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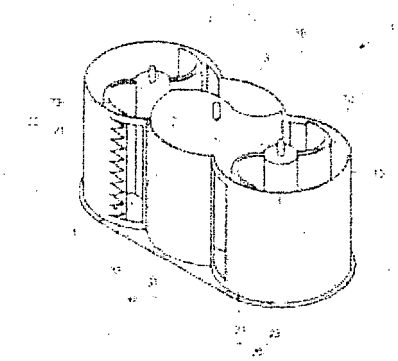
(54) NOISELESS PRESSURE BLOWER

(57) The present invention relates to a noiseless pressure blower including a main body having an inlet port and an outlet port; a pressing member which rotates to suck in fluid from the inlet port; a control member which rotates in contact with the pressure member to prevent the sucked in fluid from flowing to the inlet port; and an interlocking means for transmitting rotational force to the pressure member and the control member. The main body has two cylinders that communicate with each other. The pressure member includes a pressure rotating shaft which rotates by the interlocking means, and a spiral pressure plate provided on the pressure rotating shaft. The control member includes a control rotating shaft which rotates by the interlocking means, and a control body provided on the control rotating shaft, and which rotates in linear contact with the pressure plate.

[Fig.4]



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Description

Technical Field

[0001] The present invention relates generally to noiseless pressure blowers and, more particularly, to a noiseless pressure blower which is configured in such a way that a pressing member and a control member rotating in contact with the pressing member reliably convey air, so that noise can be prevented from being generated and air can be reliably conveyed even in places like a duct, where resistance occurs.

[0002] Generally, blowers are devices to increase the intensity of gas flow, particularly, air flow. Blowers are classified into turbo-blowers and displacement blowers. Turbo-blowers are classified into axial-flow bowers that generate energy using dynamic lift of blades, which is generated by rotating an impeller, and centrifugal blowers that generate energy using centrifugal force.

[0003] A centrifugal multi-blade blower which is a representative example of such blowers includes a cylindrical main body. An inlet port is formed on the central portion of one surface of the main body, and an outlet port is formed at a predetermined position on the circumferential surface of the main body. The centrifugal multi-blade blower further includes a scroll, an impeller and blades which rotate around the central axis of the cylindrical main body. The blades are inclined in one direction, and when they rotate, air is sucked into the central portion of the cylindrical impeller including the blades and then discharged, under pressure, out of the blower.

Background Art

[0004] Such blowers are used in factories, workshops, basements, restaurants, kitchens, etc. where ventilation is required. However, blowers rotate at a high speed, thus generating noise attributable to air friction. In particular, in cases where a duct is used, no-load operation is caused by resistance of the duct, and noise is generated by vortex flow, resulting in poor ventilation.

Disclosure

Technical Problem

[0005] Accordingly, the present invention has been made keeping in mind the above problems occurring in the prior art, and an object of the present invention is to provide a noiseless pressure blower which minimizes air friction to prevent noise and reliably conveys air even in places like a duct, where resistance occurs.

Technical Solution

[0006] In order to accomplish the above object, the present invention provides a noiseless pressure blower, including: a main body having a hollow portion, an inlet port for sucking in a fluid, and an outlet port for discharging the fluid sucked in; a pressing member installed in the hollow portion of the main body, the pressing member rotating to suck in the fluid from the inlet port; a control member installed in the hollow portion of the main body, the control member rotating in contact with the pressure member to prevent the sucked in fluid from flowing to the inlet port; and an interlocking means for transmitting rotational force generated by a motor to the pressure member and the control member so that the pressure member and the control member rotate at a same rpm.

[0007] The main body may have a shape in which two cylinders communicate with each other via side surfaces thereof. The pressure member may include a pressure rotating shaft rotating by the interlocking means, and a spiral pressure plate provided on the pressure rotating shaft. The control member may include a control rotating shaft rotating by the interlocking means, and a control body provided on the control rotating shaft. The control body may rotate in linear contact with the pressure plate.

[0008] The pressing member and the control member may be alternately installed in the main body.

[0009] Furthermore, an edge of the inlet port may have a sawtooth shape.

[0010] The interlocking means may comprise a gear unit.

[0011] The main body may include a cylinder having a hollow portion therein, and a compartment communicating with the cylinder via a side surface thereof. The pressure member may be installed in the cylinder. The pressure member may include a pressure rotating shaft rotating by the interlocking means, and two spiral blades provided on the pressure rotating shaft. The control member may include a control rotating shaft installed in the compartment, the control rotating shaft rotating by the interlocking means, and a disk-shaped control plate provided on the control rotating shaft, with a slot formed through the control plate, the slot extending a predetermined length in a radial direction of the control plate, such that the blades pass through the slot when the blades and the control plate rotate.

[0012] The cylinder of the main body may comprise two cylinders communicating with the compartment via opposite side surfaces thereof. The control member may be installed in the compartment, and the pressing member may comprise two pressing members installed in the respective two cylinders.

[0013] The interlocking means may comprise a gear unit or a timing belt.

Advantageous Effects

[0014] As described above, in the present invention, a noiseless pressure blower rotates at a comparatively low speed, so that noise can be prevented from being generated. Furthermore, because the blower is configured in such a way that a pressing member and a control member suck in air and discharge the air, air can be reliably

conveyed even in places like a duct, where resistance occurs. In addition, the present invention can provide superior ventilation effect, even in a place where the amount of sucked in air is comparatively small; for example, due to an exit door. Moreover, the noiseless pressure blower of the present invention can continuously convey a constant quantity of fluid, so that it can be used in various kinds of devices.

Description of Drawings

[0015]

Fig. 1 is a perspective view of a noiseless pressure blower, according to a first embodiment of the present invention;
Fig. 2 is a plan view of the noiseless pressure blower of Fig. 1;
Fig. 3 is a sectional view of the noiseless pressure blower of Fig. 1;
Fig. 4 is an exploded perspective view of a critical part of the noiseless pressure blower of Fig. 1;
Fig. 5 is a view illustrating pressing members and a control member;
Fig. 6 is of views illustrating the operation of the noiseless pressure blower of Fig. 1;
Fig. 7 is a perspective view of a noiseless pressure blower, according to a second embodiment of the present invention;
Fig. 8 is an exploded perspective view of the noiseless pressure blower of Fig. 7;
Fig. 9 is a perspective view of a noiseless pressure blower, according to a third embodiment of the present invention;
Fig. 10 is a view showing the construction of the noiseless pressure blower of Fig. 9;
Fig. 11 is an exploded perspective view of the noiseless pressure blower of Fig. 9;
Fig. 12 is a perspective view of a pressing member installed in the noiseless pressure blower of Fig. 9;
Fig. 13 is a perspective view of a control member installed in the noiseless pressure blower of Fig. 9;
Fig. 14 is of views illustrating the operation of the noiseless pressure blower of Fig. 9;
Fig. 15 is a view illustrating the flow of air in the noiseless pressure blower of Fig. 9;
Fig. 16 is a perspective view of a noiseless pressure blower, according to a fourth embodiment of the present invention; and
Fig. 17 is an exploded perspective view of the noiseless pressure blower of Fig. 16.

Description of the elements in the drawings

[0016]

1: pressure blower, 10: main body,
11: inlet port, 12: outlet port,
13: cylinder, 15: compartment,
20: pressing member, 21: pressure rotating shaft,
23: pressure plate, 25: blade,
30: control member, 31: control rotating shaft,
33: control body, 35: control plate,
37: slot, 70: communicating member

Best Mode

[0017] Hereinafter, a preferred embodiment of the present invention will be described in detail with reference to the attached drawings. Reference now should be made to the drawings, in which the same reference numerals are used throughout the different drawings to designate the same or similar components.

[0018] Fig. 1 is a perspective view of a noiseless pressure blower, according to a first embodiment of the present invention. Figs. 2 and 3 respectively are a plan view and a sectional view showing the noiseless pressure blower of Fig. 1. Fig. 4 is an exploded perspective view of a critical part of the noiseless pressure blower.

[0019] As shown in the drawings, the noiseless pressure blower designated by the reference numeral 1 includes a main body 10, pressing members 20 and a control member 30.

[0020] As shown in Fig. 3, the main body 10 has a shape in which three cylinders 13 communicates with each other via the side surfaces thereof. An inlet port 11 and an outlet port 12 are formed through the side surface of each of the two outer cylinders 13. The main body 10 is contained in a casing 5.

[0021] The control member 30 is installed in the cylinder 13 that is located in the medial portion of the main body 10. The pressing members 20 are installed in the respective outer cylinders 13.

[0022] As shown in Figs. 2 and 3, rotational force generated by a motor 40 is transmitted to the pressing members 20 and the control member 30 via a gear unit 50. The control member 30 and the pressing members 20 are rotated at the same speed in the opposite directions to each other by the gear unit 50.

[0023] The inlet port 11 and the outlet port 12 are formed in each of the cylinders 13 of the main body 10 that contain the respective pressing members 20 therein. As shown in Fig. 4, each inlet port 11 has a sawtooth edge so that noise generated at an initial stage of operation of sucking in air can be mitigated.

[0024] As shown in the drawings, the two inlet ports 11 are located at opposite positions to each other, and the two outlet ports 12 are also located at opposite positions to each other. Thus, the inlet ports 11 and the outlet ports 12 which are located at different positions suck in air in different directions and discharge air in different directions. Therefore, the inlet ports 11 which are provided at opposite sides are connected to each other by a communicating member 70, and the outlet ports 12 are also connected to each other by a communicating member 70. As shown in Fig. 1, the communicating members

70 are provided between the main body 10 and the casing 5. As such, because the inlet ports 11 are connected to each other by the corresponding communicating member 70 and the outlet ports 12 are connected to each other by the corresponding communicating member 70, the blower can blow from one side to the other side.

[0025] Each pressing member 20 includes a pressure rotating shaft 21 which is rotated by the gear unit 50, and a pressure plate 23 which is provided on the pressure rotating shaft 21. As shown in Fig. 5, the pressure plate 23 has a spiral shape and a semicircular cross-section. The pressure plate 23 comprises a pair of pressure plates 23 which are respectively fastened on the opposite sides of the pressure rotating shaft 21.

[0026] The control member 30 includes a control rotating shaft 31 which is rotated by the gear unit 50, and a control body 33, which is provided on the control rotating shaft 31. The control body 33 rotates in close contact with the pressure plate 23. As shown in Fig. 5, the control body 33 has a spiral shape. A hollow portion is formed in the control body 33 so that it has a predetermined volume.

[0027] The pressing members 20 and the control member 30 rotate at the same rpm. The pressure plates 23 and the control body 33 come into line contact with each other with respect to the longitudinal direction while they rotate. Hence, because the control body 33 and the pressure plates 23 rotate in contact with each other, there is no space between the pressure plates 23 and the control body 33 so that the flow of air therebetween is interrupted.

[0028] The operation of the present invention having the above-mentioned construction will be explained with reference to Fig. 6.

[0029] The pressing members 20 and the control member 30 which rotate at the same rpm in opposite directions come into line contact with each other. Thus, air is interrupted from flowing between the pressing members 20 and the control member 30.

[0030] Therefore, air is sucked into the inlet ports 11 by the rotation of the pressing members 20. The sucked-in air flows along the pressure plates 23 and then is discharged to the outside through the outlet ports 12 which are located at positions opposite to the respective inlet ports 11.

[0031] As shown in the drawings, the two inlet ports 11 and the two outlet ports 12 are located at opposite positions. Furthermore, the two inlet ports 11 communicate with each other through the corresponding communicating member 70, and the two outlet ports 12 also communicate with each other through the corresponding communicating member 70. Thereby, the blower can suck in air from one side and then discharge the air to the other side (refer to Fig. 1).

Mode for Invention

[0032] Figs. 7 and 8 are views illustrating a noiseless pressure blower, according to a second embodiment of the present invention.

[0033] Although the single control member 30 and the two pressing members 20 are provided in the first embodiment described above, as shown in the drawings, the second embodiment includes a single pressing member 20 and a single control member 30. The construction of each component and the operation of the blower are similar to or the same as those of the first embodiment, so detailed explanation thereof will be omitted. Furthermore, it will be easily understood that the blower may be configured in such a way that that two or more control members 30 and two or more pressing members 20 are connected to each other in the same manner as that of the first embodiment, so further explanation thereof will also be omitted.

[0034] Figs. 9 through 15 illustrate a noiseless pressure blower, according to a third embodiment of the present invention.

[0035] As shown in the drawing, the blower according to the third embodiment also includes a main body 10, pressing members 20 and a control member 30.

[0036] As shown in Fig. 11, the main body 10 includes two cylinders 13 which are located at positions spaced apart from each other. A compartment 15 is formed between the two cylinders 13 so that the two cylinders 13 communicate with each other through the compartment 15. The main body 10 is covered with a casing 5 to have the shape of Fig. 9.

[0037] As shown in Fig. 12, each pressing member 20 includes a pressure rotating shaft 21 which is rotated by a motor 40, and two spiral blades 25 which are provided on the pressure rotating shaft 21. The pressing members 20 are installed in the respective cylinders 13.

[0038] As shown in Fig. 13, the control member 30 includes a control rotating shaft 31 which is rotated by the motor 40 and installed in the compartment 15, and a control plate 35 having a disk shape. Two slots 37 are formed in the control plate 35 and extend predetermined lengths in the radial direction of the control plate 35.

[0039] The pressing members 20 are installed in the respective cylinders 13, and the control member 30 is installed in the compartment 15. As shown in Figs. 10 and 11, the control rotating shaft 31 is oriented in the horizontal direction, and the pressure rotating shafts 21 are orientated in the vertical direction.

[0040] The blades 25 of the pressing members 20 pass through the two slots 37 formed in the control plate 35. As shown in Fig. 12, each blade 25 has a bent spiral shape so that it can be inserted into and pass through the corresponding slot 37 of the control plate 35, which is rotating.

[0041] The operation of the noiseless pressure blower of the third embodiment having the above-mentioned construction will be described with reference to Figs. 14 and 15.

[0042] As shown in the drawings, the control member 30 and the pressing members 20 rotate at the same rpm.

[0043] The blades 25 of the pressing members 20,

which are rotating, pass through the corresponding slots 37 of the control plate 35, as shown in Fig. 14.

[0044] The disk-shaped control plate 35 can prevent air from flowing in an incorrect direction despite allowing the blades 25 of the pressing members 20 to pass along the slots 37, as shown in Fig. 14. As shown in Fig. 15, the blower blows air following this principle.

[0045] Figs. 16 and 17 illustrate a noiseless pressure blower, according to a fourth embodiment of the present invention. As shown in the drawings, the noiseless pressure blower of the fourth embodiment includes a single control member 30 and a single pressing member 20 rather than having two pressing members 20. The control member 30 is connected to the pressing member 20 by a gear unit 50 or a timing belt 60. The operation of the blower of the fourth embodiment having such construction is the same as that of the prior embodiments, so further explanation thereof will be omitted.

[0046] The noiseless pressure blower according to the present invention can be used not only as a device to blow air but also as a pump to move fluid, such as water or chemicals.

[0047] Although the preferred embodiments of the noiseless pressure blower of the present invention have been disclosed for illustrative purposes, the present invention is not limited to these embodiments, and those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

Industrial Applicability

[0048] In the present invention, a blower rotates at a comparatively low speed, so that noise can be prevented from being generated. Furthermore, because the blower is configured so that a pressing member and a control member suck in air and discharge the air, air can be reliably conveyed even in a place, such as in a duct, where resistance occurs. In addition, the noiseless pressure blower of the present invention can continuously convey a constant quantity of fluid, so that it can be used as a pump.

Claims

1. A noiseless pressure blower, comprising:

a main body (10) having a hollow portion, an inlet port (11) for sucking in a fluid, and an outlet port (12) for discharging the fluid sucked in;
a pressing member (20) installed in the hollow portion of the main body (10), the pressing member (20) rotating to suck in the fluid from the inlet port (11);
a control member (30) installed in the hollow portion of the main body (10), the control member (30) rotating in contact with the pressure member (20) to prevent the sucked in fluid from flowing to the inlet port (11); and
interlocking means for transmitting rotational force generated by a motor (40) to the pressure member (20) and the control member (30) so that the pressure member (20) and the control member (30) rotate at a same rpm.

2. The noiseless pressure blower as set forth in claim 1, wherein the main body (10) has a shape in which two cylinders (13) communicate with each other via side surfaces thereof, the pressure member (20) comprises: a pressure rotating shaft (21) rotating by the interlocking means; and a spiral pressure plate (23) provided on the pressure rotating shaft (21), and the control member (30) comprises: a control rotating shaft (31) rotating by the interlocking means; and a control body (33) provided on the control rotating shaft (31), the control body (33) rotating in linear contact with the pressure plate (23) .

3. The noiseless pressure blower as set forth in claim 1 or 2, wherein the pressing member (20) and the control member (30) are alternately installed in the main body (10).

4. The noiseless pressure blower as set forth in claim 1 or 2, wherein an edge of the inlet port (11) has a sawtooth shape.

5. The noiseless pressure blower as set forth in claim 2, wherein the interlocking means comprises a gear unit (50).

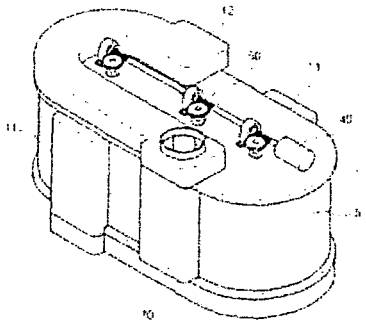
6. The noiseless pressure blower as set forth in claim 1, wherein the main body (10) comprises: a cylinder (13) having a hollow portion therein; and a compartment (15) communicating with the cylinder (13) via a side surface thereof, the pressure member (20) is installed in the cylinder (13), the pressure member (20) comprising: a pressure rotating shaft (21) rotating by the interlocking means; and two spiral blades (25) provided on the pressure rotating shaft (21), and the control member (30) comprises: a control rotating shaft (31) installed in the compartment (15), the control rotating shaft (31) rotating by the interlocking means; and a disk-shaped control plate (35) provided on the control rotating shaft (31), with a slot (37) formed through the control plate (35), the slot (37) extending a predetermined length in a radial direction of the control plate (35), such that the blades (25) pass through the slot (37) when the blades (25) and the control plate (35) rotate.

7. The noiseless pressure blower as set forth in claim 6, wherein the cylinder (13) of the main body (10) comprises two cylinders (13) communicating with

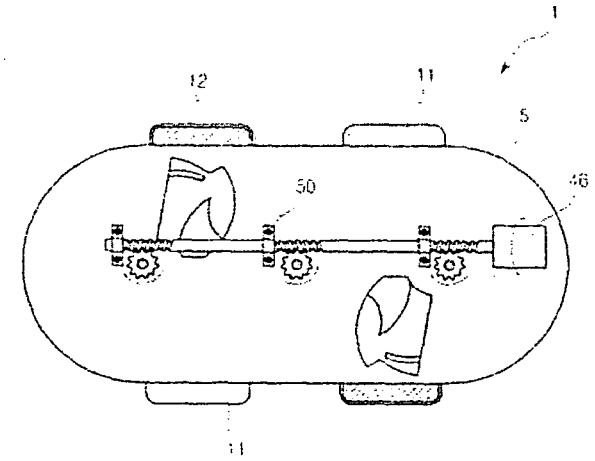
the compartment (15) via opposite side surfaces thereof, the control member (30) is installed in the compartment (15), and the pressing member (20) comprises two pressing members (20) installed in the respective two cylinders (13).

8. The noiseless pressure blower as set forth in claim 6, wherein the interlocking means comprises a gear unit (50) or a timing belt (60).

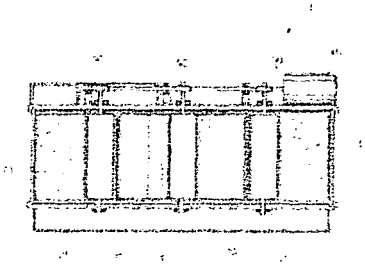
[Fig.1]



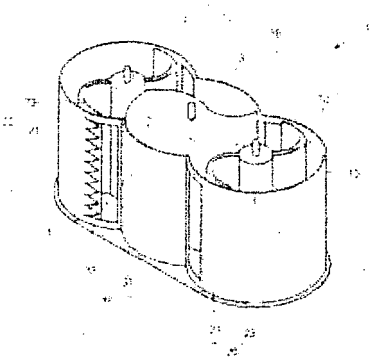
[Fig.2]



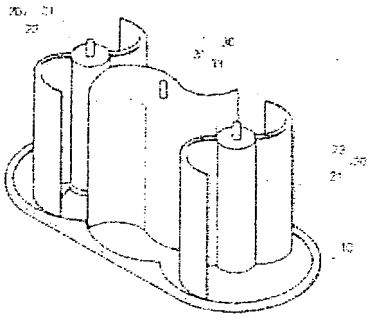
[Fig.3]



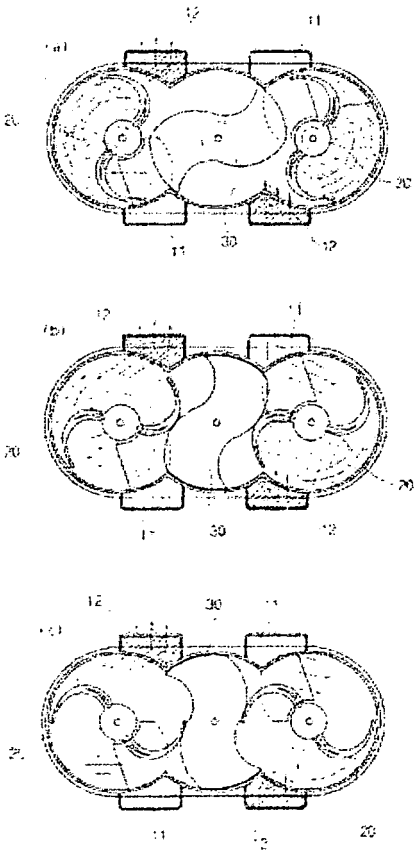
[Fig.4]



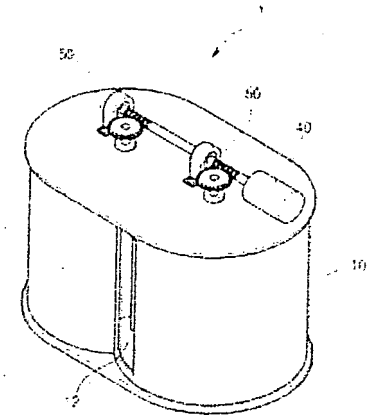
[Fig.5]



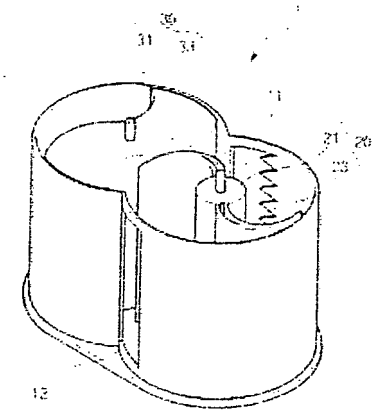
[Fig.6]



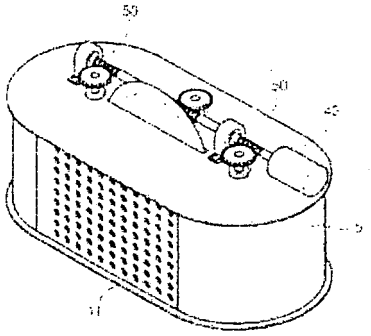
[Fig.7]



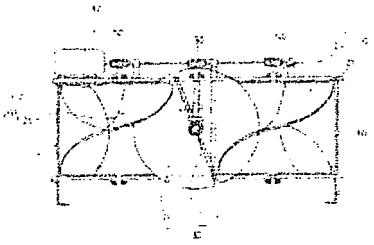
[Fig.8]



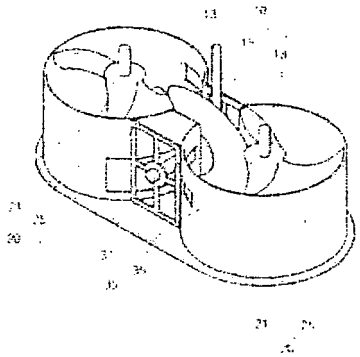
[Fig.9]



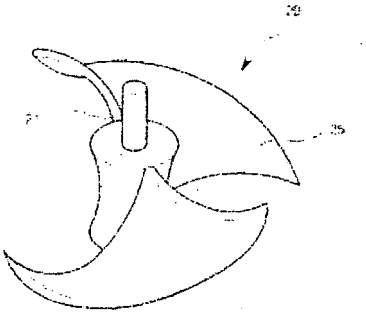
[Fig.10]



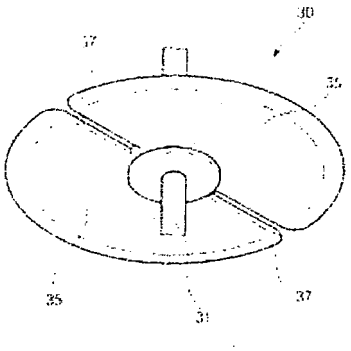
[Fig.11]



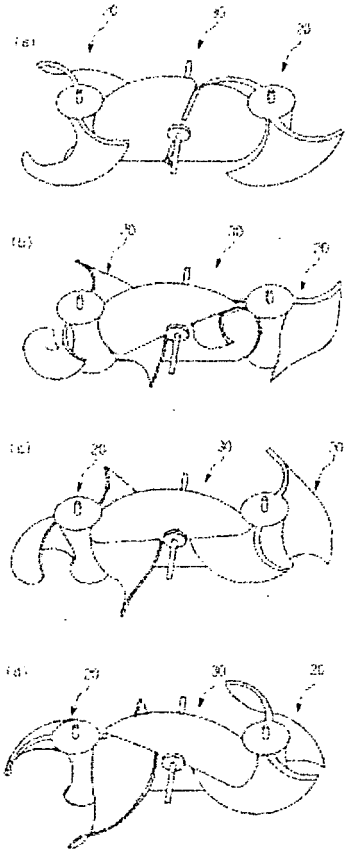
[Fig.12]



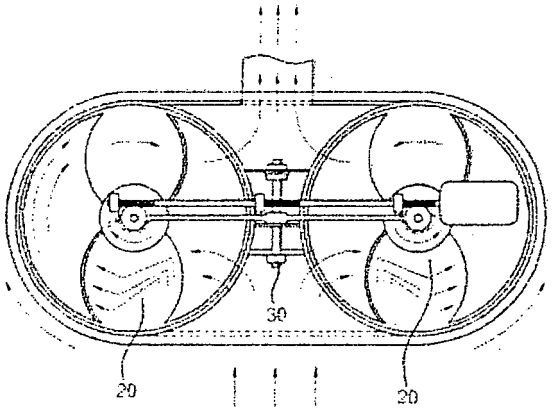
[Fig.13]



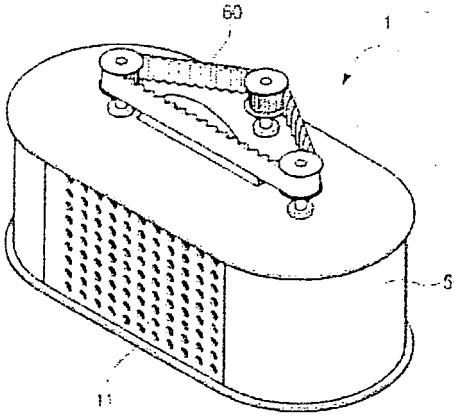
[Fig.14]



[Fig.15]



[Fig.16]



[Fig.17]