

Claims

1. A method for producing a reusable packaging from a carton, in which a rectangular main blank with sides X and Y and an overall area xy is provided and

$$2(a + h) \leq x \leq 3(a + h) + a$$

and

$$y - 2(h + r) \leq b \leq y,$$

wherein x and y respectively a and b correspond to lengths of sides X and Y of the blank~~the side dimensions of the footprint area~~, a and b correspond to side dimensions of a footprint area of a finished packaging formed from the blank, h corresponds to ~~the a~~ a height of the finished packaging, and r corresponds to ~~the a~~ a width, or the width reduced by the height h, of the a periphery region R of the finished packaging that forms a cavity in the finished packaging and is accessible from outside the finished packaging, and the method comprises the following further steps:

~~—~~producing folding lines B_n in the main blank parallel to ~~a first~~the side Y at least at the following distances from the latter side Y:

$$B_1: a_1 = h$$

$$B_2: a_2 = h + a$$

$$B_3: a_3 = 2h + a,$$

producing folding lines A_n'' in the main blank parallel to the side X at the following distances from the side X:

$$\underline{A_1''}: b_1 = h$$

$$\underline{A_2''}: b_2 = h + r$$

$$A_3'': b_3 = y - (h + r)$$

$$A_4'': b_4 = y - h$$

~~characterised in that~~wherein by virtue of the severing of at least four severing lines T_3'' and T_4'' , which are arranged oppositely in pairs and each of which start from opposite sides X, along at least one of the folding lines B_n , a distance between two severing line end points E_T which are closer to an axis of symmetry S_1 , which is parallel to the side X, corresponds to a length b'' of the side B'' of the finished packaging, and

wherein at least four angled cuts T_1''/T_5'' , T_2''/T_6'' are formed along areas formed by folding lines A, B with sides of lengths h and r.

~~two severing lines T, each starting from opposite sides X, along at least one of the folding lines B_n or the extension thereof, the distance between those two end points E_T of the severing lines T of the blank which are closer to an axis of symmetry S_1 , which is parallel to the side X, is selected such that the length of the distance corresponds to a side B'' of the finished packaging or the length of a side M of a packaging insert.~~

2. The method according to claim 1, ~~characterised in that~~ the wherein a length t of the severing lines T_3'' and T_4'' satisfies:

$$h \leq t < y / 2.$$

3. The method according to ~~either one of the preceding claims~~ 1, ~~characterised in that~~wherein at least one folding line B_n is formed only in ~~the~~ a region between two severing

lines T_3'' and T_4'' extending the at least one folding line B_n .

4. The method according to ~~any one of the preceding claims~~ 1, characterised in that wherein said method comprises ~~at least~~ the production of producing one or more of the following folding lines B_n of the main blank parallel to ~~a first~~ the side Y at the following distances from the ~~latter~~ side Y:

$$B_4: a_4 = 2 (h + a)$$

$$B_5: a_5 = 2 (h + a) + h$$

$$B_0: a_0 = 0.$$

5. The method according to claim 4, ~~characterised in~~ that wherein at least one perforation line is provided in ~~the a~~ a region of ~~the~~ at least one closure tab of the blank, parallel to and/or on ~~the folding line~~ one of the folding lines B_n .

~~6. The method according to any one of the preceding claims, characterised in that an insert E which is a terminal insert in relation to the side X is severed from a side face adjacent thereto by virtue of the severing of two severing lines T_5 , each starting from opposite sides X, along one of the folding lines B_5 or B_0 , or extending one of these folding lines, such that the distance between the two inner end points ET of the severing lines T corresponds to the length m of a side M of the insert.~~

~~7. The method according to claim 6, characterised in that the insert is folded out in a rectangle from the blank and the second side length of the insert corresponds substantially to the side dimension a of the footprint area of the finished packaging.~~

~~8. The method according to claim 7, characterised in that~~

~~— folding lines A on the main blank are produced in the region of the insert parallel to both sides X, in each case at the following distances from the corresponding side lines:~~

$$\text{— } A_1(A_1') = r$$

$$A_2(A_2') = r + h, \text{ and}$$

~~— an article receptacle is provided in a central region B_M of the insert, wherein said provisioning comprises at least one of the following operations:~~

- ~~• forming at least one further severing line T;~~
- ~~• forming at least one further folding line A parallel to the side X, X' and/or B, B' parallel to the Y-axis;~~
- ~~• forming at least one cut-out C.~~

~~9. The method according to claim 8, characterised in that the provisioning of an article holder in the region of the insert comprises the following steps:~~

~~— producing folding lines of length $n = m - 2 \cdot o - y - 2 \cdot (r + h + o)$ parallel and centrally to the side Y' delimiting the insert at the following distances from the latter:~~

$$\begin{aligned} \bullet B_6 &= a - j \\ \bullet B_7 &= a - (j + h) \\ \bullet B_7' &= j + h \\ \bullet B_6' &= j \end{aligned}$$

wherein o is the distance between the folding lines A_2, A_2' parallel to the side X and an inner periphery of the insert, j is the distance between Y' or the folding line B_5 parallel to the side Y' and a further inner periphery of the insert, and $(j + h + k) = a / 2$ is the distance to the centre of the insert from the sides Y' and B_5 ;

- forming a severing line T_6 in a region of the insert that is a central region in relation to the side a ;
- forming two severing lines T_7 between opposite folding lines A_2, A_2' and the axis of symmetry S_1 .

10. The method according to claim 9, characterised in that a severing line T_8, T_8' as far as the folding line A_2 is formed at least in a one-sided extension of the folding lines B_6 and B_6' respectively.

11. The method according to claims 6 to 10, characterised in that the length of the side X of the main blank lies in the following range: $2(h + a) + a \leq x \leq 3(a + h) + a$.

12. The method according to any one of claims 6 to 10, characterised in that the length h between the folding lines B_5 and B_4 and/or the folding lines B_6 (B_6') and B_7 (B_7') and the lengths a of the insert is/are corrected by once to many times the thickness d of the carton.

~~13. The method according to any one of claims 1 to 5, characterised in that folding lines A of the main blank are produced parallel to a first side X at the following distances from the latter:~~

$$A_1'' : b_1 = h$$

$$A_2'' : b_2 = h + r$$

$$A_3'' : b_3 = y'' - (h + r)$$

$$A_4'' : b_4 = y'' - h$$

~~and, by virtue of the severing of at least four severing lines T_3'' , T_4'' , which are arranged oppositely in pairs and each start from opposite sides X, along at least one of the folding lines B, the distance between those two severing line end points E_4 which are closer to an axis of symmetry S_1 , which is parallel to the side X, corresponds to the length b'' of a side B'' of the finished packaging and at least four angled cuts T_1''/T_5'' , T_2''/T_6'' are formed along areas formed by folding lines A, B with sides of lengths h and r or h and h.~~

~~146. The method according to claim 13, characterised in that wherein the angled cuts are made in a region between B_0 (or Y) the side Y and B_1 , and/or between B_2 and B_3 and/or between B_4 and/or B_5 .~~

~~157. The method according to any one of claims 13 to 14, characterised in that wherein the angled cuts are made in a region between A_1'' and A_2'' and between A_3'' and A_4'' .~~

~~168~~168. The method according to ~~any one of claims 13 to 14,~~
~~characterised in that~~wherein the length x of the side X of the
main blank satisfies:

$$2 (a + h) \leq x \leq 3 (a + h).$$

~~179~~179. The method according to ~~any one of the preceding claims~~
~~1,~~ ~~characterised in that~~wherein the folding lines are produced
by grooving and/or by perforation.

~~1810~~1810. The method according to ~~any one of the preceding~~
~~claims 1,~~ ~~characterised in that~~wherein at least ~~a~~the height h
and/or ~~at least one~~the side dimension a is corrected by once
or many times ~~the~~a thickness d of the carton.

~~1911~~1911. The method according to ~~any one of the preceding~~
~~claims 1,~~ ~~characterised in that~~wherein the carton is
constructed from the blank such that an article can be
inserted into the carton.

~~2012~~2012. A packaging that is produced from a main blank BZ of
a carton by a method according to ~~claims 1 to 19,~~
~~characterised in that~~wherein the packaging at least in ~~the~~its
closed state is mechanically reinforced at least in relation
to two of its side walls ~~(31, 31', 33, 33')~~ by two further
support walls ~~(42, 34''')~~, wherein the support walls ~~(42,~~
~~34''')~~ are each connected to the packaging ~~(30, 30')~~ via at
least one folding line A_n'', B_n'', B₆', B₆', B₇', B₇', A₂', A₂',
A₁'', A₂'', A₃'', A₄'').

~~21. The packaging according to claim 20, characterised in that the packaging is substantially cuboidal, wherein each two opposite side faces of dimensions a and h have a circumferential periphery edge R_K of a periphery region R and a side face offset inwardly in relation thereto by a distance $r_s = r + h$ or $r_s = r$.~~

~~22. The packaging according to either one of claims 20 or 21, characterised in that the packaging has been produced in accordance with any one of claims 1 to 19.~~

~~23. A method for packaging an article by means of a packaging according to claim 20, comprising the following steps:~~

~~detecting article information during the transport of the article to an insertion station and processing of the detected information by a computer interface in order to:~~

- ~~— determine the dimensions a, b, h and r_s of the packaging suitable for the article size, wherein a, b and h correspond to the geometric outer dimensions, determined by the article dimensions, of a cuboid packaging and r_s corresponds to an appropriate periphery region R protruding on two opposite sides of length a and height h;~~
- ~~— select a main blank XY dimensioned suitably for this purpose with side lengths x and y or produce same from a carton strip and feed it to a cartoning machine;~~

~~— automatically adjust and/or actuate the cartoning machine in order to produce the corresponding dimensions (a, b, h, r_s) of the packaging from the main blank BZ;~~

~~— actuate the cartoning machine or a carton-turning unit arranged between the cartoning machine and insertion station such that the packaging is transferred in an upwardly open state to the insertion station;~~

~~wherein the computer interface controls the carton feed A, the cartoning machine and an article-transporting unit C such that the packaging and article reach the insertion station synchronously and the article can be inserted into the packaging.~~

~~24. The method according to claim 23, characterised in that the article information and/or further article information is read out by a code attached to the article or provided with the article.~~

~~25. The method according to either one of claims 23 to 24, characterised in that spatial dimensions of the article are firstly detected and are forwarded to the computer interface in order to provide the further article information.~~

~~26. The method according to any one of claims 23 to 25, characterised in that the article is inserted by hand or automatically.~~

~~27. The method according to any one of claims 23 to 26, characterised in that the packaging is automatically closed and removed following the insertion of the article.~~

~~28. The method according to any one of claims 23 to 27, characterised in that at least one of the following steps is performed before or during the removal:~~

- ~~— marking the packaging;~~
- ~~— checking the packaging.~~

~~29. The method according to any one of claims 23 to 28, characterised in that the cartoning machine comprises a plurality of sub-units.~~

~~30. The method according to any one of claims 23 to 29, characterised in that the cartoning machine comprises a carton-transporting unit for providing the carton in an upwardly open position and/or transporting it to the insertion station.~~

~~31. The method according to either one of claims 29 to 30, characterised in that the cartoning machine comprises at least two, preferably at least three folding and/or gluing units.~~

~~32. The method according to any one of claims 29 to 31, characterised in that the blanks or packagings are moved away from the carton feed A and cartoning machine B over a~~

~~packaging transport path, and the articles are moved away from the article-transporting unit C over an article transport path intermittently in the direction of the insertion station (15), and the packaged articles are moved away from the packing station D by a removal device E intermittently or continuously.~~

~~33. The method according to any one of claims 23 to 32, characterised in that~~

~~the computer interface is connected to one or more computing units and actuates same.~~

~~34. A blank for producing a packaging according to any one of claims 20 to 22, produced by a method according to any one of claims 1 to 18.~~