

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
15 December 2005 (15.12.2005)

PCT

(10) International Publication Number
WO 2005/118941 A1

(51) International Patent Classification⁷: **D06F 39/12**

(21) International Application Number:
PCT/KR2005/001534

(22) International Filing Date: 25 May 2005 (25.05.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10-2004-0039501 1 June 2004 (01.06.2004) KR

(71) Applicant (for all designated States except US): **LG ELECTRONICS, INC.** [KR/KR]; 20 Yoido-dong, Youngdungpo-gu, Seoul 150-875 (KR).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **KWON, Ho-Cheol** [KR/KR]; 89-3, Sapa-dong, Changwon-si, Kyung-sang-nam-do 641-550 (KR). **YIM, Il-Hyeok** [KR/KR];

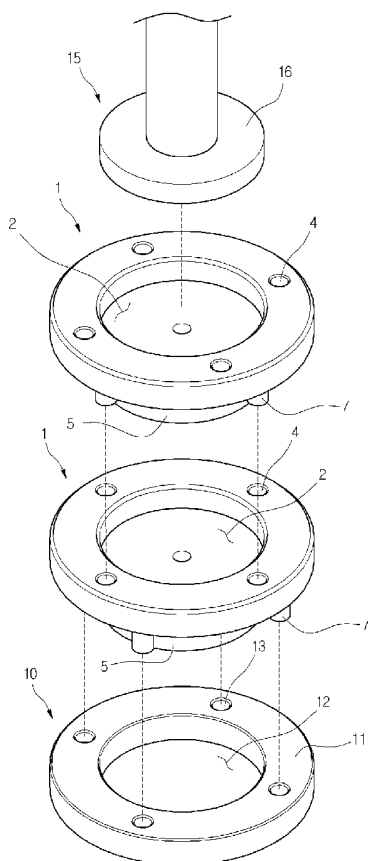
206-1803, Sandul-maeol, 1578-1610, Ilsan2-dong, Il-san-gu, Goyang-si, Kyunggi-do SEOUL (KR). **JUNG, Youn-Su** [KR/KR]; A-406, LG SanghwalGwan, Gaumjung-dong, Changwon-si, Kyung-sang-nam-do 641-110 (KR). **SONG, Hack-Jai** [KR/KR]; 706-1952, Sogae-dong, Changwon-si, Kyung-sang-nam-do 641-480 (KR). **KIM, Beom-Jun** [KR/KR]; 203-2018, Sungwon 2nd Apt. Sangnam-dong, Changwon-si, Kyung-sang-nam-do 641-010 (KR).

(74) Agent: **HAW, Yong-Noke**; 8th Fl. Songchon Bldg., 642-15, Yoksam-dong, Kangnam-gu, Seoul 135-080 (KR).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM,

[Continued on next page]

(54) Title: HORIZON CONTROL STRUCTURE FOR WASHING MACHINE



(57) Abstract: A horizon control structure for a washing machine is provided. The structure includes: a stopper base having a base body having a predetermined diameter, a sleeve mount hollow depressed inside of the base body and having a predetermined diameter, at least one protrusion insertion through-hole being at a distance and provided inside of the base body, and a slip preventing part provided on a bottom surface of the base body; and a leg stopper layered on the stopper base, and having a stopper body having a predetermined diameter, an insertion sleeve extended from a rear surface of the stopper body and having a predetermined diameter and length, and an insertion protrusion protruded from a rear surface of the stopper body and having a predetermined length.



PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO,

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Description

HORIZON CONTROL STRUCTURE FOR WASHING MACHINE

Technical Field

- [1] The present invention relates to a washing machine, and more particularly, to a horizon control structure for a washing machine in which the washing machine is always maintained in a horizontal state even when it is installed at a place where a bottom is not in the horizontal state.

Background Art

- [2] In general, a washing machine is household appliances for eliminating contaminants from clothes using a collision reaction of laundry and washing water and a surface active reaction of detergent. In the washing machine, wash, rinse, dehydration and/or dry are/is performed using an electric motor as a main power source.
- [3] The washing machine is classified into a cylinder type washing machine, an agitator type washing machine and a pulsator type washing machine depending on a washing method.
- [4] In a detailed description, the cylinder type washing machine has a plurality of lifts within a drum. The lift raises and drops the laundry in the drum when the drum is rotated at a low speed centering on a horizontal axis. At this time, impact is generated between the laundry and the washing water, thereby performing wash.
- [5] In the agitator type washing machine, a wing-shaped agitator is protruded from a center of a drum tub, and is rotated to the right and left to perform the wash.
- [6] In the pulsator type washing machine, a distal shaped pulsator is rotated to generate the flow of water, thereby performing the wash.
- [7] A conventional washing machine is disclosed in a Korean Patent Application No. 10-2002-0013602 and therefore, its detailed description for a construction and an operation will be omitted.
- [8] The conventional washing machine has a leg mounted at a lower side. The leg is rotated to always maintain the washing machine in a horizontal state even at a place where a bottom is uneven or sloped.
- [9] However, when the conventional washing machine is installed on a heavily sloped bottom or a rugged bottom, it has limitation in that due to limited length of the leg, horizon cannot be controlled using only rotation of the leg at a heavily sloped place.
- [10] In other words, due to the above limitations, when the washing machine is installed at the heavily sloped place, a separate member such as a brick or a wood fragment is provided at a lower side of the leg, thereby adjusting the washing machine in height.
- [11] However, the separate member is not constructed integrally with a washing

machine body and the leg. Accordingly, the conventional washing machine has a drawback in that a walking phenomenon of shaking the washing machine is caused by vibration, which is generated and not absorbed when the washing machine is activated.

Disclosure of Invention

Technical Problem

- [12] Accordingly, the present invention is directed to a horizon control structure for a washing machine that substantially obviates one or more of the problems due to limitations and disadvantages of the related art.
- [13] An object of the present invention is to provide a horizon control structure for a washing machine in which the washing machine can be always maintained in a horizontal state even when being installed at a place where a bottom is not in the horizontal state or is not smooth.
- [14] Another object of the present invention is to provide a horizon control structure for a washing machine in which a user is allowed to directly adjust and set a horizontal state of the washing machine, thereby reducing a cost resulting from a separate service request.

Technical Solution

- [15] To achieve these and other advantages and in accordance with the purpose of the present invention, as embodied and broadly described, there is provided a horizon control structure for a washing machine, the structure including: a leg; at least one leg stopper disposed at a lower side of the leg; and a stopper base disposed at a lower side of the leg or the leg stopper.
- [16] In another aspect of the present invention, there is provided a horizon control structure for a washing machine, the structure including: a stopper base having a base body having a predetermined diameter, a sleeve mount hollow depressed inside of the base body and having a predetermined diameter, at least one protrusion insertion through-hole being at a distance and provided inside of the base body, and a slip preventing part provided on a bottom surface of the base body; and a leg stopper layered on the stopper base, and having a stopper body having a predetermined diameter, an insertion sleeve extended from a rear surface of the stopper body and having a predetermined diameter and length, and an insertion protrusion protruded from a rear surface of the stopper body and having a predetermined length.

Advantageous Effects

- [17] According to the present invention, there is an effect in that a washing machine is always maintained even at a place where a bottom is sloped and rugged.
- [18] Further, the present invention has an effect in that a user can directly adjust horizon of a washing machine without a separate service request, thereby reducing a cost of

service.

Brief Description of the Drawings

- [19] FIG. 1 is a plan and perspective view illustrating a leg stopper of a washing machine according to the present invention;
- [20] FIG. 2 is a rear and perspective view illustrating the leg stopper of FIG. 1;
- [21] FIG. 3 is a plan and perspective view illustrating a stopper base for adjusting horizon of a washing machine according to the present invention;
- [22] FIG. 4 is a rear and perspective view illustrating the stopper base of FIG. 3; and
- [23] FIG. 5 is a disassembled perspective view illustrating a state where a leg stopper of a washing machine is assembled according to the present invention.

Best Mode for Carrying Out the Invention

- [24] Hereinafter, preferred embodiments of the present invention will be described in detail with reference to accompanying drawings.
- [25] FIG. 1 is a plan and perspective view illustrating a leg stopper of a washing machine according to the present invention, and FIG. 2 is a rear and perspective view illustrating the leg stopper of FIG. 1.
- [26] Referring to FIGs. 1 and 2, the leg stopper 1 includes a stopper body 3 having a predetermined diameter; and a sleeve mount hollow 2 depressed inside of the stopper body 1 and having a predetermined diameter and depth.
- [27] The leg stopper 1 further includes at least one protrusion insertion through-hole 4 being at a distance on the stopper body 3; a mount sleeve 5 extended from a rear surface of the sleeve mount hollow 2 and having a predetermined diameter and depth; and a coupling protrusion 7 protruded from a rear surface of the stopper body 3 and having a predetermined length, and inserted into the protrusion insertion through-hole 4.
- [28] In a detailed description, the stopper body 3 can be formed to have a predetermined thickness, but is formed to have a hollow part and a plurality of radial outer ribs 9 on its rear surface, thereby preventing a swelling phenomenon or a twisting phenomenon in a process of cooling a high temperature resin when the leg stopper 1 is injection molded. Accordingly, there is an effect in that the stopper body 3 is totally reduced in thickness and instead, the outer rib 9 prevents contraction and reinforces strength in injection molding.
- [29] Meantime, the mount sleeve 5 is provided on a rear surface of the sleeve mount hollow 2, and is extended to have the almost same diameter as the sleeve mount hollow 2. A plurality of inner ribs 8 are also provided inside of the mount sleeve 5 to have a hollow part and a radial shape as the stopper body 3 does. The outer rib 9 and the inner rib 8 are disposed on the same line passing a center of the leg stopper 1, thereby

preventing the leg stopper 3 from being destroyed by stress concentration. The mount sleeve 5 is more extended from the rear surface of the stopper body 3 to have a predetermined length, and is inserted into and mounted on a sleeve mount hollow 2 provided on an upper surface of another leg stopper 1. A mount surface 6 is ranged from a rim portion of the mount sleeve 5 to a circumference portion of the stopper body 3, and is in contact with an upper surface of the stopper body 3.

[30] The coupling protrusion 7 can be formed in plural on the rear surface of the stopper body 3, and is preferably formed integrally with a center of the outer rib 9. In other words, if the coupling protrusion 7 itself is protruded from the rear surface of the stopper body 3, it is in danger of being broken by external force. However, if the coupling protrusion 7 is formed integrally with the center of the outer rib 9, it is reinforced in strength by the outer rib 9. For coupling convenience, the coupling protrusion 7 is preferably formed at an inter-symmetric position. The coupling protrusion can be also formed integrally with the inner rib 8.

[31] The protrusion insertion through-hole 4 is spaced apart from the coupling protrusion 7 to insert the coupling protrusion 7. In other words, the protrusion insertion through-hole 4 is provided at the hollow part, which is disposed between the outer ribs 9, and passes through the stopper body 3.

[32] Preferably, the leg stopper 1 is injection molded using plastic to facilitate manufacture and reduce a cost of manufacture.

[33] FIG. 3 is a plan and perspective view illustrating a stopper base for adjusting horizon of the washing machine according to the present invention, and FIG. 4 is a rear and perspective view illustrating the stopper base of FIG. 3.

[34] Referring to FIGs. 3 and 4, the stopper base 10 includes a base body 11 formed to have a predetermined diameter; a sleeve mount hollow 12 depressed inside of the base body 11 and having a predetermined diameter and depth; and at least one protrusion insertion through-hole 13 being at a distance on the base body 11 and inserting the coupling protrusion 7. In a detailed description, the protrusion insertion through-hole 13 is preferably disposed at the inter-symmetric position to be effectively coupled with the coupling protrusion 7 as aforementioned in the description for the leg stopper 1.

[35] The stopper base 10 includes at least one slip preventing part 14 concentrically formed on its rear surface. In a detailed description, the slip preventing part 14 prevents the stopper base 10 from slipping in direct contact with a bottom surface when the stopper base 10 supports the washing machine in contact with the bottom surface.

[36] Since the stopper base 10 is in direct contact with the bottom surface, it should absorb vibration generated when the washing machine is activated, and prevent the washing machine from slipping on the bottom surface. Accordingly, the stopper base

10 is preferably formed of rubber. In a detailed description, the stopper base 10 can be formed of butyl synthetic rubber.

[37] The stopper base 10 is preferably formed to have the almost same diameter as the leg stopper 1, thereby providing neat appearance and effectively coupling with the leg stopper 1.

[38] FIG. 5 is a disassembled perspective view illustrating a state where the leg stopper of the washing machine is assembled according to the present invention.

[39] In FIG. 5, the leg stopper 1 and the stopper base 10 described in FIGs. 1 to 4 are duplicate and accordingly, their descriptions will be omitted.

[40] Nondescribed parts of FIG. 5 are a leg 15 of the washing machine, and a leg mount part 16 provided at a lower side of the leg 15 and mounted on the sleeve mount hollow 2.

[41] Referring to FIG. 5, the leg mount part 16 has a size of being mounted on the sleeve mount hollow 2, and the coupling protrusion 7 is inserted into the protrusion insertion through-holes 4 and 13. The mount sleeve 5 is inserted into and mounted on the sleeve mount hollows 2 and 12.

[42] When the washing machine is installed on a sloped bottom or a rugged bottom, an appropriate number of the leg stoppers 1 can be layered on the stopper base 10 depending on a gradient of the bottom and the like.

[43] In a detailed description, the leg stopper 1 layered on the stopper base 10 is controlled in number, thereby maintaining the washing machine in the horizontal state. In other words, when the bottom is smoothly sloped, only the stopper base 10 can be used. On the contrary, when the bottom is abruptly sloped, the stopper base 10 and the appropriate number of the leg stoppers 1 can be used.

[44] Meantime, in the inventive horizon control structure for the washing machine, it is desirable that the stopper base 10 is essentially used to absorb the vibration and prevent the slip. It is desirable that the leg stopper 1 is layered as much of the number as needed for height adjustment, thereby allowing the washing machine to be in the horizontal state.

[45] While the present invention has been described and illustrated herein with reference to the preferred embodiments thereof, it will be apparent to those skilled in the art that various modifications and variations can be made therein without departing from the spirit and scope of the invention. Thus, it is intended that the present invention covers the modifications and variations of this invention that come within the scope of the appended claims and their equivalents.

Industrial Applicability

[46] In a horizon control structure for a washing machine according to the present

invention, even when the washing machine is installed at a place where a bottom is sloped or rugged, its horizontal state can be easily controlled and therefore, an industrial applicability is greatly enhanced.

[47]

[48]

Claims

- [1] A horizon control structure for a washing machine, the structure comprising:
a leg;
at least one leg stopper disposed at a lower side of the leg; and
a stopper base disposed at a lower side of the leg or the leg stopper.
- [2] The structure according to claim 1, wherein the leg stopper comprises:
a stopper body having a predetermined diameter; and
a sleeve mount hollow provided inside of the leg stopper and having a predetermined diameter and depth.
- [3] The structure according to claim 1, wherein a protrusion insertion through-hole having a predetermined depth is at a distance and provided in plural inside of the leg stopper.
- [4] The structure according to claim 2, wherein the leg stopper further comprises a mount sleeve extended from its rear surface to have a predetermined length, and inserted into the sleeve mount hollow.
- [5] The structure according to claim 1, wherein the leg stopper comprises at least one radial reinforcing rib on its rear surface.
- [6] The structure according to claim 1, wherein the leg stopper comprises at least one coupling protrusion protruded from its rear surface to have a predetermined length.
- [7] The structure according to claim 1, wherein the leg stopper is formed of plastic.
- [8] The structure according to claim 1, wherein the leg stopper is formed by injection molding.
- [9] The structure according to claim 1, wherein the stopper base comprises:
a base body having a predetermined diameter;
a sleeve mount hollow depressed inside of the base body and having a predetermined diameter and depth; and
at least one protrusion insertion through-hole being at a distance, and provided inside of the base body and having a predetermined depth.
- [10] The structure according to claim 1, wherein the stopper base has a slip preventing part on its rear surface.
- [11] The structure according to claim 10, wherein the slip preventing part has a shape of concentric circle.
- [12] The structure according to claim 1, wherein the stopper base is formed of rubber.
- [13] The structure according to claim 1, wherein the stopper base is formed of butyl synthetic rubber.
- [14] A horizon control structure for a washing machine, the structure comprising:

a stopper base having a base body having a predetermined diameter, a sleeve mount hollow depressed inside of the base body and having a predetermined diameter, at least one protrusion insertion through-hole being at a distance and provided inside of the base body, and a slip preventing part provided on a bottom surface of the base body; and

a leg stopper layered on the stopper base, and having a stopper body having a predetermined diameter, an insertion sleeve extended from a rear surface of the stopper body and having a predetermined diameter and length, and an insertion protrusion protruded from a rear surface of the stopper body and having a predetermined length.

[15] The structure according to claim 14, wherein the insertion sleeve is mounted on the sleeve mount hollow.

[16] The structure according to claim 14, wherein the insertion protrusion is inserted into the protrusion insertion through-hole.

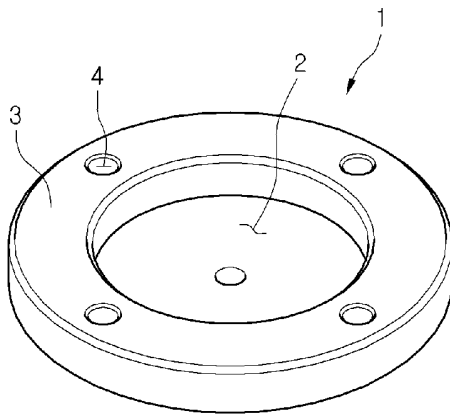
[17] The structure according to claim 14, wherein the leg stopper has a plurality of radial reinforcing ribs on its rear surface, and the insertion protrusion is formed integrally with the reinforcing rib.

[18] The structure according to claim 14, further comprising at least one protrusion insertion through-hole being at a distance and provided inside of the stopper body.

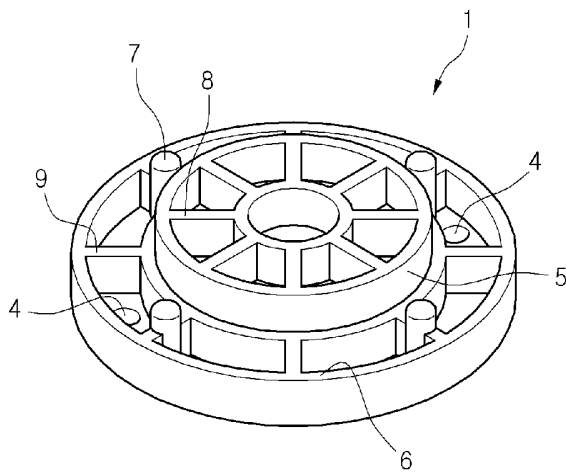
[19] The structure according to claim 18, wherein the protrusion insertion through-hole is provided on the same circumference as the insertion protrusion, and is spaced apart from the insertion protrusion in a circumferential direction.

[20] The structure according to claim 17, wherein the reinforcing rib comprises an inner rib provided inside of the insertion sleeve and an outer rib provided on a rear surface of the stopper body, the inner rib and the outer rib being provided on the same line.

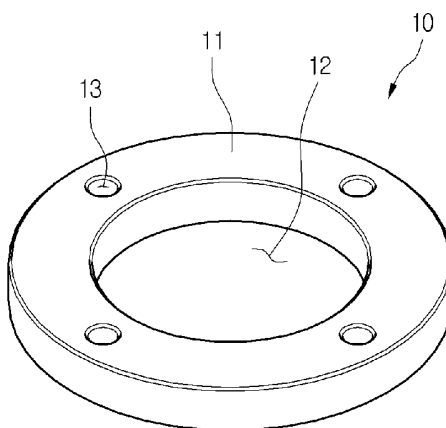
[Fig. 1]



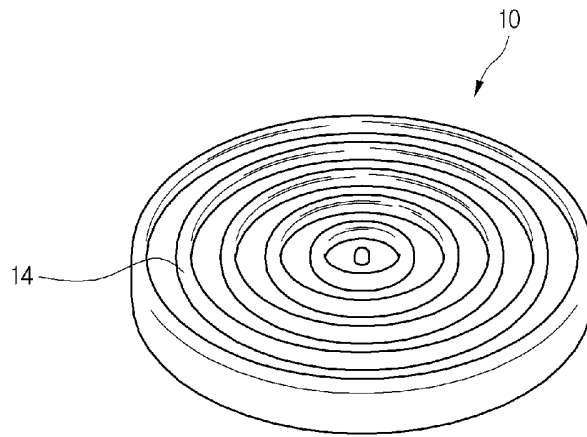
[Fig. 2]



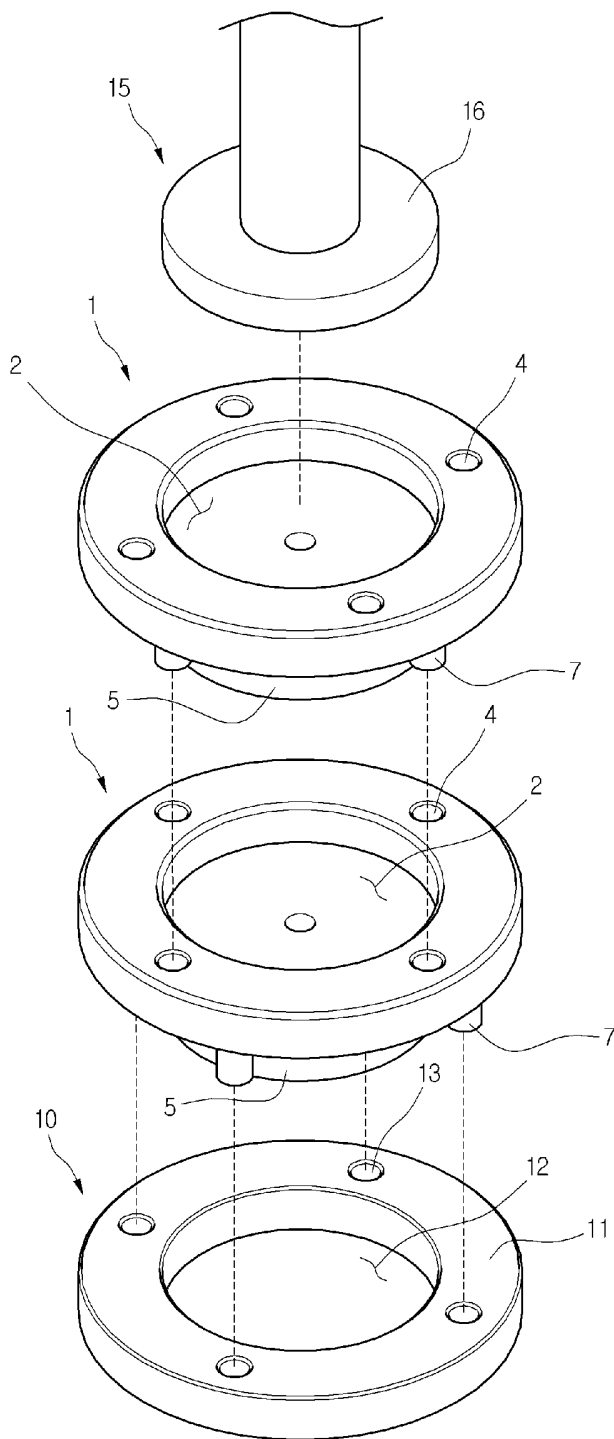
[Fig. 3]



[Fig. 4]



[Fig. 5]



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2005/001534

A. CLASSIFICATION OF SUBJECT MATTER**IPC7 D06F 39/12**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7 D06F39/12, 37/24

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean Patents and applications for inventions since 1975

Korean Utility models and applications for Utility models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKIPASS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	JP 02 - 72298 A (SANYO ELECTRIC CO. LTD) 12 Mar. 1990 see the whole document	1, 7-8, 10-13 2, 4
Y	KR 2000-20040 A (LG ELECTRONIC CO. LTD.) 15 Apr. 2000 see the whole document	2, 4
A	JP 55 - 13540 U (MATSUSHITA ELECTRIC CO. LTD.) 28 Jan. 1980 see claim; Figure 1 and 6	1-20
A	JP 61 - 170496 U (TOSHIBA CORP) 22 Oct. 1986 see the whole document	1-20
A	US 4462225 A (THE MAYTAG COMPANY) 31 JUL. 1984 see the whole document	1-20

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

29 AUGUST 2005 (29.08.2005)

Date of mailing of the international search report

30 AUGUST 2005 (30.08.2005)

Name and mailing address of the ISA/KR



Korean Intellectual Property Office
920 Dunsan-dong, Seo-gu, Daejeon 302-701,
Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

KIM, Sung Nam

Telephone No. 82-42-481-8282

