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(54) Improved air pump

(57) An air pump includes a mount member (10) having a main body (13) and a chamber (17). An air bag set (30) has a substrate (31), two air bags (33), each of which have an air chamber (35) and a linking portion (335). An insulating plate (40) has a plate member (41), two inlets (43) and two outlets (45) communicated with the air chambers (35) of the air bags respectively. A ventilation part (50) has a pad member (51), two inlet valves (53) and two outlet valves (55), both of which are communicated with the inlets (43) and the outlets (45) of the insulating plate respectively. An air guide device (60) has a main member (61), two inlets (63) and two outlets (68), both of which are communicated with the inlet (53) and outlet valves (55) of the ventilation part respectively. A linking assembly (70) has a rotary base (71) and a linking portion (85) connected to the linking portion (335) of the air bag set (30).

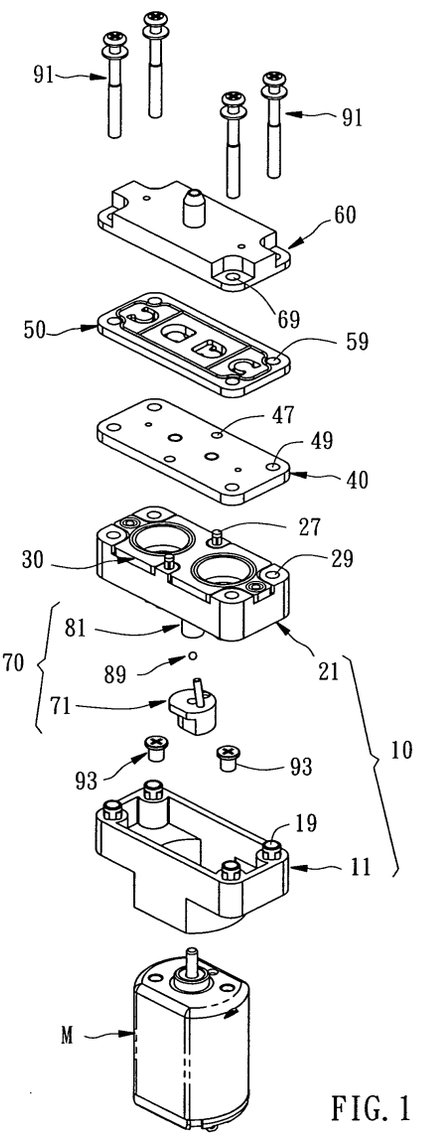

FIG. 1

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates generally to a pump, and more particularly to an air pump having an improved structure and assembly.

2. Description of the Related Art

[0002] A conventional air pump has an old style of assembly and complicated structure, and more particularly, the conventional air pump is consisted of a large amount of components and it is a hard job to assemble these components. A following drawback of that is the higher cost of fabrication. There is still no a fine solution to fix aforesaid drawbacks of the conventional air pump.

SUMMARY OF THE INVENTION

[0003] The primary objective of the present invention is to provide an air pump, which has a new type of structure to reduce the numbers of components, make the process of assembly easier and faster and reduce the cost of fabrication.

[0004] According to the objective of the present invention, an air pump, which is driven by a spindle of a motor, comprises a mount member having a main body and a chamber. An air bag set has a substrate, an air bag provided on the substrate, in which an air chamber is formed. The air bag has a bag bladder and a linking portion. An insulating plate has a plate member. An inlet and an outlet are communicated with the air chamber of the air bag set. A ventilation part has a pad member. An inlet valve is communicated with the inlet of the insulating plate and an outlet valve is communicated with the outlet of the insulating plate. An air guide device has a main member. An inlet is communicated with the inlet valve of the ventilation part and an outlet is communicated with the outlet valve of the ventilation part. A linking assembly has rotary base driven by the spindle of the motor for rotation and a linking portion connected to the linking portion of the air bag of the air bag set.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005]

FIG. 1 is an exploded view of a preferred embodiment of the present invention;

FIG. 2 is an exploded and sectional view of the preferred embodiment of the present invention;

FIG. 3 is a sectional view of the preferred embodiment of the present invention;

FIG. 4 is a sectional view along the 4-4 line of FIG. 3;

FIG. 5 is an potion exploded view of the second mount, the air bag set and the bag linking device, and

FIG. 6 and FIG. 7 are sectional views of the preferred embodiment of the present invention, showing the air pump working.

DETAILED DESCRIPTION OF THE INVENTION

[0006] As shown in FIGS, from FIG. 1 to FIG. 5, an air pump of the preferred embodiment of the present invention, which is driven by a spindle M1 of a motor M comprises:

[0007] A mount member **10** is consisted of a first mount **11** and a second mount **21.** The first mount **11** has a main body **13,** a base **15,** a chamber **17** and four coupling portions **19.** The second mount **21** has a main body **23,** four positioning recesses **24** on the main body **23,** two surrounding members **25,** two locating posts **27** and four coupling portions **29.** The coupling portions **29** are four through holes and aligned with the coupling portions **19** of the first mount **11** respectively. The motor M is mounted on the mount member **10** via two bolts **93.**

[0008] An air bag set **30** has a substrate **31,** four positioning plates **32** provided on the substrate **31** and received in the positioning recesses **24** of the mount member **10** respectively, two air bags **33** provided on the substrate **31** and formed two air chambers **35** therein. Each air bag **33** has a bag bladder **331,** a bag head **333** and a linking portion **335** in sequence.

[0009] An insulating plate **40** has a plate member **41,** two inlets **43,** two outlets **45,** two locating holes **47** to receive the locating posts **27** of the mount member **10** respectively and four coupling portions **49.**

[0010] A ventilation part **50** has a pad member **51,** two inlet valves **53** and two outlet valves **55** for the inlets **43** and the outlets **45** of the insulating plate **40** respectively, two sealing ribs **57** formed on a top side and a bottom side of the pad member **61** for surrounding and isolating said inlet valve **53** and said outlet valve **55,** and four coupling portions **69.**

[0011] An air guide device **60** has a main member **61,** two inlets **63,** an air chamber **65,** an air pipe **67** having an outlet **68** therethrough and four coupling portions **69.**

[0012] A linking assembly **70** has a rotary base **71** and a bag linking device **81.** The rotary base **71** has a rotary member **73** driven by the spindle M 1 of the motor M for rotation and a shaft **75** tilted toward a center axis of the rotary base **71.** The bag linking device **81** has a shaft portion **87,** a disk **83,** two linking portions **85** and a ball **89** received in the shaft portion **87.**

[0013] Four coupling devices **91** are inserted through the coupling portions **69, 59, 49** and **29** of the air guide device **60,** the ventilation part **50,** the insulating plate **40** and the second mount **21** and screwed to the coupling portions **19** of the mount member **10** respectively.

[0014] First, a hose (not shown in FIGS.) is connected to the air pipe **67** of the air guide device **60**. The spindle M1 of the motor M drives the rotary base **71** of the linking

assembly **70** for rotation. The shaft **75** of the rotary base **71** drives the bag linking device **81** for rotation to move the linking portions **335** of the air bags **33** of the air bag set **30** upwards and downwards via the linking portions **85** of the bag linking device **81** respectively.

[0015] As shown in FIG. 3, in the meantime, air in the air chamber **35** of the air bag set **30** is compressed and flows to the hose (not shown) via the outlet **45** of the insulating plate **40,** the outlet valve **55** of the ventilation part **50,** the air chamber **65** and the outlet **68** of the guide device **60.**

[0016] On the contrary, another air bag **33** of the air bag set **30** sucks air into the air chamber **35** of the air bag set **30** from the inlet **63** of the air guide device **60** via the inlet valve **53** of the ventilation part **50** and the inlet **43** of the insulating plate **40.** The air will be exhausted to the hose as described above in the next action.

[0017] FIG. 6 shows the rotary base **71** is rotated **90** degrees.

[0018] As shown in FIG. 7, the rotary base **71** rotates continuously to make the air bag **33** at right sucking air into the air chamber **35** from the inlet **63** of the air guide device **60** and the air bag **33** at left exhausting the air in the air chamber **35** out as described above.

[0019] The character of the present invention is that the air pump of the present invention is different from the conventional air pump in structure to meet the requirement of various sizes of the air pumps.

Claims

1. An air pump, which is driven by a spindle of a motor, comprising:

a mount member having a main body and a chamber;

an air bag set having a substrate, an air bag provided on said substrate, in which an air chamber is formed, wherein said air bag has a bag bladder and a linking portion;

an insulating plate having a plate member, an inlet and an outlet, wherein said inlet and said outlet are communicated with said air chamber of said air bag set;

a ventilation part having a pad member, an inlet valve and an outlet valve, wherein said inlet valve is communicated with said inlet of said insulating plate and said outlet valve is communicated with said outlet of said insulating plate;

an air guide device having a main member, an inlet and an outlet, wherein said inlet is communicated with said inlet valve of said ventilation part and said outlet is communicated with said outlet valve of said ventilation part, and

a linking assembly having rotary base driven by said spindle of said motor for rotation and a linking portion connected to said linking portion of said air bag of said air bag set.

2. The air pump as defined in claim 1, wherein said mount member has a first mount and a second mount assembled together.

3. The air pump as defined in claim 1, wherein said mount member has a surrounding member to receive said bag bladder of said air bag of said air bag set therein.

4. The air pump as defined in claim 1, wherein said pad member of said ventilation part has a sealing rib surrounding and isolating said inlet valve and said outlet valve.

5. The air pump as defined in claim 1, wherein said air guide device further has an air pipe communicated to said outlet of said air guide device.

6. The air pump as defined in claim 1, wherein said linking assembly further has an bag linking device pivoted on said rotary base and said linking portion is provided on said bag linking device.

7. The air pump as defined in claim 1, wherein said mount member has a positioning recess and said air bag set has a positioning plate to be received in said positioning recess of said mount member.

8. The air pump as defined in claim 1, wherein the quality of air bag of said air bag set is two.

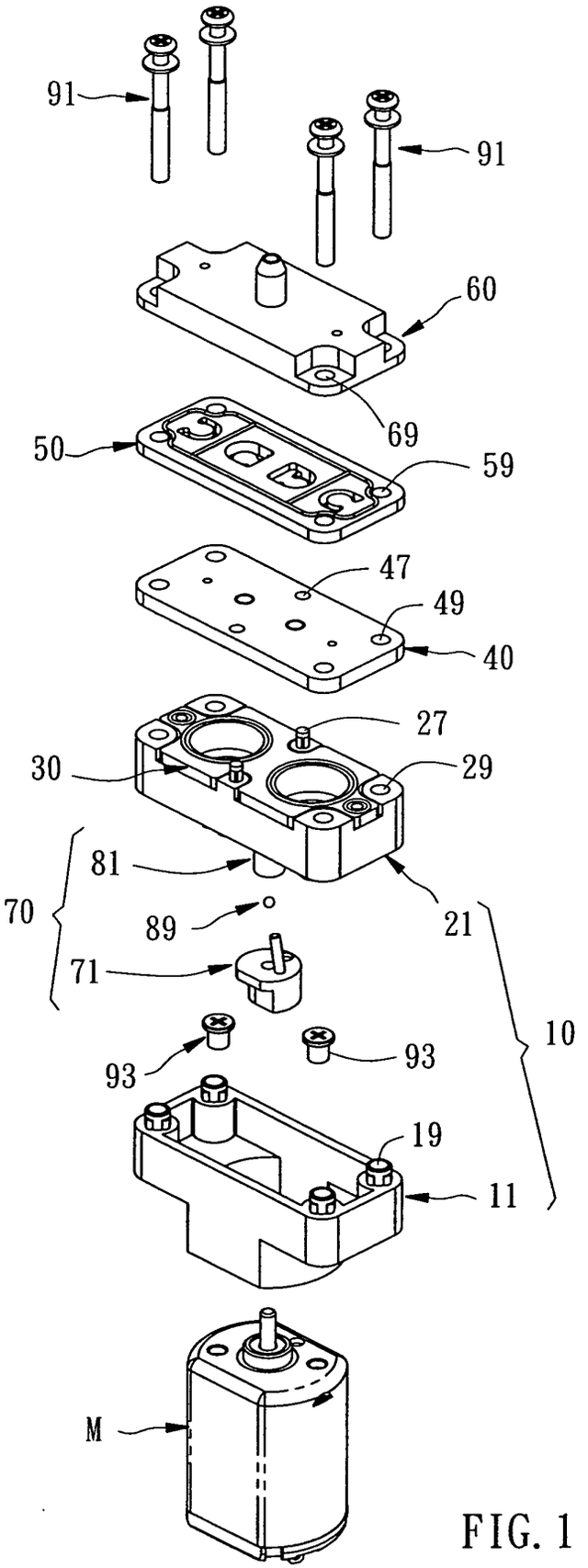
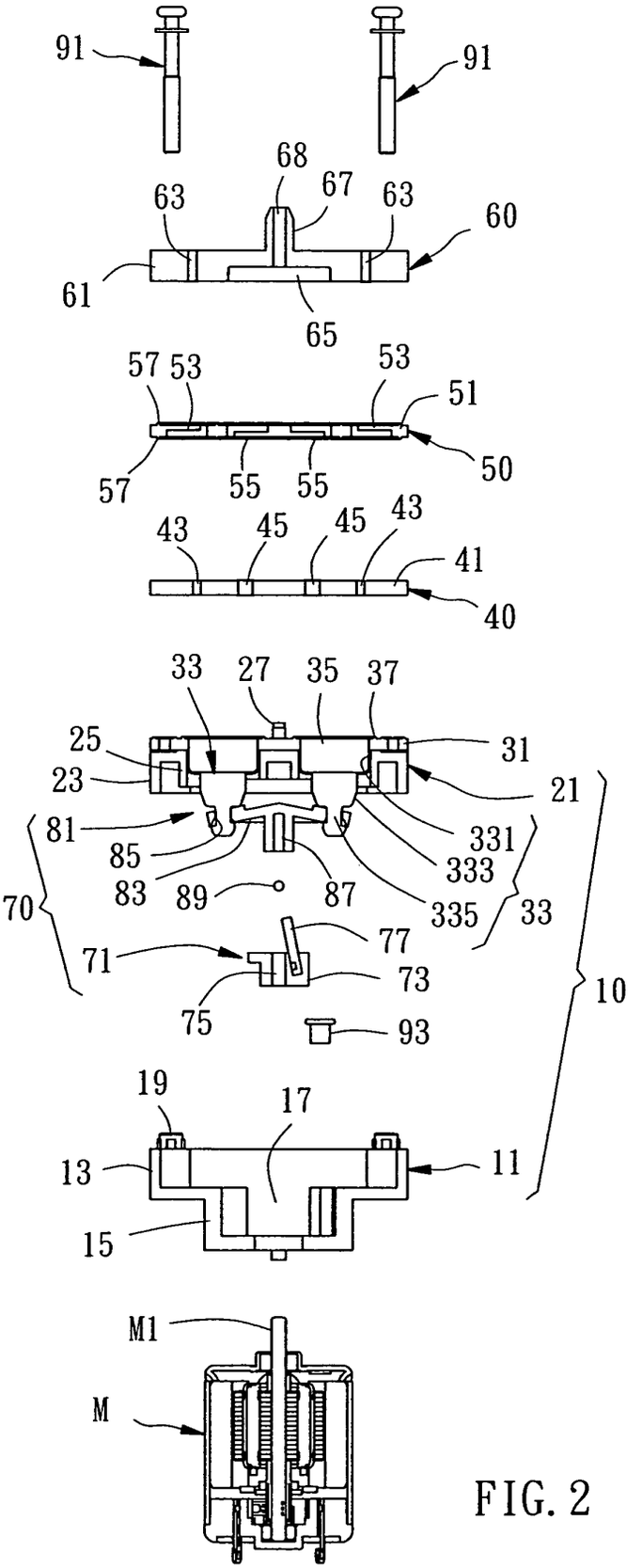


FIG. 1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35
37
25
31
23
21
81
331
85
333
83
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335
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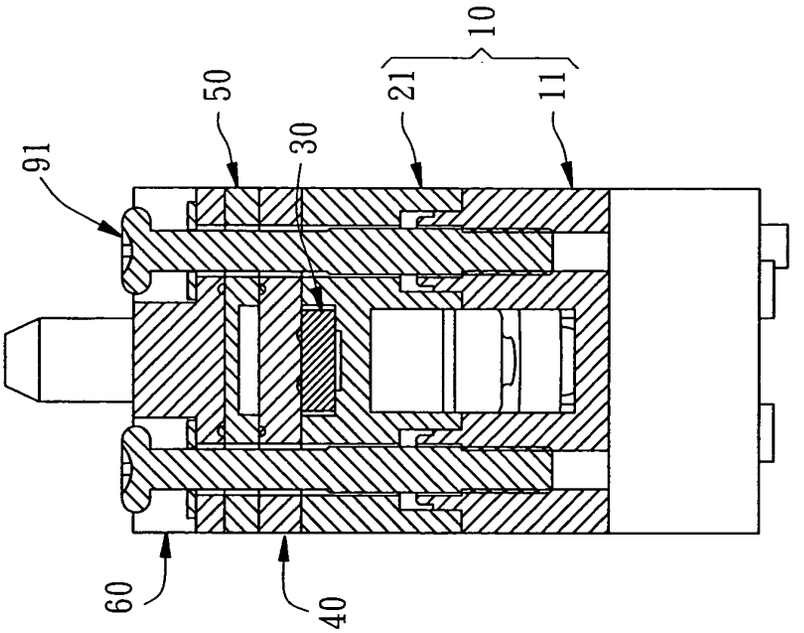
73
75
93
10
19
17
13
11
15
M1
M

FIG. 2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11
50
30
91
60
40

FIG. 4

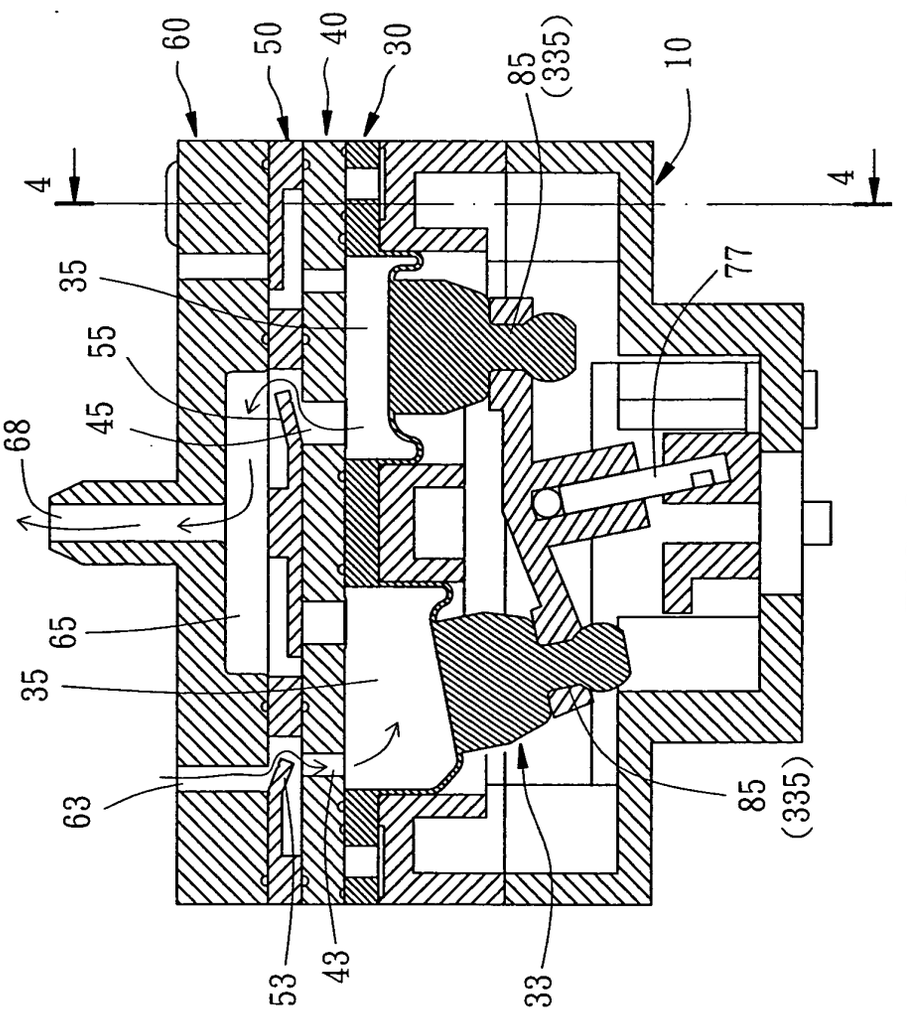
60
50
40
30
85
(335)
10
4
4
35
55
45
68
77
65
35
63
85
(335)
53
43
33

FIG. 3

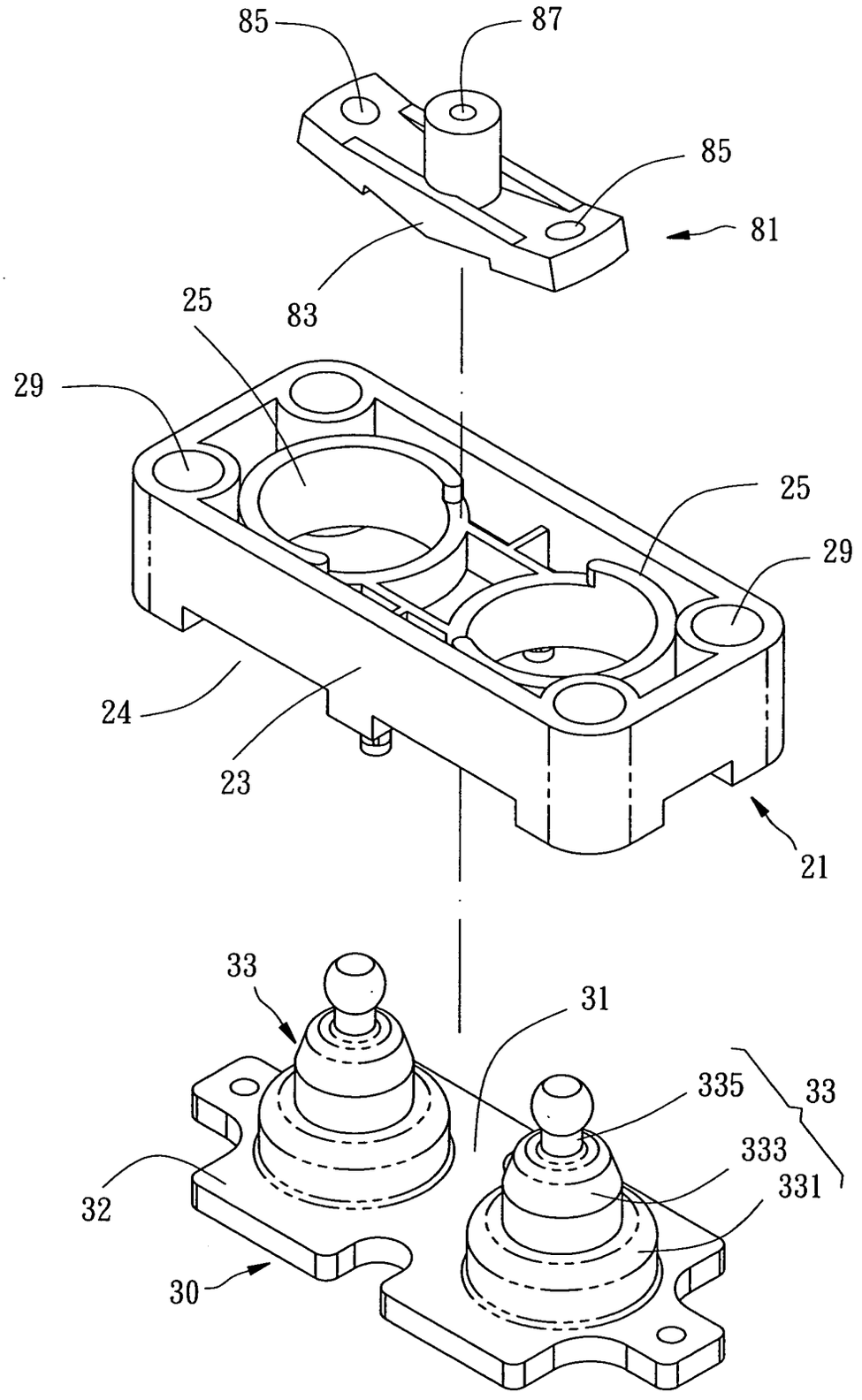

FIG. 5

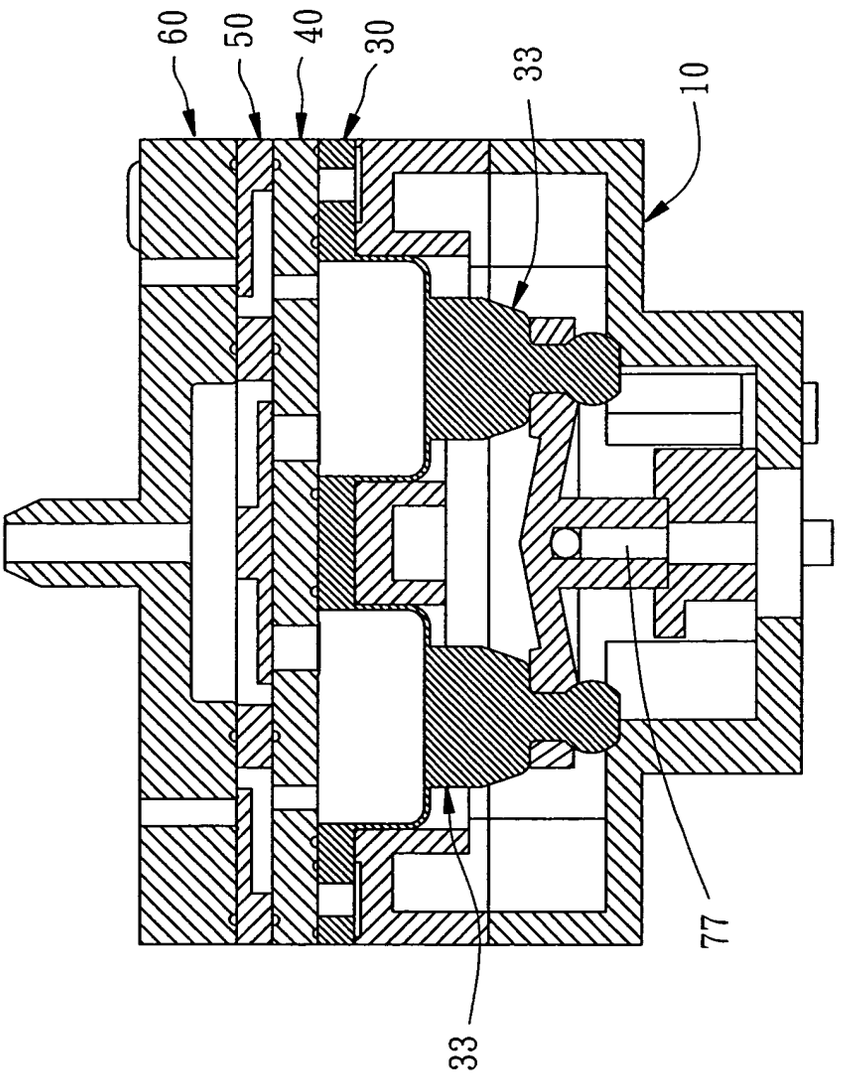

FIG. 6

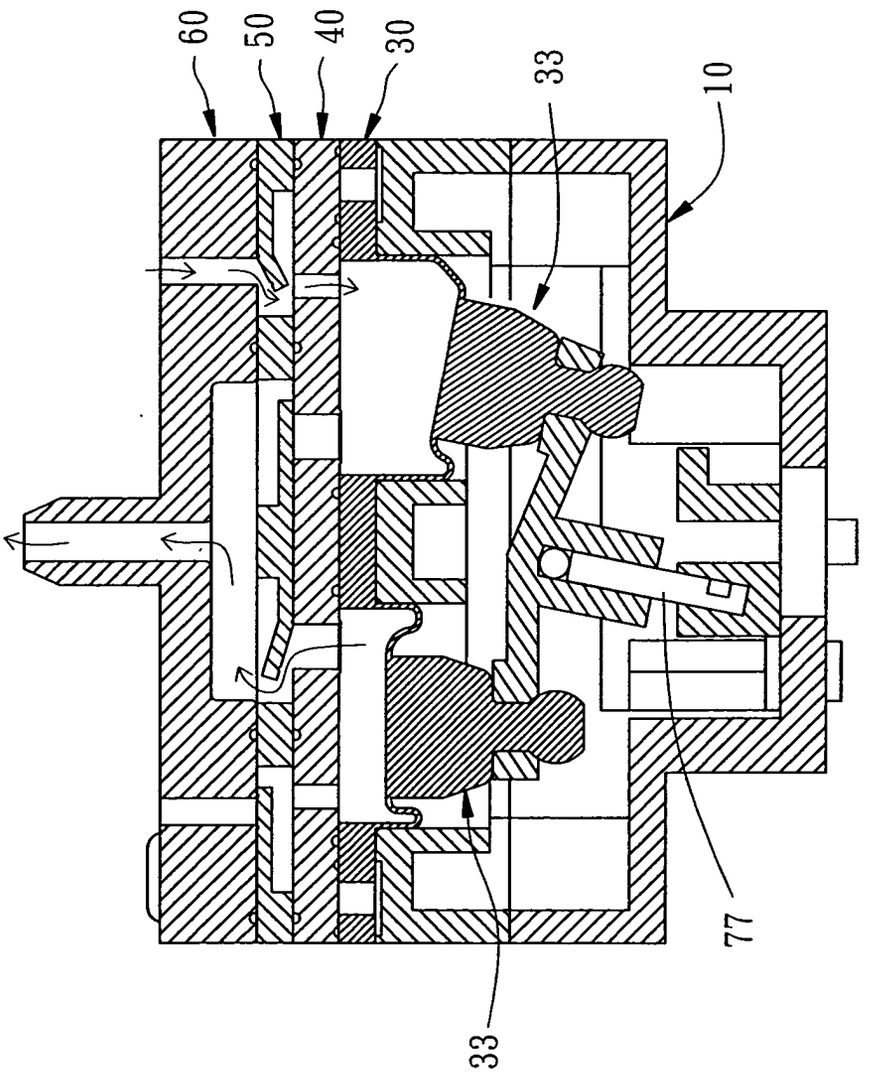

FIG. 7

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EUROPEAN SEARCH REPORT

Application Number
EP 04 00 5330

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	PATENT ABSTRACTS OF JAPAN vol. 2003, no. 09, 3 September 2003 (2003-09-03) -& JP 2003 148354 A (OKEN LTD), 21 May 2003 (2003-05-21) * abstract; figures 4-6 *	1-8	F04B45/04
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A	PATENT ABSTRACTS OF JAPAN vol. 2003, no. 12, 5 December 2003 (2003-12-05) & JP 2003 269337 A (OKEN LTD), 25 September 2003 (2003-09-25) * abstract *	1-8	TECHNICAL FIELDS SEARCHED (Int.Cl.7) F04B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	23 July 2004	Descoubes, P

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