(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 656 294 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **94118591.0**

(51) Int. Cl.[6]: **B65D 5/36**

(22) Date of filing: **25.11.94**

(30) Priority: **03.12.93 IT MI930950 U**

(43) Date of publication of application:
07.06.95 Bulletin 95/23

(84) Designated Contracting States:
AT BE CH DE DK ES FR GB GR IE IT LI LU MC NL PT SE

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(54) Improved punched cardboard box.

(57) The punched cardboard box is of the type which is delivered to the customers in a flattened condition with a pair of opposite walls (A) already formed and a pair of opposite walls (B) to be formed. This pairs of walls are connected by bellows tabs (29) foldable along an oblique folding line (12) and the purpose of which is to produce the erection of the formed walls (A) during the box assembly for obtaining the use conformation thereof. Each bellows tab (29) has a projecting tongue (30) to be folded and glued to the inner surface of the adjacent wall (B) to be formed. The oblique folding line (12) of the bellows tabs (29) is interrupted by a slot (13, 13') extending parallel to the folding lines of the walls (B) to be formed. The slot (13,13') in the bellows tabs (29) can terminate in an arcuate segment (S) or have a triangular shape with rounded apex (S) to minimize the tearing danger of the bellows tabs (29) during the box assembly.

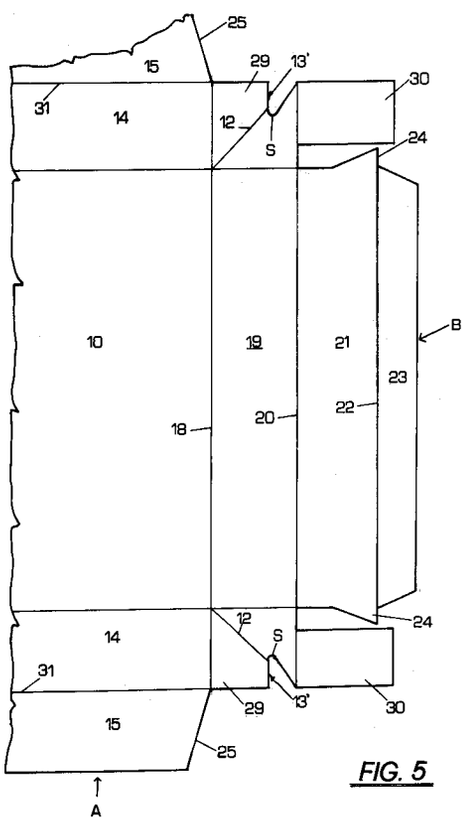

FIG. 5

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This invention generally relates to punched cardboard boxes, of the type which is delivered to the customers in a flattened condition and having a pair of opposite walls already formed and a pair of opposite walls to be formed, these walls being attached to each other by means of bellows tabs permitting the assembly of the box by exerting a force on the opposite walls to be formed and, more particularly, to an improved box of this type. In this context under the term "wall" both simple walls and cavity walls (hollow walls) are intended.

As known, the boxes of this type are delivered in a flattened condition in order to occupy a very small space during the transport. Since they have a pair of opposite walls already formed, it is necessary to form only the other pair of opposite walls to obtain the box in the use condition, thereby offering the further advantage of requiring a lower number of assembly operations.

For example, for forming the box a single cardboard blanc is used and by starting therefrom a pair of opposite walls are first formed which then are folded in a flattened condition to be delivered to the customers. The pair of already formed walls are connected to the other pair of opposite walls to be formed by means of suitable bellows tabs which have the function to produce the erection of the formed opposite walls when the opposite walls to be formed are mounted in order to obtain the use condition of the box.

The assembly of the box can be carried out by hand or by means of machines suitable for this operation, the latter solution being of course preferred because of the high assembly speed which can be obtained thereby.

The walls to be formed are possibly provided with means for locking them in the assembled condition. This feature offers the great advantage of permitting the assembly of the box by means of machines.

However, the boxes of this type are again affected by disadvantages both from the assembly technology standpoint and from a merely aesthetic standpoint.

From the standpoint of the assembly technlogy it can be said that when the box is assembled by means of machines suitable for this operation, the bellows tabs glued to the inner surfaces of the walls to be formed undergo a tearing action, principally at their oblique folding line, what can lead to a breakage thereof.

Furthermore, always from this standpoint, it can be said that, particularly in boxes having cavity sidewalls, the bellows tabs ca cause glueing disadvantages because the box provided with the cavity sidewalls preformed in a flattened condition has different thicknesses.

From the aesthetical standpoint, particularly but not esclusively in boxes having cavity sidewalls, it has been noted that at the junction between the cavity sidewalls already formed and those to be formed, the outer vertical sides of the cavity walls bear against the bellows tabs when in a mounted condition. In this mounted condition the outer vertical side of the cavity walls to be formed does not exactly mate the bellows tabs, but a small slit between the two portions is formed, which can be remarked from the outside because the inner surface of this outer vertical side usually has the appearance of the row cardboard, what forms a visible contrast with the outer surface of the box which usually is plastified, coated or provided with writings and/or printings. This disadvantage, even if of smaller importance, is decisive for the acceptance on the market of the boxes of this type.

Still another disavantage resides in the fact that, in the case of boxes having relatively high sidewalls a so called "bag-effect" can occur, which impairs the aesthetical appearance of the box.

The present invention aims at obviating these and other disadvantages by providing a box having a pair of sidewalls already formed and a pair of sidewalls to be formed attached to each other by means of bellow tabs, which is improved from this standpoint.

More particularly, the punched cardboard box of the type delivered to the customers in a flattened condition and having a pair of opposite walls already formed and a pair of opposite walls to be formed connected to the formed walls by means of bellows tabs foldable along an oblique folding line and having the function to produce the erection of the formed walls during the box assembly for obtaining the use configuration of the box, is characterized in that:

- said bellows tabs have a projecting tongue intended to be inwardly folded and glued against the inner surface of the adjacent wall to be formed, and
- said oblique folding line of the bellows tabs is interrupted by a slot extending substantially perpendicular to the folding lines of the formed walls and which is intended to minimize the tearing danger of the bellows tabs during the box assembly.

This invention will be now described in more detail in connection with the accompanying drawings, wherein:

Fig. 1 shows the blanc portion of a box of the type having cavity sidewalls and relating the subject matter of the invention;

Fig. 2 is a partial front view of the box of Fig. 1 at the beginning of the erection step of the formed cavity walls;

Fig. 3 is a partial perspective view of the box of Fig. 1 with the cavity walls to be formed during the assembly operation;

Fig. 4 is a perspective view of the detail of a corner of the box of Fig. 1 in the final mounted condition;

Fig. 5 shows the blanc portion of a box of a type having simple side-walls and showing a slot modified according to the present invention;

Fig. 6 is a partial front view of the box of Fig. 5 at the beginning of the erection step of the formed simple walls;

Fig. 7 is a partial perspective view of the box of Fig. 5 with the simple walls to be formed during the assembly operation; and

Fig. 8 is a perspective view of a detail of a corner of the box of Fig. 5 in the final assembled condition.

Fig. 1 shows a blanc F intended to form a box having cavity sidewalls, and only for the portion which is of interest for the present invention. This blanc F has a bottom 10 to which the portion intended to form the cavity sidewalls A already formed and the portions intended to form the cavity sidewalls B to be formed are attached. The portions forming the cavity walls A already formed include the strips 14 for forming the outer vertical sides of said cavity walls A, the strips 15 for forming the upper sides thereof, the strips 16 for forming the inner vertical sides thereof and the end strips 17 intended to bear on the box bottom 10 and to be glued thereto in an assembled condition. Extending from the bottom 10 and through folding lines 18 are also the portions forming the cavity walls B to be formed. Each of such portions includes a strip 19 for forming the outer vertical side of said cavity walls B and extending, through the folding line 20, in a strip 21 having beveled ends and intended to form the upper side of the cavity walls B. This strip 21 extends through a folding line 22 in a strip 23 having at each of its ends rounded projections 24 and 25 forming locking means for locking in position by snap action the cavity walls B and intended to form the inner vertical sides thereof. Finally, from this strip and through the folding line 26 the strip 27 intended to bear against the box bottom 10 extends. From the ends of the strips 15 ears 28 outwardly project, which are intended to enter the cavity walls B to be formed in order to facilitate the assembly thereof. The strips 16 forming the inner vertical sides of the cavity walls A already formed have at their ends a pair of slots 11 for making this wall elastic and for cooperating with the projections 24,25 of the inner vertical side of the cavity walls B to be formed in order to lock them by snap action in an assembled condition, as well as to prevent vertical movements thereof.

The strips 14 of the cavity walls A already formed and the strips 19 of the cavity walls B to be formed are connected to each other by means of bellows tabs 29 which are substantially square or rectangular in shape and which are foldable along an oblique folding line 12, which, in this case, is interrupted by a slot 13 extending parallel to the folding lines 18-20. This slot 13 terminates in an arcuate segment S the purpose of which is to resolve the tearing force acting on the bellows tabs 29 during the box assembly in its components and therefore to reduce the tearing danger thereof.

Projecting from each of the bellows tabs 29 in the direction of the cavity walls B to be formed is a tongue 30 the purpose of which is to obviate the above mentioned disadvantages.

The box, as already said, is delivered to the customers with the formed cavity walls A inwardly folded so as to obtain a flattened condition of the box. The strips 17 are therefore glued to the box bottom 10 and the bellows tabs 29 are glued to the inner surface of the strips 19 of the cavity walls B which are to be assembled by hand or by suitable machines in order to obtain a use condition thereof.

Fig. 5 shows a blanc F intended to form a box having simple sidewalls, limited to the portion which is of interest for the present invention. This blanc has a bottom 10 to which the portions intended to form the walls A already formed and the portions intended to form the walls B to be formed are attached. Each of the portions forming the walls A already formed includes the strip 14 extending through the folding line 31 in a strip 15 and forming the wall A once they have been folded and glued one against the other. Extending from the bottom 10, through folding lines are also the portions forming the walls B to be formed. Each of such portions includes three strips 19,21,23. The strip 19 extends through the folding line 20 in the strip 21 which in turn extends through the folding line 22 in the strip 23. The strip 21 has at each of its ends a triangular projection 24 forming the locking means of the walls B to be formed when the strip 21 is folded against the strip 19 and the strip 23 is folded so as to bear against the bottom surface. These projections abut the bevel 25 provided in the strips 15 of the walls A.

The strips 14 of the walls A already formed and the strips 19 of the walls B to be formed are connected to each other by the bellows tabs 29 which are substantially square or rectangular in shape and foldable along the oblique folding line 12, which is interrupted by a slot 13' extending parallel to the folding lines 18-20. This slot 13' can be the same as that of the slot 13 of the box described in connection with Figs. 1-4, but in this case a modification thereof is described which is valid also for the embodiment of Figs 1-4. This slot

13' is triangular in shape with rounded apex S and the roundnes of this apex S is intended to resolve the tearing force acting on the bellows tabs in its components and therefore to minimize the tearing danger of the bellows tabs 29 during the box assembly.

Projecting from each of the bellows tabs 29 in the direction of the walls B to be formed is a tongue 30 the purpose of which is to obviate the above mentioned disadvantages.

The box, as already said, is delivered to the customers with the formed walls A folded inwardly in order to obtain a flattened condition of the box. The strips 14 and 15 are therefore glued to each other for forming the reinforced walls A of the box and the bellows tabs 29 are glued by hand or by suitable machines to the inner surface of the strips 19 of the walls B when the box is to be put in use.

In the following description under the term "wall" both the simple walls and the cavity walls are intended.

The bellows tabs 29 according to the invention and also the projecting tongues 30 permit the above mentioned drawbacks to be avoided. As a matter of fact, what is glued to the inner surface of the strips 19 of the walls B to be formed is no longer the bellows tab as in the preceding embodiment, but the projecting tongue 30. It is folded inwardly on itself as can be seen from Figs. 2,3 and 6,7 respectively and glued against the inner surface of strip 19 forming the walls B to be formed.

The walls A already formed are erected by the action exerted by the bellows tabs 29 during the assembly of the walls B to be formed. In fact, when the strips 19 forming the outer sides of the walls B are lifted, the bellows tabs 29 are folded along the folding line 12 by compelling the walls A already formed to assume their erected position. Since the tongues 30 are already glued, this action is facilitated by the slots 13, 13' respectively, which open. Then, in the case of the cavity walls of Figs 2,3 and 4 the other strips 21,23 and 27 of the cavity walls B are folded on themselves and the projections 24 and 25 of the inner vertical strips 23, through the elastic action imparted by the slots 11 formed in the ends of the inner vertical sides 16 of the cavity walls A, are disposed behind the edge of said walls, thereby causing the locking by snap action of the cavity walls B in their mounted position.

On the contrary, in the case of boxes having simple sidewalls, see Figs. 6,7 and 8, the strips 21 are inwardly folded and the strips 23 are outwardly folded so that the strips 23 bear on the box bottom 10 and the triangular projections 24 are disposed against the bevels 25 of the strips 15 of the walls A.

From Figs 4, and 8 respectively, it can be seen that in the corners of the box in which the cavity walls A and the simple walls A already formed, respectively are joined to the cavity walls B and simple walls B to be formed, a fold is formed comprising the tongue 30 and the bellows tab 29. This fold obviates the above mentioned aesthetical disadvantages because the tongue 30 which is folded on itself and glued against the strip 19 of the cavity wall B, shows the same surface as that of the outside of the box and therefore the contrast of the prior art boxes cannot be remarked.

This fold of the tongue 30, in the case of boxes having higher sidewalls, obviates also the disadvantage of the "bag effect" because since in the folded condition a higher thickness is formed, the tongue 30 fills the space existing in the corner junction of the box.

From the technological standpoint, the characteristic shape of the slots 13 and 13', respectively, minimizes the tearing problem which occurs particularly during the machine assembly of the box. In fact, the tearing force acting on the bellows tab is resolved in its components by the arcuate segment S of the slot 13 and by the rounded apex S of the slot 13'. The resolution of the tearing force in its components permits the tearing danger of the bellows tab to be reduced.

Furthermore, this fold causes the box in a flattened condition which is treated in the glueing machines for forming the walls already formed, to have a uniform thickness along all the sides of the walls already formed and therefore there are no longer problems of glueing of the bellows tabs.

Claims

1. Punched cardboard box of the type delivered to the customers in a flattened condition and having a pair of opposite walls (A) already formed and a pair of opposite walls (B) to be formed connected to the walls (A) already formed by means of bellows tabs (29) foldable along an oblique folding line (12) and having the function to produce the erection of the walls (A) already formed during the assembly of the box for obtaining a use configuration thereof, characterized in that:
   - said bellows tabs (29) have a projecting tongue (30) intended to be inwardly folded and to be glued against the inner surface of the adjacent wall (B) to be formed, and
   - said oblique folding line (12) of the bellows tabs (29) is interrupted by a slot (13, 13') extending substantially perpendicular to the folding lines of the walls (A) already formed and which is intended to

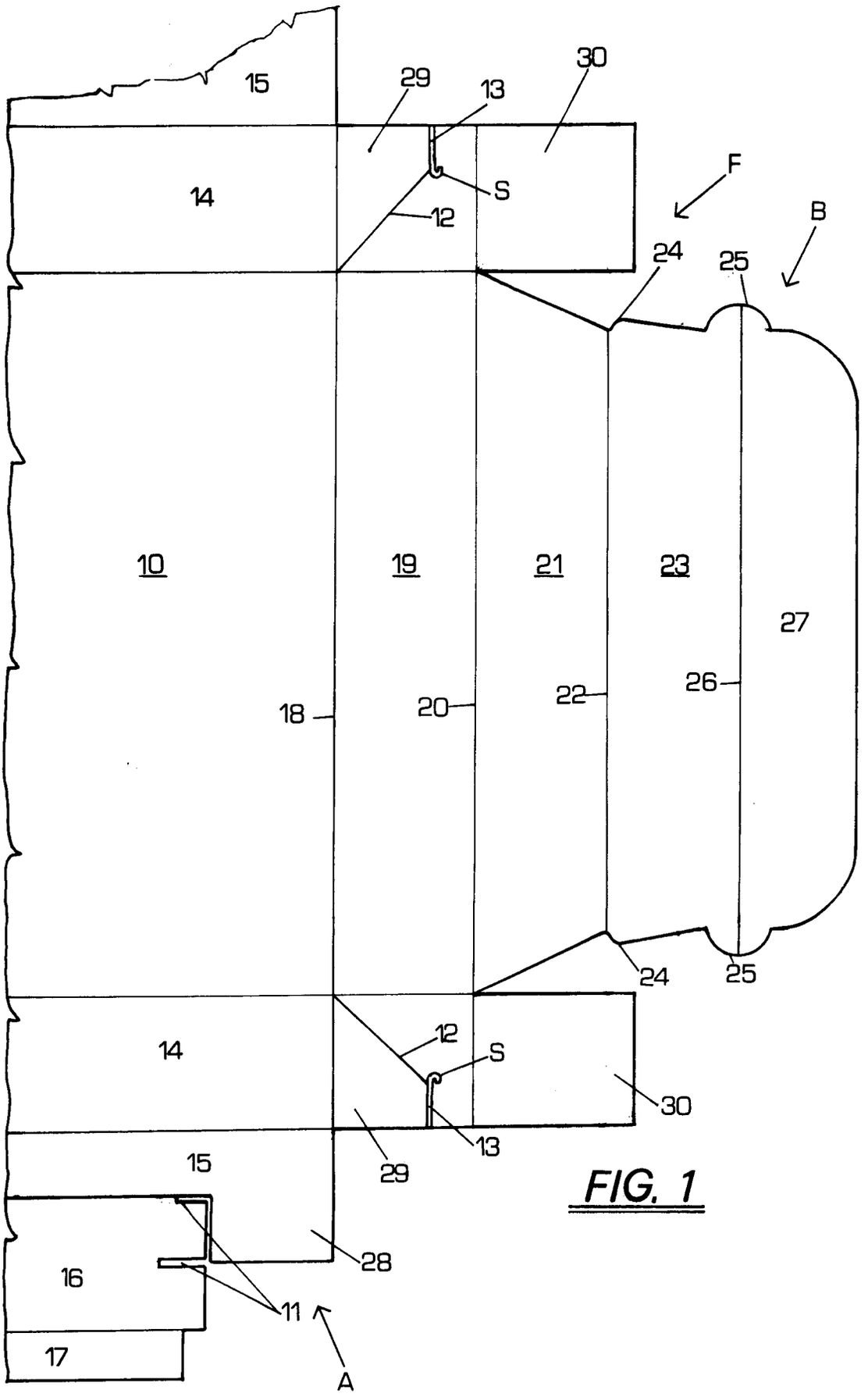
minimize the tearing danger of the bellows tabs (29) during the box assembly.

2. Box according to claim 1, characterized in that said slot (13) terminates in an arcuate segment (S) intended to resolve the tearing forces acting on the bellows tabs (29).

3. Box according to claim 1, characterized in that said slot (13') is triangular in shape with rounded apex (S) which is intended to resolve the tearing forces acting on the bellows tabs (29).

4. Box according to claims 1-3, characterized in that the outer visible surface of the projecting tongue (30) is the same as that of the outside of the box, so that visible contrasts in the corners of the boxes cannot be remarked.

5. Box according to claims 1-3, characterized in that said folding of the projecting tongue (30) eliminates the so called "bag-effect" occurring in the case of boxes having higher sidewalls.


15
29
13
30
14
S
12
F
B
24
25
10
19
21
23
27
18
20
22
26
24
25
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12
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16
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17
A

FIG. 1

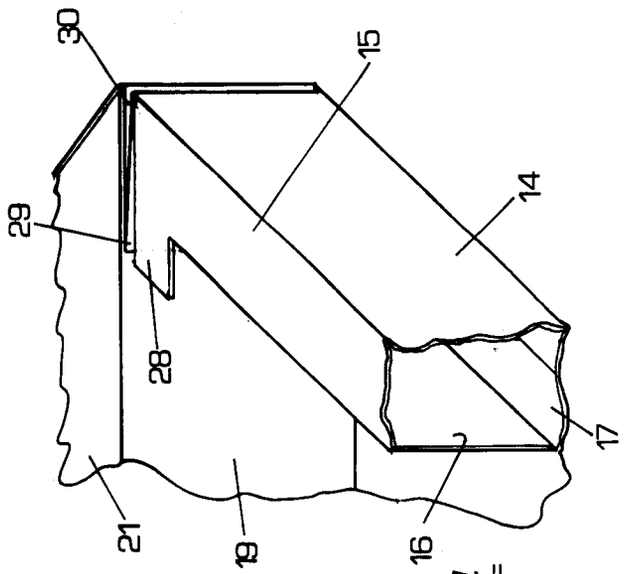


FIG. 4

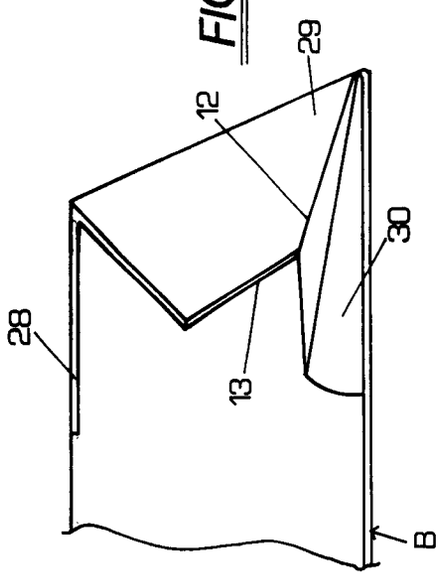


FIG. 2

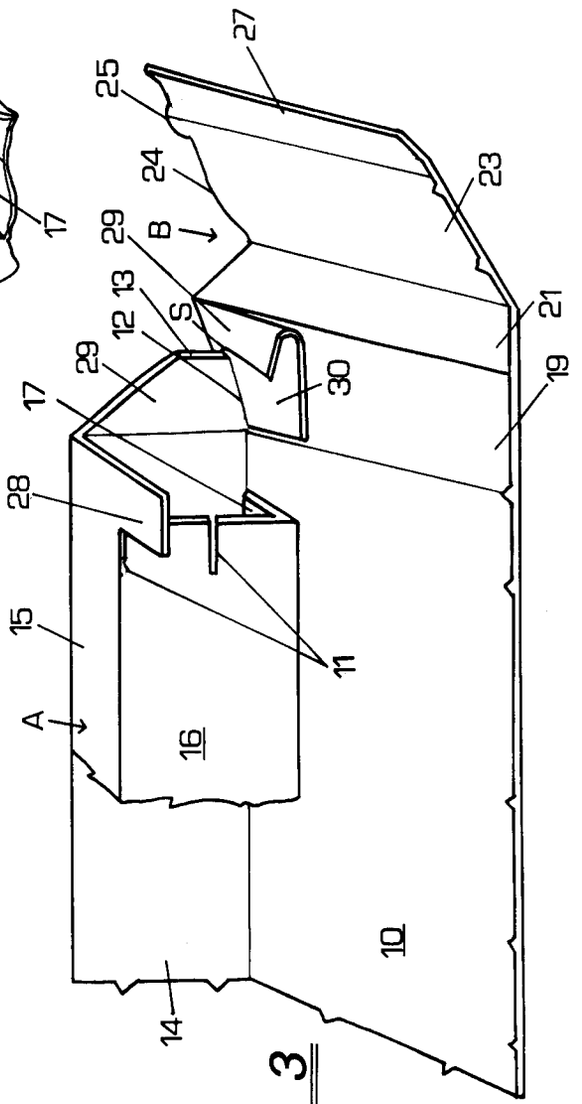
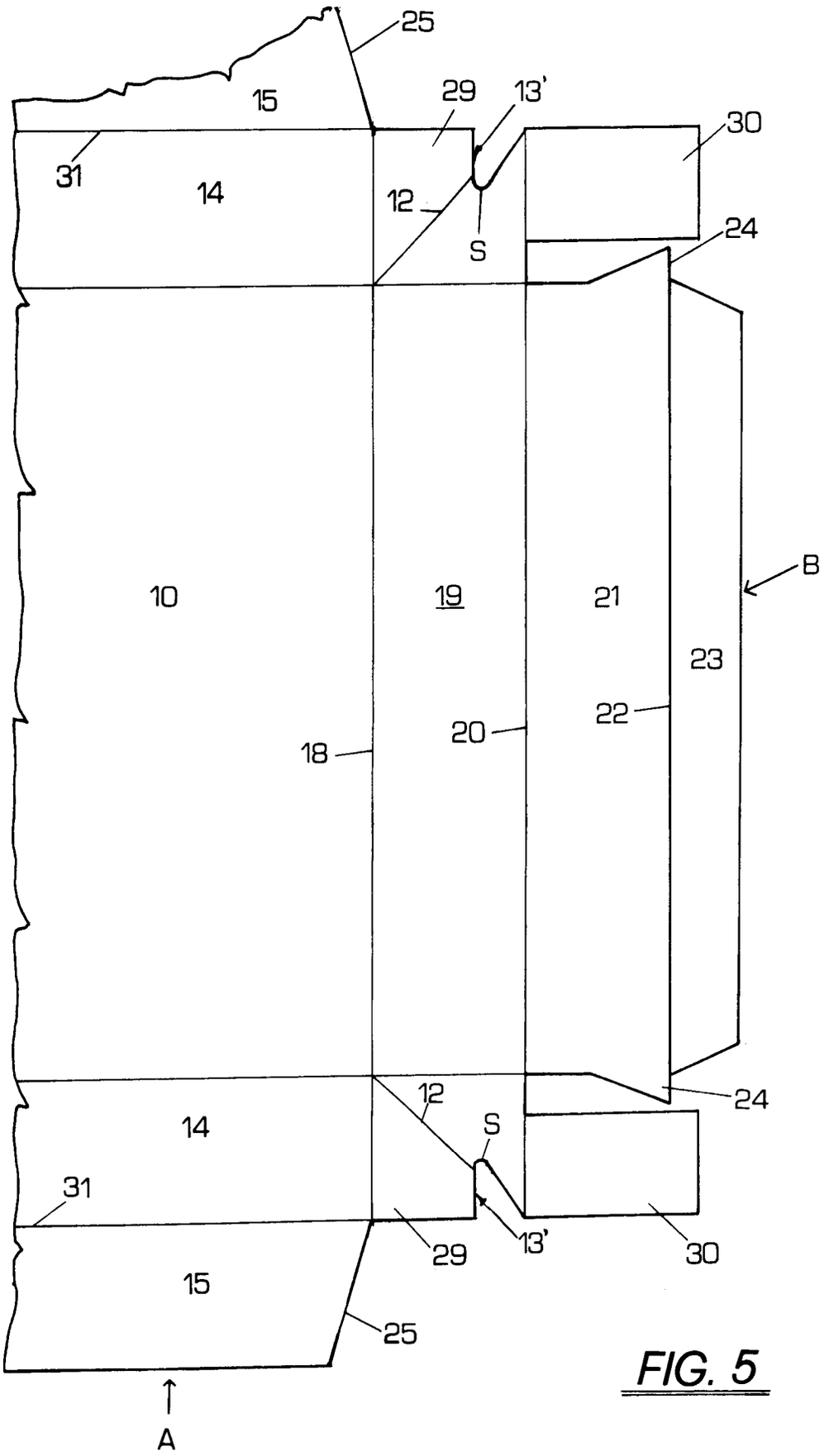


FIG. 3


25
15
29
13'
30
31
14
12
S
24
10
19
21
B
23
22
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18
12
24
14
S
31
13'
29
30
15
25
A

FIG. 5

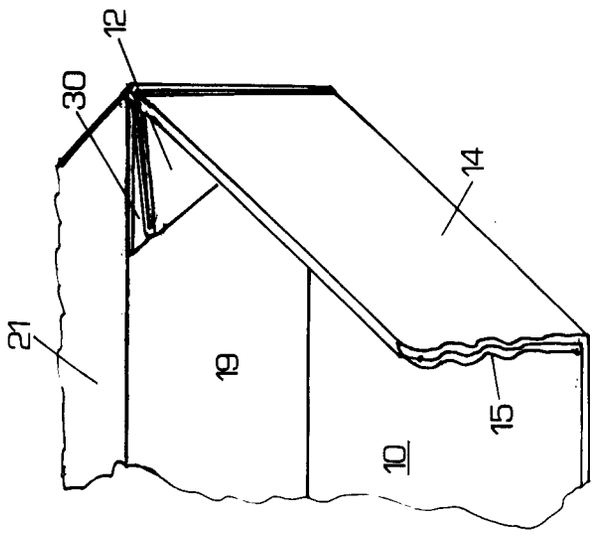

FIG. 8

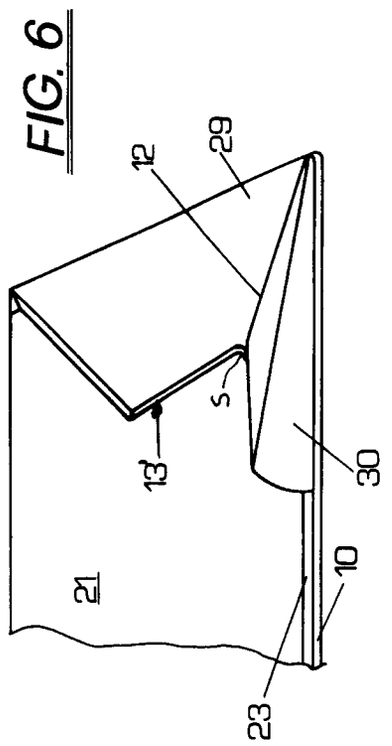

FIG. 6

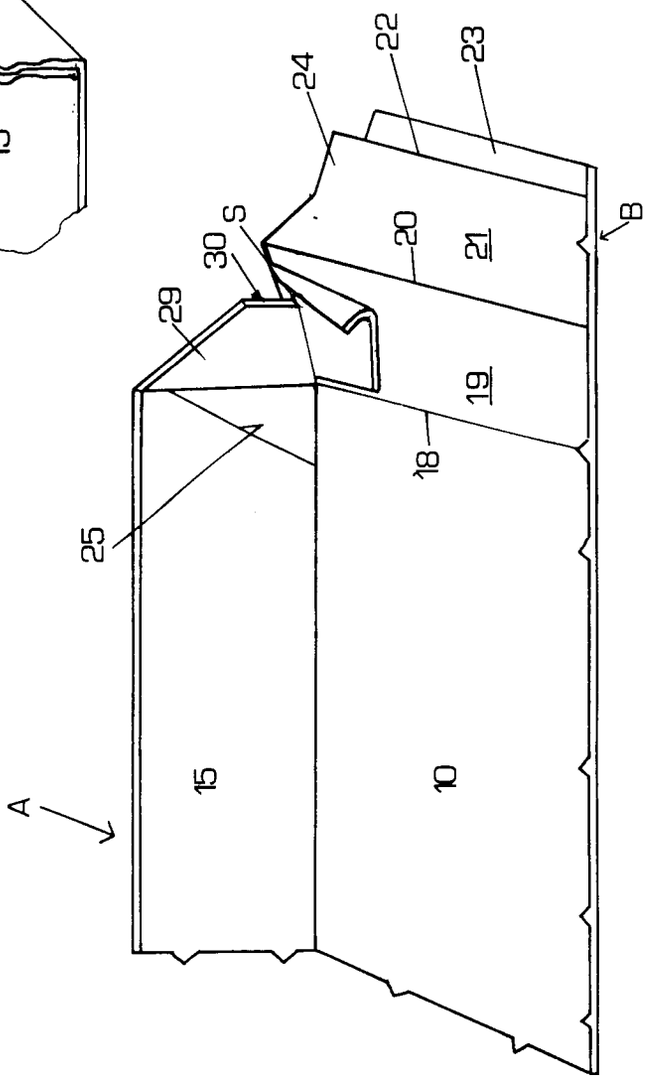

FIG. 7

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EUROPEAN SEARCH REPORT

Application Number
EP 94 11 8591

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 Y	US-A-2 664 236 (LEVKOFF) * figures * ---	1,4,5 2,3	B65D5/36
X	US-A-3 189 248 (ROCCAFORTE) * figures * ---	1,4,5	
X	US-A-2 307 720 (RINGLER) * figures 1-4 * ---	1,4,5	
Y	WO-A-88 09750 (MANVILLE) * page 5, line 7 - line 10; figure 1 * ---	2	
Y	GB-A-934 368 (BOXFOLDIA) * figure 7 * -----	3	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	10 March 1995	Bridault, A

CATEGORY OF CITED DOCUMENTS

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