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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
29 December 2016 (29.12.2016)

WIPO | PCT

(10) International Publication Number
WO 2016/206759 A1

(51) International Patent Classification:
A47L 9/20 (2006.01) *A47L 9/14* (2006.01)

(21) International Application Number:
PCT/EP2015/064553

(22) International Filing Date:
26 June 2015 (26.06.2015)

(25) Filing Language: English

(26) Publication Language: English

(71) Applicant: **AKTIEBOLAGET ELECTROLUX** [SE/SE]; S: t Göransgatan 143, S-10545 Stockholm (SE).

(72) Inventors: **SCHALLER, Maeva**; AB Electrolux, S: t Göransgatan 143, S-10545 Stockholm (SE). **ERIKSSON, Henrik**; AB Electrolux, S:t Göransgatan 143, S-10545 Stockholm (SE).

(74) Agent: **WRETBLAD, Eva**; S: t Göransgatan 143, S-105 45 Stockholm (SE).

(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, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, 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: ARRANGEMENT FOR CLEANING A FILTER OF A BAG-LESS CONTAINER OF A VACUUM CLEANER

(57) Abstract: The invention relates to an arrangement for cleaning a filter of a bag-less container of a vacuum cleaner. An arrangement is provided for cleaning a filter (15) of a bag-less container (13) of a vacuum cleaner (10). The arrangement comprises a filter cleaner (20) mounted to an interior of the container (13), a cover (16) for closing and opening the container (13), the filter (15) being attached to the cover (16) and configured to be accommodated in the container (13) during vacuum cleaner operation when the cover (16) closes the container (13), and a handle (21) attached to the cover (16) by which a user can move the filter (15) in and out of the container (13), wherein upon user movement of the filter (15) out of the container (13), debris is released from the filter (15) upon contact with the filter cleaner (20).

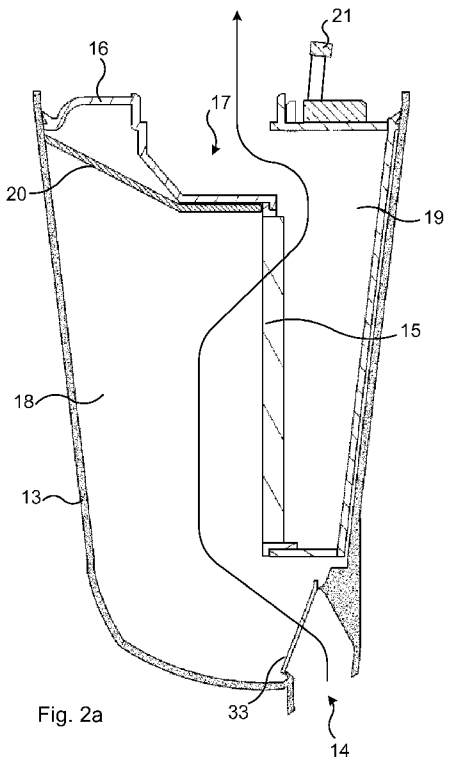


Fig. 2a

WO 2016/206759 A1

ARRANGEMENT FOR CLEANING A FILTER OF A BAG-LESS CONTAINER OF A VACUUM CLEANER

TECHNICAL FIELD

The invention relates to an arrangement for cleaning a filter of a bag-less container of a vacuum cleaner.

BACKGROUND

When collecting dirt and debris in vacuum cleaners, bag-less containers can be used. Such containers needs to be emptied by the user when full in order to maintain good performance of the vacuum cleaner and to free up space for further debris in the container. Common existing solutions enable a user to either empty the container by opening a lid - usually at the bottom – via which the debris leaves the container, or to empty the container by removing what is inside the container from the top by removing parts of a separation system of the vacuum cleaner, including one or more filters.

In many of these prior art containers, part of the separation is performed by one or more filters and/or meshes. These filters may become clogged with debris and decrease the performance of the vacuum cleaner. Therefore, emptying the container is not sufficient to maintain full performance of the vacuum cleaner; the filter or mesh additionally needs to be cleaned.

US 2002/0166199 discloses a dirt collecting system for a vacuum cleaner including a dirt cup formed with a coarse particle separation chamber and a fine particle separation chamber separated by an aperture wall. An inlet opening is formed in the dirt cup and communicates with the coarse particle separation chamber for inputting a stream of dirt laden air into the coarse particle separation chamber. A clean air outlet opening is formed in the fine particle separation chamber for allowing the filtered air stream to exit the dirt cup. The apertured wall includes a pre-filter for filtering coarse particles from a stream of dirt laden and depositing the coarse particles in the coarse particle separation chamber.

A pre-filter cleaning member is installed at a top of the dirt cup on a pre-filter frame on the coarse particle separation chamber side of the pre-filter frame. The pre-filter cleaning member is in operative engagement with the pre-filter. When the pre-filter frame is in the fully inserted position inside dirt cup, the pre-filter cleaning member is in operative engagement with a top section of the pre-filter.

A problem with US 2002/0166199 is that when the pre-filter is to be cleaned, a user must open a lid arranged for sealing the dirt cup, grab the pre-filter frame, and pull it in an upwards direction such that the cleaning member with the pre-filter thereby removing any dirt particles that may have accumulated thereon. The cleaning of the pre-filter continues along the entire length of the pre-filter as long as the pre-filter frame is moved upwards. This is process is somewhat intricate, and requires the opening of a lid before the pre-filter frame can be removed from the dirt cup to facilitate cleaning of the fine filter element. Further, a user may be subjected to dirt as she must remove the pre-filter frame which potentially accommodates dirt particles.

SUMMARY

An object of the invention is to solve, or at least mitigate, this problem in the art and to provide an improved arrangement for cleaning a filter of a bag-less container of a vacuum cleaner.

This object is attained in a first aspect of the invention by an arrangement for cleaning a filter of a bag-less container of a vacuum cleaner. The arrangement comprises a filter cleaner mounted to an interior of the container, a cover for closing and opening the container, the filter being attached to the cover and configured to be accommodated in the container during vacuum cleaner operation when the cover closes the container, and a handle attached to the cover by which a user can move the filter in and out of the container, wherein upon user movement of the filter out of the container, debris is released from the filter upon contact with the filter cleaner.

This object is attained in a second aspect of the invention by an arrangement for cleaning a filter of a bag-less container of a vacuum cleaner. The arrangement comprises a filter cleaner mounted to the container on a distance from the filter, a cover for closing and opening the container, the filter being attached to the cover and configured to be accommodated in the container during vacuum cleaner operation when the cover closes the container, and a handle attached to the cover by which a user can move the filter in and out of the container, wherein user movement of the filter out of the container and into contact with the filter cleaner causes debris to be released from the filter.

With the above two aspects of the invention for cleaning the filter, the cleaning process advantageously becomes both straightforward and non-messy, since the user is not in contact with the debris.

In an embodiment, the filter is releasably attached to the cover, in which case a user advantageously can remove the filter from the cover for e.g. rinsing.

In the second aspect of the invention, in an embodiment, the filter cleaner is mounted to an exterior of the container. Advantageously, by providing the filter cleaner on the exterior of the container, the container can be emptied without the risk of any debris getting stuck on the filter cleaner.

In another embodiment, the arrangement further comprises a mesh unit attached to the cover of the container and being configured to be fitted within the container, which mesh unit accommodates the filter and comprises a mesh element arranged as a cover over of the filter and extending along the filter, wherein upon user movement of the mesh unit out of the container, debris is released from the mesh element upon contact with the filter cleaner.

In an embodiment of the invention, the filter cleaner is flexible, e.g. manufactured as a rubber member, in order to advantageously adapt to the shape of the mesh element or the filter.

In a further embodiment, the filter cleaner is mounted to the interior of the container such that it is distanced from a respective side wall of the container so that debris will not adhere to the filter cleaner at the respective side wall.

Further provided is a vacuum cleaner comprising the arrangement for cleaning a filter of a bag-less container of the vacuum cleaner as discussed herein.

Generally, all terms used in the claims are to be interpreted according to their ordinary meaning in the technical field, unless explicitly defined otherwise herein. All references to "a/an/the element, apparatus, component, means, step, etc." are to be interpreted openly as referring to at least one instance of the element, apparatus, component, means, step, etc., unless explicitly stated otherwise. The steps of any method disclosed herein do not have to be performed in the exact order disclosed, unless explicitly stated.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is now described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 illustrates a prior art vacuum cleaner in which the invention may be implemented;

Figure 2a illustrates a sectional view of an arrangement for cleaning a filter of a bag-less container of a vacuum cleaner according to an embodiment of the invention;

Figure 2b illustrates a sectional view of the arrangement of Figure 2a when the filter is removed from the container for cleaning;

Figure 3 shows a perspective view of the arrangement illustrated in section in Figure 2a with the cover removed from the container;

Figure 4 shows a perspective view of the arrangement according to a further embodiment of the invention with the cover removed from the container;

Figure 5 illustrates a procedure of cleaning the mesh element according to an embodiment of the invention;

Figure 6 illustrates an arrangement according to yet a further embodiment of the invention where the filter cleaner is mounted to an exterior of the container; and

Figure 7 shows a further illustration of the filter cleaner being mounted in the interior of the container according to an embodiment of the invention.

DETAILED DESCRIPTION

The invention will now be described more fully hereinafter with reference to the accompanying drawings, in which certain embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided by way of example so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. Like numbers refer to like elements throughout the description.

Figure 1 illustrates a cordless vacuum cleaner 10 of an upright model in which the present invention may be applied. It may also be implemented for instance in a canister or hand-held vacuum cleaner, or any other bag-less cleaner. The vacuum cleaner comprises a nozzle 11 via which debris is removed from a surface to be cleaned via an opening in a bottom of the nozzle. In the interior of the vacuum cleaner, a suction fan (not shown) is arranged to cause an air flow to transport debris from the opening of the nozzle 10 to a clean air outlet 12 located on a back side of the vacuum cleaner 10 via a releasable bag-less container 13 collecting the debris. When full, the bag-less container 13 can be released from the vacuum cleaner 10 and emptied by a user. Now, the bag-less container 13 comprises a filter for removing debris from the air flow such that the debris is retained in the container 13. As previously mentioned, in prior art vacuum cleaners, the cleaning of the filter is oftentimes problematic.

Figures 2a and b illustrate a sectional view of an arrangement for cleaning a filter of a bag-less container of a vacuum cleaner according to an embodiment of the invention. The bag-less container 13 comprises an air inlet 14 in a bottom section and a filter 15 arranged to remove debris from the air flow entering the air inlet 14 before the air flow exits the container 13 via an air outlet. A cover 16 is arranged to close an opening of the container 13, which cover 16 in an embodiment comprises an air outlet 17 via which the air flow entering the air inlet 14 exits the container 13 after having been filtered by the filter 15. The cover may partially or fully cover the opening.

As can be seen in Figure 2a, the filter 15 divides the container 13 in two compartments; a first compartment 18 in direct fluid communication with the air inlet 14 where a major part of the debris will be collected, and a second compartment 19 in direct fluid communication with the air outlet 17 of the cover 16, where the filtered air flow exits the container 13 after the debris contained in the air flow entering the container 13 has been removed by the filter 15. It should be noted that this particular container 13 is exemplifying only, and that the arrangement of according to embodiments of the invention could be applied to containers designed differently.

Now, the filter 15 will filter the air flow entering the container 13 via the air inlet 14, and must occasionally be cleaned from debris such that suction power of the vacuum cleaner is maintained.

In the embodiment of the invention illustrated in Figures 2a and b, a filter cleaner 20 is mounted to an interior of the container 13, in a top wall of the container 13, to be in contact with the filter 15 which is accommodated in the container 13 during vacuum cleaner operation. The filter 15 is further attached to the cover 16, and the cover 16 comprises a handle 21 by which a user can move the filter 15 in and out of the container 13.

In an embodiment, the container 13 contains a flap element 33 arranged at the air inlet 14 and configured to cover the air inlet 14 when no air flow is

drawn through the container 13, in order to prevent debris from falling out of the air inlet 14

In Figure 2b, upon user movement of the filter 15 out of the container 13, debris 22 is advantageously released from the filter 15 upon contact with the filter cleaner 20 and falls towards the bottom section of the container 13. The filter 15 is thus cleaned and the container 13 can be emptied. This process is advantageously both straightforward and non-messy, since the user is not in contact with the debris.

In a further embodiment of the present invention, the filter 15 is releasably attached to the cover 16, in which case a user can remove the filter 15 from the cover 16 for e.g. rinsing.

Figures 3 illustrates an arrangement according to still another embodiment of the invention in a perspective view, with the cover 16 being removed from the container 13 (illustrated in section). In this particular embodiment, the arrangement further comprises a mesh unit 30 attached to the cover 16 of the container 13 and being configured to be fitted within the container 13. The mesh unit 30 accommodates the filter 15 and comprises a mesh element 31 arranged as a cover over, and extending along, the filter 15. The mesh element 31 advantageously stops coarse-grained debris, while the filter 15 stops more fine-grained debris.

When the mesh unit 30 is accommodated in the container 13 and in contact with the filter cleaner 20, and the user moves the mesh unit 30 out of the container 13 by pulling the handle 21, debris is advantageously released from the mesh element 31 upon contact with the filter cleaner 20 and falls towards the bottom section of the container 13. The filter 15 is thus cleaned and the container 13 can be emptied. As can be seen in Figure 3, the container 13 may contain a flap element 33 arranged at the air inlet 14 and configured to cover the air inlet 14 when no air flow is drawn through the container 13, in order to avoid debris from falling out of the air inlet 14. Thus, when the vacuum cleaner 10 is not being operated, and no air flow hence is drawn trough the

container 13, the flap element 33 will cover the air inlet 14. Conversely, when an air flow is created and acts on the flap element 33, the element 33 will flap open and allow the air flow to be drawn through the container 13.

Figure 4 illustrates of an arrangement for cleaning a filter of a bag-less container of a vacuum cleaner according to another embodiment of the invention in a perspective view with the mesh unit 30 being removed from the container 13. This embodiment is illustrated with the mesh unit 30 included as discussed with reference to Figure 3, but is equally applicable to an arrangement only comprising the filter 15 without the mesh unit 30 and the mesh element 31 as discussed with reference to Figures 2a and b.

Now, in this particular embodiment, the filter cleaner 20 is mounted to the container 13 in its interior, on a distance from the mesh element 31, wherein the user moves the filter 15 out of the container 13 by pulling the handle 21 then sets the mesh element 31 into contact with the filter cleaner 20 to cause debris to be released from the mesh element 31 (or alternatively the filter 15 in case no mesh element 31 is used).

Figure 5 illustrates a procedure of cleaning the mesh element 31 using the arrangement illustrated in Figure 4. In a first step, a user pulls the handle 21 for removing the cover 16 to open the container 13. The cover 16 and mesh unit 30 attached to the cover 16 can thus be removed from the container 13 in a second step and the container 13 can be emptied.

Thereafter, the user can in a third step move the mesh element 31 (still by holding the handle 22) over the filter cleaner 20 back and forth to remove any dirt and debris stuck to the mesh, and again empty the container 13 if required. Finally, in a fourth step, the user inserts the mesh unit 30 back into the container 13. Hence, the container 13 has been emptied and the mesh element 31 has advantageously been cleaned.

Figure 6 illustrates a further embodiment of the arrangement of the invention (only showing the filter cleaner 20 and the container 13). In this particular embodiment, the filter cleaner is arranged on an exterior of the container.

Again, in order to clean the mesh element 31 (or the filter 15) as previously discussed with reference to Figure 5, a user removes the mesh unit 30 from the container 13 by pulling the handle 21 and subsequently moves the mesh element 31 over the filter cleaner 20 back and forth to remove any dirt and debris stuck to the mesh. By providing the filter cleaner 20 on the exterior of the container 13, the container 13 can be emptied without the risk of any debris getting stuck on a filter cleaner arranged in the interior of the container 13.

Figure 7 further illustrates the filter cleaner 20 when being mounted to the interior of the container 13. In an embodiment of the invention, the filter cleaner is flexible, e.g. manufactured as a rubber member having a thickness of about 1 mm, in order to advantageously adapt to the shape of the mesh element 31 or the filter 15.

In a further embodiment, the filter cleaner 20 is mounted to the interior of the container 13 such that it is distanced from a respective side wall 25, 26 of the container 13 so that debris will not adhere to the filter cleaner at the respective side wall 25, 26.

The invention has mainly been described above with reference to a few embodiments. However, as is readily appreciated by a person skilled in the art, other embodiments than the ones disclosed above are equally possible within the scope of the invention, as defined by the appended patent claims.

CLAIMS

1. Arrangement for cleaning a filter (15) of a bag-less container (13) of a vacuum cleaner (10), comprising:

a filter cleaner (20) mounted to an interior of the container (13);

a cover (16) for closing and opening the container (13), the filter (15) being attached to the cover (16) and configured to be accommodated in the container (13) during vacuum cleaner operation when the cover (16) closes the container (13); and

a handle (21) attached to the cover (16) by which a user can move the filter (15) in and out of the container (13), wherein upon user movement of the filter (15) out of the container (13), debris is released from the filter (15) upon contact with the filter cleaner (20).

2. The arrangement of claim 1, further comprising:

a mesh unit (30) attached to the cover (16) of the container (13) and being configured to be fitted within the container (13), said mesh unit (30) accommodating the filter (15) and comprising a mesh element (31) arranged as a cover over the filter (15) and extending along the filter (15), wherein upon user movement of the mesh unit (30) out of the container (13), debris is released from the mesh element (31) upon contact with the filter cleaner (20).

3. The arrangement of claims 1 or 2, wherein:

the filter cleaner (20) mounted to the interior of the container (13) is mounted on a distance from a respective side wall (25, 26) of the container.

4. Arrangement for cleaning a filter (15) of a bag-less container (13) of a vacuum cleaner (10), comprising:

a filter cleaner (20) mounted to the container (13) on a distance from the filter (15);

a cover (16) for closing and opening the container (13), the filter (15) being attached to the cover (16) and configured to be accommodated in the container (13) during vacuum cleaner operation when the cover (16) closes the container (13); and

a handle (21) attached to the cover (16) by which a user can move the filter (15) in and out of the container (13), wherein user movement of the filter (15) out of the container (13) and into contact with the filter cleaner (20) causes debris to be released from the filter (15).

5. The arrangement of claim 4, further comprising:

a mesh unit (30) attached to the cover (16) of the container (13) and being configured to be fitted within the container (13), said mesh unit (30) accommodating the filter (15) and comprising a mesh element (31) arranged as a cover over the filter (15) and extending along the filter (15), wherein user movement of the mesh unit (30) out of the container (13) and into contact with the filter cleaner (20) causes debris to be released from the filter (15).

6. The arrangement of claim 5, wherein:

the filter cleaner (20) is mounted to an interior of the container (13).

7. The arrangement of claim 5, wherein:

the filter cleaner (20) is mounted to an exterior of the container (13).

8. The arrangement of any one of the preceding claims, wherein:

the filter (15) is configured to be releasably attached to the cover (16).

9. The arrangement of any one of the preceding claims, wherein:

the filter cleaner (20) comprise a flexible member contacting the filter (15) or the mesh element (31) for removing the debris.

10. The arrangement of any one of the preceding claims, wherein:

the container (13) comprises an air inlet (14) where an air flow to be filtered by the filter (15) enters the container (13); and

the cover (16) comprises an air outlet (17) where the air flow passing through the filter (15) exits the container (13).

11. The arrangement of claim 10, further comprising:

a flap element (33) arranged at the air inlet (14) and configured to cover the air inlet (14) when no air flow is drawn through the container (13), while

being configured to flap open when acted on by an air flow entering the air inlet (14).

12. A vacuum cleaner (10) comprising the arrangement for cleaning a filter (15) of a bag-less container (13) of the vacuum cleaner (10) according to any one of the preceding claims.

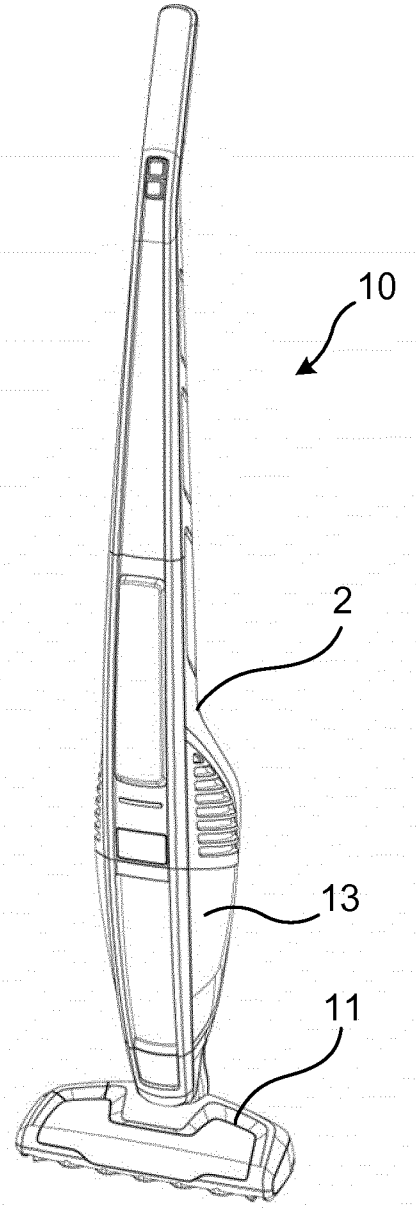


Fig. 1

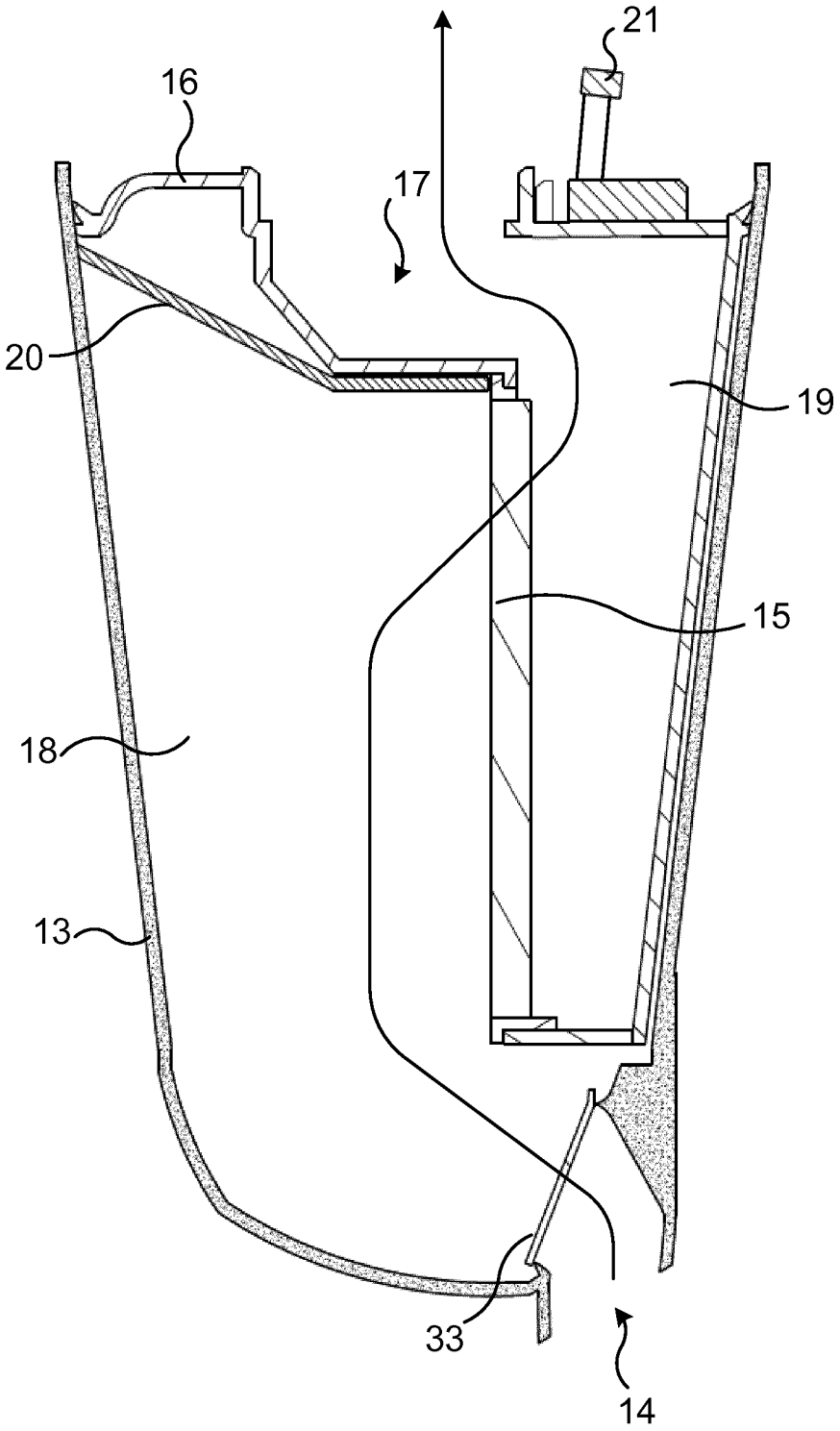


Fig. 2a

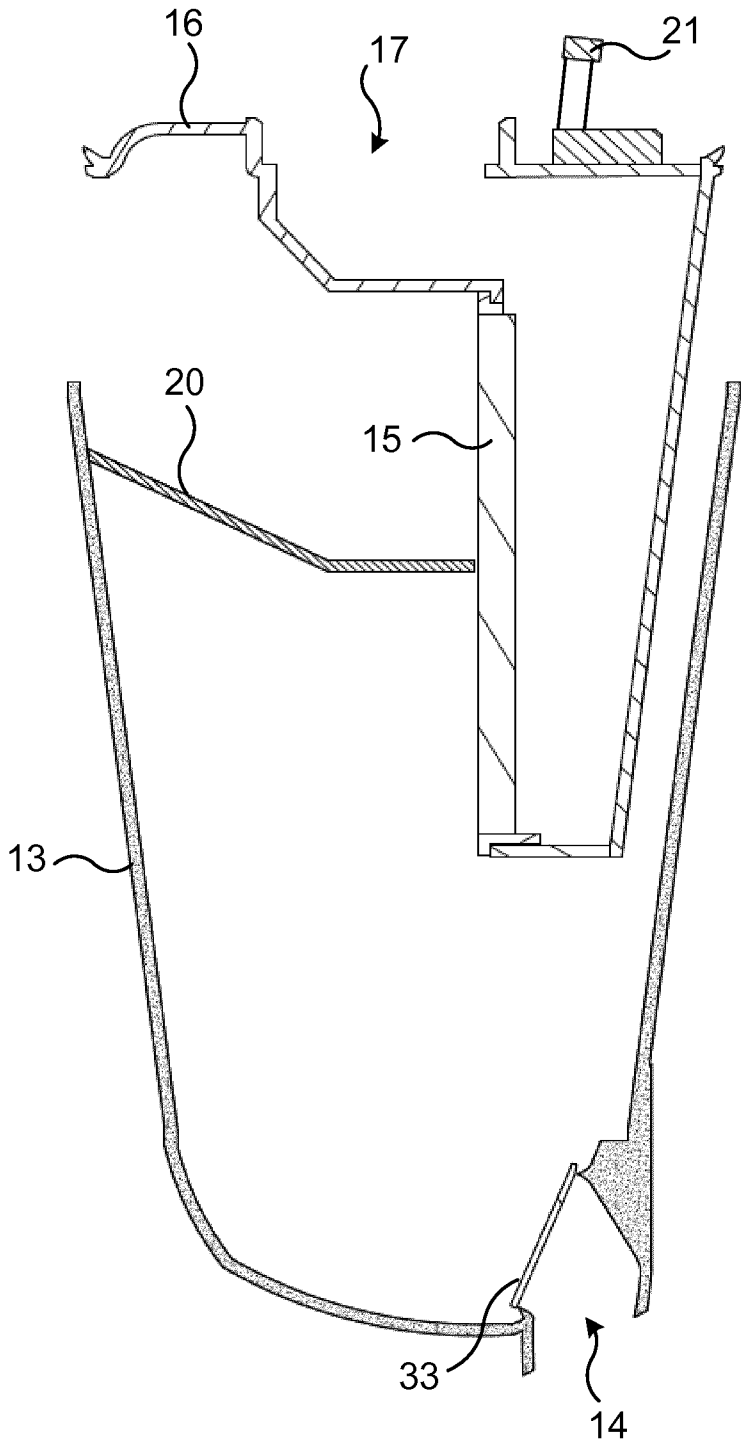


Fig. 2b

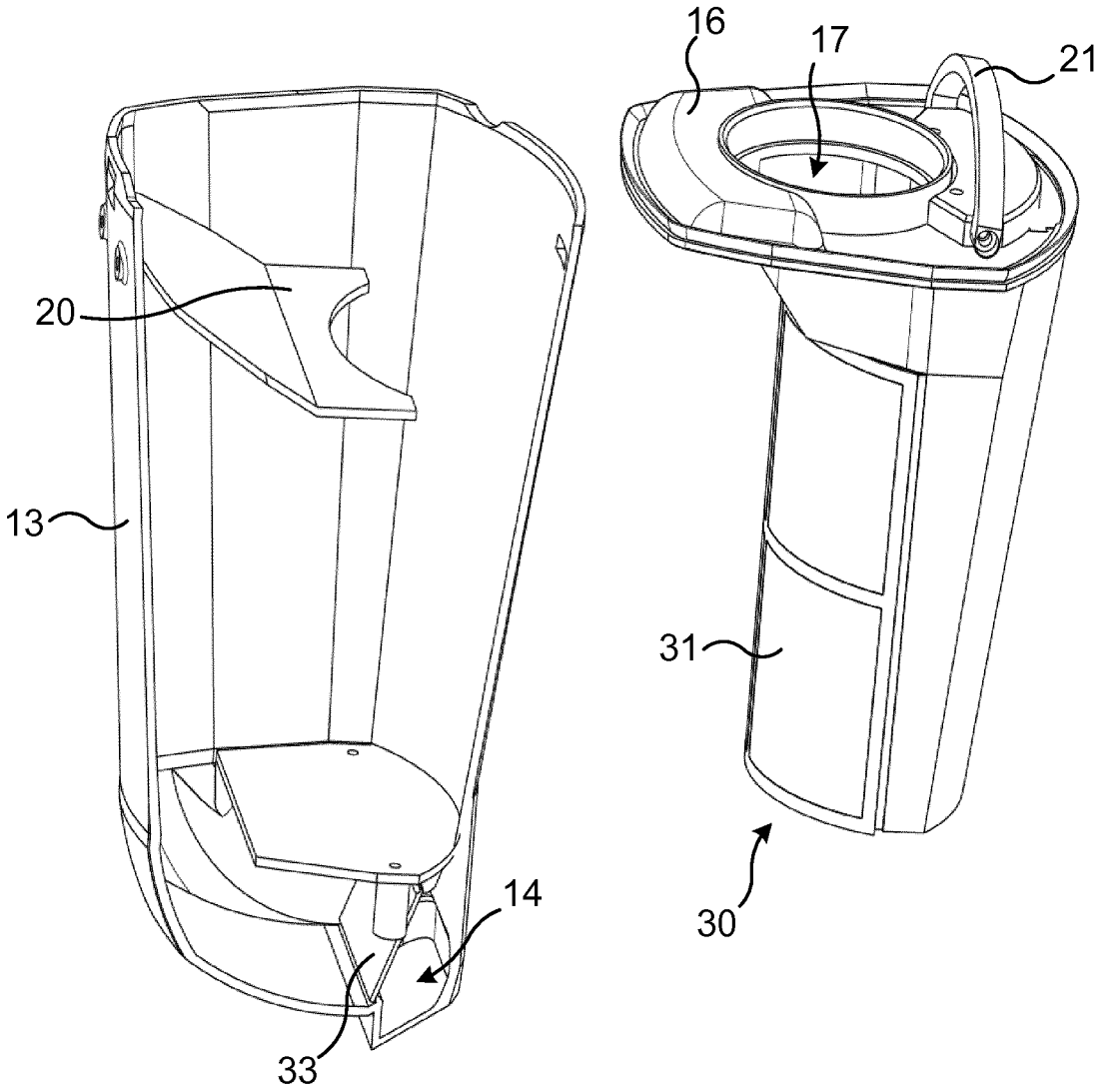


Fig. 3

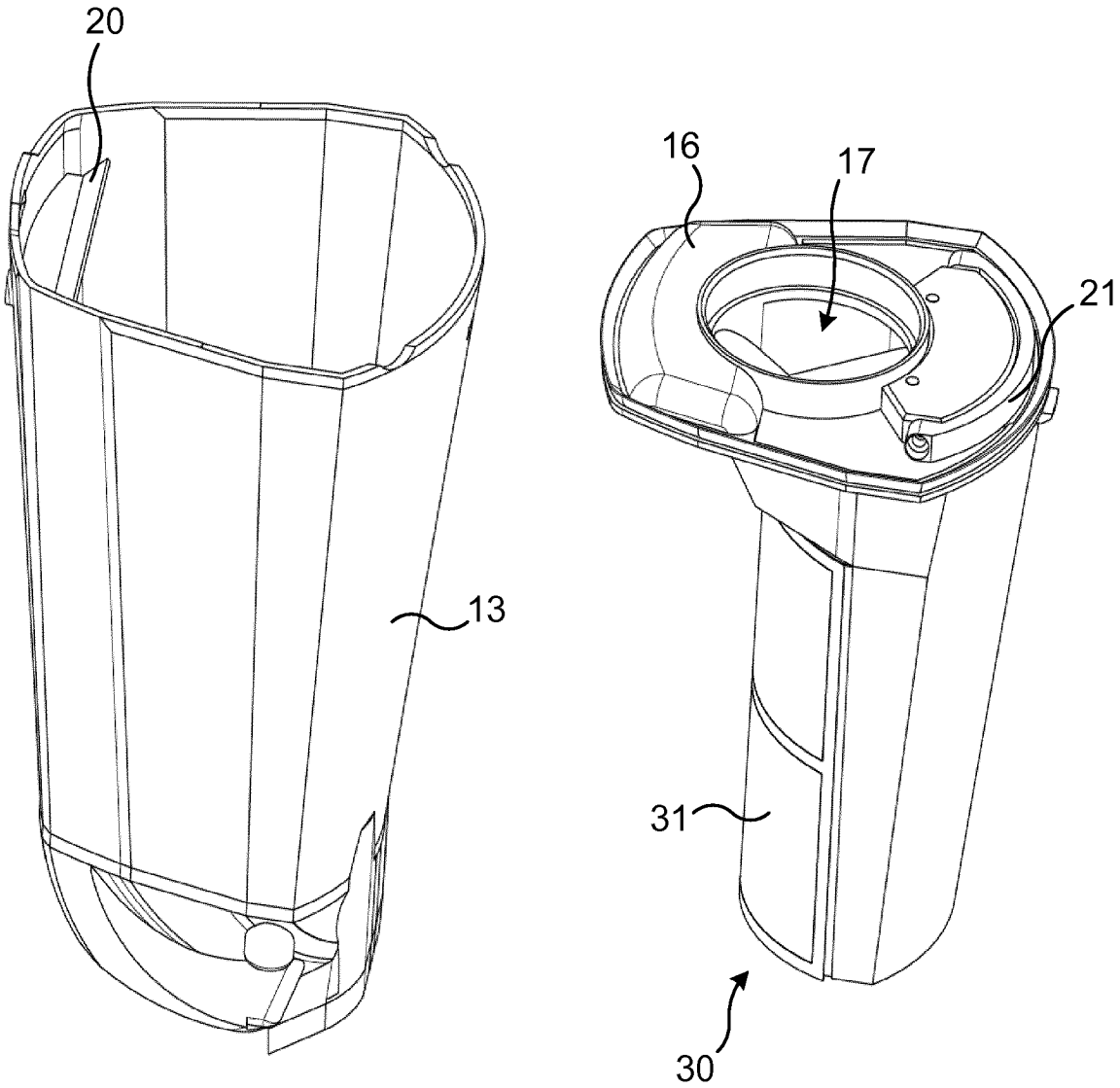
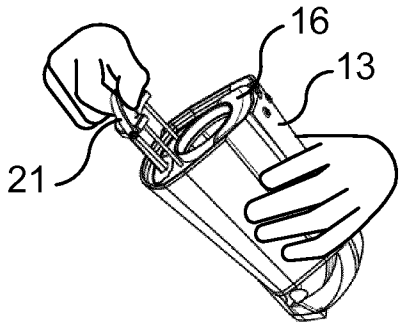
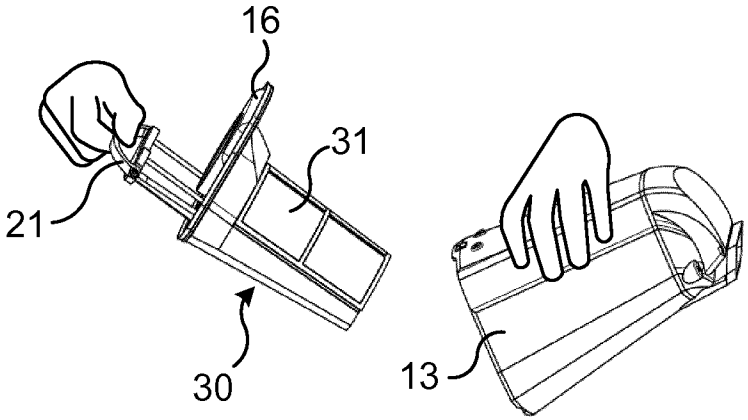


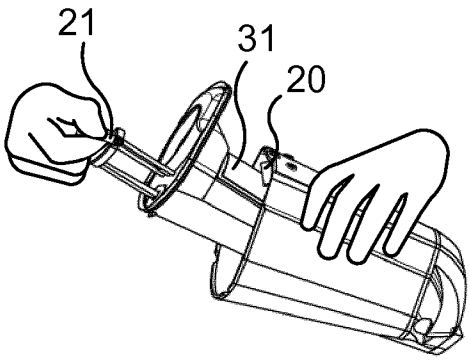
Fig. 4



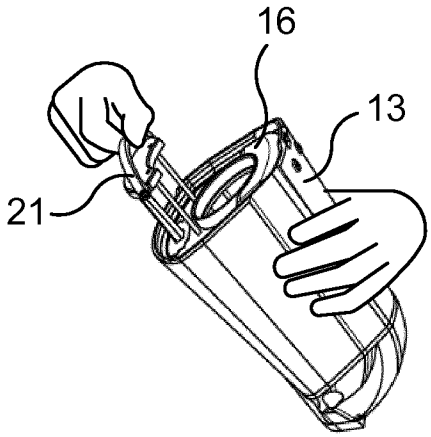
1)



2)



3)



4)

Fig. 5

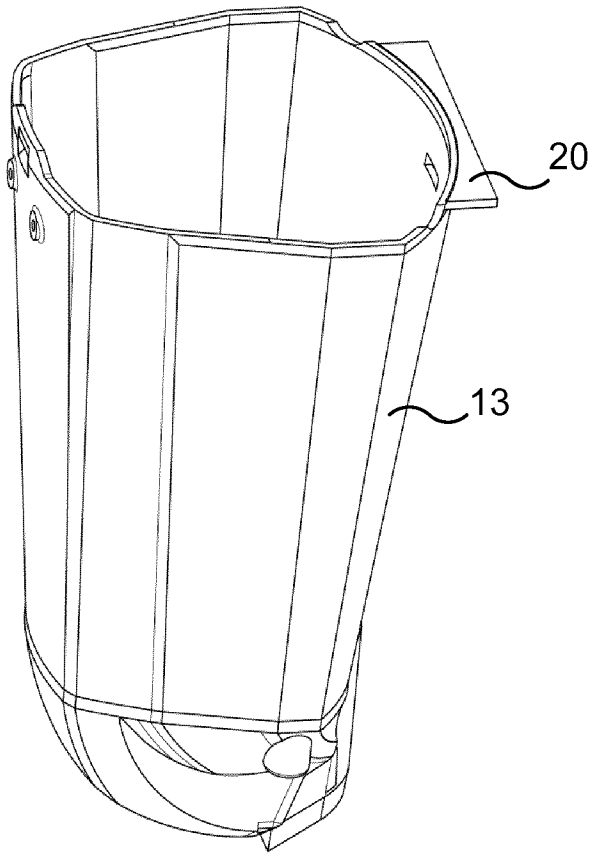


Fig. 6

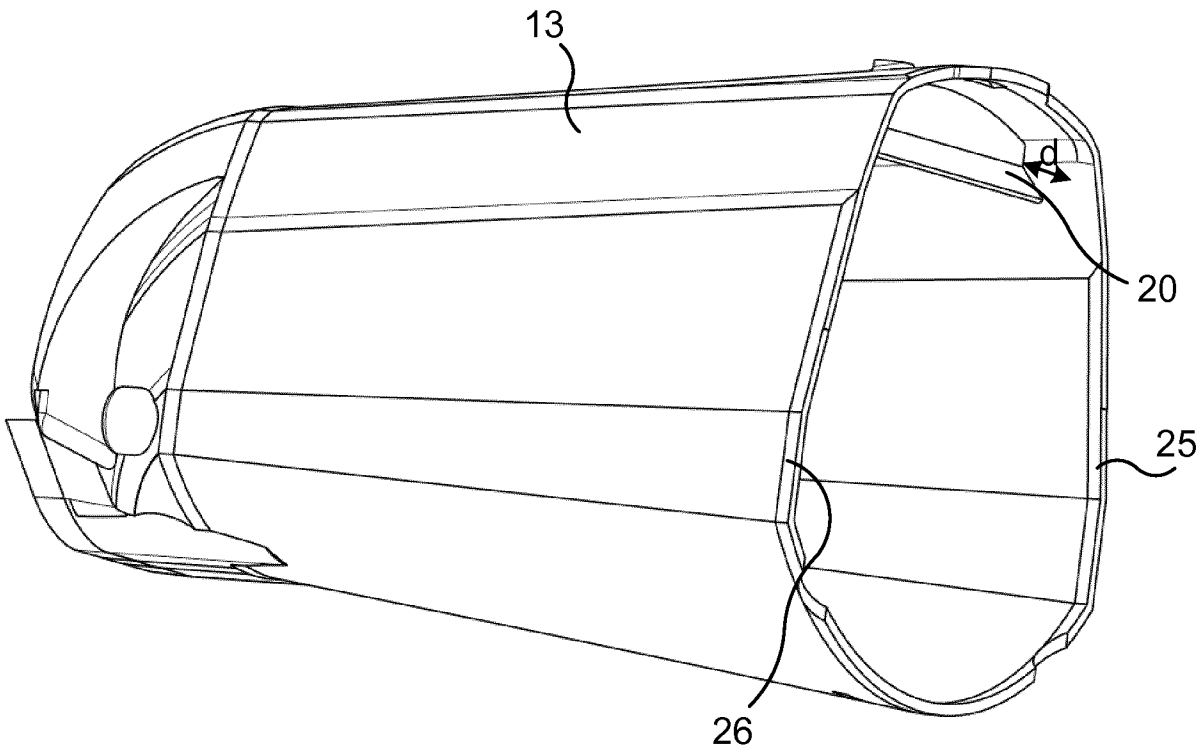


Fig. 7

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2015/064553

A. CLASSIFICATION OF SUBJECT MATTER
INV. A47L9/20 A47L9/14
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, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 136 028 A2 (SHARP KK [JP]) 26 September 2001 (2001-09-26) paragraphs [0076] - [0081]; figures 23-25	1-6,9, 10,12
X	US 2005/132680 A1 (WEGELIN JACKSON [US] ET AL) 23 June 2005 (2005-06-23) the whole document	4,5,7,8, 10-12
X	US 2002/166199 A1 (BOLES DAVID J [US] ET AL) 14 November 2002 (2002-11-14) cited in the application paragraphs [0023] - [0024]	1,2
X	GB 2 430 863 A (SHARP KK [JP]) 11 April 2007 (2007-04-11) the whole document	4

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[X] Further documents are listed in the continuation of Box C.

[X] 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

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Date of the actual completion of the international search	Date of mailing of the international search report
16 February 2016	24/02/2016

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	Martin Gonzalez, G

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Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2015/064553

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	AU 436 167 B2 (PYE INDUSTRIES LIMITED) 28 May 1973 (1973-05-28) the whole document -----	1-12

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INTERNATIONAL SEARCH REPORT

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International application No
PCT/EP2015/064553

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