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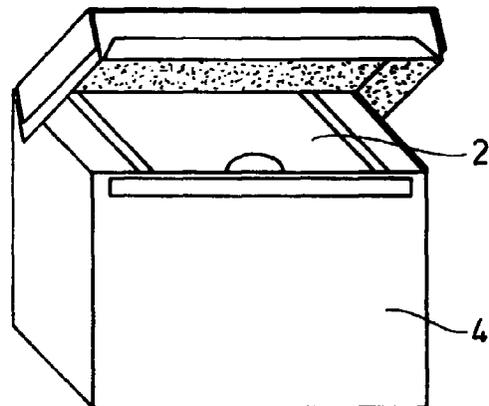
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(54) **Carton for granular materials**

(57) A carton, a blank and a process for forming the carton. The carton comprises bottom (3), front (4) and back (5) panels associated with left and right side flaps (7-9,7'-9'). An inner top panel (2) having side flaps (10,10') and an outer top panel (1) are together forming a double walled top side. The side flaps (10,10') of the inner top panel (2) are arranged inside at least one of the other left and right side flaps (7-9,7'-9') respectively, so as to render the carton sift-proof. A hinged lid with tear open means and a reclosable snap lock may be formed in the top side.

Fig. 5b



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Description

Technical field

The invention relates to carton board containers for granular materials and more particularly to such containers which are side-fill and sift-proof.

Background of the invention

Various types of containers are formed from carton board. Typical containers made from carton board, also simply called cartons, have a substantially parallelepipedal shape with six sides and twelve edges, namely the top, bottom, back, front, left and right sides, the edges being defined by the two sides of which they are the intersection, for example the back/top edge. For definition purposes, it will be considered in the following that when the carton is upright the top and bottom sides are in the horizontal plane, the four other sides being vertical. We will consider that if the front side of the upright carton is facing an observer, the left side is on to the left of the observer and the right side on to the right of the observer, the back side being invisible for the observer.

The present invention relates to a carton, the carton comprising top and bottom sides opposing each other, left and right sides opposing each other, and front and back sides opposing each other, whereby:

- a) the top side comprises an outer top panel (1) and an inner top panel (2);
- b) the bottom side comprises a bottom panel (3);
- c) the front side comprises a front panel (4);
- d) the back side comprises a back panel (5) and a back flap (6) associated with an edge to the inner top panel (2);
- e) the left side comprises a first left flap (7) associated with an edge to the front panel (4), a second left flap (8) associated with an edge to the bottom panel (3), a third left flap (9) associated with an edge to the back panel (5) and a fourth left flap (10) associated with an edge to the inner top panel (2);
- f) the right side comprises a first right flap (7') associated with an edge to the front panel (4), a second right flap (8') associated with an edge to the bottom panel (3), a third right flap (9') associated with an edge to the back panel (5) and a fourth right flap (10') associated with an edge to the inner top panel (2).

Such cartons are usually folded and glued from a die cut. A die cut, or blank, is a flat structure which has not been folded or glued. At least three main steps appear in the folding-gluing-filling process. In a first main step, the die cut is folded and glued to form a sleeve. A sleeve is substantially a four sided structure structured like a six sided carton of which two opposite

sides are not folded or glued. In the sleeve structure, four of the twelve edges of the carton have been folded, these four edges being in a parallel direction to each other. It should be noted that usually the remaining eight edges all have their direction in a plane perpendicular to the direction of the four folded ones. The sleeve structure has the advantage that it can be flattened. As a consequence, sleeves can be stored or shipped easily. In a second main step, the carton is erected from the sleeve, which means that one of the two opposite sides which were not folded and glued during the sleeve step is now folded, four more edges being consequently formed. At this stage, the carton cannot be flattened anymore. However, it can be filled through the last non folded side. In the last step, the last non folded side is folded and glued, so forming the four last edges. In summary, when preparing a carton, the structure goes through successive stages, namely the die cut, followed by the sleeve, which subsequently is formed into an erected carton, before the closed carton stage. Each of these stages is separated by one main folding-gluing step.

There is two alternative ways of forming the sleeve from the die cut, because a choice can be made of the two opposite sides which will be left unfolded and unglued. In a first way, these two side may be the top and bottom sides. In a second way the right and left sides or the back and front sides will be left open. In theory, it is considered equivalent to choose back/front or left/right because these sides are differentiated only as a convention. However, the top/bottom sides are normally perpendicular to gravity when the carton is in its upright position.

In the first way of forming the sleeve, the sleeve will be formed of the front, left, back and right sides, or of any circular permutation of these, while the top and bottom sides will be left opened. In this case, the carton is usually erected by folding the bottom, and then by folding the top after filling. This way avoids having to turn the carton around after the filling process when the filling is made thanks to gravity, because the carton is already upright when filled.

In the second way of forming the sleeve, the sleeve will be formed, for example, of the front, top, back and bottom sides, or of any circular permutation of these, while the left and right sides will be left opened. In this case, the carton is erected by folding indifferently the left or the right side, the left for example, the erected carton being filled through the right side, which should consequently be at the top of the carton during filling. Finally, the carton will be closed. After closing, the carton may have to be turned around in upright position, with the top side on the top.

The present invention relates to a process, the process comprising the steps of erecting a sleeve to a carton and closing the carton, whereby:

- a) the erecting step comprises folding a first left flap

(7) being associated with an edge to a front panel (4), a second left flap (8) being associated with an edge to a bottom panel (3), a third left flap (9) being associated with an edge to a back panel (5) and a fourth left flap (10), the fourth left flap (10) being associated with an edge to an inner top panel (2);
 b) the closing step comprises folding a first right flap (7') being associated with an edge to a front panel (4), a second right flap (8') being associated with an edge to a bottom panel (3), a third right flap (9') being associated with an edge to a back panel (5) and a fourth right flap (10'), the fourth right flap (10') being associated with an edge to an inner top panel (2);

As explained above, the eight edges which are not being folded to form the sleeve have their direction in a plane perpendicular to the direction of the four edges folded to form the sleeve. This means that in the die cut form, the four sleeve folded edges are in one direction and the eight others in the substantially perpendicular direction. By definition, the direction of the eight edges is called the main folding direction or axial direction because most of the folding is made along this direction. The other direction is the transverse direction. Normally, the four edges of the transverse direction should be the sleeve forming edges. As an example, in the first way for folding a sleeve, the front/left, left/back, back/right and right/front edges would be along the transverse direction, while in the second way of folding a sleeve, the front/top, top/back, back/bottom and bottom/front edges would be along the transverse direction.

A die cut is preferably made from a single piece for costs reasons. A die cut normally has a specific grain direction. This means that the material forming the die cut is not isotropic but has a preferred direction along which the die cut can be folded more easily. This direction is the grain direction. For easy folding, it is important that the main folding direction be in the grain direction.

For stiffness reasons, it is important that the grain direction is not horizontal, and preferably vertical, when the carton is in its upright position. This means that the direction of gravity should be the grain direction for the front, back, left and right sides of the carton when the carton is upright, or that the edges front/left, left/back, back/right and right/front should follow the grain direction. Consequently, the edges front/left, left/back, back/right and right/front should not be in the transverse direction on the die cut. This leads to choosing the second way of folding for stiffness reasons. Cartons folded in such a manner are usually called side fill cartons. It should be noted that this denomination is due to the folding method, and is not directly linked to the grain direction. Examples of side fill cartons are disclosed in the pending application JP-09066927, published on the 11th of March 1997. Indeed, the other type of cartons obtained with the first way of folding the sleeve, so-

called top fill cartons, usually require an internal liner for improving stiffness and strength, in particular in case of stacking.

The side fill carton disclosed in JP-09066927 includes an inner top panel and fourth left and right flaps together with a back flap associated with an edge to the inner top panel as well as a lid which can be re-closed. The inner top panel provides extra robustness for the top side because the top side is formed of a double panel. The inner top panel also contributes to avoid sitting prior to opening because the inner top panel lies on the top edge of the front, left and right sides of the carton and is held in this position. The inner top panel is held in this position prior to opening on its four edges because the inner top panel is associated with an edge to the front panel, with another edge to the back flap and with the two remaining edges to the left and right four flap. Consequently, the content cannot escape the carton through the top/front edge because it is made of a folding line. The content cannot escape the carton from the top/back edge because the back flap is glued all along the back panel. Lastly, the content should not escape through the left/top and right/top edges because the fourth left and right flaps are glued so that the inner top panel lies tight on the top edges of the left and right sides.

In the absence of such an inner top panel, a very high accuracy and a substantial amount of glue has to be applied to glue the sides of the lid to the sides of the carton in such a manner that the lid itself is held tight to press on the top of the sides of the carton to prevent the content to migrate during transportation or manipulation. It should be noted that extra flap forming sides for the lid would consequently become necessary because a lid composed only of a top panel could not be glued directly onto the top of the sides of the carton. In order to facilitate opening of such a carton, the user should not have to unglue this substantial gluing. This would indeed be avoided by integrating a tear strip. If this carton is a side fill carton, the tear strip is not along the grain direction on the die cut, which means that it is more solid and can consequently be more easily removed. The tear strip mechanism is known for top fill cartons but in this case it follows the grain direction, so that it usually needs to be reinforced, with a plastic tape for example, to avoid breaking.

The present invention relates to a die cut, the die cut having a first direction and a second direction, the second direction being substantially perpendicular to the first direction, the die cut comprising:

an outer top panel (1);

a) a back panel (5) associated to the outer top panel (1) along a folding line parallel to the second direction;

b) a bottom panel (3) associated to the back panel (5) along a folding line parallel to the sec-

ond direction;

c) a front panel (4) associated to the bottom panel (3) along a folding line parallel to the second direction;

d) an inner top panel (2) associated to the front panel (4) along a folding line parallel to the second direction;

e) a back flap (6) associated to the inner top panel (2) along a folding line parallel to the second direction;

f) a first left flap (7) associated to the front panel (4) along a folding line parallel to the first direction;

g) first right flap (7') associated to the front panel (4) along a folding line parallel to the first direction;

h) a second left flap (8) associated to the bottom panel (3) along a folding line parallel to the first direction;

i) a second right flap (8') associated to the bottom panel (3) along a folding line parallel to the first direction;

a) a third left flap (9) associated to the back panel (5) along a folding line parallel to the first direction;

b) a third right flap (9') associated to the back panel (5) along a folding line parallel to the first direction;

c) a fourth left flap (10) associated to the inner top panel (2) along a folding line parallel to the first direction;

d) a fourth right flap (10') associated to the inner top panel (2) along a folding line parallel to the first direction;

e) a fifth left flap (11) associated to the outer top panel (1) along a folding line parallel to the first direction;

f) a fifth right flap (11') associated to the outer top panel (1) along a folding line parallel to the first direction.

In practice, an issue appears due to the structure of the side fill carton disclosed in JP-09066927 when opening the carton, because the content can be spilled at opening of this carton. Indeed, prior to opening, the content of the carton can migrate through the top/right or top/left edge. Consequently, part of the content is trapped just behind the fourth left or right flap of the carton. This results in spillage at opening because the fourth left and right flaps have to be removed at least partially at opening of the carton in order to pull the inner top panel open, so that the trapped content gets released out of the carton in an undesirable manner. This occurs because the fourth left and right flaps are respectively folded over the first, second and third left and right flaps. Secondly, skewing of the carton due to drag back appears during the folding-gluing-filling process, so that the left and right sides, or end walls, have to

be made of two main layers with a full size, sometimes cut at special angles, to ensure that the end walls are sift proof and also requires a very high accuracy for folding. Furthermore, the aesthetic of the final carton suffers from skewing.

Accordingly, it is an object of the present invention to produce a carton which does not produce spillage at opening.

10 Summary of the invention

The present invention provides a side fill carton in a manner to satisfy the aforementioned needs.

The carton of the invention is characterised in that at least one of the first (7), second (8) or third (9) left flaps is folded over the fourth left flap (10) and at least one of the first (7'), second (8') or third (9') right flaps is folded over the fourth right flap (10').

In another aspect of the invention, a die cut for a carton is provided, the die cut being characterised in that the fourth left flap (10) has a part longer than the fifth left flap (11) and the fourth right flap (10') has a part longer than the fifth right flap (11').

In a third aspect of the invention a process is provided, the process being characterised in that at least one of the first (7), second (8) or third (9) left flaps is folded over the fourth left flap (10) and at least one of the first (7'), second (8') or third (9') right flaps is folded over the fourth right flap (10').

30 Brief description of the drawings

The invention will now be described by way of example and with reference to the accompanying drawings in which:

Figure 1 is a top plan view of a preferred embodiment of a die cut of the present invention.

Figure 2 is a top plan view of a partial sleeve made from the die cut of figure 1.

Figure 3 is a top plan view of a complete sleeve made from the partial sleeve of figure 2.

Figures 4 a-i describe an example of the erecting step according to the present invention with a sequence starting from the complete sleeve of figure 3.

Figures 5 a-c describe an example of opening of a carton according to the present invention with a sequence starting from the complete closed carton made for example from the die cut of figure 1.

Figures 6 a-b are cross-sectional views of the carton of figure 5a along a plane parallel to the front side (6-a) or parallel to the left side (6-b) showing

the wall construction of the carton.

Figure 7 is a top plan view of another preferred embodiment of a die cut of the present invention.

Figure 8 is a top plan view of yet another preferred embodiment of a die cut of the present invention.

Figure 9 is a top plan view of an additional preferred embodiment of a die cut of the present invention.

Figure 10 is a top plan view of a further preferred embodiment of a die cut of the present invention.

Figure 11 is a top plan view of a partial sleeve made from the die cut of figure 10.

Figure 12 is a top plan view of a complete sleeve made from the partial sleeve of figure 11.

Figure 13 is lastly a top plan view of a preferred embodiment of a die cut of the present invention.

Description of the preferred embodiments

The carton of the present invention is preferably made of cardboard or corrugated board, but other materials could also be used. Such cartons are usually used for housing granular materials. The cartons normally have a parallelepipedal shape with six sides. The sides can be defined as a top, bottom, left, right, back and front sides. The top side is on the top of the carton when the carton is in its upright position, the bottom side being opposite to the top side. For the purpose of the description, the front and back sides are opposing sides and the left and right side are opposite sides as well. Each of these sides can be made of several layers of material. Each of the sides is usually of a substantially rectangular shape, each side being limited at its borders by four edges. The structure of the carton is due to links which can exist between different layers of different sides through the edges. For example, if the front side is made of a single layer, this layer may be linked to the left side through the edge between the two sides, the link and the edge being provided by a folded line or/and by glue. The layers which compose the sides of the carton may be of different sorts. If such a layer is covering a complete side, it is called a panel, and is said as corresponding to the side it covers. When a layer covers a side only partially, it is called a flap, and it is said that it corresponds to the side it covers. However, a flap may be extended up to the panel size, in which case it is a long flap. Long flaps are particularly used for contributing to the rigidity of the structure. Flaps and panels can also comprise cut outs allowing use of a minimum amount of materials. Panels or flaps can be said as associated to another layer, which means that they have a side in common with this layer through a folded line or

score line, in doing so describing an edge of the carton. Each side may comprise one or more panels, one or more flaps, or a combination of these. In the present application, the panels may have in their denomination the name of the side of which they cover the surface, for example the bottom panel (3) corresponds to the bottom side, their position being given in their denomination if several panels are corresponding to one side, such as the outer top panel (1) and the inner top panel (2) in case of the top side, the inner panel being closer to the inside of the carton. In the present application the flaps may have in their denomination the name of the side with which they correspond once the carton is folded, followed of the name of the flap or panel with which they are associated. For example, the first left flap (7) associated with an edge to the front panel (4) is forming part of the left side in the folded carton and is physically attached the front panel (4) with a folding line. It should be noted that the side denomination, namely left, right, top, bottom, back and front, are conventional denominations which are introduced for ease of explanation, and should not be limiting. In order to complete the structure, some flaps and panels may be linked to each other not by folding lines but by glue. The glue can be applied in different ways. For example, cold glue can be used, applied with rollers or glue guns, but also hot glue, whether applied with glue guns or pattern plates.

The carton structure of the present invention is such that it can be sift proof, or even air tight if a special glue pattern is applied, so as to prevent air from passing through the structure.

The structure should to be sift proof both through the sides and through the edges. By sift proof, what is meant is that the content of the carton should not escape the carton in an undesired manner, for example in the form of dust or particles.

In order to be sift proof through the sides, and if the side comprises a panel, it has to be ensured that the panel does not accidentally burst. This is particularly important on the top side, which usually is more exposed to external intervention which can lead to bursting. For this reason, the top side of the present invention comprises two panels, the outer top panel (1) and the inner top panel (2). If the side is composed of flaps, it is important that the flaps cooperate with each other as expected to obtain a sift proof structure. Usually, it is obtained by gluing the flaps to each other. However, there is an issue due to drag back. Drag back is a dynamic phenomenon which usually occurs while forming the carton structure: the sleeve may not remain perfectly rectangular in cross section but take a trapezoidal shape, so that gluing and folding is not done perfectly, introducing the risk of not being in line, so that the flaps may not cooperate properly to cover in a sift proof manner the side because the flaps may be skewed. It is additionally an object of the present invention to prevent skewing of the carton and to render the production process less sensitive. In the present invention, skewing is

minimised because the fourth left or right flap can render the sleeve more rectangular in cross section prior to folding and gluing by lying against two opposite sides, for example the front and back ones, in such a manner that the edge between the front or back with the top side is maintained at a right angle by the fourth left flap (10) or by the fourth right flap (10').

The structure should equally be sift proof along the edges. This is usually not difficult, except in the presence of a lid arrangement. Indeed, if a carton did not have a specific lid arrangement, all edges could be made sift proof by applying a sufficient amount of glue. However, in our case, the carton should have a lid which can be lifted and re-closed without difficulty. This means that the lid should not be glued only with a limited amount of glue. This usually has the consequence that the carton is not completely sift proof around the lid area, or that spillage occurs at opening of the carton. In the present invention, this is prevented by using the inner top panel (2), the fourth left and right flaps (10,10') and the back flap (6) to seal with glue the carton in the lid area. As a consequence, the content will be kept away from the lid area by the inner top panel (2) arrangement, so that the lid can be lightly glued to be lifted easily. Because the outer top panel (1) can for example be glued directly onto the inner top panel (2) in such a manner that it forms a lid once lifted, extra flaps are not required. Therefore, a further object of the present invention is to produce a sift proof carton with a simple lid without extra flaps.

The carton may also comprise a snap lock (14) mechanism in the lid area, of any kind known of the man skilled in the art, for example composed of a snap flap and of a snap tab. Preferred here are audible snap lock (14) mechanisms. The lid may also be lifted at opening by means of a de-laminated area (17) combined with perforations or with extra glue spots.

The carton of the present invention should allow use of a minimised amount of material for various reasons. Firstly, such a carton would not require a liner for extra stiffness if the grain direction is oriented adequately. Secondly, it is possible to use short flaps versions because skewing due to drag back is limited, so that the flaps are co-operating with each other as expected and do not need to be made larger to ensure that the carton is sift proof. Indeed, skewing is not critical for this type of carton because the fourth right and left flaps make the carton sift-proof. Furthermore short flaps can be used because the link between the outer top panel (1) and, for example, the left or right sides, is not critical, because the carton will be sift proof even if the outer top panel (1) is not tightly pressed onto the extremity of the flaps, were glue cannot be applied, so the carton is sift proof because the fourth left and right flaps (10,10') are providing the sealing. Additionally, the content of the carton can be increased at fixed cardboard quality because there is limited skewing, so that the structure is more robust and maintains better. This

contributes to an additional object of the present invention for producing a carton with a reinforced structure and to yet another object of the invention which is to produce an ecological carton using a minimised quantity of materials.

The carton of the present invention may comprise different sorts of lid. As an example, a hinged lid could be simply made of the outer top panel (1). Preferably, a full hinged lid can be made of the outer top panel (1), of part of the front flap (12), and of extra flaps so that the lid covers at least partially the front, left and right sides of the carton once closed. This can be achieved thanks to a sixth left flap (13) associated with an edge to the front flap (12), a sixth right flap (13') associated with an edge to the front flap (12), a fifth left flap (11) associated with an edge to the outer top panel (1), and a fifth right flap (11') associated with an edge to the outer top panel (1). In this particular case, the fifth left and right flaps (11,11') are linking the outer top panel (1) to the right and left side by being glued onto the left side for the fifth left flap (11) and on the right side for the fifth right flap (11'), so that this link would also be achieved if the fifth flaps were attached with an edge to the left and right sides respectively, and glued onto the outer top panel (1).

In a general manner, the carton of the invention may comprise features and variations of the existing cartons, such as for example the cartons disclosed in EP 0 588 789 B1 or in WO 92/20583.

Usually, die cuts used for cartons are preferably made of one piece only, in order to reduce complexity of assembly and the production costs. This often leads to difficulties for integrating a lid to the structure while ensuring that the final carton is sift proof and the lid easy to open. This should be done while fulfilling another object of the present invention which is to produce a carton which does not require a tear strip. This is achieved in the present invention as the outer top panel (1) can be simply glued directly onto the inner top panel (2), or can be provided with extra flaps so that the lid covers at least partially the sides of the carton once closed. Another characteristic of a die cut according to the present invention is to have only two folding or cutting direction, this again for costs reasons. A die cut has a grain direction. The folding or cutting directions may be chosen so as to take account of the grain direction, considering that the cardboard is more foldable along the grain direction.

Extra parts may be added, such as extra flaps for the lid. Such a die cut can be used for making cartons as described in claim 1. Snap lock (14) means known of the man skilled in the art can be integrated to the die cut.

In a preferred embodiment of the invention, presented in figure 1, the carton is made from a single unit die cut. The die cut comprises a back flap (6). This back flap (6) can be folded back as indicated. The next move consists in folding the folding line between the front

panel (4) and the bottom panel (3). This leads to Figure 2, whereby the back flap (6) has been glued onto the inner side of the back panel (5). This is followed by folding the outer top panel (1) to lay it onto the inner top panel (2), and by gluing the front flap (12) to the outer side of the front panel (4) and sixth left and right flaps (13,13') associated with an edge to the front flap (12) respectively to the first left and right flaps (7,7'), or by simply gluing the outer top panel (1) directly onto the inner top panel (2), partially or completely. This leads to figure 3, where the sleeve is made. Normally, up to this stage, manufacture is made by the carton supplier. Once folded and glued, the sleeve can be shipped and delivered easily because it can be flattened. The erection takes place afterwards.

The sleeve of figure 3 is normally placed as in the figure 4-a position, so that the opposite sides which are still opened are in the vertical axis. This is due to the fact that standard processing lines are adapted to such a position. At first, the sleeve is unfolded as shown in 4-b, so that it is not a flat structure anymore. Following the moves indicated on figure 4-b and 4-c, moves which can be achieved thanks to standard folding rails or tucker wheels, the carton takes a rectangular cross section. It should be noted that the fourth left flap (10) should have a part longer than the fifth left flap (11), because it should be folded before the fifth left flap (11), so it has to be folded independently from the fifth left flap (11). Indeed, it should be possible to fold the fourth left flap (10) by pushing the part which is longer without pushing the fifth left flap (11). In the example, the fourth left flap (10) is longer than the fifth left flap (11) along the second direction of the die cut, but for example a cut-out in the fifth left flap (11) would be sufficient to gain the access for folding the fourth left flap (10) before folding the fifth left flap (11). The rectangular cross section of the sleeve is due to the position of the fourth left flap (10) position, which, as can be seen in figure 4-d, is ensuring that the carton is not subject to drag back. As shown as well in Figure 4-d, glue can be applied according to standard processes to prepare the next folding. The way glue is applied in 4-d is important because it will insure that the fourth left flap (10) is sift proof. In this example, the fourth left flap (10) is folded first, so that all of the other left flaps are folded over it. However, it is sufficient that only one of the first (7), second (8) or third (9) left flaps be folded and glued onto the fourth left flap (10). By folding over, it is meant that the fourth left flap (10) is closer to the inside of the carton than any flap folded over it. For example, if the second left flap (8) were a long flap, the second left flap (8) could be the only flap glued and folded over the fourth left flap (10). In the present example, it is the third left flap (9) which is folded over the fourth left flap (10) first, followed by all the other. This is done in 4-e, where it should be noted that the third left flap (9) is glued with minimised skewing. If some skewing still occurs, the shape of the third left flap (9) or of other flaps could be slightly modified to

allow skewing. Thanks to this folding/gluing operation, a sift proof attachment is made between the top side and the left side. This sift proof attachment could also be achieved with a short flap (16) as the one found on figure 7, allowing to use less material. This particular short flap is shortened along the first direction, but any flap could also be shortened along the second direction, or be adapted and have cut-outs integrated by the man skilled in the art to facilitate the assembly or other properties. Once this is done, there is another gluing stage, which can also be achieved by standard gluing procedures. It should be noted that this gluing stage will allow finishing folding and gluing of the entire left side of the carton. The glue patterns can be modified to improve further the fact that the carton is sift proof, or to take account of other elements, such as use of short flaps. Folding will go on as described in figures 4-g and 4-h, using again standard rails and tucker wheels, so as to obtain a folded and closed left side. Normally, the fifth left flap (11) is folded and glued last, whether the fifth left flap (11) is glued on the left side and associated to the outer top panel (1) with an edge, or whether it is glued on the outer top panel (1) and associated to the sixth left flap (13) attached with an edge to the front flap (12). Once this is made, the carton can be turned around, the right side on top, so as to be filled. However, this is not necessary because on some folding lines, the folding can take place on the top or on the bottom. Once filling is achieved, the right side is folded, the folding of the right side comprising the same steps as the folding of the left side. This leads to a filled and closed carton structure, such as the structure presented in figure 5-a. It should be noted that this process allows use of standard machines, so that an other object of the invention is to produce a carton which is easy to process.

Additionally, it is an object of the present invention to produce a carton at lower costs.

The carton structure is delivered to the user in the state described in figure 5-a. Up to this point, the carton is completely sealed and sift proof, and may even be made air tight. The first action required by the user is to lift the lid, which can be easily done thanks to the to minimised gluing, or de-lamination, or thanks to perforated lines. The lid presented in this example is a hinged lid, and is comprising the outer top panel (1), at least part of the front flap (12), the sixth left and right flaps (13,13'), the fifth left flap (11) and the fifth right flap (11'). Such a lid has sides which cover the left, right and front sides of the carton once re-closed. Once opened, the user gains access to the inner top panel (2). Promotional items or others may have been inserted in a tamper proof location between the inner top panel (2) and the outer top panel (1), so that the user now has access to them. The user can easily access the content of the carton by removing the inner top panel (2) or part of it, as described in figure 5-c. Removal may be facilitated by various ways known in the art, using perforated lines, partial cuts, tear strip or tear tape for example. The inner

top panel (2) may be only partially removable, in such a manner that part of the inner top panel (2) remains to avoid spillage of the content if, for example, the carton is inclined once opened. The removable part may be used to display instructions or as a promotional voucher or other items of the sort. In a most preferred embodiment of the invention, the inner top panel (2) is glued to the outer top panel (1), so that opening occurs in a single step when the lid is lifted for the first time. The carton can be re-closed with the lid. A snap lock (14) mechanism can be provided as known of the man skilled in the art, preferably of the audible snap lock (14) kind, although it is possible to have a carton without snap lock (14), for example with the carton which would be obtained from the die cut described in figure 13.

Figure 6-a and 6-b are examples of a cross section of a carton according to the present invention, in a plane parallel to the front or back side for 6-a, and in a plane parallel to the right or left side in 6-b. In figure 6-a, it is clear that the assembly composed of the left side, the inner top panel (2) the right side and the bottom side can be rendered sift proof by gluing the fourth left flap (10) and the fourth right flap (10'). The lid is also clearly seen, composed of the outer top panel (1), of the sixth left and right flaps (13,13'), of the fifth left and right flaps (11,11') and of at least part of the front flap (12). Easy removing of part of the inner top panel (2) is here provided by the partial cuts and reversed partial cuts. Similarly, easy opening of the lid is achieved thanks to breaking of perforation. Such an embodiment also provides a snap lock (14) mechanism.

Another preferred embodiment of the present invention is presented by the die cut of figure 7, this die cut having the characteristic of having a long front flap (12) and long sixth left and right flaps (13,13'), so as to render the carton more robust. In this way, the front side in particular has a double layer, consisting of a long front flap (12) and of a front panel (4). It is preferred to integrate a tear strip (15) mechanism to this embodiment in order to facilitate opening of the carton. It should be noted that the tear strip (15) should have an axis perpendicular to the direction of the grain of the die cut in order to be more resistant. This die cut is also presented together with the option of replacing a long flap with a short flap, so as to use less material. Robustness can be further improved on the back side by using a long back flap (6) as presented in figure 8. Different combination of long or short flaps can be chosen in order to adapt the carton to the robustness required.

Figure 9 presents another embodiment of the present invention whereby the fifth left and right flaps (11", 11'") are attached to the sixth left and right flaps (13,13') respectively. In this case, the fifth left and right (11",11'") flaps will be glued to the outer top panel (1) during folding of the carton. This is an example of variations on the carton of the invention.

Figure 10 introduces an other embodiment of the carton of the present invention, whereby the folding of

the sleeve is modified, due to a different positioning of the panels on the die cut, so that the sleeve is formed by folding the folding line between the inner top panel (2) and the front panel (4) as presented in figure 12, after what the folding line between the bottom panel (3) and the back panel (5) is folded to be glued onto the front flap (12) and onto the sixth left and right flaps (13,13'). In this particular example, the opening of the lid is facilitated by the removal of a tear strip (15).

Care should be taken while designing such die cuts that the grain direction is suitable, so that it ensures robustness and easy folding of the carton. For example, in the die cut of figure 1, the grain direction should be vertical because it would allow easier folding of the left flaps and because the front and back side will participate more efficiently to supporting the structure if the grain direction of the panels of which they are composed is aligned to gravity. In the die cuts presented in figures 1, 7, 8, 10 and 13, the first direction is vertical and the second direction horizontal, the first direction being preferably the grain direction.

Claims

1. A carton, the carton comprising top and bottom sides opposing each other, left and right sides opposing each other, and front and back sides opposing each other, whereby:
 - a) the top side comprises an outer top panel (1) and an inner top panel (2);
 - b) the bottom side comprises a bottom panel (3);
 - c) the front side comprises a front panel (4);
 - d) the back side comprises a back panel (5) and a back flap (6) associated with an edge to the inner top panel (2);
 - e) the left side comprises a first left flap (7) associated with an edge to the front panel (4), a second left flap (8) associated with an edge to the bottom panel (3), a third left flap (9) associated with an edge to the back panel (5) and a fourth left flap (10) associated with an edge to the inner top panel (2);
 - f) the right side comprises a first right flap (7') associated with an edge to the front panel (4), a second right flap (8') associated with an edge to the bottom panel (3), a third right flap (9') associated with an edge to the back panel (5) and a fourth right flap (10') associated with an edge to the inner top panel (2); characterised in that at least one of the first (7), second (8) or third (9) left flaps is folded over the fourth left flap (10) and at least one of the first (7'), second (8') or third (9') right flaps is folded over the fourth right flap (10').

2. The carton according to claim 1, whereby the car-

- ton comprises a fifth left flap (11) associated to the outer top panel (1) with an edge and a fifth right flap (11') associated to the outer top panel (1) with an edge.
3. The carton according to claim 1, whereby the carton comprises a front flap (12) associated with an edge to the outer top panel (1), a sixth left flap (13) associated with an edge to the front flap (12) and a sixth right flap (13') associated with an edge to the front flap (12).
 4. The carton according to claims 2 and 3, whereby it comprises a hinged lid, the hinged lid comprising at least a portion of the outer top panel (1), at least a portion of the fifth left flap (11), at least a portion of the fifth right flap (11'), at least a portion of the sixth left flap (13), at least a portion of the sixth right flap (13') and at least a portion of the front flap (12).
 5. The carton according to claim 1, whereby the carton is a side fill carton.
 6. The carton according to claim 1, whereby the carton further comprises a snap lock (14) mechanism.
 7. The carton according to claim 1, whereby the carton further comprises a pre cut de-lamination zone for easy opening.
 8. The carton according to claim 1, whereby the inner top panel (2) comprises means for opening, preferably partial cuts, reversed cuts, perforations, tear tapes or a combination of these.
 9. The carton according to claim 1, whereby flaps are extended to provide a double panel on the front or back side or a triple panel on the left or/and right side.
 10. The carton according to claim 8 whereby the carton further comprises a tear strip (15) means.
 11. The carton according to claim 10, whereby the carton opening comprises two steps, the first step consisting in lifting up the lid, the second step consisting in pulling open at least part of the inner top panel (2).
 12. The carton according to claim 1, whereby the part of the inner top panel (2) can be used as an advertising item, preferably as a tear off coupon, or to communicate usage instructions.
 13. The carton as in claim 1, whereby promotional items are placed between the outer top panel (1) and the inner top panel (2).
 14. The carton according to claim 1, whereby the inner top panel (2) is glued top the outer top panel (1) for easy removal.
 15. A die cut, the die cut having a first direction and a second direction, the second direction being substantially perpendicular to the first direction, the die cut comprising:
 - a) an outer top panel (1);
 - b) a back panel (5) associated to the outer top panel (1) along a folding line parallel to the second direction;
 - c) a bottom panel (3) associated to the back panel (5) along a folding line parallel to the second direction;
 - d) a front panel (4) associated to the bottom panel (3) along a folding line parallel to the second direction;
 - e) an inner top panel (2) associated to the front panel (4) along a folding line parallel to the second direction;
 - f) a back flap (6) associated to the inner top panel (2) along a folding line parallel to the second direction;
 - g) a first left flap (7) associated to the front panel (4) along a folding line parallel to the first direction;
 - h) a first right flap (7') associated to the front panel (4) along a folding line parallel to the first direction;
 - i) a second left flap (8) associated to the bottom panel (3) along a folding line parallel to the first direction;
 - j) a second right flap (8') associated to the bottom panel (3) along a folding line parallel to the first direction;
 - k) a third left flap (9) associated to the back panel (5) along a folding line parallel to the first direction;
 - l) a third right flap (9') associated to the back panel (5) along a folding line parallel to the first direction;
 - m) a fourth left flap (10) associated to the inner top panel (2) along a folding line parallel to the first direction;
 - n) a fourth right flap (10') associated to the inner top panel (2) along a folding line parallel to the first direction;
 - o) a fifth left flap (11) associated to the outer top panel (1) along a folding line parallel to the first direction;
 - p) a fifth right flap (11') associated to the outer top panel (1) along a folding line parallel to the first direction;

the die cut being characterised in that the fourth left flap (10) has a part longer than the fifth left flap (11)

and the fourth right flap (10') has a part longer than the fifth right flap (11').

16. The die cut according to claim 15, whereby the die cut has a grain direction, and the grain direction is the first direction. 5

17. A process, the process comprising the steps of erecting a sleeve to a carton and closing the carton, whereby: 10

a) the erecting step comprises folding a first left flap (7) being associated with an edge to a front panel (4), a second left flap (8) being associated with an edge to a bottom panel (3), a third left flap (9) being associated with an edge to a back panel (5) and a fourth left flap (10), the fourth left flap (10) being associated with an edge to an inner top panel (2); 15

b) the closing step comprises folding a first right flap (7') being associated with an edge to a front panel (4), a second right flap (8') being associated with an edge to a bottom panel (3), a third right flap (9') being associated with an edge to a back panel (5) and a fourth right flap (10'), the fourth right flap (10') being associated with an edge to an inner top panel (2); 20 25

the process being characterised in that at least one of the first (7), second (8) or third (9) left flaps is folded over the fourth left flap (10) and at least one of the first (7'), second (8') or third (9') right flaps is folded over the fourth right flap (10'). 30

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Fig. 1

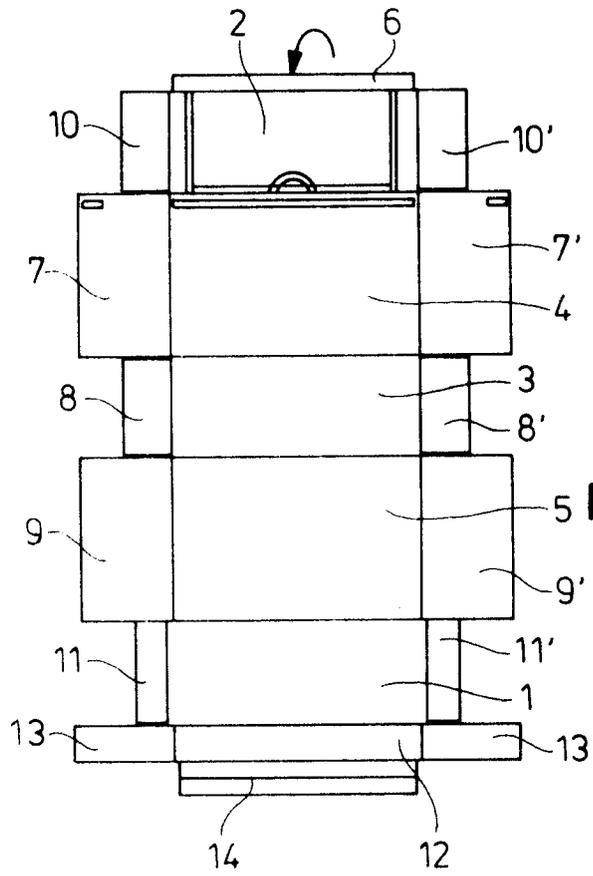


Fig. 2

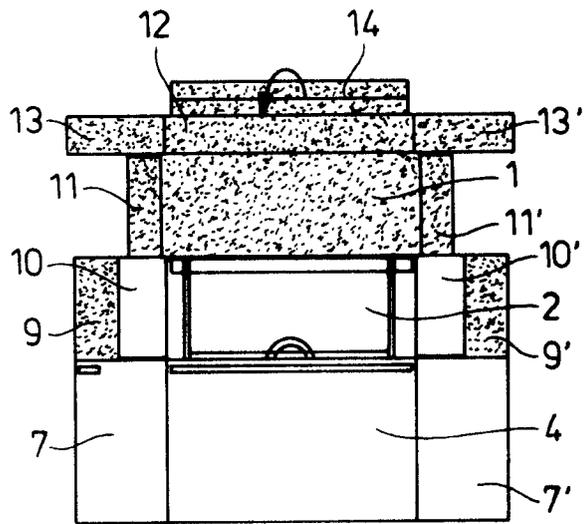


Fig. 3

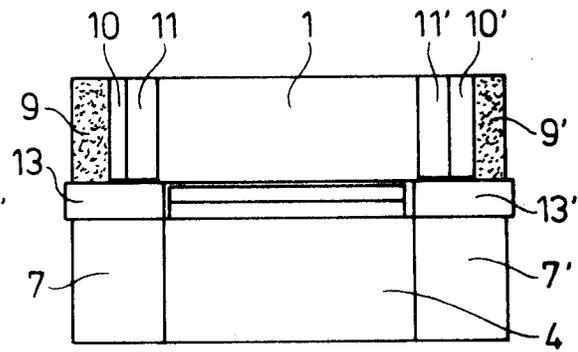


Fig. 4a

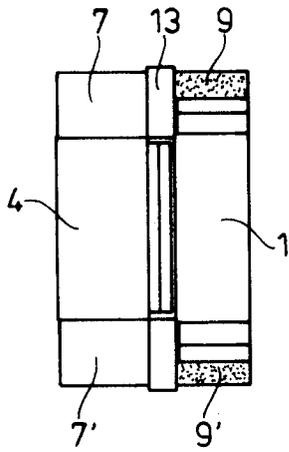


Fig. 4b

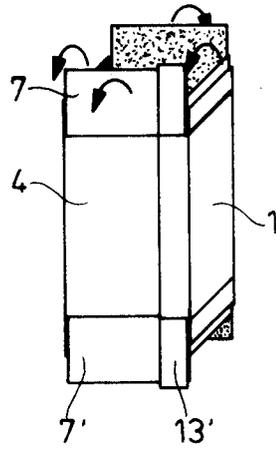


Fig. 4c

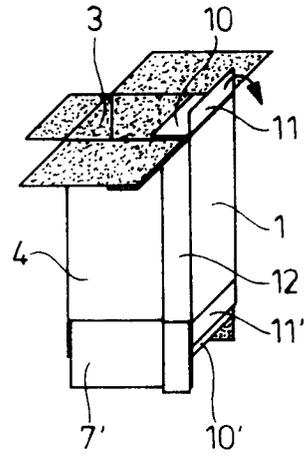


Fig. 4d

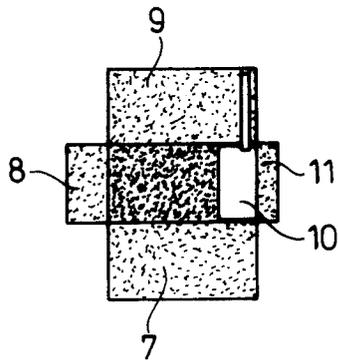


Fig. 4e

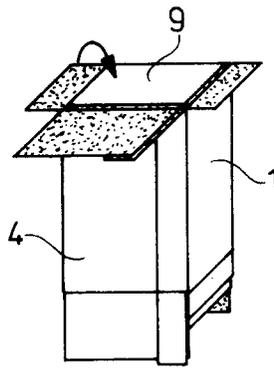


Fig. 4f

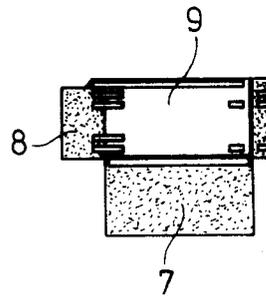


Fig. 4g

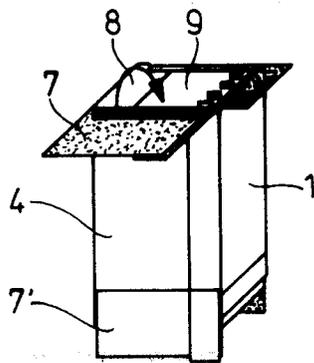


Fig. 4h

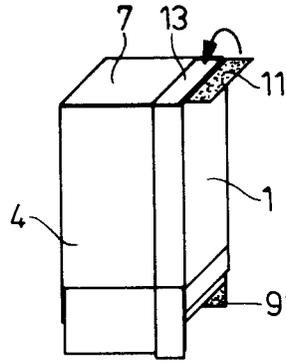


Fig. 4i

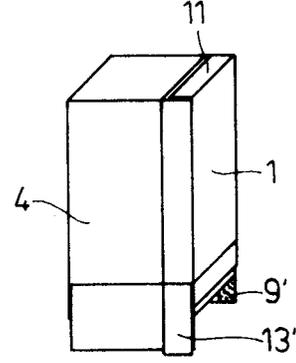


Fig. 5a

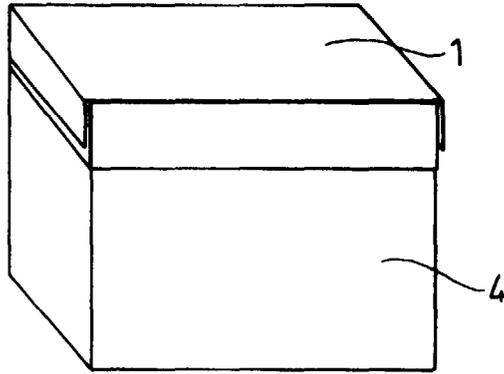


Fig. 5b

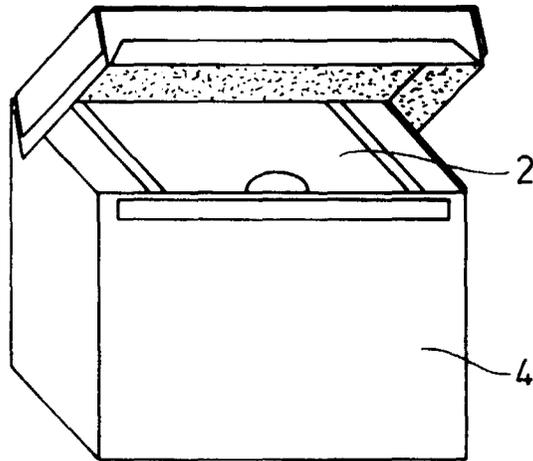


Fig. 5c

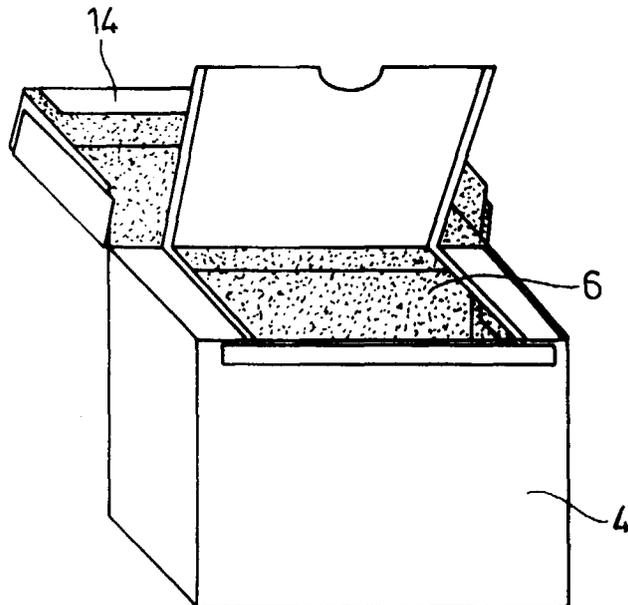


Fig. 6a

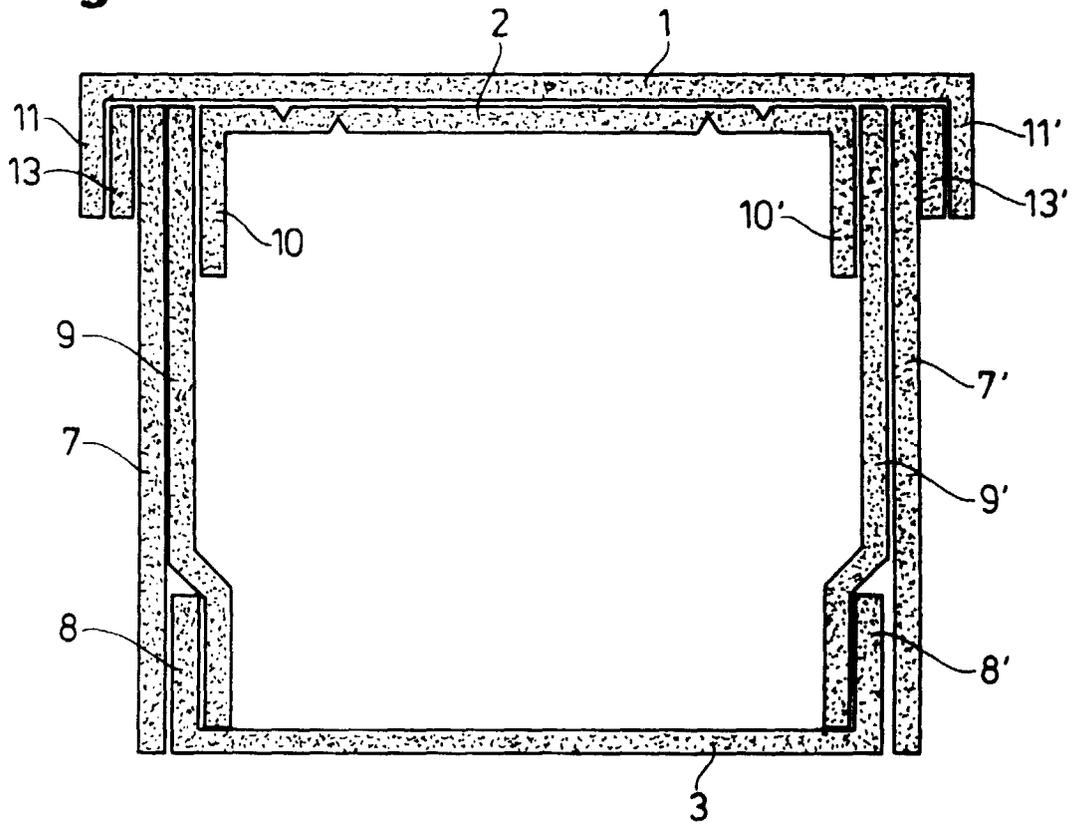


Fig. 6b

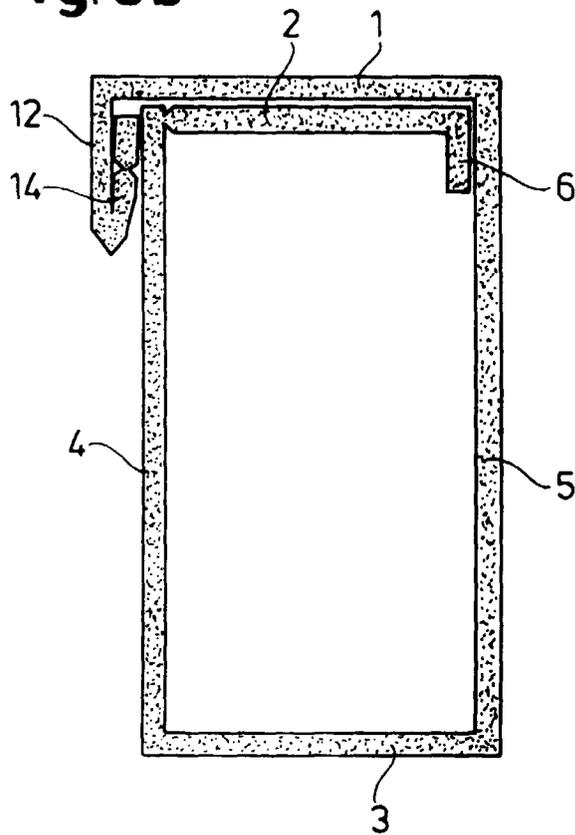


Fig. 7

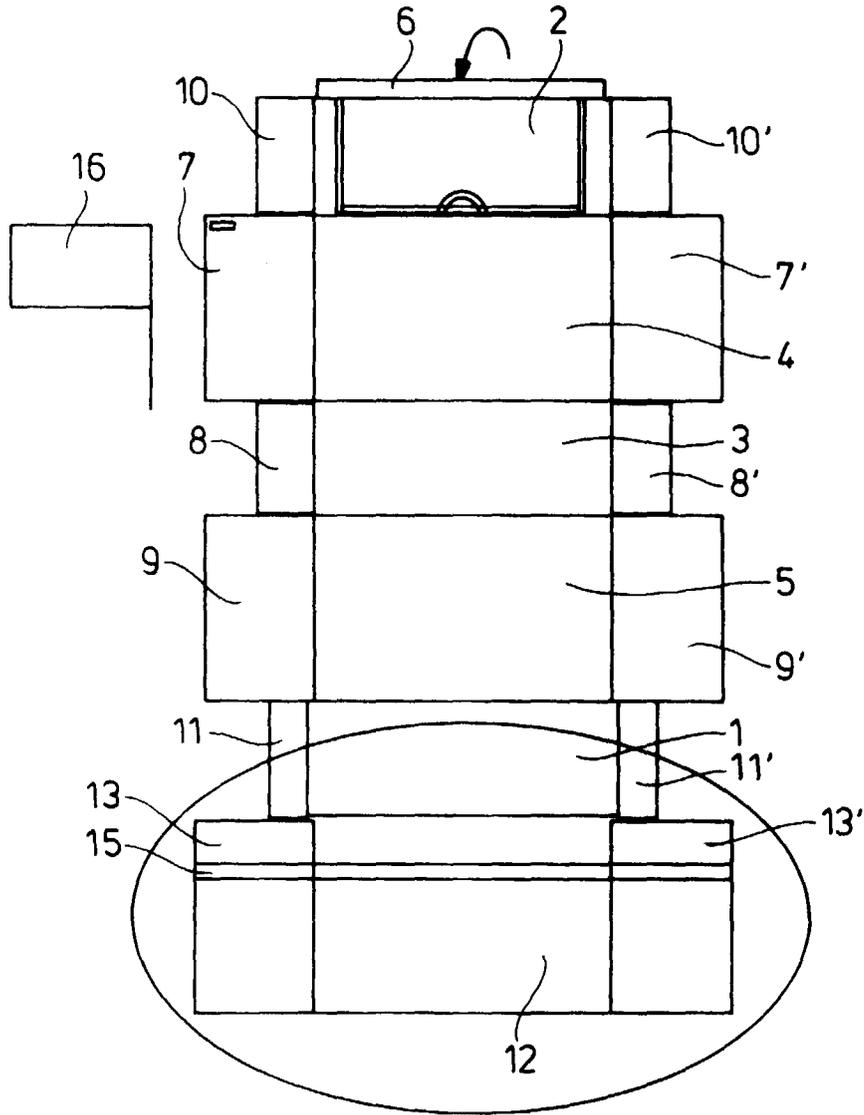


Fig. 8

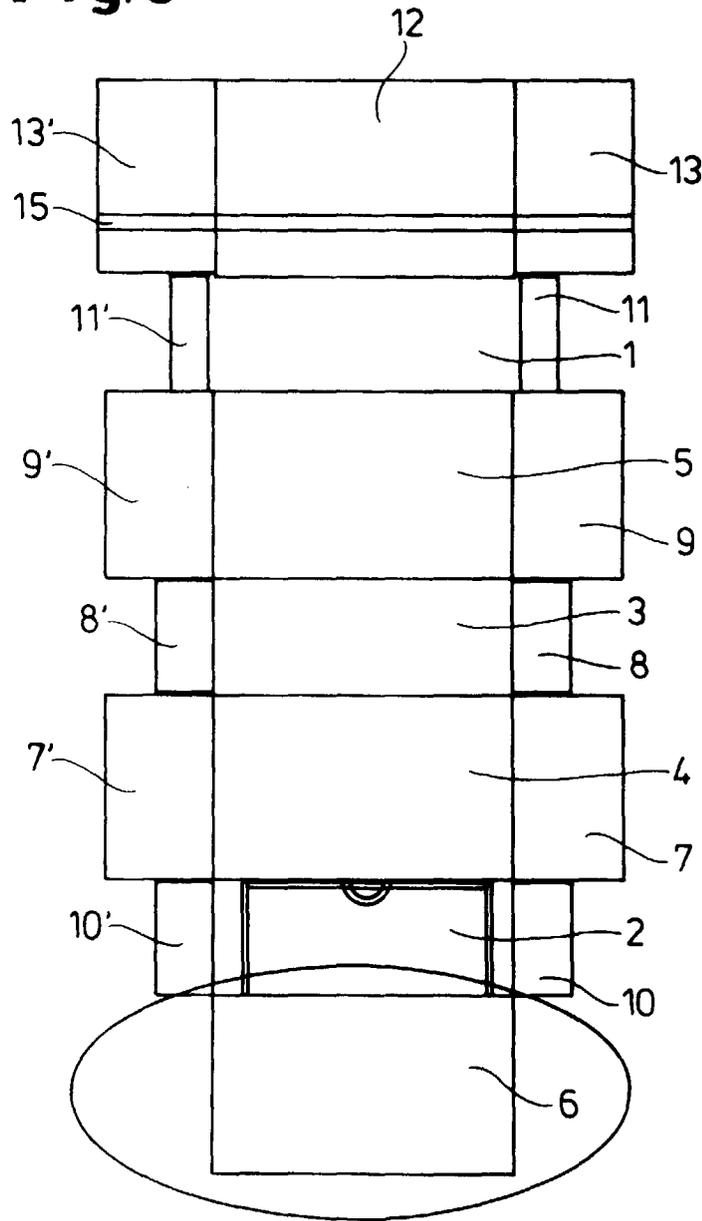


Fig.9

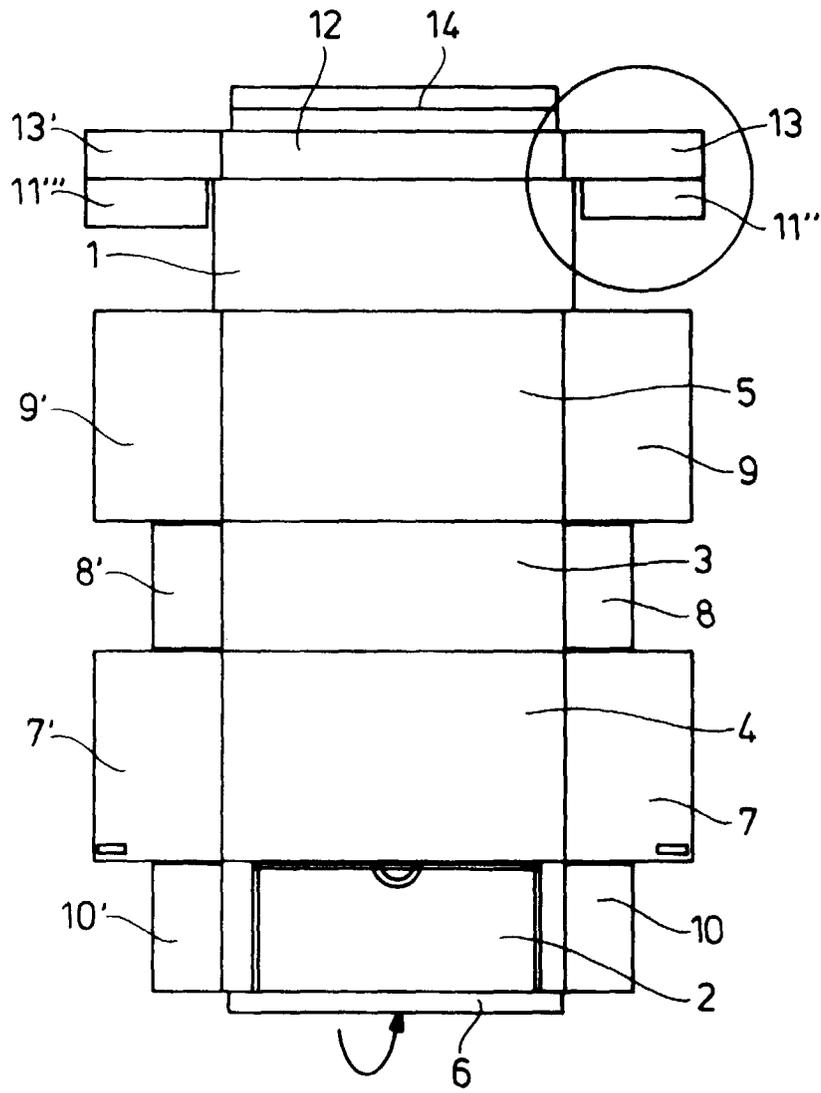


Fig. 10

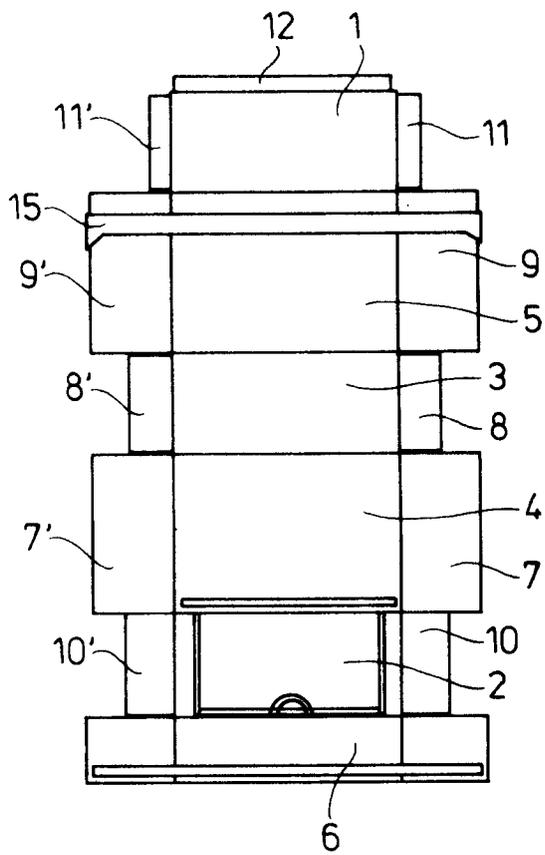


Fig. 11

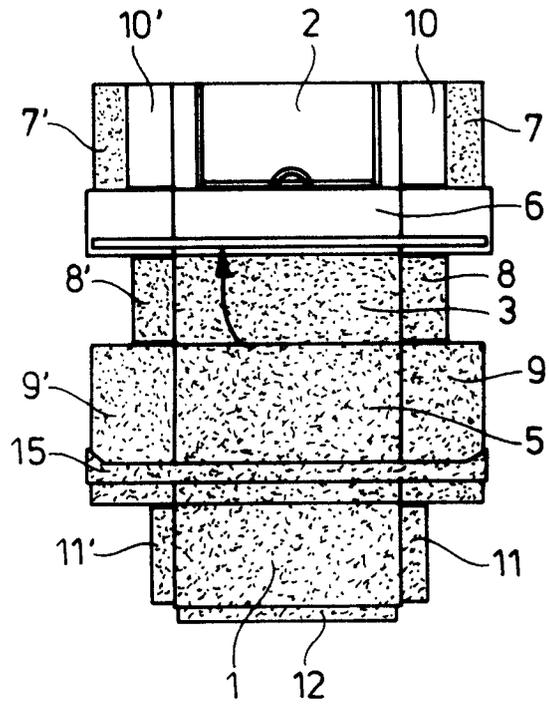


Fig. 12

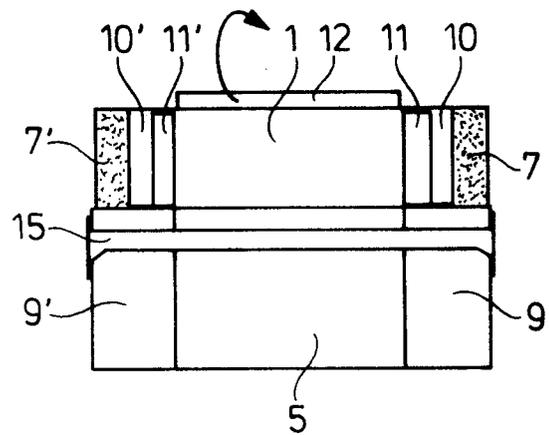
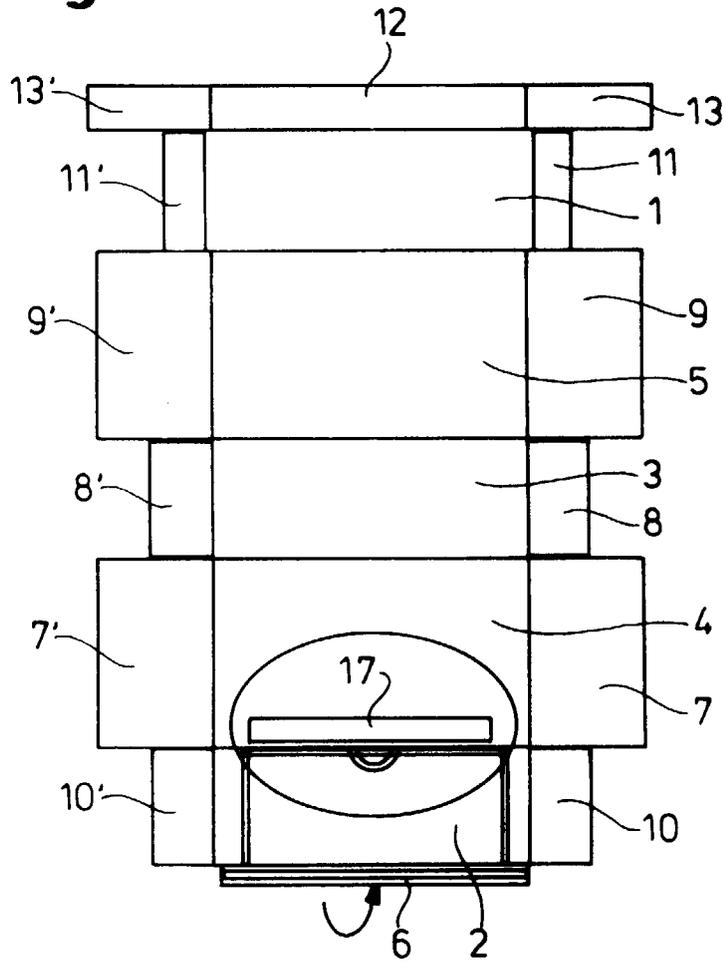


Fig. 13





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 97 20 2128

| DOCUMENTS CONSIDERED TO BE RELEVANT | | | | |
|---|--|----------------------------------|--|--------------------------------------|
| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int.Cl.6) | |
| X | US 4 049 190 A (O'NEILL JAMES L) | 1,5,8, 10-12,17 | B65D5/02 | |
| Y | * column 4, line 21 - column 5, line 6 * * figures 1-5 * | 6,7,13 | | |
| X | US 2 442 079 A (DUNNING, R.M) | 1,2,14, 15,17 | | |
| Y | * column 3, line 9 - column 4, line 75 * * figures 1-5 * | 16 | | |
| Y | US 4 141 449 A (STONE ORISON W) * column 2, line 64 - line 68 * | 6 | | |
| A | * column 4, line 30 - line 38 * * figures 1-5 * | 13 | | |
| Y | WO 95 32125 A (UNILEVER PLC ;UNILEVER NV (NL)) * figures 3-7 * * page 6, line 21 - line 29 * | 7 | | TECHNICAL FIELDS SEARCHED (Int.Cl.6) |
| Y | US 5 074 462 A (COUNTEE JR JOSEPH) * figures 1-4 * * column 5, line 35 - line 53 * | 13 | | B65D |
| Y | US 2 835 594 A (FELT, C. E ET AL) * column 4, line 29 - line 31; figure 1 * | 16 | | |
| A | GB 950 989 A (MERCK & CO. INC.) * figure 8 * | 3 | | |
| A | US 3 591 071 A (ROSENBERG CHARLES W JR) * figures 1-4 * * column 2, line 33 * | 12 | | |
| The present search report has been drawn up for all claims | | | | |
| Place of search | | Date of completion of the search | Examiner | |
| THE HAGUE | | 1 December 1997 | Wennborg, J | |
| <p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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</p> <p>& : member of the same patent family, corresponding document</p> | | | | |

EPO FORM 1503 03/82 (P4/C01)