank pin or drive pin 151 projects axially from an end surface of disk rotor 15 and, hence, from an end of drive shaft 13, and is radially offset from the center of drive shaft 13. Circular plate 261 of orbiting scroll member 26 is provided with a tubular boss 263 axially projecting from an end surface opposite to the side thereof from which spiral element 262 extends or is affixed. A discoid or short axial bushing 33 is fitted into boss 263, and is rotatably supported therein by bearing means, such as a needle bearing 34. Bushing 33 has a balance weight 331 which is shaped as a portion of a disk or ring and extends radially from bushing 33 along a front surface thereof. An eccentric hole 332 is formed in bushing 33 radially offset from center of bushing 33. Drive pin 151 is fitted into the eccentrically disposed hole 332 within which a bearing 32 may be applied. Bushing 33 is therefore driven by the revolution of drive pin 151 and permitted to rotate by needle bearing 34.

Respective placement of center Os of drive shaft 13, center Oc of bushing 33, and center Od of hole 332 and thus of drive pin 151, is shown in Fig. 4. In the position shown in Fig. 4, the distance between Os and Oc is the radius Ro of orbital motion, and when drive pin 151 is placed in eccentric hole 332, center Od of drive pin 151 is placed, with respect to Os, on the opposite side of a line L1, which is through Oc and perpendicular to a line L2 through Oc and Os, and also beyond the line through Oc and Os in direction of rotation A of drive shaft 13.

In this construction of a driving mechanism, center Oc of bushing 33 is permitted to swing about the center Od of drive pin 151 at a radius E_2 , as shown in Fig. 4. Such swing motion of center Oc is illustrated as arc Oc'-Oc'' in Fig. 4. This permitted swing motion allows the orbiting scroll member 30 to compensate its motion for changes in Ro due to wear on the spiral elements 252, 262 or due to other dimensional inaccuracies of the spiral elements. When drive shaft 13 rotates, a drive force is exerted at center Od to the left, and a reaction force of gas compression appears at center Oc to the right, both forces being parallel to line L1. Therefore, the arm Od-Oc swing outwardly by creation of the moment generated by the two forces. Spiral element 262 of orbiting scroll member 26 is thereby forced toward spiral element 252 of fixed scroll member 25 and the center of orbiting scroll member 26 orbits with the radius Ro around center Os of drive shaft 13. The rotation of orbiting scroll member 26 is prevented by a rotation preventing/thrust bearing mechanism, described more fully hereinafter, whereby orbiting scroll member 26 only orbits while maintaining its angular orientation. The

fluid pockets move because of the orbital motion of orbiting scroll member 26, to thereby compress the fluid.

Referring to Fig. 5 and Fig. 1, a rotation preventing/thrust bearing, means 37 will be described. Rotation preventing/thrust bearing means 37 is disposed to surround boss 263 and is comprised of a fixed ring 371 and a sliding ring 372. Fixed ring 371 is secured to an end surface of annular projection 112 of front end plate 11 by pin 373, one of which is shown in Fig. 1. Fixed ring 371 is provided with a pair of keyways 371a and 371b in an axial end surface facing orbiting scroll member 26. Sliding ring 372 is disposed in a hollow space between fixed ring 371 and circular plate 261 of orbiting scroll member 26. Sliding ring 372 is provided with a pair of keys 372a and 372b on the surface facing fixed ring 371, which are received in keyways 371a and 371b. Therefore, sliding ring 372 is slidable in the radial direction by the guide of keys 372a and 372b within keyways 371a and 371b. Sliding ring 372 is also provided with a pair of keys 372c and 372d on its opposite surface. Keys 372c and 372d are arranged along a diameter perpendicular to the diameter along which keys 372a and 372b are arranged. Circular plate 261 of orbiting scroll member 26 is provided with a pair of keyways (in Fig. 5 only one of keyway 261a is shown, the other keyway is disposed diametrical opposite to keyway 261a) on a surface facing sliding ring 372 in which are received keys 372c and 372d. Therefore, orbiting scroll member 26 is slidable in a radial direction by guide of keys 372c and 372d within the keyways of circular plate 261.

Accordingly, orbiting scroll member 26 is slidable in one radial direction with sliding ring 372, and is slidable in another radial direction independently. The second sliding direction is perpendicular to the first radial direction. Therefore, orbiting scroll member 26 is prevented from rotating, but is permitted to move in two radial directions perpendicular to one another.

In addition, sliding ring 372 is provided with a plurality of pockets or holes 38 which are formed in an axial direction. A bearing means, such as balls 39, each having a diameter which is larger than the thickness of sliding ring 372, are retained in pockets 38. Balls 39 contact and roll on the surfaces of fixed ring 371 and circular plate 261. Therefore, the thrust load from orbiting scroll member 26 is supported on fixed ring 371 through balls 39.

Claims

1. A scroll-type fluid displacement apparatus including a housing (10) having a front end plate member (11), a fixed scroll member (25) fixedly disposed within said housing (10) and having a first circular end plate means (251) from which a first wrap means (252) extends, an orbiting scroll member (26) having a second circular end plate means (261) from which a second wrap means (262) extends, said first and second wrap means

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described. Drive shaft 13, which is rotatably supported by sleeve portion 17 through bearing means, such as ball bearing 19, is formed with a disk rotor 15. Disk rotor 15 is rotatably supported by front end plate 11 through bearing means, such as ball bearing 16 disposed in the inner peripheral surface of annular projection 112.

A crank pin or drive pin 151 projects axially from an end surface of disk rotor 15 and, hence, from an end of drive shaft 13, and is radially offset from the center of drive shaft 13. Circular plate 261 of orbiting scroll member 26 is provided with a tubular boss 263 axially projecting from an end surface opposite to the side thereof from which spiral element 262 extends or is affixed. A discoid or short axial bushing 33 is fitted into boss 263, and is rotatably supported therein by bearing means, such as a needle bearing 34. Bushing 33 has a balance weight 331 which is shaped as a portion of a disk or ring and extends radially from bushing 33 along a front surface thereof. An eccentric hole 332 is formed in bushing 33 radially offset from center of bushing 33. Drive pin 151 is fitted into the eccentrically disposed hole 332 within which a bearing 32 may be applied. Bushing 33 is therefore driven by the revolution of drive pin 151 and permitted to rotate by needle bearing 34.

Respective placement of center Os of drive shaft 13, center Oc of bushing 33, and center Od of hole 332 and thus of drive pin 151, is shown in Fig. 4. In the position shown in Fig. 4, the distance between Os and Oc is the radius Ro of orbital motion, and when drive pin 151 is placed in eccentric hole 332, center Od of drive pin 151 is placed, with respect to Os, on the opposite side of a line L1, which is through Oc and perpendicular to a line L2 through Oc and Os, and also beyond the line through Oc and Os in direction of rotation A of drive shaft 13.

In this construction of a driving mechanism, center Oc of bushing 33 is permitted to swing about the center Od of drive pin 151 at a radius E₂, as shown in Fig. 4. Such swing motion of center Oc is illustrated as arc Oc'-Oc'' in Fig. 4. This permitted swing motion allows the orbiting scroll member 30 to compensate its motion for changes in Ro due to wear on the spiral elements 252, 262 or due to other dimensional inaccuracies of the spiral elements. When drive shaft 13 rotates, a drive force is exerted at center Od to the left, and a reaction force of gas compression appears at center Oc to the right, both forced being parallel to line L1. Therefore, the arm Od-Oc swing outwardly by creation of the moment generated by the two forces. Spiral element 262 of orbiting scroll member 26 is thereby forced toward spiral element 252 of fixed scroll member 25 and the center of orbiting scroll member 26 orbits with the radius Ro around center Os of drive shaft 13. The rotation of orbiting scroll member 26 is prevented by a rotation preventing/thrust bearing mechanism, described more fully hereinafter, whereby orbiting scroll member 26 only orbits while maintaining its angular orientation. The

fluid pockets move because of the orbital motion of orbiting scroll member 26, to thereby compress the fluid.

Referring to Fig. 5 and Fig. 1, a rotation preventing/thrust bearing, means 37 will be described. Rotation preventing/thrust bearing means 37 is disposed to surround boss 263 and is comprised of a fixed ring 371 and a sliding ring 372. Fixed ring 371 is secured to an end surface of annular projection 112 of front end plate 11 by pin 373, one of which is shown in Fig. 1. Fixed ring 371 is provided with a pair of keyways 371a and 371b in an axial end surface facing orbiting scroll member 26. Sliding ring 372 is disposed in a hollow space between fixed ring 371 and circular plate 261 of orbiting scroll member 26. Sliding ring 372 is provided with a pair of keys 372a and 372b on the surface facing fixed ring 371, which are received in keyways 371a and 371b. Therefore, sliding ring 372 is slidable in the radial direction by the guide of keys 372a and 372b within keyways 371a and 371b. Sliding ring 372 is also provided with a pair of keys 372c and 372d on its opposite surface. Keys 372c and 372d are arranged along a diameter perpendicular to the diameter along which keys 372a and 372b are arranged. Circular plate 261 of orbiting scroll member 26 is provided with a pair of keyways (in Fig. 5 only one of keyway 261a is shown, the other keyway is disposed diametrically opposite to keyway 261a) on a surface facing sliding ring 372 in which are received keys 372c and 372d. Therefore, orbiting scroll member 26 is slidable in a radial direction by guide of keys 372c and 372d within the keyways of circular plate 261.

Accordingly, orbiting scroll member 26 is slidable in one radial direction with sliding ring 372, and is slidable in another radial direction independently. The second sliding direction is perpendicular to the first radial direction. Therefore, orbiting scroll member 26 is prevented from rotating, but is permitted to move in two radial directions perpendicular to one another.

In addition, sliding ring 372 is provided with a plurality of pockets or holes 38 which are formed in an axial direction. A bearing means, such as balls 39, each having a diameter which is larger than the thickness of sliding ring 372, are retained in pockets 38. Balls 39 contact and roll on the surfaces of fixed ring 371 and circular plate 261. Therefore, the thrust load from orbiting scroll member 26 is supported on fixed ring 371 through balls 39.

Claims

1. A scroll-type fluid displacement apparatus including a housing (10) having a front end plate member (11), a fixed scroll member (25) fixedly disposed within said housing (10) and having a first circular end plate means (251) from which a first wrap means (252) extends, an orbiting scroll member (26) having a second circular end plate means (261) from which a second wrap means (262) extends, said first and second wrap means



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(252, 262) interfitting at an angular offset to make a plurality of line contacts to define at least one pair of sealed off fluid pockets, and a driving means including a drive shaft (13) which penetrates said front end plate member (11) and is rotatably supported thereby to effect orbital motion of said orbiting scroll member (26) by the rotation of said drive shaft (13) while the rotation of said orbiting scroll member (26) is prevented, whereby said fluid pockets change volume by the orbital motion of said orbiting scroll member (26), said housing (10) comprising a cup-shaped casing (12), with a cylindrical inner surface and said front end plate member (11), characterised in that the member (11) has an annular projection (112) which projects from an inner surface thereof and is fitted into an opening of said cup-shaped casing (12) so as to seal off its open end, said fixed scroll member (25) is fixedly disposed within the interior of said cup-shaped casing (12) so that a peripheral surface of said first circular end plate means (251) is fitted against the cylindrical inner surface of said cup-shaped casing (12) so as to provide a fluidtight separation within the interior of said cup-shaped casing (12) between a first chamber (31) including said first wrap means (252) and a second chamber (30) defined between the end surface of said first circular end plate means (251) opposite to the side thereof from which said first wrap means (252) extends and a bottom plate portion (124) of said cup-shaped casing (12), one only of said first circular end plate means (251) and the bottom plate portion (124) of said cup-shaped casing (12) has at least one projection (253) which extends within said second chamber (30) towards the other one of said first circular end plate means (251) and said bottom plate portion (124), an end surface of said at least one projection (253) fits against an end surface of said other one of said first circular end plate means (251) and said bottom plate portion (124), and said fixed scroll (25) is firmly fixed to said cup-shaped casing (12) by screw means (27) inserted through said at least one projection (253) and said bottom plate portion (124) from outside said cup-shaped casing (12).

2. An apparatus as claimed in claim 1, wherein said at least one projection (253) is formed integrally with said first end plate means (251) and a tapped hole (254) for receiving a screw (27) is formed in an end surface of the or each projection (253).

3. An apparatus as claimed in claim 2, wherein said at least one projection (253) comprises a plurality of legs.

4. An apparatus as claimed in claim 2, wherein said at least one projection comprises an annular projection (253, 257), and at least one connecting bore is formed through a peripheral surface of said annular projection.

5. An apparatus as claimed in claim 2, wherein a first seal ring (28) is interposed between the end surface of the or each projection (253) and the inner surface of the bottom plate portion (124) of

said cup-shaped casing (12) to surround the associated screw (27).

6. An apparatus as claimed in claim 5, wherein a second seal ring member (29) is disposed between an outer peripheral surface of said first circular end plate means (251) and the cylindrical inner surface of said cup-shaped casing (12) to isolate said first and second chambers (30, 31) from one another, said first chamber (31) containing said first wrap means (252), orbiting scroll member (26) and driving mechanism, and said second chamber (30) containing said at least one projection (253) of said fixed scroll member (25).

7. An apparatus as claimed in claim 6, wherein said first circular end plate means (251) is formed with a hole (258) at a position corresponding to the center of said first wrap means (252), said cup-shaped casing (12) provided with a fluid outlet port (36) communicating with one of said first and second chambers (30, 31) and with a fluid inlet port (35) communicating with the other of said first and second chambers (30, 31).

8. An apparatus as claimed in claim 1, wherein an opening portion of said cup-shaped casing (12) is formed with a flange portion (121) for fitting against the inner surface of said front end plate member (11).

9. An apparatus as claimed in claim 8, wherein an O-ring (14) is disposed between the inner surface of said front end plate member (11) and the flange portion (121) of said cup-shaped casing (12).

10. An apparatus as claimed in claim 9, wherein said cup-shaped casing (12) and said front end plate member (11) are connected together by bolt means screwed into a tapped hole formed in said front end plate member through said flange portion (121) of cup-shaped casing (12).

11. An apparatus as claimed in claim 10, wherein annular shim means (114) are interposed between said front end plate member (11) and said flange portion (121) of said casing (12).

12. An apparatus as claimed in claim 1, wherein said cup-shaped casing (12) is formed with a plurality of angularly-spaced wall portions (122) of increased-thickness at its open end, said bolt means (113) being screwed into said wall portions (122) through said front end plate member (11).

13. An apparatus as claimed in claim 12, wherein an O-ring (14) is disposed between the outer surface of said annular projection (112) of said front end plate member (11) and the inner surface of said casing.

14. A scroll-type fluid displacement apparatus comprising:

a housing (10) comprising of a cup-shaped casing (12) with a cylindrical inner surface and a front end plate means (11) having an annular projection (112) which projects from an inner surface thereof and is fitted into an opening of said cup-shaped casing (12);

a fixed scroll member (25) fixedly disposed within said housing (10) and having a first circular end plate means (251) from which a first wrap



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means (252) extends, said first circular end plate (251) fitting the cylindrical inner surface of said cup-shaped casing (12) so as to provide a fluid-tight separation within the interior of said cup-shaped casing (12) between a first chamber (31) including said first wrap means (252) and a second chamber (30) defined between the end surface of said first circular end plate means (251) opposite to the side thereof from which said first wrap means (252) extends and a bottom plate portion (124) of said cup-shaped casing (12);

a plurality of legs (253) formed integrally with said first circular end plate means (251) to extend within said second chamber (30) and fit against the inner surface of the bottom plate portion (124) of said casing (12), said legs (253) being fixed to the inner surface of said cup-shaped casing (12) by screw means (27), whereby said fixed scroll member (25) is fixedly disposed within said housing (10);

an orbiting scroll member (26) movably disposed within said first chamber of said housing (10) and having a second circular end plate means (261) from which a second wrap means (252) extends;

a driving means including a drive shaft (13) which penetrates said front end plate means (11) and is rotatably supported by said front end plate means (11), said driving means being connected to said orbiting scroll member (26) for transmitting orbital motion to said orbiting scroll member (26), and means for preventing rotation of said orbiting scroll member;

a first seal ring member (28) disposed between each end surface of said each legs (253) and the inner surface of said casing (12); and

a second seal ring member (29) disposed between an outer peripheral surface of said first circular end plate means (251) and the inner surface of said casing (12).

15. The apparatus as claimed in claim 14, wherein said cup-shaped casing (12) is formed with a flange portion (121) at an opening portion thereof, said front end plate means (11) having an annular projection (112) projecting from an inner surface facing said cup-shaped casing (12) and said flange portion (121) being fixed to the end surface of said front end plate member (11) by fastener means (113).

16. The apparatus as claimed in claim 15, wherein an O-ring (14) is disposed on a contact surface between the end surface of said front end plate means (11) and said flange portion (121) of said cup-shaped casing (12).

Revendications

1. Machine à déplacement de fluide du type à volutes comprenant un logement (10) présentant une plaque d'extrémité avant (11), un organe fixé en forme de volute (25) disposé de façon fixée à l'intérieur dudit logement (10) et comportant une première plaque d'extrémité circulaire (251) à partir de laquelle s'étendant des premiers moyens d'enveloppement (252), un

organe orbital en forme de volute (26) comportant une seconde plaque d'extrémité circulaire (261) à partir de laquelle s'étendent des seconds moyens d'enveloppement (262), lesdits premiers et seconds moyens d'enveloppement (252, 262) s'emboîtant selon un décalage angulaire pour constituer un ensemble de lignes de contact en vue de définir au moins une paire de poches à fluide étanches, et des moyens d'entraînement comprenant un arbre d'entraînement (13) qui pénètre dans ladite plaque d'extrémité frontale (11) et est supporté de façon rotative par celle-ci pour déterminer un mouvement orbital dudit élément orbital en forme de volute (26) par la rotation dudit arbre d'entraînement (13) alors que la rotation dudit élément fixe en forme de volute (25) est empêchée, ce qui fait que les poches à fluide changent de volume du fait du mouvement orbital dudit élément orbital en forme de volute (26), le logement (10) comprenant un carter en forme de cuvette (12) avec une surface interne cylindrique et ladite plaque d'extrémité avant (11),

caractérisée en ce que la plaque (11) comprend une saillie annulaire (112) qui fait saillie d'une surface interne de celle-ci et est imbriquée dans une ouverture dudit carter en forme de cuvette (12) de manière à fermer de façon étanche son extrémité ouverte, ledit organe fixe en forme de volute (25) est disposé de façon fixe à l'intérieur dudit carter en forme de cuvette (12) de manière qu'une surface périphérique de ladite première plaque d'extrémité circulaire (251) soit appliquée contre la surface cylindrique interne dudit carter en forme de cuvette (12) de façon à déterminer une séparation étanche au fluide à l'intérieur dudit carter en forme de cuvette (12) entre une première chambre (31) comprenant lesdits premiers moyens d'enveloppement (252) et une seconde chambre (30) définie entre la surface d'extrémité de ladite première plaque circulaire d'extrémité (251) à l'opposé de son côté à partir duquel s'étendant lesdits premiers moyens d'enveloppement (252) et une partie de la plaque de fond (124) dudit carter en forme de cuvette (12), l'un seulement des éléments constitués par ladite première plaque d'extrémité circulaire (251) et ladite partie (124) de la plaque de fond du carter en forme de cuvette (12) comprenant au moins une saillie (235) s'étendant à l'intérieur de la seconde chambre (30) en direction de l'autre des éléments constitués par ladite première plaque circulaire d'extrémité (251) et ladite partie (124) de la plaque de fond, une surface d'extrémité de ladite saillie au moins (253) s'appliquant contre une surface d'extrémité de l'autre des éléments constitués par ladite première plaque circulaire d'extrémité (251) et ladite partie (124) de la plaque de fond, et ledit organe fixe en forme de volute (25) est fermement fixé au carter en forme de cuvette (12) par des vis (27) insérées dans ladite saillie au moins (253) et ladite partie (124) de la plaque de fond par l'extérieur dudit carter en forme de cuvette (12).

2. Machine selon la revendication 1, caracté-



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terisée en ce que ladite saillie au moins (253) fait partie intégrante de ladite première plaque d'extrémité (251) et en ce qu'un trou taraudé (254) pour recevoir une vis (27) est constitué dans une surface d'extrémité de la ou de chaque saillie (253).

3. Machine selon la revendication 2, caractérisée en ce que ladite saillie au moins (253) comprend un ensemble de pieds.

4. Machine selon la revendication 2, caractérisée en ce que ladite saillie au moins comprend une saillie annulaire (253, 254) et en ce qu'au moins un alésage de liaison est constitué au travers de la surface périphérique de ladite saillie annulaire.

5. Machine selon la revendication 2, caractérisée en ce qu'une première bague d'étanchéité (28) est interposée entre la surface d'extrémité de la ou de chaque saillie (253) et la surface interne de la partie de plaque de fond (124) dudit carter en forme de cuvette (12) pour entourer la vis associée (27).

6. Machine selon la revendication 5, caractérisée en ce qu'une seconde bague d'étanchéité (29) est disposée entre une surface périphérique externe de ladite première plaque d'extrémité circulaire (251) et la surface cylindrique interne dudit carter en forme de cuvette (12) pour isoler les première et seconde chambres (30, 31) l'une de l'autre, ladite première chambre (31) contenant lesdits premiers moyens d'enveloppement (252), l'organe orbital en forme de volute (26) et le mécanisme d'entraînement, et ladite seconde chambre (30) contenant ladite saillie au moins (253) dudit organe fixe en forme de volute (25).

7. Machine selon la revendication 6, caractérisée en ce que ladite première plaque circulaire d'extrémité (251) comprend un trou (258) dans une position correspondant au centre desdits premiers moyens d'enveloppement (252), ledit carter en forme de cuvette (12) est muni d'une ouverture de sortie de fluide (36) communiquant avec l'une desdites première et seconde chambres (30, 31) et d'une ouverture d'admission de fluide (35) communiquant avec l'autre desdites première et seconde chambres (30, 31).

8. Machine selon la revendication 1, caractérisée en ce qu'une ouverture dudit carter en forme de cuvette (12) comprend une bride (121) destinée à s'appliquer contre la surface interne de ladite plaque d'extrémité avant (11).

9. Machine selon la revendication 8, caractérisée en ce qu'un joint torique (14) est disposé entre la surface interne de ladite plaque d'extrémité avant (11) et la bride (121) dudit carter en forme de cuvette (12).

10. Machine selon la revendication 9, caractérisée en ce que ledit carter en forme de cuvette (12) et ladite plaque d'extrémité avant (11) sont reliés ensemble par un boulon vissé dans un trou taraudé constitué dans ladite plaque d'extrémité avant et traversant ladite bride (121) du carter en forme de cuvette (12).

11. Machine selon la revendication 10, caractérisée en ce que des cales annulaires (114) sont

interposées entre ladite plaque d'extrémité avant (11) et ladite bride (121) dudit carter en forme de cuvette (12).

12. Machine selon la revendication 1, caractérisée en ce que ledit carter en forme de cuvette (12) comprend un ensemble de parties de paroi (122) espacées angulairement et d'épaisseur plus importante à son extrémité ouverte, lesdits boulons (113) étant vissés dans lesdites parties de paroi (122) en traversant ladite plaque d'extrémité avant (11).

13. Machine selon la revendication 12, caractérisée en ce qu'un joint torique (14) est disposé entre la surface externe de ladite saillie annulaire (112) de ladite plaque d'extrémité avant (11) et de la surface interne dudit carter.

14. Machine à déplacement de fluides du type à volutes, comprenant:

un logement (10) comprenant un carter en forme de cuvette (12) avec une surface interne cylindrique et une plaque d'extrémité avant (11) munie d'une saillie annulaire (112) qui fait saillie d'une surface interne de cette dernière et est disposée dans un ouverture dudit carter en forme de cuvette (12),

un organe fixe en forme de volute (25) disposé de façon fixe à l'intérieur dudit carter (10) et comprenant une première plaque d'extrémité circulaire (251) à partir de laquelle s'étendant des premiers moyens d'enveloppement (252), ladite première plaque d'extrémité circulaire (251) se disposant sur la surface interne cylindrique dudit carter en forme de cuvette (12) de manière à déterminer une séparation étanche aux fluides avec elle, l'intérieur dudit carter en forme de cuvette (12) entre une première chambre (31) comprenant lesdits premiers moyens d'enveloppement (252) et une seconde chambre (30) définie entre la surface d'extrémité de ladite première plaque d'extrémité circulaire (251) à l'opposé du côté de cette dernière à partir de laquelle s'étendent lesdits premiers moyens d'enveloppement (252) et une plaque de fond (124) dudit carter en forme de cuvette (12);

un ensemble de pieds (253) formés d'un seul tenant avec ladite première plaque d'extrémité circulaire (251) et s'étendant à l'intérieur de ladite seconde chambre (30) en se disposant contre la surface interne de ladite plaque de fond (124) dudit carter (12), lesdits pieds (253) étant fixés à la surface interne dudit carter en forme de cuvette (12) par des vis (27), ledit organe fixe en forme de volute (25) étant disposé de façon fixe à l'intérieur dudit logement (10);

un organe orbital en forme de volute (26) disposé de façon mobile à l'intérieur de ladite première chambre du carter (10) et comprenant une seconde plaque d'extrémité circulaire (261) à partir de laquelle s'étendent les seconds moyens d'enveloppement (252);

des moyens d'entraînement comprenant un arbre d'entraînement (13) qui pénètre dans ladite plaque d'extrémité avant (11) et est supporté de façon rotative par ladite plaque d'extrémité avant (11), lesdits moyens d'entraînement étant reliés



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audit organe orbital en forme de volute (26) pour transmettre le mouvement orbital audit organe orbital en forme de volute (26), et des moyens pour empêcher la rotation dudit organe orbital en forme de volute,

une première bague d'étanchéité (28) disposée entre chaque surface d'extrémité desdits pieds (253) et la surface interne dudit carter (12), et

une seconde bague d'étanchéité (29) disposée entre une surface périphérique externe de ladite première plaque d'extrémité circulaire (251) et la surface interne dudit carter (12).

15. Machine selon la revendication 15, caractérisée en ce que ledit carter en forme de cuvette (12) comprend une bride (121) autour d'une partie ouverte du carter, ladite plaque d'extrémité avant (11) comprenant une saillie annulaire faisant saillie à partir d'une surface interne face audit carter en forme de cuvette (12) et ladite bride (121) étant fixée à la surface d'extrémité de ladite plaque d'extrémité avant (11) par des moyens de fixation (113).

16. Machine selon la revendication 15, caractérisée en ce qu'un joint torique (14) est disposé sur une surface de contact entre la surface d'extrémité de ladite plaque d'extrémité avant (11) et ladite bride (121) dudit carter en forme de cuvette (12).

Patentansprüche

1. Strömungsmaschine in Schneckenbauart, bestehend aus einem Gehäuse (10) mit einem becherförmigen, einen zylindrischen Innenraum umschließenden Gehäuseteil (12), welcher mit einer vorderen Gehäusestirnwand (11) abgeschlossen ist, einem im Gehäuse (10) fest angeordneten stationären Schneckenkörper (25) mit einer ersten kreisförmigen Stirnplatte (251) und an dieser vorragenden ersten Spiralwand (252), einem kreisend bewegbar gelagerten Schneckenkörper (26) mit einer zweiten kreisförmigen Stirnplatte (261) und an dieser vorragenden zweiten Spiralwand (262), wobei erste und zweite Spiralwand (252, 262) gegeneinander winkelmäßig versetzt ineinandergreifen und an mehreren Stellen Linienkontakt haben, um mindestens ein Paar geschlossener Strömungsmitteltaschen zu bilden, und einer Antriebsanordnung mit einer die vordere Gehäusestirnwand (11) durchdringenden und dort drehbar gelagerten Antriebswelle (13), welche durch Drehung den kreisend bewegbar gelagerten und an einer Drehung gehinderten Schneckenkörper (26) kreisend in Bewegung setzt, so daß die Strömungsmitteltaschen bei der kreisenden Bewegung des kreisend bewegbaren Schneckenkörpers (26) ihr Volumen ändern, dadurch gekennzeichnet, daß die vordere Gehäusestirnwand (11) mit einem auf ihrer Innenseite angeordnetem ringförmigen Ansatz (112) in den becherförmigen Gehäuseteil (12) dichtend eingreift, daß der stationäre Schneckenkörper (25) im Inneren des becherförmigen Gehäuseteils (12) so befestigt ist, daß der Umfang der ersten kreisförmigen Stirnplatte (251) an der zylindris-

chen Innenwand des becherförmigen Gehäuseteils (12) strömungsmitteldicht zur Anlage kommt, so daß innerhalb des becherförmigen Gehäuseteils (12) außer einer ersten Kammer (31) mit der ersten Spiralwand (252) zwischen der von der ersten Spiralwand (252) abgelegenen Außenseite der ersten kreisförmigen Stirnplatte (251) und einer Bodenplatte (124) des becherförmigen Gehäuseteils (12) eine zweite Kammer (30) entsteht, daß entweder die erste kreisförmige Stirnplatte (251) oder die Bodenplatte (124) des becherförmigen Gehäuseteils (12) mindestens einen die zweite Kammer (30) durchquerenden Vorsprung (253) aufweist, der mit seiner Stirnfläche an der gegenüberliegenden Innenwand von Bodenplatte (124) oder erster kreisförmiger Stirnplatte (251) anliegt, und daß der stationäre Schneckenkörper (25) am becherförmigen Gehäuseteil (12) mit von der Außenseite des becherförmigen Gehäuseteils (12) eingesetzten Schrauben (27) befestigt ist, welche den Vorsprung (253) und die Bodenplatte (124) durchqueren.

2. Strömungsmaschine nach Anspruch 1, dadurch gekennzeichnet, daß die Vorsprünge (253) feste Bestandteile der ersten Stirnplatte (251) sind und an ihren Stirnflächen Gewindebohrungen (254) zur Aufnahme einer Schraube (24) aufweisen.

3. Strömungsmaschine nach Anspruch 2, dadurch gekennzeichnet, daß die Vorsprünge (253) mehrschenklig ausgebildet sind.

4. Strömungsmaschine nach Anspruch 2, gekennzeichnet durch einen ringförmigen Vorsprung (253, 257), welcher in seiner Umfangswand mindestens eine Durchbrechung aufweist.

5. Strömungsmaschine nach Anspruch 2, dadurch gekennzeichnet, daß die Gewindebohrungen der Schrauben (27) umgebend zwischen den Stirnflächen der Vorsprünge (253) und der Innenfläche der Bodenplatte (124) des becherförmigen Gehäuseteils (12) erste Dichtungsringe (28) angeordnet sind.

6. Strömungsmaschine nach Anspruch 5, dadurch gekennzeichnet, daß am äußeren Umfang der ersten kreisförmigen Stirnplatte (251) der zylindrischen Innenfläche des becherförmigen Gehäuseteils (12) gegenüberliegend ein zweiter Dichtungsring (29) angeordnet ist, um die beiden Kammern (30, 31) voneinander zu trennen, von denen die erste Kammer (31) die erste Spiralwand (252), den kreisend gelagerten Schneckenkörper (26) und den Antrieb und die zweite Kammer (30) die Vorsprünge (253) des stationären Schneckenkörpers (25) enthält.

7. Strömungsmaschine nach Anspruch 6, dadurch gekennzeichnet, daß die erste kreisförmige Stirnplatte (251) mittig bezüglich der ersten Spiralwand (252) eine Bohrung (258) aufweist und daß der becherförmige Gehäuseteil (12) mit einem Strömungsmittelauslaß (36) und einem Strömungsmittelauslaß (35) versehen ist, die jeweils mit einer der beiden genannten ersten und zweiten Kammern (30, 31) in Verbindung stehen.



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8. Strömungsmaschine nach Anspruch 1, dadurch gekennzeichnet, daß der freie Rand des becherförmigen Gehäuseteils (12) mit einem ringsumlaufenden Flansch (121) versehen ist, der an der Innenseite der vorderen Gehäusestirnwand (11) zur Anlage kommt.

9. Strömungsmaschine nach Anspruch 8, dadurch gekennzeichnet, daß zwischen der Innenseite der vorderen Stirnplatte (11) und dem Flansch (121) des becherförmigen Gehäuseteils (12) eine O-Ring-Dichtung (14) angeordnet ist.

10. Strömungsmaschine nach Anspruch 9, dadurch gekennzeichnet, daß die vordere Stirnplatte (11) am becherförmigen Gehäuseteil (12) mit Schraubbolzen verbunden ist, welche den Flansch (121) des becherförmigen Gehäuseteils (12) durchsetzen und in Gewindebohrungen der vorderen Stirnplatte (11) eingreifen.

11. Strömungsmaschine nach Anspruch 10, dadurch gekennzeichnet, daß zwischen der vorderen Stirnplatte (11) und dem Flansch (121) des Gehäuses (12) eine Ringdichtung (114) angeordnet ist.

12. Strömungsmaschine nach Anspruch 1, dadurch gekennzeichnet, daß der becherförmige Gehäuseteil (12) mit mehreren auseinanderliegenden und über den Umfang verteilten und am freien Ende verdickt ausgebildeten Wandteilen (122) versehen ist und daß die Schraubbolzen (113) die vordere Stirnplatte (11) durchsetzend in die verdickten Wandteile (122) eingeschraubt sind.

13. Strömungsmaschine nach Anspruch 12, dadurch gekennzeichnet, daß an der Außenseite des ringförmigen Vorsprungs (112) der vorderen Stirnplatte (11) und der Innenseite des becherförmigen Gehäuses ein O-Ring (14) angeordnet ist.

14. Strömungsmaschine in Schneckenbauart, bestehend aus:

ein Gehäuse (10) mit einem mit zylindrischer Innenwand versehenen becherförmigen Gehäuseteil (12) und einer vorderen Gehäusestirnwand (11), welche mit einem ringförmigen Ansatz (112) an seiner Innenseite in die Öffnung des becherförmigen Gehäuseteils (12) eingreift;

ein im Gehäuse (10) fest angeordneter stationärer Schneckenkörper (25) mit einer ersten kreisförmigen Stirnplatte (251), an der eine erste Spiralwand (252) vorragt, wobei die erste kreisförmige Stirnplatte (251) strömungsmitteldicht in die zylindrische Innenwand des becherförmigen Gehäuseteils (12) so eingesetzt ist, daß der Innenraum des becherförmigen Gehäuseteils in eine

erste und eine zweite Kammer (31, 32) unterteilt wird, wobei die erste Kammer (31) die erste Spiralwand (252) umschließt und die zweite Kammer (30) zwischen der von der ersten Spiralwand (252) abgelegenen Seite der ersten kreisförmigen Stirnplatte (251) und einer Bodenplatte (124) des becherförmigen Gehäuses (12) liegt;

eine Mehrzahl von einteilig mit der ersten kreisförmigen Stirnplatte (251) hergestellten Schenkeln (253) ragen in die zweite Kammer (30) hinein und kommen an der Innenfläche der Bodenplatte (124) des Gehäuseteils (12) zur Anlage, wo sie an der Innenfläche des becherförmigen Gehäuseteils (12) mit Schrauben (27) befestigt sind, so daß der stationäre Schneckenkörper (25) innerhalb des Gehäuses (10) eine festgelegte Lage erhält;

ein innerhalb der ersten Kammer des Gehäuses (10) kreisend bewegbar gelagerter Schneckenkörper (26) besteht aus einer zweiten kreisförmigen Stirnplatte (261), an der eine zweite Spiralwand (262) vorragt;

ein Antrieb mit einer die vordere Gehäusestirnwand (11) durchdringenden und dort drehbar gelagerten Antriebswelle (13), welche mit dem kreisend bewegbar gelagerten Schneckenkörper (26) antriebsmäßig verbunden ist und mit einer Sperre zusammenarbeitet, die eine Drehung des kreisend gelagerten Schneckenkörpers (26) verhindert;

erste Dichtungsringe (28) zwischen den einzelnen Stirnflächen der Schenkel (253) und der Innenseite des Gehäuses (12); und

eine zweite Ringdichtung (29) zwischen einer äußeren Umfangsfläche der ersten kreisförmigen Stirnplatte (251) und der Innenwandung des Gehäuses (12).

15. Strömungsmaschine nach Anspruch 14, dadurch gekennzeichnet, daß das becherförmige Gehäuse (12) mit einem Randflansch (121) versehen ist, daß die vordere Gehäusestirnwand (11) mit einem ringförmigen Ansatz (112) an der dem becherförmigen Gehäuse (12) benachbarten Seite versehen ist und daß der Randflansch (121) mit der Innenfläche der vorderen Gehäusestirnwand (11) mit Halteelementen (113) verbunden ist.

16. Strömungsmaschine nach Anspruch 15, dadurch gekennzeichnet, daß an der Berührungsstelle zwischen der Stirnfläche der vorderen Gehäusestirnwand (11) und dem Randflansch (121) des becherförmigen Gehäuseteils (12) ein O-Ring (14) angeordnet ist.



* C L H S *