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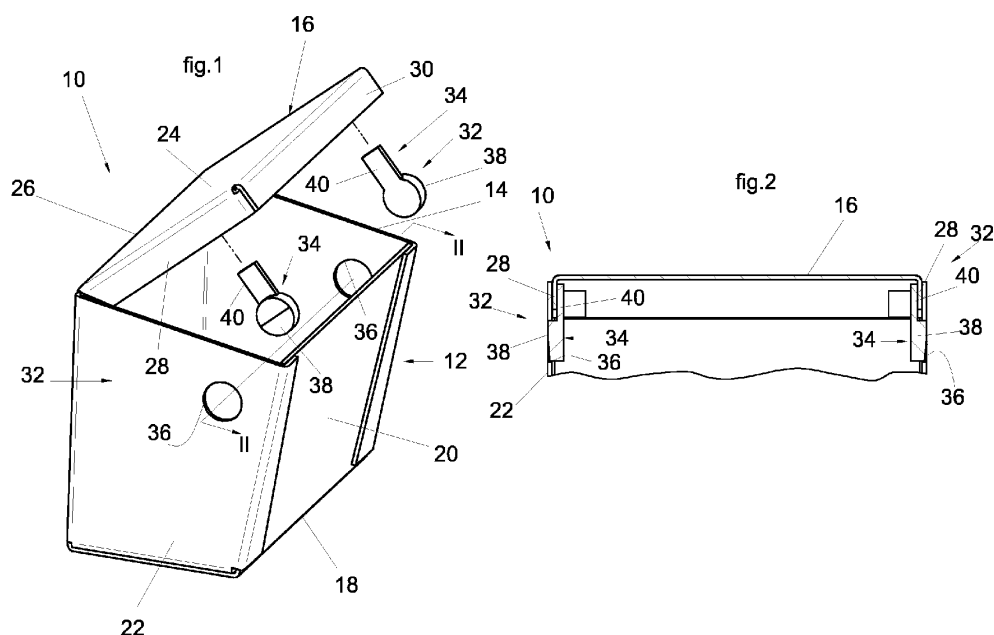
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(54) **A RECLOSABLE CONTAINER**

(57) A reclosable container (10) comprising a container body (12) made of a cellulosic material and at least one closing formation (32) including a first closure element (34) and a second closure element (36) engageable with each other to keep the container in a closed config-

uration and disengageable from each other to open the container, wherein at least one of said first closure element (34) and second closure element (36) is made of a hydrosoluble thermoplastic material.



Description

Field of the invention

[0001] The present invention relates to containers, in particular to containers for household products.

[0002] The invention was developed in particular in view of its application to containers for laundry and dishwasher detergents, in particular detergent pods.

Prior art

[0003] Nowadays, reclosable containers for household products are almost entirely made of plastics (mono- or poly-coupled, flexible or rigid), which are produced from fossil resources and therefore have a significant energy and environmental impact both for their production and their recycling. The energy and environmental impact is not reduced even when recyclable plastics are used.

[0004] Therefore, there is a strong need of containers for household products that are recyclable in the paper chain.

[0005] However, containers made from paper materials have limitations regarding re-closable closures. In fact, paper materials, whether cellulose pulp, paper, or cardboard, do not have the same elasticity as plastics, and re-closable closures made from these materials cannot achieve the same functions as those achieved using plastic material. In particular, opening and closing operations tend to bend and wear out the closure elements, which after a short time are no longer capable to ensure an effective closure.

[0006] Additionally, if the containers are entirely made from paper materials it is difficult to ensure compliance with child-proof standards, such as UNI EN ISO 8317:2005 standard "Child-resistant packaging - Requirements and test procedures for reclosable packaging".

[0007] Eco-compatible plastic solutions are known. For instance, WO2016/207849 discloses a thermoplastic composition made of cellulose and a hydrolysable or hydro-soluble polyhydroxylated polymer which is water-soluble.

[0008] A container made of this material would be recyclable in the paper chain as it would dissolve in water and the residue after dissolution consists of cellulose.

[0009] However, water-soluble plastic materials are not suitable for producing containers for household products such as detergent pods, detergent powders, and the like. In fact, containers of household products are often stored in kitchen and bathroom compartments and are often exposed to moisture and water, which would rapidly deteriorate the containers. Also, the user may grasp such containers with wet hands, which would leave sticky residues on the hands of the user and would deteriorate the parts of the containers which have been in contact with water.

[0010] Additionally, water-soluble plastic materials have a plastic-like appearance, which may confuse the user about the correct way of conferring to the recycling waste collection. In fact, containers made of water-soluble plastic materials must not be disposed of in the plastic chain as they would pollute the plastic recycling chain, contrary to a first and immediate evaluation that could lead the user to a disposal as plastic.

[0011] Furthermore, water-soluble plastic materials are expensive and would substantially increase the packaging costs as compared to the costs of paper packaging.

Object and summary of the invention

[0012] An object of the present invention is to provide an eco-sustainable container for household products which overcomes the problems of the prior art.

[0013] More specifically, the present invention aims to provide a container that is entirely recyclable in the paper chain and has an appearance and a tactility that spontaneously induces the consumer to the correct option of conferring.

[0014] An additional object of the present invention is to provide a container which is totally recyclable in the paper chain and which complies with the child-proof standards for reclosable containers.

[0015] In accordance with the present invention, these objects are achieved by a container according to claim 1.

[0016] Preferred features of the invention are defined in the dependent claims.

[0017] The claims form an integral part of the technical disclosure provided here in relation to the invention.

Brief description of the drawings

[0018] The present invention will now be described in detail with reference to the attached drawings, given purely by way of non-limiting example, wherein:

- Figure 1 is a partially exploded perspective view of a first embodiment of a container according to the present invention,
- Figure 2 is a cross-section taken along the line II-II of figure 1,
- Figure 3 is a partially exploded perspective view of a second embodiment of a container according to the present invention,
- Figure 4 is a cross-section taken along the line IV-IV of figure 3,
- Figure 5 is a partially exploded perspective view of a third embodiment of a container according to the present invention,
- Figure 6 is a cross-section taken along the line VI-VI of figure 5,
- Figure 7 is a partially exploded perspective view of a fourth embodiment of a container according to the present invention,
- Figure 8 is a plan view of the container of figure 7

along the line VIII of figure 7,

- Figure 9 is a cross-section taken along the line IX-IX of figure 8,
- Figure 10 is a partially exploded perspective view of a fifth embodiment of a container according to the present invention,
- Figure 11 is a cross-section taken along the line XI-XI of figure 10,
- Figure 12 is a partially exploded perspective view of a sixth embodiment of a container according to the present invention,
- Figure 13 is a plan view of the container of figure 12 along the line XIII of figure 12,
- Figure 14 is a cross-section taken along the line XIV-XIV of figure 13,
- Figure 15 is a partially exploded perspective view of a seventh embodiment of a container according to the present invention, and
- Figure 16 is a cross-section taken along the line XVI-XVI of figure 15.

[0019] It should be appreciated that the attached drawings are schematic and various figures may not be represented in the same scale. Also, in various figures some elements may not be shown to better show other elements.

Detailed description

[0020] Figures 1-16 show seven different embodiments of a reclosable container 10.

[0021] The reclosable container 10 comprises a container body 12 and at least one closing formation including a first closure element and a second closure element, engageable with each other to keep the container in a closed configuration and disengageable from each other to open the container.

[0022] In the seven different embodiments of the reclosable containers 10 shown in the figures the container bodies 12 and the closing formations have different shapes and structure. In all the embodiments that will be described below, the container body 12 is made of a cellulosic material and the least one of said first closure element and second closure element is made of a hydrosoluble thermoplastic material.

[0023] The term "cellulosic material" indicates a material primarily or completely made of cellulose, such as, paper, cardboard, cellulose pulp, and the like.

[0024] The container body 12 is entirely recyclable in the paper chain.

[0025] The definition "hydrosoluble thermoplastic material" indicates a material suitable to be submitted to common methods of heat forming, or thermoforming, of thermoplastic materials, and which dissolves in the presence of water. An example of a hydrosoluble thermoplastic material is disclosed in WO2016207849A1 which relates to a material formed by a combination of cellulose with a thermoplastic material comprising a hydrolysable

or hydrosoluble polyhydroxylated polymer. The hydrosoluble thermoplastic material disclosed in WO2016207849A1 is marketed under the trade name "PolyPaper" by NextMaterials Srl, Milano, Italy. A remarkable feature of a hydrosoluble thermoplastic material according to WO2016207849A1 is that it is entirely recyclable in the paper chain. Therefore, a container including a container body 12 of cellulose material and one or more closure elements made of a hydrosoluble thermoplastic material is recyclable in the paper chain without the need of separating the closure elements of hydrosoluble thermoplastic material from the container body of cellulose material.

[0026] In various possible embodiments, the container body 12 has an aperture 14 and a movable cover 16 of cellulosic material removably applied to the aperture 14 and movable between an open configuration and a closed configuration. As it will be described more in detail in the following, said first closure element and second closure element are provided, respectively, on said container body 12 and movable cover 16.

[0027] In possible embodiments, at least one of said closure elements of hydrosoluble thermoplastic material may be provided as a separate element fixed by water-sealing or by glue either said container body 12 or movable cover 16. Water-sealing is a property of "Polypaper" which, having a PVOH matrix, partially melts in contact with water and can be bonded to cellulose-based materials.

[0028] With reference to figures 1 and 2, the container body 12 comprises a body bottom wall 18, a pair of body front walls 20 and a pair of body side walls 22.

[0029] The movable cover 16 comprises a cover top wall 24 hinged to the container body 12 along a hinge line 26 extending along a side of the cover top wall 24 and along a top side of one of said body front walls 20 of the container body 12. The movable cover 16 may comprise a pair of cover sides 28 and a cover front wall 30 which, in the closed configuration of the reclosable container 10, are in contact with respective portions of the body side walls 22 and to the body front wall 20 opposite to the hinge line 26.

[0030] The reclosable container 10 comprises a pair of closing formations 32. Each closing formation 32 includes a first closure element 34 made of hydrosoluble thermoplastic material and a second closure element consisting of a through hole 36 formed on a respective body side wall 22.

[0031] The first closure element 34 comprises an engagement button 38 set at a distal end of an arm 40 fixed to an inner surface of a respective cover side 28.

[0032] In the closed configuration of the reclosable container 10, each of said engagement buttons 38 snap engages into a respective through hole 36 and retains the cover 16 to the container body 12. A user may release the cover 16 from the container body 12 by pressing inwardly on said engagement buttons 38.

[0033] With reference to figures 3 and 4, the container

body 12 comprises a body bottom wall 18, a pair of body front walls 20 and a pair of body side walls 22. The top edges of the front walls 20 and side walls 22 define an aperture 14. In this embodiment the movable cover 16 is detachable from the container body 12 and comprises a cover top wall 24, at least one pair of cover sides 28, and a pair of cover front walls 30.

[0034] The reclosable container 10 of figures 3 and 4 comprises a pair of closing formations 32 each including a first closure element formed by an engagement tooth 44 made of hydrosoluble thermoplastic material and a second closure element consisting of a through slot 42 formed on a respective body side wall 22. The engagement teeth 44 are fixed to respective cover sides 28, e.g. by water sealing or by glue. In the closed configuration of the reclosable container 10 each of the engagement teeth 44 snap engages into a respective through slot 42 and retains the cover 16 to the container body 12. A user may release the movable cover 16 from the container body 12 by pressing inwardly on said engagement teeth 44.

[0035] With reference to figures 5 and 6, the container body 12 comprises a body bottom wall 18, a pair of body front walls 20 and a pair of body side walls 22, defining an aperture 14. In this embodiment, the movable cover 16 has a tubular shape elongated along a longitudinal axis A and is detachable from the container body 12. The movable cover 16 comprises a cover top wall 24, a cover bottom wall 46 and a pair of cover sides 28. The movable cover 16 is slidable on the container body 12 along the longitudinal direction A.

[0036] The reclosable container 10 of figures 5 and 6 comprises a pair of closing formations 32, each including a first closure element formed by an engagement button 34 made of hydrosoluble thermoplastic material and a second closure element consisting of a through hole 36 formed on a respective cover side wall 28. The engagement buttons 34 are fixed, e.g. by water sealing or by glue, to outer surfaces of respective body side walls 20.

[0037] In the closed configuration of the reclosable container 10 of figures 5 and 6 each of the engagement buttons 34 snap engages into a respective through hole 36 and retains the movable cover 16 to the container body 12. A user may release the movable cover 16 from the container body 12 by pressing inwardly on the engagement buttons 34 and by sliding the movable cover 16 with respect to the container body 12 in the longitudinal direction A.

[0038] With reference to figures 7-9, the container body 12 has a bucket-like shape and comprises a body lateral wall 48 and a body top wall 50 in which an aperture 14 is formed. A movable cover 16 is detachable from the container body 12 and comprises a cover top wall 24 which closes the aperture 14 when the movable cover 16 is applied to the body top wall 50.

[0039] The reclosable container 10 comprises a pair of closing formations 32, each including a first closure element formed by a flexible engagement tab 52 made

of hydrosoluble thermoplastic material and a second closure element consisting of a through slot 54 formed in said cover top wall 24.

[0040] Each flexible engagement tab 52 is fixed to an outer surface of the body top wall 50 and projects upwardly from said outer surface.

[0041] In the closed configuration of the reclosable container 10 each of the flexible engagement tabs 52 extends through the respective through slot 54. As shown in figure 8, in the closed configuration a lateral portion of each flexible engagement tab 52 is askew with respect to the respective through slot 54 and retains the movable cover 16 to the container body 12. A user may release the movable cover 16 from the container body 12 by deforming the lateral portions of the flexible engagement tabs 52 so as to align the flexible engagement tabs to the respective through slots 54, and by moving the movable cover 16 upwardly.

[0042] In the embodiment of figures 7-9, the body lateral wall 48 has an open top edge and the body top wall 50 has an annular flat surface 56 in which the aperture 14 is formed. The flexible engagement tabs 52 are fixed to the annular flat surface 56. The body top wall 50 has a flank portion extending upwardly from the annular flat surface 56 and fixed to an upper portion of the body lateral wall 48 and has a cover side wall which in the closed configuration is in contact with an inner surface of the flank portion of the body top wall 50. The cover top wall 24 of the movable cover 16 is recessed with respect to an outer edge of the movable cover 16, and in the closed configuration abuts on the annular flat surface 56 of the body top wall 50.

[0043] With reference to figures 10 and 11, the container body 12 comprises a body bottom wall 18, a pair of body front walls 20 and a pair of body side walls 22 defining an aperture 14. The movable cover 16 is hinged to the container body 12 along a hinge line 26 extending along a top side of one of said front walls 20 of the container body 12. The movable cover 16 comprises a cover top wall 24, a pair of cover sides 28 and a cover front wall 30 opposite to the hinge line 26. The reclosable container 10 comprises a pair of closing formations 32, each including a first closure element formed by an engagement tooth 44 and a second closure element formed by a U-shaped bridge 60, both made of hydrosoluble thermoplastic material,

[0044] The engagement teeth 44 are fixed to the cover front side 30 and the U-shaped bridges 60 are fixed to the body front wall 20. In the closed configuration of the reclosable container 10 each the engagement teeth 44 snap engages into respective U-shaped bridges 60 and retains the cover 16 to the container body 12. A user may release the movable cover 16 from the container body 12 by pressing inwardly on the engagement teeth 44 and by simultaneously lifting the movable cover 16.

[0045] With reference to figures 12-14, the container body 12 comprises a body top wall 50 in which an aperture 14 is formed. The reclosable container 10 comprises

a movable cover 16 including a flat panel 64 of cellulosic material slidable on the body top wall 50 along a longitudinal direction A.

[0046] The reclosable container 10 comprises a first closure element formed by a plate 70 of hydrosoluble thermoplastic material fixed at an end of the flat panel 64 and having a pair of flexible teeth 72.

[0047] The reclosable container 10 comprises a second closure element including a pair of straight guide sections 66 made of hydrosoluble thermoplastic material and fixed to an outer surface of the body top wall 50. The straight guide sections 66 are parallel to said longitudinal direction A and extend outside of the aperture 14. The straight guide sections 66 may be joined at respective ends by a transverse element 68. The flat panel 64 is slidably movable between the straight guide sections 66 along the longitudinal direction A between an open position and a closed position, and vice versa.

[0048] The flexible teeth 72 of the plate 70 engage respective holes 74 formed in end portions of the straight guide sections 66 in the closed position of the flat panel 64. A user may release the movable cover 16 from the container body 12 by pressing inwardly on the flexible teeth 72 and simultaneously sliding the movable cover 16 towards the open position.

[0049] With reference to figures 15 and 16, the container body 12 may be formed by a flexible bag 76 of cellulosic material. In this embodiment the closing formation 32 comprises a first elongated closure element 78 and a second elongated closure element 80 made of hydrosoluble thermoplastic material fixed to opposite walls of the flexible bag 76 and having respectively a slot and a ridge mutually engageable so as to form a zip device.

[0050] In all the previously disclosed embodiments, the closing formations 32 of hydrosoluble thermoplastic material are only a small fraction of the total surface of the container and are therefore less prone to degradation when the container is exposed to water or moisture as compared to a container entirely made of hydrosoluble thermoplastic material. The closing formations necessitate small quantities of hydrosoluble thermoplastic material and therefore do not increase in a substantial way the cost of the container. Also, the closing formations may ensure compliance with child-proof closure standards without compromising the recyclability of the containers in the paper chain.

[0051] Of course, without prejudice to the principle of the invention, the details of construction and the embodiments can be widely varied with respect to those described and illustrated, without thereby departing from the scope of the invention as defined by the claims that follow.

Claims

1. A reclosable container, comprising a container body (12) made of a cellulosic material and at least one

closing formation (32), said at least one closing formation (32) including a first closure element (34, 44, 52, 70, 78) and a second closure element (36, 42, 54, 60, 66, 80) engageable with each other to keep the container in a closed configuration and disengageable from each other to open the container, wherein at least one of said first closure element (34, 44, 52, 72, 78) and second closure element (36, 42, 54, 60, 66, 80) is made of a hydrosoluble thermoplastic material.

2. The reclosable container of claim 1, wherein the container body (12) has an aperture (14) and wherein the reclosable container (10) comprises a movable cover (16) of cellulosic material removably applied to said aperture (14) and movable between an open configuration and a closed configuration, and wherein said first closure element (34, 44, 52, 70) and second closure element (36, 42, 54, 60, 66) are provided, respectively, on said container body (12) and movable cover (16).

3. The container of claim 2, wherein at least one of said closure elements (34, 44, 52, 60, 66, 70) of a hydrosoluble thermoplastic material is provided as a separate element fixed by water-sealing or by glue to either said container body (12) or movable cover (16).

4. The container of claim 2 or 3, wherein the container body comprises a body bottom wall (18), a pair of body front walls (20) and a pair of body side walls (22),

wherein the movable cover (16) comprises a cover top wall (24) hinged to the container body (12) along a hinge line (26) extending along a side of the cover top wall (24) and along a top side of one of said body front walls (20) of the container body (12), and a pair of cover sides (28),

wherein the reclosable container (10) comprises a pair of closing formations (32) each including a first closure element (34) made of hydrosoluble thermoplastic material and a second closure element consisting of a through hole (36) formed on a respective body side wall (22),

wherein said first closure element (34) comprises an engagement button (38) set at a distal end of an arm (40) fixed to an inner surface of a respective cover side (28), and

wherein in said closed configuration each of said engagement buttons (38) snap engages into a respective through hole (36).

5. The container of claim 2 or 3, wherein the container body (12) comprises a body bottom wall (18), a pair of body front walls (20) and a pair of body side walls (22),

wherein the movable cover (16) is detachable from

the container body (12) and comprises a cover top wall (24), and at least one pair of cover sides (28), wherein the reclosable container (10) comprises a pair of closing formations (32) each including a first closure element (44) made of hydrosoluble thermoplastic material and a second closure element consisting of a through slot (42) formed on a respective body side wall (22),

wherein said first closure element comprises an engagement tooth (44) fixed to a respective cover side (28), and

wherein in said closed configuration of the reclosable container (10) each of said engagement teeth (44) snap engages into a respective through slot (42).

6. The container of claim 2 or 3, wherein the container body comprises a body bottom wall (18), a pair of body front walls (20) and a pair of body side walls (22),

wherein the movable cover (16) has a tubular shape elongated along a longitudinal direction (A), and comprises a cover top wall (24), a cover bottom wall (46) and a pair of cover sides (28), and wherein the movable cover (16) is detachable from the container body (12) and is slidable on the container body (12) along said longitudinal direction (A),

wherein the reclosable container (10) comprises a pair of closing formations each including a first closure element formed by an engagement button (34) made of hydrosoluble thermoplastic material and a second closure element consisting of a through hole (36) formed on a respective cover side wall (28), wherein each engagement button (34) is fixed to an outer surface of a respective body side wall (22), and wherein in said closed configuration of the reclosable container (10) each of said engagement buttons (34) snap engages into a respective through hole (36).

7. The container of claim 2 or 3, wherein the container body (12) comprises a body top wall (50) in which said aperture (14) is formed,

wherein the movable cover (16) is detachable from the container body (12) and comprises a cover top wall (24),

wherein the reclosable container (10) comprises a pair of closing formations (32) each including a first closure element formed by a flexible engagement tab (52) of hydrosoluble thermoplastic material and a second closure element consisting of a through slot (54) formed in said cover top wall (24),

wherein said flexible engagement tab (52) is fixed to an outer surface of said body top wall (50) and projects upwardly from said outer surface,

wherein in said closed configuration of the reclosable container (10) each of said flexible engagement tabs (52) engages into a respective through slot (54).

8. The container of claim 7, wherein the container body

(12) comprises a body lateral wall (48) having an open top edge, wherein said body top wall (50) has an annular flat surface (56) in which said aperture (14) is formed and a flank portion extending upwardly from said annular flat surface (56) and fixed to an upper portion of said body lateral wall (48), wherein said flexible engagement tabs (52) are fixed to said annular flat surface (56), and wherein said movable cover (16) has a cover side wall having an outer edge and wherein said cover top wall (24) is recessed with respect to said outer edge, and wherein in said closed configuration said cover side wall is in contact with an inner surface of said flank portion of said body top wall and said cover top wall (24) abuts on said annular flat surface (56).

9. The container of claim 2 or 3, wherein the container body (12) comprises a body bottom wall (18), a pair of body front walls (20) and a pair of body side walls (22),

wherein the movable cover (16) is hinged to the container body (12) along a hinge line (26) extending along a top side of one of said front walls (20) of the container body (12), and comprises a cover front side (30) opposite to said hinge line (26),

wherein the reclosable container (10) comprises a pair of closing formations (32) each including a first closure element and a second closure element both made of hydrosoluble thermoplastic material, wherein said first closure element is formed by an engagement tooth (44) fixed to said cover front wall (30) and said second closure element is formed by a U-shaped bridge (60) fixed to the body front wall (20) opposite to the hinge line (26),

wherein in said closed configuration each of said engagement teeth (44) snap engages into a respective U-shaped bridge (60).

10. The container of claim 2 or 3, wherein the container body (12) comprises a body top wall (50) in which said aperture (14) is formed,

wherein the movable cover (16) comprises a flat panel (64) of cellulosic material slidable on said body top wall (50) along a longitudinal direction (A),

wherein the first closure element of said closing formation (32) is formed by a plate (70) of hydrosoluble thermoplastic material fixed at an end of said flat panel (64) and including two flexible engagement teeth (72),

wherein the second closure element of said closing formation (32) comprises a pair of straight guide sections (66) made of hydrosoluble thermoplastic material fixed to an outer surface of said body top wall (50), parallel to said longitudinal direction (A) and extending outside of said aperture (14),

wherein said flat panel (64) is slidably movable in said longitudinal direction (A) between said straight guide sections (66) and wherein in a closed position

of said flat panel (64) said flexible engagement teeth (72) engage respective holes (74) formed in end portions of said straight guide sections (66).

11. The container of claim 1, wherein the container body (12) consists of a flexible bag (76) of cellulosic material, wherein said closing formation (32) comprises a first elongated closure element (78) and a second elongated closure element (80) made of hydrosoluble thermoplastic material fixed to opposite walls of said flexible bag and having respectively a slot and a ridge mutually engageable so as to form a zip device.

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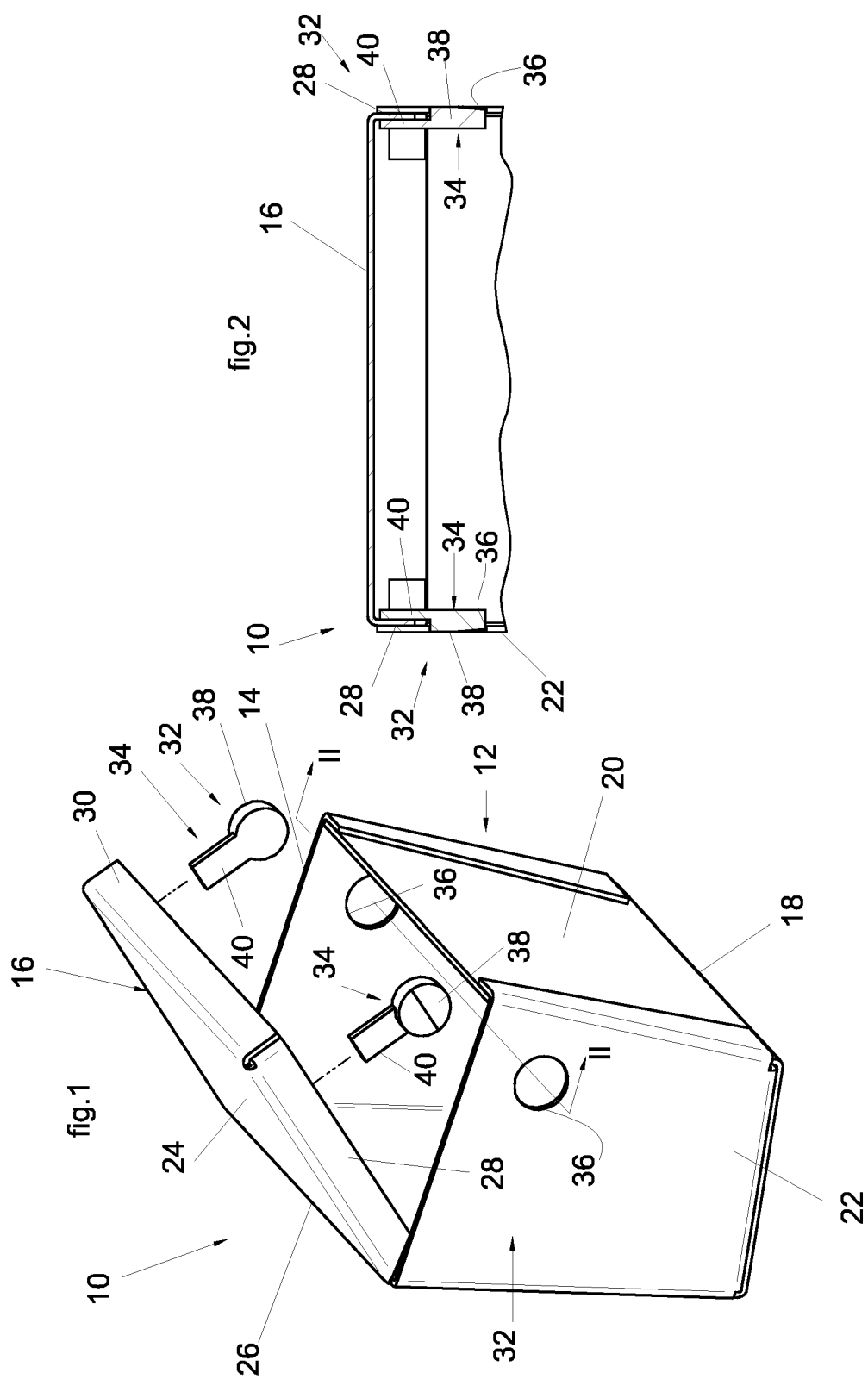
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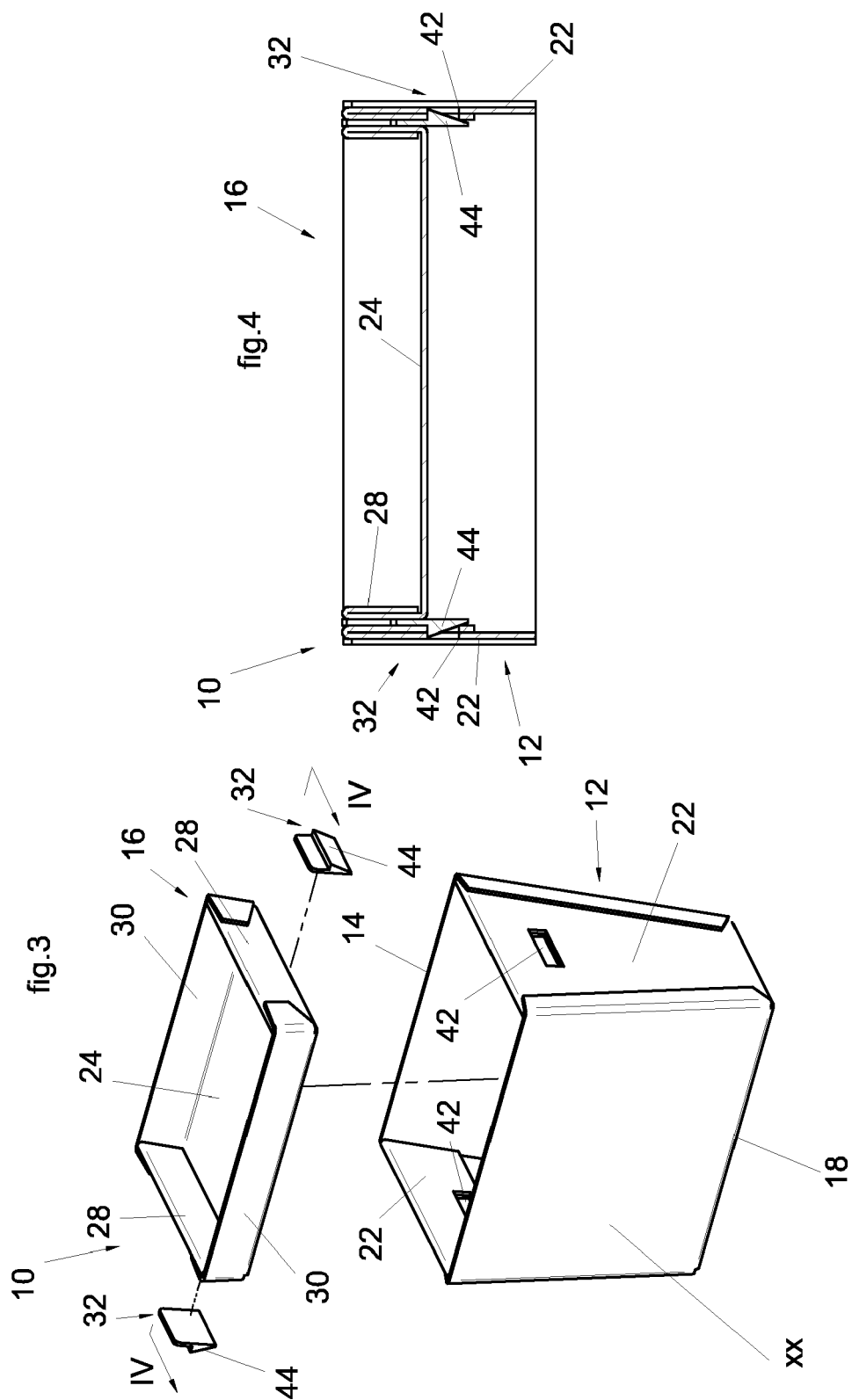
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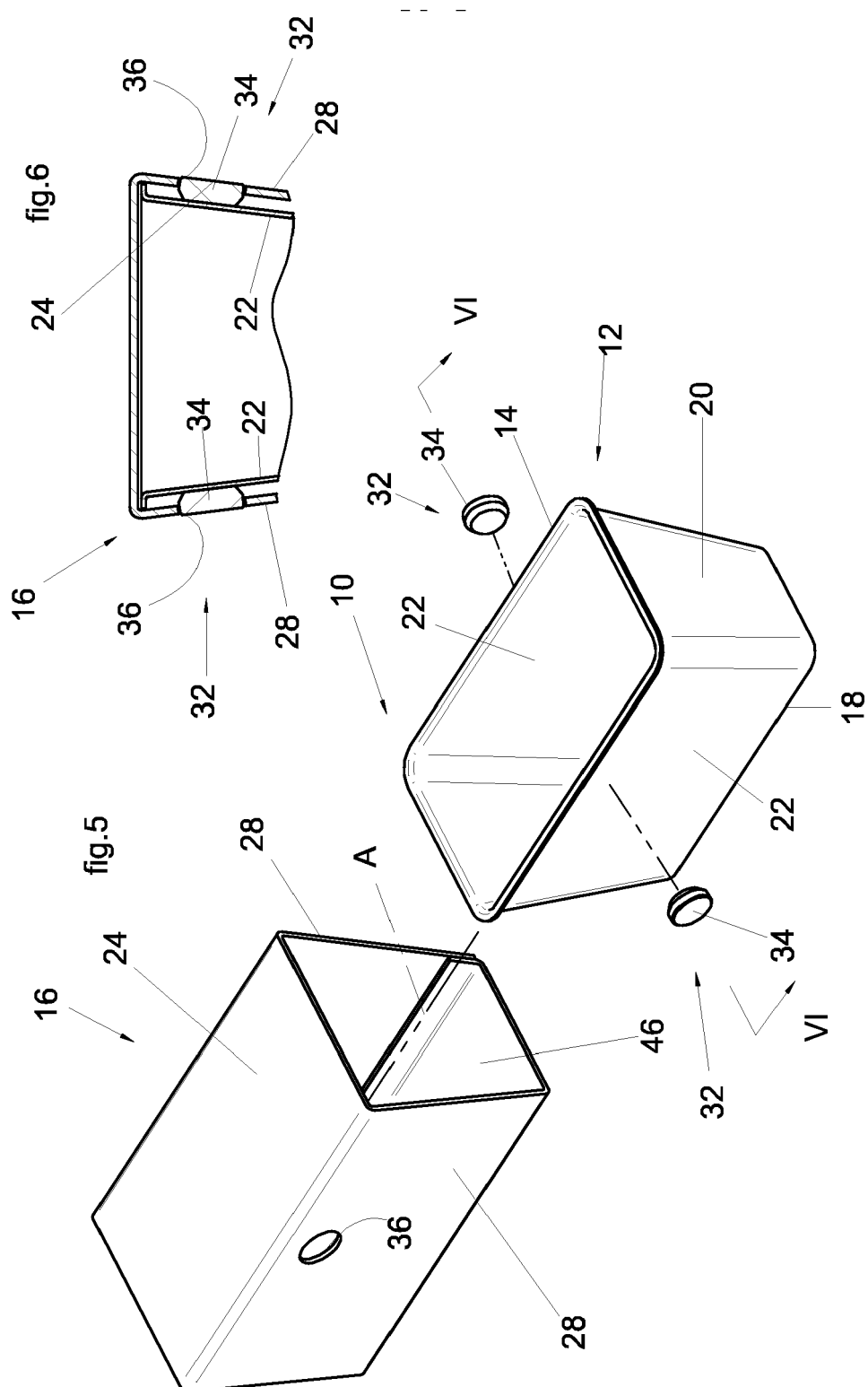
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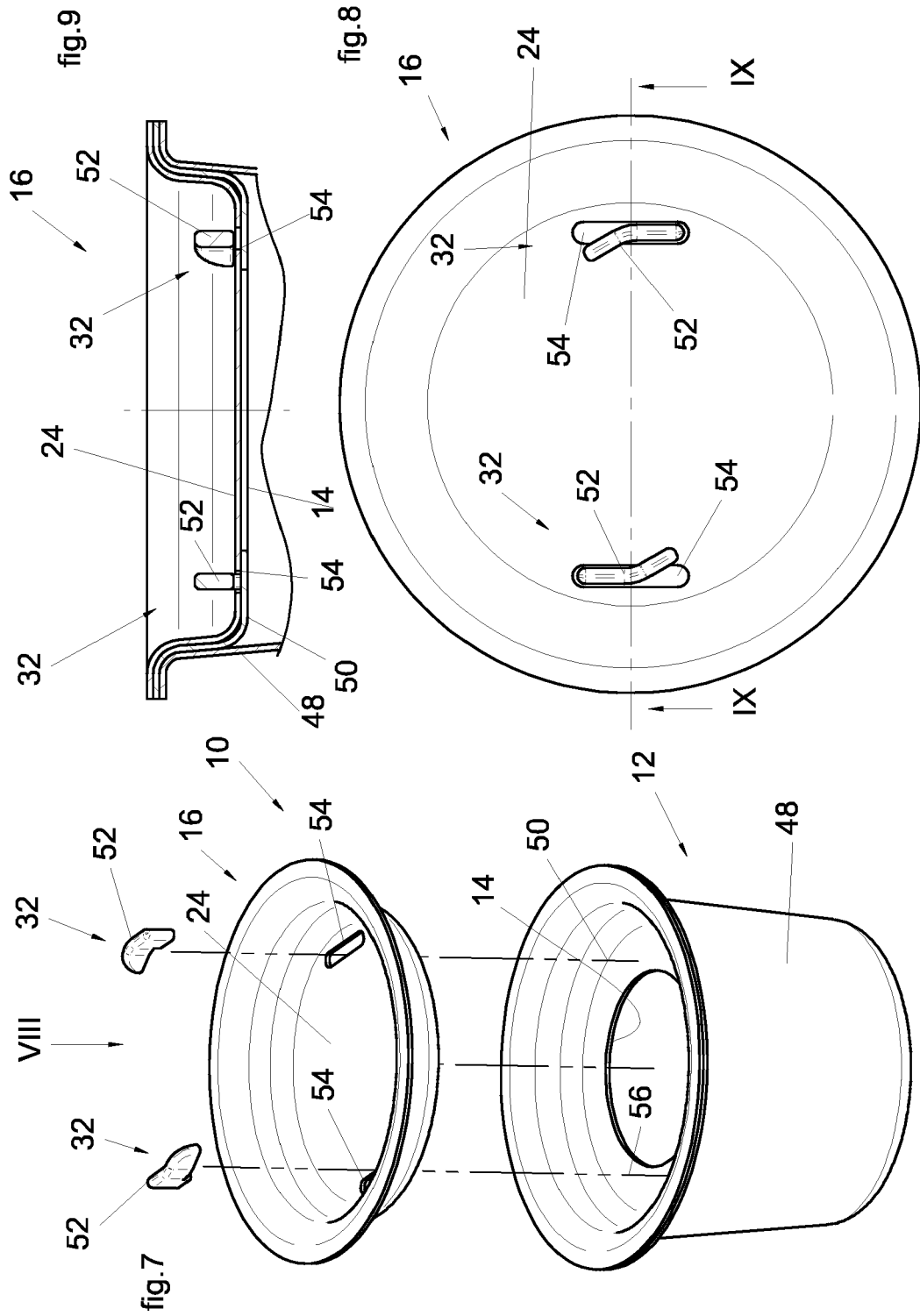
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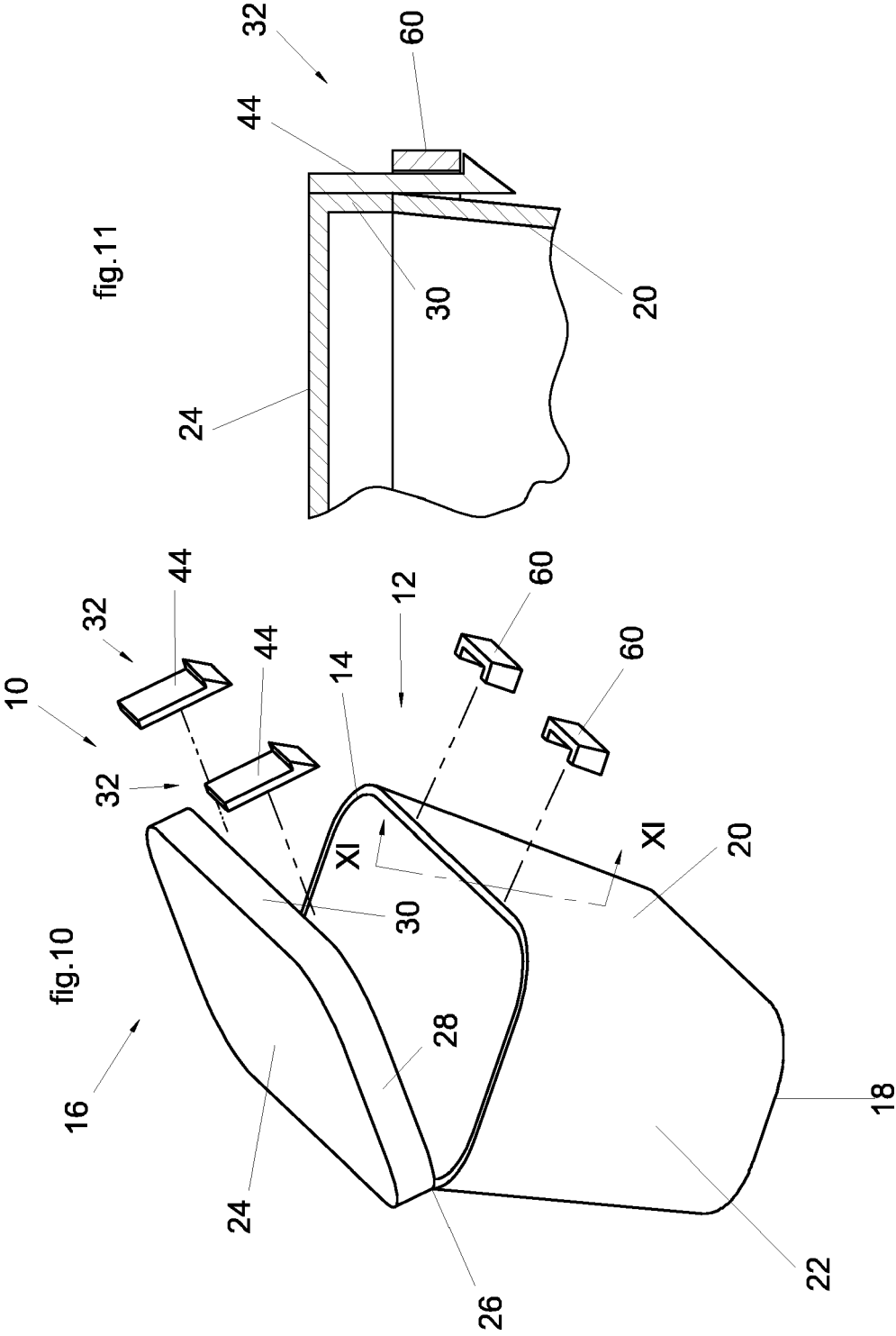
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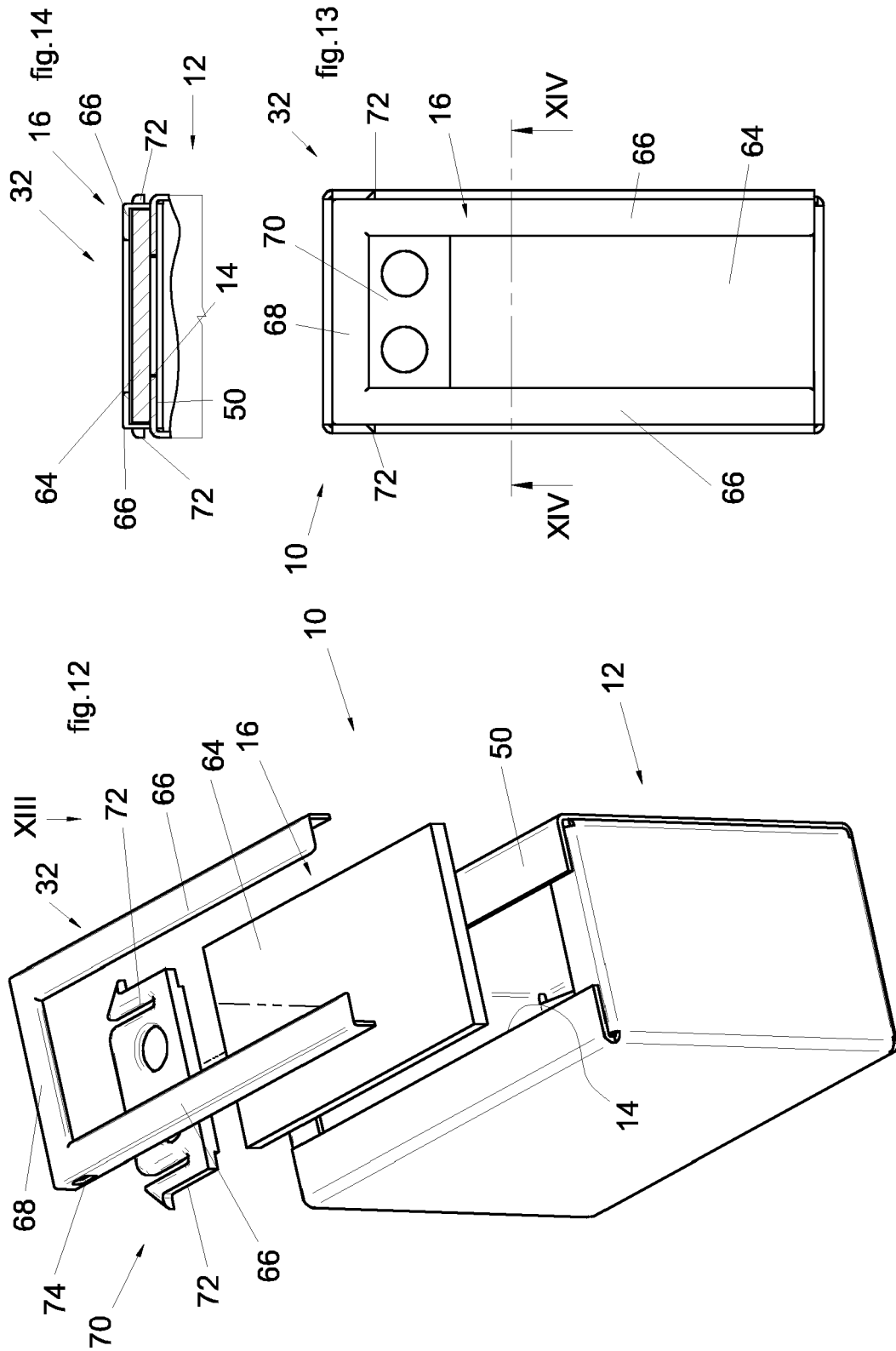


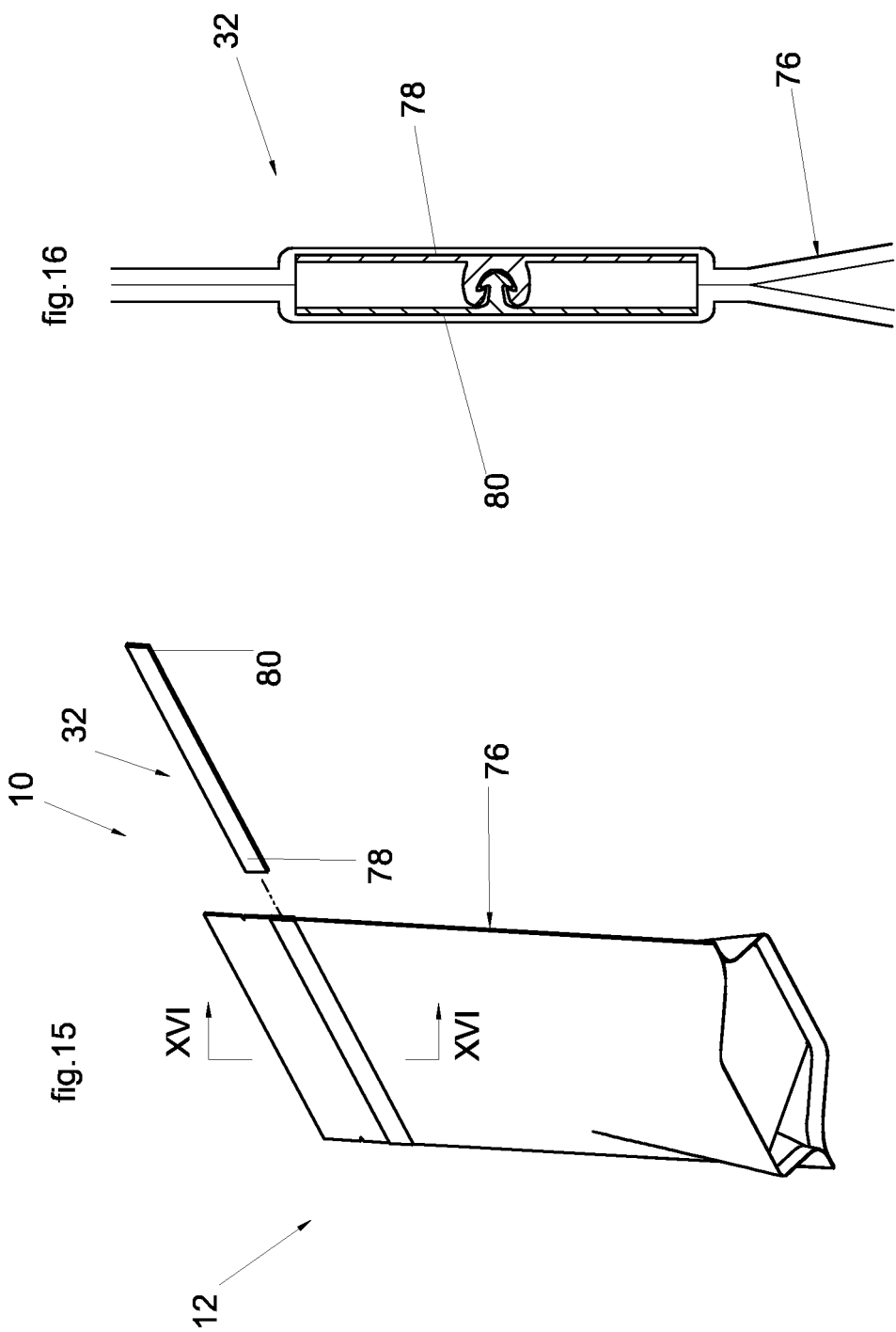














EUROPEAN SEARCH REPORT

Application Number
EP 21 17 4048

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	WO 94/11257 A1 (ROBERTS SYSTEMS INC [US]) 26 May 1994 (1994-05-26) * page 4, line 13 - page 5, line 16; figures 1-4 *	1-4	INV. B65D5/38 B65D5/64 B65D5/66 B65D33/25 B65D43/02 B65D65/46
A	WO 98/43877 A1 (SUNDS DEFIBRATOR IND AB [SE]; LUNDBERG T JOERGEN [SE]) 8 October 1998 (1998-10-08) * claims 1-2 *	1	
E	WO 2021/183629 A1 (ILLINOIS TOOL WORKS [US]) 16 September 2021 (2021-09-16) * claim 1 *	1,11	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 8 November 2021	Examiner Bridault, Alain
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			

EPO FORM 1503 03.82 (P04C01)

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

EP 21 17 4048

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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