



(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
16.03.2016 Bulletin 2016/11

(51) Int Cl.:

A47L 5/24 (2006.01)
A47L 5/28 (2006.01)

A47L 9/32 (2006.01)

(21) Application number: 15183102.1

(22) Date of filing: 31.08.2015

<div>(84) Designated Contracting States: AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR</div> <div>Designated Extension States: BA ME</div> <div>Designated Validation States: MA</div> <div>(30) Priority: 15.09.2014 IT TO20140724</div> <div>(71) Applicant: Indesit Company S.p.A. 60044 Fabriano (AN) (IT)</div>	<div>(72) Inventors:</div> <div> <ul style="list-style-type: none"> Hasuike, Makio 20143 Milano (IT) Szalay, Cecilia 20156 Milano (IT) </div> <div>(74) Representative: Santonicola, Paolo Indesit Company S.p.A. Viale Aristide Merloni 47 60044 Fabriano (AN) (IT)</div>
--	--

(54)

REVERSIBLE ELECTRIC BROOM

(57)

An electric broom is described, which comprises a handle (2), a body (1) and a cleaning accessory (3), the handle and the cleaning accessory being irremovably connected to opposite ends of the body, characterized in that:

- said handle (2) is planarly rotatable relative to the body by means of rotation means;
- said cleaning accessory (3) has a substantially triangular shape, and is equipped with a first suction area on a first side (3') of the accessory, and a second suction area at a vertex (3'') of the accessory, opposite to said first side;
- said cleaning accessory (3) is connected to the body (1) via connection means (15) adapted to create an articulation, such as to allow the body to tilt in all directions relative to the accessory.

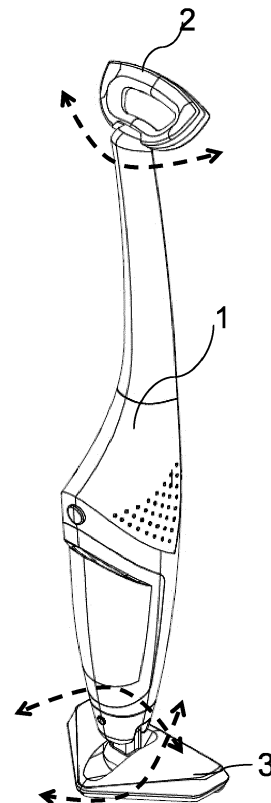


FIG. 1

DescriptionField of the invention

[0001] The present invention relates to the field of suction and cleaning systems, more specifically to a reversible electric broom.

Background art

[0002] The vacuum cleaner is a particular household appliance intended for cleaning floors and other surfaces. Its internal mechanism allows it to suck dust and other particles mixed with air, and to hold them inside its body by means of a filter element, so as to release clean air.

[0003] The motor, which is typically an electric one, allows sucking external air by creating a sort of a vacuum, by means of a fan, inside the vacuum cleaner.

[0004] The electric broom is a particular type of vacuum cleaner, the body of which is typically directly connected to the cleaning accessory through a joint. In addition, the electric broom known in the art is fitted with a handle rigidly connected to the body.

[0005] Said known electric broom suffers from some effectiveness problems when operating in narrow spaces, to which it can hardly, or not at all, gain access. In such situations, manoeuvrability and mobility are poor or even prevented and the cleaning accessory may easily get stuck, in addition to making it difficult for the user to move his/her arm.

Summary of the invention

[0006] It is therefore the object of the present invention to propose an electric broom which can overcome the above-mentioned problems.

[0007] The invention relates to an electric broom comprising a handle, a body and a cleaning accessory, the handle and the cleaning accessory being irremovably connected to opposite ends of the body, characterized in that:

- said handle is planarly rotatable relative to the body by means of rotation means;
- said cleaning accessory has a substantially triangular shape, and is equipped with a first suction area on a first side of the accessory, and a second suction area at a vertex of the accessory, opposite to said first side;
- said cleaning accessory is connected to the body via connection means adapted to create an articulation, such as to allow the body to tilt in all directions relative to the accessory.

[0008] In particular, the present invention relates to an electric broom as set out in detail in the claims, which are an integral part of the present description.

Brief description of the drawings

[0009] Further objects and advantages of the present invention will become apparent from the following detailed description of a preferred embodiment (and variants) thereof and from the annexed drawings, which are only supplied by way of non-limiting example, wherein:

Figures 1, 2 and 3 are side views of an electric broom according to the present invention;

Figures 4 and 5 are two side views of the handle of the electric broom;

Figure 6 shows a further side view of the electric broom, in particular of the upper part of the body with the handle;

Figure 7 is a sectional view of the handle, highlighting the internal components thereof;

Figure 8 is an enlarged view of the end of the body of the electric broom, to which the handle is connected;

Figure 9 is an enlarged view of the cleaning accessory and of its connection to the broom body.

[0010] In the drawings, the same reference numerals and letters identify the same items or components.

Detailed description of some embodiments of the invention

[0011] With reference to the drawings, 1 designates the body of the electric broom, connected at one end to a handle 2 and at the other end to a cleaning accessory 3.

[0012] According to the main aspects of the invention, the handle 2 is planarly rotatable relative to the body, and the cleaning accessory 3 has a substantially triangular shape and can be tilted relative to the body.

[0013] More particularly, the handle 2 is of the closed type, is D-shaped, can rotate by 180°, and can take three fixed angular positions relative to the body (0°, + 90° and - 90°).

[0014] Preferably, the handle rotates by $\pm 90^\circ$, thus taking two extreme positions (Fig. 3) perpendicular to the central position (Fig. 2), which in turn is parallel (Fig. 2) to the front part of the accessory.

[0015] Figures 5 and 6 show the axis of rotation AM of the handle relative to the axis of the body AC. In a non-limiting example, it is tilted by 50° towards the front part of the accessory.

[0016] With particular reference to Figures 7 and 8, the head 4 of the body 1 comprises an articulation including a circular joint 5 integral with the body and divided into two parts having different diameters, the upper part 5' having a greater diameter than the lower part 5". On the circumference of the upper part there are two pairs of recessed drafts 6', 6", 6"', 6"" positioned at a mutual distance of 90°. In its lower part, the joint 5 comprises two diametrically opposite stops (one of which, designated by reference numeral 7, is visible in the drawings).

[0017] The handle 2 is fitted into the circular joint 5 in a rotatable manner. For this purpose, the underside of the handle (Fig. 7) has truncated conical profiles 8 fitting into the lower part 5' of the circular joint 5, so that the handle can turn by an arc of circumference and stop against the two stops 7. The profiles have a shape compliant with that of the body head 4.

[0018] In the lower internal part of the handle there is a handle rotation control system that causes the handle to stop at one of the pairs of drafts 6', 6", 6"', 6'''.

[0019] To this end, the control system includes a pair of opposite pins 9, the tips of which can engage into corresponding pairs of drafts.

[0020] The pins 9 are preferably pushed by springs 10, which are internally equipped with respective guides 12 firmly positioned inside the handle, which can penetrate cavities in the pins 9, so that the pins can slide relative to the guides.

[0021] One end of the springs engages against stops 11 on the pins themselves, while the other end of the springs engages against stops 13 within the handle. In this manner, when the handle is turned the springs will contract and the pins 9 will move back, sliding on the edge of the upper part 5' of the circular joint 5 and then stopping into a pair of drafts.

[0022] As far as the cleaning accessory 3 is concerned, it has a substantially triangular shape and is hinged, but not rotatable, relative to the axis of the body. For this purpose (Fig. 9), it is connected to the body of the electric broom through a cardan joint 15. The latter has one end 15' connected to a pin 16 arranged in the terminal region of the body 1, and an opposite end 15'' connected to a pin (not shown in the drawing) arranged in a cavity 17 in the cleaning accessory 3.

[0023] The two pins are orthogonal to each other and lie at different heights relative to the body: the pin of the end 15'' allows the electric broom to tilt forwards/backwards relative to the accessory, while the pin 15' allows the electric broom to be tilted laterally relative to the accessory.

[0024] The triangular shape of the cleaning accessory 3 is such that it has two opposite suction parts, one (at the front relative to the body) arranged at the straight front part 3', and the other arranged at the vertex 3'' opposite to the straight part of the accessory. The suction flow can thus be distributed between the two parts, i.e. the straight part and the opposite vertex part, so that the latter can easily reach angular areas which are difficult to get to.

[0025] Combined together, the two joints of the cleaning accessory and of the handle allow reversible use of the electric broom, thus providing optimum access to narrow spaces while still ensuring good manoeuvrability and mobility without sticking, thus following at best the movements of the user's arm. In fact, by tilting the body towards the vertex part 3'' of the accessory one facilitates the use of the straight suction part, whereas by tilting it towards the opposite part 3' one facilitates the use of the vertex

suction part 3''. The additional articulations of the handle 2 and of the pin 16 contribute to ensuring optimal bending and torsion conditions of the electric broom, while also facilitating the use thereof by right-handed and left-handed people.

[0026] The above-described example of embodiment may be subject to variations without departing from the protection scope of the present invention, including all equivalent designs known to a man skilled in the art.

[0027] The elements and features shown in the various preferred embodiments may be combined together without however departing from the protection scope of the present invention.

[0028] From the above description, those skilled in the art will be able to produce the object of the invention without introducing any further construction details.

Claims

1. Electric broom comprising a handle (2), a body (1) and a cleaning accessory (3), the handle and the cleaning accessory being irremovably connected to opposite ends of the body, **characterized in that:**

- said handle (2) is planarly rotatable relative to the body by means of rotation means;
- said cleaning accessory (3) has a substantially triangular shape, and is equipped with a first suction area on a first side (3') of the accessory, and a second suction area at a vertex (3'') of the accessory, opposite to said first side;
- said cleaning accessory (3) is connected to the body (1) via connection means (15) adapted to create an articulation, such as to allow the body to tilt in all directions relative to the accessory.

2. Electric broom according to claim 1, wherein said rotation means are adapted to rotate the handle by 180°, so that it can take three fixed angular positions relative to the body, preferably 0°, + 90° and - 90°.

3. Electric broom according to claim 1 or 2, wherein said rotation means comprise:

- a circular joint (5) integral with the body, two pairs of recessed drafts (6', 6", 6"', 6''') being present on the circumference of said joint, positioned at a mutual distance of 90°;
- a pair of opposite pins (9) in the lower internal part of the handle, said pair of opposite pins ending with a tip adapted to engage with corresponding pairs of said drafts;
- thrust means in said lower internal part of the handle, adapted to push said pair of pins towards the circumference of the joint.

4. Electric broom according to claim 3, wherein said

thrust means comprise:

- a pair of springs (10) adapted to push said pair of pins towards the circumference of the joint;
- a pair of guides (12) for said springs, firmly positioned inside said handle, said pair of pins being equipped with cavities allowing said guides to fit therein at least partially.

5. Electric broom according to claim 1 or 2, wherein said rotation means comprise:

- two stops (7) in diametrically opposite positions on said circumference of the circular joint (5);
- profiles (8) of the underside of the handle, adapted to stop against said two stops (7), so as to define said 180° rotation of the handle.

6. Electric broom according to claim 1, wherein said connection means (15) for connecting the cleaning accessory (3) to the body (1) are configured as a cardan joint comprising:

- a first end (15') connected to a pin (16) arranged in the terminal region of the body, so as to allow the body to tilt relative to the accessory about a first axis of rotation;
- a second end (15'') connected to a cavity in said cleaning accessory, so as to allow the body to tilt relative to the accessory about a second axis of rotation orthogonal to said first axis of rotation, wherein said second axis of rotation is substantially parallel to said first side (3') of the accessory, said first and second axes of rotation lying at different heights relative to the body.

40

45

50

55

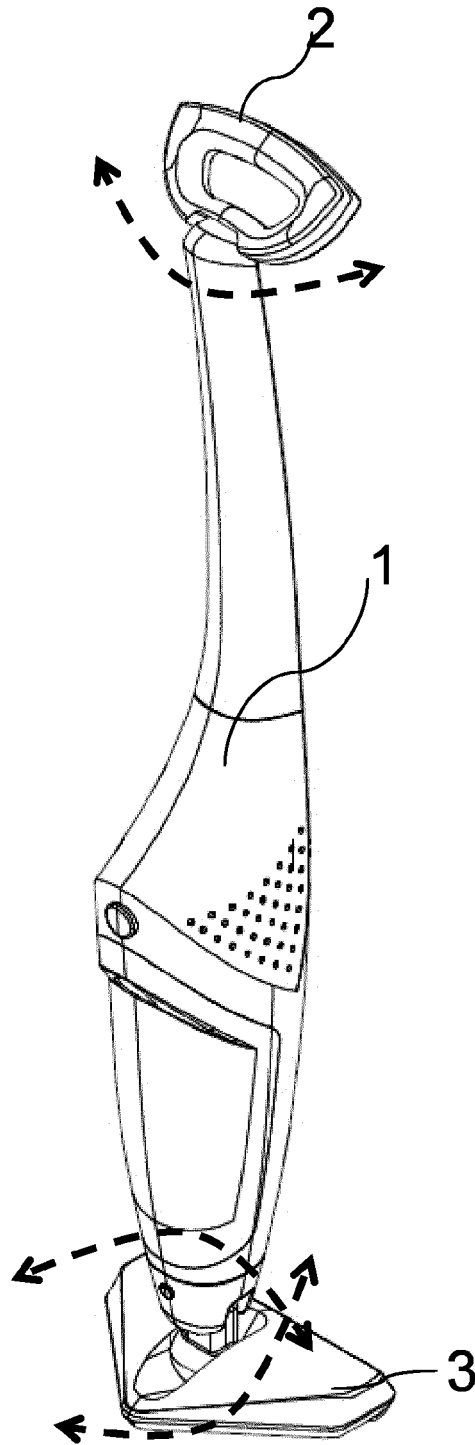


FIG. 1

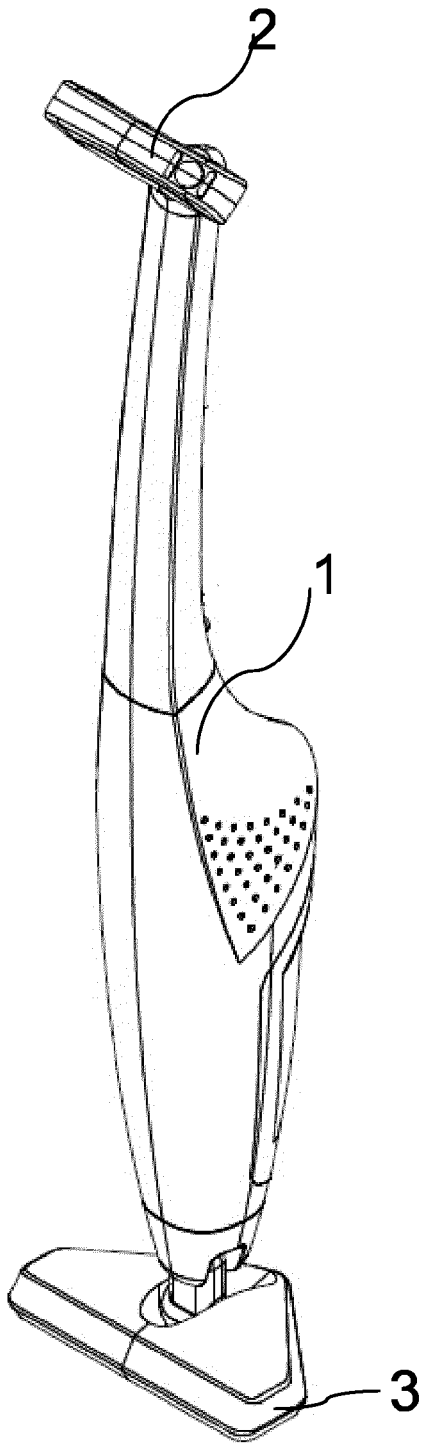


FIG. 2

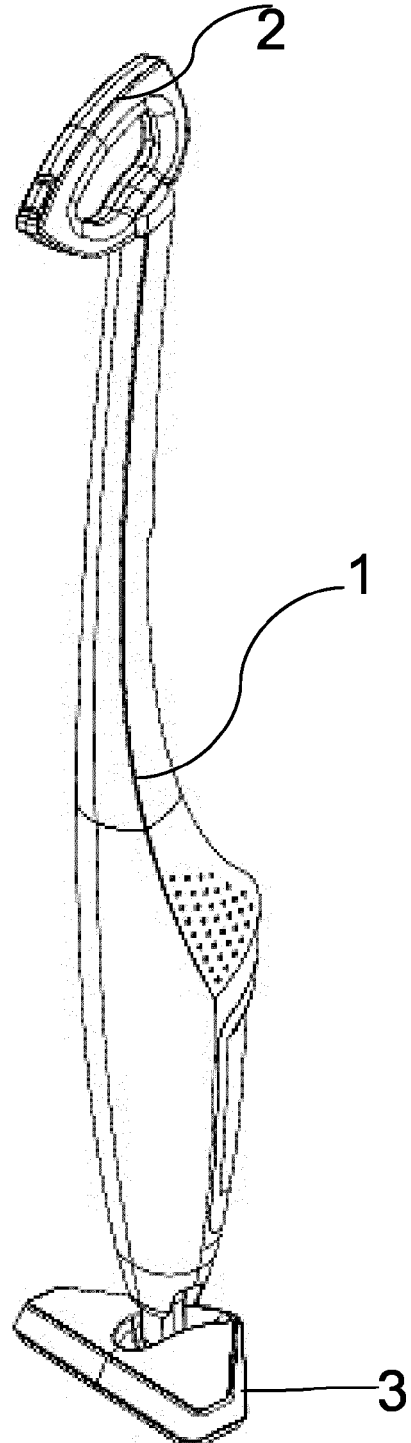


FIG. 3

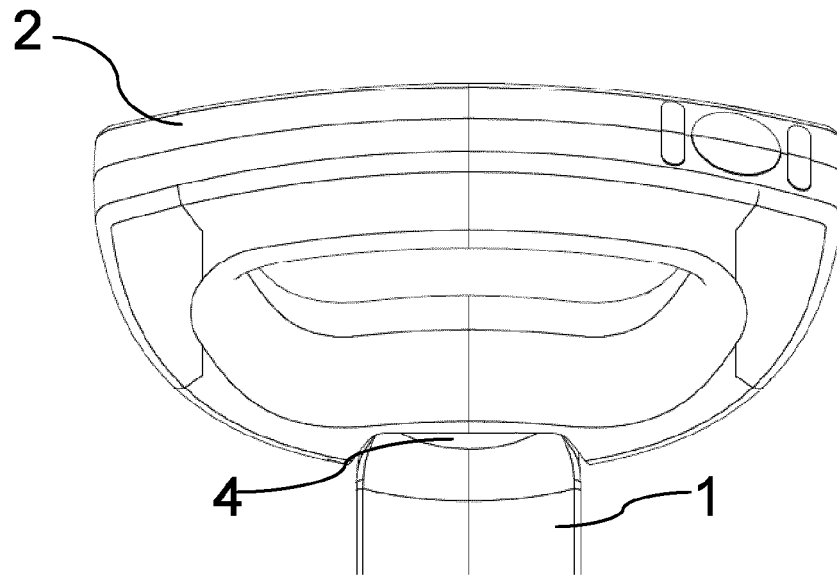


FIG. 4

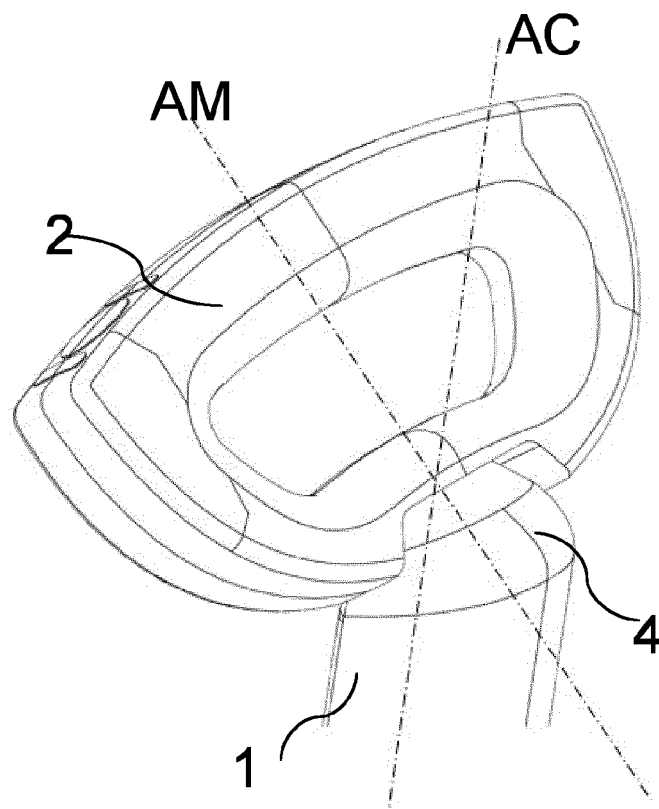


FIG. 5

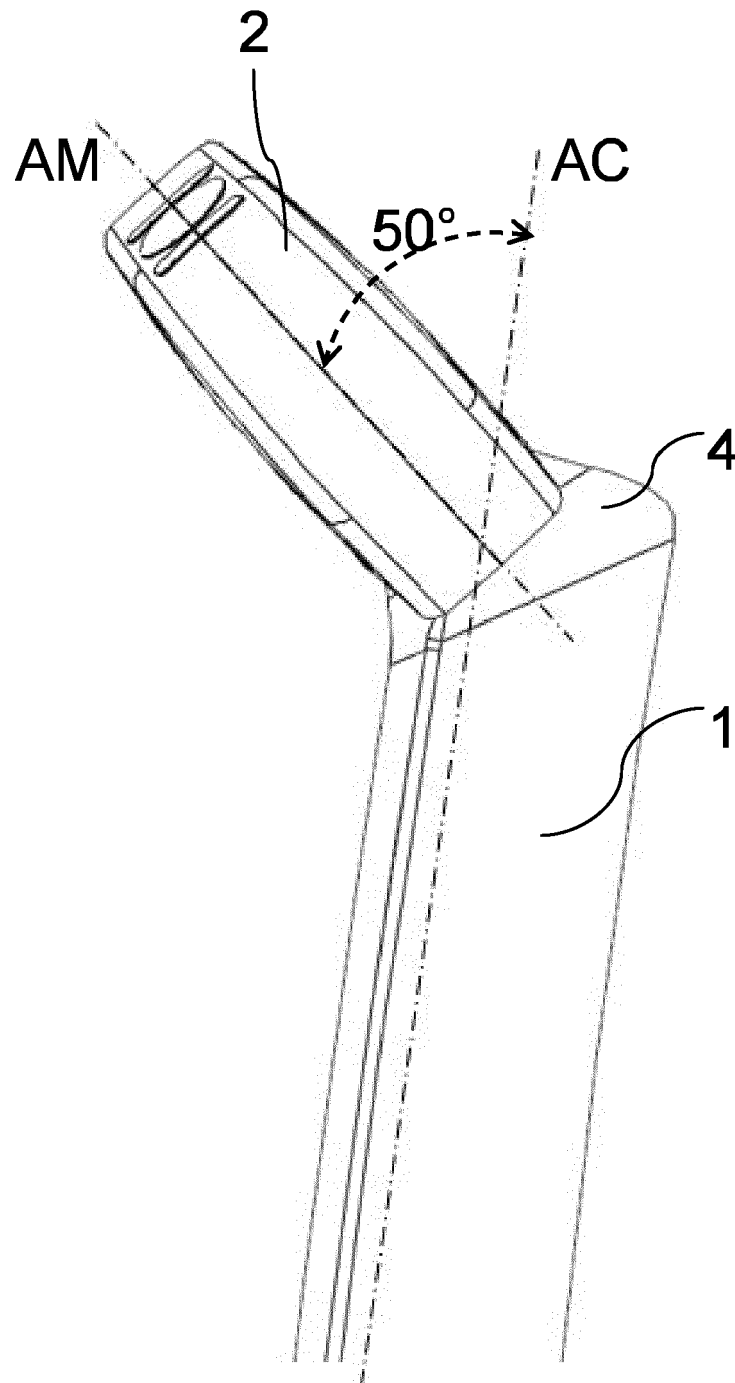


FIG. 6

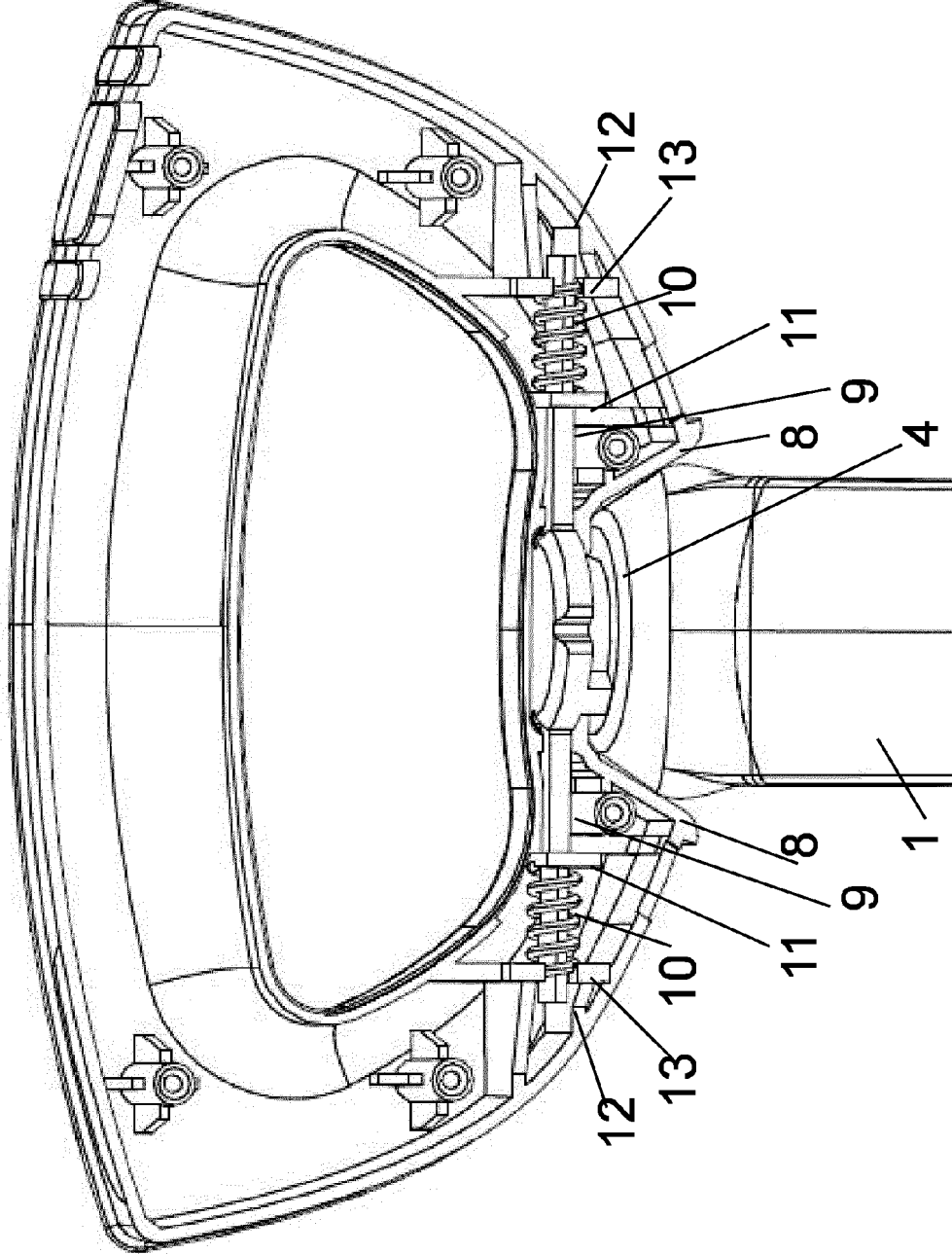


FIG. 7

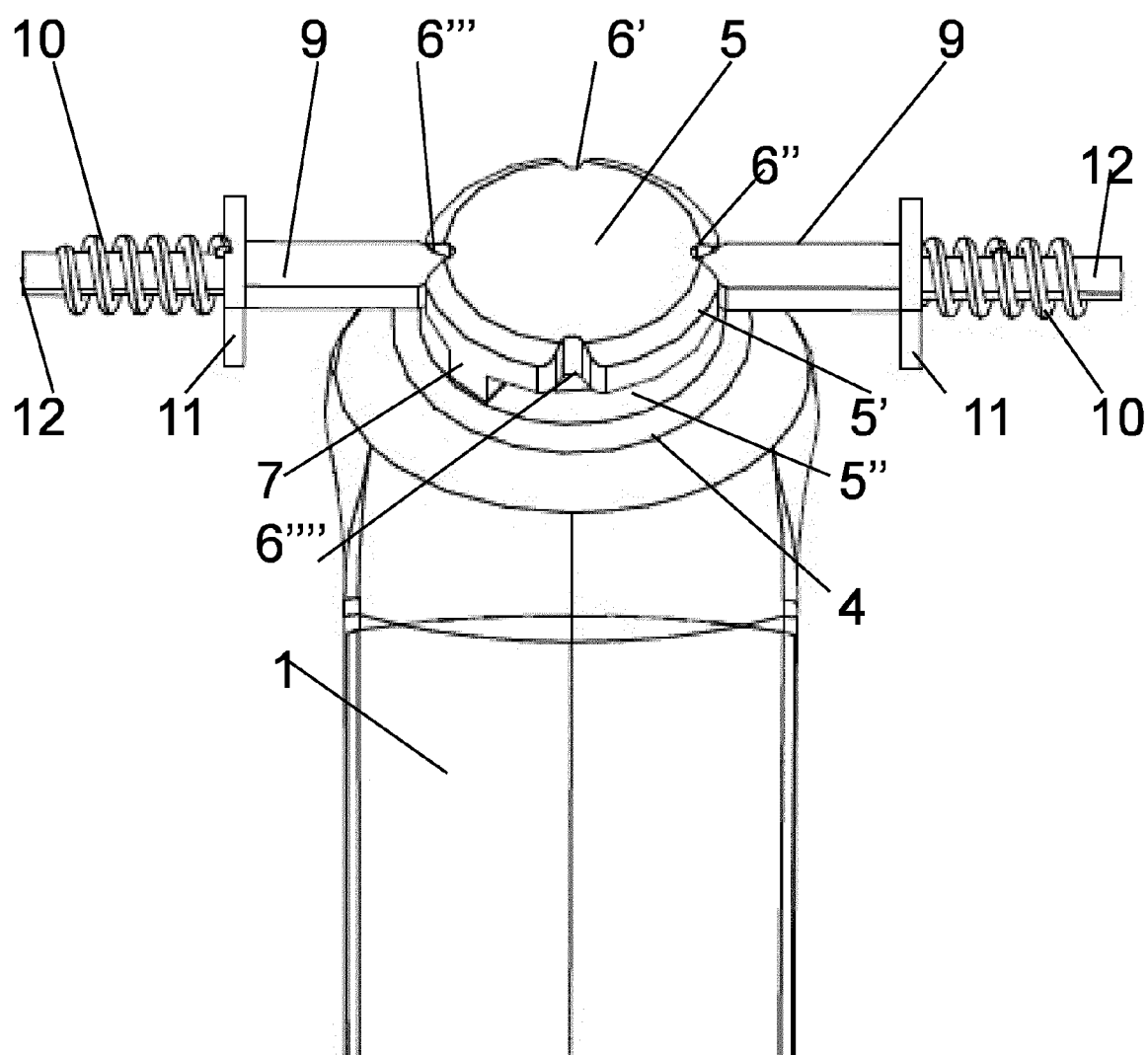


FIG. 8

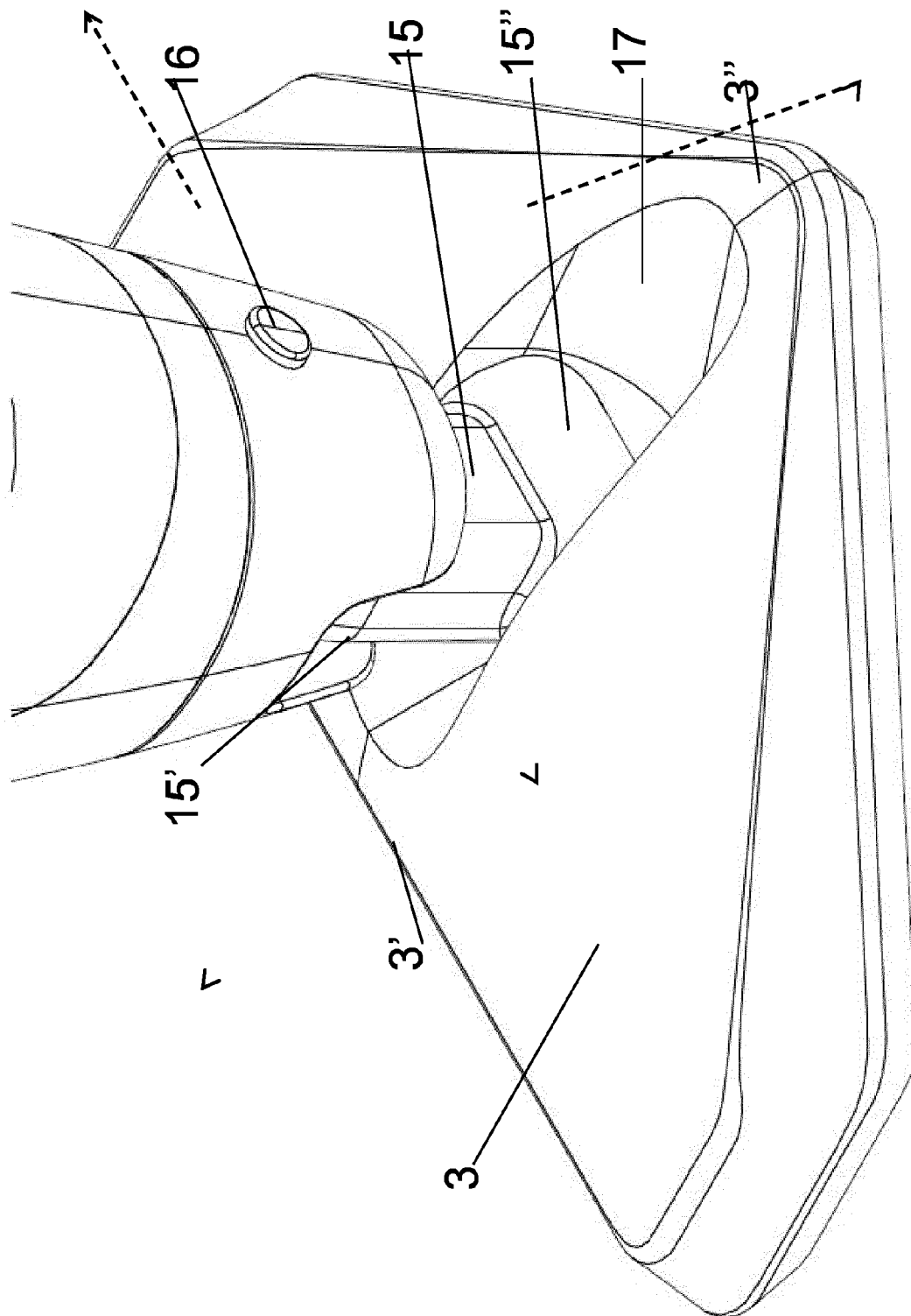


FIG. 9



EUROPEAN SEARCH REPORT

Application Number
EP 15 18 3102

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2004/103144 A1 (DE LONGHI SPA [IT]; FOLLEGOT RODOLFO [IT]; CESTER FRANCESCA [IT]) 2 December 2004 (2004-12-02)	1	INV. A47L5/24 A47L9/32 A47L5/28
Y	* pages 2,3; figure 2a *	2-6	
Y	EP 2 581 016 A1 (PANASONIC CORP [JP]) 17 April 2013 (2013-04-17) * paragraph [0044] - paragraph [0046]; figures 9-11 *	2-6	
Y	WO 2005/034706 A2 (T P A IMPEX SPA [IT]; AMORETTI LUIGI [IT]) 21 April 2005 (2005-04-21) * figure 11 *	2-6	
Y	EP 1 321 086 A2 (NEXT AT S R L [IT]) 25 June 2003 (2003-06-25) * figures 1-6 *	2-6	
Y	WO 2014/091392 A1 (INDESIT CO SPA [IT]) 19 June 2014 (2014-06-19) * figures 1-7 *	2-6	
Y	DE 10 2007 040951 A1 (MIELE & CIE [DE]) 5 March 2009 (2009-03-05) * figures 4,5 *	2-6	TECHNICAL FIELDS SEARCHED (IPC) A47L
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 28 January 2016	Examiner Trimarchi, Roberto
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03.02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 15 18 3102

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

28-01-2016

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2004103144 A1	02-12-2004	AT 345082 T CN 1791353 A EP 1631182 A1 ES 2277257 T3 PT 1631182 E US 2006070208 A1 WO 2004103144 A1	15-12-2006 21-06-2006 08-03-2006 01-07-2007 28-02-2007 06-04-2006 02-12-2004
EP 2581016 A1	17-04-2013	CA 2802508 A1 CN 102939037 A EP 2581016 A1 JP 2012000121 A US 2013086768 A1 WO 2011158454 A1	22-12-2011 20-02-2013 17-04-2013 05-01-2012 11-04-2013 22-12-2011
WO 2005034706 A2	21-04-2005	EP 1677658 A2 WO 2005034706 A2	12-07-2006 21-04-2005
EP 1321086 A2	25-06-2003	EP 1321086 A2 IT M020010255 A1	25-06-2003 23-06-2003
WO 2014091392 A1	19-06-2014	EP 2928352 A1 WO 2014091392 A1	14-10-2015 19-06-2014
DE 102007040951 A1	05-03-2009	NONE	