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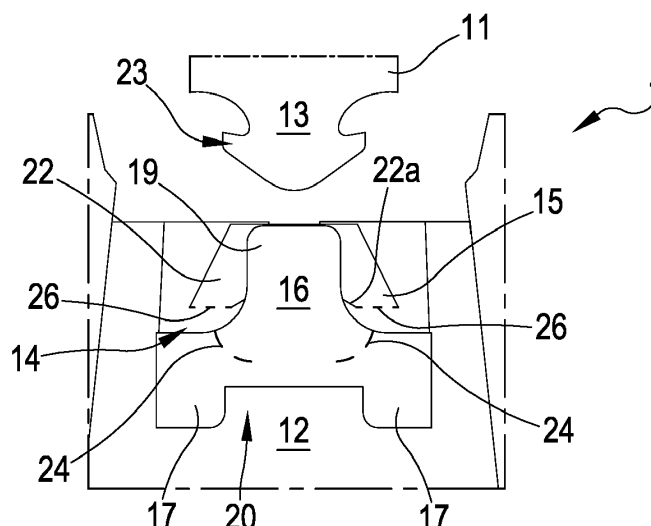
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(54) **TAMPER-EVIDENT COUPLING SYSTEM, PROCESS OF MAKING SAID COUPLING SYSTEM, CONTAINER COMPRISING SAID COUPLING SYSTEM AND USE THEREOF**

(57) The present invention relates to a coupling system (1) made of tamper-evident sheet material comprising: a first base portion (11), a second base portion (12), a first coupling portion (13) borne by the first base portion (11), a second coupling portion (14) borne by the second base portion (12). The first and the second coupling portions are configured for defining an arming condition in which they are stably engaged with each other. At least one between the first and the second coupling portion (13, 14) comprises a removable portion (15) configured for separating from the coupling system upon a first disengagement condition of the first and second coupling

portion (13, 14) following the arming condition for preventing a following coupling of the first and second coupling portion (13, 14). The coupling system comprises a supporting portion (16) constrained to the second base portion (12) and/or the second coupling portion (14); said supporting portion is configured, during an initial contact step between the first and the second coupling portion (13, 14), for supporting the second coupling portion. The present invention also relates to a process for making the coupling system, a container comprising said coupling system as well as a use of the latter.

FIG.3



Description

FIELD OF THE INVENTION

[0001] The present invention relates to a tamper-evident coupling system and a process for making the same. The present invention further relates to a container comprising said coupling system and a use of said coupling system for containers, packaging, envelopes and/or bands for the containment and/or wrapping of products of various kinds. The coupling system may find application in all the fields providing for the packaging of products and requiring a degree of security which enables to show a possible tampering of the package. For example, the coupling system may be employed in the fields of packaging, communication (for example, for postal services), transport and logistics.

BACKGROUND OF THE INVENTION

[0002] The employment of packages - made of paper or plastic material - is known, for products of various kinds and equipped with security systems defined as "tamper-evident". In fact, the demand for packaging to ensure to the consumer the integrity of the product is increasing: tamper-evident systems have the purpose of showing a first opening of the package, so as to warn of the danger of possible tampering of the product. For example, containers made of paper material are known which use, as tamper-evident system, adhesive labels positioned on the closure of the container and configured for preventing the opening of the latter without the previous removal of the label. Such containers, although equipped with a security system, are certainly more expensive with respect to conventional containers (containers without tamper-evident systems) since they require additional raw materials, such as seals/labels, as well as additional steps for the preparation and application of such elements. However, the adhesive labels do not allow the containers to be effectively made tamper-proof; the labels can easily be removed by removing the same without this operation clearly damaging the package: after opening the container, it is possible to tamper with the contents thereof and replace the same label removed - or a new label - on the closure of the container without the user having evidence of the tampering of the product. Given the poor efficacy of the labels described above, tamper-evident containers made of paper material have been manufactured which do not require the application of additional seals to close the container itself. A first example, described in patent application BE410524A, relates to a box made of paper material exhibiting a storage provided with an opening delimited by a free edge. The container also has a closing tab engaged on the free edge of the storage and movable by rotation around the latter between a closed and an open condition of the container. The closing tab bears a inserting portion adapted to be inserted inside the container in the closed condition thereof; on the inserting

portion, two folded flaps are defined opposite to each other, joined to the inserting portion by means of a weakened portion. The container also comprises a coupling portion defined by a tab integrally joined to the free edge of the storage, V-folded inside the storage itself. On the tab - at the bottom of the "V" shape - a pocket is defined for receiving the coupling portion in the closed condition of the container: the tabs, in the closed condition of the container, are configured to fit into the pocket and constrain to the coupling portion in such a way as to lock the closure tab to the storage. Following a first open condition of the container, the flaps are configured for detaching from the inserting portion.

[0003] Although the container described in application no. BE410524A is an improvement over the containers described above, however it is noted that the tamper-evident safety system of the application BE410524A does not allow clear evidence if the container has been previously tampered with: the user must be able to notice the container tampering only on the basis of the perceived resistance which opposes the opening of the container.

[0004] A second example, described in patent application WO2015170203A1 of the same Applicant, relates to a tamper-evident container of sheet material exhibiting a storage provided with an opening delimited by a free edge. The container comprises a closing system associated to the free edge of the storage and movable by rotation around the latter between a closed condition and an open condition of the container. The container comprises a security device exhibiting a first coupling portion associated with the closing system and a second coupling portion arranged inside the storage; the first and the second coupling portions are configured for engaging under a first closed condition of the container. The security device further comprises a removable portion defined by at least one between said first and second coupling portions; the removable portion is configured for breaking and separating from the container under a first opening condition of the latter immediately following the first closed condition. A through opening is present on the storage, enabling the display of the removable portion. The container described in application WO2015170203A1 is an improvement with respect to the previous solutions described above, since - in addition to enabling an effective closure of the container without the use of additional seals - it is capable of clearly showing the occurred tampering of the container by virtue of the presence of the through opening on the storage, through which the lack of the removable portion of the security device may be immediately identified. However, the Applicant has noted that the tamper-evident security devices known today - although widely used - may be further improved.

OBJECT OF THE INVENTION

[0005] The object of the present invention therefore is to substantially solve the drawbacks and/or limitations of

the above prior art.

[0006] A first objective of the invention is to provide a coupling system which may effectively guarantee that tampering is shown at a first opening thereof; in particular, it is the object of the invention to provide a tamper-evident coupling system having a tamper-evident security system which is easily armable (activatable) under a first closed condition thereof. It is a further object of the invention to provide a coupling system of simple and rapid manufacturing, which enables to reduce product and production costs to a minimum. It is an additional object to provide a coupling system which is flexible in the use thereof, which may be effectively employed on different types of products, such as, for example, containers of sheet material (both made of paper and plastic), envelopes, product wrapping bands. An additional object is to facilitate and make the activation step of the coupling system more reliable during the automatic implementation process. One or more of the objects described above and which will become more apparent in the course of the following description are substantially achieved by a tamper-evident coupling system, a manufacturing process and a use of the coupling system itself according to one or more of the accompanying claims and/or of the following aspects, taken alone or in any combination thereof or in combination with any one of the accompanying claims and/or in combination with any of the further aspects or features described below.

SUMMARY

[0007] A first aspect provides for a tamper-evident coupling system (1) of sheet material, comprising:

- at least one first base portion (11),
- at least one second base portion (12),
- at least a first coupling portion (13) borne by the first base portion (11),
- at least one second coupling portion (14) borne by the second base portion (12) and configured for co-operating with said first coupling portion (13),

the first and the second coupling portion (13, 14) being configured for defining at least one arming condition in which said first and second coupling portion (13, 14) are stably engaged with each other, wherein at least one between the first and the second coupling portion (13, 14) comprises at least one removable portion (15) configured for separating from the coupling system (1) - upon a first disengagement condition of said first and second coupling portion (13, 14) following said arming condition - to inhibit a following coupling of said first and second coupling portion (13, 14), the coupling system (1) comprising at least one supporting portion (16) directly constrained to at least one between the second base portion (12) and the second coupling portion (14), wherein the supporting portion (16) is configured - at least during an contact initial step between

the first and second coupling portion (13, 14) of the coupling system (1) before said arming condition - for supporting at least part of said second coupling portion (14).

[0008] In a second aspect according to the first aspect, the supporting portion (16) comprises a reciprocal coupling portion (17) overlapping and stably fastened to at least a respective reciprocal coupling portion (18) of at least one selected between the second base portion (12) and the second coupling portion (14).

[0009] In a third aspect, according to the preceding aspect, the supporting portion (16) comprises a thrusting portion (19) emerging from the reciprocal coupling portion (17) of the same supporting portion (16), said thrusting portion (19) being configured for receiving against it, to sustain it, the second coupling portion (14).

[0010] In a fourth aspect, according to the preceding aspect, the thrusting portion (19) is movable, in particular rotatively, with respect to the reciprocal coupling portion (17) of the supporting portion (16) itself.

[0011] In a fifth aspect, according to the third or the fourth aspect, the thrusting portion (19) is not directly constrained to the first coupling portion (13), to the second coupling portion (14), to the first base portion (11) and to the second base portion (12).

[0012] In a sixth aspect, according to any one of the aspects from the third to the fifth, the thrusting portion (19) and the reciprocal coupling portion (17) of the supporting portion (16) are integrally joined defining a tab of sheet material.

[0013] In a seventh aspect, according to any one of the aspects from the third to the sixth, the reciprocal coupling portion (17) of the supporting portion (16) is defined at a bottom area (20) of the supporting portion (16), the thrusting portion (19) emerging from the bottom portion (20) along a longitudinal development trajectory of the supporting portion (16).

[0014] In an eighth aspect according to any one of the aspects from the second to the fifth, the supporting portion (16) comprises at least two reciprocal coupling portions (17) substantially disposed at longitudinally opposite end portions of the supporting portion (16) itself, optionally the two reciprocal coupling portions (17) symmetrically extend with respect to the longitudinal development path.

[0015] In a ninth aspect according to any one of the aspects from the second to the eighth, the reciprocal coupling portion (17), optionally each reciprocal coupling portion, of the supporting portion (16) is fixed by means of adhesive material, in particular it is glued, to at least one between the second base portion (12) and the second coupling portion (14).

[0016] In a tenth aspect, according to any one of the preceding aspects, the reciprocal coupling portion (17) of the supporting portion (16) is exclusively and directly engaged, in particular stuck, with the second base portion (12).

[0017] In an eleventh aspect, according to any one of the preceding aspects, the second coupling portion (14)

is facing and in contact with the second base portion (12).

[0018] In a twelfth aspect, according to any one of the preceding aspects, the first coupling portion (13) is - at least in the arming condition - facing and in contact with the second base portion (12).

[0019] In a thirteenth aspect, according to any one of the preceding aspects, the removable portion (15) comprises at least one undercut portion essentially defining a coupling edge adapted to receive in engagement said first or second coupling portion (13, 14).

[0020] In a fourteenth aspect according to any of the preceding aspects, the second coupling portion (14) comprises at least one hook (22) defining at least one undercut portion delimited by a gripping edge (22a), wherein the first wherein the first coupling portion (13) comprises at least one respective hook (23) defining at least one undercut portion delimited by a respective gripping edge (23a), said hooks (22, 23) of the first and second coupling portion (14, 13), being configured to engage stably to each other at least during the arming condition, optionally said hooks (22, 23) - in the arming condition - having respective concavities facing each other.

[0021] In a fifteenth aspect according to the preceding aspect, the first coupling portion (13) comprises at least a pair of undercut portions delimited by a respective pair of gripping edges (23a) and defining two respective hooks (23).

[0022] In a sixteenth aspect according to the preceding aspect, the hooks (23) of the first coupling portion (13) - in the arming condition - being configured for engaging the hook (22) of the second coupling portion (14), optionally the second coupling portion (14) comprising a single undercut portion defining a single hook (22).

[0023] In a seventeenth aspect according to any one of the preceding aspects, the supporting portion (16) is joined in a single piece to the second coupling portion (14).

[0024] In an eighteenth aspect, according to any one of the preceding aspects, the second base portion (12) is joined in a single piece to the second coupling portion (14).

[0025] In a nineteenth aspect according to any one of the preceding aspects, the second coupling portion (14), the second base portion (12) and the supporting portion (16) are reciprocally joined together to define a single sheet, in particular of paper material, folded.

[0026] In a twentieth aspect according to any one of the preceding aspects, the second coupling portion (14) is interposed - at least during the arming condition - between the second base portion (12) and the supporting portion (16).

[0027] In a twenty-first aspect according to any one of the preceding aspects, the second coupling portion (14), the second base portion (12) and the supporting portion (16) are obtained by folding a single sheet, in particular of paper material.

[0028] In a twenty-second aspect, according to any one of the preceding aspects, the supporting portion (16)

comprises a weakening portion (24) configured for enabling the supporting portion (16) to define at least the following operative condition:

- 5 - a holding operative condition defined during an initial step between said first and second coupling portion during which the first coupling portion (13) abuts on the second coupling portion (14), wherein the weakening portion (24) during said holding operative condition is intact and enables the supporting portion (16) itself to support the second coupling portion (14), limiting the movement thereof,
- 10 - a releasing operative condition, optionally defined at least under the arming condition, in which the breaking of the weakening portion (24) occurs, so that the supporting portion (16) may enable a greater movement of the second coupling portion (14) with respect to the holding operative condition,

20 said weakening portion (24) being configured for enabling the passage of the supporting portion (16) from the holding operative condition to the releasing one during the definition of the arming condition of the coupling system.

25 **[0029]** In a twenty-third aspect, according to the preceding aspect, the supporting portion (16), under the holding operative condition, exerts a pressure on the second coupling portion (14) to increase a flexural stiffness thereof.

30 **[0030]** In a twenty-fourth aspect according to the twenty-second or twenty-third aspect, the second coupling portion (14) comprising a base body (25) which directly bears the hook (22) of the same second coupling portion (14), said hook (22) of the second coupling portion (14) being rotatively movable with respect to said base body (25).

35 **[0031]** In a twenty-fifth aspect according to any one of aspects twenty-second to twenty-fourth, the supporting portion (16) - during the holding operative condition - is configured to receive in abutment at least the hook (22) of the second coupling portion (14), to limit a rotation of said hook (22) approaching the supporting portion (16) itself. In a twenty-sixth aspect according to any one of the aspects from twenty-second to twenty-fifth, the supporting portion (16), during the holding operative condition - is configured to allow an angular displacement of the hook (22) of the second coupling portion (14) that is smaller than 90°, in particular contained between 0° and 70°, still more in particular contained between 0° and 45°; said angular displacement is understood as the relative rotation of the hook (22) considered between an initial position of the hook (22) - previously the holding operative condition - essentially aligned with the base body (25) and a final position that said hook (22) can assume in the holding operative condition.

50 **[0032]** In a twenty-seventh aspect, according to any one of the aspects twenty-second to twenty-fifth, the supporting portion (16), under the releasing operative con-

dition - is configured for enabling an angular displacement of the hook (22) of the second coupling portion (14) greater than the angular displacement enabled under the holding operative condition.

[0033] In a twenty-eighth aspect according to any one of the aspects twenty-second to twenty-sixth, the supporting portion (16) is configured for counteracting the bending of at least part of the second coupling portion (14) during the holding operative condition, in particular during the engagement step between the first and second coupling portion (13, 14).

[0034] In a twenty-ninth aspect, according to any one of the aspects twenty-second to twenty-eighth, the supporting portion (16) is configured for counteracting the bending of the hook (22) of the second coupling portion (14) during the holding operative condition.

[0035] In a thirtieth aspect according to any one of the preceding aspects, the removable portion (15) is defined by at least one part of the second coupling portion (14).

[0036] In a thirty-first aspect, according to any one of the preceding aspects, the removable portion (15) is defined by the hook (22) of the second coupling portion (14).

[0037] In a thirty-second aspect according to the preceding aspect, the second coupling portion (14) comprises a weakening element (26) delimiting the hook (22) of the same second coupling portion (14) which defines said removable portion (15).

[0038] In a thirty-third aspect, according to the thirty-first or thirty-second aspect, the second coupling portion (14) exhibits a weakening between the base body (25) and the hook (22) so that said hook (22) can define said removable portion (15).

[0039] In a thirty-fourth aspect according to any one of the first to the twenty-ninth aspects, the removable portion (15) is defined by at least one part of the first coupling portion (13), optionally the removable portion (15) is defined by the respective hook (23) of the first coupling portion (13).

[0040] In a thirty-fifth aspect according to the preceding aspect, the first coupling portion (13) comprises a weakening element (26) delimiting the respective hook (23) of the same first coupling portion (13) which defines said removable portion (15), optionally the first coupling portion (13) has a weakening element (26) between a base body and the respective hook (23) so that the latter can define said removable portion (15).

[0041] In a thirty-sixth aspect according to any one of the aspects from thirty-first to thirty-fifth, the weakening element (26) of the first or second coupling portion (13, 14) comprises at least one selected from: one or more cuts passing through the sheet material, an incision of the sheet material, a local squashing of the sheet material.

[0042] In a thirty-seventh aspect according to any one of the preceding aspects, the system comprises at least one of:

- a through opening (28) defined on the first base por-

- tion (11) which is configured - in the arming condition - to enable the display of the removable portion (15),
- an indentation (29) defined on the second base portion (12) which is configured - in the arming condition - to enable the display of the removable portion (15).

[0043] In a thirty-eighth aspect, according to the preceding aspect, the second coupling portion (14), in particular, the removable portion (15), comprises a projection (30) which is configured for crossing - at least under the arming condition - at least partially, the through opening (28) defined on the first base portion (11).

[0044] In a thirty-ninth aspect according to the thirty-seventh or thirty-eighth aspect, the indentation (29) enables the display - in the arming condition of the coupling system - of the second coupling portion (14), in particular of the removable portion (15).

[0045] In a fortieth aspect according to any one of the aspects from the thirty-seventh to the thirty-ninth, the indentation (29) defines an open perimetric outline having at least one selected from the group of the following shapes: "C" shape, "U" shape, "V" shape.

[0046] In a forty-first aspect according to any one of the aspects from the thirty-seventh to the fortieth, the through opening (28) of the first base portion (11), in the arming condition of the coupling system (1), is arranged at the indentation (29).

[0047] In a forty-second aspect according to any one of the aspects from thirty-seventh to forty-first, the indentation (29) and the through opening (28) of the first base portion (11) are facing each other.

[0048] In a forty-third aspect according to the any one of the aspects from the thirty-seventh to the forty-second, the through opening (28) and the indentation (29), in the arming condition of the coupling system (1), are at least partly counter-shaped to each other and allow the display of the removable portion (15), optionally the tactile perception of the projection (30).

[0049] In a forty-fourth aspect according to any one of the preceding aspects, the first base portion (11) is integrally joined to the first coupling portion (13), said first base portion (11) and the first coupling portion (13) defining a single sheet, for example of paper material.

[0050] In a forty-fifth aspect according to any one of the preceding aspects, the first coupling portion (13) extends without interruption from the first base portion (11) to define a tab of sheet material.

[0051] In a forty-sixth aspect a tamper-evident container (100) is provided for, comprising:

- at least one storage (2) of sheet material defining an internal volume (3) and configured for housing products, said storage (2) exhibiting a predetermined number of lateral walls (4) defining at least one passage opening (5) delimited by a free edge (6), said passage opening (5) being configured for putting in communication the internal volume (3) of the storage (2) with the external environment,

- at least one coupling system (1) according to any one of the preceding claims,

wherein the first base portion (11) is constrained by rotation to the free edge (6) of the storage (2), the first coupling portion (13) is borne by the first base portion (11) so that this latter is interposed between the free edge (6) of the storage (2) and the first coupling portion (13), wherein the first base portion (11) and the first coupling portion (13) are movable, in particular by rotation, relative to the storage (2), and are configured for defining at least one closing condition in which at least part of the first base portion (11) interdicts communication between the internal volume (3) of the storage (2) and the external environment, the first base portion (11) and the first coupling portion (13) being further configured for defining an opening condition in which the latter allows communication between the internal volume (3) and the external environment,

wherein the second base portion (12) of the coupling system (1) defines at least part of a lateral wall (4) of the storage (2) while the second coupling portion (14) is at least partly arranged in the internal volume (3) of said storage (2), wherein the coupling system (1) - during a first closure condition of the container (100) - is configured for defining the arming condition in which the first and second coupling portions (13, 14) are engaged with each other, in which the coupling system (1) - during a first opening condition of the container (100) subsequent to the first closure condition - is configured for defining the first disengagement condition during which the removable portion (15) is configured for separating from the coupling system (1) to show evidence of tampering of the coupling system (1) itself and therefore of the container (100). In a forty-seventh aspect according to the preceding aspect, the supporting portion (16) of the coupling system (1) is arranged in the storage.

[0052] In a forty-eighth aspect according to the forty-sixth or the forty-seventh aspect, the supporting portion (16) of the coupling system (1) is entirely arranged in the internal volume (3) of the storage (2).

[0053] In a forty-ninth aspect according to any one of the aspects forty-sixth to forty-eighth, the second base portion (12) defines at least part of a lateral wall (4) of the storage (2), wherein the reciprocal coupling portion (17) of the supporting portion (16) is engaged to an inner surface of the second base portion (12), optionally of at least one lateral wall (4) of the storage (2), spaced apart of the free edge (6), wherein the thrusting portion (19) of the supporting portion (16) itself extends from said reciprocal coupling portion (17) towards the free edge (6), in particular the thrusting portion (19) extends up at said free edge. In a fiftieth aspect, according to the preceding aspect, the first base portion (11) comprises:

- a closing portion (7) directly engaged with the free edge (6) of the storage (2) and movable, in particular rotatively, with respect to the latter,

- at least one inserting portion (8) configured for being inserted, under the closed condition of the container inside the internal volume (3) of the storage (2),

5 in which the first coupling portion (13) extends as a prolongation of the first base portion (11) from the opposite part to the storage (2), in which, under the first closed condition of the container (1) and therefore under the arming condition, the first and the second coupling portions (13, 14) are engaged with each other in the internal volume (3) of the storage (2).

[0054] In a fifty-first aspect, according to the preceding aspect, the closing portion (7) and the inserting portion (8) of the first base portion (11) are integrally joined defining a closing tab (9) of the container (100) made of sheet material, for example paper.

[0055] In a fifty-second aspect according to any one of the aspects forty-sixth to fifty-first, the gripping edge (22a) delimiting the at least one undercut portion of the hook (22) of the second coupling portion (14) is, at least in the arming condition, spaced from the free edge (6) of the storage (2), in particular it is placed inside the storage (2).

[0056] In a fifty-third aspect according to any one of the aspects from forty-sixth to fifty-second, the through opening (28) is defined on the closing portion (7) and/or on the inserting portion (8), said through opening (28) being configured for arrange, at least in the condition of first closure of the container, at the removable portion (15). In a fifty-fourth aspect according to any one of the aspects from forty-sixth to fifty-third, the through opening (28), following the arming condition of the coupling system (1) and before the first disengagement condition, is adapted to allow the passage of the projection (30) of the removable portion (15) and then the exit of the projection itself from the storage (2).

[0057] In a fifty-fifth aspect according to any one of the aspects from forty-sixth to fifty-fourth, the through opening (28) is defined, without interruption, at least partly on the closing portion (7) and at least partly on the inserting portion (8) of the closing tab (9).

[0058] In a fifty-sixth aspect according to any one of the aspects from forty-sixth to fifty-fifth, the second coupling portion (14) is directly connected to at least one lateral wall (4) of the storage (2) and extends at least partly parallel to the latter.

[0059] In a fifty-seventh aspect according to any one of the aspects from forty-sixth to fifty-sixth, the indentation (29) is defined on a lateral wall (4) of the storage (2).

[0060] In a fifty-eighth aspect according to any one of the aspects from forty-sixth to fifty-seventh, the lateral wall (4) on which the indentation (29) is defined is parallel to the second coupling portion (14).

[0061] In a fifty-ninth aspect according to any one of the aspects from the forty-sixth to the fifty-eighth, the indentation (29) is defined on the lateral wall (4) of the storage (2) directly connected to the second coupling portion (14). In a sixtieth aspect, a process is provided for the manufacturing of a coupling system (1) according to

any one of the aspects from the first to the forty-fifth.

[0062] In a sixty-first aspect, according to the preceding aspect, said process comprising at least the following steps:

- preparing at least one first base portion (11),
- preparing at least one first coupling portion (13),
- preparing at least one second base portion (12),
- preparing at least one second coupling portion (14),
- preparing at least one supporting portion (16),
- preparing at least one removable portion (15),
- constraining at least one part of the supporting portion (16) to at least one between the second base portion (12) and the second coupling portion (14).

[0063] In a sixty-second aspect, according to the preceding aspect, the step of preparing the first base portion (11) comprises:

- a step of preparing a first sheet (51) on a plane surface,
- a step of cutting the first sheet (51) defining the first base portion (11).

[0064] In a sixty-third aspect, according to the sixty-first or the sixty-second aspect, the step of preparing the first coupling portion (13) comprises:

- a step of preparing a second sheet (52) on a plane surface,
- a step of cutting the second sheet (52) defining the first coupling portion (13), in particular, said cutting step defining the respective hook (23) of the first coupling portion (13), even more in particular, said cutting step defining the gripping edge (23a) delimiting an undercut portion of the first coupling portion (13).

[0065] In a sixty-fourth aspect, according to any one of the aspects from the sixty-first to the sixty-third, the step of preparing the second base portion (12) comprises:

- a step of preparing a third sheet (53) on a plane surface,
- a step of cutting the third sheet (53) defining the second base portion (12).

[0066] In a sixty-fifth aspect, according to any one of the aspects from the sixty-first to the sixty-fourth, the step of preparing the second coupling portion (14) comprises:

- a step of preparing a fourth sheet (54) on a plane surface,
- a step of cutting the fourth sheet (54) defining the second coupling portion (14), in particular, said cutting step defining the hook (22) of the second coupling portion (14), even more in particular, said cutting step defining the gripping edge (22a) delimiting

an undercut portion of the second coupling portion (14).

[0067] In a sixty-sixth aspect, according to any one of the aspects from the sixty-first to the sixty-fifth, the step of preparing the supporting portion (16) comprises:

- a step of preparing a fifth sheet (55) on a plane surface,
- a step of cutting the fifth sheet (55) defining the supporting portion (16), in particular said cutting step defining the reciprocal coupling portion (17) and the thrusting portion (19).

[0068] In a sixty-seventh aspect, according to the preceding aspect, the step of cutting the fifth sheet (55) defines the weakening portion (24) configured for allowing the supporting portion (16) the passage from the holding condition to the releasing one during the definition of the arming condition of the coupling system (1).

[0069] In a sixty-eighth aspect, according to any one of the aspects from the sixty-first to the sixty-seventh, the step of preparing the removable portion (15) comprises a step of cutting the second (52) or fourth sheet (54) defining the weakening element (26) of the removable portion (15).

[0070] In a sixty-ninth aspect, according to any one of the aspects from the sixty-first to the sixty-eighth, the cutting step provides for at least one operation between: punching, engraving, shearing, laser cutting.

[0071] In a seventieth aspect according to any one of the aspects from sixty-first to sixty-ninth, the step of constraining at least a part of the supporting portion (16) to at least one of the second base portion (12) and the second coupling portion (14) comprises at least one of:

- a step of gluing the supporting portion (16) to at least one of the second base portion (12) and the second coupling portion (14), in particular the gluing of the reciprocal coupling portion (17) of the supporting portion (16) with the respective reciprocal coupling portion (18) of at least one selected between the second base portion (12) and the second coupling portion (14), said gluing step providing a step of dispensing adhesive material on at least one between the first, fourth and fifth sheets (51, 54, 55),
- a step of anchoring the supporting portion (16) to at least one between the second base portion (12) and the second coupling portion (14), by means of at least one operation selected between deformation, cutting and pressing of at least one between the first, fourth and fifth sheet (51, 54, 55).

[0072] In a seventy-first aspect according to any one of the aspects from sixty-first to seventieth, the first and second sheets (51, 52) are joined together to form a single body.

[0073] In a seventy-second aspect according to any

one of the aspects from sixty-first to seventy-first, the third, fourth and fifth sheets (53, 54, 55) are joined together to form a single body.

[0074] In a seventy-third aspect, according to any one of the aspects from the sixty-first to seventy-second, the first, second, third, fourth and fifth sheet are made of paper sheet material.

[0075] In a seventy-fourth aspect, a process is provided for making a container (100) according to any one of the aspects from the forty-sixth to the fifty-ninth, said process comprising at least the following steps:

- preparing the storage (2),
- preparing the coupling system (1) so that:
 - the first base portion (11) and the first coupling portion are borne by the free edge (6) of the storage (2) and are rotatively movable with respect to the latter,
 - the second base portion (12) defines at least part of a lateral wall (4) of the storage,
 - the second coupling portion (14) is arranged at least partly in the internal volume (3) of the storage (2). In a seventy-fifth aspect, according to the preceding aspect, the preparation of the coupling system (1) occurs by means of the process according to any one of the aspects from the sixtieth to the seventy-third.

[0076] In a seventy-sixth aspect according to the seventy-fourth or seventy-fifth aspect, the storage preparation step (2) comprises at least the following sub-steps:

- preparing a sixth sheet (56) comprising at least one first and one second portion (57, 59) interconnected by a central connecting portion (58), said sixth sheet (56) further comprising at least one first and one second lateral connecting portion (60, 61), said central connecting portion (58) being interposed between the first and the second portion (57, 59), the first portion (57) being interposed between the first lateral connecting portion (61) and the central connecting portion (58), the second portion (59) being interposed between the second lateral connecting portion (60) and the central connecting portion (58), each of said portions (57, 58, 59, 60, 61) comprising at least two opposite longitudinal edges and two opposite end edges, said first and second portions (57, 59), central connecting portion (58) and said lateral connecting portions (60, 61) being joined along the longitudinal edges and aligned along a single connection direction,
- folding said sixth sheet (56), joining said lateral connecting portions (60, 61), to form the storage (2) exhibiting the passage opening (5) delimited by the free edge (6),
- preparing a seventh sheet (62) exhibiting at least one portion (63) connected to at least one central

and/or lateral connecting portion of the sixth sheet (56) and emerging with respect to the latter,

- folding the portion (63) of the seventh sheet (62) to form a resting portion (80) of the container (100),
- folding the first base portion (11) and the first coupling portion (13) of the first and second sheets (51, 52) to form the closing portion (7) and the inserting portion (8), respectively, of the closing tab (9).

[0077] In a seventy-seventh aspect, according to the preceding aspect, the third sheet (53) defining the second base portion (12) of the coupling system (1) is integrally joined to form a single body with the first portion (57) of the sixth sheet (56), in particular in which said third sheet (53) emerges from the longitudinal edges of the sixth sheet (56).

[0078] In a seventy-eighth aspect, according to the seventy-sixth or the seventy-seventh aspect, the first sheet (51) defining the first base portion (11) of the coupling system (1) is integrally joined to form a single body with the second portion (59) of the sixth sheet (56), in particular in which said first sheet (51) emerges from the longitudinal edges of the sixth sheet (56).

[0079] In a seventy-ninth aspect, a process is provided for, for the arming of the coupling system (1) according to any one of the aspects from the first to the forty-fifth, said process comprising the following steps:

- nearing the first coupling portion (13) and the second coupling portion (14) so that the first coupling portion may rest against the second coupling portion,
- during the nearing step, supporting the second coupling portion by the supporting portion (16)
- engaging the first and the second coupling portions (13, 14) defining the arming condition.

[0080] In an eightieth aspect, according to the preceding aspect, the step of nearing the first and the second coupling portions (13, 14) comprises the following sub-steps:

- nearing the hook (23) of the first coupling portion (13) to the hook (22) of the second coupling portion (14),
- putting in contact, optionally pressing, the respective hook (23) of the first coupling portion (13) at the hook (22) of the second coupling portion (14), in particular, so that the respective hook (23) is interposed between the hook (22) of the second coupling portion (14) and the second base portion (12).

[0081] In an eighty-first aspect, according to the seventy-ninth or the eightieth aspect, the step of nearing the first and the second coupling portions (13, 14) comprises a step of resting the thrusting portion (19) against the hook (22) of the second coupling portion (14), said support step defining the holding operative condition of the supporting portion (16).

[0082] In an eighty-second aspect, according to any

one of the aspects from the seventy-ninth to the eighty-first, the step of engaging the first and the second coupling portions (13, 14) comprises the following steps:

- inserting the respective hook (23) of the first coupling portion (13) at the gripping edge (22a) of the hook (22) of the second coupling portion (14),
- defining the grip between the undercut portions of the first and of the second coupling portion (13, 14) respectively delimited by the gripping edges (23a, 22a) defining the releasing operative condition, in particular, in which the breaking of the weakening portion (24) of the supporting portion (16) occurs, enabling an upper movement of the hook (22) of the second coupling portion (14) with respect to the holding operative condition.

[0083] In an eighty-third aspect, according to any one of the aspects from the seventy-ninth to the eighty-second, the process comprises a step of closing the storage (2) so as to interdict the reciprocal communication between the internal volume (3) of the storage (2) and the external environment, said closing step comprising:

- folding the closing portion (7) in rotation with respect to the free edge (6) of the storage (2),
- inserting the inserting portion (8) at least partially inside the internal volume (3) of the storage (2), in particular at the second coupling portion (14),
- performing the steps of exerting a reciprocal thrust between the first and second coupling portion (13, 14) and engaging the first and second coupling portion (13, 14).

[0084] In an eighty-fourth aspect, a use of a coupling system (1) according to any one of the aspects from the first to the forty-fifth is provided for defining at least one selected from the group of: a container for containing one or more products, an envelope for containing one or more products, a wrapping band of one or more products.

DESCRIPTION OF THE DRAWINGS

[0085] Some embodiments and some aspects of the invention are described below with reference to the accompanying drawings, provided by way of indication and therefore not by way of limitation, in which:

- Figures 1, 2 and 3 are front views of different embodiments of a coupling system according to the present invention arranged in a condition preceding a first arming condition;
- Figures 4 and 5 are front views of different embodiments of a coupling system according to the present invention arranged in a first arming condition;
- Figures 5A and 5B are sectional views of the coupling system according to the present invention arranged in different operative conditions;

- Figure 6 is a front view of a portion extending in a plane of the coupling system according to the present invention;
- Figure 6A is a view of a further portion extending in a plane of the coupling system according to the present invention;
- Figures 7 and 8 are perspective views of a container comprising a coupling system according to the present invention arranged in a condition before a first arming condition;
- Figures 9 and 10 are top views of a blank for making a container comprising a coupling system according to the present invention;
- Figures 11 and 12 show respective bending steps of a blank for making a container comprising a coupling system according to the present invention;
- Figure 13 is a cross-section of a container comprising a coupling system according to the present invention arranged in an arming condition, in particular in a first closing condition;
- Figure 14 is a cross-section of a container comprising a further embodiment of a coupling system according to the present invention arranged in an arming condition, in particular in a first closing condition;
- Figure 15 is a section of the container and of the coupling system, according to trace XV-XV in figure 13, arranged in an arming condition, in particular in a first closing condition;
- Figure 16A shows a container during a condition of initial contact or approach between coupling portions of the coupling system according to the present invention;
- Figure 16B shows a container during an initial engagement step of the coupling system according to the present invention;
- Figure 17 is a section of the container and of the coupling system, according to trace XVII-XVII in figure 16B, during an initial engagement step of the coupling system according to the present invention.

DEFINITIONS AND CONVENTIONS

[0086] It should be noted that in the present detailed description, corresponding parts illustrated in the various figures are indicated by the same reference numerals. The figures may illustrate the object of the invention by representations that are not in scale; therefore, parts and components illustrated in the figures relating to the object of the invention may relate solely to schematic representations.

[0087] By the term product it is instead meant an article or a mixture of articles of any kind. The term product may also mean a package, for example, bearing a plurality of items.

[0088] The term paper material means paper or cardboard, optionally having at least 50% by weight, preferably at least 70% by weight, of organic material comprising one or more between cellulose, hemicellulose, lignin,

lignin derivatives. The paper sheet material which may be used to manufacture the coupling system, the container or the envelope (optionally a band) may have a grammage from 50 to 500 g/m², in particular from 200 to 400 g/m². The subject paper material extends between a first and a second prevailing development surface. The sheet paper material used for manufacturing the coupling system and the container (optionally of the envelope or band) can, in an embodiment variant, be covered for at least a part of the first and/or second prevalent development surface by a coating made of plastic material, for example a film, whose purpose is to reinforce the paper material. The coating may also be employed to define a sort of water and/or humidity barrier, useful to avoid the weakening and loss of structurality of the coupling system and of the container (optionally of the envelope or the band) with consequent uncontrolled deformation of the paper material constituting the latter component.

[0089] The coating can be applied to the paper material in the form of a coating or varnish deposited from solution or sprayed, whose thickness is generally, without limitation, between 0.2 and 10 μm . Alternatively, the coating may comprise a plastic film, for example, a polyethylene lining, which may be applied by means of a rolling process, on one or both sides of the paper material. In case the coating is applied by rolling, the values of the plastic film (coating) may, for example, vary from 5 to 400 μm , in particular, from 10 to 200 μm , even more in particular, from 10 to 100 μm , of coating material (i.e., polyethylene). The plastic coating material may be selected, by way of example, from the following materials: PP, PE (HDPE, LDPE, MDPE, LLDPE), EVA, polyesters (including PET and PETg), PVdC. The envelope (optionally the band or the container) may be made of at least partly plastic sheet material or, alternatively, at least partly made of plastic material and partly of paper material.

DETAILED DESCRIPTION

Coupling system 1

[0090] Reference numeral 1 overall indicates a tamper-evident coupling system of sheet material, for example, of paper material, associable to packages of various kinds - for example, containers, envelopes or bands also made of sheet material - for the containment and/or wrapping of products. The coupling system 1 comprises a first base portion 11, a second base portion 12, a first coupling portion 13 borne by the first base portion 11, a second coupling portion 14 borne by the second base portion 12 and configured for cooperating with the first coupling portion 13. The first and the second coupling portions 13, 14 are configured for defining at least one arming condition in which the first and second coupling portions 13, 14 are stably engaged with each other.

[0091] The first base portion 11 comprises a sheet body spreading in thickness between a first and a second surface. The first base portion 11 stably bears the first

coupling portion 13. In greater detail, the first coupling portion 13 is engaged at an end portion of the first base portion 11: such portions 11, 13 are reciprocally engaged to essentially define a single perimetric edge. The first coupling portion 13 may be integrally joined to the first base portion 11 and extend as a prolongation, seamlessly, with respect to said first base portion 11.

[0092] The first coupling portion 13 may have a substantially arrow or trapezoidal shape. The possibility of manufacturing a first coupling portion 13 exhibiting a different shape, for example triangular or rectangular, is not excluded. The first coupling portion 13 is also made of sheet material, for example paper, and extends in thickness between a first and a second surface. The first surface of the first coupling portion 13 is directly connected and extends continuously without interruption to the first surface of the first base portion 11. Likewise, the second surface of the first coupling portion 13 is directly connected and extends continuously without interruption to the second surface of the first base portion 11.

[0093] As shown, for example, in figures 1-8, 11-16, the first coupling portion 13 comprises at least one hook 23 of sheet material defining at least an undercut portion delimited by a respective gripping edge 23a. The first coupling portion 13 may exhibit two respective hooks 23, symmetric to each other with respect to a mid-axis of the first coupling portion 13. In this embodiment, the two respective hooks 23 define two gripping edges 23a. The coupling system 1 may comprise at least one through opening 28 defined on the first base portion 11 and/or on the first coupling portion 13 as shown in figures 8, 12, 13, 15, 16B, 17. The through opening 28 may have a rectangular shape; alternatively, the through opening may have a circular, trapezoidal, triangular shape. The through opening 28 may be arranged on at least one between the first base portion 11 and the first coupling portion 13.

[0094] The second base portion 12 comprises a sheet body spreading in thickness between a first and a second surface. The second base portion 12 stably bears the second coupling portion 14. In greater detail, the second coupling portion 14 is engaged at an end portion of the second base portion 12. In particular, the second base portion is facing and at least partly in contact with the second surface of the second base portion 12. In detail, the second coupling portion 14 is joined in one piece to an end portion of the second base portion 12 and bent above it so that said second coupling portion faces the second base portion.

[0095] The second coupling portion 14 comprises a respective hook 22 made of sheet material having a substantially "C" or "V" shape. Alternatively, the hook 22 may have a rectangular, trapezoidal, circular or semicircular shape. The hook 22 defines at least one undercut portion delimited by a gripping edge 22a. The gripping edge 22a is delimited laterally by the two connecting edges 21 of the hook 22 which is symmetrical with respect to a centerline axis passing through the same hook 22. The sec-

ond coupling portion 14 may comprise a single undercut portion defining a single hook 22.

[0096] The second coupling portion 14 comprises a base body 25 which directly carries the hook 22, movable by rotation with respect to said body 25. In particular, the hook 22 is movable by rotation around an axis defined by the connecting edges 21 by an angle smaller than 90°, in particular between 0° and 70°, even more particularly between 0° and 45°. The rotation is measured starting from a configuration in which the hook 22 is substantially parallel to the second base portion 12 as shown in figure 7, 8, 12. The hook 22 and the base body 25 may be joined together to form a single body, for example made of paper-like material, folded over the second base portion 12; in this configuration, the second coupling portion 14 is substantially parallel to the second base portion 12. The second base portion 12 and the second coupling portion 14 may comprise distinct bodies bound together by means of adhesive material.

[0097] The hooks 23, 22 respectively of the first and second coupling portion 13, 14, are configured to firmly engage with each other during the arming condition of the coupling system 1: said hooks 22, 23 - during the arming condition - have respective concavities facing each other. In greater detail, the gripping edge 22a of the hook 22 and the respective gripping edges 23a of the respective hook 23 are configured for stably engaging with each other under the arming condition of the coupling system 1. The coupling step of the hooks takes place by means of an initial contact condition between the first and second coupling portion 13, 14; in particular, the first coupling portion is inserted in interposition between the hook 22 of the second coupling portion 14 and the second base portion 12: in this condition, the first coupling portion is slid onto the hook 22. After, the first coupling portion 13 is pressed below the second coupling portion 14 so that the hook 23 (optionally the hooks 23) couples with the hook 22 defining the arming condition. In the arming condition, the first and the coupling portion 13, 14 are substantially aligned along a coupling direction (see for example figures 5 and 6): at least the first base portion 11 carrying the first coupling portion 13 is directly interposed between the second base portion 12 and the hook 22.

[0098] The coupling system 1 may comprise at least one indentation 29 associated with the second base portion 12 (figures 8, 15, 16, 17) and defining on said portion 12 an open perimetric profile exhibiting a "C" shape, a "U" shape or a "V" shape. In detail, the indentation 29 is placed at a perimetric edge of the second base portion 12 to define a part of the perimetric edge of the second base portion 12 at the end portion of the latter carrying the second coupling portion 14. In other words, the indentation is a through opening defined on the second base portion 12, facing the second coupling portion 14. In the event that the second base portion 12 is integrally joined to the second coupling portion 14, the indentation 29 may be defined at the joining edge between the sec-

ond base portion 12 and the second coupling portion 14. The through opening 28 is arranged, at least in the arming condition of the coupling system 1, at the indentation 29: the indentation 29 and the through opening 28, in the arming condition of the coupling system 1, are facing each other.

[0099] The coupling system 1 comprises at least one removable portion 15 of sheet material borne by at least one between the first and the second coupling portions 13, 14; the removable portion 15 is configured for separating from the coupling system 1 upon a first disengagement condition between the first and second coupling portions 13, 14 following the arming condition. The separation of the removable portion 15 determines the impossibility of a following engagement between the first and second coupling portions 13, 14, so as to show a tampering of the coupling system 1. In other words, a possible attempt to open or tamper with the coupling system 1, following the arming condition of said system 1, would determine the breaking and therefore the detachment of the removable portion 15 from the coupling system 1 itself. Thereby, by virtue of the removable portion 15, it is possible to highlight the tampering of the coupling system 1 and inhibit a following anchoring between the first and the second coupling portion 13, 14.

[0100] The removable portion 15 may be borne by the second coupling portion 14 (figures 3, 12 and 13) and in particular be defined by the hook 22. In this configuration, the second coupling portion 14 comprises a weakening element 26 which delimits the hook 22 and defines the removable portion 15. In greater detail, the second coupling portion 14 has the weakening element 26 placed between the base body 25 and the hook 22, in particular at the connecting edge 21 between the hook 22 and the base body 25. In the accompanying figures, the removable portion 15 is defined by the hook 22 which has two lateral weakening elements 26 adapted to allow separation of the removable portion 15 from the base body 25 during an initial opening attempt of the coupling system 1 subsequent to the arming condition, so as to show the tampering thereof and prevent a subsequent arming condition.

[0101] The removable portion 15 defined by the hook 22 may exhibit a projection 30, shown in Figures 18, 1712, 2313, configured for allowing the user a tactile perception of the removable portion 15 itself. The projection 30 is made of sheet material and exhibits a substantially triangular shape, optionally it exhibits a trapezoidal, rectangular or semi-circular shape. In fact, the projection 30 of the removable portion 15 enables visually-impaired users to verify the presence of the removable portion 15 by means of a tactile perception thereof and therefore to verify the integrity or the tampering of the coupling system 1. In particular, under the arming condition of the coupling system 1, the through opening 28 allows the passage of the projection 30 of the removable portion 15 as shown in figures 13 and 15, so as to allow the tactile perception thereof by the user. In a further embodiment, the remov-

able portion 15 is defined by at least one part of the first coupling portion 13, in particular the removable portion 15 is defined by the respective hook 23 of the first coupling portion 13. In this configuration, the removable portion 15 is defined by the respective hooks 23 of the first coupling portion 13. In this latter configuration, the first coupling portion 13 comprises a weakening element 26 which delimits the respective hook 23 and defines the removable portion 15. In particular, the first coupling portion 13 has a weakening element 26 between a base body 27 of the base portion 11 and the respective hook 23 so that the latter can define the removable portion 15.

[0102] The weakening element 26 of the first or second coupling portion 13, 14 may be defined by one or more cuts passing through the sheet material, an incision of the sheet material, a local squashing of the sheet material. The weakening element 26 enables the separation of the removable portion 15 from the coupling system 1, allowing to show the tampering following a first arming condition of the coupling system 1 itself.

[0103] As described above, the removable portion 15 may be defined on the first and/or the second coupling portion 13, 14. In the event that the portion 15 is defined by the hook 22 of the second coupling portion 14, this portion 15 is visible - at least in the arming condition described above - through the through opening 28, optionally through the through opening 28 and the indentation 29. If, on the other hand, the removable portion 15 is defined on the first coupling portion 13, the portion 15 is immediately and directly visible exclusively through the indentation 29; in the latter configuration, the opening 28 defined on the first base portion 11 is optional.

[0104] The coupling system 1 further comprises at least one supporting portion 16 (figures 1-6, 15, 17) of sheet material and constrained to at least one between the second base portion 12 and the second coupling portion 14. The supporting portion 16 is configured, at least during an initial step of putting in contact the first and the second coupling portion 13, 14 of the coupling system 1 before the arming condition, for sustaining at least part of the second coupling portion 14.

[0105] In detail, the supporting portion 16 comprises a reciprocal coupling portion 17 (figures 11, 12) overlapped and stably constrained to at least one respective reciprocal coupling portion 18 of at least one selected between the second base portion 12 and the second coupling portion 14; the supporting portion 16 may comprise two symmetrical reciprocal coupling portions 17 with respect to a longitudinal development trajectory of the supporting portion 16: the two reciprocal coupling portions 17 may be constrained to two respective reciprocal coupling portions 18 of the second base portion 12 (figures 11 and 12). The reciprocal coupling portion 17, constrained to the respective reciprocal coupling portion 18, enables the supporting portion 16 to keep a substantially fixed position, reducing the possibility of a distancing rotation of the supporting portion 16 itself with respect to the second coupling portion 14 or to the second base portion

12. The reciprocal coupling portion 17 is fastened by means of adhesive material to at least one between the second base portion 12 and the second coupling portion 14. In greater detail, the reciprocal coupling portion 17 defines a surface of the supporting portion 16 stuck to at least one between the second base portion 12 and the second coupling portion 14. The reciprocal coupling portion 17 is defined at a bottom area 20 from which a thrusting portion 19 emerges (figures 4-8, 15, 17) configured for abuttingly receiving the second coupling portion 14. In particular, the thrusting portion 19 emerges from the bottom portion 20 of the supporting portion 16 along a longitudinal development trajectory of the supporting portion 16 itself; the thrusting portion may exhibit a rectangular, alternatively trapezoidal or triangular or semi-circular shape. In fact, the thrusting portion 19 is configured for supporting the second coupling portion 14 during an initial step of contact between the first and the second coupling portion 13, 14 of the coupling system 1 before the arming condition.

[0106] The thrusting portion 19 and the reciprocal coupling portion 17 of the supporting portion 16 may be integrally joined to define a tab of sheet material: the thrusting portion 19 is not directly constrained to the first coupling portion 13, to the second one coupling portion 14, to the first base portion 11 and to the second base portion 12. The thrusting portion 19 is constrained to the second base portion 12 by the reciprocal coupling portion from which it emerges.

[0107] The supporting portion 16 is positioned in such a way that the second coupling portion 14 is interposed between the second base portion 12 and the supporting portion 16 itself. In particular, the second coupling portion 14, the second base portion 12 and the supporting portion 16 are substantially parallel to one another, at least in an arming condition of the coupling system. In greater detail, the second coupling portion 14, the second base portion 12 and the supporting portion 16 are obtained by the multiple folding of a single sheet, in particular of paper material as shown in figure 11. Figure 15 shows a section of the coupling system 1 depicted in figure 13 in a first arming condition, highlighting the substantial parallelism between the second base portion 12, the second coupling portion 14 and the supporting portion 16.

[0108] The supporting portion 16 comprises a weakening portion 24 which may be defined by means of one or more cuts, incisions or veinings of the sheet material bearing the supporting portion 16. The supporting portion 16 may have two weakening portions 24, particularly symmetrical with respect to an axis passing through the centerline of the coupling system 1 (figures 4, 5, 11, 12). This weakening portion 24 is configured to allow the supporting portion 16 itself to define a holding operative condition and a releasing operative condition. The holding operative condition, shown in figure 16B and in the corresponding section in figure 17, is defined during an initial step of the arming condition under which the first coupling portion 13 rests against the second coupling portion 14;

in the holding condition, the weakening portion 24 is intact and enables the supporting portion 16 itself to sustain the second coupling portion 14 limiting the movement thereof. In particular, the thrusting portion 19 of the supporting portion 16 allows supporting the hook 22 of the second coupling portion 14: the thrusting portion 19, during the holding operative condition, exerts a thrust on the hook 22 of the second coupling portion 14 to increase the flexural stiffness thereof. The supporting portion 16, in particular the thrusting portion 19, is therefore configured for limiting the angular displacement of the hook 22 of the second coupling portion 14 during the holding operative condition to values lower than 90°, in particular between 0° and 70°, even more particularly between 0° and 45°. These angular values are measured as rotation of the hook 22 away from the second base portion 12. The angular displacement is understood as the relative rotation of the hook 22 considered between an initial position of the hook 22 shown in figures 7, 8 and 12, before the holding operative condition, essentially aligned with the base body 25 and optionally parallel to the second base portion 12, and a final position which the hook 22 may assume under the holding operative condition. The support provided by the supporting portion 16 allows obtaining a greater arming efficiency of the coupling system, allowing to correctly guide the approach and the contact between the first coupling portion 13 and the second coupling portion 14. In fact, since the arming step is performed automatically by dedicated machinery, the thrusting portion 19 prevents a possible overturning of the hook 22 of the second coupling portion 14 due to the thrusting force exerted by the respective hook 23 of the first coupling portion 13 during the initial anchoring step of the coupling system 1. The supporting portion 16 constrained to the base portion 12 is, therefore, an improvement during the first anchoring step of the coupling system 1.

[0109] The releasing operative condition, shown in Figure 13 and in the corresponding section of Figure 15, is defined at least under the arming condition in which the total or partial breaking of the weakening portion 24 occurs, so that the supporting portion 16 may enable a greater movement of the hook 22 of the second coupling portion 14 with respect to the holding operative condition. In particular, the weakening portion 24 is configured for allowing the passage of the supporting portion 16 from the holding operative condition to the releasing one during the definition of the arming condition of the coupling system 1. The release operative condition defines a reduction in the bending stiffness of the supporting portion 16, in particular the release operative condition reduces the thrust exerted by the thrusting portion 19 on the hook 22 of the second coupling portion 14 during the arming condition. The supporting portion 16, under the releasing operative condition, is configured for enabling an angular displacement of the hook 22 of the second coupling portion 14 greater than the angular displacement enabled to the hook 22 itself under the holding operative condition. The greater freedom of movement of the hook 22 of the

second coupling portion 14 under the releasing operative condition, with respect to the holding operative condition, increases the security of the coupling system 1, since it makes the tampering thereof more difficult. The releasing operative condition follows the holding operative step. In fact, the greater mobility of the hook 22 during the release condition allows it to follow any displacements of the hook 22 of the first coupling portion 23 thus making the coupling between the portions 13 and 14 highly effective.

[0110] The supporting portion 16, in addition to acting as a support element for the second coupling portion 14, may perform the signaling function to more clearly show a tampering of the coupling system 1. As previously described, due to the possibility of verifying the lack of the removable portion 15, it is possible to signal a possible tampering of the system 1. The supporting portion 16 is adjacent to the removable portion; it is therefore possible to arrange a marker on the supporting portion 16 (for example, a change of color with respect to the removable portion) so that, in the absence of the portion 15, the supporting portion 16 may highlight, by means of the marker, the absence of said removable portion 15. The supporting portion 16 may act as a marker both in case the removable portion 15 is defined on the second coupling portion 14 (the supporting portion would be visible at least from the indentation 29 and/or from the through opening 28) and in case it is defined on the first coupling portion 13 (the supporting portion would be visible at least from the indentation 29 of the second base portion).

Container 100

[0111] The coupling system 1 previously described in each embodiment thereof may be coupled to a container 100 as shown in figures 7-8 and 13-17. The container 100 may comprise at least one storage 2 defining an internal volume 3 configured for housing products, for example pills, tablets or blister packs (the products are not shown); the storage 2 essentially represents the compartment suitable for housing and supporting the products. In greater detail, the storage 2 comprises a predetermined number of lateral walls 4 defining at least one passage opening 5 delimited by a free edge 6: the passage opening 5 is configured for putting in communication the internal volume 3 of the storage 2 with the external environment. In the accompanying figures a storage 2 is shown, exhibiting two opposite passage openings 5 with respect to the storage 2 itself, so that the latter may substantially define a duct or tube laterally delimited by the wall 4 and open at the longitudinal ends. The possibility of manufacturing, for example, a storage 2 exhibiting a single passage opening 5 or even a number of openings 5 greater than two (conditions not shown in the accompanying Figures) is not excluded.

[0112] In the accompanying figures, a storage 2 has been shown which has a rectangular prismatic shape (flat lateral walls 4 having a rectangular shape). However, the possibility of manufacturing a storage 2 having a dif-

ferent shape, for example square, trapezoidal or cylindrical, is not excluded. The storage 2 may be made of sheet material, for example paper, and is obtained, for example, by means of folding.

[0113] The container 100 comprises the coupling system 1 previously described. The first base portion 11 is rotatively constrained to the free edge 6 of the storage 2: the first coupling portion 13 is borne by the first base portion 11 so that this latter is interposed between the free edge 6 of the storage 2 and the first coupling portion 13. The first base portion 11 and the first coupling portion 13 are movable, in particular, rotatively, with respect to the storage 2 and are configured for defining at least one closed condition in which at least part of the first base portion 11 interdicts the communication between the internal volume 3 of the storage 2 and the external environment. The first base portion 11 and the first coupling portion 13 are further configured for defining an open condition in which the latter themselves enable the communication between the internal volume 3 and the external environment. The first base portion 11 is integrally joined to the free edge 6 of the storage 2: in particular, the first base portion 11 is integrally joined to at least one lateral wall 4 of the storage 2 defining a single body of paper material.

[0114] The second base portion 12 of the coupling system 1 defines at least part of the lateral wall 4 of the storage 2, while the second coupling portion 14 is at least partially disposed in the internal volume 3 of said storage 2. The coupling system 1, under a first closed condition of the container 100, is configured for defining the arming condition in which the first and the second coupling portions 13, 14 are engaged with each other. The coupling system 1 - under a first open condition of the container 100 following the first closed condition - is configured for defining the first disengagement condition under which the removable portion 15 is configured for separating from the coupling system 1 to show a tampering of the coupling system 1 itself and therefore of the container 100. During the arming condition and therefore of first closure of the container, the first and second coupling portions are entirely arranged in the internal volume 3 of the storage 2, optionally spaced from the free edge 6. Also the supporting portion 16 of the coupling system 1 is arranged, particularly in its entirety, in the storage 2 (figure 15). In detail, the supporting portion 16 of the coupling system 1 is entirely arranged in the internal volume 3 of the storage 2. Optionally, the supporting portion 16 is substantially parallel to at least one lateral wall 4, in particular, to the lateral wall 4 defined by the second base portion 12. The reciprocal coupling portion 17 of the supporting portion 16 is engaged with an internal surface of at least one lateral wall 4 of the storage 2 spaced from the free edge 6. The thrusting portion 19 of the same supporting portion 16 extends from said reciprocal coupling portion 17 nearing the free edge 6, in particular, the thrusting portion 19 extends up to the free edge 6. The first coupling portion 13 extends as a prolongation of the

first base portion 11 from the opposite part to the storage 2, in which, under the first closed condition of the container 1 and therefore under the arming condition, the first and the second coupling portions 13, 14 are configured for engaging with each other in the internal volume 3 of the storage 2.

[0115] As shown in figures 13, 14, the first base portion 11 comprises a closing portion 7 of sheet material directly engaged with the free edge 6 of the storage 2 and movable, in particular rotatively, with respect to the latter. The closing portion 7 is adapted to delimit the opening 5 of the storage 2, so that, under the closed condition of the container 100, the closing portion 7 may interdict the passage from the internal volume 3 of the storage 2 to the external environment. The closing portion 7 exhibits a rectangular or square shape (figures 13 and 14; however, the possibility that the closing portion may exhibit geometrical shapes other than those shown in the accompanying Figures is not excluded. The first base portion 11 further comprises at least one inserting portion 8 configured for being inserted, under the closed condition of the container, inside the volume 3 of the storage 2. As can be seen in the accompanying figures, the inserting portion 8 substantially comprises a plane body of sheet material having, by way of non-limiting example, a rectangular shape. As shown in figure 16, the inserting portion 8 extends between a first and a second prevalent development surface, respectively facing outwards (directly facing a lateral wall 4 of the storage 2) and towards an internal volume 3 of the storage 2. In the closing condition of the coupling system 1, at least a portion of the first development surface of the inserting portion 8 faces, in particular contacts, directly a part of a lateral wall 4 of the storage 2: the surface extends at least in part parallel to the wall 4 of the storage 2, in particular to a front wall of the storage 2 opposed to the wall directly connected to the closing portion 7. The closure portion 7 and the coupling portion 8 have a reciprocal connection edge opposite to the free edge 2 of the storage 2 with respect to the closure portion 7 itself: the coupling portion 8 is movable by rotation with respect to the closure portion 7 around to this reciprocal connection edge. As can be seen for example in figures 13 and 14, the inserting portion 8, in the arming condition of the coupling system 1, is configured to define, according to a cross section and in cooperation with the closure portion 7, a substantially "L" shape: in this condition, the coupling portion 8 extends substantially parallel to a lateral wall 4 of the storage 2. The closing portion 7 and the inserting portion 8 of the first base portion 11 are integrally joined defining a closing tab 9 of the container 100 made of sheet material, for example, paper. The closing portion 7 and the inserting portion 8 are exhibited on each of the openings 5 of the container 100 so as to define the closing system. In particular, the closing tab 9 is integrally joined to the free edge 6 of the storage 2 and, therefore, to at least one lateral wall 4 of the container 100. In the accompanying figures, a closing tab 9 exhibiting a rectangular shape,

entirely countershaped to free edge 6, has been schematized.

[0116] The through opening 28 of the coupling system 1 is defined on the closing portion 7 and/or on the inserting portion 8, and is arranged, under a closed condition of the container 100, in particular, at the removable portion 15 under the arming condition. The through opening 28, upon the arming condition of the coupling system 1 and before the first disengagement condition, is adapted to allow the passage of the projection 30 and, therefore, the exit thereof from the storage 2 (see Figure 13 and the respective section of Figure 15). The indentation 29 of the coupling system 1 is defined on at least one lateral wall 4 of the storage 2, in particular in which the through opening 28 is located at the opening 29, at least in the closed condition of the container 100 and in the arming condition of the coupling system 1.

[0117] As can be seen, for example, in figures 7, 8, 11, 12, the container 100 may further comprise at least one abutment portion 80 engaged on the free edge 6 of the storage 2 adjacent to the closing portion 7: the abutment portion 80, in the closed condition, is configured for being interposed between the internal volume 3 and the closing tab 9 so as to cooperate with the latter to keep it permanently in said closure condition. The abutment portion 80 comprises a tab integrally joined to the free edge 6. The abutment portion 80 exhibits a rectangular or trapezoidal shape. Also the abutment portion 80 is configured for rotating around the free edge 6 to face, at least in the closed condition of the container 1, towards the inside of the storage 2. In greater detail, the abutment portion 80 is constrained to the free edge 6 so as to engage, in the closed condition of the container 100, at least part of the inserting portion 8 and/or of the closing portion 7 to stably keep the closing tab 9 in said condition. The container 1 may comprise two abutment portions 80 opposed to each other with respect to the closing tab 9: the latter is interposed between the two abutment portions 11. In such configuration, the two abutment portions 80 symmetrically work on the closing tab 9 to keep it stably under the closed condition.

Process of manufacturing the coupling system 1

[0118] Furthermore, it is an object of the present invention a process for the manufacturing of the tamper-evident coupling system 1, according to one or more of the accompanying claims and/or according to the above detailed description. The process comprises at least the following steps:

- preparing at least one first base portion 11,
- preparing at least one first coupling portion 13,
- preparing at least one second base portion 12,
- preparing at least one second coupling portion 14,
- preparing at least one supporting portion 16,
- preparing at least one removable portion 15,
- constraining at least one part of the supporting por-

tion 16 to at least one between the second base portion 12 and the second coupling portion 14.

[0119] In particular, the step of preparing the first base portion 11 comprises a step of preparing a first sheet 51 on a plane surface and at least one step of cutting the first sheet 51 defining the first base portion 11. The step of preparing the first coupling portion 13 comprises a step of preparing a second sheet 52 on a plane surface and a step of cutting the second sheet 52 defining the first coupling portion 13. In particular, this cutting step defines the respective hook 23 of the first coupling portion 13. Even more in detail, the cutting step defines the gripping edge 23a delimiting an undercut portion of the first coupling portion 13. In a preferential embodiment, the first and the second sheet 51, 52 are integrally joined to form a single body. The step of preparing the second base portion 12 comprises a step of preparing a third sheet 53 on a plane surface and a step of cutting the third sheet 53 defining the second base portion 12. The step of preparing the second coupling portion 14 comprises a step of preparing a fourth sheet 54 on a plane surface and a step of cutting the fourth sheet 54 defining the second coupling portion 14. In particular, said cutting step defines the hook 22 of the second coupling portion 14. Even more in detail, the cutting step defines the gripping edge 22a delimiting an undercut portion of the second coupling portion 14. The step of preparing the supporting portion 16 comprises a step of preparing a fifth sheet 55 on a plane surface and a step of cutting the fifth sheet 55 defining the supporting portion 16. In particular, the cutting step defines the reciprocal coupling portion 17 and the thrusting portion 19. The third, the fourth and the fifth sheet 53, 54, 55 may be integrally joined to form a single body. The step of cutting the fifth sheet 55 defines the weakening portion 24 configured for allowing the supporting portion 16 the passage from the holding condition to the releasing one during the definition of the arming condition of the coupling system 1.

[0120] The step of preparing the removable portion 15 comprises a cutting step of the second 52 or fourth sheet 54 to define the weakening element 26 of the removable portion 15; this cutting step involves at least one operation between punching, etching, shearing and/or laser cutting of the first or second coupling portion 13, 14.

[0121] The step of constraining at least one part of the supporting portion 16 to at least one between the second base portion 12 and the second coupling portion 14 may comprise a step of sticking the supporting portion 16 to at least one between the second base portion 12 and the second coupling portion 14. In particular, the step of constraining provides for the sticking of the reciprocal coupling portion 17 of the supporting portion 16 to the respective reciprocal coupling portion 18 of at least a selected one of the second base portion 12 and the second coupling portion 14. The sticking step provides for a step of dispensing adhesive material on at least one between the first, fourth and fifth sheet 51, 54, 55. In a preferred

embodiment, the sticking step provides for a step of dispensing adhesive material on at least one between the first and fifth sheet 51, 55. Optionally, the step of constraining at least one part of the supporting portion 16 to at least one between the second base portion 12 and the second coupling portion 14 comprises a step of anchoring the supporting portion 16 to at least one between the second base portion 12 and the second coupling portion 14, by means of at least one operation selected between deformation, cutting and pressing of at least one between the first, fourth and fifth sheet 51, 54, 55. The first, second, third, fourth and fifth sheet are of paper sheet material.

Process of manufacturing the container 100

[0122] Furthermore, it is an object of the present invention a process for the manufacturing of a tamper-evident container 100, according to one or more of the accompanying claims and/or according to the above detailed description. The process of making the container 100 comprises at least the following steps:

- preparing the storage 2,
- preparing the coupling system 1,
- engaging the first sheet 51 having the first base portion 11 of the coupling system 1 at the free edge 6 of the storage 2 to define the closing portion 7,
- engaging the third sheet 53 having the second base portion 12 of the coupling system 1 at at least one lateral wall 4 of the storage 2,
- arranging the second coupling portion 14 of the coupling system 1 at least partly inside the internal volume 3 of the storage 2.

[0123] The step of preparing the storage 2 comprises a step of preparing a sixth sheet 56 comprising at least one first and one second portion 57, 59 interconnected with a central connecting portion 58. The sixth sheet 56 further comprises at least one first and one second lateral connecting portion 60, 61, in which the central connecting portion 58 is interposed between the first and the second portion 57, 59, the first portion 57 is interposed between the first lateral connecting portion 61 and the central connecting portion 58, the second portion 59 is interposed between the second lateral connecting portion 60 and the central connecting portion 58. Each of the portions 57, 58, 59, 60, 61 comprise at least two opposite longitudinal edges and two opposite end edges. The first and second portions 57, 59, the central connecting portion 58 and said lateral connecting portions 60, 61 are joined along the longitudinal edges and aligned along a single connection direction.

[0124] The step of preparing the storage 2 further comprises a step of folding the sixth sheet 56, joining the lateral connecting portions 60, 61, to form the storage 2 exhibiting the passage opening 5 delimited by at least one free edge 6. The lateral connecting portions 60, 61 are joined to each other by means of adhesive material.

The step of preparing the storage 2 further comprises the step of preparing a seventh sheet 62 exhibiting at least one portion 63 connected to at least one central and/or lateral connecting portion of the sixth sheet 56 and emerging with respect to the latter. The portion 63 of the seventh sheet 62 is adapted to form a resting portion 80 of the container 100.

[0125] The first base portion 11 and the first coupling portion 13 of the first and second sheets 51, 52 to form the closing portion 7 and the inserting portion 8, respectively, of the closing tab 9 of container 100. The third sheet 53 defining the second base portion 12 of the second coupling portion 14 of the coupling system 1 is integrally joined to form a single body with the first portion 57 of the sixth sheet 56, in particular in which the third sheet 53 emerges from the longitudinal edges of the sixth sheet 56. The first sheet 51 defining the first base portion 11 of the coupling system 1 is integrally joined to form a single body with the second portion 59 of the sixth sheet 56, in particular in which said first sheet 51 emerges from the longitudinal edges of the sixth sheet 56. In one embodiment, the first, second, third, fourth, fifth, sixth, and seventh sheet are integrally joined to one another defining a single body of sheet material, in particular of paper sheet material.

Process of arming the coupling system 1

[0126] Furthermore, it is an object of the present invention a process for the arming of the tamper-evident coupling system 1, according to one or more of the accompanying claims and/or according to the above detailed description.

[0127] The process comprises a step of separately preparing the first coupling portion 13 and the second coupling portion 14 and a further step of exerting a reciprocal pressure between the first and the second coupling portions 13, 14 defining an initial contact condition of the coupling system 1. Such process, comprising the step of engaging the first and the second coupling portions 13, 14 defining the arming condition. The step of exerting a reciprocal thrust between the first and second coupling portion 13, 14 comprises a sub-step of bringing the respective hook 23 of the first coupling portion 13 closer to the hook 22 of the second coupling portion 14 and contacting, optionally pushing, the respective hook 23 of the first coupling portion 13 at the hook 22 of the second coupling portion 14. As shown in figures 16A and 16B, the respective hook 23, during the step of exerting a reciprocal thrust, may be interposed between the hook 22 of the second coupling portion 14 and the second base portion 12. The step of exerting a reciprocal pressure between the first and the second coupling portions 13, 14 comprises a step in which the thrusting portion 19 receives against it, to sustain it, the hook 22 of the second coupling portion 14. The latter step corresponds to the holding operative condition of the supporting portion 16. The step of engaging the first and the second coupling

portions 13, 14 comprises the steps of inserting the respective hook 23 of the first coupling portion 13 at the gripping edge 22a of the hook 22 of the second coupling portion 14, and of defining the grip between the undercut portions of the first and of the second coupling portion 13, 14 respectively delimited by the gripping edges 23a, 22a. The latter step corresponds to the releasing operative condition, in particular in which the total or partial breaking of the weakening portion 24 of the supporting portion 16 occurs, enabling an upper movement of the hook 22 of the second coupling portion 14 with respect to the holding operative condition.

Use of the coupling system 1

[0128] Furthermore, it is an object of the present invention a use of the tamper-evident coupling system 1, according to one or more of the accompanying claims and/or according to the above detailed description. The using process provides for the employment of the coupling system 1 to define at least one selected from the group of:

- a container for the containment of one or more products in which the coupling system 1 is used to define a first closed condition of the container. The coupling system 1 is configured for defining a first open condition under which the breaking of the removable portion 15 occurs, so as to show a possible tampering of the container;
- an envelope for the containment of one or more products in which the coupling system 1 is used to define a first closed condition of the envelope. The coupling system 1 is configured for defining a first open condition of the envelope under which the breaking of the removable portion 15 occurs, so as to show a possible tampering of the envelope;
- a band for wrapping one or more products, in which the coupling system 1 - for example borne by end strips opposite to the band - is used to define a first closed condition of the band. The coupling system 1 is further configured for defining a first open condition under which the breaking of the removable portion 15 occurs, so as to show a possible tampering of the band.

Claims

1. Tamper-evident coupling system (1) of sheet material, comprising:
 - at least one first base portion (11),
 - at least one second base portion (12),
 - at least a first coupling portion (13) borne by the first base portion (11),
 - at least a second coupling portion (14) borne by the second base portion (12),

the first and the second coupling portions (13, 14) being configured for defining at least one arming condition in which said first and second coupling portions (13, 14) are engaged with each other, wherein at least one between the first and the second coupling portion (13, 14) comprises at least one removable portion (15) configured for separating from the coupling system (1) - upon a first disengagement condition of said first and second coupling portion (13, 14) following said arming condition - for preventing a following coupling of said first and second coupling portion (13, 14), the coupling system (1) comprising at least one supporting portion (16) directly constrained to at least one between the second base portion (12) and the second coupling portion (14), wherein the supporting portion (16) is configured - at least during an initial contact step between the first and second coupling portion (13, 14) before said arming condition - for supporting at least part of said second coupling portion (14), **characterized in that** the supporting portion (16) comprises a weakening portion (24) configured for enabling the supporting portion (16) to define at least the following operative conditions:

- a holding operative condition, defined during the initial step between said first and second coupling portion (13, 14) during which the first coupling portion (13) abuts on the second coupling portion (14), wherein the weakening portion (24) during said holding operative condition is intact and enables the supporting portion (16) itself to support the second coupling portion (14),
 - a releasing operative condition, optionally defined at least during the arming condition, wherein the weakening portion (24) breaks so that the supporting portion (16) can enable a movement of the second coupling portion (14) greater than the movement obtainable of the same coupling portion (14) when the supporting portion (16) defines said holding operative condition.
2. System according to claim 1, wherein the supporting portion (16) comprises a reciprocal coupling portion (17) overlapped and stably constrained to at least one respective reciprocal coupling portion (18) of at least one selected between the second base portion (12) and the second coupling portion (14).
 3. System according to the preceding claim, wherein the supporting portion (16) comprises a thrusting portion (19) emerging from the reciprocal coupling portion (17) of the supporting portion (16) itself, said thrusting portion (19) being configured for abuttingly receiving the second coupling portion (14) in order to support it, optionally said thrusting portion (19) being movable, particularly rotatively movable, with respect to the reciprocal coupling portion (17) of the

supporting portion (16) itself,
wherein the reciprocal coupling portion (17) of the
supporting portion (16) is defined at a bottom zone
(20) of the supporting portion (16), the thrusting por-
tion (19) emerging from the bottom portion (20), op-
tionally along a development longitudinal path of the
supporting portion (16).

4. System according to the preceding claim, wherein
the supporting portion (16) comprises at least two
reciprocal coupling portions (17) substantially dis-
posed at longitudinally opposite end portions of the
supporting portion (16) itself, optionally the two re-
ciprocal coupling portions (17) symmetrically extend
with respect to the longitudinal development path.
5. System according to claim 3 or 4, wherein the recip-
rocal coupling portion (17), optionally each recip-
rocal coupling portion, of the supporting portion (16) is
fixed by an adhesive material, particularly is glued,
to at least one between the second base portion (12)
and the second coupling portion (14),
optionally, the reciprocal coupling portion (17) of the
supporting portion (16) is only and directly glued to
the second base portion (12).
6. System according to any one of the preceding
claims, wherein the supporting portion (16) is con-
figured for defining said holding condition before the
arming condition of the first and second coupling por-
tion (13, 14).
7. System according to any one of the preceding
claims, wherein the second coupling portion (14)
comprises at least one hook (22) defining at least
one undercut portion delimited by a gripping edge
(22a), wherein the first coupling portion (13) com-
prises at least one respective hook (23) defining at
least one undercut portion delimited by a respective
gripping edge (23a),
said hooks (22, 23) of the first and second coupling
portion (13, 14) being configured for stably engaging
with each other during the arming condition, option-
ally said hooks (22, 23) - under the arming condition
- exhibiting respective reciprocally facing concavi-
ties.
8. System according to any one of the preceding
claims, wherein the second coupling portion (14) is
interposed - at least during the arming condition -
between the second base portion (12) and the sup-
porting portion (16), optionally the second coupling
portion (14), the second base portion (12) and the
supporting portion (16) are obtained by folding a sin-
gle sheet, particularly of paper material.
9. System according to any one of the preceding
claims, wherein the weakening portion (24) is con-

figured for enabling the supporting portion (16) to
switch from the holding operative condition to the
releasing one during the definition of the arming con-
dition of the coupling system.

10. System according to any one of claims 7 to 9, where-
in the second coupling portion (14) comprises a base
body (25) which directly bears the hook (22) of the
second coupling portion (14) itself, said hook (22) of
the second coupling portion (14) being rotatively
movable with respect to said base body (25),
wherein the supporting portion (16) - during the hold-
ing operative condition - is configured for abuttingly
receiving at least the hook (22) of the second cou-
pling portion (14), for limiting a rotation of said hook
(22) towards the supporting portion (16) itself.
11. System according to the preceding claim, wherein
the supporting portion (16), during the holding oper-
ative condition, is configured for enabling an angular
movement of the hook (22) of the second coupling
portion (14) less than 90°, particularly comprised be-
tween 0° and 70°, still more particularly comprised
between 0° and 45°;
said angular movement being understood as the rel-
ative rotation of the hook (22) considered between
an initial position of the hook (22) before the holding
operative condition, substantially aligned with the
base body (25) and a final position which said hook
(22) can take under the holding operative condition.
12. System according to any one of the preceding claims
wherein the supporting portion (16), during the re-
leasing operative condition, is configured for ena-
bling an angular movement of the hook (22) of the
second coupling portion (14) greater than the angu-
lar movement allowed during the holding operative
condition.
13. System according to any one of the preceding
claims, wherein the removable portion (15) is defined
by at least a part of the second coupling portion (14),
optionally the removable portion (15) is defined by
the hook (22) of the second coupling portion (14),
optionally, the second coupling portion (14) compris-
es a weakening element (26) delimiting the hook (22)
of the second coupling portion (14) itself, which de-
fines said removable portion (15), particularly the
second coupling portion (14) exhibits a weakening
between the base body (25) and the hook (22) so
that said hook (22) can define said removable portion
(15).
14. System according to any one of the preceding
claims, comprising at least one of:

- a through opening (28) defined on the first base
portion (11) which is configured for enabling to

display the removable portion (15) at least on said arming condition,
 - an indentation (29) defined on the second base portion (12) which is configured for enabling to display the removable portion (15) at least in said arming condition. 5

15. Tamper-evident container (100) comprising:

- at least one storage (2) of sheet material defining an internal volume (3) and configured for housing products, said storage (2) exhibiting a predetermined number of lateral walls (4) defining at least one passage opening (5) delimited by a free edge (6), said passage opening (5) being configured for establishing a communication between the internal volume (3) of the storage (2) and the external environment, 10
 - at least one coupling system (1) according to any one of the preceding claims, 20

wherein the first base portion (11) is rotatively constrained to the free edge (6) of the storage (2), the first coupling portion (13) is borne by the first base portion (11) so that this latter is interposed between the free edge (6) of the storage (2) and the first coupling portion (13), 25

wherein the first base portion (11) and the first coupling portion (13) are movable, particularly rotatively movable, with respect to the storage (2), and are configured for defining at least one closed condition in which at least part of the first base portion (11) prevents the communication between the internal volume (3) of the storage (2) and the external environment, the first base portion (11) and the first coupling portion (13) being further configured for defining an open condition under which these latter enable the communication between the internal volume (3) and the external environment, 30
 35

wherein the second base portion (12) of the coupling system (1) defines at least part of the lateral wall (4) of the storage (2), while the second coupling portion (14) is at least partially disposed in the internal volume (3) of said storage (2), 40

wherein the coupling system (1) - during a first closed condition of the container (100) - is configured for defining the arming condition wherein the first and second coupling portion (13, 14) are engaged with each other, 45

wherein the coupling system (1) - during a first open condition of the container (100) following the first closed condition - is configured for defining the first disengagement condition in which the removable portion (15) is configured for separating from the coupling system (1) for showing a tampering of the coupling system (1) itself and therefore of the container (100). 50
 55

FIG.1

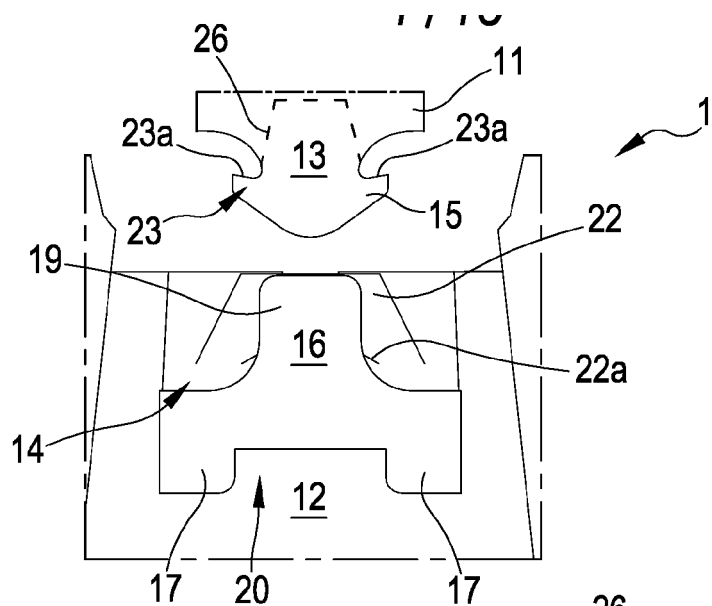


FIG.2

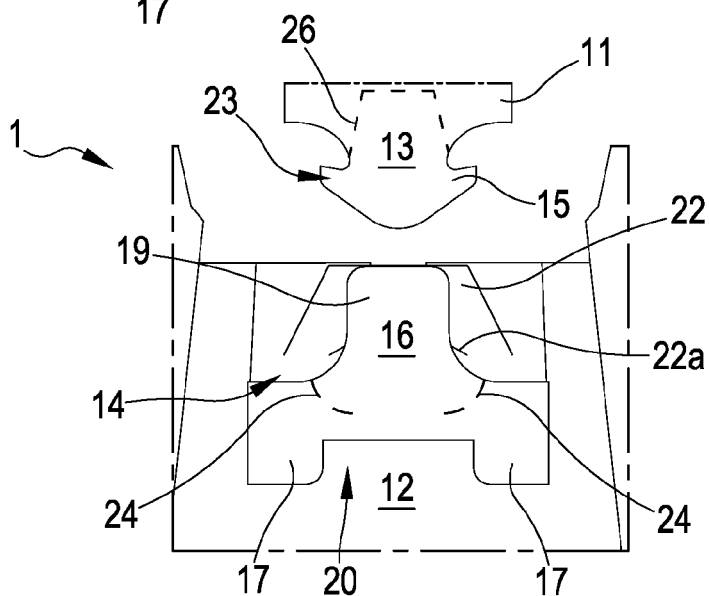


FIG.3

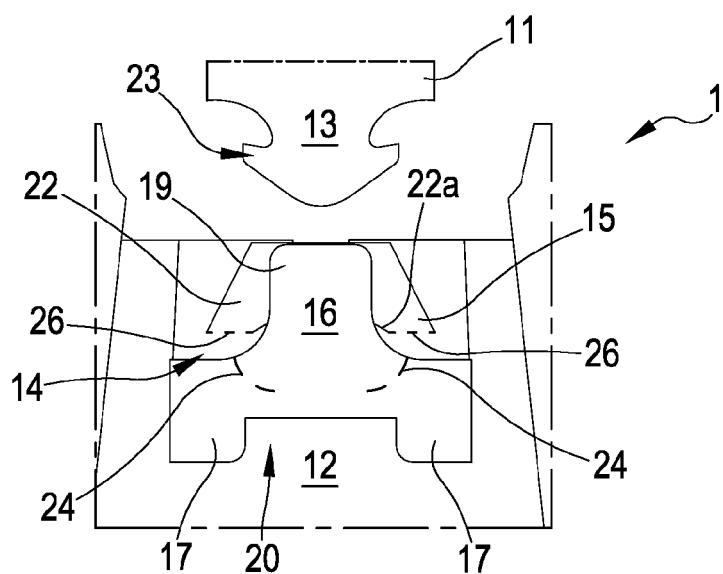


FIG.4

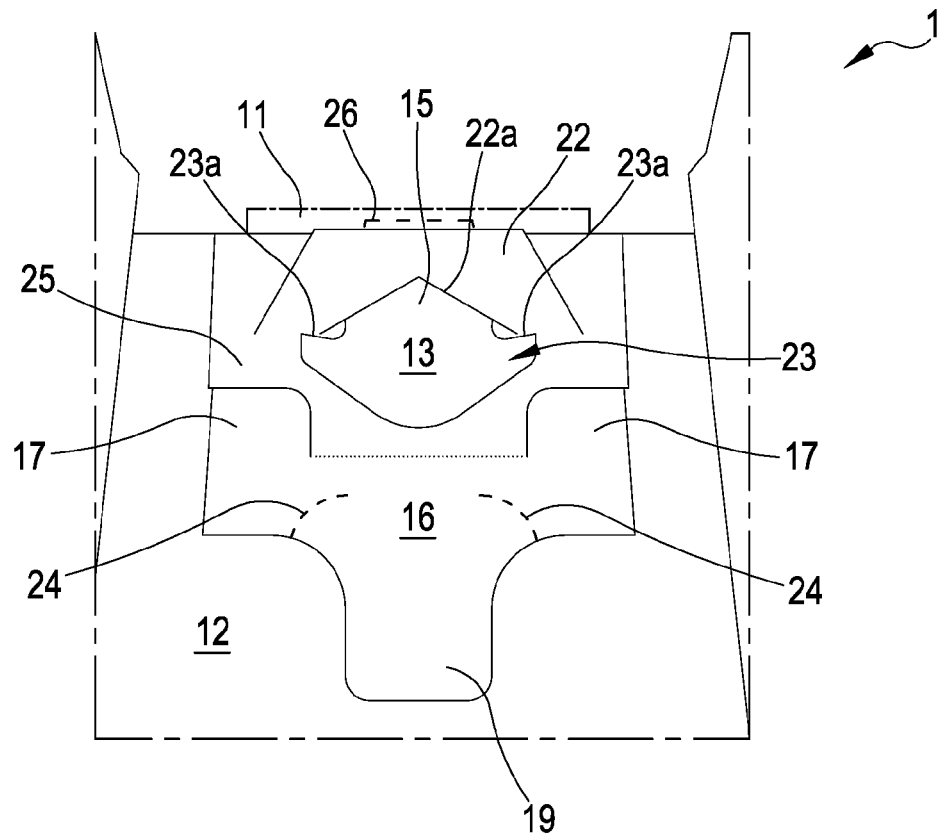
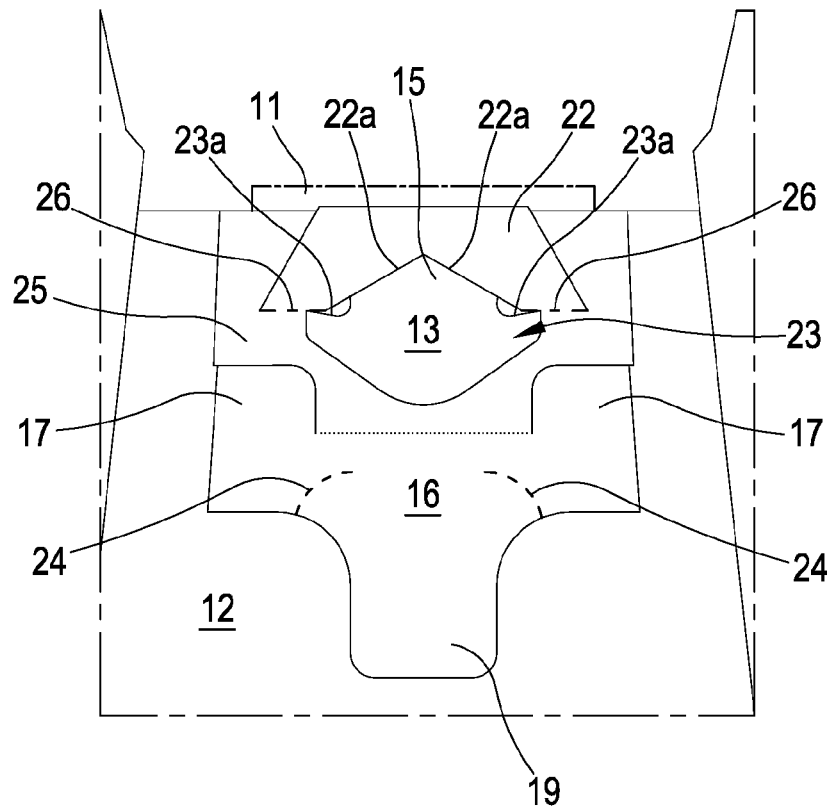


FIG.5



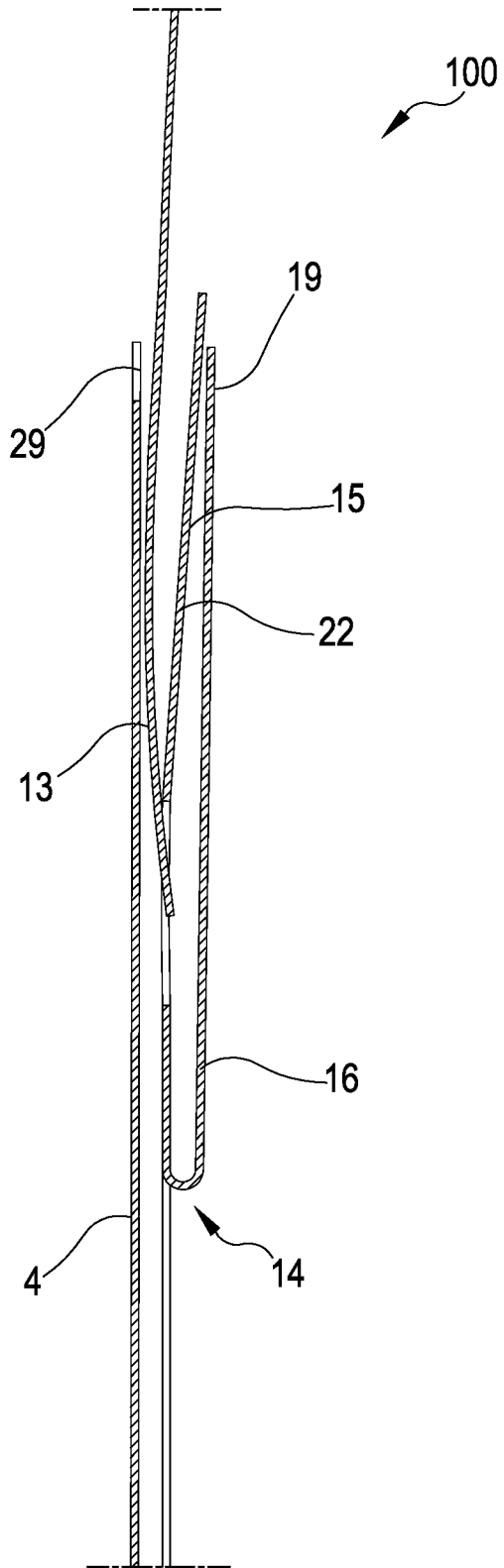


FIG. 5A

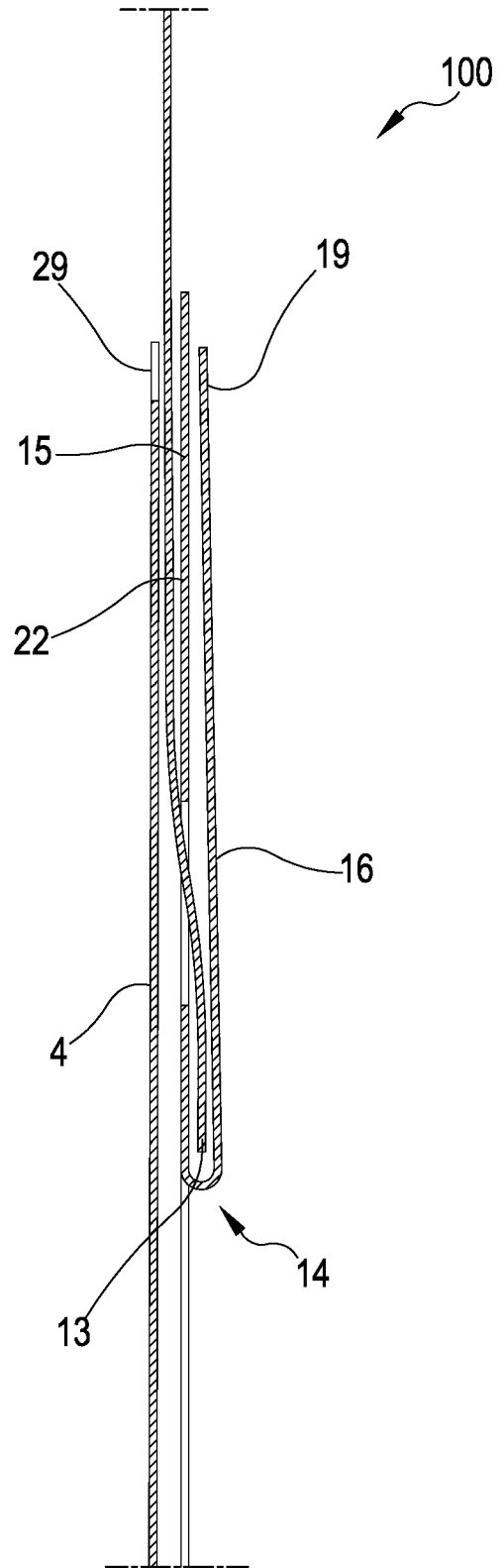


FIG. 5B

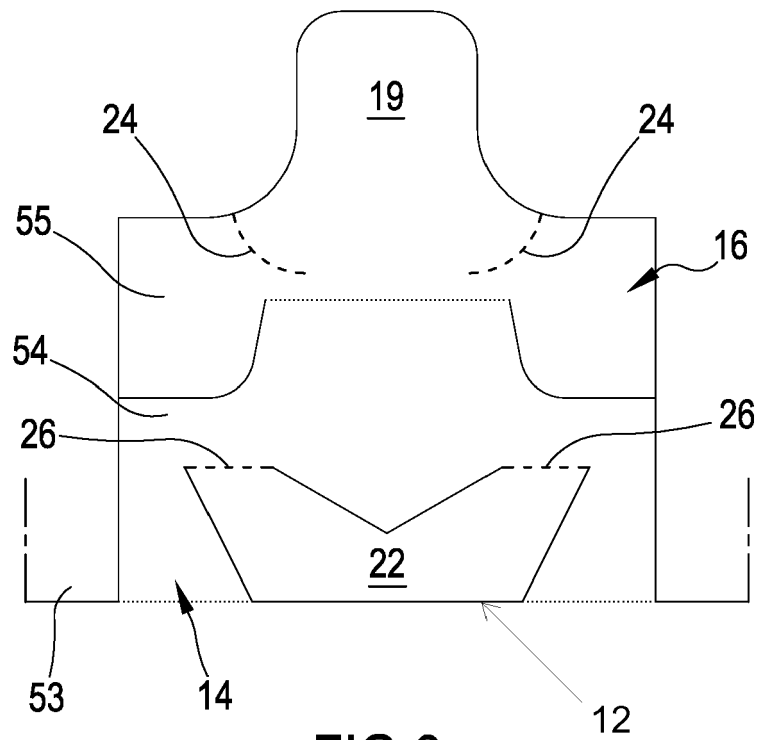


FIG. 6

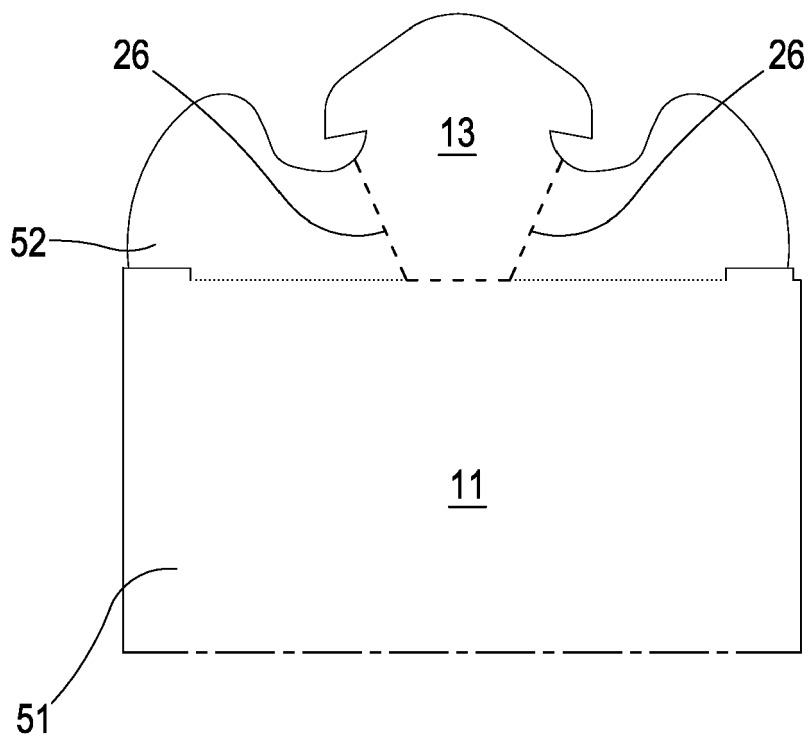


FIG. 6A

FIG.7

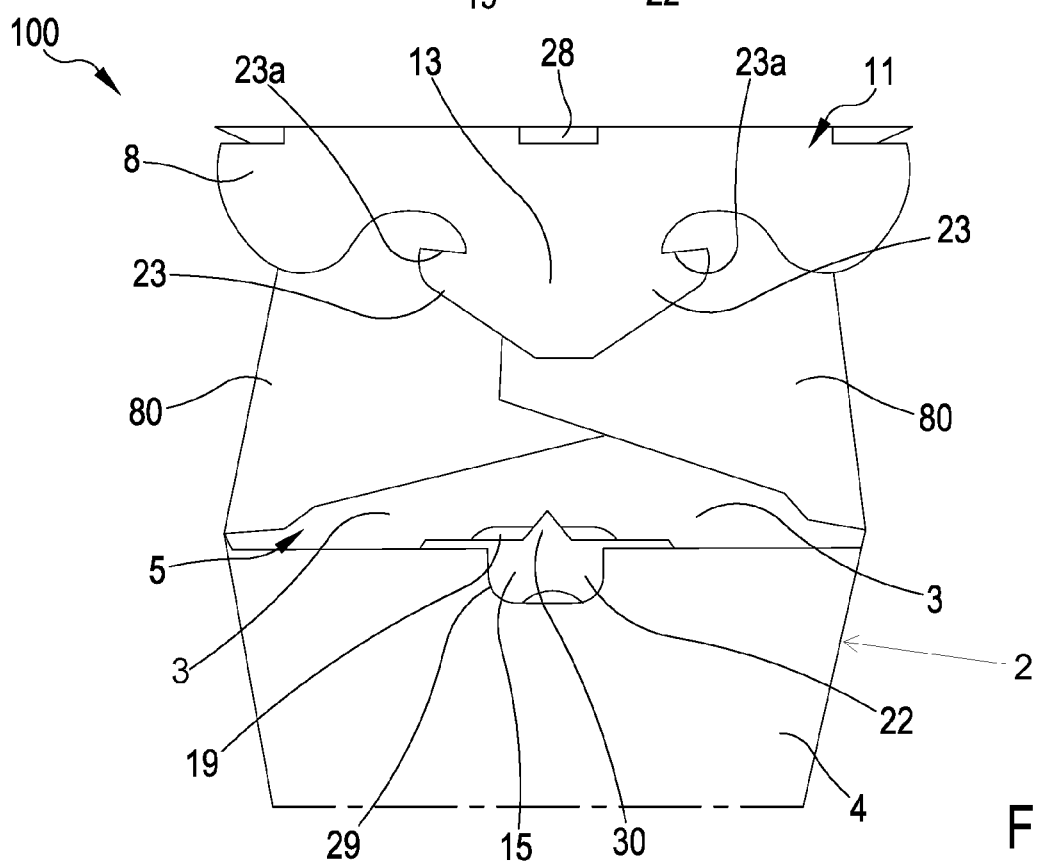
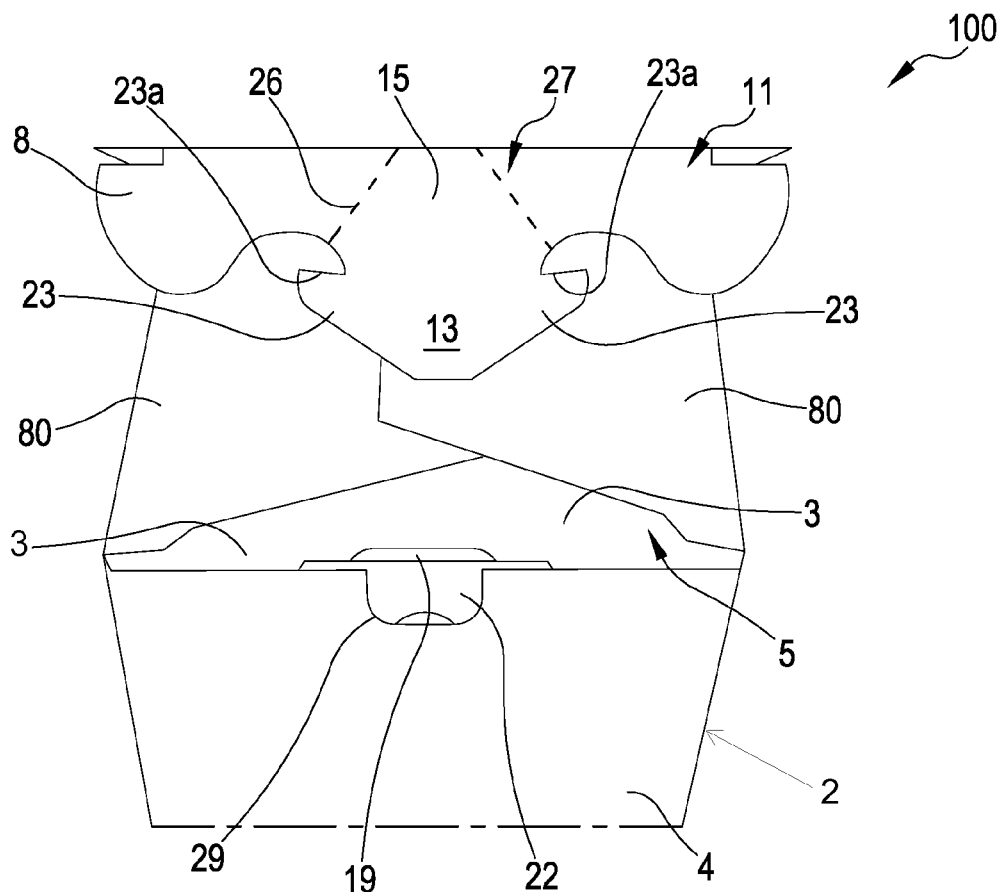


FIG.8

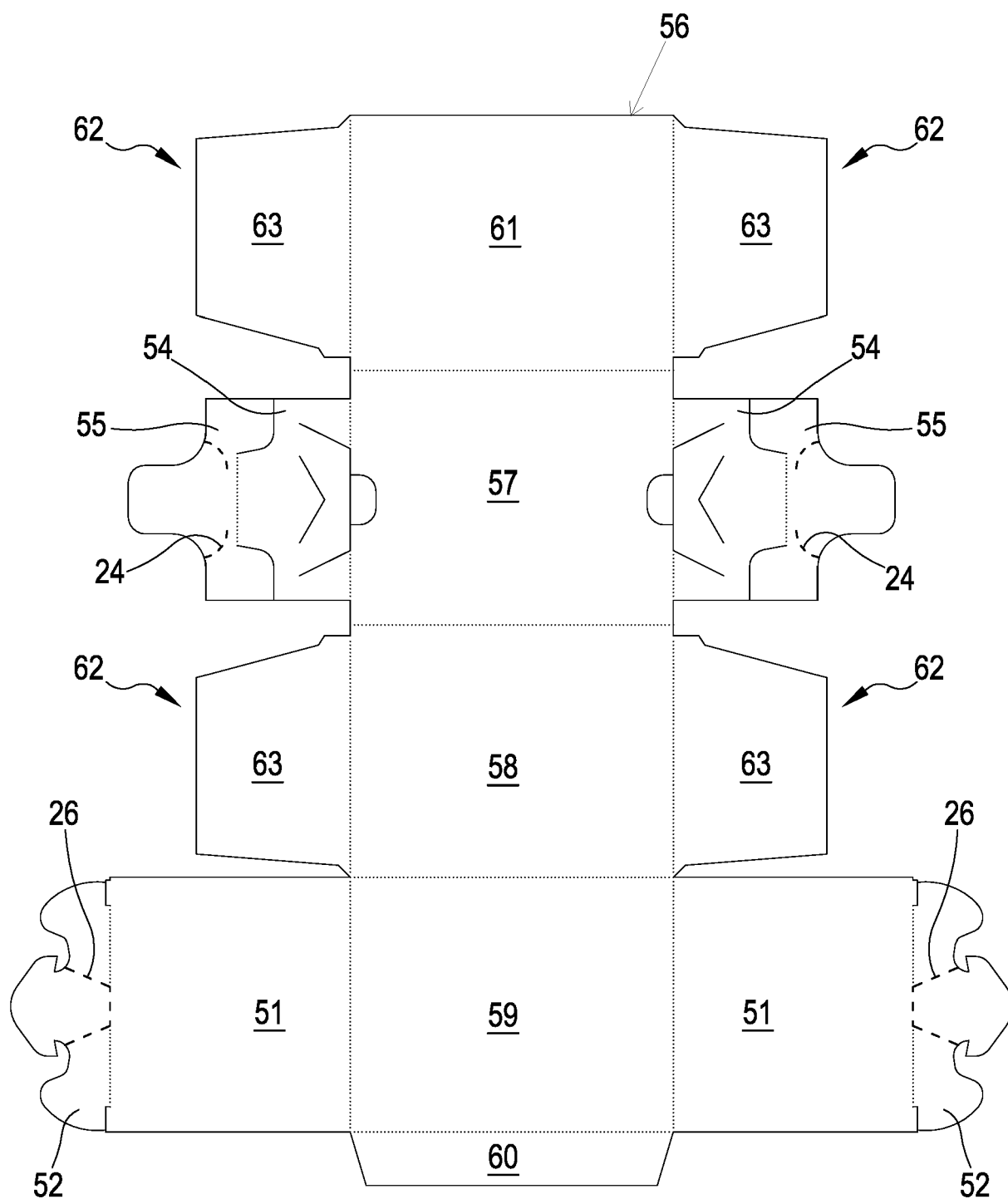


FIG.9

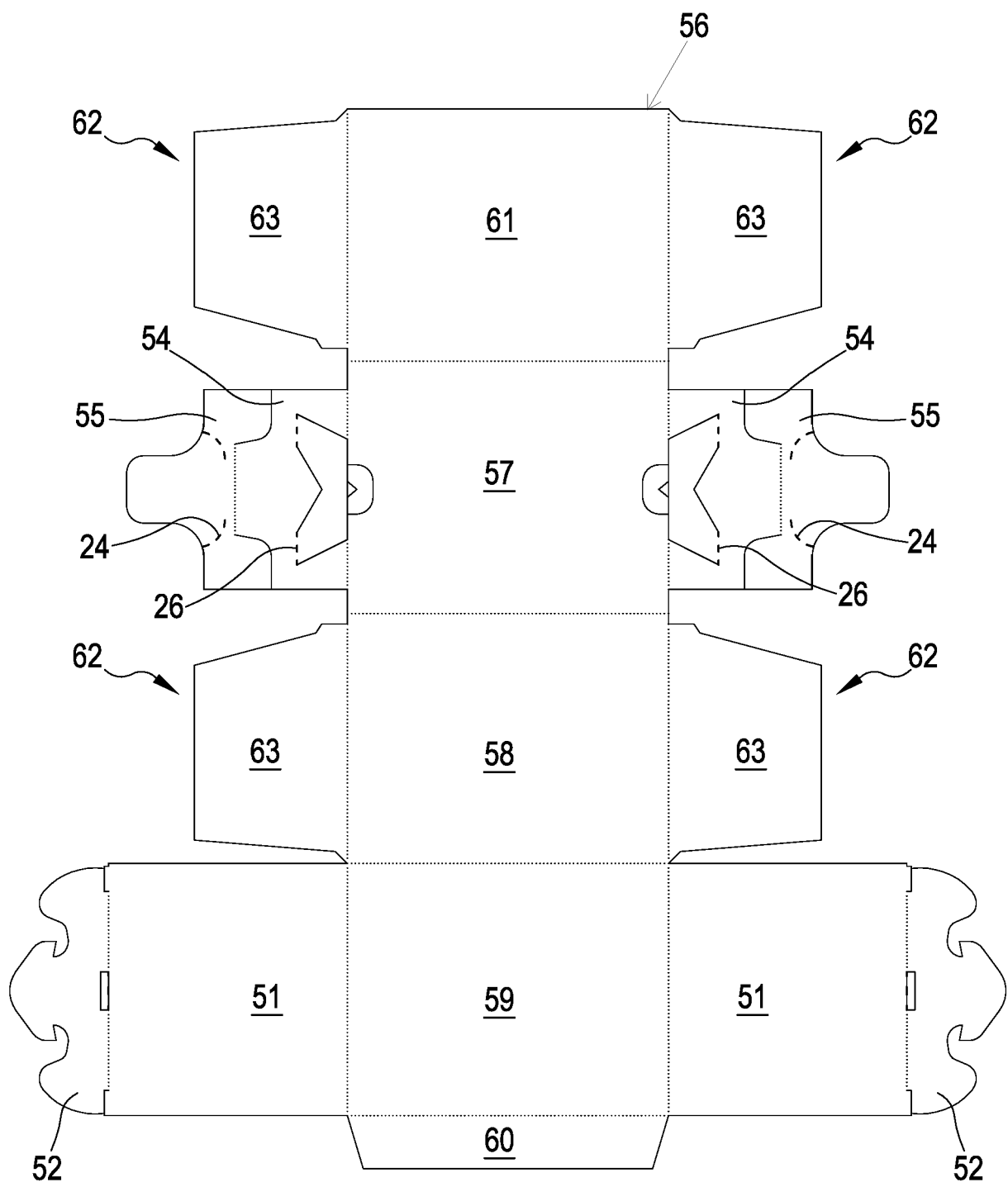


FIG.10

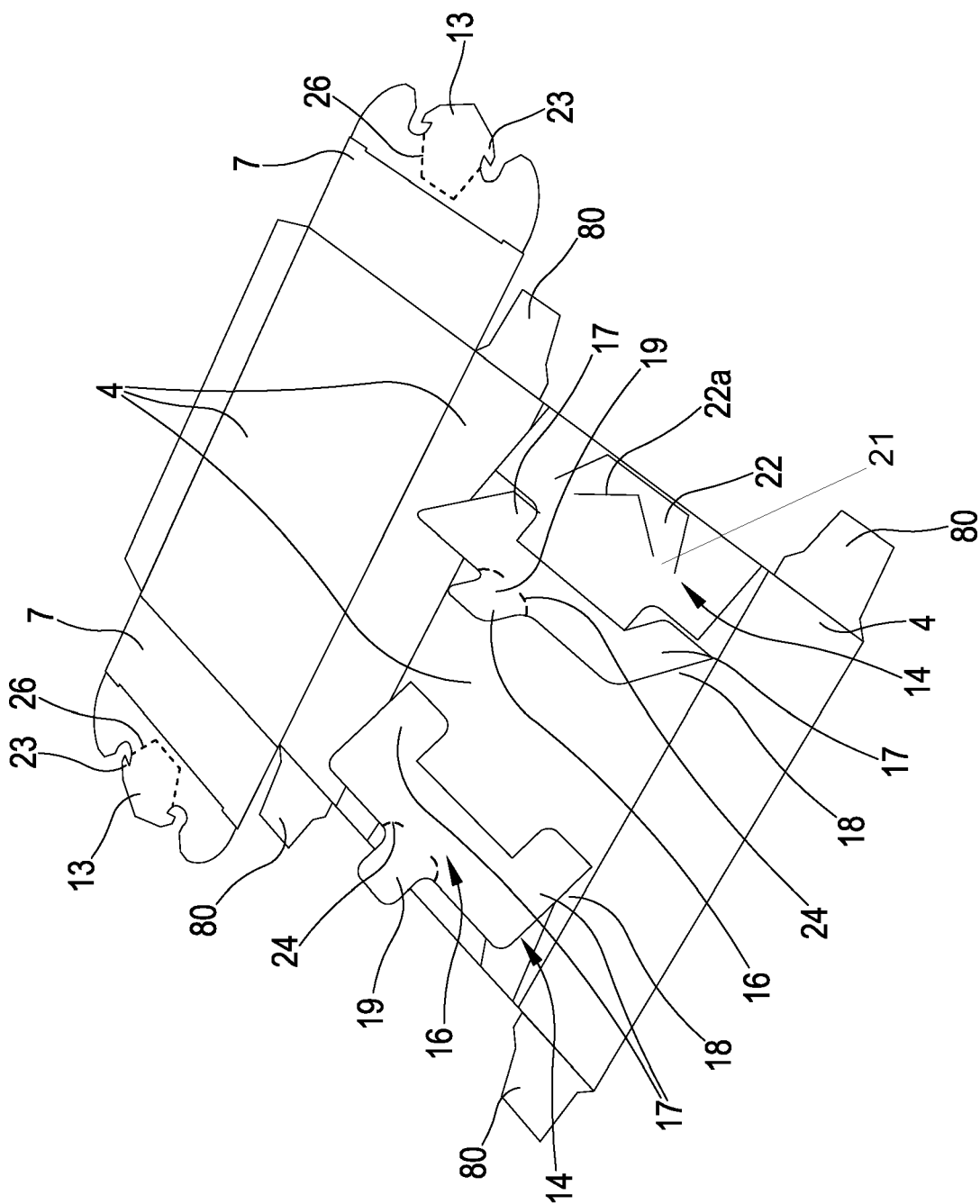


FIG.11

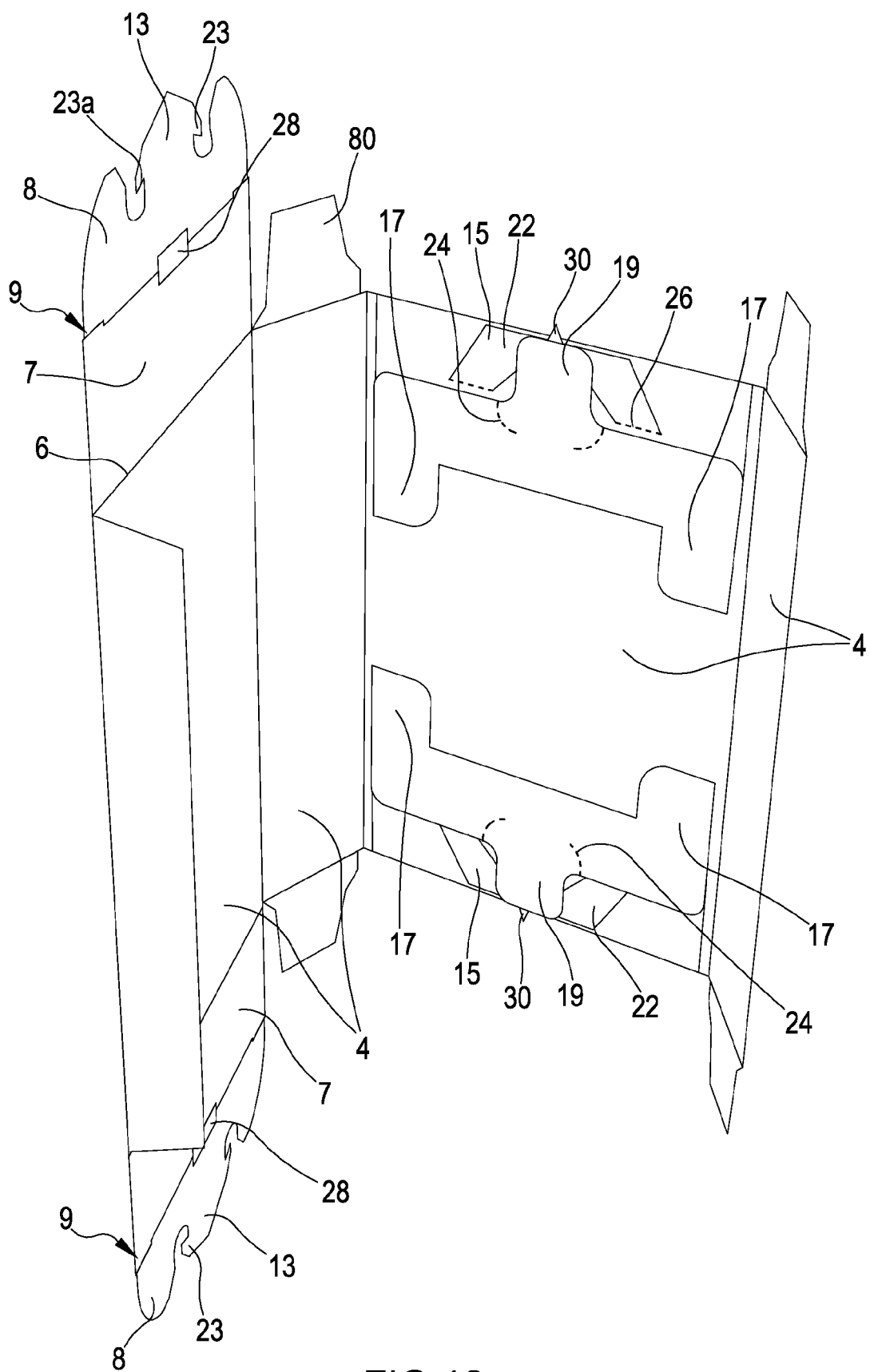


FIG.12

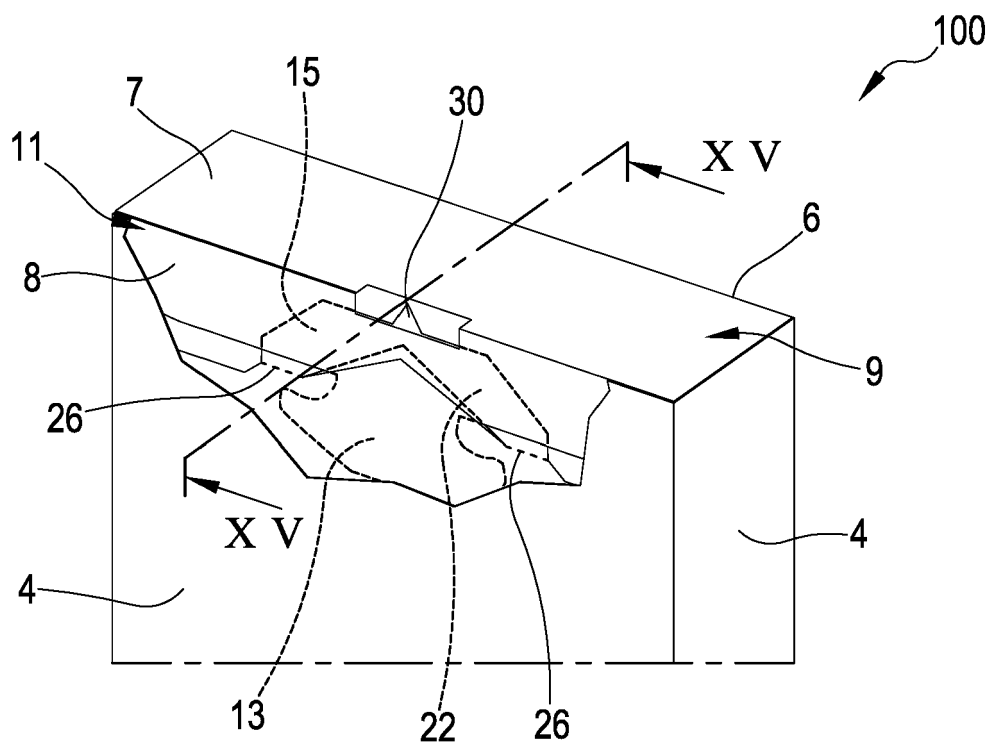


FIG. 13

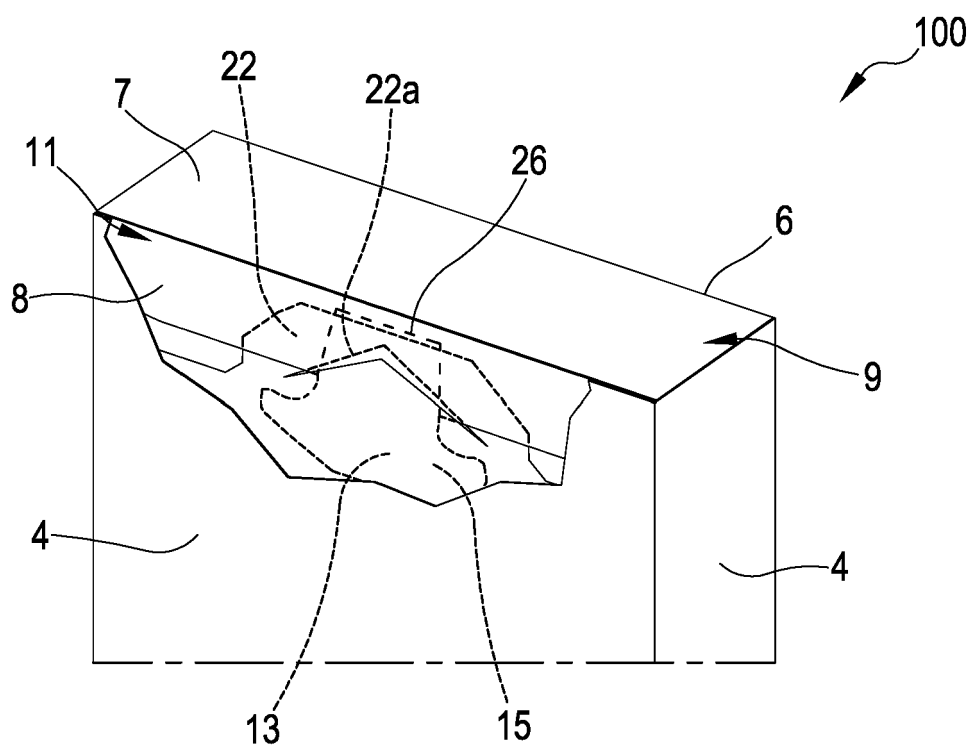


FIG. 14

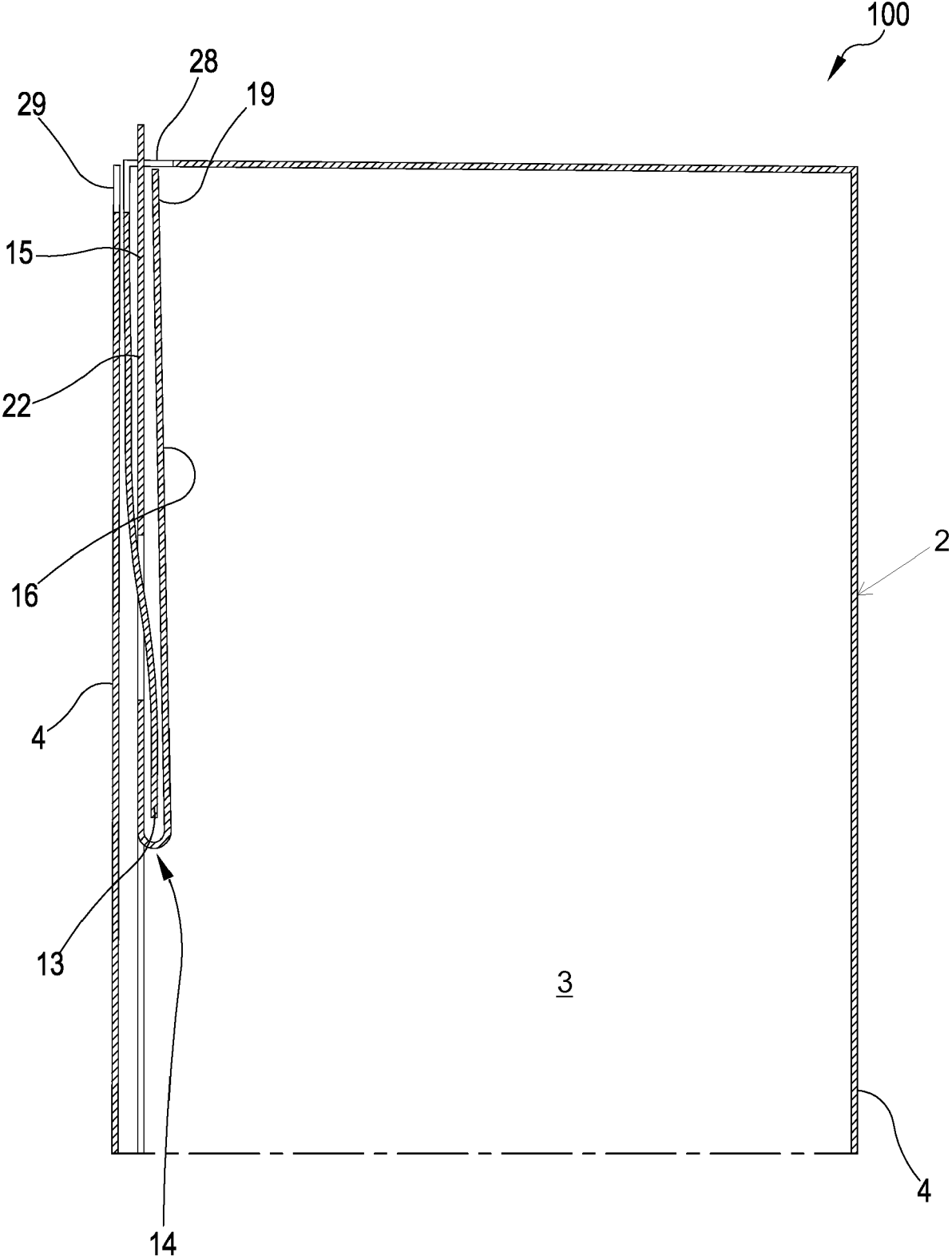
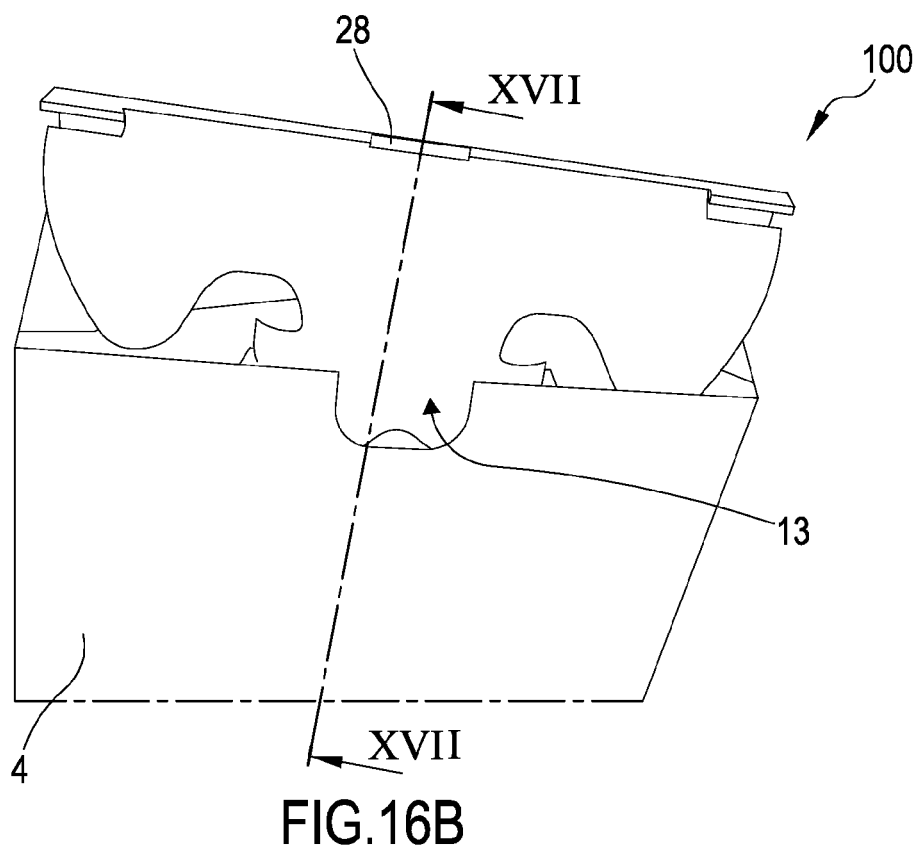
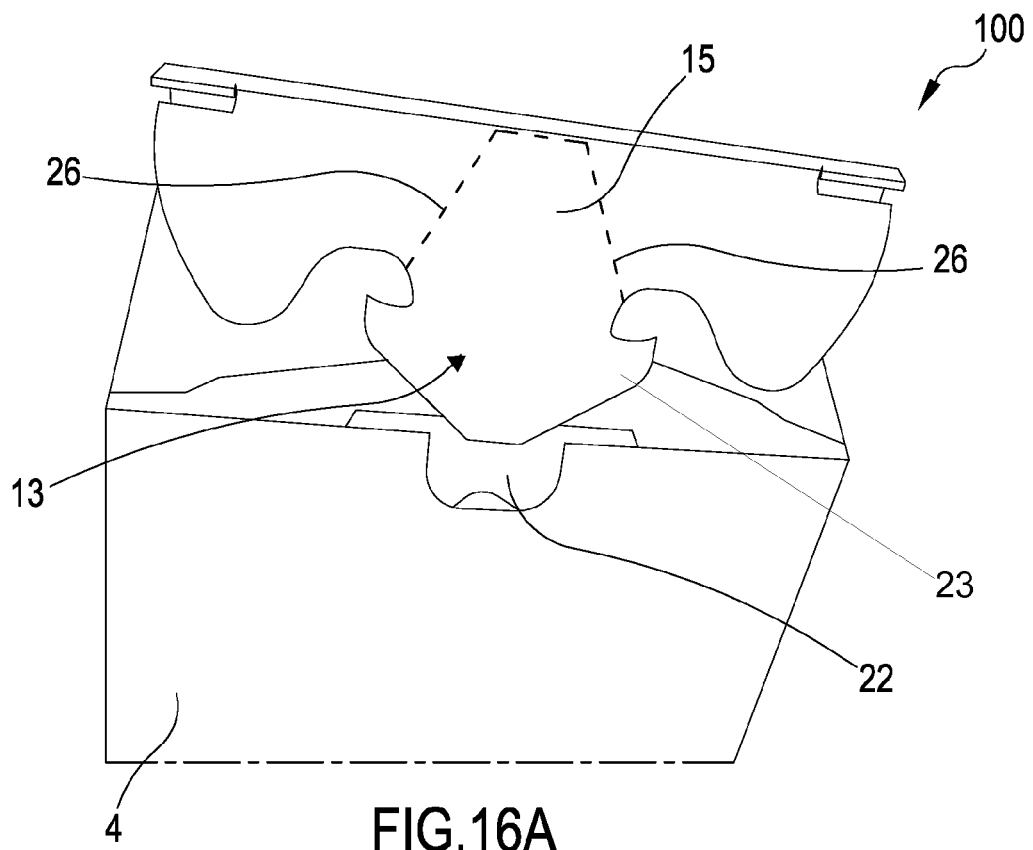


FIG.15



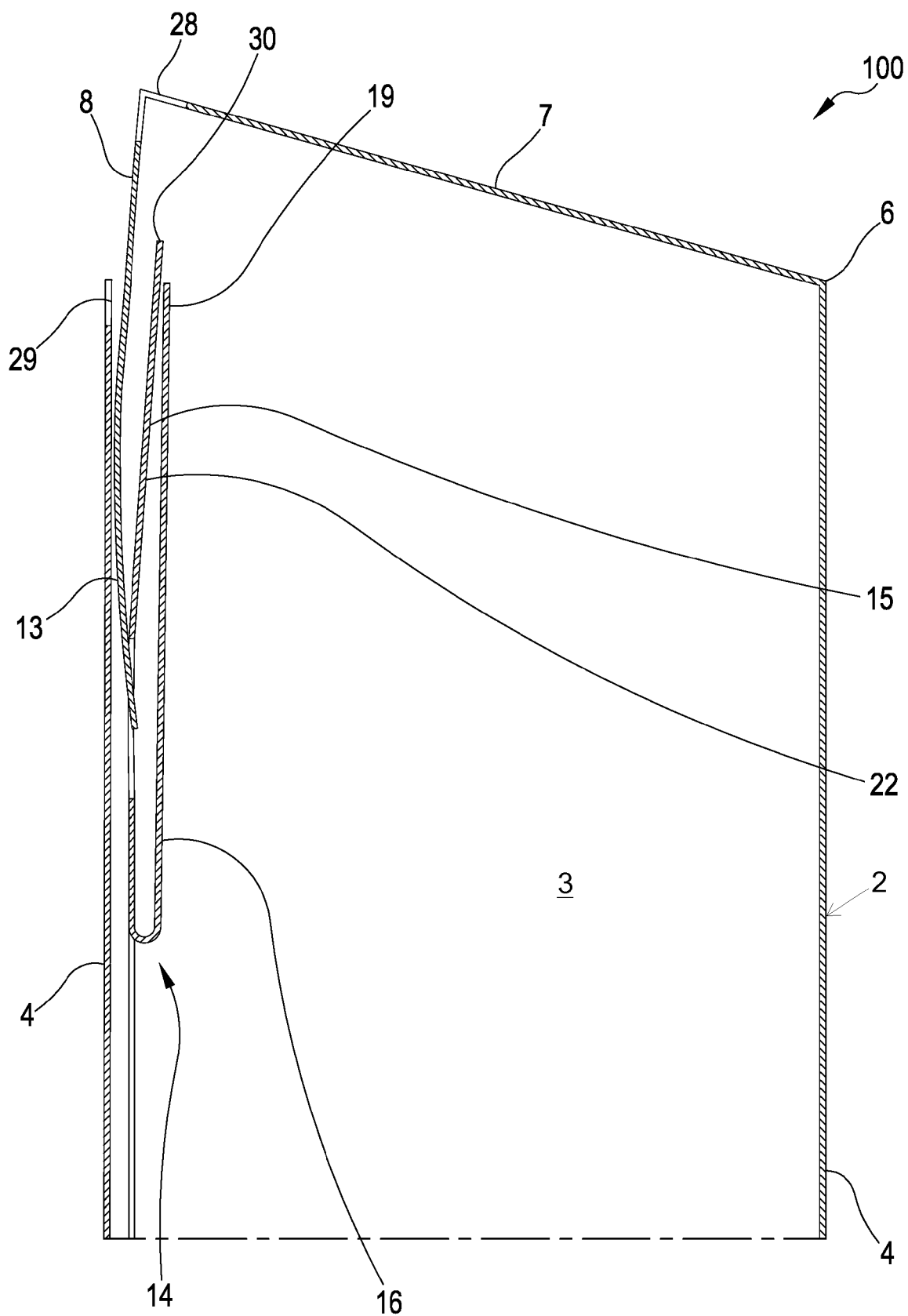


FIG.17



EUROPEAN SEARCH REPORT

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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,D	WO 2015/170203 A1 (I G B S R L [IT]) 12 November 2015 (2015-11-12) * page 94, lines 11-24; figures 29,38-40 * * page 73, lines 14-24 * -----	1-15	INV. B65D5/66
A,D	BE 410 524 A (MINIDRE, GEORGES [FR]) 31 August 1935 (1935-08-31) * figures 1-5 *	1-15	
A	WO 2013/007306 A1 (DUROPACK WELLPAPPE ANSBACH GMBH [DE]; SCHMIDT JUERGEN [DE]; STEPHAN TH) 17 January 2013 (2013-01-17) * figures 1-12 * -----	1-15	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65D
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 6 November 2018	Examiner Jervelund, Niels
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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 EPO FORM 1503 03.02 (P04C01)

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

EP 18 19 0257

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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06-11-2018

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2015170203 A1	12-11-2015	AU 2015257421 A1	15-12-2016
		BR 112016025469 A2	15-08-2017
		CA 2946689 A1	12-11-2015
		CN 106458354 A	22-02-2017
		EA 201692097 A1	31-05-2017
		EP 3110703 A1	04-01-2017
		EP 3159273 A1	26-04-2017
		JP 2017514760 A	08-06-2017
		KR 20170005830 A	16-01-2017
		TN 2016000474 A1	04-04-2018
		US 2017043929 A1	16-02-2017
		WO 2015170203 A1	12-11-2015

BE 410524 A	31-08-1935	NONE	

WO 2013007306 A1	17-01-2013	NONE	

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- BE 410524 A [0002] [0003]
- WO 2015170203 A1 [0004]