



(51) International Patent Classification:
D06F 37/06 (2006.01)

(21) International Application Number:
PCT/EP2009/052352

(22) International Filing Date:
27 February 2009 (27.02.2009)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
P200800678 3 March 2008 (03.03.2008) ES

(71) Applicant (for all designated States except US): BSH BOSCH UND SIEMENS HAUSGERÄTE GMBH [DE/DE]; Carl-Wery-Str. 34, 81739 München (DE).

(72) Inventors; and

(75) Inventors/Applicants (for US only): GOMEZ CAUDEVILLA, Miguel Angel [ES/ES]; Paseo Cuellar,45-3ºB, E-50007 Zaragoza (ES). GRACIA BOBED, Ismael [ES/ES]; Movera,107-DPDO.0, E-50014 Zaragoza (ES). LATRE ABADIA, Roberto [ES/ES]; Manuel Viola,9-4ºC, E-50014 Zaragoza (ES). MARTINEZ PEREZ, Gerardo [ES/ES]; Margarita Nelken,4-4ª-4º, E-50015 Zaragoza (ES). MELANTUCHE FUENTE, Juan [ES/ES]; Hernán Cortés,9-2I, E-50004 Zaragoza (ES). RECIO FERRER, Eduardo [ES/ES]; Bubierca,6-5ºDcha., E-50013 Zaragoza (ES).

(74) Common Representative: BSH BOSCH UND SIEMENS HAUSGERÄTE GMBH; Carl-Wery-Str. 34, 81739 München (DE).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(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, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: DRUM OF A WASHING MACHINE

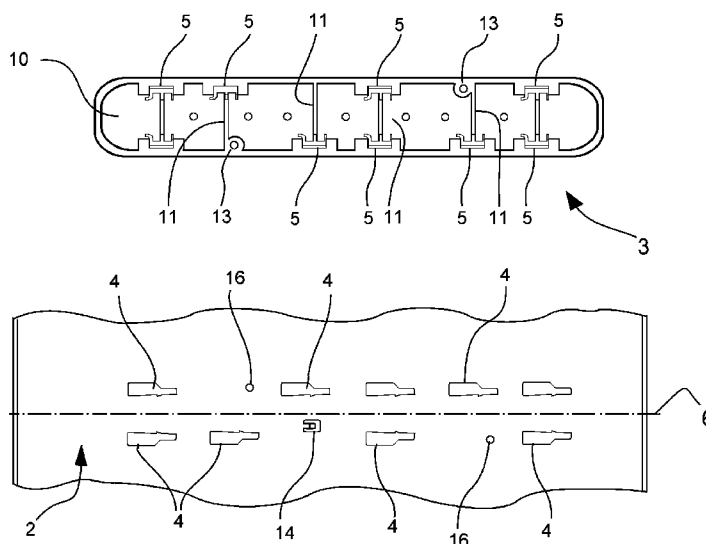


Fig. 1

(57) Abstract: A drum of a washing machine comprising a cylindrical band (2), at least two rows of openings (4) defined on the cylindrical band (2), arranged along a central line (6) between both of them, and at least a blade (3) with a blade base (12) from which at least two corresponding rows of couplings (5) extend, which are fittable into said openings (4) to fasten the blade to the cylindrical band (2) in an interior of said drum.



DRUM OF A WASHING MACHINE

The present invention relates to a drum of a washing machine for a washing machine, dryer or the like, of the drum type, comprising a cylindrical band, at least two rows of openings defined on the cylindrical band, arranged along a central line between both of them, and at least a blade with a blade base from which at least two corresponding rows of couplings extend, which are fittable into said openings to fasten the blade to the cylindrical band in an interior of said drum.

10 The use of a washing machine of the rotating-drum type is generally known. In these machines it is usual to utilize a number of, for example three or four, agitating blades projected inwards in the interior of the drum so as to make articles being washed spin during the washing and rinsing operations. Patent GB1161219 illustrates a plastic blade with a substantially triangular cross section with closed ends in order to have a U-
15 form fixed to the drum interior by means of projections, which extend from the blade edge and are held in two rows of cooperating L- slots on the drum wall. The projections are inserted into a wider zone of the L-slot and slide over a narrower zone. In order to interlock them, the blade is screwed on the drum band. A problem of this arrangement of projections consists in the fact that it does not have an immediate interlock between the
20 blade and the drum available and requires an additional joint to fix it. When securing the blade to the cylindrical wall of the drum by means of the projections arranged at the tub edges which fit into the cooperating L-slots on the wall, another fastening element such as a screw will obviously be necessary, as it is described in the prior art, to keep the blade in position after fitting it onto the wall since the projections could just get out of the
25 slots.

Patent application ES_2276627_A1 shows a drum of a washing machine comprising a cylindrical band, and at least a blade fastened to the cylindrical band in the interior of said drum by means of two corresponding rows of elastic couplings, which
30 extend from the blade and are held in receptacles at the cylindrical band of the drum. The receptacles have a protuberance extending into said receptacle so as to slide said elastic couplings by flexing them, and a fastening part to secure said couplings. This type of blade coupling continues needing an additional fastening means, since the couplings still have clearance and may vibrate producing noise if they are not additionally fastened
35 to the band when the receptacle flexes the couplings and a second zone of the receptacle is entered.

As a consequence of this, it is the object of the present invention to offer an improved drum of a washing machine in which the openings may secure and retain the blade couplings in position respectively, even without the aid of the fastening elements such as fixing screws, rivets, etc.

5

Another object of the present invention is to offer a drum of a washing machine with blades with no potential relative movement between them and the drum to reduce the noise made by this movement.

10

According to the present invention, the above-mentioned objects are achieved with an improved drum of a washing machine comprising a cylindrical band, at least two rows of openings defined on the cylindrical band, arranged along a central line between both of them, and at least a blade with a blade base from which at least two corresponding rows of couplings extend, which are fittable into said openings to fasten the blade to the cylindrical band in an interior of said drum, wherein at least one opening has a cut-out extending outwards from the opening, and at least one coupling has a rigid element joint to the blade base at a first end and an elastic retaining element at the rigid element fittable into the cut-out in the position of blade mounted on the drum.

20

According to other characteristics of the present invention, at least one coupling has at least one flap at a second end of the rigid element contactable with a surface of an exterior of the cylindrical band in a position of blade mounted on the drum.

25

The central line between both rows is substantially parallel to the drum rotation axis.

30

The opening has a bigger area which is big enough to be crossable by the coupling in a position of dismounted blade, and a smaller area where the cut-out is located, which is big enough to surround the first end of the rigid element contacting it in the position of blade mounted on the drum.

The cut-out includes a cross section substantially of a triangle and a rectangle.

35

The blade also comprises a hollow body opened towards the band at the blade base and a plurality of inner ribs located inside the body.

At least one screw hole is defined at one end of one of said ribs, wherein a screw is housable in a corresponding opening defined on said cylindrical band in case any coupling breaks and the blade needs to be secured.

5 Additionally, a tab is provided extending inwards from said cylindrical band and is fittable with one of the ribs, additionally securing thereby the blade to the drum in its longitudinal movement.

10 Furthermore, a plurality of outlets is defined on a top side of the blade to obtain a rain effect in the washing process.

15 The total length of the blade is smaller than a distance between two circular end walls of the drum so that it may be mounted by displacing it in the central line direction from the non-mounted position to the mounted position.

 The blade is made of plastic, what simplifies and makes its manufacture cheaper.

20 When the blade is mounted on the drum, the blade couplings are inserted through the openings' bigger area in a non-mounted position and are slid towards the opening's smaller area by flexing the elastic retaining element until this fits into the cut-out without the need for the coupling to flex. The coupling's connection body may be rigid and strong from its base up to its end, so that it does not break and has no clearance in the opening's smaller area to prevent the blade from vibrating and so that
25 they are fastened firmly at the openings' fastening part respectively. With this configuration of blade couplings, it is avoided that the blade moves backwards or dismounts. The additional flap may be arranged at a coupling with or without an elastic retaining element.

30 The figures show:

Fig. 1 is a perspective view of a blade and the part of the washing machine drum on which it has to be secured;

35 **Fig. 2** shows a detailed perspective view of a coupling of the blade according to Fig. 1;

Fig. 3 shows a section of a blade with a side view of a coupling according to figure 2;

Fig. 4 shows the mounting positions of a coupling of the blade before being coupled and being coupled;

5 **Fig. 5** is a perspective view of the blade set mounted within a washing machine drum.

With reference to **Fig. 1**, a washing machine drum 1 for a washing machine, dryer or the like, of the drum type comprises a cylindrical band 2 and at least a blade 3 fixed in an interior of the drum 1. At least two rows of openings 4 are defined on said
10 band 2 to receive correspondingly two rows of couplings 5 which extend from the blade 3. If the blade is of a small size in the form of a tooth, it may have even only a coupling 5 that fits into an opening. In the present embodiment, blade 3 is long with two rows of couplings, one on each side of a central line 6 parallel to the rotation axis of drum 1, the same number of openings being defined on both sides of the central line 6,
15 although this is not necessary. Alternatively, the central line 6 may not be parallel to the drum rotation axis, whereby a different number of openings may be defined on both sides of the central line 6 provided that the openings 4 defined on the band 2 comply with the requisites regarding mechanical property to fasten the blade 3 to the band 2 reliably.

20

Fig. 2 shows a perspective view of a part of the blade where the coupling is located. On the blade base 12 which is closest to the drum in mounting position I (fig. 4), the couplings 5, which have a rigid axis 52, project from the one end up to their other end, the latter ending in a flap 53 which contacts the outer face of the drum band
25 in the blade's mounted position II (fig. 4). An elastic retaining element 51, which may be bent by applying a force, projects from the coupling's rigid part 52.

Fig. 3 shows a side view of a coupling, wherein you may observe the slot between the coupling flap 53 and the blade base 12 where the drum band is
30 introduced.

With reference to **Fig. 4**, each one of the openings 4 also comprises a cut-out 7 projecting outwards at each one of the openings 4, dividing each one of the openings 4 into a bigger area 41 which is big enough to be crossable by the coupling 5 in a
35 position of dismounted blade II, and a smaller area 42 where the cut-out 7 is located, which is big enough to surround the first end of the rigid element 52 of coupling 5 contacting it in the position of blade mounted on the drum I. The opening edge forms at

its bigger area a slope ending in the cut-out 7 to facilitate that the elastic retaining element 51 bends until it is inserted in the cut-out. Said cut-out 7 includes a cross section of a triangle and a rectangle which follows the form of the elastic retaining element 51 and where, in a mounted position II, the elastic retaining element 51 of the coupling 5 fits in.

As it is shown in Fig. 1, blade 3 also comprises a hollow body 10 opened towards the cylindrical band 2 at the zone where the blade 3 is fastened, a plurality of parallel inner ribs 11 located in the hollow body 10 to increase the rigidity of blade 3 and an end of each inner rib 11 having a blade base 12 which extends from an interior of blade 3. When the blade 3 is mounted on the drum 1, the openings 4 will be covered with the blade base 12 respectively. Preferably, at least one screw hole 13 is arranged at one end opposed to the blade base 12 of the inner ribs 11 to house a fixing element, such as a screw, in a corresponding opening 16 of the cylindrical band 2 with the aim of obtaining a better fixation of blade 3 on the cylindrical band 2 in case any coupling breaks due to its use. Furthermore, at least one tab 14 extends inwards along one of both rows of openings 4 to fit with one of the inner ribs 11 and prevent blade 3 from moving backwards once mounted so as to reinforce the joint, should this be necessary.

Furthermore, in order to obtain the so-called "rain effect", meaning that, after having been led upwards by the blade 3, the water falls in a shower manner in an improved way so as to wet the washed articles, a plurality of outlets 15 is arranged on a top side 17 of blade 3, as it is shown in **Fig. 5**.

Furthermore, as it is shown in Fig. 5, the total length L' of blade 3 is smaller than distance L between two circular end walls of drum 1, whereby it is no longer necessary to retain articles which are being washed.

It should be understood that, despite the fact that many characteristics and advantages of the present invention were disclosed in the preceding description together with details regarding the structure and function of the invention, the description is merely illustrative and detailed modifications may be introduced, in particular in aspects related to the shape, size and arrangement of the parts, within the scope of the principles of the invention and determined to a great extent by the broad general meaning of the terms used in the enclosed claims.

CLAIMS

1. A drum of a washing machine comprising

5 - a cylindrical band (2),

- at least two rows of openings (4) defined on the cylindrical band (2), arranged along a central line (6) between both of them and

10 - at least a blade (3) with a blade base (12) from which at least two corresponding rows of couplings (5) extend, which are fittable into said openings (4) to fasten the blade to the cylindrical band (2) in an interior of said drum

15 **characterized in that**

- at least one opening (4) has a cut-out (7) extending outwards from the opening and,

20 - at least one coupling (5) having

- a rigid element (52) joint to the blade base at a first end and,

25 - an elastic retaining element (51) at the rigid element fittable into the cut-out (7) in the position of blade mounted on the drum (I).

30 2. The drum of a washing machine according to claim 1, **characterized in that** the rigid element has at its second end at least one flap (53) contactable with a surface of an exterior of the cylindrical band in a position of blade mounted on the drum (I).

3. The drum of a washing machine according to one of the preceding claims, **characterized in that** the opening (4) has

35 - a bigger area (41) which is big enough to be crossable by the coupling (5) in a position of dismantled blade (II) and,

- a smaller area (42) where the cut-out (7) is located, which is big enough to surround the first end of the rigid element (52) contacting it in the position of blade mounted on the drum (I).

- 5 4. The drum of a washing machine according to one of the preceding claims, **characterized in that** the cut-out (7) includes a cross section substantially of a triangle and a rectangle.
- 10 5. The drum of a washing machine according to one of the preceding claims, **characterized in that** said blade (3) also comprises a hollow body (10) opened towards the band (2) at the base of blade (3) and a plurality of inner ribs (11) located inside the body (10).
- 15 6. The drum of a washing machine according to claim 5, **characterized in that** at least one screw hole (13) is defined at one end of one of said ribs (11), wherein a screw is housable in a corresponding opening (16) defined on said cylindrical band (2).
- 20 7. The drum of a washing machine according to claim 5 or 6, **characterized in that** a tab (14) extends inwards from said cylindrical band (2) being fittable with one of the ribs (11).
- 25 8. The drum of a washing machine according to one of the preceding claims, **characterized in that** a plurality of outlets (15) is defined on a top side (17) of said blade (3) to obtain a rain effect in the washing process.
- 30 9. The drum of a washing machine according to one of the preceding claims, **characterized in that** a total length of the blade (3) is smaller than a distance between two circular end walls of the drum.
10. The drum of a washing machine according to one of the preceding claims, **characterized in that** said blade (3) is made of plastic.

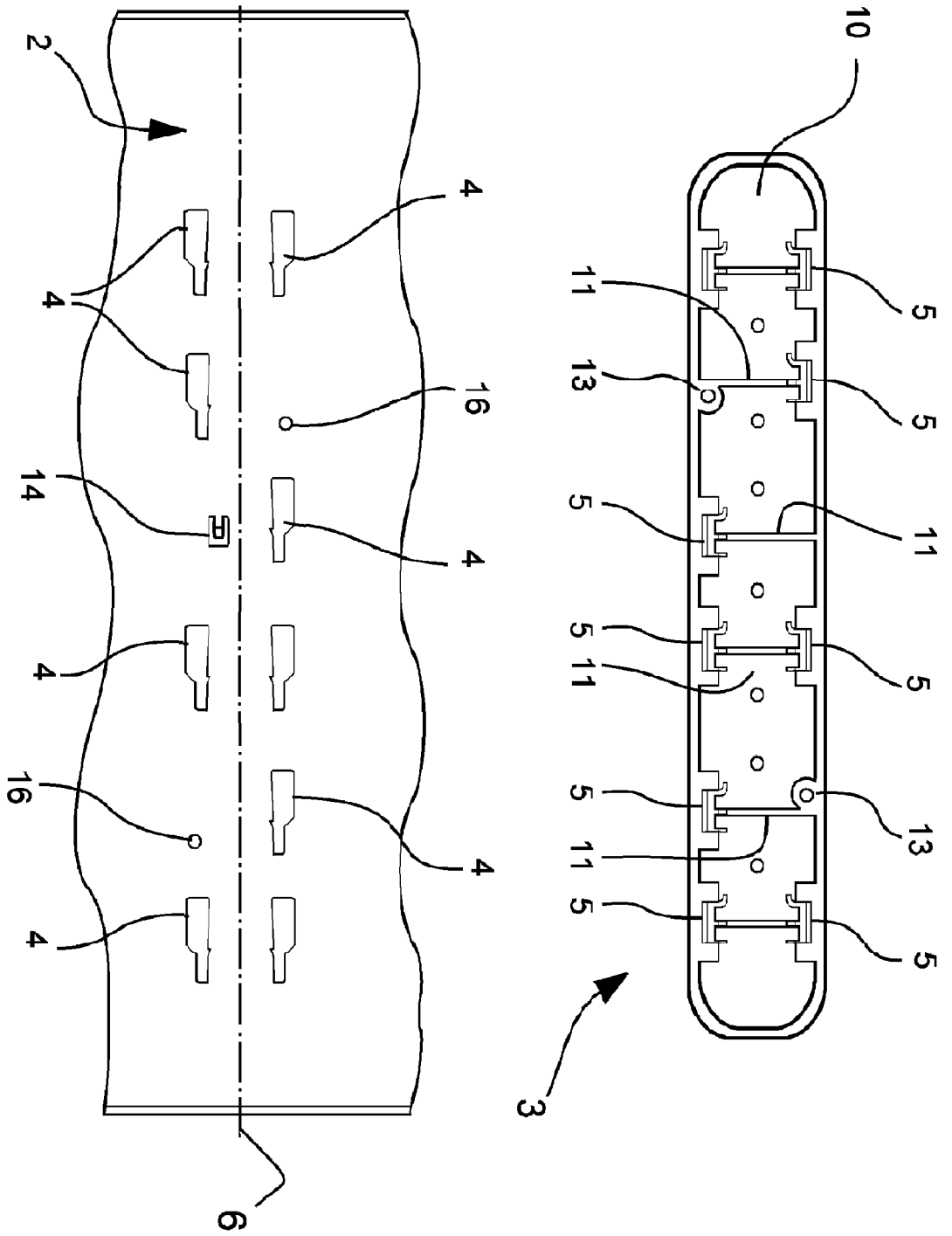


Fig. 1

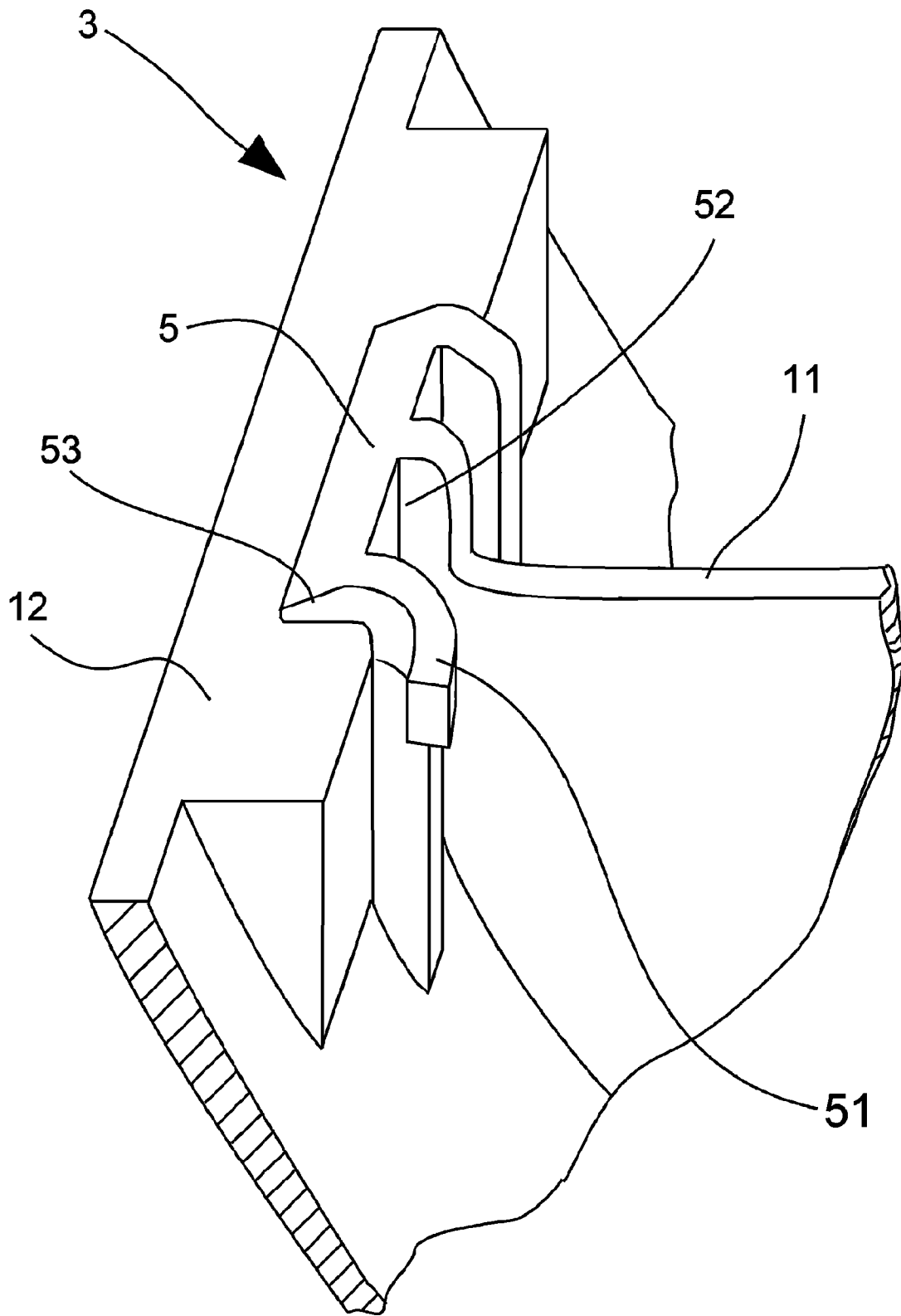


Fig.2

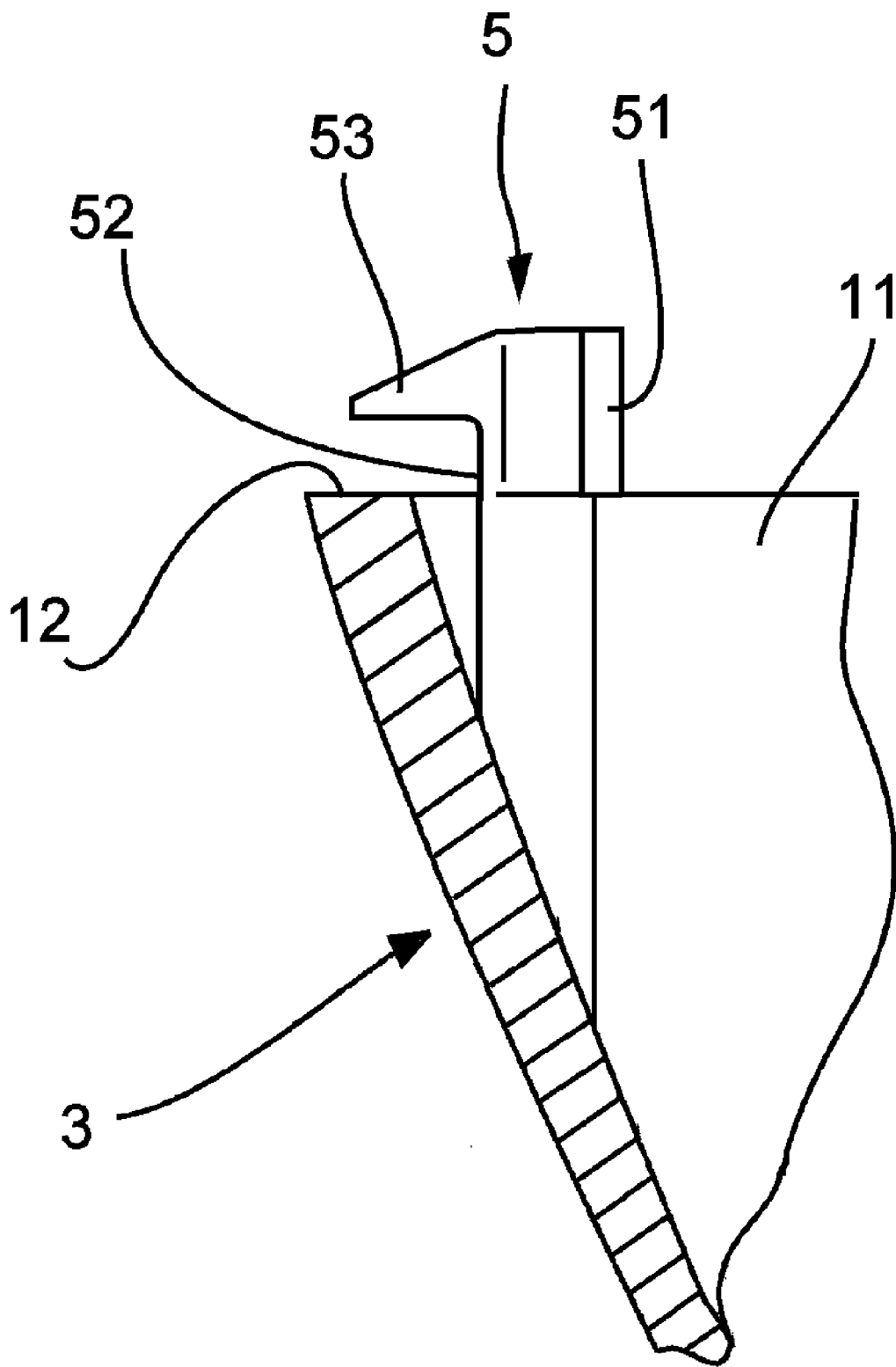


Fig.3

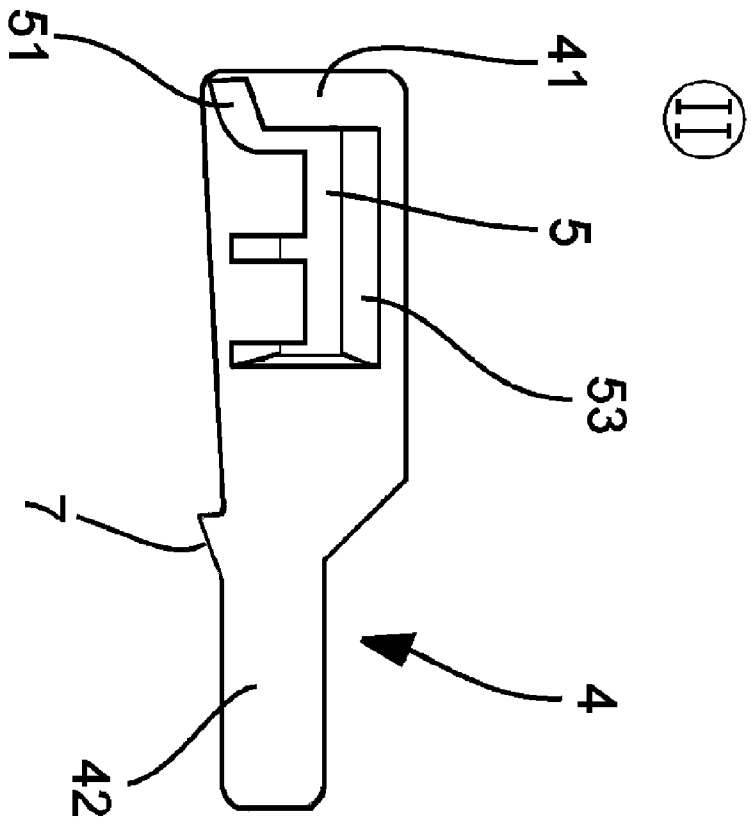
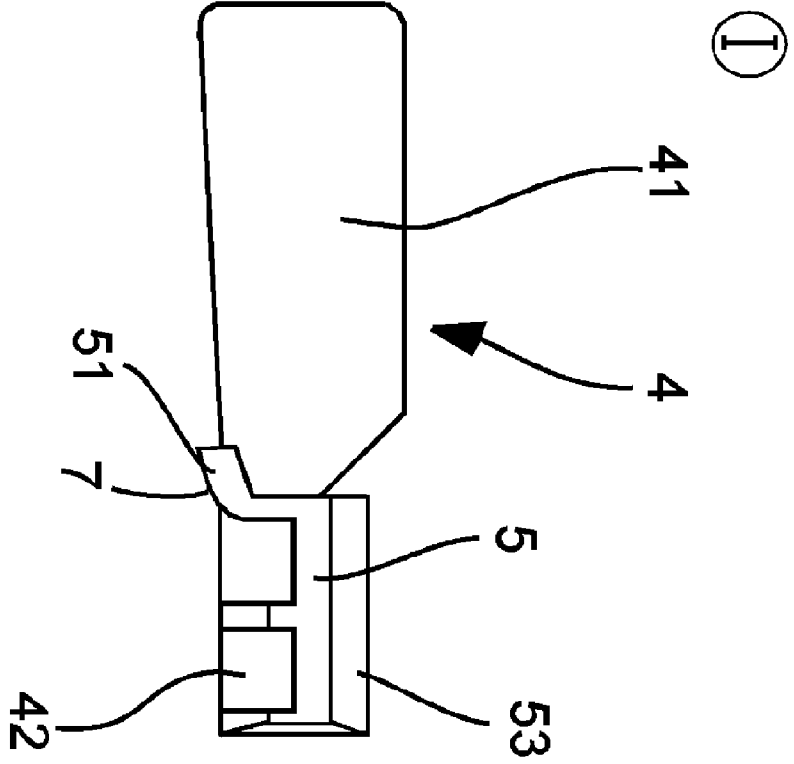


Fig. 4

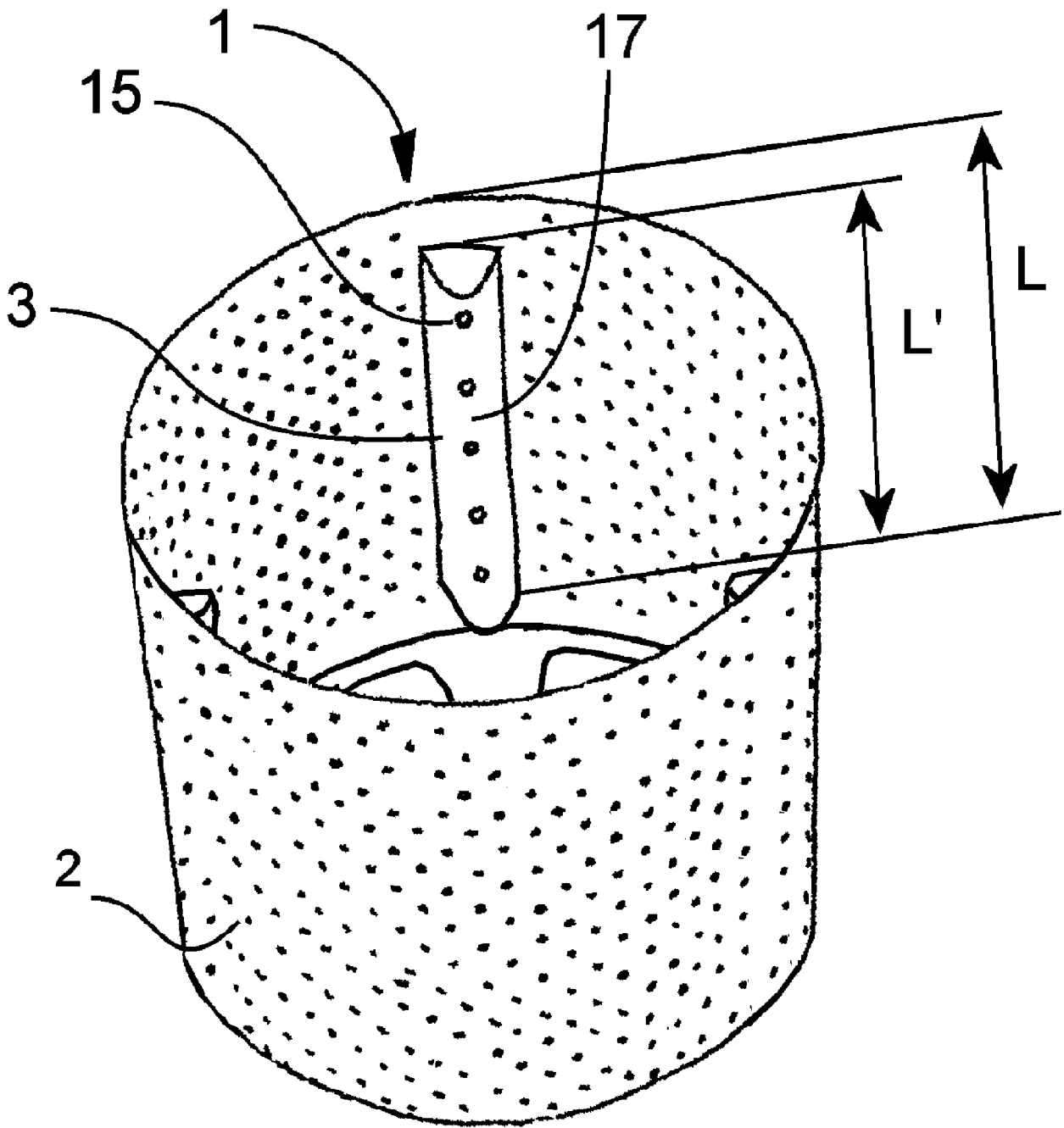


Fig.5

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2009/052352

A. CLASSIFICATION OF SUBJECT MATTER INV. D06F37/06		
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) D06F		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2005/252253 A1 (AHN BYUNG H [KR]) 17 November 2005 (2005-11-17) the whole document -----	1-5,7-9
X	WO 2007/062987 A (BSH BOSCH SIEMENS HAUSGERAETE [DE]; GRACIA BOBED ISMAEL [ES]) 7 June 2007 (2007-06-07) the whole document -----	1-10
A	GB 1 161 219 A (PHILIPS ELECTRONIC ASSOCIATED [GB]) 13 August 1969 (1969-08-13) the whole document -----	1-10
A	EP 1 306 479 A (LG ELECTRONICS INC [KR]) 2 May 2003 (2003-05-02) the whole document -----	1-10
	-/--	
<input checked="" type="checkbox"/>	Further documents are listed in the continuation of Box C.	<input checked="" type="checkbox"/>
		See patent family annex.
* Special categories of cited documents :		
<p>*A* document defining the general state of the art which is not considered to be of particular relevance</p> <p>*E* earlier document but published on or after the international filing date</p> <p>*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>*O* document referring to an oral disclosure, use, exhibition or other means</p> <p>*P* document published prior to the international filing date but later than the priority date claimed</p>		<p>*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</p> <p>*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</p> <p>*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.</p> <p>* & * document member of the same patent family</p>
Date of the actual completion of the international search 19 May 2009		Date of mailing of the international search report 04/06/2009
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Spitzer, Bettina

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2009/052352

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 01/61098 A (BSH BOSCH SIEMENS HAUSGERAETE [DE]) 23 August 2001 (2001-08-23) the whole document -----	1-10
A	EP 1 529 866 A (SAMSUNG ELECTRONICS CO LTD [KR]) 11 May 2005 (2005-05-11) the whole document -----	1-10

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/EP2009/052352

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2005252253 A1	17-11-2005	CN 1906349 A	31-01-2007
		EP 1747316 A1	31-01-2007
		WO 2005111296 A1	24-11-2005
WO 2007062987 A	07-06-2007	CN 101316959 A	03-12-2008
		EP 1931823 A1	18-06-2008
		ES 2276627 A1	16-06-2007
		US 2009120139 A1	14-05-2009
GB 1161219 A	13-08-1969	DE 1585867 A1	07-10-1971
		ES 344570 A1	16-12-1968
EP 1306479 A	02-05-2003	AU 2002301489 B2	03-03-2005
		CN 1414163 A	30-04-2003
		DE 60216699 T2	11-10-2007
		JP 3772821 B2	10-05-2006
		JP 2003126595 A	07-05-2003
		US 2003074932 A1	24-04-2003
WO 0161098 A	23-08-2001	AT 286999 T	15-01-2005
		DE 10006975 A1	30-08-2001
		EP 1257708 A2	20-11-2002
		ES 2236198 T3	16-07-2005
		PL 365826 A1	10-01-2005
EP 1529866 A	11-05-2005	CN 1616748 A	18-05-2005
		JP 4105134 B2	25-06-2008
		JP 2005137889 A	02-06-2005
		US 2005097927 A1	12-05-2005