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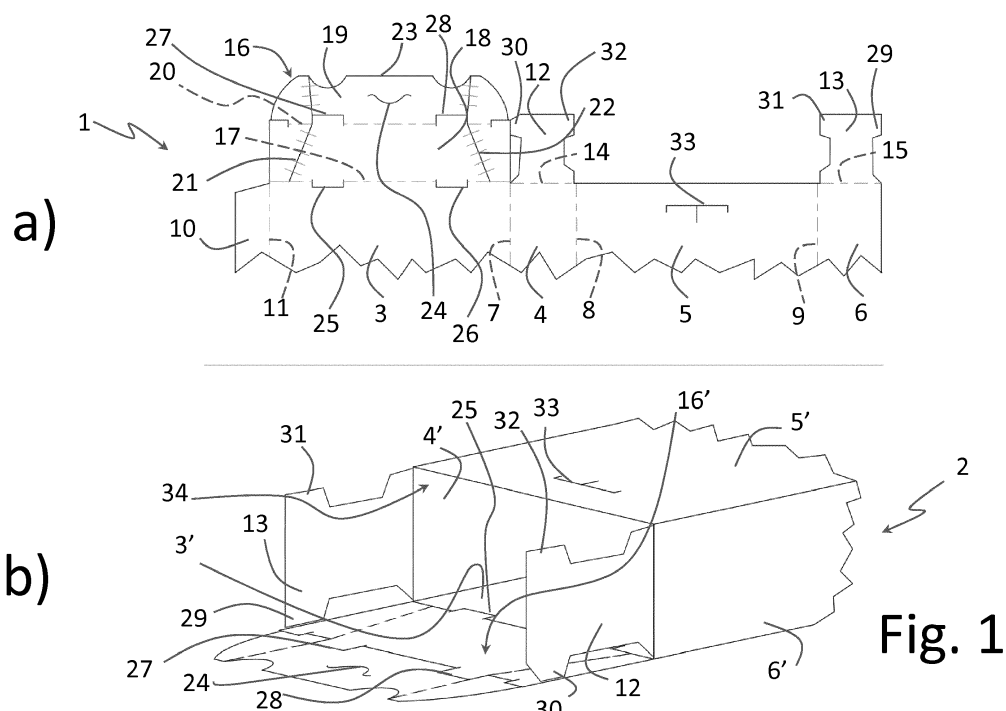
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(54) **TAMPER-PROOF PACKAGING**

(57) The present invention relates to a tamper-proof package (2) made by means of a sheet material, comprising: a cover (16') with an L-shaped portion having a first folding line (17) for connection to a first side (3') of the package and to fold over an opening (34); at least one tab (12; 13) having a second folding line (14; 15) for connection to a second side (4'; 6') of the package; the tab (12; 13) having at least one projection (31; 32) suited to be coupled in a first slit (27; 28) of the cover (16'), the first slit (27; 28) being spaced from the first folding line

(17); the cover (16') having at least one tear-off line (21; 22) when the sheet material is torn or broken along the tear-off line (21; 22) to open the package; either the L-shaped flap (35) or a third side (5') has a lip (24) suited to be coupled with a second slit (33) on the other, that is, the L-shaped flap (35) or the third side (5'). The invention also relates to a preformed element from sheet material, preferably paperboard or cardboard and a method of opening or closing a tamper-proof package.



**Fig. 1**

**Description**

## DESCRIPTION OF THE TECHNICAL FIELD

**[0001]** The present invention relates to a package, for example a box made by folding a sheet of paperboard or cardboard, and configured to indicate any possible tampering, in particular when it is opened for the first time.

**[0002]** According to a non-limiting example, the package of the present invention can be used to contain items of interest such as medications like pills in bulk, pills packed in blister packs, or medications contained in sachets.

**[0003]** It is also possible to use the packaging of the present invention in the food industry, for example to contain bulk sweets, nuts, or the like.

## STATE OF THE ART

**[0004]** Packaging or boxes with closing sides with high resistance to opening are known in the prior art. Tabs protrude from said sides and are inserted and held inside the respective box in a closed configuration. This packaging also has tear-off lines, for example die-cut, which tear when the panels are opened for the first time.

**[0005]** This makes it clear when the package is opened, which may indicate tampering, and raises the problem of continuing to use the box until a user has finished its contents. One first drawback of the known tamper-proof packages described is that they cannot be very effectively closed once opened. This can cause accidental opening and the contents falling out.

**[0006]** A further drawback or limitation of the known solutions is the fact that tamper-proof packs tend to have a relatively high number of overlapping flaps or additional internal inserts. This complicates the production cycle and, consequently, increases production costs.

**[0007]** The present invention aims to overcome these drawbacks.

**[0008]** In particular, a first object of the present invention is to provide a package and the relative preformed element with the least number of operations to contain production costs.

**[0009]** There is also the need to make the packaging and the opening and closing of the package effective after having torn the tear-off lines.

**[0010]** It is a further object of the present invention to provide a package having an efficient production cycle which is also characterized by the limited consumption of sheet material for each package.

**[0011]** In view of the situation described above, it would be desirable to have a tamper-proof package that would overcome or at least limit the problems of the known art.

**[0012]** It would therefore be desirable to have tamper-proof packaging which would overcome the drawbacks encountered in the tamper-proof packaging described above.

**[0013]** Finally, it would also be desirable to have

tamper-proof packaging which would overcome the drawbacks encountered in the known tamper-proof packaging.

## 5 OBJECTS AND SUMMARY OF THE INVENTION

**[0014]** The object of the present invention is achieved by means of tamper-proof packaging made by means of a sheet material, preferably paperboard or cardboard, comprising:

- a cover with an L-shaped portion having a first folding line for connection to a first side of the package and folding over an opening to provide a closed configuration of the package in which one or more items of interest are held in the package;
- at least one tab having a second folding line for connection to a second side of the package positioned crosswise with respect to the first side and to fold into the opening so that the tab is covered by the cover in the closed configuration;

in which:

- the tab has at least one projection suited to be coupled inside a first slit of the cover, this slit being spaced from the first folding line in such a way that the cover is locked in the closed configuration through the coupling between the projection and the first slit;
- the cover has at least one tear-off line which lies crosswise to the first folding line to define an L-shaped flap of the cover when the sheet material is torn or broken along the tear-off line by a user when the package is opened for the first time and the items of interest can be removed through the opening;
- either the L-shaped flap or a third side of the package opposite the first side with respect to the second side has a lip suited to be coupled with a second slit on the other, either the L-shaped flap or the third side so as to firmly and selectively close the opening after the sheet material is broken along the tear-off line.

**[0015]** According to the present invention, a simple modification to an easily achievable preformed element, that is, the tear-off line on the L-shaped cover, the lip and the relative slit, facilitates the creation of effective tamper-proof packaging at reduced costs. In particular, the lip allows the package to be closed easily and effectively after the first opening. Preferably, the lip and the relative slit are made by cutting operations on the preformed element without the need for any additional part, for example glued or stuck, in the ready-to-use package.

**[0016]** Preferably, the lip and the relative slit are configured so that, in the position in which the lip and the slit are coupled to close the package, an end portion of the L-shaped cover covers the third side. This allows the user to implement a simple movement to open and close the

package after the first opening that requires the tear-off line to be torn.

**[0017]** Preferably, the cover defines a second tear-off line spaced from the first tear-off line; the lip is placed between the first and second tear-off lines; a further tab is provided opposite the at least one tab and having a relative further projection; and a further slit is provided on the cover spaced from the first folding line and coupled with the further projection. This configuration is very common for pharmaceuticals, for example in packages for tablets or sachets.

**[0018]** Preferably, the first and second tear-off lines intersect the at least one slit and the further slit respectively. This allows a greater opening of the slit after tearing along the tear-off lines and, therefore, less interaction with the projection. Therefore the operations required for the successive openings following the first one are simplified. Preferably, the cover comprises disposable portions respectively positioned on opposite sides of the L-shaped flap and configured to be removed after the creation of the L-shaped flap following the tearing of the sheet material along the folding lines. Also in this case, the opening and closing of the L-shaped flap is simplified and the package remains closed since the L-shaped flap covers one end of the tab or the tabs. Preferably, the lip is made by means of a cut, in particular a cut along an overall nonlinear profile, on the L-shaped flap. This is particularly simple and inexpensive to perform during production.

**[0019]** According to the present invention, a preformed element from sheet material, preferably paperboard or cardboard, is also provided, comprising: a first, a second and a third side connected to each other by at least one first and a second folding line parallel to each other and suited to define fixed perimeter sides of a package made using the preformed element; at least one folding tab along a third folding line positioned crosswise to said first or second folding line and having at least one projection protruding in a direction parallel to the third folding line; an assembly connected to the first side through a fourth folding line parallel to the third folding line and protruding from the same side of the tab with respect to the first, second and third side, the assembly having an intermediate side adjacent to the fourth folding line and an end side positioned opposite the first side with respect to the intermediate side so as to define, during use, an L-shape through a fifth folding line parallel to the fourth folding line and positioned between the intermediate side and the end side; wherein the third side is configured to be positioned, during use, opposite the first side with respect to the second side; wherein the assembly has a first slit spaced from the fourth folding line and configured to couple, during use, with the at least one projection; wherein either the end side or the third side has a lip suited to couple, during use, with a second slit on the other that is, the end side and the third side; wherein at least one tear-off line is present along the intermediate side and the end side. This preformed element, properly assem-

bled and folded, provides the package according to the present invention.

**[0020]** Preferably, the present invention also provides a method to open or close a tamper-proof package according to the above and comprising the step of:

- uncoupling the lip from the second slit to open the package; or connect the lip with the second slit to close the package, after the tear-off line has been torn to open the package for the first time.

**[0021]** Preferably, the method further comprises the step of permanently removing the disposable portions after the tear-off lines have been torn to open the package for the first time.

**[0022]** Other advantages and features of the present invention are discussed in the description and mentioned in the dependent claims.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0023]** The aforementioned objects and advantages will be better highlighted during the description of some preferred embodiments of the tamper-proof package, provided below by way of a non-limiting example, with reference to the attached drawings where:

- Figure 1 shows a plan view of a portion of a preformed element of a package according to the present invention (detail 'a') and a corresponding perspective view of the package obtained by means of the preformed element (detail 'b');
- Figure 2 shows respective perspective views (with reference to detailed views 'a' and 'b') of successive steps to obtain the first closure of the package in Figure 1;
- Figures 3 and 4 show respective perspective views (with reference to the details 'a' and 'b' of each figure) of successive steps to obtain the first opening of the package in Figure 1; and
- Figure 5 shows a perspective view of the initial further opening after the first opening (detail 'a'); a side view (detail 'b') of the initial further closure after the first opening; and a front view (detail 'c') of the further closure after the first opening of the package in Figure 1.

## DETAILED DESCRIPTION OF THE INVENTION

**[0024]** By way of introduction, it is noted that the same parts of the individual examples of embodiments have the same reference numbers. The position indicators noted in the individual examples of embodiments should be transferred to the new position in the event of a change in position.

**[0025]** Figure 1a shows a detail of a preformed element 1 for a package made by folding starting from sheet material, for example cellulose-based such as paperboard

or cardboard with compact layers, that is, without empty spaces such as with corrugated cardboard. In alternative embodiments, the sheet material may comprise a layer of polymeric material or be a flexible multilayer for hand making folds of about 90° along folding lines and couplings with slits or notches as described in greater detail below and in the drawings.

**[0026]** The preformed element 1 is folded to make a parallelepiped box 2 (Figure 1b) but it is also possible to adapt the invention to make boxes having a more complex shape, for example prismatic with a polygonal base or the like.

**[0027]** As shown in Figure 1a, the preformed element 1 comprises a first, second, third and fourth side 3, 4, 5, 6 adjacent and delimited by respective first, second and third folding lines 7, 8, 9 in such a way as to define, when the box 2 is made, sides 3', 4', 5', 6' positioned along a closed perimeter which, in a non-limiting way, is rectangular. The preformed element 1 also comprises a gluing tab 10 adjacent to the first side 3 opposite the second side 4 and delimited by a fourth folding line 11. The tab is fixed to the third side 6, for example by gluing, to obtain the closed perimeter.

**[0028]** The preformed element 1 also comprises a first and a second tab 12, 13 defining a respective extension of the second and fourth sides 4, 6. During use, the first and second tabs 12, 13 fold along a fifth and a sixth folding line 14, 15 positioned crosswise, preferably perpendicularly, to the first, second, third and fourth folding lines 7, 8, 9, 11.

**[0029]** In addition, the preformed element 1 comprises an assembly 16 projecting from the first side 3 on the same side as the first and second tabs 12, 13. The assembly 16 folds during use along a seventh folding line 17, parallel and preferably aligned with the fifth and sixth folding lines 14, 15.

**[0030]** During use, the assembly 16 creates a closing cover 16' of the package 2 and comprises an intermediate side 18 adjacent to the seventh folding line 17 and an end side 19 positioned opposite the first side with respect to the intermediate side 18. Between the intermediate and end sides 18, 19 an eighth folding line 20 is positioned, preferably parallel and spaced from the seventh folding line 17.

**[0031]** The assembly 16 also has a first and a second tear-off line 21, 22 positioned crosswise with respect to the seventh and eighth fold line 17, 20 through the entire extension of the intermediate and end sides 18, 19. Preferably, the tear-off lines 21, 22 start from the seventh folding line 17 and continue through the eighth folding line 20 to a free edge 23 of the end side 19 positioned opposite the first side 3 with respect to the intermediate side 18.

**[0032]** The tear-off lines 21, 22 are spaced apart from each other in a direction parallel to the seventh and eighth fold lines 17, 20 and, between them, the assembly 16 has a notched lip 24 located on the end side 19.

**[0033]** Along the seventh and eighth folding lines 17,

20, the blank 1 defines, preferably in pairs on each folding line, a first, second, third, and fourth slit 25, 26, 27, 28 configured to couple with respective first, second, third, and fourth projections 29, 30, 31, 32 located in pairs on the relative tabs 12, 13. In alternative embodiments, at least one of the slots 25, 26, 27, 28 is spaced from the seventh folding line 17 so as to lock the L-shaped cover 16' when coupled with the relative projection 29, 30, 31, 32 during the first closure of the package, as will be described in greater detail below. The third side 5 further defines a fifth slit 33 coupled during use with the lip 24 as will be described more fully in the following paragraphs.

**[0034]** Figure 1b illustrates the package 2 and an opening 34, delimited by the lateral sides 3', 4', 5', 6' connected to each other along the closed rectangular perimeter. The opening 34 is also preferably rectangular and, in general, has the perimeter defined by the sides of the prismatic box.

**[0035]** Figure 2 illustrates the steps of the first closure of the opening 34, for example after the package 2 has been filled with the items of interest. In particular, the tabs 12, 13 are folded inside the opening 34 and the cover 16' is L-shaped by the folding of the end side 19 along the eighth folding line 20.

**[0036]** The end side 19 is inserted between the tabs 12, 13 and a lateral side, in particular the side with the fifth slit 33, that is, in the example shown, the third side 5. At the same time, the projections 29, 30, 31, 32 are coupled, that is, they are inserted in parallel in the respective slots 25, 26, 27, 28 on the intermediate wall 18, in particular along the seventh and eighth folding lines 17, 20.

**[0037]** When the projections 29, 30, 31, 32 are inserted and aligned in the respective slots 25, 26, 27, 28 (Figure 3a), the coupling locks the cover 16' in the closed position so that the items of interest are preserved and contained in the package 2, for example during transport and storage between a packaging plant for the products of interest and a point of sale of the products of interest, such as a pharmacy.

**[0038]** When an end user, for example after having purchased the package at the pharmacy, intends to remove one or more items of interest, the cover 16' is in the closed and locked configuration (Figure 3a) and an L-shaped flap 35, delimited between the tear-off lines 21, 22 and comprising portions of both the intermediate side 18 and the end side 19, is defined when the end user tears the tear-off lines 21, 22. The L-shaped flap 35 rotates along the seventh folding line 17 (Figure 3b) to allow access to the opening 34 and the removal of the items of interest. From opposite parts of the L-shaped flap 35 along the direction of the seventh folding line 17, respective residual portions 36, 37 of the cover 16' remain attached to the tabs 12, 13 still positioned in the opening 34.

**[0039]** The residual portions 36, 37 according to the illustrated embodiment are disposable and are permanently eliminated by the user, for example by tearing or

cutting preferably along the seventh folding line 17, so as to be able to open the tabs 12, 13 and free the opening 34 when the L-shaped flap 35 is in the open configuration (Figure 4a). Preferably, in order to simplify the movement of the flap 35, the disposable portions 36, 37 have a dimension such as to free the slits 27 and 28 so that, during the subsequent closures, the relative projections of the tabs 12, 13 have a greater possibility of movement. This is preferably achieved by the fact that the tear-off lines 21, 22 intersect the slits 27 and 28.

**[0040]** The L-shaped flap 35 comprises a portion 38 belonging to the intermediate side 18 before the tear-off lines 21, 22 are torn and a portion 39 belonging to the end side 19 before the tear-off lines 21, 22 are torn. Starting from the second closure of the package and for all subsequent closures, the portion 39 is on the opposite side of the tabs 12, 13 with respect to the side 5' (Figure 4b).

**[0041]** When the package 2 is firmly closed starting from the second closure and for all subsequent closures, the portion 38 closes the tabs 12, 13 in the opening 34 and is held in this position by the coupling between the lip 24 and the fifth slit 33 (Figure 5a).

**[0042]** Figure 5b shows the initial coupling between the lip 24 and the fifth slit 33. According to an embodiment which is not shown, a single tear-off line is created so that one of the tabs 12, 13 remains permanently bent in the opening 34 and the L-shaped flap 35 allows only the other of the tabs 12, 13 to be freed.

**[0043]** From the above it is clear how the proposed solution overcomes the aforementioned drawbacks.

**[0044]** In particular, the proposed solution advantageously enables the user to easily open and close the package after it is opened the first time. Furthermore, the production process is simple and therefore inexpensive.

**[0045]** Although the invention has been described with reference to the accompanying drawings, it may undergo modifications in the implementation phase, all falling within the sphere of the same inventive concept expressed by the claims set forth below and therefore protected by the present patent.

**[0046]** It should also be noted that where the characteristics mentioned in the claims presented below are followed by reference signs, they are to be understood as being useful to improve the intelligibility of the claim itself and not as limitations in the interpretation thereof.

## Claims

1. Tamper-proof packaging (2) made using a material in a sheet, preferably board or cardboard, comprising:

- a cover (16') with an L-shaped portion having a first folding line (17) for connection to a first side (3') of the package, designed in such a way that it folds on an opening (34) in order to obtain

a closed configuration of the package, wherein one or more objects are held in the package;

- at least one tab (12; 13) having a second folding line (14; 15) for connection to a second side (4'; 6') of the package, said second side being positioned crosswise with respect to the first side (3') and being designed in such a way that it folds into the opening (34) so that the tab (12; 13) is covered by the cover (16') in the closed configuration;

wherein:

- the tab (12; 13) is provided with at least one projection (31; 32) suited to be coupled with the inside of a first slit (27; 28) provided in the cover (16'), the first slit (27; 28) being spaced from the first folding line (17) in such a way that the cover (16') is retained in the closed configuration through the coupling between the projection (31; 32) and the first slit (27; 28);
- the cover (16') is provided with at least one tear-off line (21; 22) which lies crosswise with respect to the first folding line (17) so as to define an L-shaped edge (35) of the cover when the material in a sheet is torn or broken along the tear-off line (21; 22) by a user in order to open the package for the first time;
- one between the L-shaped edge (35) and a third side (5') of the package opposite the first side (3') with respect to the second side (4'; 6') is provided with a lip (24) suited to be coupled with a second slit (33) on the other one between the L-shaped edge (35) and the third side (5') in order to close the opening (34) securely and selectively once the material in a sheet has been broken along the tear-offline (22; 21).

2. Package according to claim 1, wherein the cover (16') defines a second tear-off line (22; 21) spaced from the first tear-off line, wherein the lip (24) is arranged between the first and the second tear-off line, wherein there is a further tab (13; 12) opposite the at least one tab and having a corresponding further projection, and wherein there is a further slit (28; 27) on the cover (16'), spaced from the first folding line (17) and suited to be coupled with the further projection (32; 31).

3. Package according to claim 2, wherein the first and the second tear-off lines (21, 22) intersect the at least one slit (27) and the further slit (28), respectively.

4. Package according to claim 2 or 3, wherein the cover (16') comprises disposable portions (36, 37) respectively arranged on opposite sides of the L-shaped edge (35) and configured so that they can be removed after the creation of the L-shaped edge (35)

once the material in a sheet has been torn along the folding lines (21, 22).

5. Package according to any of the preceding claims, wherein the lip (24) is obtained by cutting the L-shaped edge (35). 5
6. Package according to any of the preceding claims, wherein the lip (24) and the second slit (34) are configured in such a way that, in the position in which the lip and the slit are coupled together to close the package, an end side (19) of the L-shaped cover (35) covers the third side (5'). 10
7. Preformed element from a material in sheets, preferably board or cardboard, comprising: 15
  - a first, a second and a third side (3', 4', 5') connected to one another through at least one first folding line and one second folding line (7, 8) which are parallel to each other and suited to define fixed perimeter sides of a package made with the preformed element; 20
  - at least one tab (12; 13) suited to be folded along a third folding line (14; 15) which lies crosswise with respect to said first folding line or to said second folding line (7, 8) and has at least one projection (31; 32) that protrudes in a direction which is parallel to the third folding line (14; 15); 25
  - an assembly (16) connected to the first side (3) through a fourth folding line (17), which is parallel to the third folding line (14; 15) and projects from the same side of the tab (12; 13) with respect to the first, the second and the third side, the assembly being provided with an intermediate side (18) adjacent to the fourth folding line (17) and an end side (19) arranged opposite the first side (3) with respect to the intermediate side (18), in such a way as to define, during use, the shape of an L through a fifth folding line (20) which is parallel to the fourth folding line (17) and arranged between the intermediate side (18) and the end side (19); 30

wherein the third side is configured so that during use it is arranged opposite the first side with respect to the second side;

wherein the assembly (16) is provided with a first slit (27; 28) spaced from the fourth folding line (17) and configured so that during use it can be coupled with the at least one projection (31; 32); 50

wherein one between the L-shaped edge (35) and the third side (5') is provided with a lip (24) which is suited to be coupled, during use, with a second slit (33) provided in the other one between the L-shaped edge (35) and the third side (5); and wherein there is at least one tear-off line (21; 22) along the inter- 55

mediate side (18) and the end side (19).

8. Method for opening or closing a tamper-proof packaging according to any of the preceding claims, comprising the following step:

- uncoupling the lip (24) from the second slit in order to open the package; or coupling the lip (24) with the second slit (33) in order to close the package, once the board or cardboard sheet has been torn along the tear-off line (21; 22) to open the package for the first time.

9. Method according to claim 8 when applied to a package according to any of the claims from 1 to 6 when dependent on claim 4, comprising the step in which the disposable portions are permanently removed once the material in a sheet has been torn along the tear-off lines (21, 22) in order to open the package for the first time.

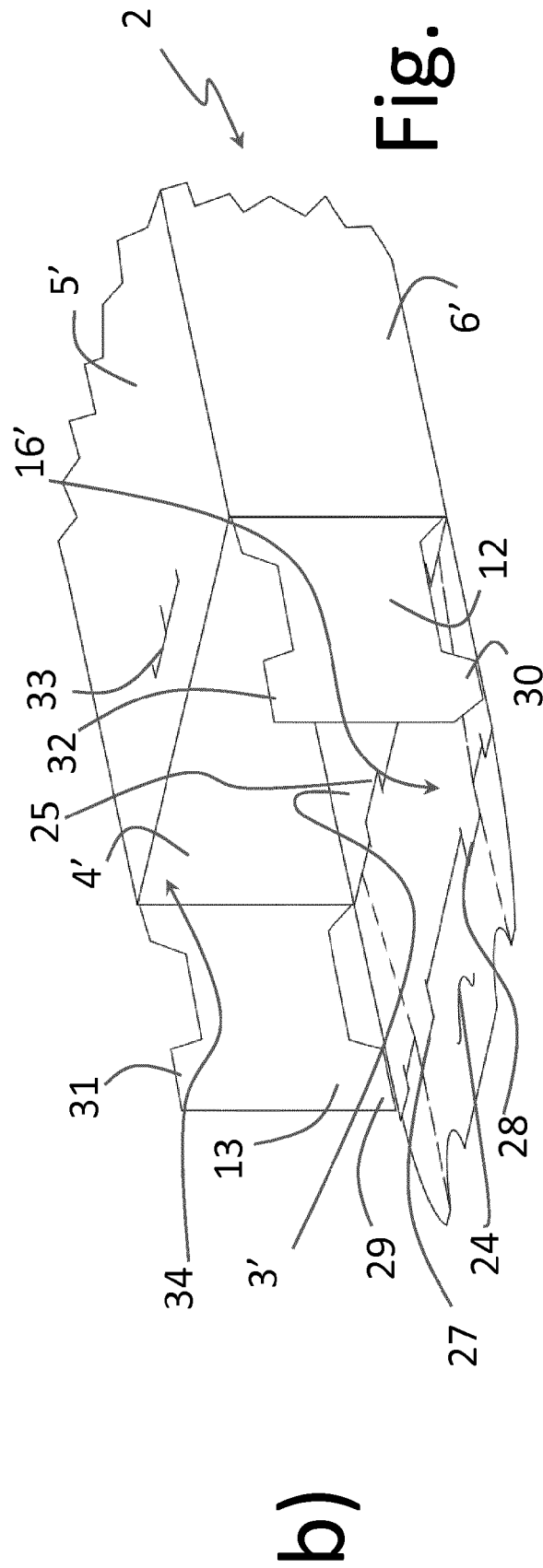
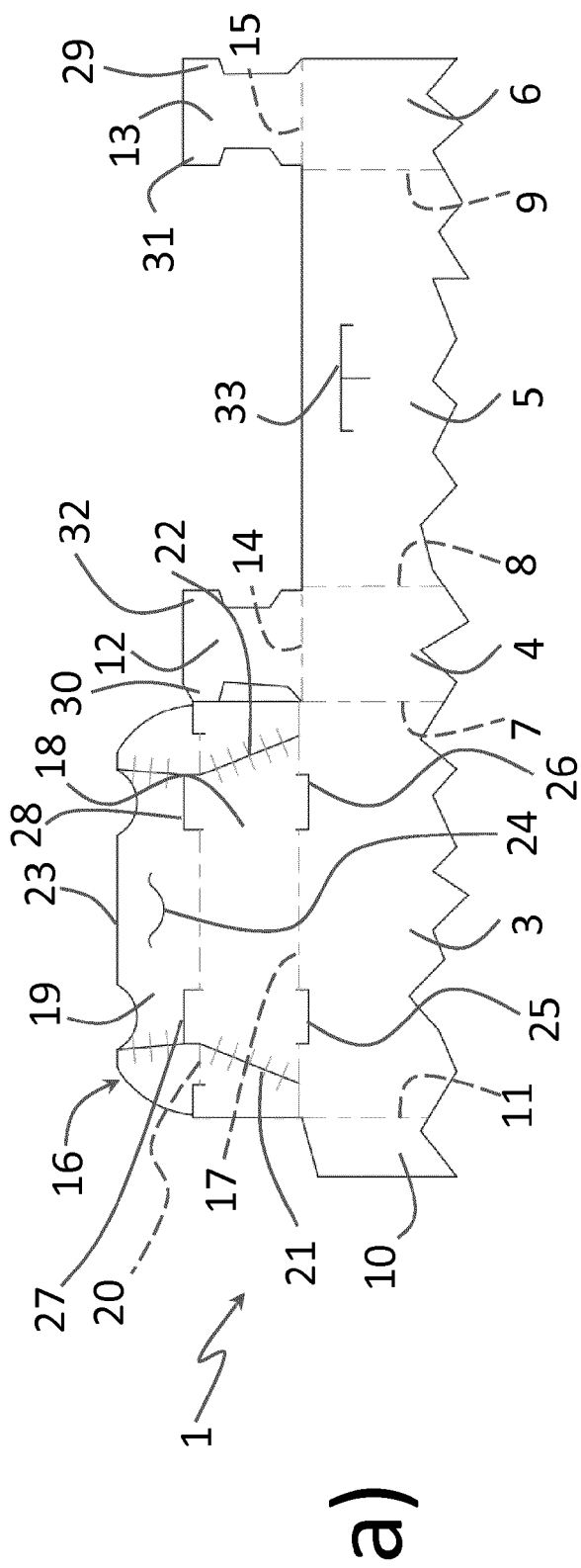
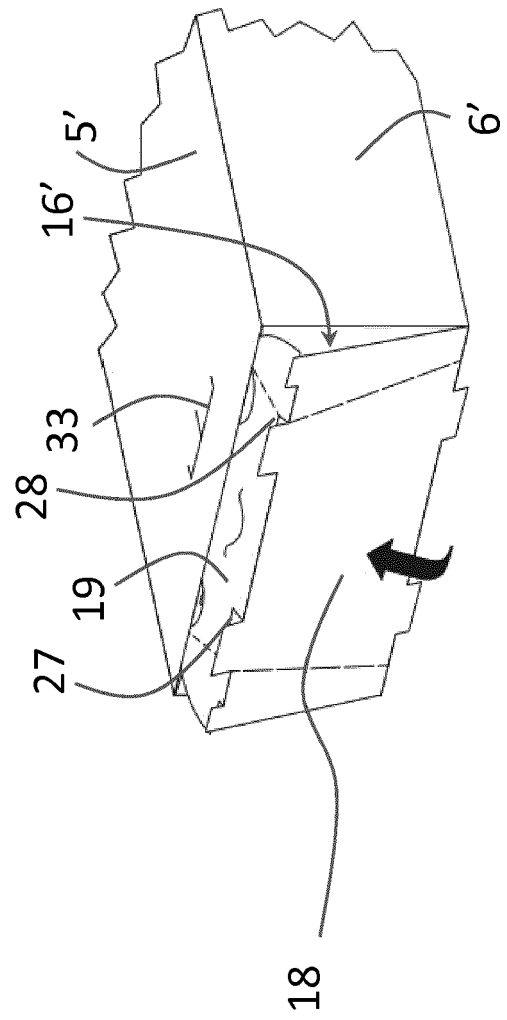
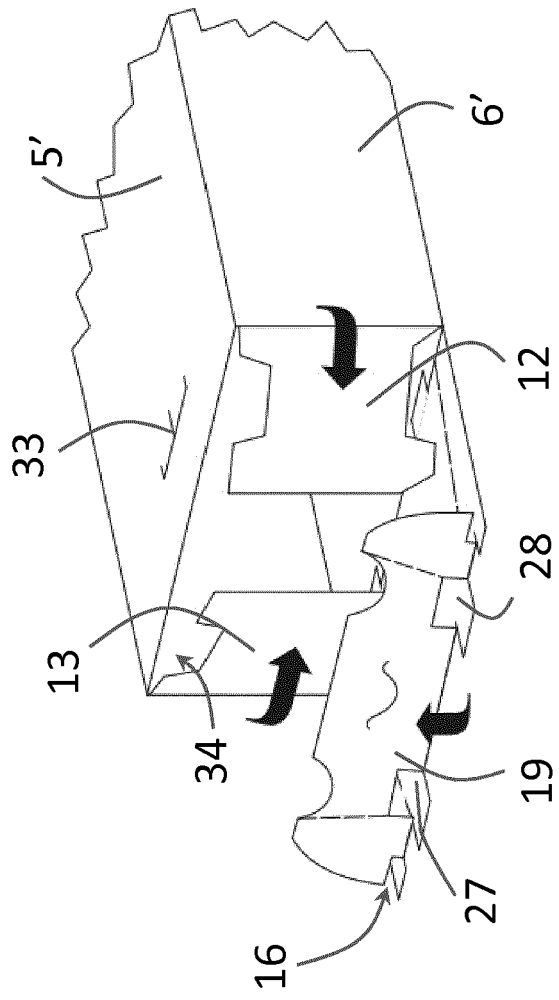
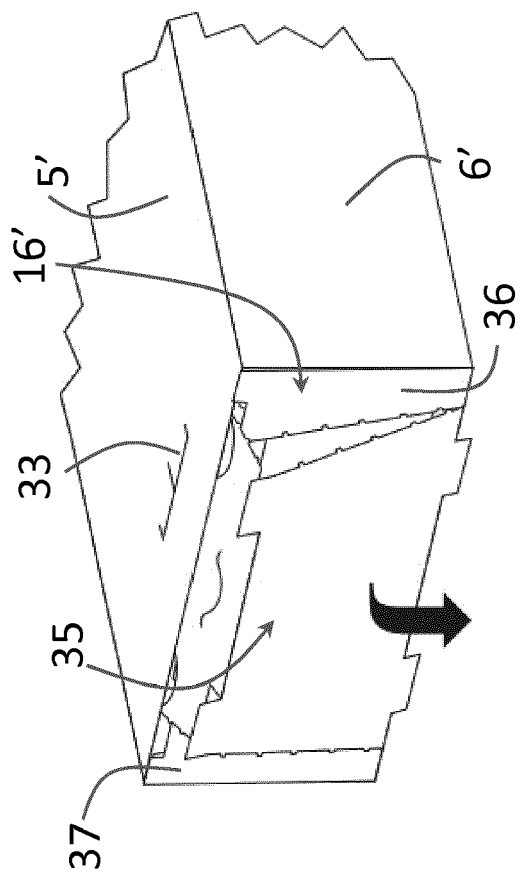
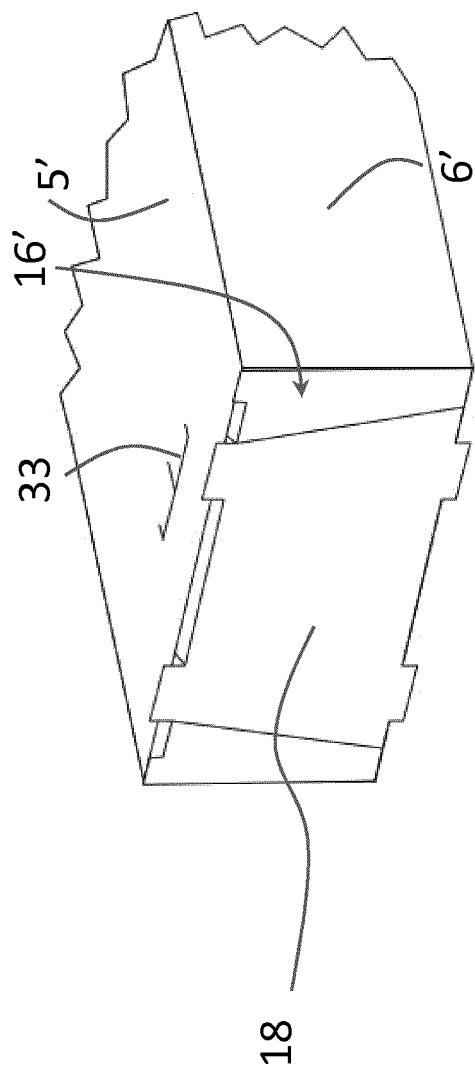


Fig. 1



## Fi. 2





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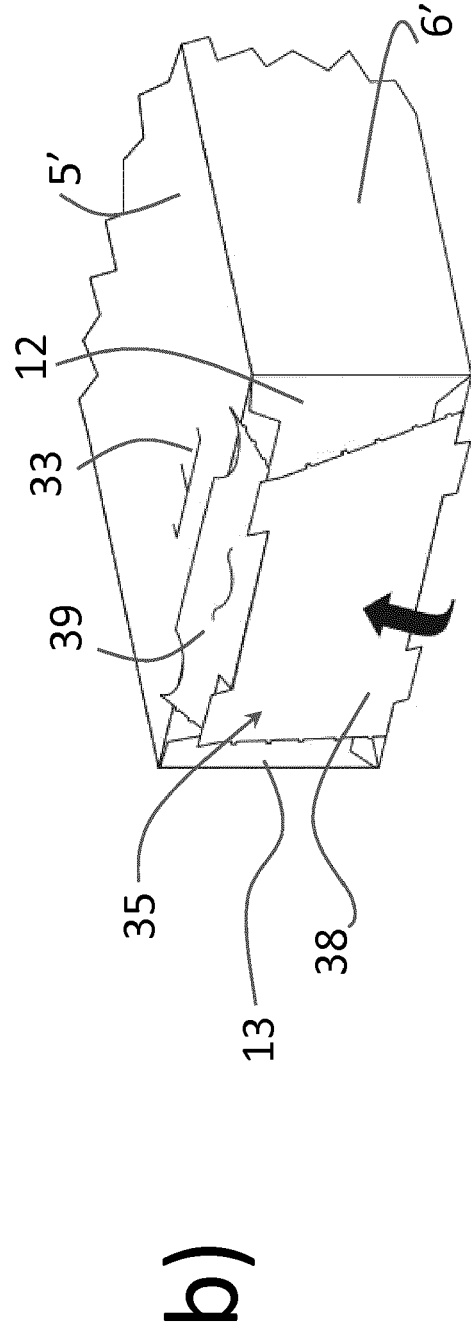
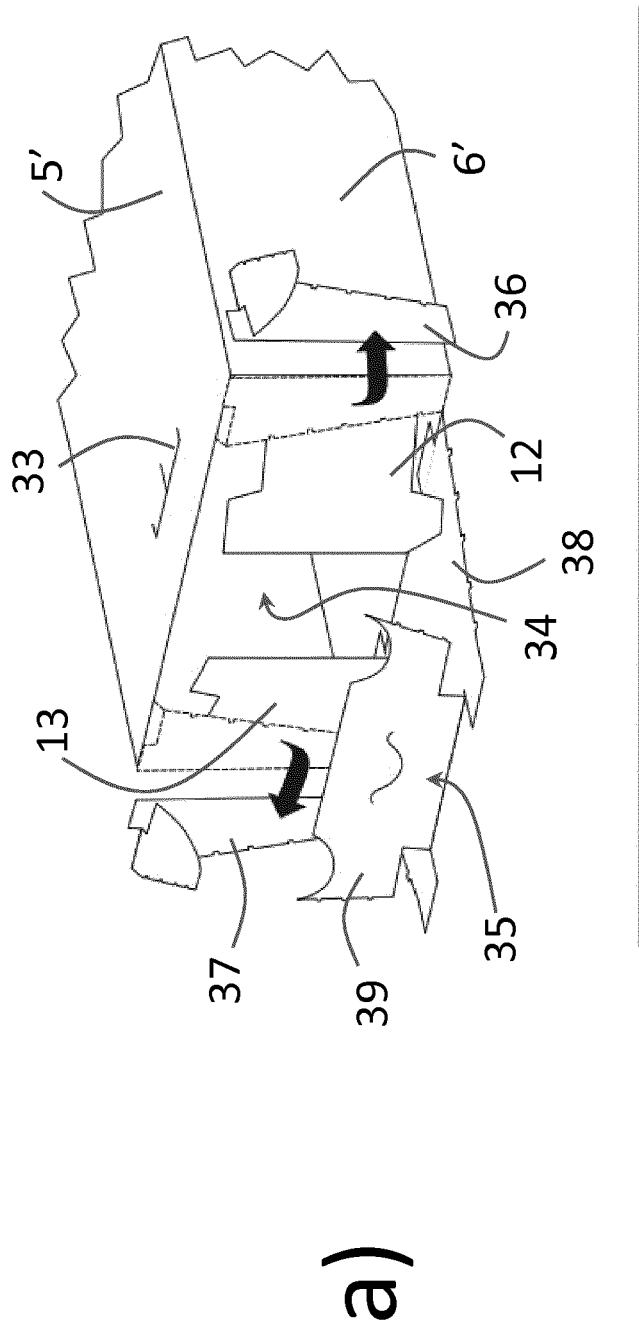


Fig. 4

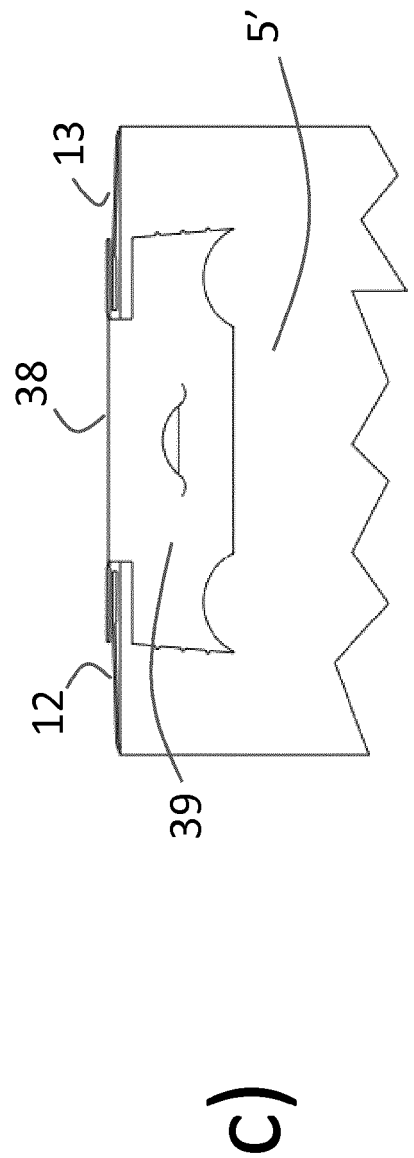
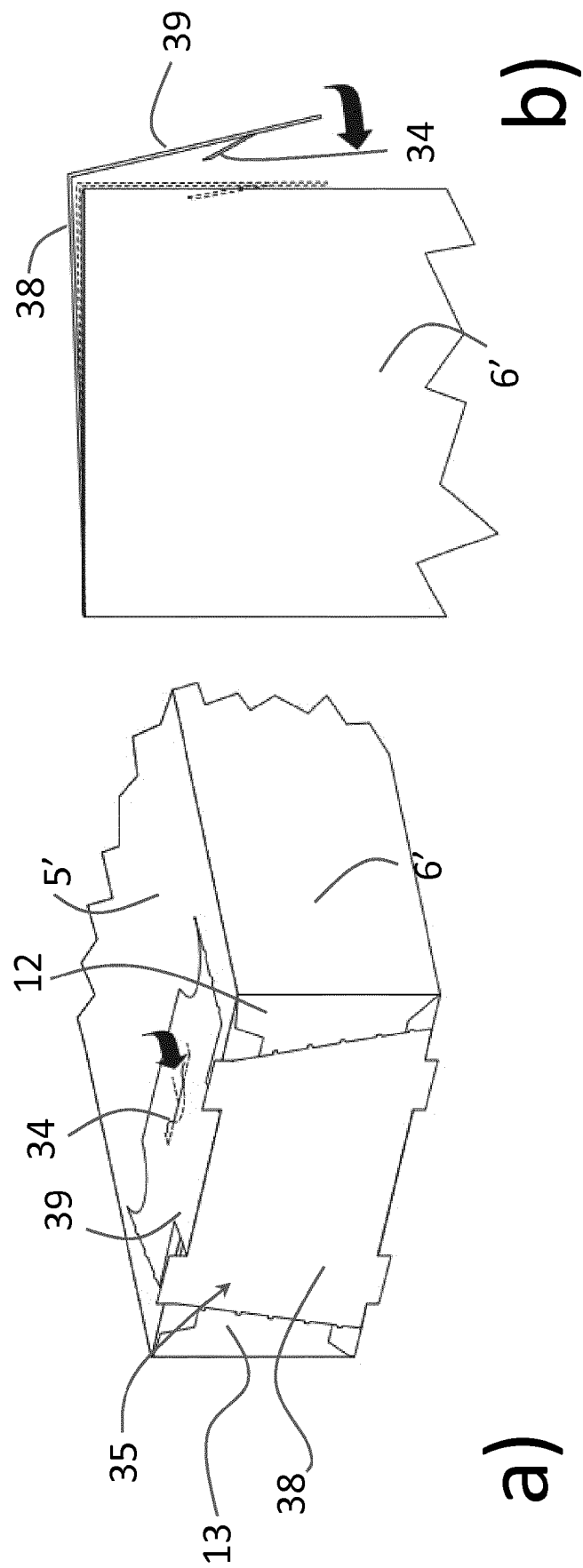


Fig. 5



## EUROPEAN SEARCH REPORT

 Application Number  
 EP 19 19 0198

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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)
Y	WO 2015/140704 A1 (GI BI EFFE SRL [IT]) 24 September 2015 (2015-09-24) * page 4, line 24 - page 45, line 27 * * figures 1-27 *	1-9	INV. B65D5/02 B65D5/54 B65D5/66 B65D5/10
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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search <b>Munich</b>		Date of completion of the search <b>22 August 2019</b>	Examiner <b>Rodriguez Gombau, F</b>
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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

EP 19 19 0198

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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