(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
07 June 2018 (07.06.2018)

WIPO | PCT

(10) International Publication Number
WO 2018/099672 A1

(51) International Patent Classification:
A47L 15/23 (2006.01)

(21) International Application Number:
PCT/EP2017/077871

(22) International Filing Date:
31 October 2017 (31.10.2017)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
A 2016/17609 01 December 2016 (01.12.2016) TR

(71) Applicant: **ARCELIK ANONIM SIRKETI** [TR/TR]; E5 Ankara Asfalti Uzeri, Tuzla, 34950 ISTANBUL (TR).

(72) Inventors: **TURGUL, Doruk**; E5 Ankara Asfalti Uzeri, Tuzla, 34950 ISTANBUL (TR). **BASARAN, Alper**; E5 Ankara Asfalti Uzeri, Tuzla, 34950 ISTANBUL (TR). **NUMANOGLU, Guvenc Nayman**; E5 Ankara Asfalti Uzeri, Tuzla, 34950 ISTANBUL (TR). **SUER, Isil Hande**; E5 Ankara Asfalti Uzeri, Tuzla, 34950 ISTANBUL (TR). **ALTINBICAK, Irem**; E5 Ankara Asfalti Uzeri, Tuzla, 34950 ISTANBUL (TR). **GORMUS, Idil**; E5 Ankara Asfalti Uzeri, Tuzla, 34950 ISTANBUL (TR).

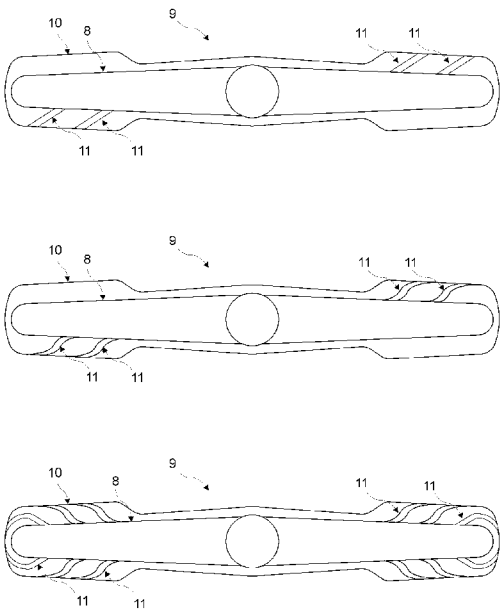
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, 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, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, 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, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report (Art. 21(3))*

(54) Title: A DISHWASHER COMPRISING SPRAY ARMS WITH FLOW GUIDE

Figure 6



(57) Abstract: The present invention relates to a dishwasher (1) comprising a tub (2) wherein the washing process is realized; a circulation pump (3) that enables washing water to be pressured; at least one rack (4) that is disposed in the tub (2) and whereon the items to be washed are placed; at least one spray arm (9) that enables the washing water to be transferred onto the items to be washed in the rack (4) by means of nozzles (5) and that has an upper part (6) and a lower part (7) that form the upper and lower parts thereof and a container (8) wherein the washing water is pumped by means of the circulation pump (3) and that is disposed between the upper part (6) and the lower part (7), and flow guides (11) disposed on the spray arm (9).

WO 2018/099672 A1

Description

A DISHWASHER COMPRISING SPRAY ARMS WITH FLOW GUIDE

[0001] The present invention relates to a dishwasher comprising spray arms that enable water to be sprayed onto the kitchenware during the washing process.

[0002] In dishwashers, the washing process is generally realized by spraying water from the spray arms disposed under the racks onto the items placed into the upper and lower racks. Washing water delivered from the circulation pump to the spray arms with a certain pressure and flow rate is sprayed from the spray arm nozzles as water jet, thus providing the rotation of the spray arms and the washing of the dishes. In order to wash the dishes placed into all the areas, especially into edge and corner areas, of the racks with the desired washing performance, generally more water needs to be consumed. Spray arm design gains importance in order to improve the washing efficiency without increasing the water consumption.

[0003] In the United States Patent Application No. US2015090306 (A1), a spray control assembly in a dishwasher is disclosed.

[0004] In the German Patent Application No. DE19624891 (A1), a dishwasher comprising spray arms that enable high washing performance is disclosed. High washing performance is enabled by means of a secondary spray arm.

[0005] In the United States Patent Application No. US2010043826 (A1), a dishwasher comprising spray arms disposed in an array is disclosed.

[0006] In the European Patent Application No. EP2974644 (A1), a dishwasher comprising a spray arm composed of different partitions is disclosed.

[0007] The aim of the present invention is the realization of a dishwasher with improved washing efficiency that comprises spray arms with improved washing water guiding structure, thus providing savings in water consumption.

[0008] In the dishwasher realized in order to attain the aim of the present invention, the spray arm is composed of an upper part and a lower part. Water pumped by the circulation pump fill into the container disposed between the upper part and the lower part, and water is sprayed from the

nozzles disposed on the spray arms. The spray arm further comprises a flange that surrounds the container and that enables the upper and lower parts to be joined at the edges. In the embodiment of the present invention, flow guides that guide the water to the ends of the spray arms are disposed on the horizontal surfaces of the flange that surrounds the spray arm, especially in the areas close to the ends of the spray arms. The flow guides transmit the water collected on the spray arm and/or the container to the ends of the spray arms. Water splattered by being directed to the ends of the spray arms act on the kitchenware located especially on the edges and corners of the rack, thus the washing performance is improved without increasing water consumption.

[0009] The dishwasher realized in order to attain the aim of the present invention is illustrated in the attached figures, where,

[0010] Figure 1 - is the schematic view of a dishwasher.

[0011] Figure 2 - is the cross-sectional view of the spray arm of the dishwasher and the recess-shaped flow guides thereon.

[0012] Figure 3 - is the cross-sectional view of the spray arm of the dishwasher and the protrusion-shaped flow guides thereon.

[0013] Figure 4 - is the cross-sectional view of the spray arm of the dishwasher and the slit-shaped flow guides thereon.

[0014] Figure 5 - is the cross-sectional view of the spray arm of the dishwasher and the flow guides thereon in fluid connection with the container.

[0015] Figure 6 - is the top view of the spray arms in various embodiments of the present invention.

[0016] Figure 7 - is the perspective view of the ends of the spray arms in various embodiments of the present invention.

[0017] The elements in the figures are numbered as follows:

1. Dishwasher
2. Tub
3. Circulation pump
4. Rack
5. Nozzle
6. Upper part

7. Lower part
8. Container
9. Spray arm
10. Flange
11. Flow guide

[0018] The dishwasher (1) comprises a tub (2) wherein the washing process is realized; a circulation pump (3) that enables washing water to be pressured; at least one rack (4) that is disposed in the tub (2) and whereon the items to be washed are placed, and at least one spray arm (9) that enables the washing water to be transferred onto the items to be washed in the rack (4) by means of nozzles (5) and that has an upper part (6) and a lower part (7) that form the upper and lower parts thereof and a container (8) wherein the washing water is pumped by means of the circulation pump (3) and that is disposed between the upper part (6) and the lower part (7). The component spraying water is called spray arm (9).

[0019] The spray arm (9) disposed in the dishwasher (1) of the present invention comprises

[0020] - a flange (10) that surrounds the container (8) and that enables the upper part (6) and the lower part (7) to be joined all around at the edges by methods such as plastic welding or snap-fit, and

[0021] - at least one flow guide (11) that is disposed on the horizontal surfaces of the flange (10) surrounding the ends of the container (8), that extends towards both ends of the spray arm (9), and that enables the water collected on the flange (10) and/or in the container (8) during the washing process to be directed to the ends of the spray arms (9).

[0022] In the dishwasher, during the washing process, the spray arm (9) rotates around the vertical axis with the pressure of the water pumped to the container (8) by the circulation pump (3), and water is sprayed to the racks (4) by means of the nozzles (5). The spray arm (9) is preferably disposed under the rack (4), and the water is sprayed upwards. Water that is sprayed upwards and that falls onto the spray arm (9) with the effect of gravity falls on the upper horizontal surface of the flange (10) that surrounds the upper wall of the container (8). The flow guides (11)

disposed on the flange (10) direct the water to the ends of the spray arm (9) with the effect of the centrifugal force applied by the spray arm (9) rotating around the axis thereof, and the water is splattered from the ends of the spray arm (9). Thus, more water is enabled to be transferred onto the kitchenware that are located at the edges and corners of the racks (4).

[0023] In an embodiment of the present invention, the spray arm (9) comprises recess-shaped flow guides (11) (Figure 2).

[0024] In another embodiment of the present invention, the spray arm (9) comprises protrusion-shaped flow guides (11) (Figure 3).

[0025] In another embodiment of the present invention, the spray arm (9) comprises slit-shaped flow guides (11) (Figure 4).

[0026] In another embodiment of the present invention, the spray arm (9) comprises groove-shaped flow guides (11) that extend between the container (8) and the flange (10) (Figure 7).

[0027] In another embodiment of the present invention, the spray arm (9) comprises S-shaped flow guides (11) that extend from the container (8) to the outer edge of the flange (10) (Figure 6).

[0028] In another embodiment of the present invention, the spray arm (9) comprises arcuated flow guides (11) that extend towards the ends of the spray arm (9) by surrounding the container (8) (Figure 6).

[0029] In another embodiment of the present invention, the flow guides (11) are disposed at the end of each spray arm (9) at one side of the container (8) (Figure 6).

[0030] In another embodiment of the present invention, water flow connection is provided between the flow guides (11) disposed on the flange (10) and the container (8), and the water collected in the container (8) during the washing process is enabled to leave the container (8) and be directed to the ends of the spray arm (9) (Figure 5).

[0031] In another embodiment of the present invention, the width of the flange (10) at the ends of the spray arm (9) is more than the width at the center of the spray arm (9). Thus, the amount of water retained at the ends of the spray arm (9) and directed by the flow guides (11) is enabled to be increased (Figure 6).

[0032] In the dishwasher (1) of the present invention, the water collected on the spray arm (9) is enabled to be transferred to different areas so as to be delivered to a wider area. When compared to the state of the art embodiments, with the same amount of water/energy consumption, a more efficient washing is realized and the washing performance is improved.

Claims

1. A dishwasher (1) **comprising** a tub (2) wherein the washing process is realized; a circulation pump (3) that enables washing water to be pressured; at least one rack (4) that is disposed in the tub (2) and whereon the items to be washed are placed, and at least one spray arm (9) that enables the washing water to be transferred onto the items to be washed in the rack (4) by means of nozzles (5) and that has an upper part (6) and a lower part (7) that form the upper and lower parts thereof and a container (8) wherein the washing water is pumped by means of the circulation pump (3) and that is disposed between the upper part (6) and the lower part (7), **characterized by**
   - a flange (10) that surrounds the container (8) and that enables the upper part (6) and the lower part (7) to be joined all around at the edges, and
   - the spray arm (9) comprising at least one flow guide (11) that is disposed on the horizontal surfaces of the flange (10) surrounding the ends of the container (8) and that enables the water collected on the flange (10) and/or in the container (8) during the washing process to be directed to the ends of the spray arms (9).
2. A dishwasher (1) as in Claim 1, **characterized by** the spray arm (9) that comprises the recess-shaped flow guides (11).
3. A dishwasher (1) as in Claim 1, **characterized by** the spray arm (9) that comprises the protrusion-shaped flow guides (11).
4. A dishwasher (1) as in Claim 1, **characterized by** the spray arm (9) that comprises the slit-shaped flow guides (11).
5. A dishwasher (1) as in any one of the above claims, **characterized by** the spray arm (9) that comprises the groove-shaped flow guides (11) that extend between the container (8) and the outer edges of the flange (10).
6. A dishwasher (1) as in any one of the Claims 1 to 4, **characterized by** the spray arm (9) that comprises the S-shaped flow guides (11) that extend from the container (8) to the outer edge of the flange (10).
7. A dishwasher (1) as in any one of the Claims 1 to 4, **characterized by** the spray arm (9) that comprises the arcuated flow guides (11) that extend towards the ends of the spray arm (9) by surrounding the container (8).
8. A dishwasher (1) as in Claim 1, **characterized by** the spray arm (9) that

comprises the flow guides (11) that are disposed at the end of each spray arm (9) at one side of the container (8).

9. A dishwasher (1) as in Claim 1, **characterized by** the spray arm (9) that comprises the flow guides (11) having a water flow connection with the container (8) and enabling the water collected in the container (8) during the washing process to leave the container (8) and be directed to the ends of the spray arm (9).
10. A dishwasher (1) as in any one of the above claims, **characterized by** the spray arm (9) that comprises the flange (10) with the width at the ends of the spray arm (9) being more than the width at the center thereof.

Figure 1

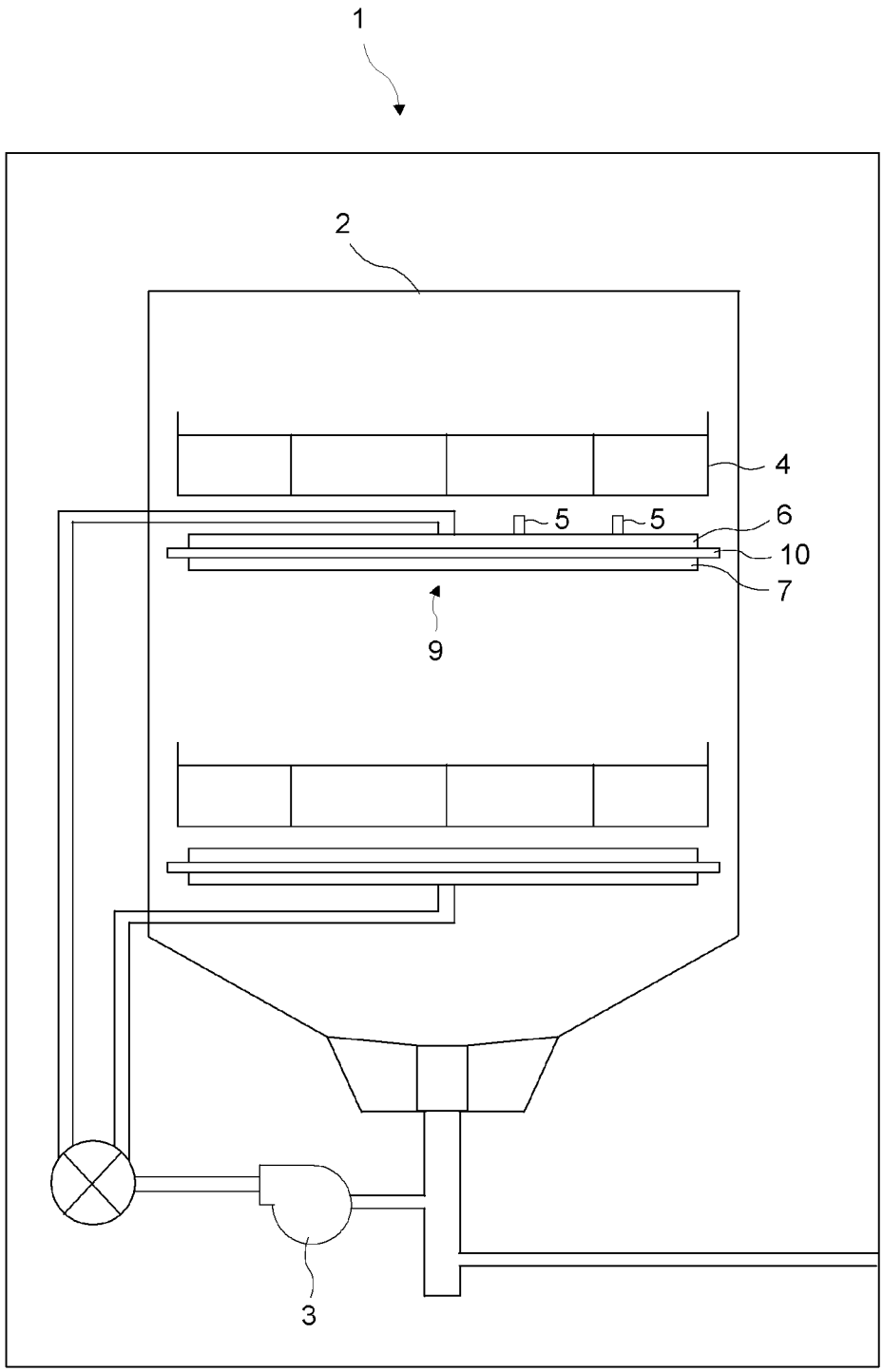


Figure 2

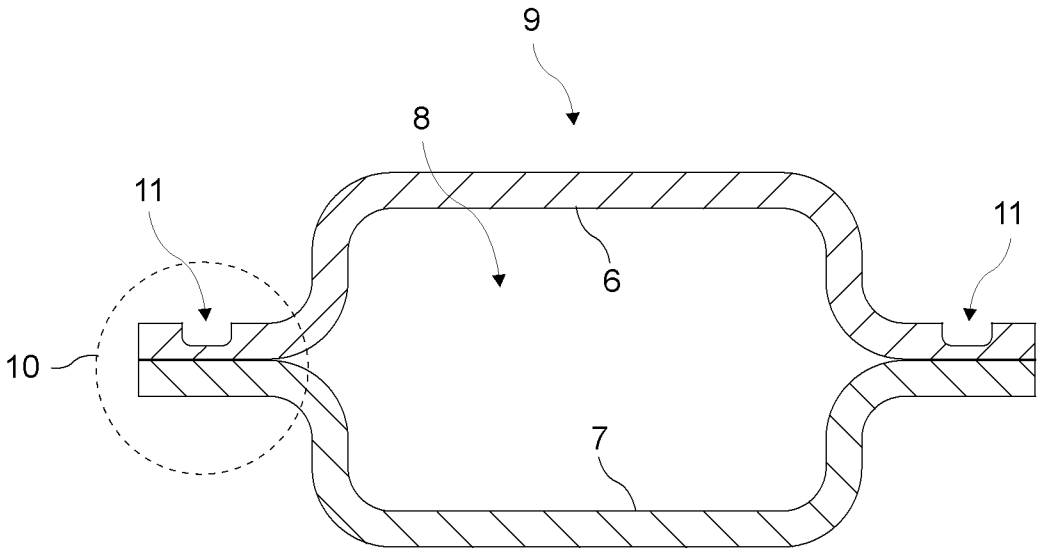


Figure 3

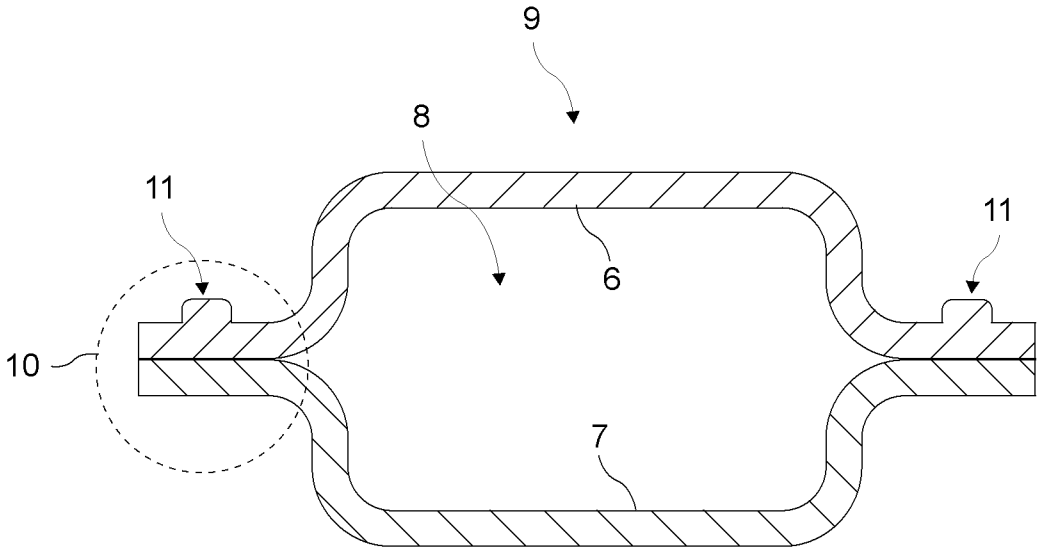


Figure 4

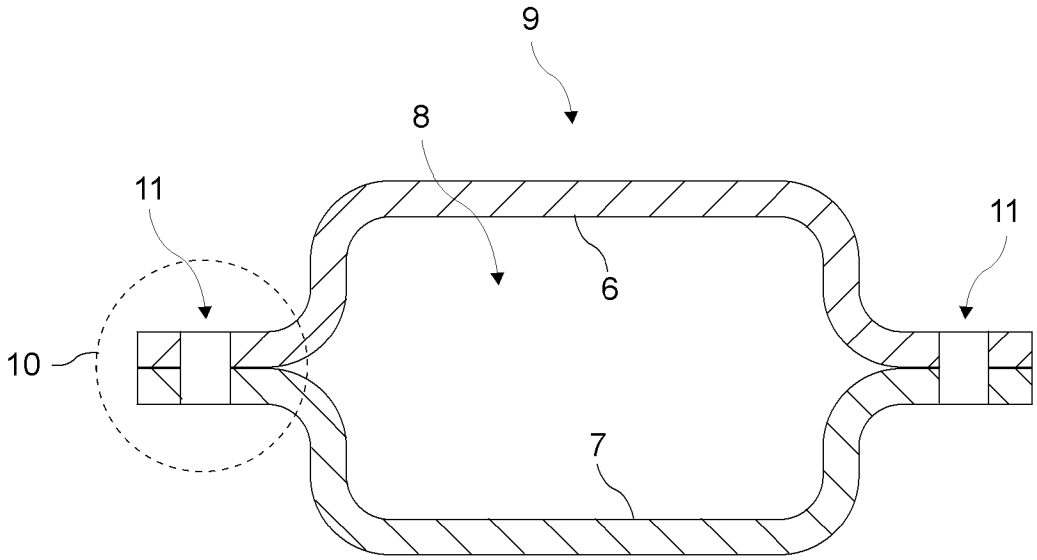


Figure 5

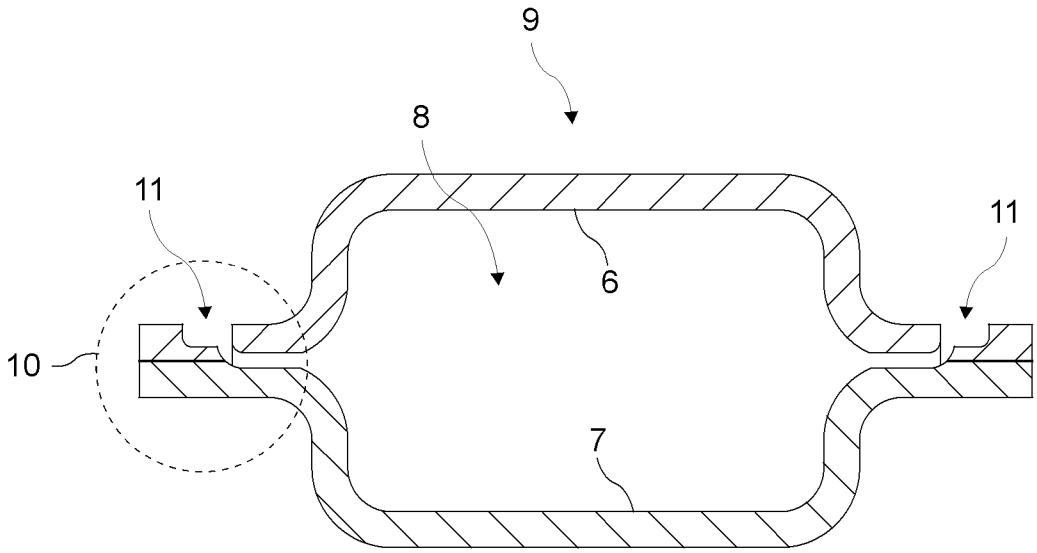


Figure 6

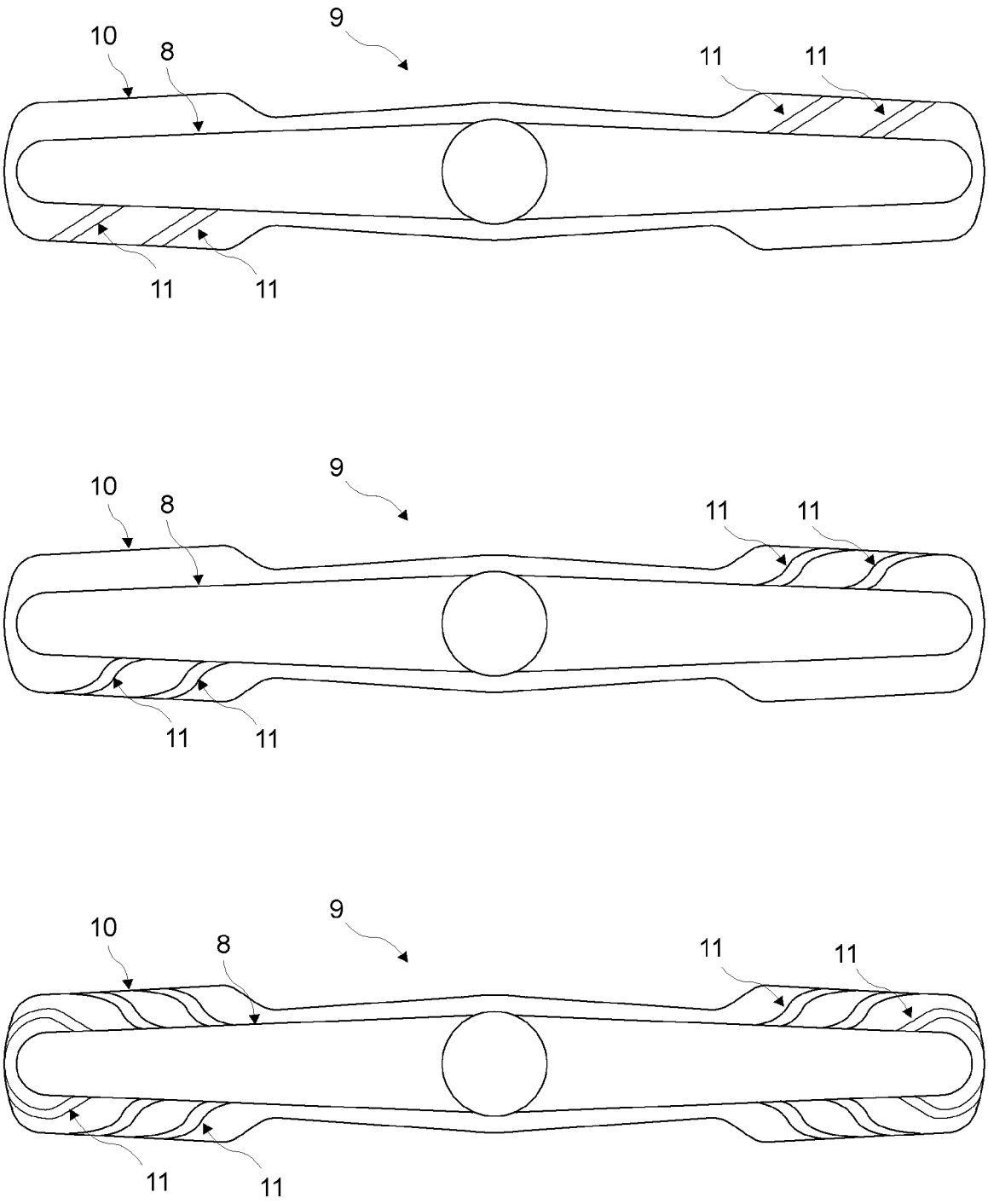
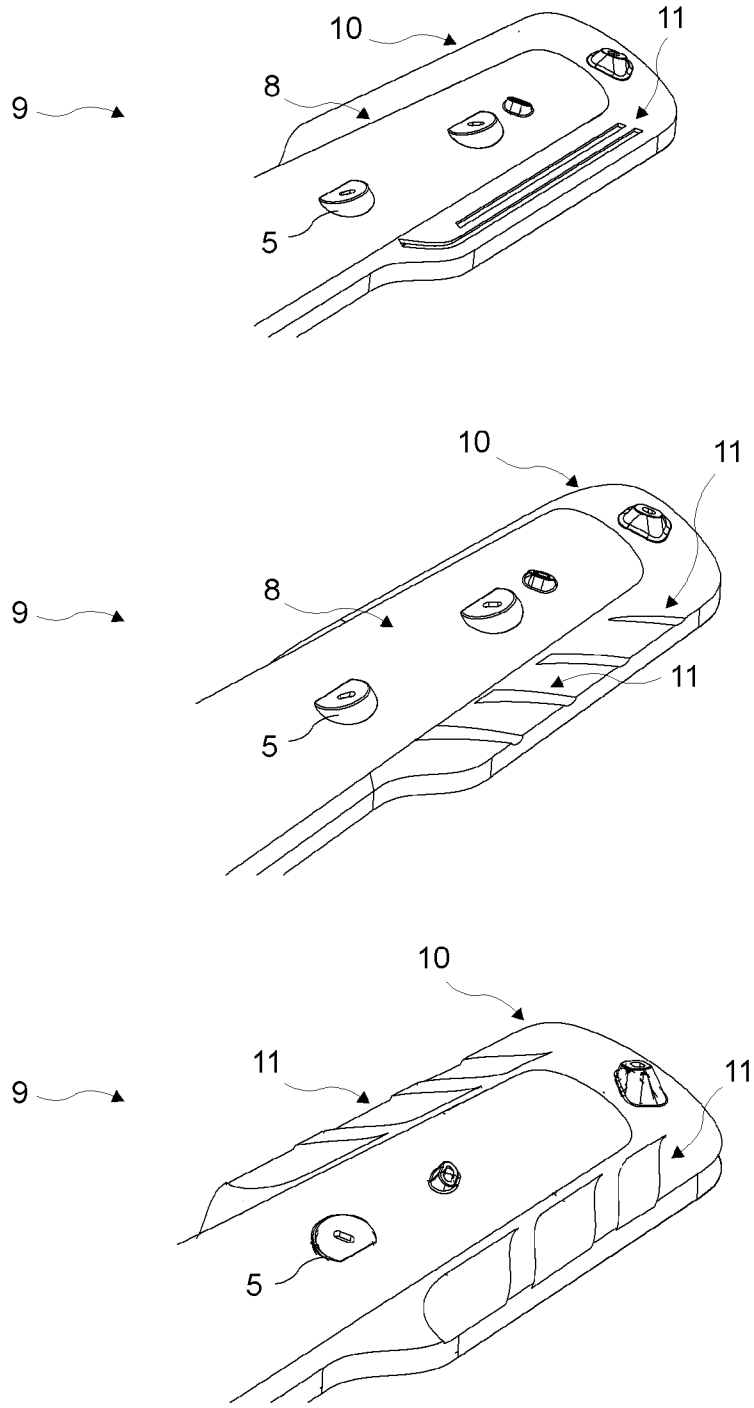


Figure 7



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2017/077871

A. CLASSIFICATION OF SUBJECT MATTER
INV. A47L15/23
ADD.

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)
A47L

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 practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2014/048164 A1 (MIDEA GROUP CO LTD [CN]; FOSHAN SHUNDE MIDEA WASHING APPLIANCES MFG CO) 3 April 2014 (2014-04-03) abstract; figures 1-7	1-10
A	US 2 673 761 A (ROBERT KARLSTROM JOHAN FREDRIK) 30 March 1954 (1954-03-30) column 2, line 50 - column 4, line 44	1-10

☐ 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 another 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	Date of mailing of the international search report
2 February 2018	22/02/2018

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Jezierski, Krzysztof

5

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2017/077871

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2014048164 A1	03-04-2014	CN 203016901 U	26-06-2013
		WO 2014048164 A1	03-04-2014
US 2673761 A	30-03-1954	BE 476815 A	02-02-2018
		CH 264545 A	31-10-1949
		FR 1013669 A	01-08-1952
		NL 73700 C	02-02-2018
		US 2673761 A	30-03-1954