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(11) Publication number:

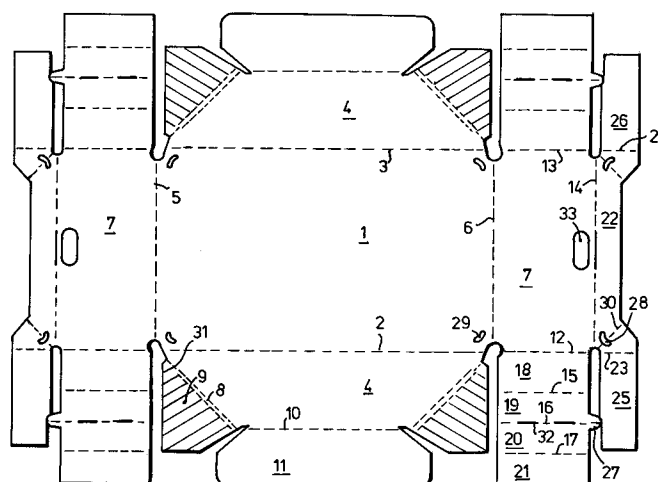
0 485 032 A1

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EUROPEAN PATENT APPLICATION(21) Application number: **91202852.9**(51) Int. Cl.⁵: **B65D 5/00, B65D 5/36**(22) Date of filing: **05.11.91**(30) Priority: **05.11.90 NL 9002403**(43) Date of publication of application:
13.05.92 Bulletin 92/20(84) Designated Contracting States:
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NL-2501 AW The Hague(NL)(54) **Stackable cardboard package with reinforced corners.**

(57) A stackable packaging has corner-reinforcing members, comprising a box provided with a cardboard bottom (1) as well as cardboard side and end panels (4, 7), said end panels (7) of the blank being provided with two four-sided posts for reinforcing the corners of the packaging in the erected condition of the packaging, and a bridge (22) that is parallel to the bottom (1) in the erected condition of the packaging and covers the corner-reinforcing members, said bridge (22) of the blank being connected to two bridge strips (25, 26) that are fixed in the erected condition of the packaging to a side panel (4) as well as to one side (18) of the four sides of the corner-

reinforcing member, while another side (21) of each corner-reinforcing member is connected to a related end panel (7), said bottom, panels, bridges and strips being connected to one another or separated from one another by foldlines. According to the invention the other two sides (19, 20) of the corner-reinforcing members are oversized, so that in the erected condition of the packaging they will be arranged by snap action in between the sides (18, 21) of the corner-reinforcing members, which are connected to the end panels (7) and the bridge strips (25, 26).

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The invention relates to a stackable packaging having corner-reinforcing members, comprising a box provided with a cardboard bottom as well as cardboard side and end panels, said end panels of the blank being provided with two four-sided posts for reinforcing the corners of the packaging in the erected condition of the packaging, and a bridge that is parallel to the bottom in the erected condition of the packaging and covers the corner-reinforcing members, said bridge of the blank being connected to two bridge strips that are fixed in the erected condition of the packaging to a side panel as well as to one side of the four sides of the corner-reinforcing member, while another side of each corner-reinforcing member is fixed to a related end panel, said bottom, panels, bridges and strips being connected to one another or separated from one another by foldlines.

Such packagings should be able to replace the familiar wooden tomato crates, provided they are made of a foldable material adapted to the three-days' stay within a so-called moist cold store with a through-flow cooling system. A more or less obvious material comprises a water-repellent grey cardboard of a density of 900 g/m² that is provided at both sides with a sheet of polyethylene ad 15 g/m² in between layers of paper ad 40 g/m². This material appears to fail to give the box of the above type adequate stability, which is illustrated by the fact that the end panels are not perpendicular to the bottom.

In applying the invention to packagings of about 38 x 29 x 14 cm, the usual dimensions for packaging roughly 6 kilograms of tomatoes, the packaging should have a compression resistance of at least 490 kg after having stayed for three days within a moist cold store with a through-flow cooling system. The above three days are connected with the weekend, and in this respect 'moist' implies a relative humidity level of around 90% at a temperature of ca. 13° C.

Packagings meeting the above-mentioned requirements do exist indeed, yet they can only be used in automatic folding machines which are only profitable when used at large market gardens.

The invention aims to provide a cardboard packaging which is both easy to erect manually and is suitable for packaging tomatoes and similar products, if made of a suitable material. According to the invention this aim is realized by the measure that the other two sides of the corner-reinforcing members are oversized, so that in the erected condition of the packaging they will be arranged by snap action substantially in between the sides of the corner-reinforcing members, which are connected to the end panels and the bridge strips.

If the bridges are provided with apertures, through which locking cams arranged at the edge of the corner-reinforcing members facing away from the bottom can pass in the erected condition of the packaging, then it can be guaranteed that the contents of the box will be diminished as little as possible by those members. Besides, all sides of the corner-reinforcing members will be arranged at those sections of the packaging which are put under the maximum load.

If the height of the locking cams suffices for being accommodated in corresponding apertures within the bottom of a superposed packaging, no longer shifts can occur among the superposed packagings, which is of major importance during transport.

Preferably, the locking cams have an axis of symmetry that coincides with the foldline between the oversized sides of the corner-reinforcing members. Thus, the cams are made rigid.

If the recesses in at least the bridges are circular-segment-shaped and have semi-circular ends, those apertures would tear in the least possible way.

The invention will be explained below into detail referring to the drawing, wherein by way of illustration a blank for producing a packaging according to the invention is represented. It is noted that in the description of this blank the term "above" is used, yet what is meant is "above the plane of the drawing". If the term "below" is used, it is just the other way round.

The represented blank comprises a bottom 1, which is connected to two side panels 4 via foldlines 2 and 3, as well as to two end panels 7 via foldlines 5 and 6. Two foldlines 8 are provided in the side panels 4 at an angle of 45°, largely bounding triangular flaps 9 which are to be folded upwards through an angle of 180°, and a foldline 10 extending parallel to the foldlines 2 and 3 which forms the boundary of a side edge reinforcing strip 11 that is to be folded through 180° during the production, so that it will be arranged eventually at the inside of the packaging. There are some details concerning the members 8-11 which are of minor significance to the invention, and consequently they will not be discussed in this context.

Instead, details concerning the right end panel will be mentioned; and needless to say, the same would apply to the left end panel.

End panel 7 is bounded by both foldline 6 and two vertical foldlines 12, 13, as well as one horizontal foldline 14. The foldlines 12 and 13 of the blank are in line with the foldlines 2 and 3 of the bottom. Beyond the vertical foldlines 12 and 13, four sides 18-21 of the intended corner-reinforcing members are arranged which are connected to one another by foldlines 15-17. Beyond the horizontal foldline

14, a bridge 22 is arranged, the right boundary of which will be arranged adjacent to the vertical centre line of the bottom 1 after having been folded together with the end panel 7 along foldline 6 through 180°.

Bridge 22 also has two foldlines 23 and 24 which provide a pliable connection to two bridge strips 25 and 26, said bridge strips 25 eventually being arranged in between and fixed to, for example by means of an adhesive, the outer surface of side 18 and - after folding - to the inner surface of flap 9.

So far the sides 19 and 20 have not been folded yet along their mutual folding line; which will not be the case until the packaging is erected, the sides 18-21 initially forming a more or less square post, as side 21 is connected to end wall 7. Yet, after the box has been erected, sides 19 and 20 will be displaced under snap action, so that the foldline 16 will be arranged nearer to the vertical foldlines 12 and 13. The oversized condition of the sides 19 and 20, the total of their widths in particular, in relation to an imaginary, diagonal joint line connecting the foldlines 15 and 17, enables the snap action and results in very rigid corner-reinforcing members in the final state of the box, said corner-reinforcing members being very well adapted, in particular, to resist forces which are mainly exerted horizontally and act on the corners of the box from the outside and being able to support a load of high-stacked packagings.

Each of the corner-reinforcing members 18-21 are provided with a locking cam 27 having a symmetry axis coinciding with the foldline 16 between the overdimensioned sides 19 and 20. In this way, the locking cams are more rigid than if they would have been just flat.

The bridges 22 are provided with apertures 28 which are arranged in the angular sections of the bridges which are bounded by the foldlines 14 and 23, 24. After the packaging has been erected and the sides 19, 20 are displaced under snap action, the locking cams 27 project into or through said apertures. They project into them when their height only slightly exceeds the thickness of the bridge 22, and they project through them when they are only a little larger than about twice the thickness of the bridge. In the latter case, they are to be accommodated in corresponding apertures 29 in the four corners of the bottom 1 of a packaging put on top of the bridges.

The apertures 28 and 29 may be shaped like a slit or a triangle, yet a circular-segment shape with semi-circular ends is preferred, as that shape has the least chance of tearing.

The above-described packaging can be produced by means of automatic machines. After punching the blank and applying the foldlines into

it, at first the sides 21 are fixed (adhered) to end panels 7, so that they will be adjacent to the sides 18. After that the side-panel-reinforcing strips 11 are folded along foldline 10 through 180°, abutting against the upper surface of the side panels 4, and fixed (adhered) to it, and the flaps 9 are folded along foldlines 8 through 180° so that they abut against the lower surface of the side panels 4, and subsequently the members 4, 9 and 11 are folded together along foldlines 2 and 3 through 180° so as to abut against the upper surface of the bottom 1.

Subsequently the bridges 22 are folded upwards along the foldlines 14 through 90°, after which the bridge strips 25 and 26 are folded along the foldlines 23 and 24 in such a way that, after the folding of the members 7, 18-22 through 180°, said bridge strips 25 and 26 will be arranged between the sides 18 and the flaps 9 and fixed (adhered) to them. In this procedure the bridges 22 are folded along foldlines 30 extending radially through the apertures 28 at an angle of 45°.

Naturally, the corner-reinforcing members could also be formed after the erection of the side panels 4 yet prior to folding the end panels 7.

When the box is in a folded state, the extremities of the bridges 22 of the blank are positioned near to the vertical centre line of the blank.

To facilitate the production and erection of the packaging some foldlines are provided with incisions for part of their length. This applies to the foldlines 8 of the illustrated example near the intended lower corners, indicated by 31, as well as to the foldlines 16, indicated by the bold line sections 32.

Into the end panels 7 apertures 33, which are known per se, are applied in order to allow fingers to grip when handling the packagings.

Within the scope of the claims also other embodiments could be selected than the one illustrated in the drawing.

Claims

1. Stackable packaging having corner-reinforcing members, comprising a box provided with a cardboard bottom (1) as well as cardboard side and end panels (4, 7), said end panels (4) of the blank being provided with two four-sided posts for reinforcing the corners of the packaging in the erected condition of the packaging, and a bridge (22) that is parallel to the bottom (1) in the erected condition of the packaging and covers the corner-reinforcing members, said bridge (22) of the blank being connected to two bridge strips (25, 26) that are fixed in the erected condition of the packaging to a side panel (4) as well as to one side (18) of

the four sides of the corner-reinforcing member, while another side (21) of each corner-reinforcing member is connected to a related end panel (7), said bottom, panels, bridges and strips being connected to one another or separated from one another by foldlines, **characterized in that** the other two sides (19, 20) of the corner-reinforcing members are oversized, so that in the erected condition of the packaging they will be arranged by snap action substantially in between the sides (18, 21) of the corner-reinforcing members, which are connected to the end panels (7) and the bridge strips (25).

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2. Packaging according to claim 1, **characterized in that** the bridges (22) are provided with apertures (28) through which locking cams (27) arranged at the edge of the corner-reinforcing members facing away from the bottom can pass in the erected condition of the packaging.

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3. Packaging according to claim 1 or 2, **characterized in that** the height of the locking cams (27) suffices for being accommodated in corresponding apertures (29) within the bottom (1) of a superposed packaging when stacking packagings.

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4. Packaging according to claim 3, **characterized in that** the locking cams (27) have axes of symmetry that coincide with the foldlines (16) between the oversized sides (19, 20) of the corner-reinforcing members.

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5. Packaging according to any of the preceding claims, **characterized in that** the apertures (28, 29) in at least the bridges are circular-segment-shaped and have semi-circular ends.

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6. Packaging according to any of the preceding claims, **characterized in that** the side panels (4) and the bridges (22) are provided with foldlines (8, 30) to present the packaging as a prepared box.

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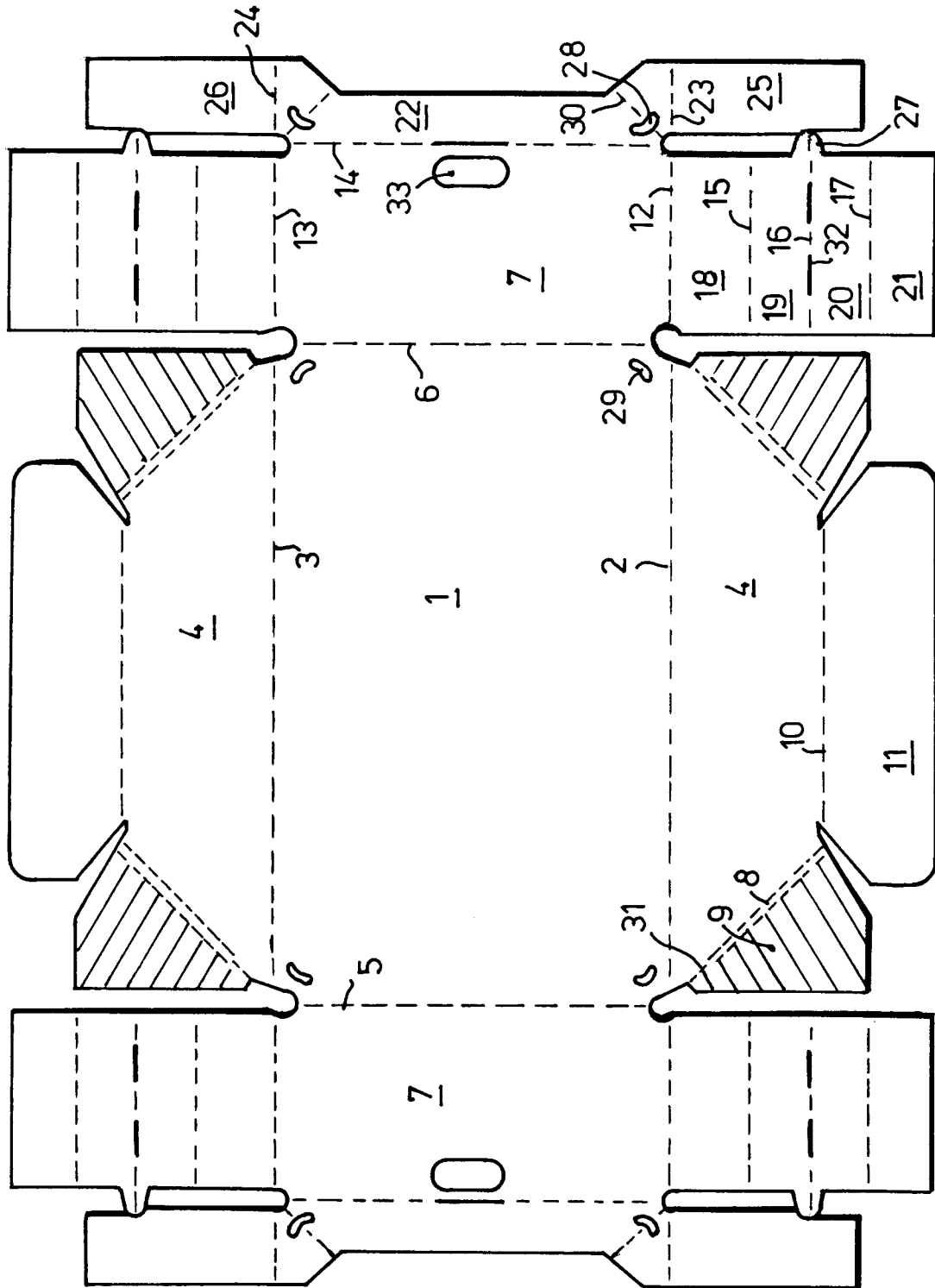
7. Packaging according to any of the preceding claims, **characterized in that** it is made of a water-repellent, grey cardboard having a density of nearly 900 g/m², at least one side of which is coated with a sheet of polyethylene in between layers of paper, so that along with the layers of glue a density exceeding 1100 g/m² is obtained.

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8. Packaging according to any of the preceding claims, **characterized in that** at least the foldlines (16) between the oversized sections (19, 20) are provided with incisions (32).

9. Packaging and blank as illustrated in the drawing and/or described with reference thereto.





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EUROPEAN SEARCH REPORT

Application Number

EP 91 20 2852

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)
X,P	EP-A-0 453 015 (BUHRMANN-TETTERODE) * column 8, line 1 - column 9, line 38; figures 5-7 *	1,6	B65D5/00 B65D5/36
Y	---		
A	EP-A-0 394 544 (G.HOFFMANN GMBH) * column 2, line 35 - column 3, line 41; figures 1-6 *	1-4,6 3,4	
Y	---		
Y	GB-A-2 196 608 (REED PACKAGING) * page 1, line 107 - line 113; figures 1-4 *	1-4,6	
Y	---		
A	FR-A-2 548 626 (CASTILLO) * page 2, line 5 - line 18; figures 1,2 *	2-4	
A	---		
A	EP-A-0 394 549 (G.HOFFMANN GMBH) * column 2, line 50 - column 3, line 18 * * column 4, line 16 - line 21; figures 1-7 *	1-4,6	
A	---		
A	US-A-4 056 223 (WILLIAMS) ---		
A	NL-A-9 000 063 (KARTONAGEFABRIEK "GELRIA") -----		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.5) B65D
Place of search THE HAGUE		Date of completion of the search 05 FEBRUARY 1992	Examiner BERRINGTON
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			