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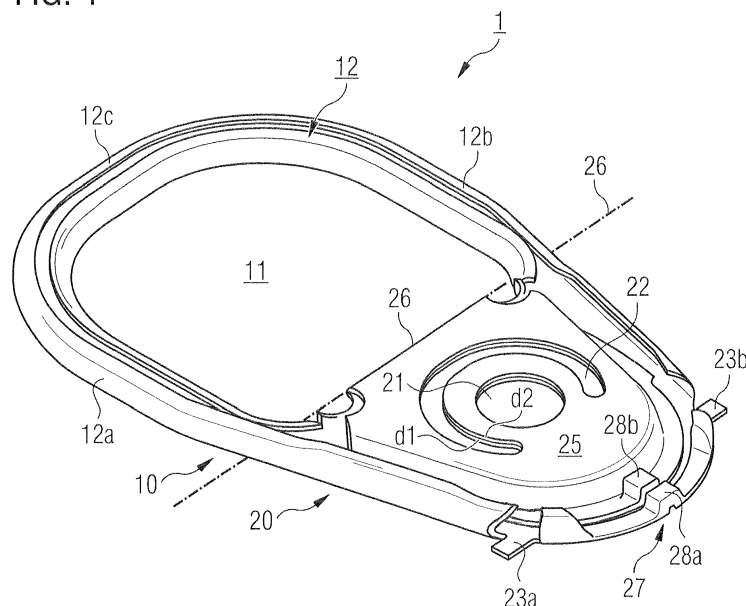
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(54) **PULL-TAB AND METHOD FOR PRODUCING THE PULL-TAB**

(57) The invention relates to the technical field of pull-tabs that are typically used in the packaging industry for application to lids. The invention provides a pull-tab 1 that is producible at reduced costs while having a sufficient mechanical strength for its purpose. Physical harm to a consumer caused by the pull-tab carrier is avoided. The tab 1 is configured 21 to be attached to a lid of a container. The pull-tab has a grip portion 10 and a front portion 20. The pull-tab 1 is formed from a portion of a

sheet of metal s, the sheet having a thickness. The grip portion 10 has a hole, configured for allowing a finger to pass through. The hole is at least partially surrounded by a gripping edge 12 of the grip portion. The grip portion 10 is adjacent to the front portion 20 of the pull-tab along a length axis L thereof. The front portion 20 of the pull-tab 1 is mechanically reinforced by a reinforcing layer 25, made from the sheet of metal s.

FIG. 1



Description

[0001] The invention relates to the technical field of pull-tabs that are typically used in the packaging industry for application to lids. They allow to open a portion of the lid or even detach a substantial part of the lid from the can body.

[0002] Pull-tabs have been known for a long time in the packaging industry as parts of the opening mechanism of filled containers. Often, these containers are cans that contain food, including beverages, but other filling goods are commonly used as well. Typically, pull-tabs are mounted to the lid of the container by a rivet, thereby the pull-tab acting as a lever during opening of the container (i.e. "opening" of the lid).

[0003] For opening the container, one side of the pull-tab is lifted causing the other side (front side) of the pull-tab to approach a part of the upper surface which is close to a scored part of the lid, or a part of the upper surface of the lid that is at least partially surrounded by a score. With a further lifting of the one pull-tab side, the scored part of the lid is depressed. For some cans, which typically at least partially contain solid food, the pull-tab, which is attached to the lid, is then pulled away from the container in order to partially or completely remove a substantial part of the lid from the container. Thereby, a consumer is able to reach the filling good inside the container. For other cans, typically beverage cans, the further lifting of the pull-tab causes a smaller part of the lid, that is partially surrounded by a score, to fold inside the container until it reaches the lower surface (inside the container) of the lid. Thereby, a consumer reaches the filling good, e.g. can drink from a beverage can.

[0004] For these purposes a pull-tab has to have a sufficient mechanical strength to withstand the mechanical forces that act during the container opening process. The mechanical strength is achieved by using a relatively high material thickness and often by curling the edges of the pull-tab.

[0005] Further, pull-tabs typically comprise carriers that are formed during the production process of the tab. These carriers weaken the mechanical strength of the tab as they interrupt the (often) curled edge of the tab and are therefore arranged at the side of the tab that is lifted by a consumer during the container opening process, since the requirements for mechanical strength are lower at this tab side compared to the requirements at the other side (front side) of the tab. During the opening process the sharp edges of the carriers can disadvantageously cause injuries to the consumer, e.g. the consumer can cut his finger.

[0006] The problem to be solved by the invention is to provide a pull-tab that is producible at reduced costs while having a sufficient mechanical strength for its purpose. Another problem to be solved is to provide a pull-tab that reduces physical harm to a consumer caused by the pull-tab carrier.

[0007] The problems are solved by the pull-tab of claim

1, which is producible according to the method of claim 15.

[0008] It has now been found that the above mentioned needs are fulfilled by a pull-tab, which is configured to be attached to a lid of a container, wherein the pull-tab has a grip portion and a front portion, and the pull-tab is formed from a sheet of metal. The sheet of metal or sheet or sheet metal has preferably a thickness that is at least ten times smaller than its width and/or length. The grip portion of the pull-tab has a hole, which is preferably configured for allowing a finger to pass through. In this sense, the hole is configured for allowing a finger to pass through the hole if a human finger of average thickness (average diameter) can at least partially reach through the hole. It can be sufficient if only a small part of a human finger (tip of the finger) can reach through the hole. The hole in the grip portion is at least partially surrounded by a gripping edge of the grip portion. The grip portion is adjacent to the front portion along a length axis. The front portion of the pull-tab is mechanically reinforced by a reinforcing layer, which is preferably made from the sheet of metal (claim 1).

[0009] The reinforcing layer may make an additional thickness of the pull-tab's front portion, wherein the reinforcing layer is preferably made of the sheet (claim 2). Here, at least a part of the pull-tab's front portion may have a combined thickness comprising the thickness of the sheet and the thickness of the reinforcing layer.

[0010] Preferably, the additional thickness of the reinforcing layer may be at least substantially equal to the thickness of the sheet from which the pull-tab is formed (claim 3).

[0011] It is preferred, that the reinforcing layer is made from the material that is used to manufacture the pull-tab (claim 4).

[0012] During the manufacture of the pull-tab from the sheet, naturally, not the entire sheet can be used for manufacturing, causing scrap or production scrap. Preferably, the reinforcing layer is made from a sheet portion that is a scrap portion of the sheet portion used to manufacture the pull-tab (claim 5). In other words, the reinforcing layer is made of the sheet metal that was used for the manufacturing of the pull-tab and is taken from a sheet portion that is a scrap portion from the manufacturing of the pull-tab.

[0013] The scrap portion of the sheet metal may be the sheet portion that was removed or punched out during manufacturing in order to at least partially form the hole in the grip portion (claim 6).

[0014] It is preferred, that the pull-tab comprises a folding line, which extends between the grip portion and the front portion, preferably in a transversal direction. The folding line is configured to act as a hinge for bending or folding a partially punched out sheet metal portion from the grip portion to the front portion. Thereby, the hole is formed in the grip portion and the mechanically reinforcing of the front portion is formed or achieved (claim 7).

[0015] The thickness of the metal sheet may be less

than 0.26 mm, preferably less than 0.23 mm, more preferably substantially 0.20 mm or substantially 200 μm (claim 8).

[0016] The pull-tab may comprise carriers, which are arranged at the front portion of the pull-tab and which are extending sidewards in a transversal direction (claim 9).

[0017] Preferably, the carriers are spaced apart from a front end of the pull-tab (claim 10). The spacing or distance between the pull-tab's front end and carriers is less than 20 mm, preferably less than 15 mm, more preferably less than 10 mm, most preferably less than 7 mm in longitudinal direction (claim 11).

[0018] The configuration to attach the pull-tab to the lid may comprise means for attaching, provided through at least two adjacent layers (claim 12). Preferably, the means for attaching is an attaching hole, which is provided through the layers (claim 13).

[0019] It is preferred, that the reinforcing layer has a three-dimensional outline or structure or shape that closely resembles the three-dimensional outline or shape of the sheet metal layer, which is in the front portion prior to supplementing this first layer with the reinforcing layer (claim 14).

[0020] Preferably, the sheet metal material is steel, not aluminum.

[0021] A pull-tab is producible or manufacturable by a method, comprising the steps of: providing a sheet of metal, having a thickness; forming a pull tab blank in the sheet, wherein the pull-tab blank having a grip portion and a front portion along a length direction of the blank; forming a hole or an opening in the grip portion of the pull-tab blank, preferably the hole being configured to allow a finger to pass through; mechanically reinforcing the front portion of the pull-tab blank by a reinforcing layer, preferably of the sheet of metal; and separating or removing the pull-tab blank from a remainder of the sheet, thereby providing an individual pull-tab, having the pull-tab blank's technical features (claim 15).

[0022] Within the method, the reinforcing layer, preferably of the sheet, may make an additional thickness. Preferably, the additional thickness is at least substantially equal to the thickness of the sheet (claim 16).

[0023] Preferably, the reinforcing layer is made from the material of the sheet that is used for manufacturing of the pull-tab blank.

[0024] It is preferred, that the reinforcing layer is made from a sheet portion that is a scrap portion of the sheet portion used to manufacture the pull-tab blank. The scrap portion of the sheet metal may be removed or punched out at least partially to form the hole in the grip portion of the pull-tab blank.

[0025] The pull-tab blank of the method may comprise a folding line, which extends between the grip portion and the front portion. After forming the pull-tab blank, a sheet metal portion of the grip portion is bent or folded about the folding line from the grip portion to the front portion. Thereby, the hole in the grip portion is formed and the front portion is mechanically reinforced (claim

17).

[0026] The thickness of the sheet may be less than 0.26 mm, preferably less than 0.23 mm, more preferably substantially equal to 0.20 mm or substantially 200 μm .

[0027] During the steps of manufacturing a pull-tab, carriers may be formed. Carriers are used as connection means for connecting a pull-tab blank and the sheet during further steps of manufacturing. In order to separate the blank from the sheet, the carriers are disconnected, thereby providing a pull-tab. Preferably, the carriers are arranged at the front portion and extend sidewards in a transversal direction. The carriers may be spaced apart from the front end of the pull-tab blank. The distance between the front end and the carriers is preferably less than 20 mm, more preferably less than 15 mm, even more preferably less than 10 mm, most preferably less than 7 mm.

[0028] It is preferred, that the reinforcing layer has a three-dimensional outline, which substantially resembles the three-dimensional outline of the sheet metal layer, being in the front portion prior to supplementing this first layer with the reinforcing layer.

[0029] The sheet of metal or sheet metal or sheet used in the method may be of steel, not aluminum.

[0030] Embodiments of the invention can be best understood from the detailed description and the following drawings, wherein:

Figure 1 shows a perspective bottom view of a pull-tab 1;

Figure 2 depicts a perspective bottom view of the pull-tab of fig.1, showing the front portion 20 in more detail;

Figure 3 shows a top view of the pull-tab 1 of fig. 1;

Figure 4 shows a perspective top view of the pull-tab of fig. 1; and

Figure 5 illustrates several steps of a method of manufacturing 100 a pull-tab 1.

[0031] The functioning of the pull-tab 1 can best be seen in fig. 1. The pull-tab 1 comprises a front portion 20 and a grip portion 10. The grip portion 10 comprises a hole 11, which hole 11 is configured for allowing a finger to pass through it. As described in more detail earlier, when the pull-tab 1 is attached to a lid of a container, the content of the filled container can be accessed by a consumer by reaching e.g. a part of his finger through the hole 11 and lifting the grip portion 10 of the pull-tab. The hole 11 of the grip portion 10 is partially surrounded by a gripping edge 12. The gripping edge 12 in this embodiment is a curled structure, wherein the inner side of the gripping edge 12 is curled from the inside of the hole 11 to the outside of the grip portion 10 and the outer side of the gripping edge 12 comprises two substantially parallel

parts 12a, 12b of the gripping edge 12 and one part 12c which is substantially orthogonal to the parallel parts 12a, 12b. The outer edge of the gripping edge 12 is curled from the outside of the pull-tab 1 to the inside of the pull-tab 1.

[0032] The front portion 20 of the pull-tab 1 is adjacent to the grip portion 10. In this embodiment, a folding line 26 is between the front portion 20 and the grip portion 10. Here, the folding line 26 acts as a hinge for bending or folding a part of the sheet metal, from which this pull-tab 1 is made, from the grip portion 10 to the front portion 20. The folding line 26 extends in transversal direction Q (shown in fig. 3). By folding or bending the sheet metal part the hole 11 is created and the front portion 20 is reinforced. The reinforced part of the front portion 20, i.e. the part with reinforcing layer 25, has a combined thickness that is equal to the sum of the sheet metal thickness d1 (used for manufacturing the pull-tab1) and the thickness of the reinforcing layer d2. In the embodiment of fig. 1 the thickness d1 and the thickness d2 are equal. In other embodiments, the reinforcing layer 25 can be provided at the pull-tab's 1 front portion 20 in other ways. For example, a metal part can be attached (glued, welded) to the front portion or a polymer can be applied at the front portion. In these embodiments, the thickness of the sheet metal d1 and the thickness of the reinforcing layer d2 are not (necessarily) equal.

[0033] The pull-tab 1 of fig. 1 has two carriers 23a, 23b which are arranged at the front portion 20 and which extend sideways. In this embodiment, the carriers 23a, 23b interrupt the gripping edge 12, which extends from the grip portion 10 along the outer edge of the pull-tab 1 to the front portion 20. At the front, close to the front end 27, the curled structure of the gripping edge 12 is flattened and a nose 28a is arranged at the front. In other embodiments, the extension of the gripping edge 12 to the front portion 20 can be designed differently. For example, the gripping edge 12 can extend in the direction of the front portion 20 in a lesser extent or in a greater extent. Typically, the flattening of the gripping edge 12 is designed in a way that during operation of a consumer, i.e. lifting the rear part of the pull-tab 1 and thereby lowering or pushing downwards the front part of the pull-tab 1, the nose 28a is the first part of the pull-tab 1 to approach and finally come in contact with a part of the lid, to which the pull-tab 1 is attached, which is close to a scored portion of the lid. With further lifting of the rear part of the pull-tab 1, the lid can be opened in a defined and reproducible way by depressing a part of the lid into the container inside direction as also described earlier.

[0034] The interruption of the gripping edge 12 by the carriers 23a, 23b causes a reduction of the mechanical stability of the pull-tab 1. This is especially crucial at the front portion 20 as the requirements on the mechanical stability during a pull-tab operation by a consumer are higher than at the grip portion 10. In this embodiment, the carriers 23a, 23b can be arranged at the front portion 20 without enhanced risk of a malfunction (i.e. breaking

or being damaged due to mechanical stress) of the pull-tab 1 due to the mechanical reinforcement in the front portion 20. The arrangement of the carriers 23a, 23b at the front portion 20 lowers the risk of consumer's injuries, e.g. cut in the finger, during operation.

[0035] At the front part of the reinforcing layer 25 another nose portion 28b is formed, which elongates the front end 27 nose 28a.

[0036] The means for attaching 21 the pull-tab 1 to a lid is in this embodiment a hole, which extends through both layers of the reinforced front portion 20 as well as an arc-shaped or curved recess 22. The attachment of the pull-tab 1 to a lid of a container is often realized by a rivet. The recess 22 allows the pull-tab 1, when being attached to a lid of a container, to be operated by a consumer in the container opening process substantially without damaging the pull-tab 1.

[0037] The front portion 20 of the pull-tab of fig. 1 is magnified in fig. 2 and shows different parts of the reinforcing layer 25. A first flat part 25b, 25d, 25e comes in substantially flat contact with the top surface of a lid to which it is attachable. During a consumer's operation of the pull-tab 1 the part 25d substantially stays in contact with the surface of the lid, while the parts 25b and 25e will be lifted as the rear part of the pull-tab 1 is lifted. By a skirt structure 25c of the reinforcing layer 25, the layer 25 extends into a second flat part 25a. In this embodiment, the three-dimensional shape of the front portion's basic metal layer, i.e. a typical front portion of a pull-tab without reinforcing layer, is resembled by the reinforcing layer 25 in order to cause a high reinforcing effect. In other embodiments, the reinforcing layer 25 may cover or reinforce smaller areas of the basic metal layer or may not resemble the three-dimensional shape of the basic metal layer, but still cause a reinforcing effect on the pull-tab.

[0038] In fig. 3 a top view of the pull-tab 1 is shown, illustrating a consumer's view on the pull-tab 1 when it is attached to a lid of a container (lid and container not shown in fig. 3). In this embodiment, the carriers 23a, 23b are spaced from the front end 27 by a distance d23 along a length axis L. As the carriers 23a, 23b have a certain length in L direction themselves, the distance d23 is to be measured from the middle or center of the carriers in L direction to the front end 27 of the pull-tab 1. The front end 27 is the outermost point of the front portion 20 in a direction opposite to the grip portion 10.

[0039] Further, the transversal direction Q is illustrated in fig. 3 and shows the substantial extension direction of the folding line 26.

[0040] In the perspective side view of the pull-tab 1 in fig. 4 the basic metal layer or sheet metal layer 24 and the reinforcing layer 25 can be seen from a different view as in fig. 1. The basic metal layer 24 is shown as typical design for pull-tabs, while the reinforcing layer 25 is visible through the means for attaching 21 and the recess 22 and is arranged under (consumer's viewing direction) the basic metal layer 24. Also, the counter structure of

the basic metal layer 24 is shown, which corresponds to the first flat part 25b, 25d, 25e, the second flat part 25a and a skirt structure 25c of the reinforcing layer 25 as shown in fig. 2.

[0041] In other embodiments, the reinforcing layer 25 may be arranged on top of the basic metal layer 24 (consumer's viewing direction) or both on top or under the basic metal layer 24.

[0042] Fig. 5 is a schematic drawing of four steps that are comprised by a method of manufacturing 100 a pull-tab 1. The schematic drawing is to be understood in that not all steps of the method of manufacturing are shown, especially the curved lines between the shown steps indicate that one or more steps may be performed between the shown steps.

[0043] In this embodiment, in a first step 110 a sheet or sheet metal or sheet of metal *s* is provided. The sheet *s* having a thickness *d*₁. In a next step 120 a profile of a pull-tab blank 101 is produced in the sheet *s*. This is preferably achieved by mechanical cutting, laser cutting and/or punching. In a next step 130 several technical features of the pull-tab blank 101 are formed. In a front portion 20 of the pull-tab blank 101 a means for attaching 21 and a recess 22 as well as a nose 28 is formed, e.g. by mechanical cutting, laser cutting and/or punching. Adjacent to the front portion 20 a gripping portion 10 is formed. Between the front portion 20 and the gripping portion 10 a folding line 26 is provided. Carriers 23a and 23b are provided for connecting the pull-tab blank 101 with the sheet *s*. Additionally, a gripping edge 12 is formed at the bottom of the pull-tab blank 101, which is not shown in fig. 5 as this figure is shown from a top view. The gripping edge 12 of the pull-tab blank 101 may be equally designed as the gripping edge 12 shown in figs. 1 and 2.

[0044] In this embodiment, a reinforcing layer 25 is provided as a sheet portion in the gripping portion 10. In a next step (not shown) the reinforcing layer 25 is folded (or bent) to the front portion 20 of the pull-tab blank 101 about the folding line 26. Thereby, a hole 11 (not shown, but may be equally designed as the hole in figs. 1 and 2) is formed in the gripping portion 10 and the front portion 20 is mechanically reinforced. The mechanical reinforcement of the front portion 20 may also be achieved by other techniques which were described earlier.

[0045] In a next step 140 the pull-tab blank 101 is removed from the sheet *s* by cutting (mechanically or by laser) the connection between the pull-tab blank 101 and the sheet *s* close to the carriers 23a, 23b. Thereby, a pull-tab 1 is formed (not shown but may be equally designed as the pull-tab 1 shown in figs. 1 to 4), which pull-tab 1 comprises the carriers 23a, 23b. A sheet cut-out 102 is left in the sheet after cutting the connection of the pull-tab blank 101 with the sheet *s*. It is noted that the steps may be interchanged temporally.

Claims

1. Pull-tab configured (21) to be attached to a lid of a container, the pull-tab having a grip portion (10) and a front portion (20), and formed from a portion of a sheet of metal (i.e. sheet), the sheet having a thickness (*d*₁), wherein
 - (a) the grip portion (10) having a hole (11), preferably the hole (11) being configured for allowing a finger to pass through, the hole being at least partially surrounded by a gripping edge (12; 12a, 12b, 12c) of the grip portion (10), the grip portion being adjacent to the front portion (20) of the pull-tab (1) along a length axis (L) thereof;
 - (b) the front portion (20) of the pull-tab being mechanically reinforced by a reinforcing layer (25; 25a, 25b, 25c, 25d, 25e), preferably made from the sheet of metal.
2. Pull-tab according to claim 1, wherein the reinforcing layer (25), preferably of the sheet, making an additional thickness (*d*₂).
3. Pull-tab according to claim 2, wherein the additional (*d*₂) thickness being at least substantially equal to the first thickness (*d*₁) of the sheet.
4. Pull-tab according to any one of claims 1 to 3, wherein the reinforcing layer (25) being made from the material of the sheet that is used to manufacture the pull-tab (1;10,20).
5. Pull-tab according to any one of claims 1 to 4, wherein the reinforcing layer (25) is made from a sheet portion that is a scrap portion of the sheet portion used to manufacture the pull-tab (1).
6. Pull-tab according to claim 5, wherein the scrap portion of the sheet metal was removed or punched out at least partially to form the hole (11) in the grip portion (10) of the pull-tab (1).
7. Pull-tab according to any one of claims 1 to 6, wherein the pull-tab comprises a folding line (26), extending between the grip portion (10) and the front portion (20), preferably in a transversal direction (Q), the folding line (26) configured to act as a hinge for bending or folding a partially punched out sheet metal portion from the grip portion (10) to the front portion (20), thereby forming both, the hole (11) in the grip portion (10) and the mechanically reinforcing of the front portion (20).
8. Pull-tab according to any one of previous claims 1 to 7, wherein the thickness of the sheet (*d*₁) is less than 0.26 mm, preferably less than 0.23 mm, more preferably substantially 0.20 mm (or 200 μm).

9. Pull-tab according to any one of claims 1 to 8, wherein the pull-tab (1) comprises carriers (23a, 23b) arranged at the front portion (20) and extending side-wards in a transversal direction (Q). 5
10. Pull-tab according to claim 9, wherein the pull-tab comprises a front end (27) and wherein the carriers (23a, 23b) are spaced apart (d_{23}) from the front end (27). 10
11. Pull-tab according to claim 10, wherein the spacing is less than 20 mm, preferably less than 15 mm, more preferably less than 10 mm, most preferably less than 7 mm in a longitudinal direction (L). 15
12. Pull-tab according to any one of claims 1 to 11, wherein the configuration to attach the pull-tab to the lid comprises means for attaching (21) provided through at least two adjacent layers (24, 25). 20
13. Pull-tab according to claim 12, wherein the means for attaching (21) the pull-tab to the lid is an attaching hole (21) provided through the layers (24; 25). 25
14. Pull-tab according to any one of claims 1 to 13, wherein the reinforcing layer (25) has a three dimensional outline (25a, 25b) to closely resemble the 3D shape of the sheet metal layer (24) being in the front portion prior to supplementing this first layer with the reinforcing layer (25). 30
15. Method of manufacturing a pull-tab, comprising the following steps: 35
- (a) Providing a sheet of metal (s), having a thickness (d_1);
 - (b) Forming a pull-tab blank (101) in the sheet (s), wherein the pull-tab blank (101) having a grip portion (10) and a front portion (20) along a length direction (L) of the blank; 40
 - (c) Forming a hole (11) in the grip portion (10) of the pull-tab blank (101), preferably the hole (11) being configured to allow a finger to pass through;
 - (d) Mechanically reinforcing the front portion (20) of the pull-tab blank by a reinforcing layer (25), preferably of the sheet of metal; and 45
 - (e) Separating or removing the pull-tab blank (101) from a remainder of the sheet (105), thereby providing an individual pull-tab, having the pull-tab blank's (101) technical features. 50
16. Method for manufacturing a pull-tab according to claim 15, wherein the reinforcing layer (25), preferably of the sheet, making an additional thickness (d_2), preferably the additional thickness (d_2) being at least substantially equal to the thickness (d_1) of the sheet. 55
17. Method for manufacturing a pull-tab according to claim 15 or 16, wherein the pull-tab blank comprises a folding line (26) extending between the grip portion (10) and the front portion (20), and wherein a sheet metal portion of the grip portion (10) is bent or folded about the folding line (26) from the grip portion (10) to the front portion (20), thereby forming the hole (11) in the grip portion (10) and the mechanically reinforced front portion (20).

FIG. 1

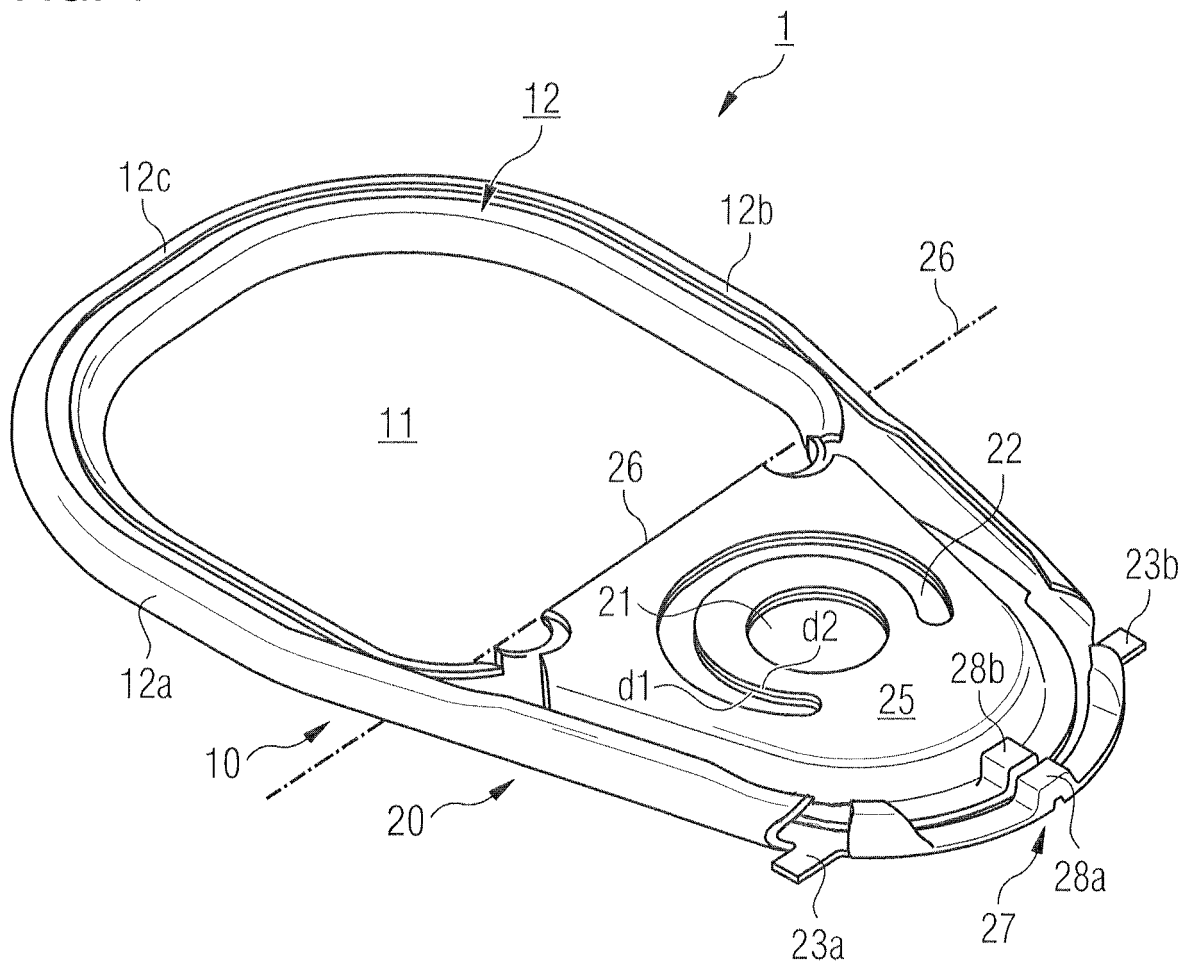


FIG. 2

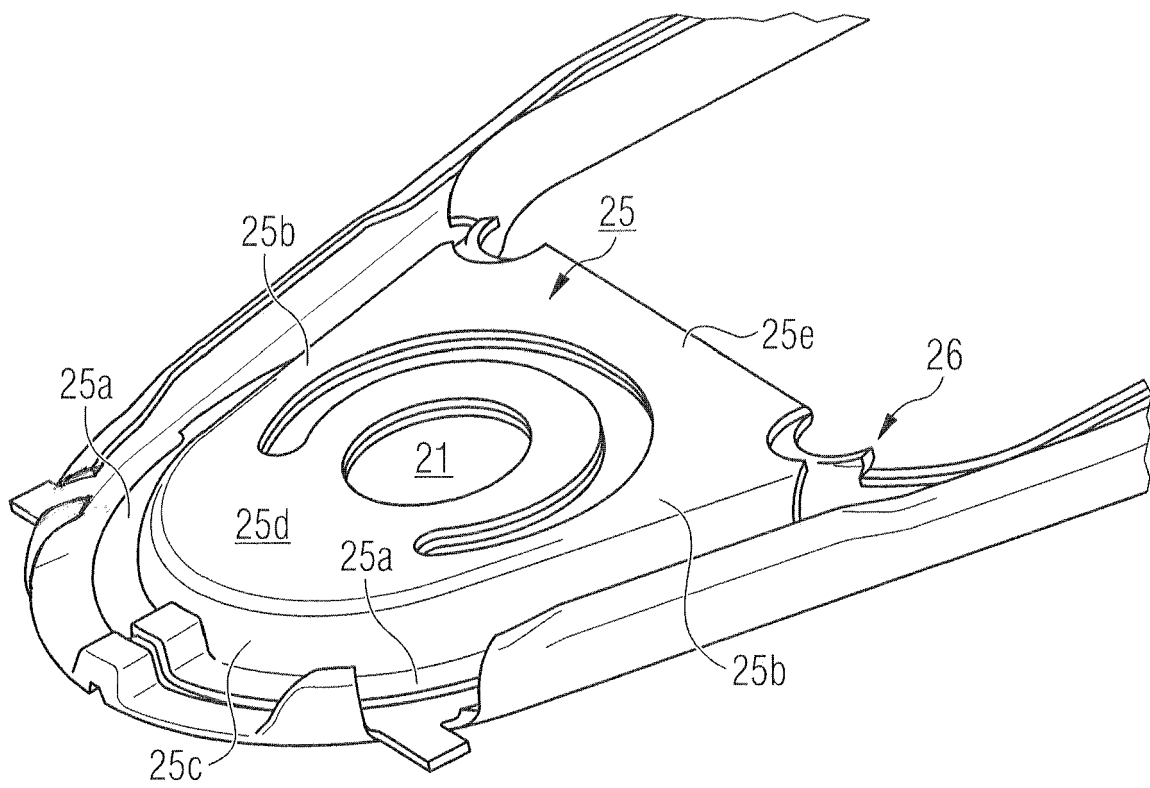


FIG. 3

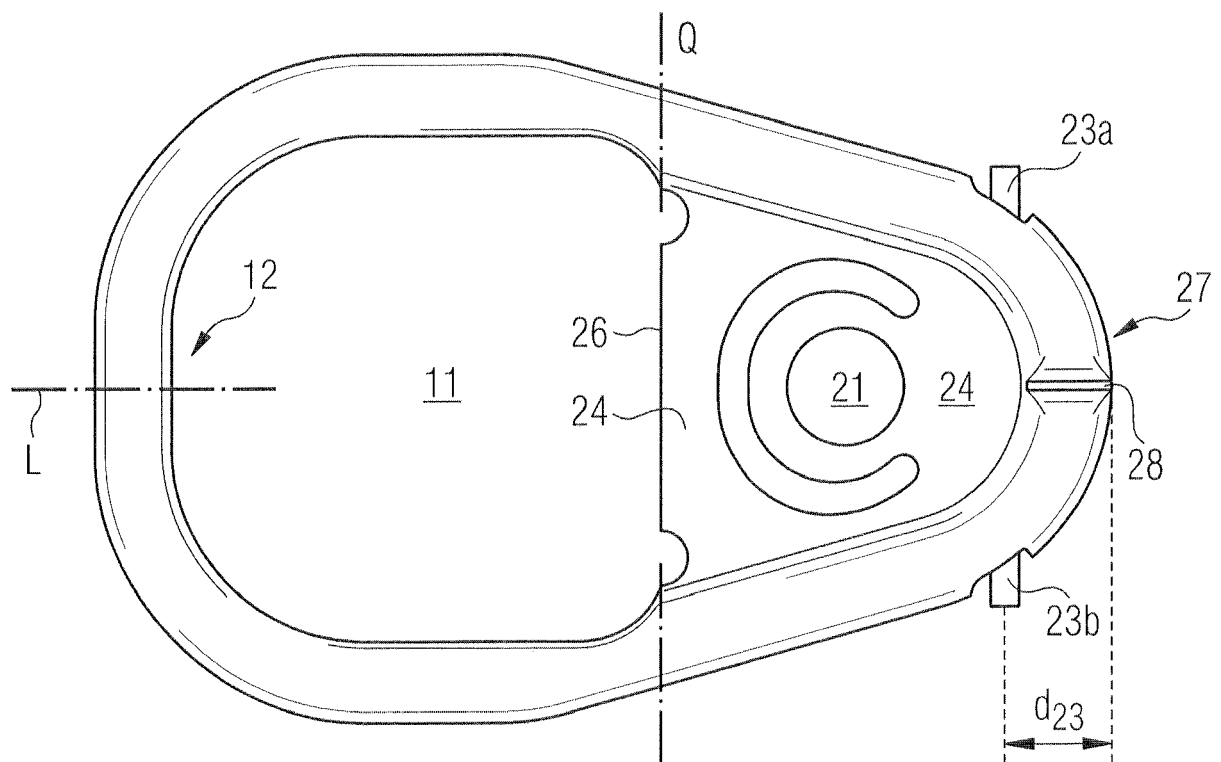


FIG. 4

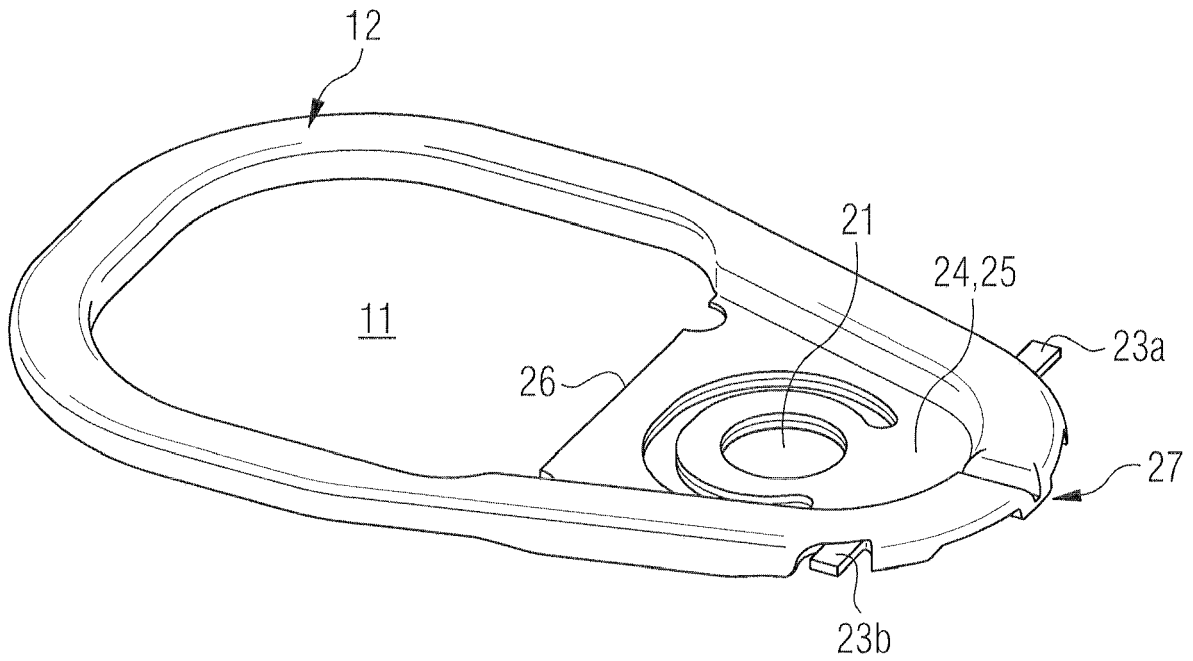
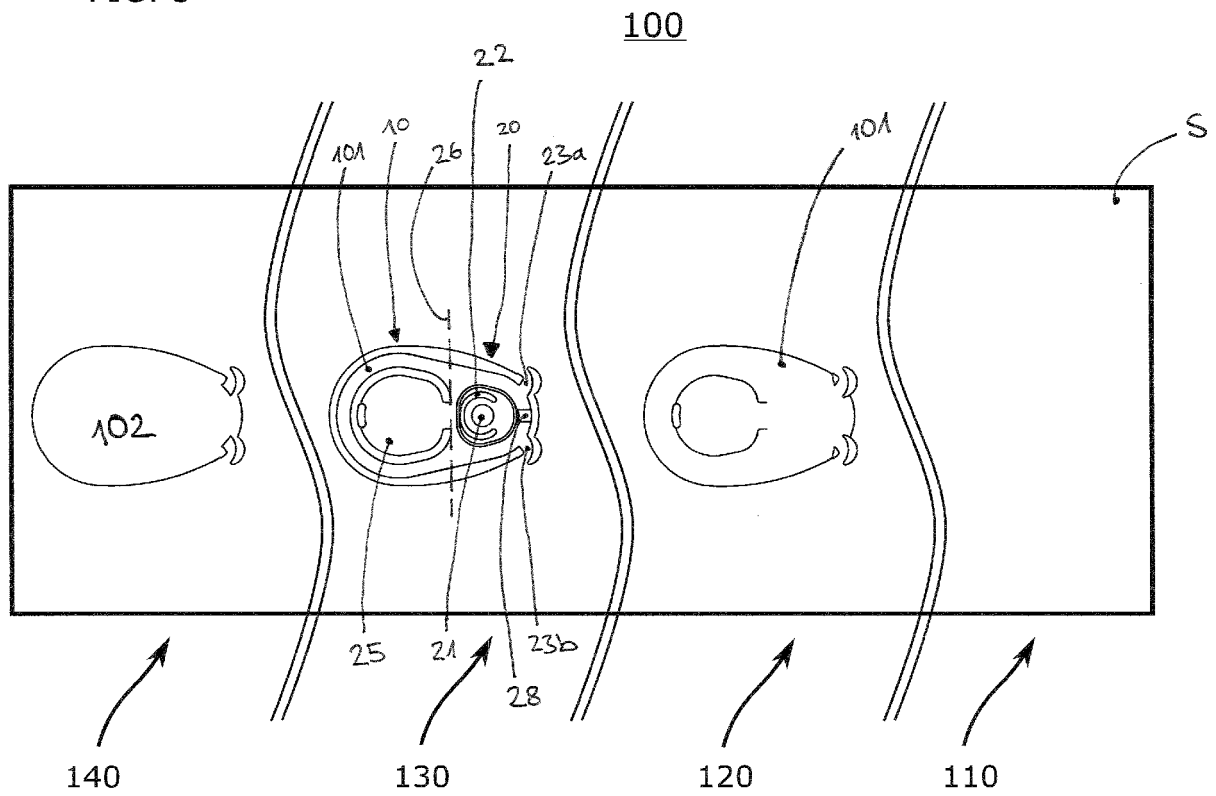


FIG. 5





EUROPEAN SEARCH REPORT

Application Number
EP 16 18 0603

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DOCUMENTS CONSIDERED TO BE RELEVANT			
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A	* page 8, lines 29-32; figures 8a-d *	6,7,17	
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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		Date of completion of the search	Examiner
The Hague		10 January 2017	Serrano Galarraga, J
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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