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

(11) Publication number: **0 392 624 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **90200861.4**

(22) Date of filing: **09.04.90**

(51) Int. Cl.5: **B65D 5/36, B65D 5/44, B65D 5/66**

(30) Priority: **10.04.89 NL 8900889**

(43) Date of publication of application: **17.10.90 Bulletin 90/42**

(84) Designated Contracting States: **BE DK ES NL**

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(54) A tray with a reinforced cover.

(57) Collapsible tray and tray cover formed from a blank and each comprising a bottom wall (1; 2), upright walls (7-10; 22-24) connected to said bottom wall along fold lines (4, 5; 19-21), where in each corner of said bottom wall the adjacent upright walls are interconnected by a rectangular connecting flap (14; 28) and a substantially isoceles-triangular connecting area (12; 26) bounded by a substantially 45° fold line (11; 25) in the other wall meeting at said corner. Said connecting flap (14; 28) and said connecting area (12; 26) are mutually fastened by the use of adhesive after folding back the connecting area against the rear side of the relevant upright wall, so that in the collapsed state of the box, the upright walls are foleded down on top of the bottom wall with the triangular connecting areas (12; 26) and the connecting flaps (14; 28) located between adjacent upright wall panels. The invention provides such a ready-for-use collapsible box, a two-part pulling element (32, 38), the two parts of which being interconnected by a fold line (37), said pulling element being arranged at one of the fold lines connecting for example cover walls (2; 22, 23), such that, while its parts (37, 38) are attached to the said cover walls (2; 22, 23), the fold line (37) of the pulling element is parallel to the cover fold line (19, 20) and off-set in relation to the cover fold line (19, 20) towards the middle of the cover bottom wall (2). The effect of the pulling element (32, 38) so arranged is that in the position of use and the tray closed by the cover, the upright cover wall (22, 23) is pulled inside against the adjacent upright wall (7, 8) of the tray, preventing this tray wall from flexing outwards under vertical load.

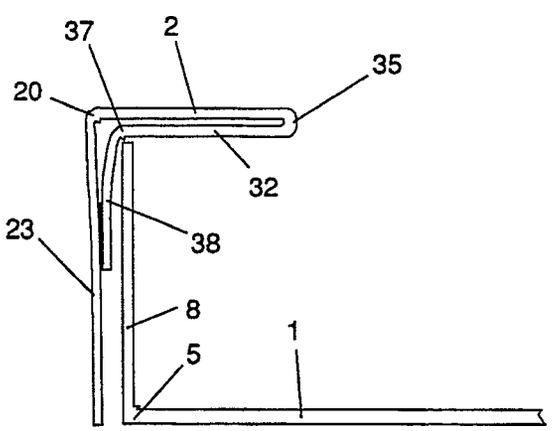

Fig.5

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A tray with a reinforced cover

This invention relates to a tray-with-cover construction, to be formed from a blank by folding and gluing, comprising a bottom panel and upright walls connected therewith by fold lines, and in which, at each corner where upright walls meet, one of the upright walls is extended with a rectangular connecting flap hinged to it, and in the other upright wall, a triangular connecting area is bounded by a fold line inclined at an angle of 45°, which connecting area, after being folded back against the rear side of the upright wall, is adhesively fastened to said rectangular connecting flap.

Such boxes and/or covers, which are fixedly connected to the tray along a hinge line at the upper edge of the tray's rear wall, and which are of the so-called collapsible type, are known. Collapsible means that, owing to the specific corner connection, the upright walls of the tray or the cover, which being already interconnected, can be folded down on the tray bottom and on the cover wall, respectively, so that ready boxes or covers can be stored in a compact form. For use, only the folded-down walls need be pulled up and a tray is ready for being filled. After pulling up the upright cover walls, the cover can be put over the filled tray. Besides collapsible trays, set-up boxes are known, which can also be formed from a blank, but require a number of steps for preparing the tray for use, such as putting the side walls separately into an upright position and making corner connections by stapling, by sliding locking tabs into slits, or other manipulations for which there is often no time such as after harvesting vegetables or fruit to be packaged. The use of setting-up machines requires additional investments.

When such boxes closed with a cover are stacked, it can be seen that, under vertical pressure, the upright cover walls tend to flex outwardly at the free edge, so that they are incapable of contributing to taking up vertical pressure. In particular with a cover having a window therein, which forms a discontinuity in the transverse rigidity of the cover, this phenomenon is more likely to occur.

It is an object of the present invention to provide a collapsible tray with an integral cover construction which does not have this drawback.

To that end, according to the present invention, a two-part pulling element is provided at at least one fold line between the cover wall and an upright wall connected to said cover wall, at least locally on the inside, the two parts of which are interconnected by a fold line, said pulling element being positioned with its fold line parallel to the fold line of the cover wall and the two parts being respectively secured to the cover wall and to the upright wall in such a manner that the fold line of the pulling element is off-set towards the centre of the cover wall relatively to the fold line of the cover wall.

In the storage position of this cover construction, the upright wall may be collapsed, flatly on the cover wall, thereby enclosing the doubled-up pulling element. When this wall is placed in an upright position, due to the off-set location of the respective fold lines the pulling element will resist swivelling movement of the upright wall transversely to the cover wall, and pull it slightly inwards towards the collapsed position. This means that when a cover is closed over a tray, an upright wall provided with such a pulling element is pulled against the adjoining upright tray wall and, when subjected to a vertical load, will not tend to deflect outwardly.

The pulling element according to the present invention may be a separate rectangular piece of the same material as that from which the tray cover is made and the parts of the element can be connected to the cover parts by gluing.

In a preferred embodiment of the present invention, however, the pulling element is made by cutting a tab in the cover and making a fold line, with the contour of the tab being such and the fold line being so positioned that by folding down the tab against the inside of the cover, the portion of the pulling element adjoining the fold extends up to the vicinity of the fold line of the cover wall and the other portion of the pulling element is adhered to the adjoining upright cover wall.

According to a further embodiment of the present invention, in which the cover presents a window, the pulling element is made from the material to be removed from the cover wall for forming the window, the pulling element is formed with a fold line having such a contour that by folding down the pulling element over a fold line located along a window edge, the portion of the pulling element adjoining the window edge extends up to the vicinity of the fold line of the cover wall, and the other portion is adhered to the adjoining upright cover wall.

According to the present invention, the two parts of the pulling element may be unequally dimensioned, i.e. the part adjoining the window edge having substantially the same dimensions as the cover area between the window and the nearest cover fold line and the other part of the pulling element being of much smaller size.

The larger part of the pulling element, in addition to functioning as a pulling element, can have the function of locally stiffening the cover material,

while the smaller part of the pulling element exclusively has the function of biasing the upright wall inwardly.

It is clear that such pull tab constructions can also be used with a tray to prevent the upright tray walls from flexing outwards under vertical load.

The present invention also provides an assembly of a reinforced collapsible tray having such a reinforced collapsible cover, with steps having been taken for the tray as well to increase the vertical load-taking capacity.

In an assembly of a collapsible tray with a hinged collapsible cover according to the present invention, the tray is provided with angular supports formed as prismatic tubes from flaps with fold lines hinge-connected to upright wall panels, said tubes being adhered with one of the tube side walls to adjoining upright walls and, in the storage position, lying in folded-flat condition on the bottom panel.

When the tray walls are pulled up, the tubes are oriented at right angles to the tray bottom and form stacking supports aiding in transferring the weight of a superjacent tray onto the bottom surface.

A further feature to increase the vertical load-taking capacity of the tray is that provided between the rear wall of the tray and the cover wall is an intermediate panel of the same height as the rear wall of the tray, which intermediate panel is collapsed and adhered against the exterior of the rear wall, so that in the completed assembly of tray and cover, the rear wall of the tray is doubled up. When the tray is closed, double walls are present all around, which, in combination with the angle support tubes and the pulling elements, ensures a very solid box construction in all respects.

One embodiment of the tray with reinforced cover according to the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a blank of a tray according to the present invention;

Fig. 2 is a perspective view of a collapsible tray with cover made from the blank according to Fig. 1, in partly opened condition;

Fig. 3 is a cross-sectional view taken on the line III-III of Fig. 2;

Fig. 4 shows the tray in the closed position of use;

Fig. 5 is a cross-sectional view taken on the line V-V of Fig. 4; and

Fig. 6 shows a blank of a variant embodiment of the tray with cover.

In the embodiment shown in the drawings, the tray-with-cover combination comprises a bottom wall 1 and a cover wall 2. Bottom wall 1 is connected through fold lines 3, 4, 5 and 6 to side walls 7 and 8, a front wall 9 and a rear wall 10.

Side walls 7, 8 contain fold lines 11 inclined at 45° for bounding triangular connecting areas 12. The front and rear walls 9, 10 of the tray are each extended through fold lines 13 with rectangular connecting flaps 14 containing further fold lines 15.

The rear wall of the tray is connected through a fold line 16 to an intermediate panel 17, which is connected through a fold line 18 to the cover wall 2. Cover wall 2 is further connected through fold lines 19, 20, 21 to cover side walls 22, 23 and to a cover front wall 24. In cover side walls 22, 23, fold lines 25 inclined at 45° bound triangular connecting areas 26. The cover front wall 24 is extended through fold lines 27 with rectangular connecting panels 28. Besides, connecting flaps 29 are indicated in the extension of intermediate panel 17.

The fold line 16 between the rear wall 10 of the tray and the intermediate panel 17, for adjustment to the tray configuration with cut-outs in the larger sides, about halfway up the rear wall of the tray and extending from the ends of said fold line are bent cut-outs 30 between panels 10 and 17.

A window 31 is formed in cover panel 2 by cutting out panels 32, 33 and making fold lines 35, 36, as well as fold lines 37, through which tabs 38, which are likewise cut out, are connected to panels 32.

Apart from the working sequence, which depends on the operation of the machine design, the tray-and-cover assembly is made from the blank of Fig. 1 in the following manner.

The tray portion is made by forming the rectangular connecting flaps 14 to prismatic tubes by means of fold lines 15, folding the triangular connecting areas 12 in side walls 7, 8 (as viewed in Fig. 1) rearwardly and adhering these to the adjoining walls of the tubes formed, with all upright walls 7-10 being collapsed over bottom wall 1.

Intermediate panel 17 is folded over fold line 16 against the exterior of the rear wall 10 of the tray and adhered thereto.

The side walls 22, 23 of the cover are connected to the front wall 24 of the cover by folding the triangular connecting areas 26 rearwardly and adhering the same to the rectangular connecting flaps 28.

The corner connections between upright walls 7-10 near the tray and upright walls 22-24 near the cover are those which are characteristic of collapsible trays, i.e. they enable upright walls already connected at right angles to each other to be collapsed over the bottom wall and the cover wall, respectively.

The cover is completed by folding the panels 32 from window 31 against the inside of cover wall 2 and adhering tabs 38 against the inside of upright walls 22, 23. The dimensions of panels 32 are so chosen in relation to the dimensions of the cover

wall portions on either side of window 31 that fold lines 37 of tabs 38 lie closer to the window than fold lines 19, 20 of upright cover walls 22, 23. The effect is that the upright walls will so to say be "biased" from the upright position to a position slightly sloping over the cover wall and in the position of use, as shown in Figs. 4, 5, the upright cover walls 22, 23 will be kept pressed against the upright tray walls 7, 8, so that, when subjected to a vertical load, they will not tend to flex outwardly.

In the variant embodiment of Fig. 6, the upright front wall 9 of the tray is connected to bottom panel 1 .through an intermediate panel 41. Intermediate panel 41, provided with rectangular connecting flaps 42, can be collapsed on to the front wall 9 and adhered against it. As a result, a substantial increase in vertical load-taking capacity of the tray-cover combination is obtained. Besides, each connecting flap 14 contains only one fold line 15. The prismatic tubes used as angular supports in the embodiment according to Figs. 1-5 have been replaced by corner reinforcements obtained by doubling up and gluing connecting flaps 14, with the resulting advantage that more space is available in the tray to receive material to be packaged.

Furthermore, Fig. 6 shows locking tabs 39 on the connecting flaps 29 and 42, which, in the position of use of the tray-cover combination, engage in locking openings 43 in the edges of bottom panel 1.

Claims

1. A tray-with-cover construction to be formed from a blank by folding and gluing, comprising a bottom panel (1, 2) and upright walls (7-10; 22-24) connected therewith by fold lines (3-6; 18-21), and in which, at each corner where upright walls meet, one of the upright walls is extended with a rectangular connecting flap (14; 28) hinged to it, and in the other upright wall, a triangular connecting area (12; 26) is bounded by a fold line (11; 25) inclined at an angle of 45°, which connecting area, after being folded back against the rear side of the upright wall, is adhesively fastened to the said rectangular connecting flap, characterized in that a two-part pulling element (32, 38) is provided at at least one fold line (19, 20) between the cover wall (2) and an upright wall (22, 23) connected to said cover wall, at least locally on the inside, the two parts (32, 38) of which are interconnected by a fold line (37), said pulling element (32, 38) being positioned with its fold line (37) parallel to the fold line (19, 20) of the cover wall and two parts of the pulling element (32, 38) being respectively secured to the cover wall (2) and to the upright wall (22, 23) in such a manner that the fold line (37) of the pulling element is off-set towards the centre of cover wall (2) relatively to the fold line (19, 20) of the cover wall.

2. A construction as claimed in claim 1, characterized in that the pulling element is a separate rectangular piece of the same material as that from which the tray cover is made and the parts of the element are connected to the cover portion by gluing.

3. A construction as claimed in claim 1, characterized in that the pulling element is made by cutting a tab in the cover and making a fold line, with the contour of the tab being such and the fold line being so positioned that by folding down the tab against the inside of the cover, the portion of the pulling element adjoining the fold extends up to the vicinity of the fold line of the cover wall and the other portion of the pulling element is adhered to the adjoining upright cover wall.

4. A construction as claimed in claim 1, characterized in that with a cover (2) having a window (31), the pulling element is made from the material to be removed from the cover wall (2) for forming the window (31), the pulling element is formed with a fold line (37) having such a contour that by folding down the pulling element (32, 38) over a fold line (35) located along a window edge, the portion (32) of the pulling element adjoining the window edge extends up to the vicinity of the fold line (19, 20) of the cover wall, and the other portion (38) is adhered to the adjoining upright cover wall (22, 23).

5. A construction as claimed in claim 4, characterized in that the two parts of the pulling element (32, 38) are unequally dimensioned, i.e. the part (32) adjoining the window edge (35) has substantially the same dimensions as the cover area between the window (31) and the nearest cover fold line (19, 20) and the other part of the pulling element (38) being of much smaller size.

6. An assembly of a collapsible tray and collapsible cover hinged to it, as claimed in any of the preceding claims, characterized in that the tray is provided with angular supports formed from flaps (14) with fold lines (15) connected hingedly to upright wall panels (9, 10) which angular supports are adhered to adjoining upright walls (7, 8) and, in the storage position, lie folded-flat on the bottom panel (1).

7. An assembly as claimed in claim 6, characterized in that provided between the rear wall (10) of the tray and the cover wall (2) is an intermediate panel (17) having the same height as the rear wall (10) of the tray, which intermediate panel (17) is collapsed against the exterior of the rear wall (10) and adhered thereto, so that in the completed assembly of tray and cover, the rear wall

(10) of the tray is doubled.

8. An assembly as claimed in claim 6 or 7, characterized in that the upright front wall (9) of the tray is connected to the bottom panel (1) through an intermediate panel (41) collapsed over a fold line (40) against the front wall (9) and is adhered to it.

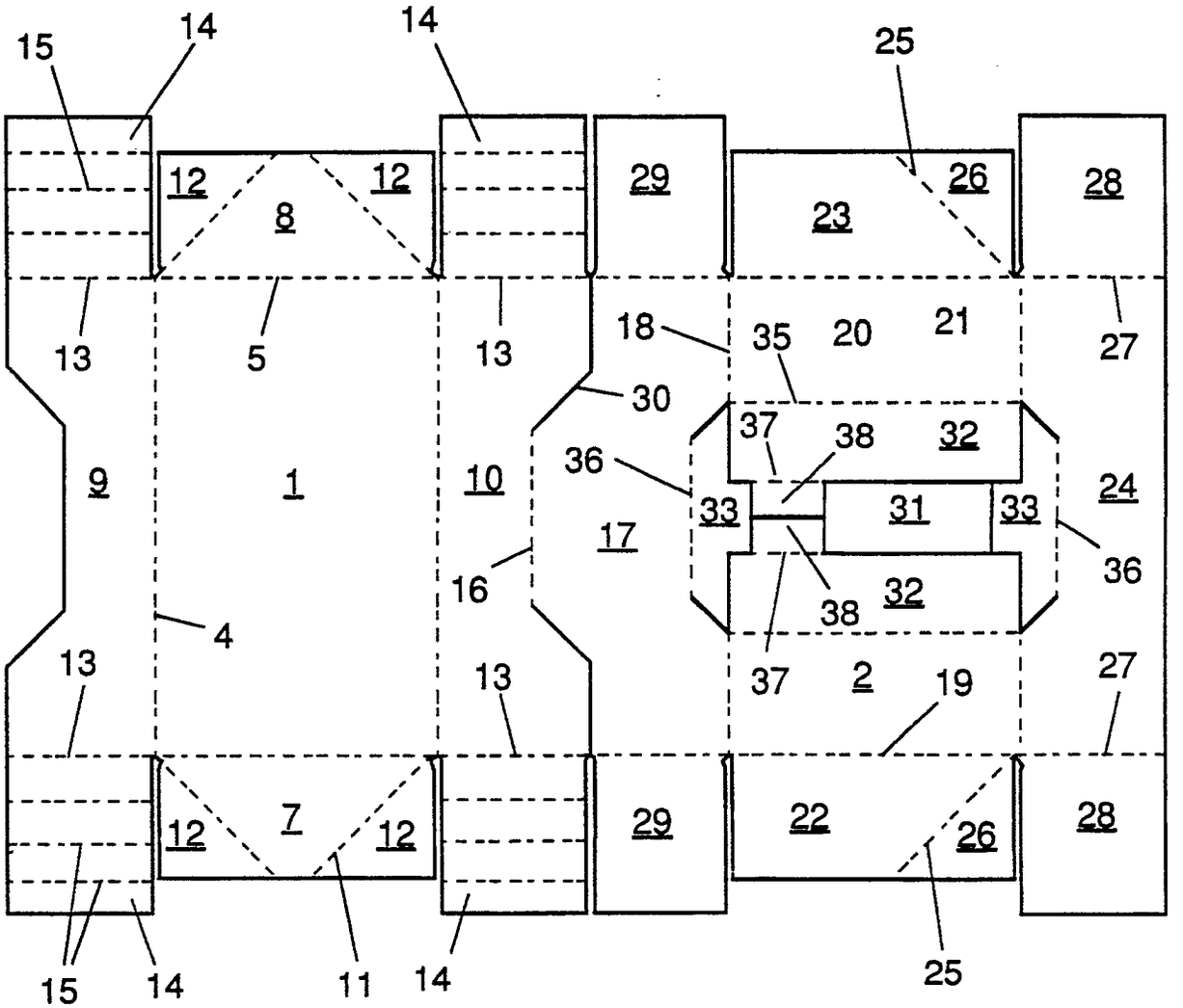
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Fig.1

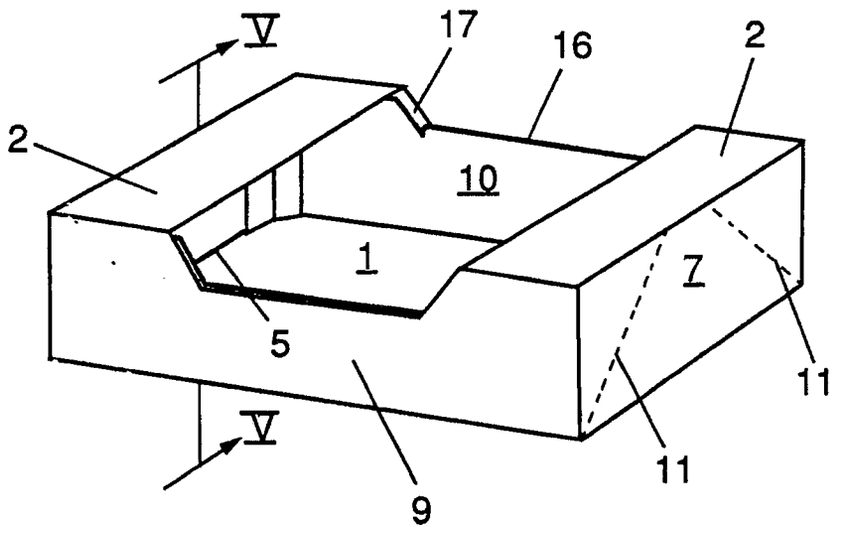
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Fig.4

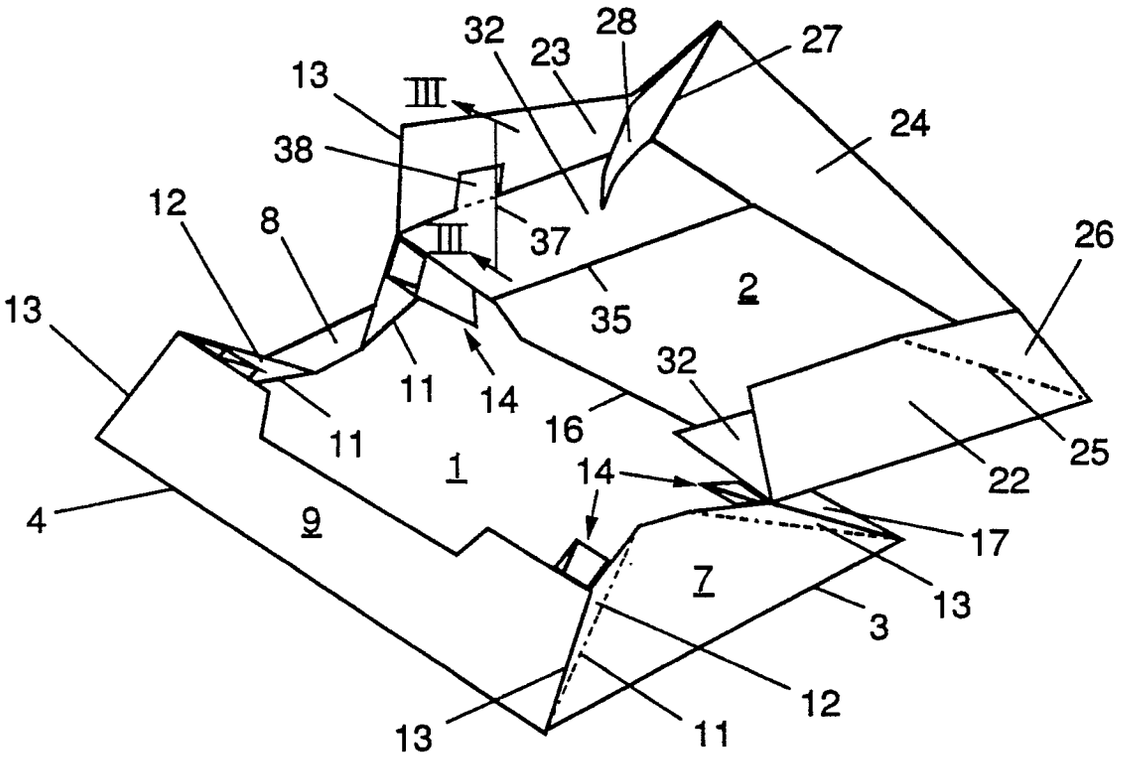

Fig.2

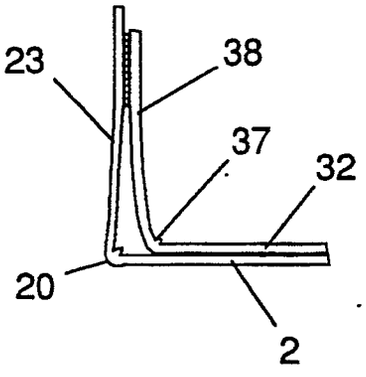

Fig.3

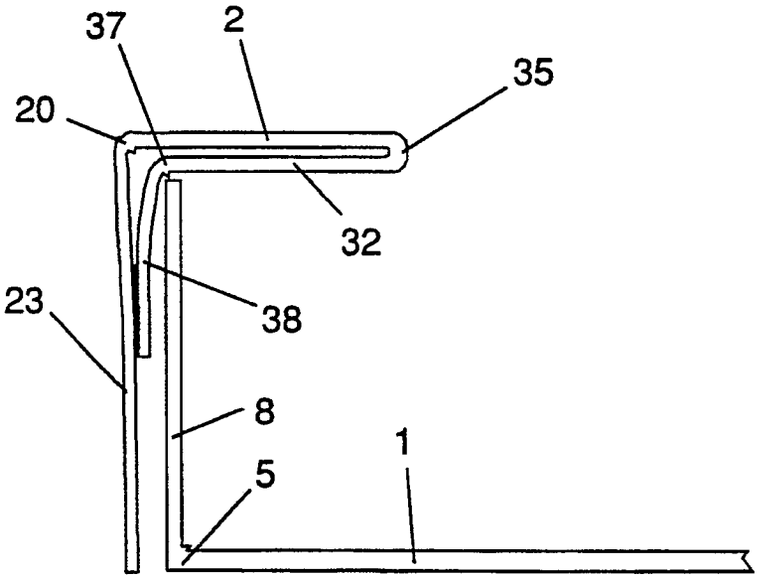

Fig.5

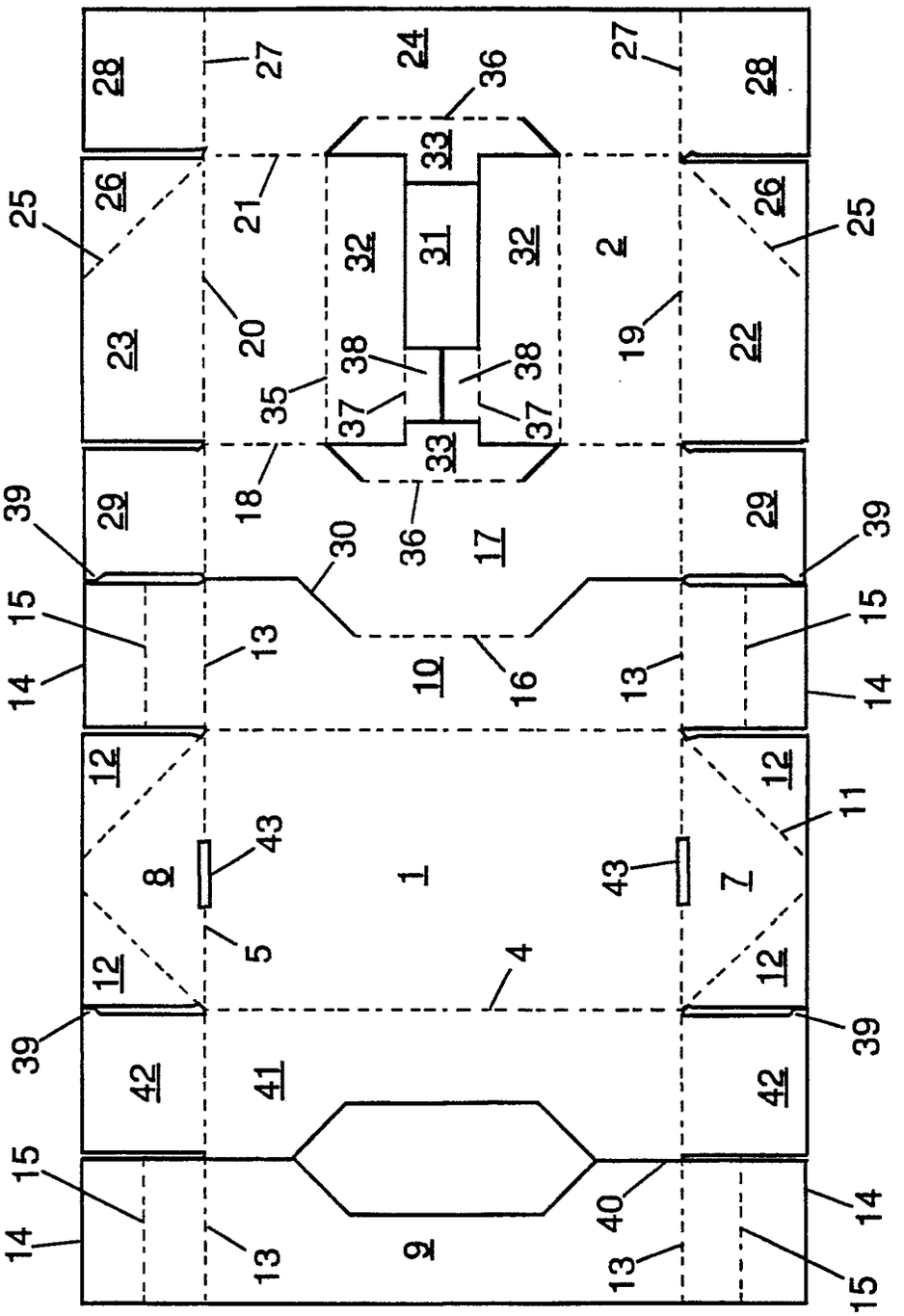
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Fig.6

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EUROPEAN SEARCH REPORT

Application Number

EP 90 20 0861

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.5)
A	NL-A-8 502 214 (TRIMBACH) * Page 3, line 17 - page 5, line 13; figures 2,3A * ---	1,7	B 65 D 5/36 B 65 D 5/44 B 65 D 5/66
A	NL-A- 268 833 (LEHNER) * Page 2, line 45 - page 3, line 27; figures 1-5 * ---	1,4	
A	US-A-1 706 804 (MILLER) * Page 2, lines 4-29; figures 4,5 * ---	1,3,4,5	
A	FR-A-1 361 548 (BOWATER) * Page 2, column 1, last paragraph; page 2, column 2, paragraph 1; figures 1-4 * -----	1,6	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

B 65 D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	27-06-1990	VANTOMME M.A.

CATEGORY OF CITED DOCUMENTS

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