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(54) **ACCESSORY FOR A SUCTION NOZZLE OF VACUUM CLEANERS OR THE LIKE**

(57) A suction nozzle is described, said nozzle comprising a base plate shaped so as to have at least one channel open towards a surface to be vacuumed, a suction channel in fluid communication with the base plate channel and a covering body, wherein the suction nozzle further comprises an accessory configured to be removably coupled with the suction nozzle in the region of the base plate, wherein said accessory comprises a main

body with an upper face, a lower face facing the surface to be vacuumed, and an elongate slot, wherein said accessory also comprises a first strip of a sliding material arranged substantially along the entire front edge of the elongate slot and a second strip of a sliding material arranged substantially along the entire rear edge of the elongate slot.

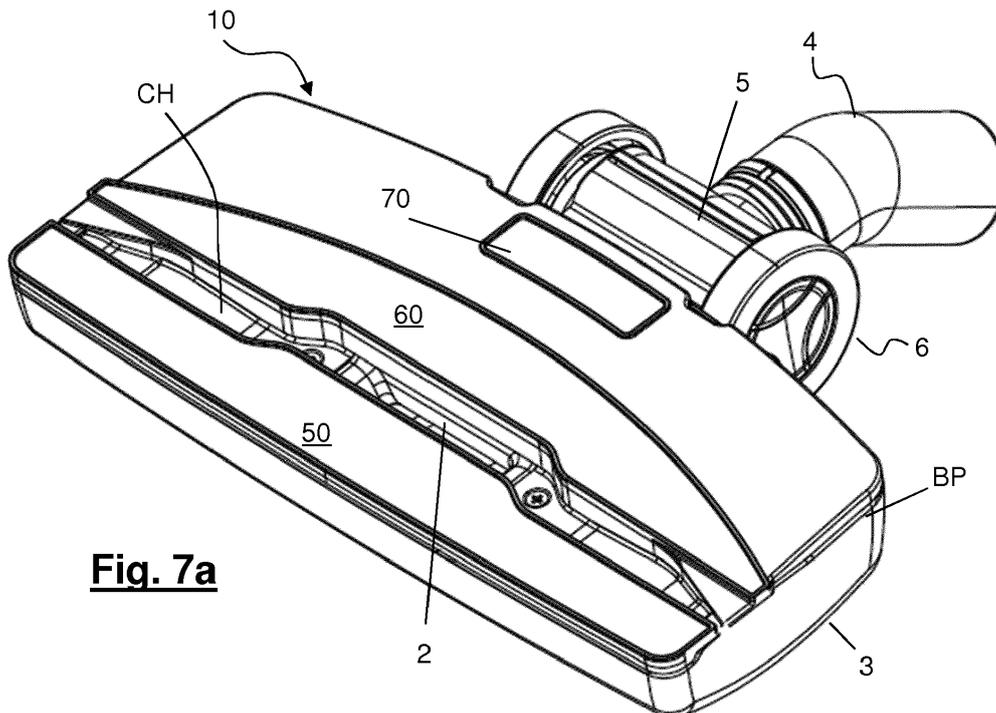


Fig. 7a

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Description

[0001] The present invention relates to the sector of electric household appliances for performing cleaning by means of suction, such as a vacuum cleaner, an electric broom or a multi-purpose drum vacuum cleaner, for sucking up dust and/or fluids and/or dirt from a surface. More particularly, it relates to an accessory for a suction nozzle to be fitted to such an electric household appliance.

[0002] As is known, a vacuum cleaner, an electric broom or a similar electric household appliance for performing cleaning by means of suction comprises a suction nozzle for sucking up dust, dirt or fluids from a surface. In the sector of electric household appliances, a suction nozzle is generally referred to by the term "brush". For the purpose of the present description, therefore, the terms "suction nozzle" and "brush" are considered to be equivalent. Again for the purpose of the present invention, the term "vacuum cleaner" will be used with a broad meaning so as to include all those apparatus, for professional or domestic use, which perform cleaning by means of suction. Therefore, the term "vacuum cleaner" will comprise a vacuum cleaner, an electric broom, a so-called multi-purpose drum vacuum cleaner, a centralized suction system for domestic or industrial use and an apparatus for supplying and sucking in steam.

[0003] Basically a known suction nozzle comprises a base plate shaped so as to have at least one base plate channel open towards a surface to be vacuumed, a suction channel which, during use, is joined to the base plate and is in fluid communication with the base plate and optionally a covering body which can be connected to the base plate/suction channel assembly. The other end of the suction channel communicates with a suction tube usually via a rotatable joint. Also known are suction nozzles in which the suction channel, during use, is joined to the covering body.

[0004] In order to avoid an incorrect interpretation of certain expressions which will be frequently used during the course of the present description and in the claims, a number of definitions are provided hereinbelow. These definitions will also be used further below with specific reference to the figures.

- the expression "width" of a suction nozzle, will be understood as meaning the maximum dimension (or footprint) of a suction nozzle without the covering body and calculated substantially parallel to a longitudinal axis of the base plate channel;
- the expression "suction efficiency" will be understood as meaning essentially the ratio, in percentage terms, of the vacuumed material to the material to be vacuumed; the vacuuming tests are carried out in accordance with the provisions of the standard EN 60312-1:2013-05.

[0005] Although different suction nozzles which perform the function of sucking dust and/or fluids and/or dirt

from a surface in a sufficiently efficient manner are available on the market, the Applicant has noticed that there exists the need to improve the performance of the known suction nozzles. In particular, the Applicant has noticed the need to increase the suction efficiency on hard and substantially smooth surfaces such as floors consisting of marble, cement, resin, tiles, parquet or the like. In addition to hard surfaces, the accessory is advantageously used for suction-cleaning dust from crevices, such as the joints between the tiles on floors.

[0006] The problem is that generally a vacuum cleaner is designed to clean both hard surfaces and carpets, rugs, mats or other pile surfaces.

[0007] Therefore, a conventional suction nozzle supplied with a vacuum cleaner generally represents a compromise in terms of suction efficiency on the various types of surface.

[0008] The Applicant has therefore defined the object of improving substantially the suction efficiency of a conventional suction nozzle on substantially smooth and compact surfaces without modifying substantially the suction characteristics of the suction nozzle on other types of surfaces.

[0009] According to the Applicant, the aforementioned object, together with others, may be achieved with an accessory which can be coupled with a suction nozzle, the accessory comprising a main body with an upper face configured to be coupled with the suction nozzle and a lower face facing the surface to be vacuumed when in use. The main body has an elongate slot. A first strip of a sliding material is provided substantially along a front edge of the elongate slot and a second strip of sliding material is provided substantially along a rear edge of the elongate slot.

[0010] The present invention comprises a suction nozzle comprising a base plate shaped so as to have at least one base plate channel open towards a surface to be vacuumed, a suction channel in fluid communication with the base plate channel and a covering body connected to at least one of said base plate and said suction channel, wherein the suction nozzle further comprises an accessory configured to be removably coupled with the suction nozzle in the region of the base plate, wherein said accessory comprises a main body with an upper face configured to be coupled with the suction nozzle, a lower face facing the surface to be vacuumed, and an elongate slot, wherein said accessory also comprises a first strip of a sliding material arranged substantially along the entire front edge of the elongate slot and a second strip of a sliding material arranged substantially along the entire rear edge of the elongate slot.

[0011] The first and second strips may be separate strips or may be joined together.

[0012] Preferably, the material of the first strip is the same as the material of the second strip.

[0013] The sliding material may comprises a fibrous material. For example, it may be selected from the group comprising: natural fibers, synthetic fibers, a combination

of natural fibers and heat-bonded synthetic fibers, mop-type fabric, non-woven fabric, velvet or the like.

[0014] Preferably, the thickness of the first strip is substantially constant (with due allowance for machining tolerances or defects) over its entire surface.

[0015] Preferably, the thickness of the second strip is substantially constant (with due allowance for machining tolerances or defects) over its entire surface.

[0016] Preferably, the thickness of the first strip is between about 1 mm and about 4 mm. More preferably, the thickness of the first strip is between about 1.5 mm and about 3 mm. Even more preferably, the thickness of the first strip is between about 2 mm and about 2.5 mm.

[0017] Preferably, the thickness of the second strip is between about 1 mm and about 4 mm. More preferably, the thickness of the second strip is between about 1.5 mm and about 3 mm. Even more preferably, the thickness of the second strip is between about 2 mm and about 2.5 mm.

[0018] Preferably, the thickness of the first strip is substantially the same as the thickness of the second strip.

[0019] The accessory may also comprise a third stabilizing strip made of a sliding material. This third strip may be made of the same material as the first and/or second strips and have the same thickness.

[0020] The accessory may also have a rib for delimiting at least one area of said lower face for said first strip and/or said second strip and/or said third strip of sliding material.

[0021] In the accessory according to the invention, the first strip and/or the second strip and/or the third strip of sliding material are joined to the lower face using an adhesive, a double-sided tape or mechanical fastener or Velcro®-type system.

[0022] In embodiments, along at least a portion of the perimeter of the elongate slot a joining rim is provided for connecting the edge of the base plate channel to the edge of the slot.

[0023] Advantageously, the accessory may also comprise coupling devices for releasably connecting the accessory to the suction nozzle. For example, these coupling devices may be in the form of feet configured to engage with the edge of the base plate or penetrate into corresponding openings.

[0024] The present invention will become clearer from the following detailed description, provided by way of a non-limiting example, to be read with reference to the accompanying drawings, in which:

- Figure 1 and Figure 2 are two axonometric views which show the accessory according to an embodiment of the invention coupled with a base plate of a suction nozzle (not shown);
- Figure 3 shows a plan view, from the lower face (floor side), of the accessory according to an embodiment of the present invention;
- Figure 4 shows a front view of the accessory according to an embodiment of the present invention;

- Figure 5 shows a plan view, from the upper face (base plate side), of the accessory according to an embodiment of the present invention;
- Figure 6 shows a cross-section, on a larger scale, of the accessory along the line A-A of Figure 3;
- Figures 7a and 7b are two views of a suction nozzle with the accessory 10 according to the invention mounted.

[0025] The various figures show by way of example an embodiment of an accessory 10 for a suction nozzle of a vacuum cleaner or the like. The accessory 10 is configured to cooperate with a suction nozzle in order to improve the suction performance on substantially smooth and compact surfaces such as floors consisting of stone (marble or similar), terracotta, clinker, cement, resin, tiles, parquet or the like.

[0026] The accessory 10 is configured to be coupled with a suction nozzle, preferably in a removable manner. According to an embodiment of the invention, the accessory 10 is configured to be coupled removably with the base plate BP of the suction nozzle, as shown in Figures 1, 2, 7a and 7b.

[0027] As mentioned above, the suction nozzle 1 (shown in Figures 7a and 7b) comprises a base plate BP shaped so as to have at least one base plate channel CH open towards a surface to be vacuumed, a suction channel 2 which, during use, is in fluid communication with the base plate channel CH and optionally a covering body 3 which can be coupled with the base plate and/or the suction channel 2. The other end of the suction channel communicates with a suction tube 4, usually via a rotatable joint 5.

[0028] The accessory 10 according to the present invention comprises a substantially flattened main body 11. Preferably, the main body 11 has a substantially rectangular shape. Preferably, the length L_{11} of the main body 11 corresponds substantially to the width of the base plate BP of the suction nozzle. The width W_{11} of the main body 11 may be substantially the same as that of the base plate of the suction nozzle or may also be greater. This, in order to ensure a greater stability and/or provide an edge acting as a lever for separating the accessory from the suction nozzle. In any case, the plan-view form of the accessory may be different from that shown by way of example in the figures. Figure 2 shows a base plate BP having smaller dimensions than the dimensions of the accessory.

[0029] In the present description, the adjectives "upper" and "lower" will be used to identify the two faces of the main body 11 in its working configuration. In particular, the term "lower face" 20 is understood as meaning the face of the main body which, when in use, faces the surface to be vacuumed (floor side). The term "upper face" 30 is understood as meaning the face of the main body which, when in use, faces the base plate BP of the suction nozzle. In Figure 1, the lower face 20 is that which is shown; while Figure 2 shows the upper face 30.

[0030] Preferably, the upper face 20 of the main body is substantially flat except for any reliefs 21 which will be described below.

[0031] The main body 11 comprises a through-slot 40 which extends substantially along its entire length L_{11} , except, optionally, for two short end sections. The slot 40 is preferably shaped substantially in the same manner as the base plate channel CH. In one embodiment, it comprises a wider central portion 41 and two side sections 42 with a constant width and, thereafter, with a decreasing width. The side sections 42 may be axially offset with respect to the central portion 41. The slot 40 comprises a front edge 44 and a rear edge 45.

[0032] According to a preferred embodiment of the invention, a first strip 50 of a sliding material is provided substantially along the front edge of the elongate slot 41 and a second strip 60 of a sliding material 60 is provided substantially along the rear edge 45 of the elongate slot 40. Preferably, the first and the second strips 50, 60 are continuous along the entire front edge 44 and rear edge 45, but could also if necessary be formed by a plurality of discontinuous sections. Preferably the first strip extends as far as the front edge of the main body. Alternatively it could have a smaller width. However, the extension as far as the front edge of the main body provides the accessory with greater stability when used on a floor.

[0033] The second strip has preferably a profile which matches the rear edge 45 of the slot 40. On the opposite side, the strip may form a curved line (as shown in Figure 1 and Figure 3), a straight line or broken line.

[0034] Preferably, the material of the first strip 50 is the same as the material of the second strip 60.

[0035] The sliding material may comprise a fibrous material.

[0036] According to embodiments, the fibrous material may be a felt with natural fibers. According to other embodiments, the fibrous material may be a synthetic felt comprising heat-bonded fibers. For example, it could comprise polyester fibers or could be formed completely of polyester fibers. Alternatively other materials of the mop type or velvet may be used.

[0037] Preferably, the thickness of the first strip 50 is substantially constant (with due allowance for machining tolerances or defects) over its entire surface.

[0038] Preferably, the thickness of the second strip 60 is substantially constant (with due allowance for machining tolerances or defects) over its entire surface.

[0039] Preferably, the thickness of the first strip 50 is between about 1 mm and about 4 mm. More preferably, the thickness of the first strip is between about 1.5 mm and about 3 mm. Even more preferably, the thickness of the first strip is between about 2 mm and about 2.5 mm. Advantageously it may be equal to about 2.5 mm.

[0040] Preferably, the thickness of the second strip is between about 1 mm and about 4 mm. More preferably, the thickness of the second strip is between about 1.5 mm and about 3 mm. Even more preferably, the thickness of the second strip is between about 2 mm and about 2.5

mm. Advantageously it may be equal to about 2.5 mm.

[0041] Preferably, the thickness of the first strip is substantially the same as the thickness of the second strip. This solution is preferable in order to keep the accessory substantially flat with respect to the surface to be vacuumed. However, it may be advantageous to provide the first (front) strip so that it is lower than the second (rear) strip. In this way the adherence (and therefore the suction performance) is favored when the suction nozzle is pushed forwards, this being the step during which the greatest amount of suction is required.

[0042] Preferably, the accessory may also comprise a third stabilizing strip 70 made of a sliding material. The third strip 70 is preferably situated in the rear area of the lower surface of the accessory, along a central section.

[0043] The sliding material of the third stabilizing strip 70 may be a fibrous material.

[0044] As mentioned above, the thickness of the strips is preferably relatively small so as to keep the accessory (and therefore the suction nozzle) very close to the surface to be vacuumed. The Applicant has established that this is decisive for the suction performance. The density of the sliding material of the strips is preferably between about 300 and 700 g per mm^2 . More preferably it is about 500 g per mm^2 .

[0045] According to embodiments, the fibrous material may be a felt with natural fibers. According to other embodiments, the fibrous material may be a synthetic felt comprising heat-bonded fibers.

[0046] It should be pointed out that the term "strip" does not necessarily indicate an elongate element, but may also comprise a non-elongate element, without a main direction, with any shape (for example the shape of a regular or irregular polygon).

[0047] The first, second and third strips 50, 60, 70 may be fastened to the lower face 20 using any suitable means. For example, the strips 50, 60, 70 may be joined to the lower face 20 of the main body 11 using adhesive, double-sided tape or by means of a mechanical fastener (rivets, screws) or other Velcro®-type system. The latter has the advantage that the strips may be replaced when worn.

[0048] Preferably reliefs 21 projecting from the lower face 20 of the main body 11 may be provided, said reliefs delimiting corresponding areas reserved for the strips of sliding material. The reliefs 21 may form a closed line or open line in the region of one or more sections. The reliefs preferably have a substantially constant height less than that of the strips of sliding material. For example, they may have a height of about 1 mm or less. The purpose of the projecting reliefs 21 is to protect the edges of the sliding strips and limit the possibility that these strips may become detached from the lower face 20 of the main body owing to repeated rubbing on the surface to be vacuumed. Preferably, a first area reserved for the first strip 50 is delimited by the relief 215, a second area reserved for the second strip 60 is delimited by the relief 216 and a third area reserved for the third strip 70 is delimited by

the relief 217.

[0049] According to embodiments, along at least a portion of the perimeter of the elongate slot 40 a joining rim 48, 49 is provided for joining the edge of the base plate channel CH to the edge of the elongate slot 40. This edge is visible in the cross-section of Figure 6 and in Figure 5. Preferably a front rim 48 configured to engage with the front edge of the base plate channel and a rear rim 49 configured to engage with the rear edge of the base plate channel are provided.

[0050] According to embodiments, coupling means 80 are provided for releasably connecting the accessory 10 to the suction nozzle. For example, these coupling means 80 may be in the form of feet, such as those shown in Figures 4, 5 and 6. The feet are configured to engage with the edge of the base plate BP of the suction nozzle, as shown in Figure 2. Alternatively they may be configured to penetrate into special openings. Although less preferred, it is also possible to couple the accessory 10 to the base plate BP by means of screws or similar systems. This for example when the vacuum cleaner is used solely (or mainly) to vacuum substantially smooth and compact surfaces and not surfaces with fibers (carpets, rugs, mats). By way of a further alternative it is also possible to couple the accessory to the base plate by means of a Velcro®-type or similar fastening system.

[0051] According to embodiments, along at least a part of the edge of the main body a perimetral rib 31 projecting from the upper face is provided.

[0052] According to a preferred embodiment, the accessory is made of a plastic material by means of injection-molding. Alternatively it may be made of a metallic or composite material. The strips are applied during a subsequent step.

[0053] The Applicant has carried out various tests to compare the suction performance of a known suction nozzle with that of the same suction nozzle having the accessory according to the invention mounted on it.

[0054] In particular, the tests were carried out comparing a known suction nozzle commercially distributed by the same Applicant and regarded as being a suction nozzle with optimum suction characteristics.

[0055] As regards the suction values, the known suction nozzle has suction values of around 102%, while the suction nozzle according to the present invention achieved suction values higher than 111%.

Claims

1. A suction nozzle (1) comprising a base plate (BP) shaped so as to have a base plate channel (CH) open towards a surface to be vacuumed, a suction channel (2) in fluid communication with the base plate channel (CH) and a covering body (3) connected to at least one of said base plate channel (BP) and said covering body (3), wherein the suction nozzle (1) further comprises an accessory (10) config-

ured to be removably coupled with the suction nozzle in the region of the base plate (BP), wherein said accessory (10) comprises a main body (11) with an upper face (30) configured to be coupled with the suction nozzle, a lower face (20) facing the surface to be vacuumed, and an elongate slot (40), wherein said accessory (10) also comprises a first strip (50) of a sliding material arranged substantially along the entire front edge (44) of the elongate slot (40) and a second strip (60) of a sliding material arranged substantially along the entire rear edge (45) of the elongate slot (40).

2. The suction nozzle (1) according to claim 1, further comprising coupling devices for releasably connecting the accessory (10) to the suction nozzle.

3. The suction nozzle (1) according to claim 2, wherein said coupling devices (80) are in the form of feet (80) configured to engage, at least partly, with the edge of the base plate (BP).

4. The suction nozzle (1) according to claim 2, wherein said coupling devices (80) are in the form of feet (80) configured to penetrate into corresponding openings of the base plate (BP).

5. The suction nozzle (1) according to claim 1, wherein the sliding material comprises a fibrous material.

6. The suction nozzle (1) according to claim 5, wherein said fibrous material is selected from the group comprising: natural fibers, synthetic fibers, a combination of natural fibers and synthetic fibers, fabric, mop-type fabric, velvet or the like.

7. The suction nozzle (1) according to any one of the preceding claims, wherein the thickness of the first strip (50) is between about 1 mm and about 4 mm, preferably between about 1.5 mm and about 3 mm.

8. The suction nozzle (1) according to any one of the preceding claims, wherein the thickness of the second strip (60) is between about 1 mm and about 4 mm, preferably between about 1.5 mm and about 3 mm.

9. The suction nozzle (1) according to any one of the preceding claims, further comprising a third stabilizing strip (70) made of a sliding material.

10. The suction nozzle (1) according to claim 9, wherein said third stabilizing strip (70) is situated centrally in the rear area of the lower face (20) of the accessory.

11. The suction nozzle (1) according to any one of the preceding claims, further comprising a rib (21) for delimiting at least one area of said lower face (20)

for said first strip (50) and/or said second strip (60) of sliding material.

12. The suction nozzle (1) according to any one of the preceding claims, wherein said first strip (50) and/or said second strip (60) of sliding material are joined to said lower face (20) using an adhesive and/or a double-sided tape and/or a mechanical fastener and/or a Velcro®-type system.
13. The suction nozzle (1) according to any one of the preceding claims, wherein along at least a portion of the perimeter of the slot (40) a joining rim (48, 49) is provided for joining the edge of the base plate channel (CH) to the edge of the slot (40).

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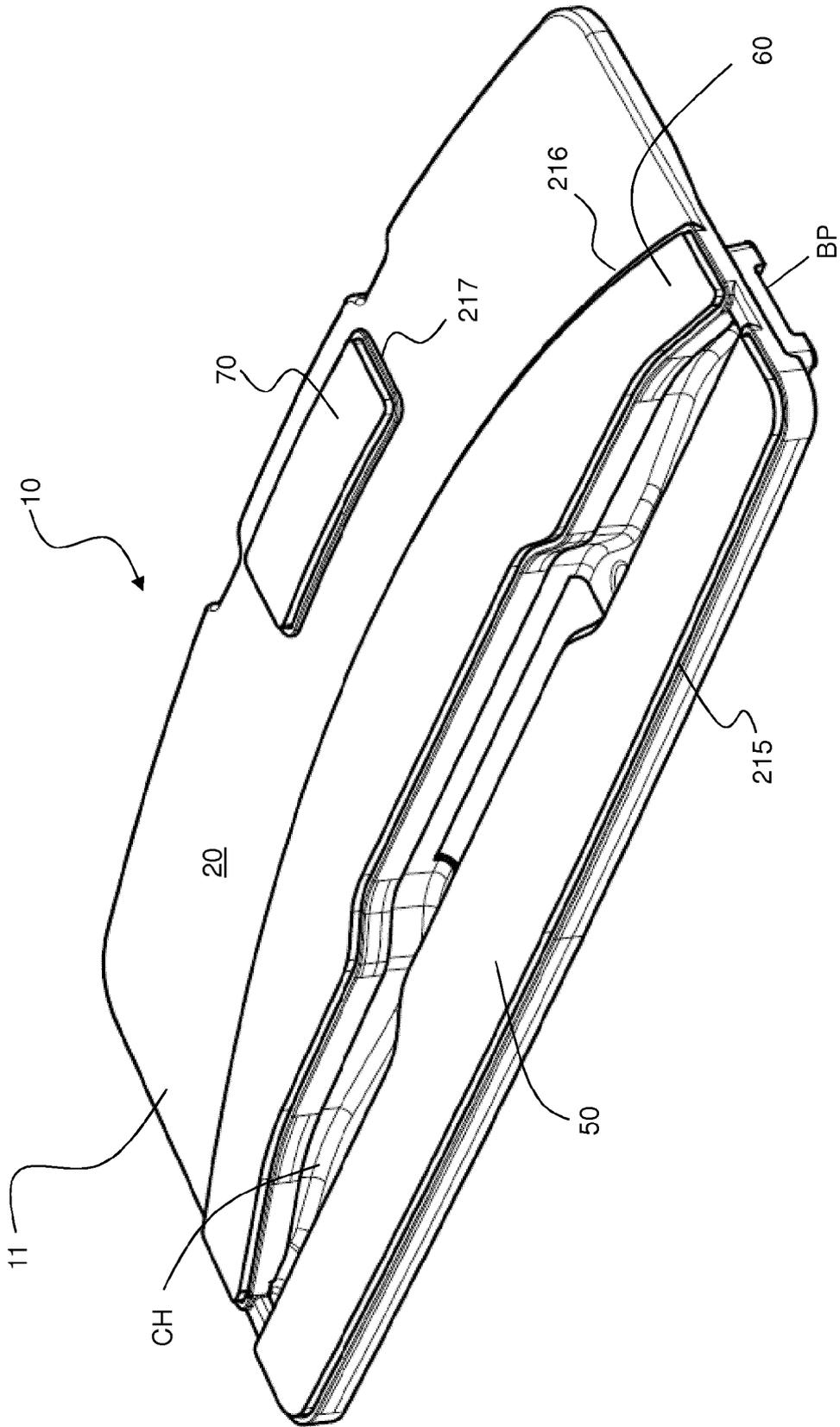


Fig. 1

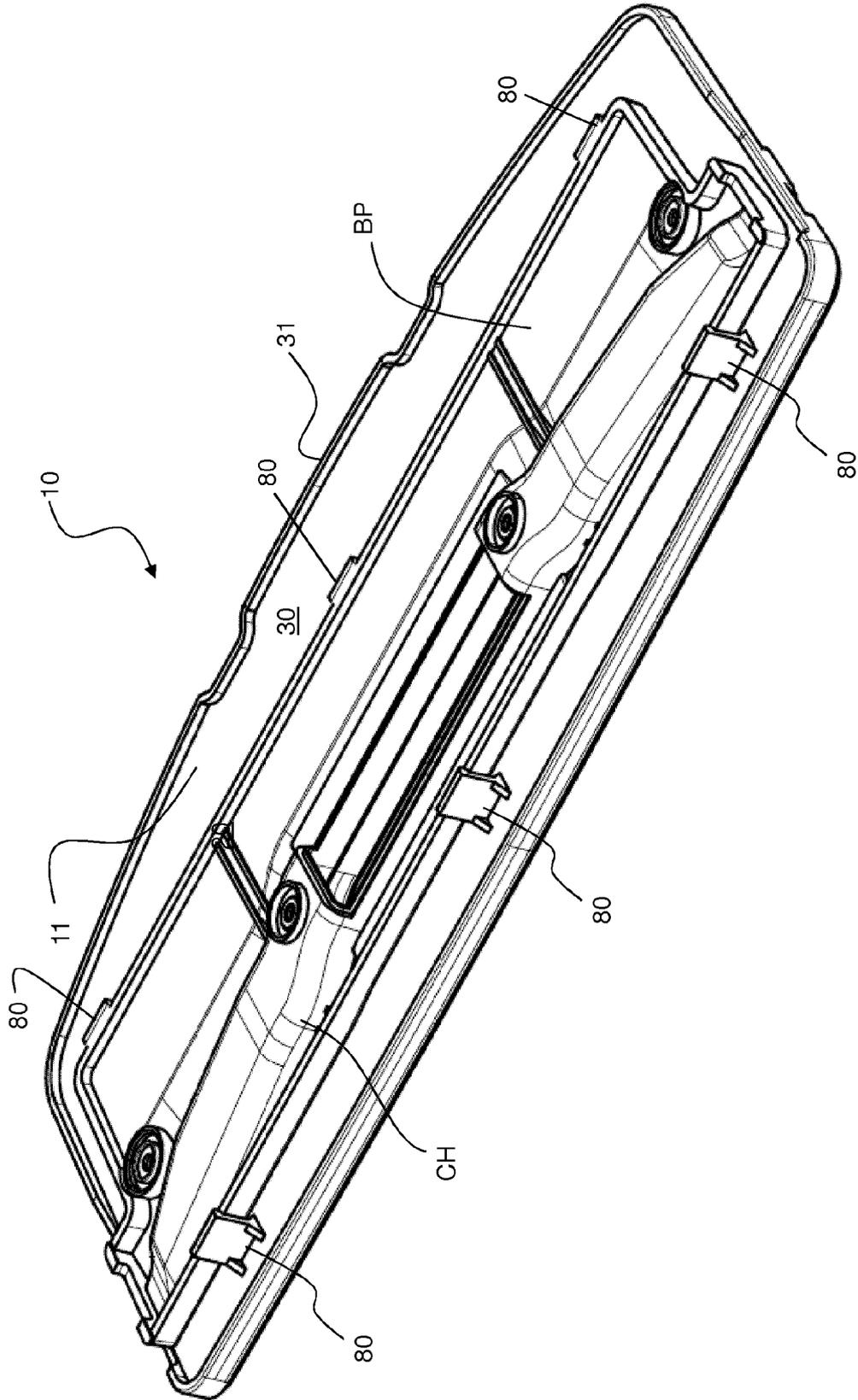


Fig. 2

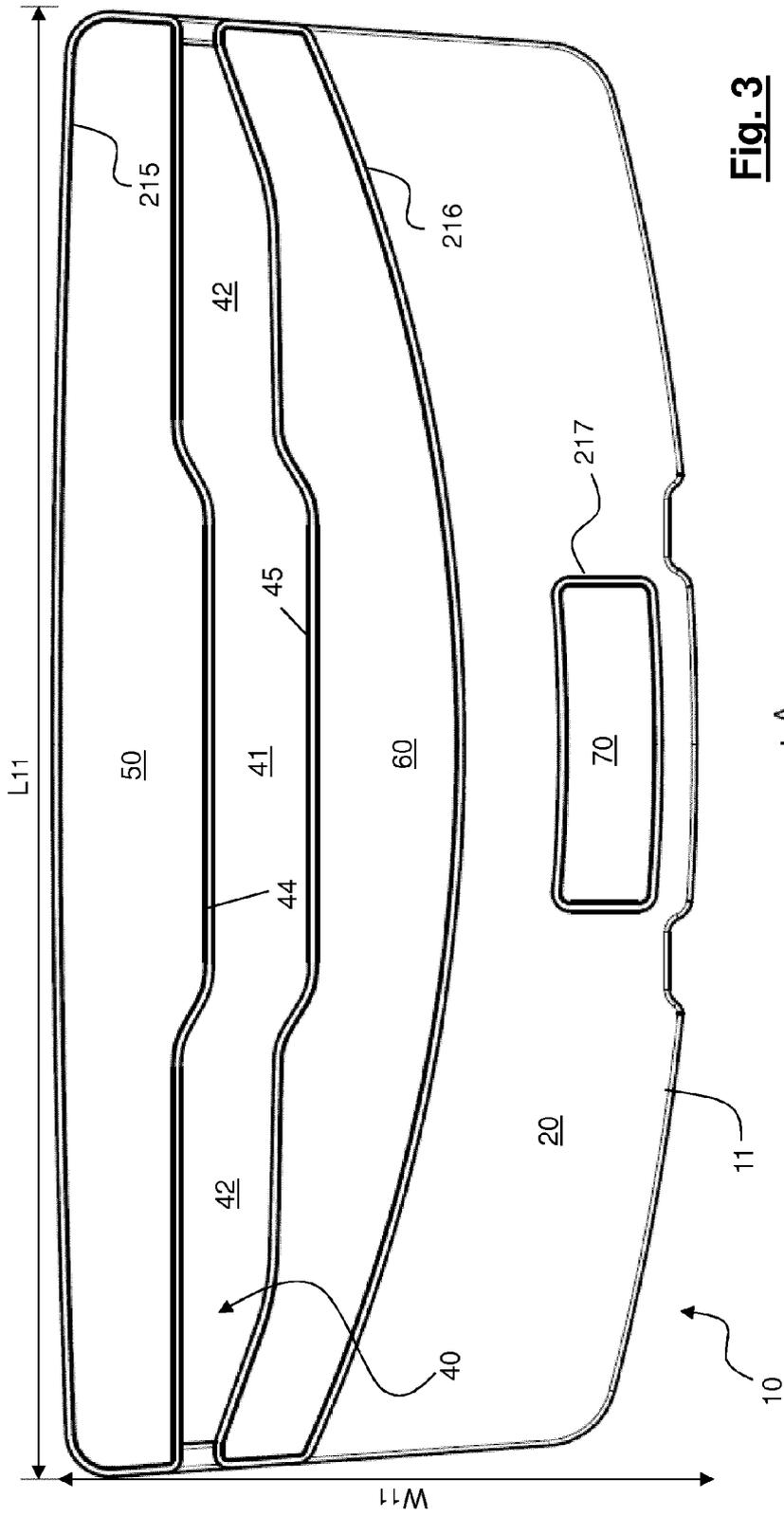


Fig. 3

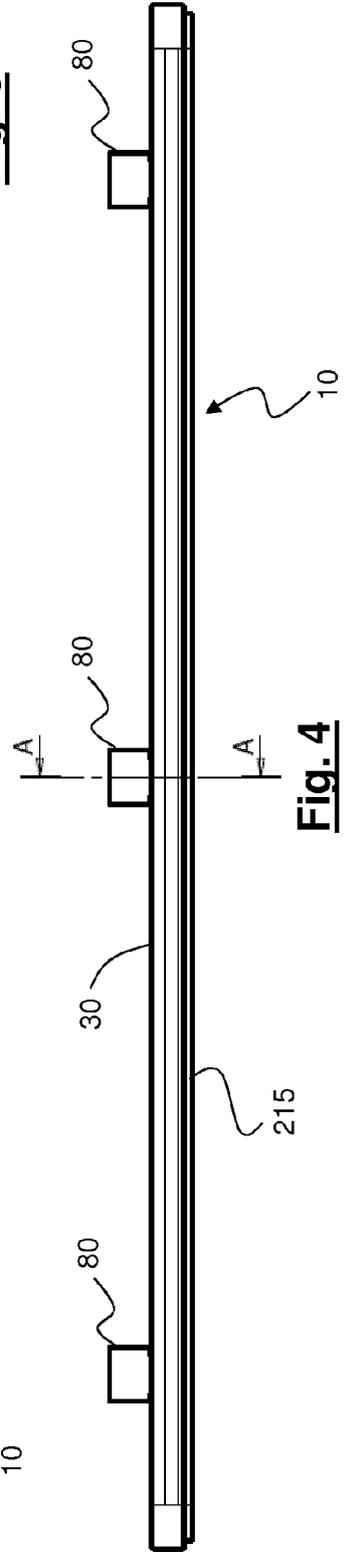


Fig. 4

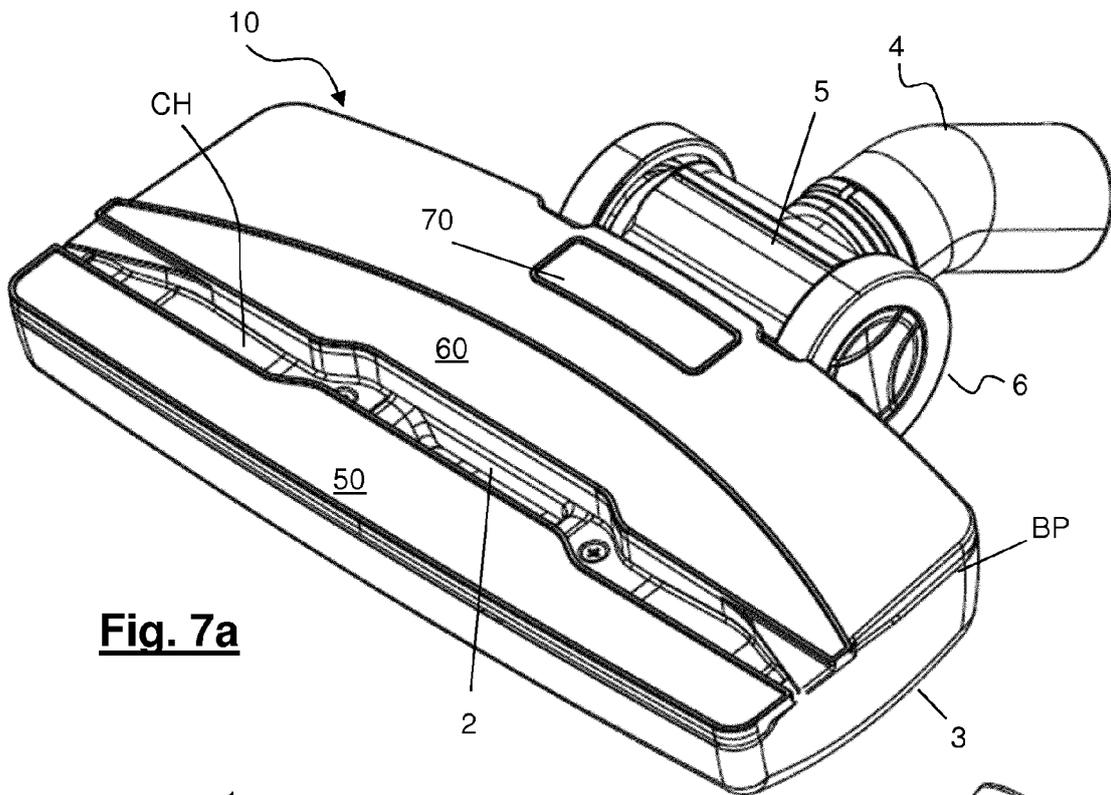


Fig. 7a

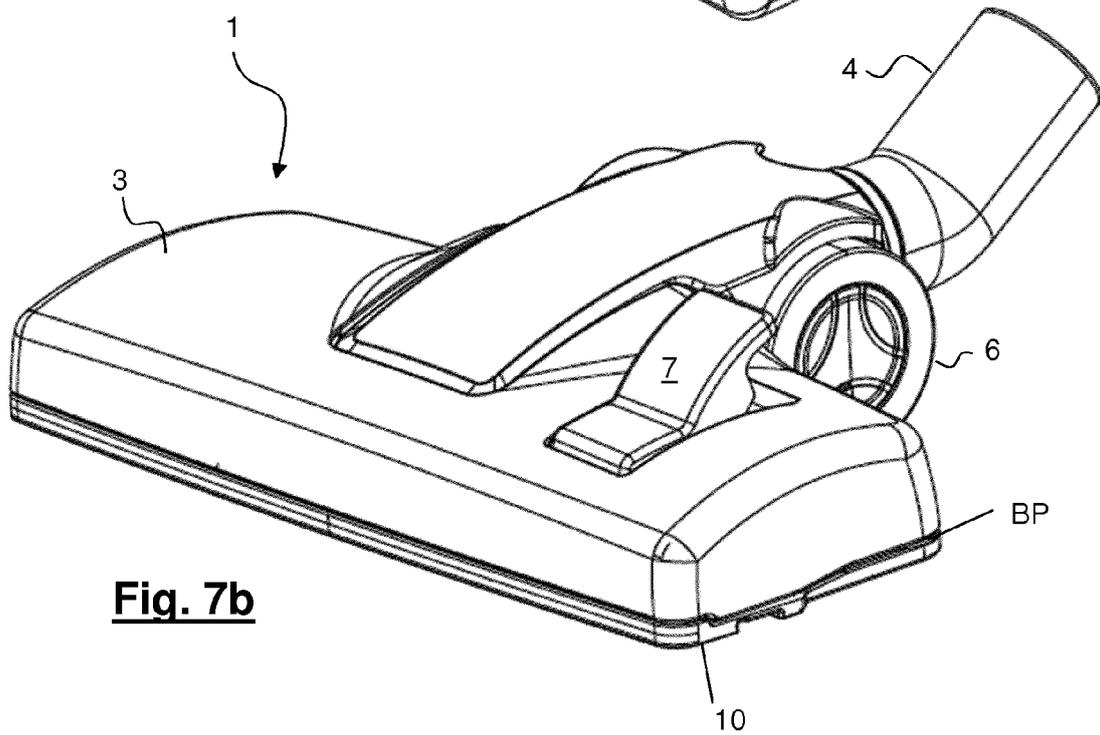


Fig. 7b



EUROPEAN SEARCH REPORT

Application Number
EP 15 18 2274

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 18 December 2015	Examiner Trimarchi, Roberto
CATEGORY OF CITED DOCUMENTS 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		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	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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