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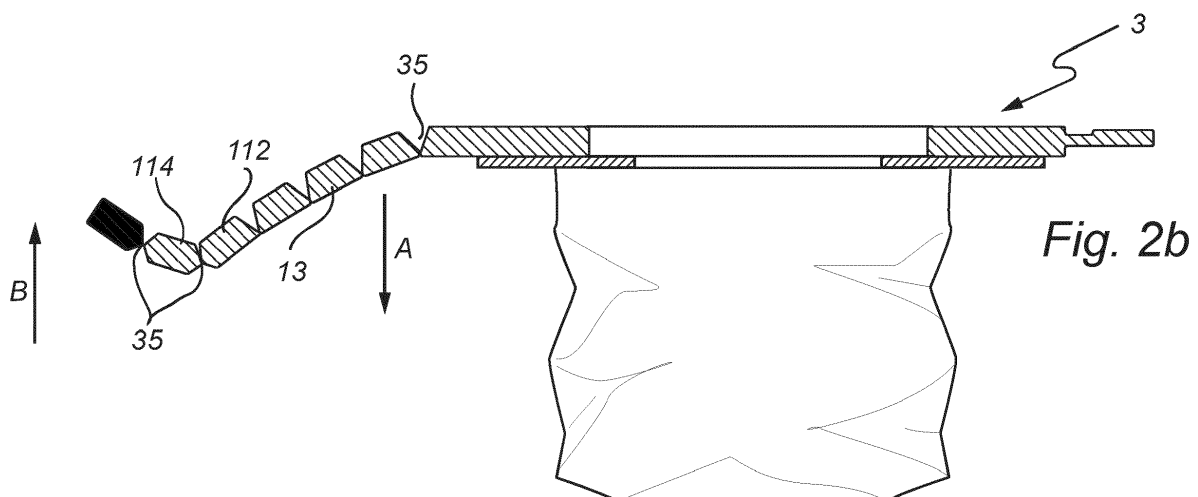
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(54) **VERSATILE DUST CONTAINER FOR A VACUUM CLEANER**

(57) Described is, among other things, a dust container (1) for a vacuum cleaner. The dust container comprises a dust bag (5), made of an air permeable material, and a connector plate (3) having a hole, surrounding an opening (9) in the dust bag (5). The connector plate (3) comprises a central portion (11) surrounding said hole,

and an extending portion (13) projecting from the central portion (11). The extending portion (13) at a first section (112) is configured to be bent in a first direction (A). The extending portion at a second section (114) is configured to be bent in a second direction (B) being opposite to the first direction (A).



Description

Technical field

[0001] The present disclosure relates to a dust container for a vacuum cleaner and to devices related to a dust container.

Background

[0002] Dust containers for vacuum cleaners can be provided with connector plates. An example of such a dust container is disclosed for instance in WO2017/194081 A1. The connector plate in WO2017/194081 A1 has an extending portion devised to be leading in the direction of insertion into a holder. The extending portion leading in the direction of insertion can comprise means to interact with functions in the holder. Also, an indicator on the connector plate may show the direction of insertion.

[0003] The dust container can also be provided with a closing slide as described in DE202004008972. The closing slide is used to close the opening to the dust container when the dust container is removed from the vacuum cleaner. The closing slide can be a separate part of the connector plate, but can also be connected in one piece to the connector plate.

[0004] Thanks to the connector plate, the opening of the dust bag can be reliably positioned and oriented to receive a flow of dust laden air from the vacuum cleaner inlet. Further, the connector plate can trigger a feedback switch in the holder of the vacuum cleaner to verify that a dust container has been correctly installed in the holder, thus enabling the vacuum cleaner to prevent use in case of an absent or incorrectly installed dust container. Such use could otherwise damage the vacuum cleaner by injecting heavily dust laden air into a fan/motor arrangement.

[0005] There is a constant desire to improve dust containers and to make them more user-friendly.

Summary

[0006] One object of the present disclosure is therefore to provide a dust container that can be more efficiently used with compact vacuum cleaners and in particular usable with different types of vacuum cleaners. This object is achieved by a dust container as set out in the appended claims.

[0007] In a first aspect of the invention, a dust container for a vacuum cleaner is provided. The dust container comprises a dust bag, made of an air permeable material, and a connector plate having a hole surrounding an opening in the dust bag. The connector plate comprises a central portion surrounding said hole, and an extending portion projecting from the central portion. The extending portion at a first section is configured to be bent in a first direction. The extending portion at a second section is

configured to be bent in a second direction being opposite to the first direction. The extending portion is configured to be leading in the direction of insertion and with the central portion as a trailing part, when slid into a holder in a vacuum cleaner.

[0008] Hereby a dust container for a vacuum cleaner can be provided that has an extending portion that can be bent in different directions and in particular in a wave formed shape allowing for the extending portion to be inserted into a holder in the vacuum cleaner in different manner whereby the dust container can be made more versatile and become able to fit into many different types of vacuum cleaners. Thus, when the extending portion which is leading in the direction of insertion into the holder can be bent in different direction, such as in a wave form, the connector plate becomes more versatile and can be used in many different types of vacuum cleaners.

[0009] In accordance with one embodiment, the extending portion at the second section is configured to be able to be bent both in the first direction and in the second direction. Hereby an efficient implementation can be made.

[0010] In accordance with one embodiment, the extending portion is configured to be bent in a step-wise or continuous curvature at the first section and/or the second section. Hereby different types of implementations for bending the first and second section can be implemented.

[0011] In accordance with one embodiment, the first section is attached to the central portion.

[0012] In accordance with one embodiment, the second section is attached to the first section.

[0013] In accordance with one embodiment, the second section comprises a transverse rib, preferably provided with at least one hole or recess.

[0014] In accordance with one embodiment, the first section is closer to the central position than the second section and wherein the extending portion at the first section is configured to be more easily bent backwards, towards the dust bag.

[0015] In accordance with one embodiment, living hinges are formed in the extending portion and wherein the living hinges are formed on a first side on the first section and on a second side, opposite to the first side on the second section. Hereby an efficient implementation for the extending portion can be made that allows the extending portion to be bent in different directions. In particular in a wave formed shape.

[0016] In accordance with one embodiment, living hinges are formed on both sides on the second portion.

[0017] In accordance with one embodiment, the extending portion is configured to have a lower bending stiffness by being thinner than the central portion.

[0018] In accordance with one embodiment, the extending portion is configured to have a lower bending stiffness by comprising a material with a lower modulus of elasticity than the material of the central portion.

[0019] In accordance with one embodiment, the ex-

tending portion is configured to have a lower bending stiffness by means of a number of perforations being provided along the length of the extending portion.

[0020] In accordance with a second aspect of the invention a connector plate for a vacuum cleaner dust container is provided. The connector plate comprises an opening. The connector plate is configured to correctly position the opening within a vacuum cleaner by the connector plate being slid into a holder of the vacuum cleaner. The connector plate comprises a central portion surrounding said opening, and an extending portion projecting from the central portion in the plane thereof.

[0021] The extending portion at a first section is configured to be bent in a first direction. The extending portion at a second section is configured to be bent in a second direction being opposite to the first direction. The extending portion is configured to be leading in the direction of insertion and with the central portion as a trailing part, when slid into a holder in a vacuum cleaner.

[0022] Hereby an extending portion for a vacuum cleaner can be provided that can be bent in different directions and in particular in a wave formed shape allowing for the extending portion to be inserted into a holder in the vacuum cleaner in different manner whereby the dust container can be made more versatile and become able to fit into many different types of vacuum cleaners.

[0023] In accordance with a third aspect of the invention, an extender for use with a dust bag container of a vacuum cleaner is provided, where the dust container comprises a dust bag, made of an air permeable material, and a connector plate with a central portion is adapted to be inserted into a holder in the vacuum cleaner. The extender comprises a first section configured to be bent in a first direction and a second section configured to be bent both in a first direction and in the second opposite direction, wherein the second section is configured to be inserted into the holder before the first section. The extending portion is configured to be leading in the direction of insertion and with the central portion as a trailing part, when slid into a holder in a vacuum cleaner.

[0024] In accordance with one embodiment the extender at the first section comprises a first edge adapted to abut an edge of the connector plate.

[0025] In accordance with one embodiment the second section comprises a second edge for interacting with a device in the vacuum cleaner. The safety device can for example be a switch for preventing use of the vacuum cleaner when no dust bag is placed in the vacuum cleaner.

Brief description of the drawings

[0026]

Fig. 1 shows a cross-sectional view of a vacuum cleaner with a dust container,

Figs. 2a and 2b show a cross-sectional view of a

connector plate from the side,

Figs 3a and 3b are views in perspective from the front and back side of the connector plate, respectively, and

Figs. 3c and 3d are views in perspective from the front and back side of the connector plate with the extender in a wave shape, respectively,

Detailed description

[0027] The present disclosure relates to a dust container 1 for a vacuum cleaner 100, as illustrated with an example in fig 1. The dust container 1 has a dust bag 5, which is schematically indicated and is made of an air permeable material, as is well known per se. A connector plate 3 is attached to the dust bag 5, for instance by being glued thereto, and typically has an opening coinciding with an opening in the dust bag 5, such that the opening of the connector plate also becomes the opening of the dust bag as a whole. The connector plate 3 can be configured to position the opening of the dust bag in a correct manner in relation to an air inlet in the body or canister of a vacuum cleaner. This can be carried out by sliding the connector plate into a holder or socket in the vacuum cleaner. This operation positions the opening correctly to receive a flow of dust laden air thereby entering the bag, which is capable to remove most of the dust from the air flow. A gasket may be attached to the connector plate 3 at the opening so as to provide a sealing function, reducing leaks in the flow from an inlet hose to the dust bag 5.

[0028] Fig 2a shows a cross-sectional side view of a connector plate 3. In some described embodiments, the connector plate 3 comprises a central portion 11, which is central with respect to the opening 9 which it surrounds, and may be substantially flat and rectangular (see Figs. 3a and 3b). The connector plate 3 comprises an extending portion (extender) 13, which can project from an edge of the central portion 11.

[0029] When used in a vacuum cleaner, the connector plate 3 may be slid into a holder in the vacuum cleaner with the extending portion leading in the direction of insertion and the central portion as a trailing part as is generally described in WO2017/194081. In other words, the extending portion is configured to act as a leading guide member when inserting the connector plate 3 into the holder of the vacuum cleaner. This can facilitate the insertion and the extending portion that extends in the direction of insertion will follow the geometry of the holder as will be described in more detail herein. The width of the central portion 11 and the extending portion 13 may be substantially uniform from a distal edge of the extending portion, being inserted first, to the edge of the central portion 11 opposite to the distal edge. This allows the holder to guide the insertion of the connector plate. Close to said distal edge, the connector plate may however be

slightly tapered to facilitate insertion by providing rounded corners.

[0030] The central and the extending portions 11, 13, may extend in a common plane, and may be made in one piece, for instance by injection molding polypropylene, PP. Other plastic materials can be used and reinforced plastic can be considered, as well as paper such as cardboard in one or more layers

In some embodiments the central portion 11 and the extending portion 13 may be made in one or more separate pieces, for instance by injection molding polypropylene, PP. Other plastic materials can be used and reinforced plastic can be considered, as well as paper such as cardboard in one or more layers. The two or more pieces may also be made in different materials.

[0031] Together, the central and extending portions 11, 13 provide a reliable fixation of the dust bag opening 9 in the vacuum cleaner. Additionally, the extending portion 13 may provide a locking function that retains the connector plate in the holder, and an indicating function, triggering a sensor or switch in the holder, that makes the vacuum cleaner aware of a dust bag being correctly inserted, thereby allowing the vacuum cleaner to disable use of a suction function unless a dust bag is correctly fitted.

[0032] The extending portion 13 can have a decreased bending stiffness compared to the central portion 11. The extending portion may therefore be bent out of the plane of the central portion 11 and into a curvature substantially without bending the central portion 11. This means that the connector plate can easily be inserted into a holder where the inner part of the holder, that takes up the connector plate's extending portion 13, can be curved. The insertion into the holder forces the extending portion to be bent.

[0033] Thereby the holder can better use the available space inside a vacuum cleaner canister, which may have a curved inner wall. The holder may closely follow the inner wall, such that the dust bag 5 may be allowed to expand to a greater extent, thereby increasing the available dust bag volume. The whole length of the connector plate may still contribute in keeping the dust bag 5 safely in the correct position. Additionally, it becomes easier to locate the end of the holder, which receives the leading distal edge of the extending portion, closer to the part of the vacuum cleaner that contains e.g. control electronics. In general, a greater freedom to locate the end of the holder where desired is obtained. In one example, a mechanical function may be provided in the holder end, verifying that a bag is correctly installed and prohibiting closing of a canister hatch unless a bag is provided. Using a curved holder, allows this function to be located at a number of positions along the canister periphery. In another example, if the inlet is located in the front of a canister, the connector plate is centered around this inlet. The holder may still lead the extending portion 13 along the curved inner wall of the canister towards the rear of the canister where suitably the motor/fan combination,

driving the air flow, and the associated electronics are located. This makes it possible to locate a function, that verifies that a dust bag is correctly installed, closer to the control electronics, which for instance simplifies wiring.

While the extending portion 13 is bent into a curved shape, the central portion 11 may remain flat, which facilitates the connection to the inlet hose of the vacuum cleaner, providing a tighter sealing function by means of a gasket.

[0034] As is further illustrated in fig 2a and 2b, the extender forming the extending portion 13 may project from the central portion 11. The extending portion 13 can at a first section 112 be configured to be bent in a first direction A. The extending portion can at a second section 114 be configured to be bent in a second direction B being opposite to the first direction A. Thus, the first section 112 can be attached to the central portion 11. The second section 114 can be attached to the first section 112.

[0035] Hereby the extending portion 13 can be configured to be shaped as a wave (wave-shaped). This can be advantageous when inserting the extending portion 13 into different types of holders in different types of vacuum cleaners. Typically, the dust container 3 can become more versatile and suitable to use in different types of vacuum cleaners. Further, living hinges 35 may be provided on the extending portion 11. The living hinges provide joints that are bent to an extent determined by the curvature of the holder, and need not be uniformly bent. Hereby the extending portion 13 can be bent at a plurality of locations along the insertion direction to provide a step-wise curvature.

[0036] The extending portion can be designed in numerous different ways to enable the extending portion 13 to bend in different directions. Thus, while living hinges is one possible implementation other implementations are also possible that allow the extending portions to be inserted with a wave shaped. For example, the extending portion at the second section 114 can be configured to be able to be bent both in the first direction and in the second direction. This can be achieved by providing living hinges 35 on both sides of the second section 114. In accordance with one embodiment living hinges are formed in the extending portion 13. The living hinges can be formed on a first side on the first section 112 and on a second side, opposite to the first side on the second section 114 or on both sides on the second portion 114.

[0037] In accordance with one embodiment, at least the second section can comprise a transverse rib. The rib can be provided with at least one hole or recess.

[0038] In accordance with one embodiment the extending portion 13 is configured to have a lower bending stiffness than the central portion by being thinner than the central portion 11.

[0039] In accordance with one embodiment the extending portion 13 is configured to have a lower bending stiffness than the central portion 11 by comprising a material with a lower modulus of elasticity than the material of the central portion 11.

[0040] In accordance with one embodiment the extending portion 13 is configured to have a lower bending stiffness than the central portion by means of a number of perforations being provided along the length of the extending portion. In this embodiment the extending portion and also the central portion 11 may be made of paper, e.g. one or more layers of cardboard, with perforations or holes providing a lower bending stiffness, or alternatively a plastic material with perforations.

[0041] Figs 3a - 3d shows a perspective view of a connector plate 3, where an extending portion 13 can be bent out of the plane of a central portion as if inserted into a holder forcing the extending portion to bend. Typically, the extending portion 13 may be configured to be more easily bent backwards, towards the dust bag, with the first portion 112 as this is how the connector plate would best fit inside a canister. This can be accomplished by means of living hinges or by some other means such as providing an extending portion 13 that can be bent in a wave form. For example, the bending stiffness of the extending portion 13 can be reduced by the extending portion comprising a material with a lower modulus of elasticity than the central portion 11. Alternatively, the bending stiffness of the extending portion 13 can be reduced by the perforations or holes in the material. For instance, the central portion 11 may be made in polypropylene, PP, while the extending portion 13 may be made in a softer rubber composition. Two-component injection molding techniques exist that facilitate the production of such a connector plate. It would also be possible to provide the softer material in stripes across the extending portion 13 at regular intervals along the extending portion. This provides joints that make the extending portion flex into a step-wise curvature.

[0042] The extending portion may alternatively be made as a separate part. The central portion comprising the dust bag, and the extending portion, the extender, would then be two separate parts. The central portion could then in accordance with some embodiments be defined as a connector plate. The extender comprises a first section configured to be bent in a first direction (A) and a second section configured to be bent both in a first direction and in the second opposite direction, wherein the second section is configured to be inserted into the holder of the vacuum cleaner before the first section. After the extender has been inserted into the holder the central portion/connector plate comprising the dust bag is inserted into the holder. The first section of the extender comprises a first edge adapted to abut an edge of the central portion/connector plate. A second section comprises a second edge for interacting with a device in the vacuum cleaner. Preferably the second section is opposite the first section. The extending portion may be made in different material or mix of materials, such as plastic, rubber or paper.

[0043] In one embodiment the extending portion is made in plastic with living hinges as described in Fig 2-3. In another embodiment the extending portion is made in

plastic with rubber strips perpendicular to the direction of insertion into the holder. In another embodiment the extender is made in rubber. In another embodiment the extender is made of paper, e.g. one or more layers of cardboard, with perforations or holes providing a lower bending stiffness.

[0044] The present disclosure is not limited to the examples described above, and may be varied and altered in different ways within the scope of the appended claims. For instance, other materials than polypropylene may be considered, such as polyethylene, PE, rubber, paper or cardboard. Other method for allowing the extending portion to bend can be envisaged, including those described in WO2017/194081 A1.

Claims

1. Dust container (1) for a vacuum cleaner, the dust container comprising a dust bag (5), made of an air permeable material, and a connector plate (3) having a hole, surrounding an opening (9) in the dust bag (5), the connector plate (3) comprises a central portion (11) surrounding said hole, and an extending portion (13) projecting from the central portion (11), wherein the extending portion (13) at a first section (112) is configured to be bent in a first direction (A) wherein the extending portion at a second section (114) is configured to be bent in a second direction (B) being opposite to the first direction (A), and wherein the extending portion is configured to be leading in the direction of insertion and with the central portion as a trailing part, when slid into a holder in a vacuum cleaner.
2. Dust container according to claim 1, wherein the extending portion is configured to be bent into a wave-shaped form.
3. Dust container according to any of claims 1-2 wherein the extending portion at the second section is configured to be able to be bent both in the first direction and in the second direction.
4. Dust container according to any of claims 1-3 wherein the extending portion (13) is configured to be bent in a step-wise or continuous curvature at the first section (112) and/or the second section (114).
5. Dust container according to any of claims 1-4, wherein the first section is attached to the central portion (11).
6. Dust container according to any of claims 1-5, wherein the second section (114) is attached to the first section (112).
7. Dust container according to any of claims 1-6, where-

in the second section comprises a transverse rib, preferably provided with at least one hole or recess.

8. Dust container according to any one of claims 1 - 7, wherein the first section is closer to the central position (11) than the second section and wherein the extending portion (13) at the first section is configured to be more easily bent backwards, towards the dust bag (5). 5
9. Dust container according to any of claims -1 - 8, wherein living hinges are formed in the extending portion (13) and wherein the living hinges are formed on a first side on the first section (112) and on a second side, opposite to the first side on the second section (114). 10 15
10. Dust container according to claim 9, wherein living hinges are formed on both sides on the second portion. 20
11. Dust container according to any of claims 1 - 8, wherein the extending portion (13) is configured to have a lower bending stiffness by being thinner than the central portion (11). 25
12. Dust container according to any of claims 1 - 8, wherein the extending portion (13) is configured to have a lower bending stiffness by comprising a material with a lower modulus of elasticity than the material of the central portion (11). 30
13. Dust container according to any of claims 1 - 8, wherein the extending portion (13) is configured to have a lower bending stiffness by means of a number of perforations being provided along the length of the extending portion. 35
14. Connector plate (3) for a vacuum cleaner dust container (1), the connector plate comprising an opening (9), wherein the connector plate (3) is configured to correctly position the opening (9) within a vacuum cleaner by the connector plate being slid into a holder of the vacuum cleaner, the connector plate (3) comprising a central portion (11) surrounding said opening, and an extending portion (13) projecting from the central portion (11) in the plane thereof, wherein the extending portion (13) at a first section (112) is configured to be bent in a first direction (A) wherein the extending portion at a second section (114) is configured to be bent in a second direction (B) being opposite to the first direction (A), and wherein the extending portion is configured to be leading in the direction of insertion and with the central portion as a trailing part, when slid into a holder in a vacuum cleaner. 40 45 50 55
15. Extender (13) for use with a dust bag container of a

vacuum cleaner, said dust container comprising a dust bag (5), made of an air permeable material, and a connector plate (3) with a central portion adapted to be inserted into a holder in the vacuum cleaner, wherein the extender comprises a first section configured to be bent in a first direction (A) and a second section configured to be bent both in a first direction and in the second opposite direction, wherein the second section is configured to be inserted into the holder before the first section, and wherein the extender is configured to be leading in the direction of insertion and with the central portion as a trailing part, when slid into a holder in a vacuum cleaner.

16. Extender according to claim 15, wherein the first section comprises a first edge adapted to abut an edge of the connector plate.
17. Extender according to claim 15 or 16, wherein the second section comprises a second edge for interacting with a device in the vacuum cleaner.
18. Extender according to any of the claims 15-17, wherein the extender is made, at least partly, of plastic, rubber or paper.

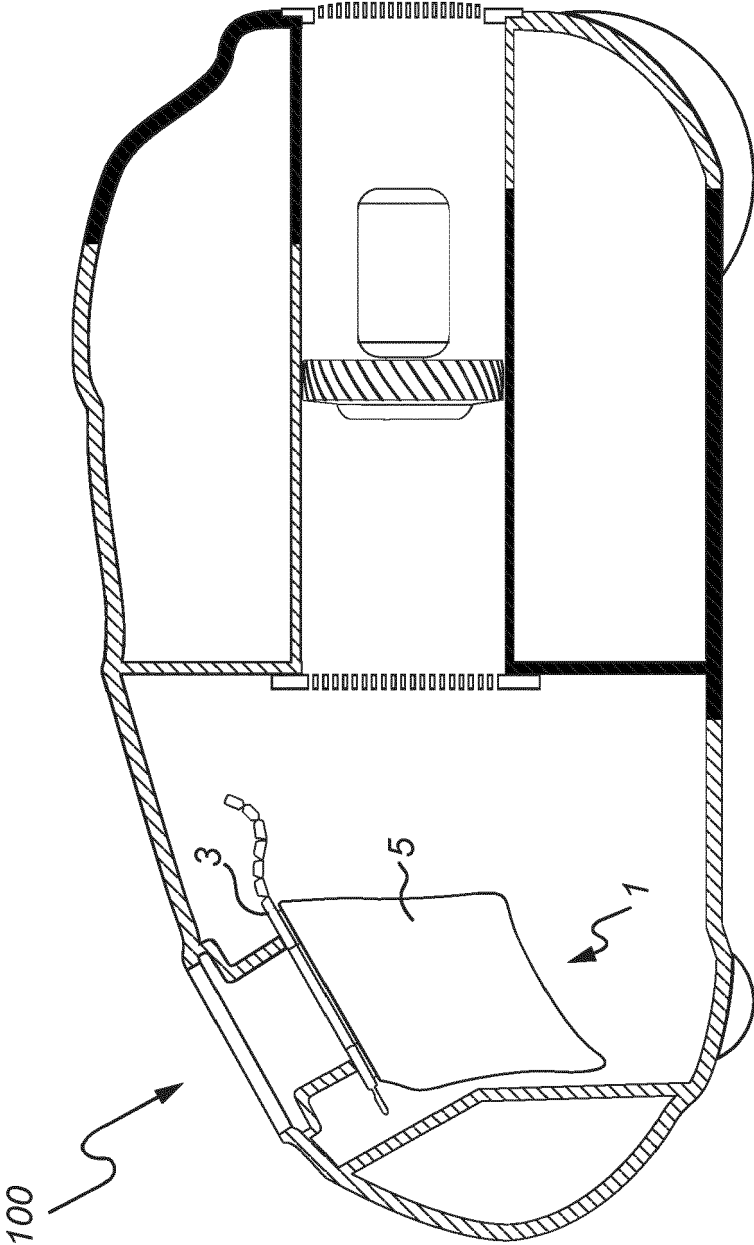
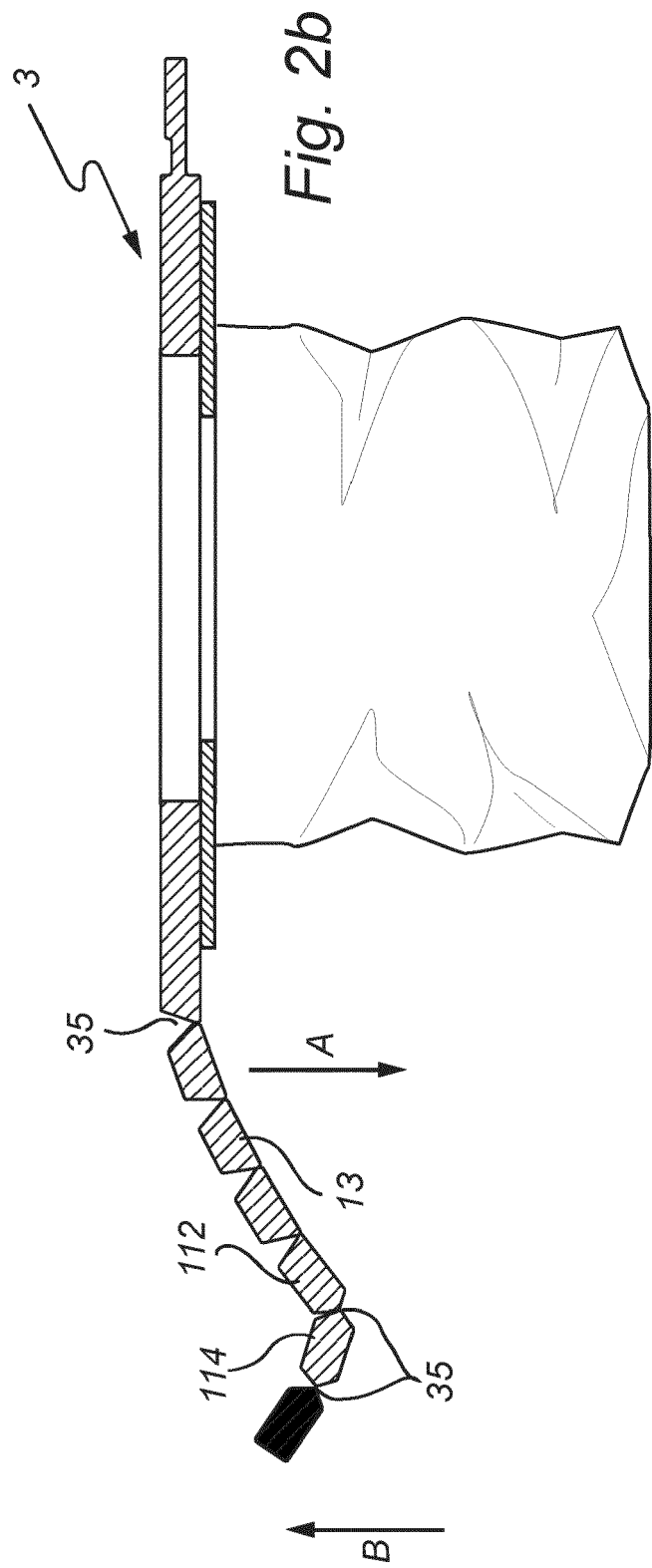
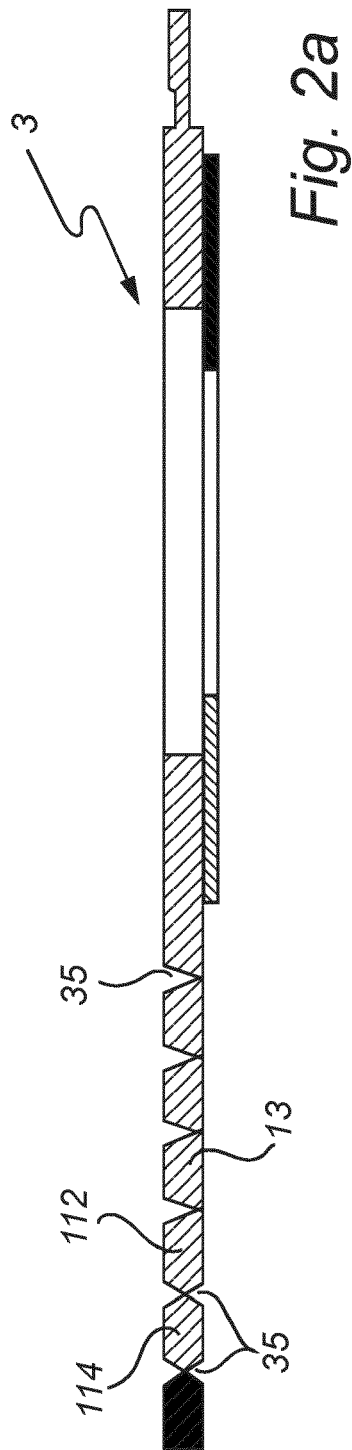


Fig. 1



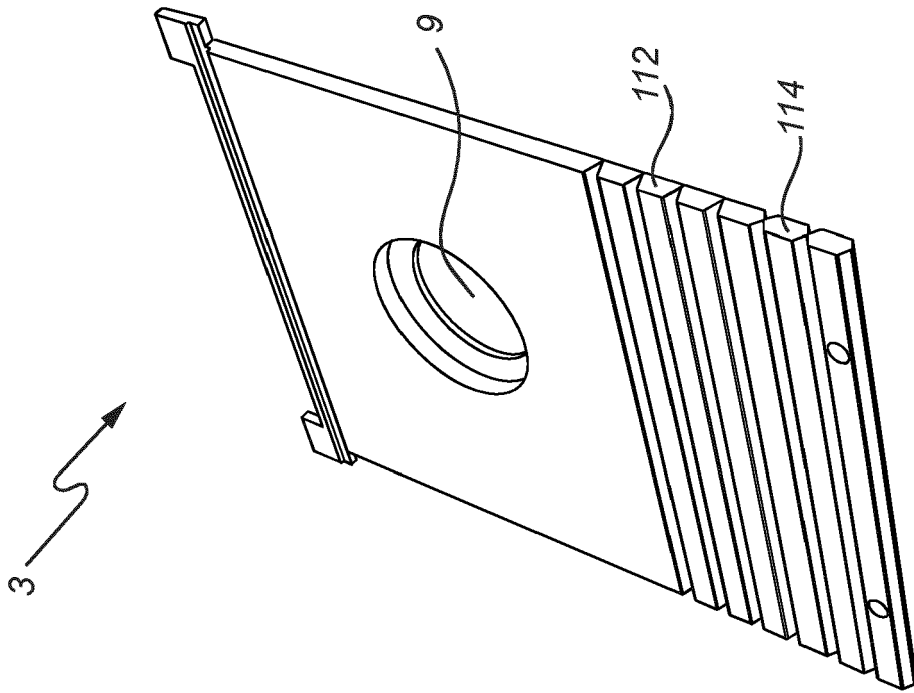


Fig. 3b

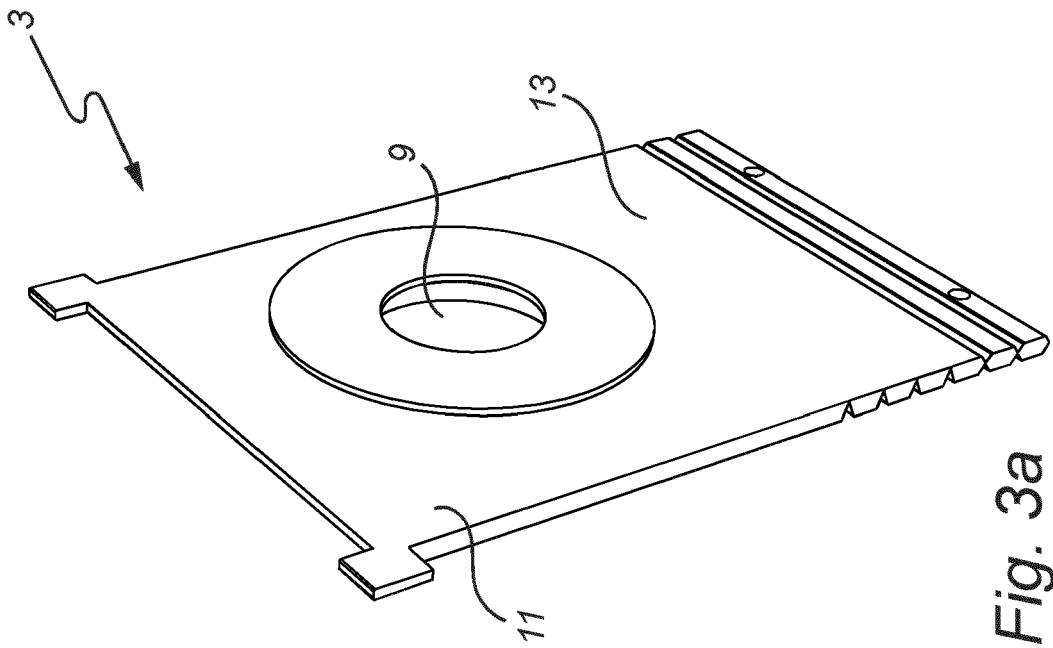


Fig. 3a

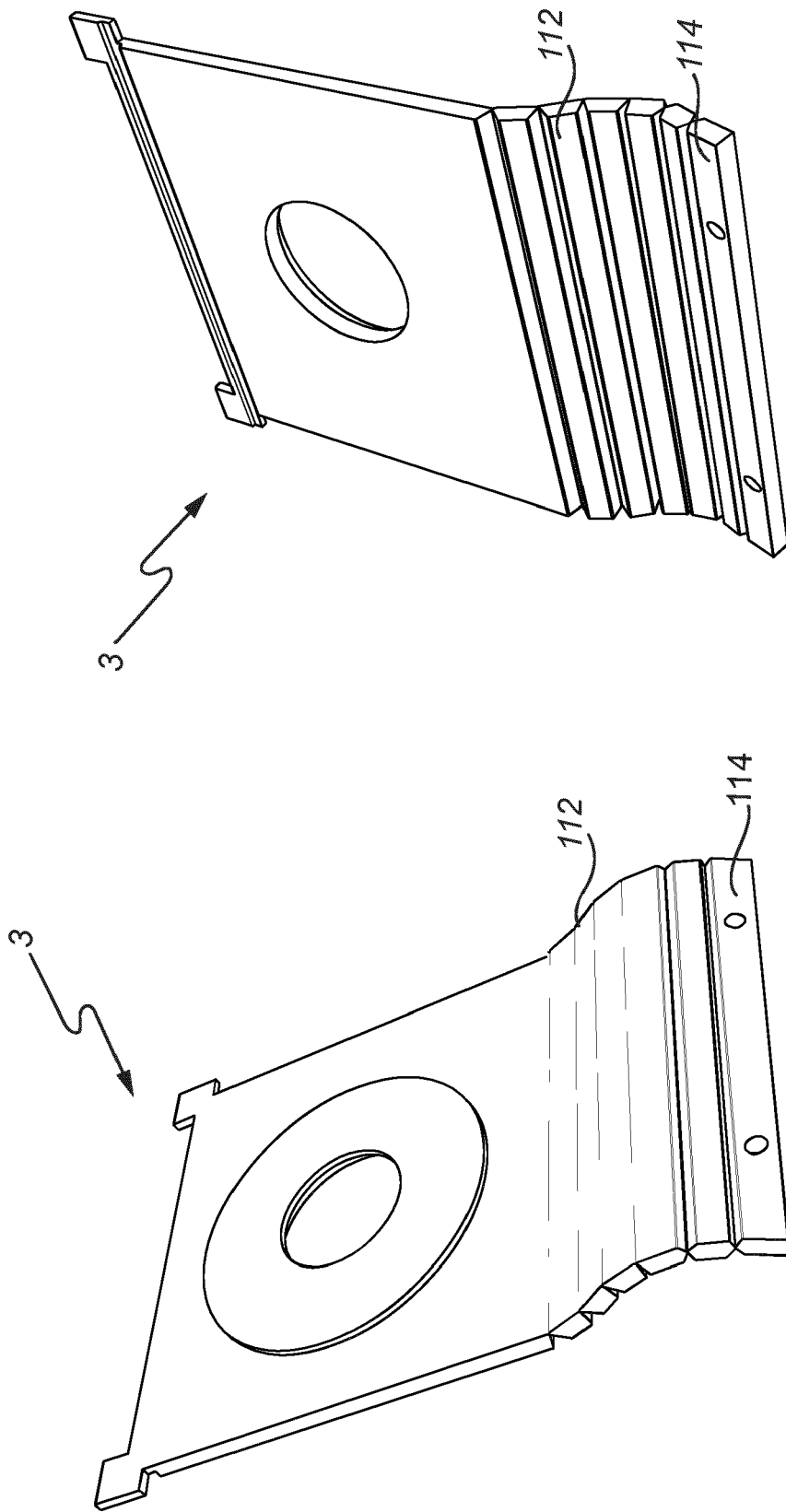


Fig. 3d

Fig. 3c



EUROPEAN SEARCH REPORT

 Application Number
 EP 20 19 4086

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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 13 January 2021	Examiner Blumenberg, Claus
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 20 19 4086

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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