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(54) Packing method and unit for folding a blank from which to form a container in such a manner as to form a front box wall and two lateral box walls of a hinged lid of the container

(57) A packing method and unit (33) for folding a blank (23) from which to form a container (4) in such a manner as to form a front box wall (18) and two lateral box walls (19) of a hinged lid (11) of the container (4); the blank (23) has two longitudinal fold lines (27) and a plurality of transverse fold lines (28) that define, between the two longitudinal fold lines (27), a first panel (14') forming a front wall (14) of the container (4), a second panel (13') forming a bottom wall (13) of the container (4), a third panel (15') forming a rear wall (15) of the container (4), a fourth panel (17') forming a top wall (17) of the lid (11), a fifth panel (18') forming an outer portion of the front box wall (18) of the lid (11), a sixth panel (18") forming an inner portion of the front box wall (18) of the lid (11) and a seventh panel (20').

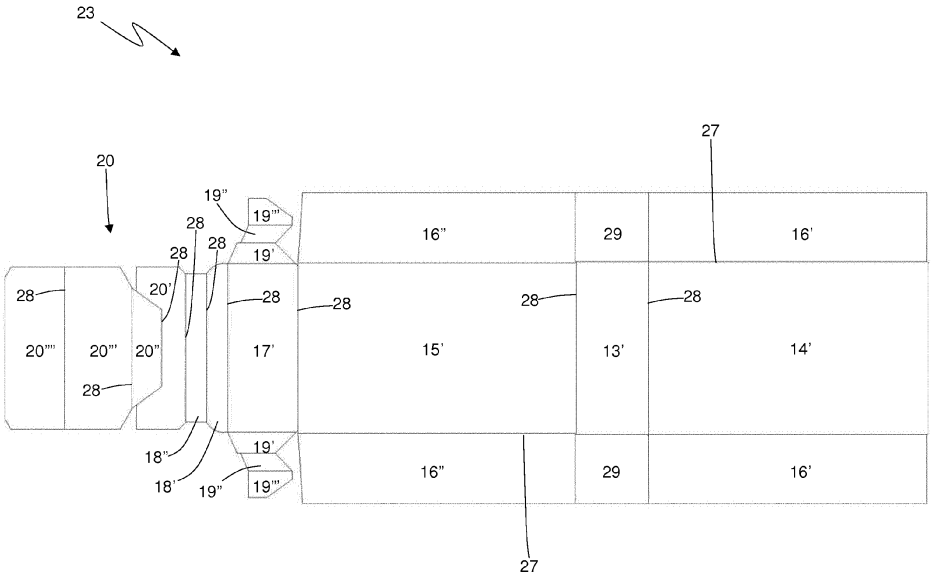

Fig. 2

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Description

TECHNICAL FIELD

[0001] The present invention relates to a packing method and unit for folding a blank from which to form a container in such a manner as to form a front box wall and two lateral box walls of a hinged lid of the container.

[0002] In the description that follows, for brevity and without loss of generality for the present invention, reference will be made to a cigarette packet with slide opening and a hinged lid.

PRIOR ART

[0003] Rigid packets for cigarettes with a hinged lid are currently the most widespread cigarette packets on the market, as they are simple to manufacture, practical and easy to use and offer good mechanical protection for the cigarettes contained inside them.

[0004] In addition to the above-mentioned rigid cigarette packets with a hinged lid, rigid cigarette packets have been proposed with slide opening comprising two containers, one fitted in the other in a separable manner. In other words, a rigid cigarette packet with slide opening comprises an inner container, which is able to contain a set of cigarettes wrapped in a foil wrapper and is housed inside an outer container so that it can slide with respect to the outer container between a closed configuration, where the inner container is inserted inside the outer container, and an open configuration, where the inner container is extracted from the outer container.

[0005] A rigid cigarette packet has also been proposed with slide opening and a hinged lid, where the inner container (or, alternatively, the outer container) is fitted with a hinged lid rotating between a closed position and an open position of an open upper end of the inner container. The lid has a connecting tab that has one end integral with the lid and the other end integral with the outer container (or, alternatively, the inner container) to "automatically" control the rotation of the lid (i.e. without the user having to touch the lid) by sliding the inner container with respect to the outer container.

[0006] However, it has been observed that when turned upside down (as frequently happens inside a bag or a pocket of the user's clothes), a rigid cigarette packet with slide opening and a hinged lid tends to lose tobacco dust, which essentially falls out through the gap between the front edge of the top wall of the lid of the inner container and the facing upper edge of the front wall of the outer container. To prevent the undesired spilling of tobacco dust, it has been proposed to provide a lid that enables sealing the open upper end by being fitted with a front wall and two lateral walls, each formed by cardboard panels set apart from each other, i.e. by "box" walls, such that on closing, the lid seals the open upper end of the inner container.

[0007] Patent application EP2325093A1 provides an example of a cigarette packet with a slide opening and hinged lid of the above-described type, i.e. where the lid is fitted with front and lateral "box" walls, so that closing the lid seals the open upper end of the inner container. It has been observed that the current known methods used for making cigarette packets with slide opening and a hinged lid fitted with box walls do not permit achieving high productivity levels (i.e. a large number of cigarette packets produced per unit time), especially if it is wished to maintain a high standard of quality. In consequence, known packing machines used to make cigarette packets with slide opening and a hinged lid are excessively slow and only suitable for producing small batches for special series.

DESCRIPTION OF THE INVENTION

[0008] The object of the present invention is to provide a packing method and unit for folding a blank from which to form a container in such a manner as to form a front box wall and two lateral box walls of a hinged lid of the container, this packing method and unit being devoid of the above-described drawbacks and, in particular, simple and inexpensive to implement.

[0009] According to the present invention, a packing method and unit are provided for folding a blank from which to form a container in such a manner as to form a front box wall and two lateral box walls of a hinged lid of the container, in accordance with that claimed in the appended claims.

BRIEF DESCRIPTION OF DRAWINGS

[0010] The present invention will now be described with reference to the attached drawings, which illustrate a non-limitative embodiment, where:

- Figure 1 is a front perspective view of a container made according to the packing method of the present invention;
- Figure 2 is a plan view of a blank used to make the container in Figure 1;
- Figure 3 is a schematic perspective view of a packing conveyor that performs preliminary folding of the blank in Figure 2; and
- Figures 4 and 5 are a perspective view and a plan view, respectively, of the preliminary folding sequence of the blank in Figure 2 performed by the packing conveyor in Figure 3.

PREFERRED EMBODIMENTS OF THE INVENTION

[0011] In Figure 1, reference numeral 4 indicates, as a whole, a container destined to contain a wrapped set of cigarettes (not shown). Preferably, the container 4 forms an outer container of a rigid cigarette packet with slide opening by translation (linear movement); in consequence, the container 4 is able to house an inner con-

tainer in a sliding manner to allow the inner container to slide with respect to the container 4, moving with a translational movement between a closed configuration, where the inner container is inserted completely inside the container 4, and an open configuration, where the inner container is extracted from the container 4 to enable access to a wrapped set of cigarettes housed in the inner container.

[0012] The container 4 has an open top end 10 and is fitted with a lid 11, which is hinged to the container 4 on a hinge 12 to rotate, with respect to the container 4, between an open position (shown in Figure 1) and a closed position (not shown) of the open top end 10 of the container 4. The container 4 is parallelepipedal and has a bottom wall 13 opposite to the open top end 10, a front wall 14 and a rear wall 15 parallel and opposite to each other, and two lateral walls 16 parallel to each other and interposed between walls 14 and 15.

[0013] The lid 11 has a top wall 17 that closes the open top end 10 of the container 4 when the lid is in the closed position, a front wall 18 and two lateral walls 19. The top wall 17 of the lid 11 is "flat" (i.e. constituted by a single cardboard panel or by multiple cardboard panels stacked one on top of the other and therefore solid inside), while walls 18 and 19 of the lid 11 are "boxed" (i.e. constituted by two cardboard panels set apart from each other and therefore hollow inside) and have a triangular cross-section. When the lid 11 is in the closed position, walls 18 and 19 of the lid 11 fit into the open top end 10 of the container 4 so that the top wall 17 of the lid 11 is flush with the top edges of walls 14, 15 and 16 of the container 4.

[0014] According to one embodiment, a rear wall of the inner container can be connected to the top wall 17 of the lid 11 by a connecting tab 20 to control the rotation of the lid 11 "automatically" (i.e. without the user having to touch the lid 11) by sliding the inner container with respect to the container 4.

[0015] The container 4 of the packet shown in Figure 1 is obtained from a corresponding blank 23, which is shown in Figure 2 and comprises, amongst other things, a plurality of elements that, where possible, are indicated by accented reference numerals equal to the reference numerals indicating the corresponding walls of the container 4.

[0016] With reference to Figure 2, the blank 23 has two longitudinal fold lines 27 and a plurality of transverse fold lines 28, which define, between the two longitudinal fold lines 27, a panel 17' forming the top wall 17 of the lid 11, a panel 15' forming the rear wall 15 of the container 4, a panel 13' forming the bottom wall 13 of the container 4, and a panel 14' forming the front wall 14 of the container 4.

[0017] Panel 18' is connected to panel 17' along a transverse fold line 28 and, in turn, panel 18" is connected to panel 18' along a transverse fold line 28; the two panels 18' and 18" form the front wall 18 of the lid 11 and, in particular, respectively form the outer portion and the inner portion of the front wall 18. The connecting tab 20 is connected to panel 18" along a transverse fold line 28 and, in turn, is formed by four panels 20', 20", 20'" and 20"" that are separated from each other by respective transverse fold lines 28; panel 20' of the connecting tab 20 is glued to an inner surface of the top wall 17 of the lid 11 (therefore, to an inner surface of panel 17'), while panel 20'" of the connecting tab 20 is glued to an outer surface of a rear wall of the inner container (after having been superimposed on and glued to panel 20""). Panel 14' has a pair of lateral flaps 16', which form an outer portion of the lateral walls 16, are located on opposite sides of panel 14' and are separated from panel 14' by the longitudinal fold lines 27. Panel 15' has a pair of lateral flaps 16", which are glued to the corresponding flaps 16', form an inner portion of the lateral walls 16, are located on opposite sides of panel 15' and are separated from panel 15' by the longitudinal fold lines 27. The lateral flaps 16" of panel 15' have a pair of tabs 29, each of which is separated from the respective lateral flap 16" by a transverse fold line 28.

[0018] Panel 17' has a pair of two lateral appendices, which are located on opposite sides of panel 17', are separated from panel 17' by the longitudinal fold lines 27, are formed by respective flaps 19', 19" and 19'" that are separated from each other by further longitudinal fold lines, and form the lateral walls 19 of the lid 11. Each lateral appendix of panel 17' has two flaps 19' and 19" that respectively form the outer portion and the inner portion of a lateral wall 19 and a flap 19'" that is glued to an inner surface of the top wall 17 of the lid 11 with the interposition of panel 20' of the connecting tab 20 (i.e. panel 20' is directly connected to the inner surface of panel 17' and flaps 19'" are glued to panel 20').

[0019] In accordance with that shown Figure 3, a packing unit 33 is provided, in which a packing conveyor 54 performs preliminary folding of the blank 23 to form the box walls 18 and 19 of the lid 11.

[0020] The packing conveyor 54 is provided with a plurality of packing pockets 55, each of which is able to seat a blank 23 to convey the blank 23 along a packing path P3 that runs from an input station S6 to an output station S7. A hopper (not shown) is provided at the input station S6, this hopper housing a stack of blanks 23 and cyclically feeding the blanks 23 from a lower output opening to the packing pockets 55 of the packing conveyor 54; in particular, each blank 23 positioned at the lower output opening of the hopper is picked by a head of a vertically-moving suction gripper and is positioned on an underlying packing pocket 55 of the packing conveyor 54 that is stationary at the input station S6 and aligned with the lower output opening of the hopper.

[0021] A gumming device 57 is connected to the packing conveyor 54 along the packing path P3 downstream of the input station S6 and applies glue 58 (shown in Figure 5) on panel 20'" of each blank 23. A folding device 59 is connected to the packing conveyor 54 downstream of the gumming device 57 along the packing path P3 and folds panel 20"" with respect to panel 20'" for superim-

posing and glue panels 20'" and 20"". A pressure device 60 is connected to the packing conveyor 54 downstream of the folding device 59 along the packing path P3 and keeps panels 20'" and 20"" pressed together to aid the gluing together of panels 20'" and 20"".

[0022] A gumming device 61 is connected to the packing conveyor 54 along the packing path P3 downstream of the pressure device 60 and applies glue 62 (shown in Figure 5) on panel 17' of each blank 23. A folding device 63 is connected to the packing conveyor 54 downstream of the gumming device 61 along the packing path P3 and folds panels 20', 20", 20'" and 20"" (these last two being superimposed on and glued to each other) to lay panels 20'" and 20"" (superimposed on and glued to each other) on panel 15' and form the front wall 18 of the lid 11. In particular, the folding device 63 simultaneously folds panel 18' with respect to panel 17', panel 18" with respect to panel 18' and panel 20' with respect to panel 18" to bring panel 20' into contact with panel 17' (to which it adheres due to the glue 62) and, at the same time, forms the front box wall 18 of the lid 11, with panel 18' and panel 18" inclined with respect to each other. A pressure device 64 is connected to the packing conveyor 54 downstream of the folding device 63 along the packing path P3 and keeps panels 20' and 17' pressed together to aid the gluing together of panels 20' and 17'. According to a preferred embodiment, the folding device 63 comprises a counter-body around which panels 18' and 18" are folded to form the front wall 18 of the lid 11, as described in detail in patent application BO2011A000426, incorporated herein for reference.

[0023] A gumming device 65 is connected to the packing conveyor 54 along the packing path P3 downstream of the pressure device 64 and applies glue 66 (shown in Figure 5) on panel 20' (which has previously been superimposed on and glued to panel 17') of each blank 23. A folding device 67 is connected to the packing conveyor 54 downstream of the gumming device 65 along the packing path P3 and simultaneously folds, on each lateral appendix of panel 17', flap 19' with respect to panel 17', flap 19" with respect to flap 19' and flap 19'" with respect to flap 19" to bring flap 19'" into contact with panel 20' and, at the same time, form the lateral box wall 19 of the lid 11, with flap 19' and flap 19" inclined with respect to each other. A pressure device 68 is connected to the packing conveyor 54 downstream of the folding device 67 along the packing path P3 and keeps flaps 19'" and panel 20' (which has been previously superimposed on and glued to panel 17') pressed together to aid the gluing of flaps 19'" to panel 20'. Folding device 67 is located at an end portion of a straight section of the packing path P3, while pressure device 68 is located along a curved section and is equipped with rotatably mounted grippers that follow each blank 23 along an arc of the curved section of the packing path P3. According to a preferred embodiment, folding device 67 comprises two counter-bodies around which flaps 19' and 19" are folded to form the lateral walls 19 of the lid 11, as described in detail in patent application BO2011A000426 incorporated herein for reference.

[0024] According to a preferred embodiment shown in Figure 3, the packing conveyor 54 is formed by a conveyor belt that is looped around two end pulleys and supports a plurality of packing pockets 55; in consequence, the packing path P3 has a U-shape and extends between the input station S6 located along an initial straight section of the packing path P3 and the output station S7 located along a final straight section of the packing path P3, which is connected to the initial straight section by an intermediate semi-circular section. The folding device 67 and the pressure device 68 are located on this intermediate semi-circular section.

[0025] The packing method and the corresponding packing unit 33 described above have numerous advantages, as they enable manufacturing containers 4 with high productivity levels (i.e. a large number of containers 4 produced per unit time), while at the same time maintaining a high level of quality. This result is achieved thanks to the fact that the two lateral appendices of panel 17' (formed by flaps 19', 19" and 19'") are folded onto panel 20' that was previously superimposed on and glued to panel 17', instead of the other way around as followed in accordance with current known folding methods, described, for example, in patent application EP2325093A1.

[0026] In other words, in accordance with current known folding methods, described, for example, in patent application EP2325093A1, flaps 19'" are glued directly to panel 17' and panel 20' is then superimposed on and glued to panel 17' on top of the flaps 19'". However, in this way it becomes difficult to effectively press panel 20' against panel 17', due to the presence of the flaps 19'". In fact, an empty space remains between the two opposite folded flaps 19'" that separates panels 20' and 17' and therefore even when pressing on panel 20', it is difficult to make panel 20' remain in contact with panel 17' (not in direct face-to-face contact with each other) without a prolonged pressure force. Therefore, when panel 20' is superimposed on and glued to panel 17' on top of the flaps 19'", it is necessary to prolong the pressure action on panel 20', as more time is needed to achieve satisfactory gluing of panel 20' to the underlying panel 17' due to the interposition of the flaps 19'"; obviously, this entails a significant drop in productivity of the packing process. The present invention is, as described above, devoid of these drawbacks.

Claims

1. A packing method for folding a blank (23) from which to form a container (4) in such a manner as to form a front box wall (18) and two lateral box walls (19) of a hinged lid (11) of the container (4);
the blank (23) has two longitudinal fold lines (27) and a plurality of transverse fold lines (28) that define,

between the two longitudinal fold lines (27), a first panel (14') forming a front wall (14) of the container (4), a second panel (13') forming a bottom wall (13) of the container (4), a third panel (15') forming a rear wall (15) of the container (4), a fourth panel (17') forming a top wall (17) of the lid (11), a fifth panel (18') forming an outer portion of the front box wall (18) of the lid (11), a sixth panel (18") forming an inner portion of the front box wall (18) of the lid (11) and a seventh panel (20');
the fourth panel (17') has two lateral appendices, which are located on opposite sides of the fourth panel (17'), are separated from the fourth panel (17') by the longitudinal fold lines (27), and each comprise a first wing (19') forming an outer portion of a respective lateral box wall (19) of the lid (11), a second wing (19") forming an inner portion of the lateral box wall (19) of the lid (11) and a third wing (19'"); and the packing method comprises the steps of:

applying a first glue (62), by means of a first gumming device (61), between the fourth panel (17') and the seventh panel (20');
simultaneously folding, by means of a first folding device (63), the fifth panel (18') with respect to the fourth panel (17'), the sixth panel (18") with respect to the fifth panel (18'), and the seventh panel (20') with respect to the sixth panel (18"), for bring the seventh panel (20') into contact with the fourth panel (17') and to form the front box wall (18) of the lid (11), with the fifth panel (18') and the sixth panel (18") inclined with respect to each other;
applying a second glue (66), by means of a second gumming device (65), between each third wing (19'") and the seventh panel (20'), which is superimposed on and glued to the fourth panel (17'); and
simultaneously folding on each lateral appendix of the fourth panel (17'), by means of a second folding device (67), the first wing (19') with respect to the fourth panel (17'), the second wing (19") with respect to the first wing (19'), and the third wing (19'") with respect to the second wing (19"), for bring the third wing (19'") into contact with the seventh panel (20') and to form a respective lateral box wall (19) of the lid (11), with the first wing (19') and second wing (19") inclined with respect to each other.

2. A packing method according to Claim 1, wherein the blank (23) comprises an eighth panel (20") connected to the seventh panel (20') along a transverse fold line (28), a ninth panel (20'") connected to the eighth panel (20") along a transverse fold line (28), and a tenth panel (20"") connected to the ninth panel (20'") along a transverse fold line (28); the packing method comprising the further steps:

applying a third glue (58), by means of a third gumming device (57), between the ninth panel (20'") and the tenth panel (20""); and
folding, by means of a third folding device (59), the ninth panel (20'") with respect to the tenth panel (20"") for superimposing the ninth panel (20'") onto the tenth panel (20""), before folding the fifth panel (18') with respect to the fourth panel (17'), so that the tenth panel (20"") superimposed with the ninth panel (20'") rests on the third panel (15') when the fifth panel (18') is folded with respect to the fourth panel (17').

3. A packing method according to Claim 2, wherein the seventh, eighth, ninth and tenth panels (20', 20", 20'", 20"") form a connecting tab (20) connecting the top wall (17) of the lid (11) to a rear wall of a further container, which is placed on the third panel (15') of the blank (23).

4. A packing method according to one of Claims 1 to 3, and comprising the further step of keeping the fourth panel (17') and the seventh panel (20') pressed together by means of a first pressure device (64) located downstream from the first folding device (63).

5. A packing method according to one of Claims 1 to 4 and comprising the further step of keeping each third wing (19'") and the seventh panel (20') pressed together by means of a second pressure device (68) located downstream from the second folding device (67).

6. A packing method according to one of Claims 1 to 5, wherein the first folding device (63) comprises a counter body, around which the fifth panel (18') and sixth panel (18") are folded to form the front box wall (18) of the lid (11).

7. A packing method according to one of Claims 1 to 6, wherein the second folding device (67) comprises two counter bodies, around each of which the first wing (19') and second wing (19') are folded to form the corresponding lateral box wall (19) of the lid (11).

8. A packing unit (33) for folding a blank (23) from which to form a container (4) in such a manner as to form a front box wall (18) and two lateral box walls (19) of a hinged lid (11) of the container (4);
the blank (23) has two longitudinal fold lines (27) and a plurality of transverse fold lines (28) that define, between the two longitudinal fold lines (27), a first panel (14') forming a front wall (14) of the container (4), a second panel (13') forming a bottom wall (13) of the container (4), a third panel (15') forming a rear wall (15) of the container (4), a fourth panel (17') forming a top wall (17) of the lid (11), a fifth panel

(18') forming an outer portion of the front box wall (18) of the lid (11), a sixth panel (18") forming an inner portion of the front box wall (18) of the lid (11) and a seventh panel (20');
the fourth panel (17') has two lateral appendices, which are located on opposite sides of the fourth panel (17'), are separated from the fourth panel (17') by the longitudinal fold lines (27), and each comprise a first wing (19') forming an outer portion of a respective lateral box wall (19) of the lid (11), a second wing (19") forming an inner portion of the lateral box wall (19) of the lid (11) and a third wing (19'"); the packing unit (33) comprising:

a first gumming device (61) for applying a first glue (62) between the fourth panel (17') and the seventh panel (20');
a first folding device (63) for simultaneously folding the fifth panel (18') with respect to the fourth panel (17'), the sixth panel (18") with respect to the fifth panel (18'), and the seventh panel (20') with respect to the sixth panel (18"), for bring the seventh panel (20') into contact with the fourth panel (17') and to form the front box wall (18) of the lid (11), with the fifth panel (18') and the sixth panel (18") inclined with respect to each other;
a second gumming device (65) for applying a second glue (66) between each third wing (19'") and the seventh panel (20'), which is superimposed on and glued to the fourth panel (17'); and
a second folding device (67) for simultaneously folding on each lateral appendix of the fourth panel (17'), the first wing (19') with respect to the fourth panel (17'), the second wing (19") with respect to the first wing (19'), and the third wing (19'") with respect to the second wing (19"), for bring the third wing (19'") into contact with the seventh panel (20') and to form a respective lateral box wall (19) of the lid (11), with the first wing (19') and second wing (19") inclined with respect to each other.

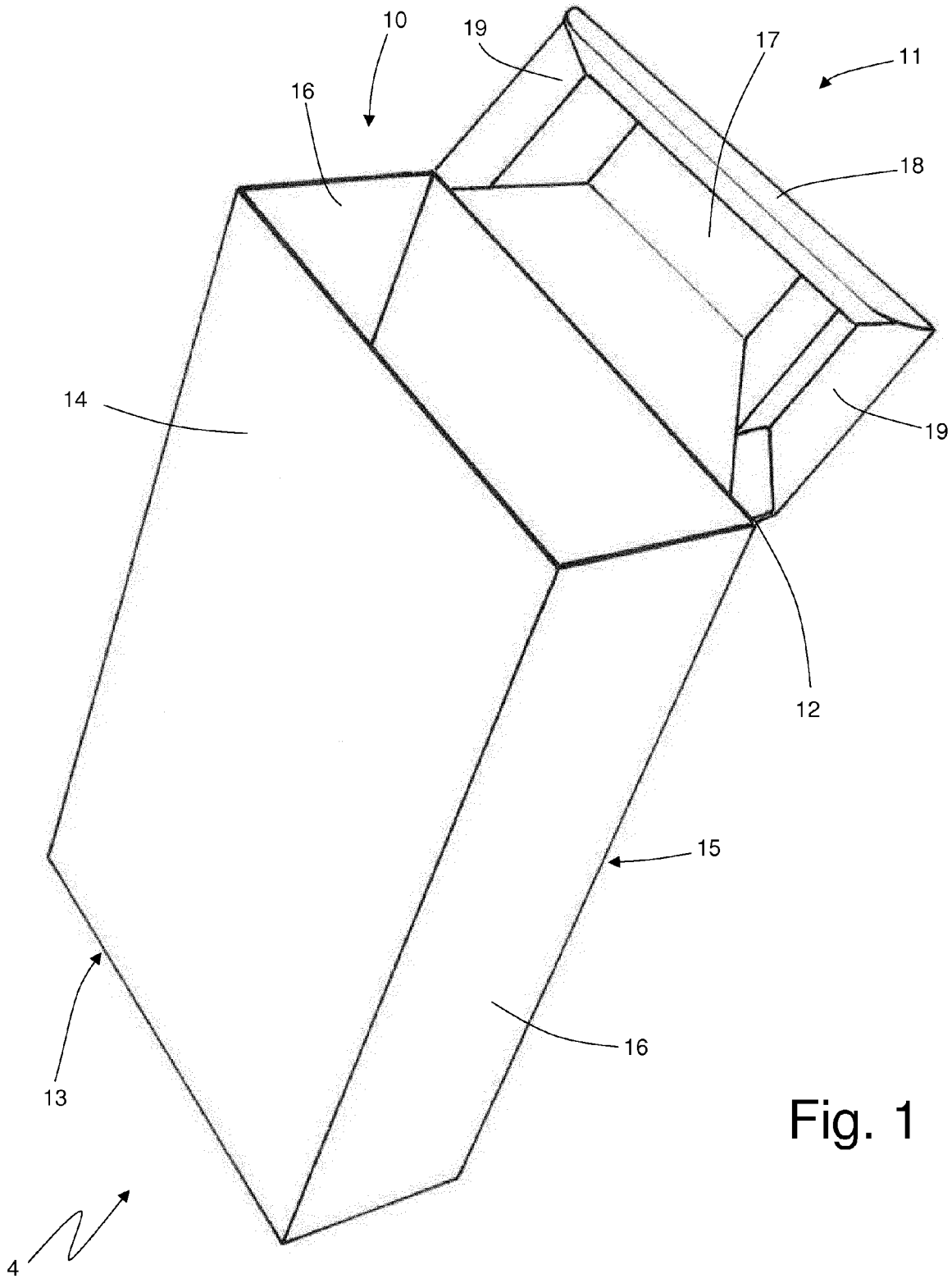

Fig. 1

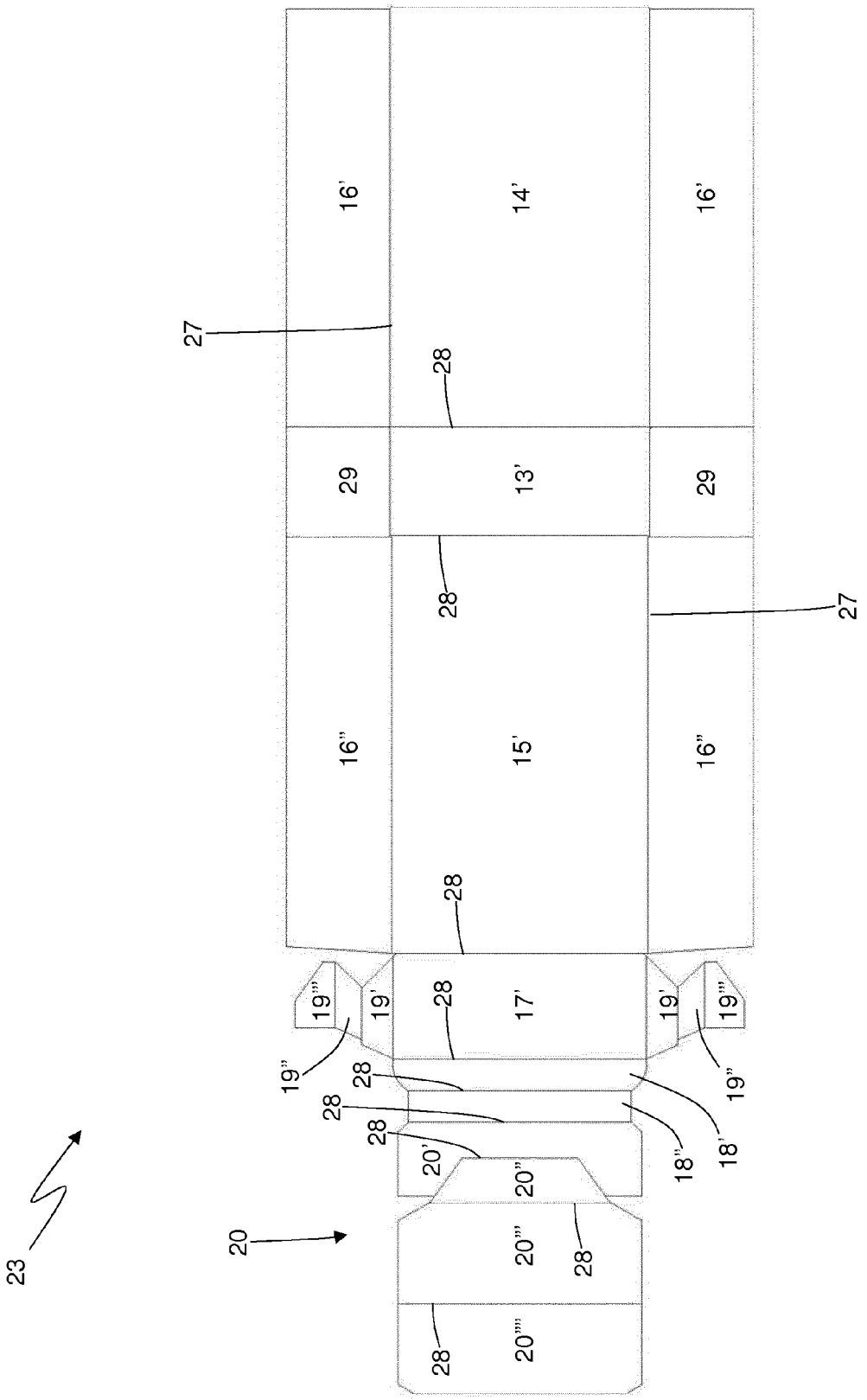
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Fig. 2

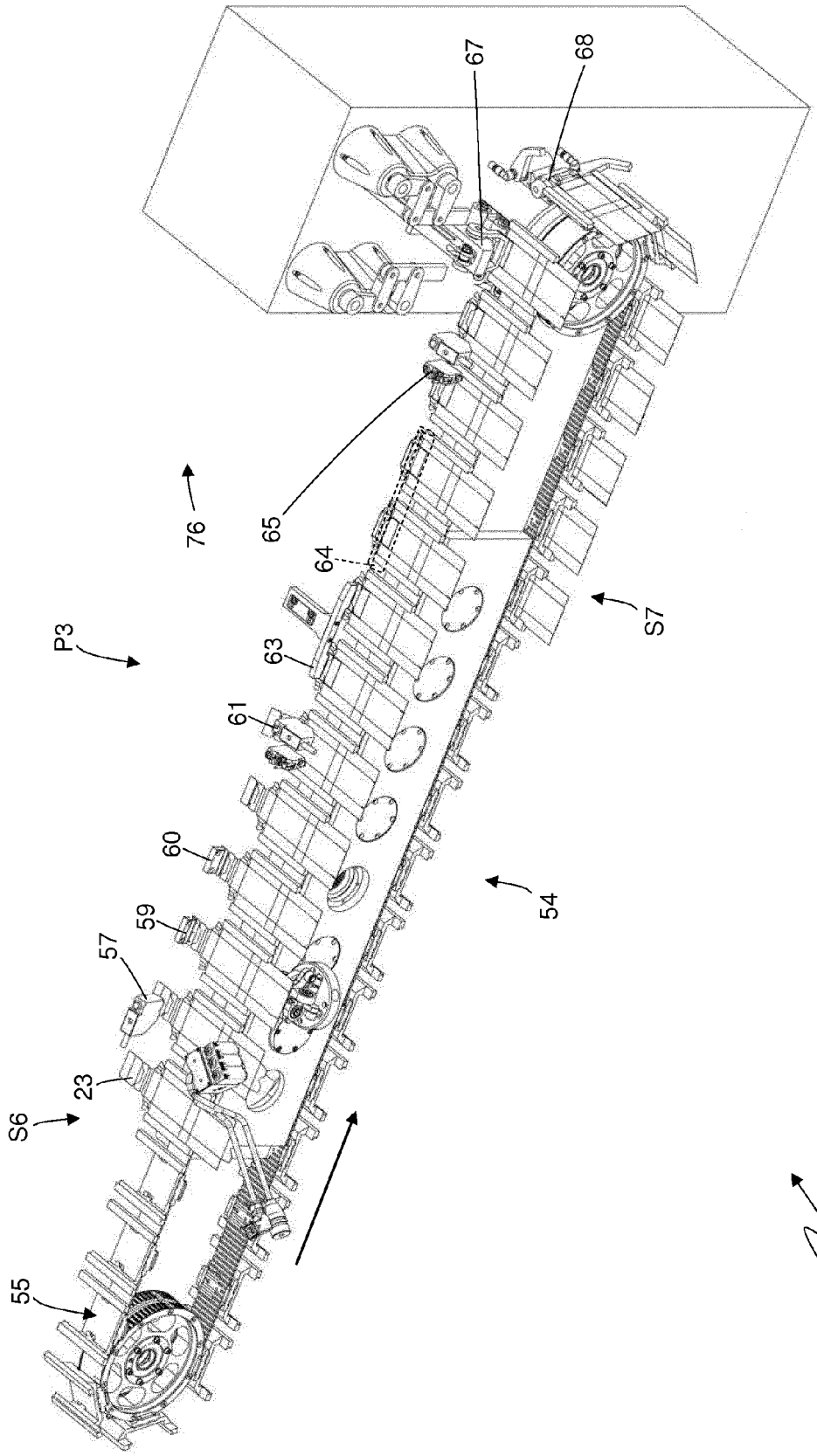

Fig. 3

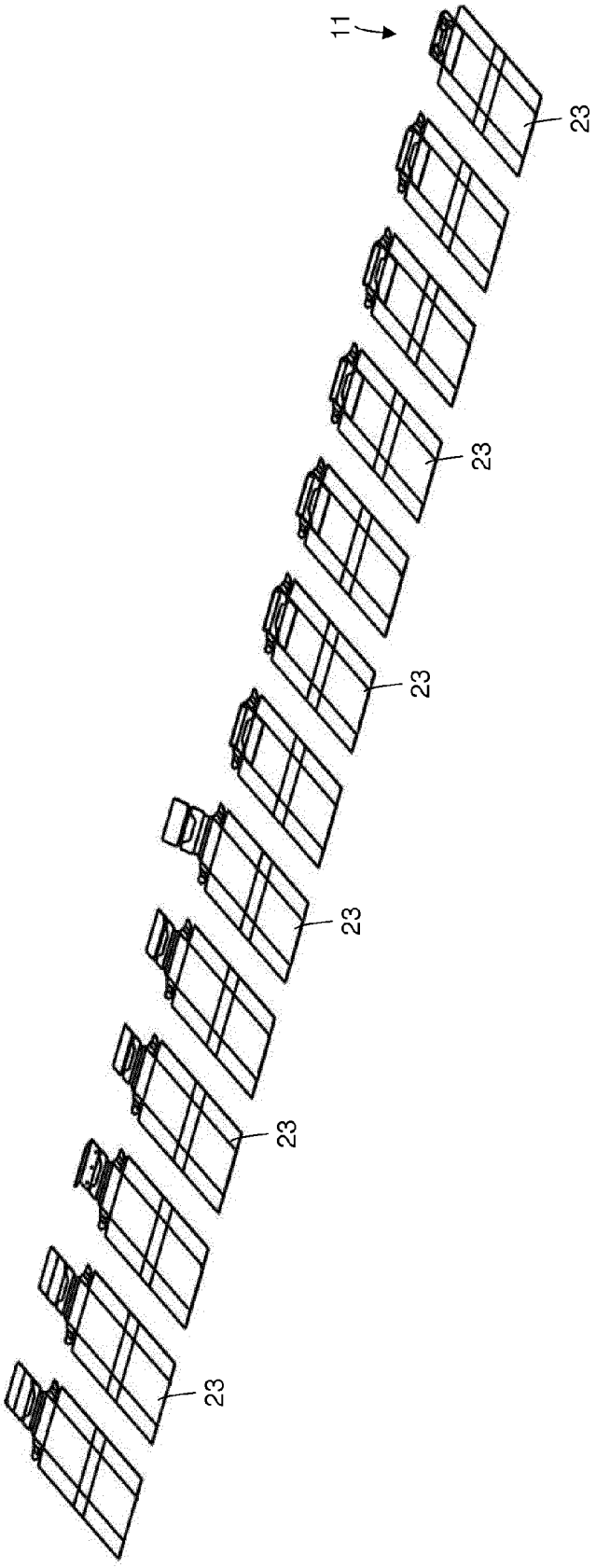

Fig. 4

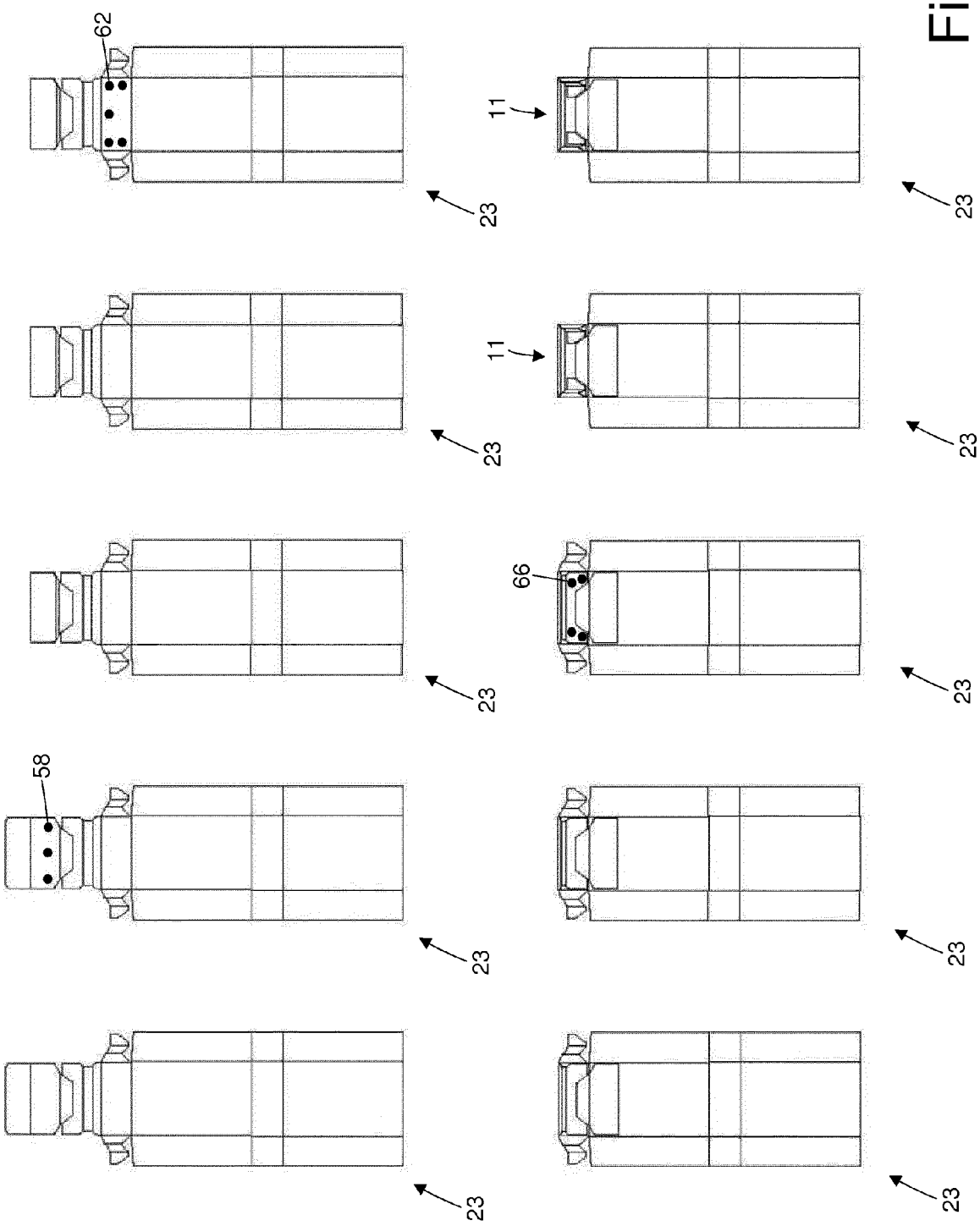

Fig. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 13 15 2954

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	EP 2 325 093 A1 (IMP TOBACCO LTD [GB]) 25 May 2011 (2011-05-25)	1,4-8	INV. B65B19/22
A	* paragraph [0045]; figures 1a,1b,2a *	2,3	B65D5/66 B65D85/10
Y	US 2011/041463 A1 (SQUARZONI MICHELE [IT] ET AL) 24 February 2011 (2011-02-24) * abstract; figure 5 *	1,4-8	B65B51/02
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TECHNICAL FIELDS SEARCHED (IPC)

B65B
B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	6 May 2013	Schelle, Joseph

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
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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

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1

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 13 15 2954

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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06-05-2013

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