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

(11) **EP 4 134 318 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
15.02.2023 Bulletin 2023/07

(21) Application number: **21190298.6**

(22) Date of filing: **09.08.2021**

(51) International Patent Classification (IPC):
B65D 5/20 *(1968.09)* ***B65D 85/36*** *(1968.09)*
B65D 5/36 *(1968.09)* ***B65D 5/42*** *(1968.09)*

(52) Cooperative Patent Classification (CPC):
B65D 5/2042; B65D 5/3607; B65D 5/4204; B65D 85/36

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(71) Applicant: **Coveris Flexibles UK Limited**
Spalding, Lincolnshire PE11 3ZN (GB)

(72) Inventor: **NEALE, Steven**
Spalding, PE11 3ZN (GB)

(74) Representative: **Ayre, Nicola Unity**
Withers & Rogers LLP
2 London Bridge
London SE1 9RA (GB)

(54) **A CARTON**

(57) According to a first aspect of the present teachings there is provided a partially-assembled carton for the sealed containment of food, the partially-assembled carton comprising a base panel and a rear panel, wherein the base panel and the rear panel are substantially rectangular; and a first side panel extending between the base panel and the rear panel and a second side panel extending between the base panel and the rear panel, wherein the first and second side panels are substantially triangular. At least one of the base panel, the rear panel, the first side panel and the second side panel comprises a first portion hingedly connected to another one of the base panel, the rear panel, the first side panel and the second side panel, and a second portion hingedly connected to a further one of the base panel, the rear panel, the first side panel and the second side panel. The first portion and the second portion are joined to one another at a first seam. The first seam is adhesively secured.

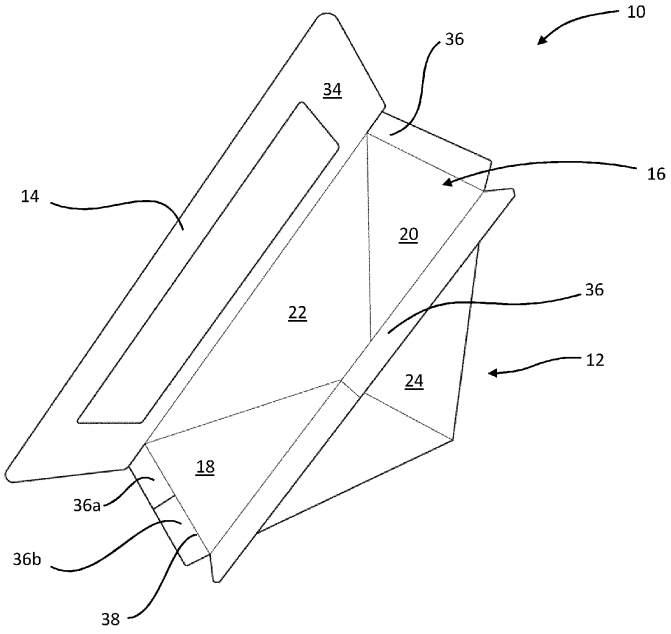

Fig. 1

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Description

FIELD

[0001] The present teachings relate to a partially-assembled carton for the sealed containment of food, and to a method of forming a partially-assembled carton for the sealed containment of food from a blank.

BACKGROUND

[0002] Cartons made from paperboard material for packaging triangular cut sandwiches are well known, and are widely used for sandwiches sold in supermarkets, cafes and convenience food outlets. The board is readily printed so that the sandwich is attractively presented on the shelf, and the packs are relatively low cost and user friendly for the consumer.

[0003] Where such a carton is intended to keep food fresh for some time, i.e. more than a few hours, the carton may be sealable. Such a sealable carton usually has a triangular-prism shaped body to hold the sandwich and a lid for sealing to the body once the body has been filled. It is common for such a sealable carton to be provided by the manufacturer in a partially-assembled form, i.e. with some panels folded and secured in place, but with the lid still openable. The partially-assembled carton is usually folded flat for ease and efficiency of transport. Once transported the partially-assembled carton is erected ready for filling. Once filled, e.g. with a sandwich, the lid is sealed to the body.

[0004] The lid must be sealed or hinged to the body on all sides to protect the food held therein. Typically a series of flanges is used to seal the lid to the body. The lid and/or the flanges conventionally include a cut (e.g. a perforated line) whereby contents of the carton can be accessed by a consumer tearing the lid away from the body.

[0005] Once sealed, such a carton can keep a sandwich fresh and in a safely edible condition for a number of days. In order to increase the shelf-life of a sandwich, cartons are known to be hermetically sealed, i.e. airtight, preventing air or other gases moving between the interior and exterior of the carton. A modified atmosphere can then be used to further extend the shelf-life of the contents of the carton, as is well known. That is, the oxygen level of the interior of the carton can be reduced, and replaced with an elevated level of an atmosphere that will prolong the shelf-life of the carton, e.g. elevated C02.

[0006] A paperboard carton with a triangular-prism shaped body for holding a sandwich can be difficult to hermetically seal. Such cartons are often made up of folded panels of paperboard forming a body, the body having a peripheral flange for the sealing of a lid. The paperboard is commonly laminated with a film, so that heat sealed seams can be formed between the joins of the panels and between the flange and the lid.

[0007] The geometry of such a carton, i.e. the folds and joins required to form the triangular-prism shaped body from the panels, make it difficult to provide a fully sealed carton. In particular, leaks can form or air holes can be left at corners of the carton. Any such air holes can lead to escape of the modified atmosphere, so that oxygen levels within the interior of the carton return to normal, i.e. atmosphere conditions, and the modified atmosphere is lost, resulting in decreased shelf-life of the contents of the carton.

[0008] The present teachings seek to overcome or at least mitigate the problems of the prior art.

SUMMARY

[0009] According to a first aspect of the present teachings there is provided a partially-assembled carton for the sealed containment of food, the partially-assembled carton comprising a base panel and a rear panel, wherein the base panel and the rear panel are substantially rectangular; and a first side panel extending between the base panel and the rear panel and a second side panel extending between the base panel and the rear panel, wherein the first and second side panels are substantially triangular. At least one of the base panel, the rear panel, the first side panel and the second side panel comprises a first portion hingedly connected to another one of the base panel, the rear panel, the first side panel and the second side panel, and a second portion hingedly connected to a further one of the base panel, the rear panel, the first side panel and the second side panel. The first portion and the second portion are joined to one another at a first seam. The first seam is adhesively secured.

[0010] The formation of the seam at a panel rather than elsewhere on the carton, e.g. at a flange, allows the seam to be formed by adhesive rather than simply by heat sealing, as the panel provides the required space for adhesive sealing. A better seal can be formed, improving ease of producing a hermetic seal, and reducing the likelihood of leakage of modified atmosphere once the carton has been filled and sealed. Securing the first and second portions of a panel to one another to create a seam advantageously minimises the material used, so reducing transport costs and the amount of material used whilst providing sealing.

[0011] In exemplary embodiments, the base panel or the rear panel comprises the first portion and the second portion.

[0012] Formation of the adhesive seam at one of the rectangular panels improves ease of manufacture of the partially-assembled carton, as well as optimising sealing.

[0013] In exemplary embodiments, the second portion comprises an overlap portion, and the first portion overlies the overlap portion.

[0014] The overlap arrangement of the first and second portions allows adhesive to be used to secure the first seam. Effective sealing is provided whilst allowing a flat panel to be formed.

[0015] In exemplary embodiments, the partially-assembled carton comprises a second seam, and the sec-

ond seam is heat sealed.

[0016] The combination of adhesive and heat sealed seams allows optimum sealing whilst minimising the material used.

[0017] In exemplary embodiments, said at least one of the base panel, the rear panel, the first side panel and the second side panel that comprises the first portion and the second portion further comprises a first flange, and a further one of the base panel, the rear panel, the first side panel and the second side panel comprises a second flange. The second seam is between the first flange and the second flange.

[0018] The combination of an adhesive seam and a heat-sealed seam in the most appropriate locations optimises sealing of the carton.

[0019] In exemplary embodiments, the base panel or the rear panel comprises the first portion and the second portion, and the other of the base panel or the rear panel comprises the second seam.

[0020] In exemplary embodiments, the first flange and the second flange extend outwardly in relation to an interior of the partially-assembled carton.

[0021] The first and second flanges extending outwardly provides a secure seam that can easily be heat sealed. The resulting outwardly extending second seam advantageously stabilises the erected carton.

[0022] In exemplary embodiments, the partially-assembled carton further comprises a front panel.

[0023] The front panel provides a lid for sealing the carton once erected and filled.

[0024] In exemplary embodiments, the front panel is hingedly connected to the first side panel or the second side panel,

[0025] The front panel being hingedly connected to one or other of the side panels conveniently keeps the front panel attached to the remainder of the carton during transport.

[0026] In exemplary embodiments, the front panel defines a window.

[0027] The window allows the contents of the carton to be displayed.

[0028] In exemplary embodiments, the partially assembled carton is of paperboard laminated with a barrier film configured for use with modified atmosphere packaging.

[0029] According to a further aspect there is provided a blank for forming a partially-assembled carton as described above.

[0030] According to yet a further aspect there is provided a method of forming a partially-assembled carton as described above from a blank, the method comprising the steps of:

a) providing a blank as described above;

b) applying adhesive to the second portion at a seam region;

c) folding the first portion to meet the second portion at the seam region; and

d) applying pressure to the seam region to form a first seam.

[0031] In exemplary embodiments, the method further comprises the step of:

e) heat sealing opposing faces of the blank to form a second seam.

[0032] In exemplary embodiments, step e) succeeds steps a) to d), and the method further comprises the steps of:

f) before step b), orienting the blank in a first orientation for the application of adhesive; and

g) after step d) and before step e), orienting the blank in a second orientation for heat sealing.

[0033] There is also provided a method of forming a partially-assembled carton for the sealed containment of food from a blank, the method comprising the steps of:

a) providing a blank comprising a base panel and a rear panel, wherein the base panel and the rear panel are substantially rectangular; and a first side panel between the base panel and the rear panel and a second side panel between the base panel and the rear panel, wherein the first and second side panels are substantially triangular;

b) applying adhesive to a first seam region of the blank;

c) folding the blank such that a second seam region meets the first seam region;

d) applying pressure to the seam region to form a first seam; and

e) heat sealing opposing faces of the blank to form a second seam.

[0034] The combination of adhesive sealing and heat sealing allows optimal sealing of the carton.

[0035] The preferred method of sealing of a seam can be selected for each seam location.

[0036] In exemplary embodiments, the method further comprises the steps of:

f) before step b), orienting the blank in a first orientation for the application of adhesive; and

g) after step d) and before step e), orienting the blank in a second orientation for heat sealing.

[0037] In exemplary embodiments, steps b) to d) take place in a single pass of the blank through a process

station.

[0038] Advantageously, performing steps b) to d) in a single pass increases efficiency of the manufacturing process.

[0039] In exemplary embodiments, steps b) to d) take place in a first pass of the blank through a die station, and step e) takes place in a second pass of the blank through a die station.

[0040] There is further provided a press apparatus configured to perform one or both of the methods described above.

BRIEF DESCRIPTION OF THE DRAWINGS

[0041]

Figure 1 is a perspective view of a partially-assembled carton for the sealed containment of food according to an embodiment, with a lid in an open position;

Figure 2 is a perspective view of the carton of the embodiment of Figure 1 in a fully assembled condition, with the lid in a closed position;

Figure 3 is a plan view of a blank for the carton of Figures 1 and 2;

Figure 4 is a plan view of the blank of Figure 3 after a first stage of assembly;

Figure 5 is a plan view of the blank of Figures 3 and 4 after a second stage of assembly;

Figure 6 is a rear view of the fully assembled carton of Figure 2;

Figure 7 is a side view of the fully assembled carton of Figures 2 and 6;

Figure 8 is a schematic view of a press apparatus for the production of the blank of Figure 3; and

Figure 9 is a schematic view of an apparatus for the partial assembly of the blank of Figure 3.

DETAILED DESCRIPTION

[0042] With reference to Figure 1, a partially-assembled carton for the sealed containment of food is indicated generally at 10. The carton is of the triangular-prism shaped type, for receiving a triangular sandwich. The carton 10 has a triangular-prism shaped body 12 defining a cavity 16 in which food is received. Once fully assembled, the carton 10 will be as shown in Figure 2, with a lid 14 sealed over the cavity 16. The carton 10 is a modified atmosphere pack, i.e. intended for hermetic sealing so that the atmosphere within the cavity 16 can be controlled as described above.

[0043] The carton 10 has a base panel 18 and a rear panel 20. The base panel 18 and the rear panel 20 are in this embodiment interchangeable, as either of the base panel 18 and the rear panel 20 could be at the base of the fully assembled carton 10. The base panel 18 and the rear panel 20 are substantially rectangular.

[0044] The carton 10 has a first substantially triangular side panel 22 and a second substantially triangular side panel 24. The first and second side panels 22, 24 extend between opposite sides of the base panel 18 and the rear panel 20, to form the triangular prism shape of the body 12.

[0045] At least one of the base panel 18, the rear panel 20, and the first and second side panels 22, 24 is made up of first and second portions joined to create that panel 18, 20, 22 or 24. Each of the first and second portions is hingedly connected, i.e. connected at a fold line, to another of the panels 18, 20, 22, 24.

[0046] Figure 3 shows a blank 11 of the carton 10, prior to partial assembly. As shown in Figure 3, in this embodiment, the base panel 18 is formed of a first portion 18a and a second portion 18b. The first portion 18a is hingedly connected to the first side panel 22 at a fold line 23. The second portion 18b is hingedly connected to the second side panel 24 at a fold line 25.

[0047] With reference to Figure 5, when the carton 10 is partially assembled, the first portion 18a and the second portion 18b are joined to one another to form a first seam 26. That is, the first portion 18a and the second portion 18b are directly connected to one another without the intervention of some further part of the carton 10. Advantageously, this arrangement minimises the amount of material used, keeping cost down and keeping the carton as lightweight as possible.

[0048] The first portion 18a and the second portion 18b are secured to one another by adhesive. In this embodiment, the adhesive is a hot melt type of adhesive, for example as produced by Henkel Limited of Hemel Hempstead, UK. In alternative embodiments, some other suitable adhesive is used.

[0049] The carton 10 of this embodiment is of a flexible substrate laminated with a film. In this embodiment, the flexible substrate is paperboard. In this embodiment, the film is a film suitable for modified atmosphere packaging. For example, in this embodiment, the film is a polypropylene/polyethylene co-extruded film with an ethyl vinyl alcohol barrier. The film is a blown film, advantageously providing a natural stretch. In alternative embodiments, the film is of some other type suitable for modified atmosphere packaging.

[0050] For the creation of the first seam 26, adhesive is applied to the blank 11 in addition to the existing paperboard and film laminate, as described in further detail below. That is, an additional adhesive is used as well as any adhesive that may be used in lamination of the film to the paperboard substrate.

[0051] The use of an adhesive, rather than relying on

a heat sealed seam, effectively creates the required hermetic seal. In particular, where the first seam is pressed (as will be described in further detail below) to flatten and tighten the seam, air gaps can be avoided and an effective seam produced.

[0052] In this embodiment, as shown in Figure 5, the first portion 18a and the second portion 18b overlie one another to create a flat first seam 26. The first portion 18a or the second portion 18b has an overlap portion or seam portion 18c where the first portion 18a and the second portion 18b overlap one another. In this embodiment, the second portion 18b includes the overlap portion 18c. In alternative embodiments, the first portion includes an overlap portion.

[0053] In addition to the adhesive first seam 26, the carton 10 has in this embodiment a second seam 28. The second seam 28 is heat sealed. This combination of adhesive and heat sealing in suitable places on the carton allows effective hermetic sealing to be provided.

[0054] The rear panel 20 has a first end 21 at which the rear panel 20 joins the base panel 18, as shown in Figures 6 and 7. The rear panel first end 21 has a peripheral flange 30. The base panel 18 has a first end 19 that meets the rear panel first end 21 when the carton 10 is partially assembled. The base panel first end 19 has a peripheral flange 32. In this embodiment, where the base panel 18 is formed of first and second panels 18a and 18b, the base panel flange 32 is formed of first and second flange portions 32a, 32b. When the carton 10 is in the partially assembled state shown in Figure 1 (or in the fully assembled state shown in Figures 6 and 7) the base panel flanges 32a, 32b come together as shown in Figure 6 to form the flange 32.

[0055] In this embodiment, the second seam 28 is formed between the rear panel flange 30 and the base panel flange 32. A tab 27 of film extends from the overlap portion 18c adjacent the second flange portion 32b, and aids sealing.

[0056] As shown in Figure 5, the second seam 28 extends outwardly from the base panel 18, so can easily be accessed for heat sealing. That is, the rear panel flange 30 and the base panel flange 32 extend outwardly in relation to the cavity 16 of the carton 10.

[0057] The combination of the adhesively secured first seam 26 between the first and second portions 18a, 18b of the base panel, and the heat sealed seam 28 between the base panel 18 and the rear panel 20, provide thorough sealing of the body 12 of the carton 10.

[0058] As the flanges 30, 32 extend outwardly from the body 12 of the carton 10, additional stability of the carton 10 once fully assembled is provided.

[0059] The carton of this embodiment includes a front panel 34 for sealing over the body 12 as the lid 14 once the carton 10 is filled. The body 12 has a peripheral flange 36 extending around an opening of the cavity 16, to which the front panel 34 is sealed. The flange 36 includes a series of notches 37 removed from the paperboard to allow folding of the flange 36. Film is left in place at the notches 37 to ensure sealing of the front panel 34 to the flange 36.

[0060] In this embodiment, where the base portion 18 is made up of first and second portions 18a, 18b, the peripheral flange 36 for the front panel is provided in two parts 36a, 36b. The two flange parts 36a, 36b are of corresponding shape and dimensions so as to provide a full peripheral flange 36 along an outer edge 38 of the base panel 18. A further tab 27 of film extends from the overlap portion 18c adjacent the second flange part 36b, and aids sealing.

[0061] In this embodiment, the front panel 34 is hingedly connected to one of the side panels 22, 24. In this embodiment, in shown in Figure 1, the front panel 34 is hingedly connected to the first side panel 32. In alternative embodiments, the front panel is unattached to the body. In alternative embodiments, the front panel is hingedly connected to another one of the side panels, or to the rear panel, or to the base panel.

[0062] The partially assembled carton is produced as follows, with reference to Figures 4, 5 and 8. A web 40 of paperboard from which each blank 11 is to be cut is provided. The web 40 is run from a reel 42 through one or more print units 44 where a desired design is printed on the web 40. After each print unit 44 the paperboard is passed under a UV lamp 46, for curing each printed design.

[0063] The paperboard 40 is then passed through a first die station 48 for a first cut of each blank 11 to be made. For example, in this embodiment, an aperture 50 for a window is cut at the first die station 48. In addition, the notches 37 are cut from the peripheral flange 36 at the first die station 48. Fold lines are formed as required, for example by a cut part way through the web or by perforated lines.

[0064] The paperboard 40 is then passed through a lamination station 52, where lamination of a film 54 to the paperboard takes place. In this embodiment, the film 54 is secured to the paperboard 40 by a UV cured adhesive. UV curing of the resulting laminate 55 takes place at a curing station 56.

[0065] The web of laminate 55 is then passed through a second die station 58 where an outline cut is made to cut each blank 11 from the web. Exposed portions of film are cut at this stage, along with the outline of the blank 11. That is, some cuts are made through the depths of the paperboard only, rather than the full depth of the laminate, to leave exposed portions of film without corresponding paperboard at the notches 37 and the tabs 27.

[0066] Each blank 11 is passed to a delivery belt 60 and stacked ready for partial assembly.

[0067] In the next stage of the process, shown in Figure 9, the blank 11 is passed through a series of process stations to be folded, glued and heat sealed to form the partially assembled carton 10.

[0068] A first stage of partial assembly is shown in Figure 4. In this first stage, the blank 11 is folded along a fold line 62 defined in the second side panel 24. In this

embodiment, the fold line 62 substantially bisects the second side panel 24, extending from an apex of the substantially triangular shape to the centre of a long side of the triangular shape.

[0069] Folding of the blank 11 along the fold line 62 leads to folding over of the second portion 18b such that the film side of the second portion 18b is folded inwardly, so that the paperboard or outer side is exposed. Adhesive is then applied to the overlap portion or seam portion 18c of the second portion 18b.

[0070] In this embodiment, adhesive is applied in two lines 64 extending along the length of the rectangular overlap or seam portion 18c as shown in Figure 4. It has been found that the application of adhesive in such a format provides suitable hermetic sealing of the partially assembled carton 10. In alternative embodiments, adhesive is applied in some other suitable format. In an alternative embodiment, adhesive is applied in three or more lines.

[0071] Once adhesive has been applied, the blank 11 is folded along a further fold line 66 defined in the first side panel 22. In this embodiment, the fold line 66 substantially bisects the first side panel 22, extending from an apex of the substantially triangular shape to the centre of a long side of the triangular shape.

[0072] Folding the blank 11 along the further fold line 66, as shown in Figure 5, causes the first portion 18a to be brought over to meet the second portion 18b. As shown in Figure 5, the first portion 18a overlies the overlap or seam portion 18c. The seam portion 18c is shown in broken outline in Figure 5.

[0073] Folding and gluing of the blank 11 takes place at a folding and gluing station 70.

[0074] Once folded in this way, the partially assembled carton 10 is pressed at the seam portion 18c so that the first seam 26 is formed. In this embodiment, each partially assembled carton 10 is passed through a belt 72 in order to flatten and tighten the first seam 26. Any air gaps are removed during pressing of the seam portion 18c.

[0075] In an alternative embodiment, folding of the first portion 18a is carried out with a roller that applies pressure to the first seam 26 to flatten the adhesive and tighten the first seam 26. Advantageously, in this embodiment, folding of the first portion 18a at the fold line 66 and applying pressure to the seam 26 takes place in one pass, so speeding up the folding and gluing process.

[0076] Once the first seam 26 has been formed, the second seam 28 is formed by heat sealing. The flanges 30, 32 that form the second seam 28 are already aligned due to the previous folds at 62, 66, as shown in Figure 5. The partially assembled carton 10 is passed through heat seal heads of a heat seal unit 74 to form the heat sealed second seam 28.

[0077] In this embodiment, on the press apparatus as shown in schematic form in Figure 9, the partially assembled carton 10 is reoriented between the formation of the first seam 26 and the formation of the second seam 28, i.e. between stations 72 and 74. Reorientation take place so that the partially assembled carton 10 is correctly positioned for heat sealing of the second seam 28.

[0078] In the alternative embodiment described above, where folding of the first portion is carried out with a roller simultaneously with pressure being applied to the first seam 26, the partially assembled carton 10 is reoriented after formation of the first seam 26 and before formation of the second seam by heat sealing, to correctly position the partially assembled carton for heat sealing.

[0079] Advantageously, forming a first, adhesive, seam and a second, heat sealed, seam in separate operations allows the first seam to be tightly formed, and the flanges 30, 32 to be placed in the optimal position for sealing.

[0080] In an alternative embodiment, the second seam 28 is formed with adhesive, rather than by heat sealing.

Claims

1. A partially-assembled carton for the sealed containment of food, the partially-assembled carton comprising:

   a base panel and a rear panel, wherein the base panel and the rear panel are substantially rectangular; and
   a first side panel extending between the base panel and the rear panel and a second side panel extending between the base panel and the rear panel, wherein the first and second side panels are substantially triangular;
   wherein at least one of the base panel, the rear panel, the first side panel and the second side panel comprises a first portion hingedly connected to another one of the base panel, the rear panel, the first side panel and the second side panel, and a second portion hingedly connected to a further one of the base panel, the rear panel, the first side panel and the second side panel;
   wherein the first portion and the second portion are joined to one another at a first seam; and
   wherein the first seam is adhesively secured.

2. The partially-assembled carton according to claim 1, wherein the base panel or the rear panel comprises the first portion and the second portion.

3. The partially-assembled carton according to claim 1 or claim 2, wherein the second portion comprises an overlap portion, and wherein the first portion overlies the overlap portion.

4. The partially-assembled carton according to any one of claims 1 to 3, wherein the partially-assembled carton comprises a second seam, and wherein the second seam is heat sealed.

5. The partially-assembled carton according to claim 4, wherein said at least one of the base panel, the rear panel, the first side panel and the second side panel that comprises the first portion and the second portion further comprises a first flange, and a further one of the base panel, the rear panel, the first side panel and the second side panel comprises a second flange; wherein the second seam is between the first flange and the second flange, preferably wherein the base panel or the rear panel comprises the first portion and the second portion, and the other of the base panel or the rear panel comprises the second seam, more preferably wherein the first flange and the second flange extend outwardly in relation to an interior of the partially-assembled carton.

6. The partially-assembled carton according to any one of claims 1 to 5, further comprising a front panel, preferably wherein the front panel is hingedly connected to the first side panel or the second side panel, more preferably wherein the front panel defines a window.

7. The partially-assembled carton according to any one of claims 1 to 6, wherein the partially assembled carton is of paperboard laminated with a barrier film configured for use with modified atmosphere packaging.

8. A blank for forming a partially-assembled carton according to any one of claims 1 to 7.

9. A method of forming a partially-assembled carton according to any one of claims 1 to 7 from a blank, the method comprising the steps of:

    a) providing a blank according to claim 8;
    b) applying adhesive to the second portion at a seam region;
    c) folding the first portion to meet the second portion at the seam region; and
    d) applying pressure to the seam region to form a first seam.

10. The method according to claim 9, further comprising the step of:
    e) heat sealing opposing faces of the blank to form a second seam.

11. The method according to claim 10, wherein step e) succeeds steps a) to d), and further comprising the steps of:

    f) before step b), orienting the blank in a first orientation for the application of adhesive; and
    g) after step d) and before step e), orienting the blank in a second orientation for heat sealing.

12. A method of forming a partially-assembled carton for the sealed containment of food from a blank, the method comprising the steps of:

    a) providing a blank comprising a base panel and a rear panel, wherein the base panel and the rear panel are substantially rectangular; and a first side panel between the base panel and the rear panel and a second side panel between the base panel and the rear panel, wherein the first and second side panels are substantially triangular;
    b) applying adhesive to a first seam region of the blank;
    c) folding the blank such that a second seam region meets the first seam region;
    d) applying pressure to the seam region to form a first seam; and
    e) heat sealing opposing faces of the blank to form a second seam.

13. The method according to claim 12, further comprising the steps of:

    f) before step b), orienting the blank in a first orientation for the application of adhesive; and
    g) after step d) and before step e), orienting the blank in a second orientation for heat sealing.

14. The method according to claim 12 or claim 13, wherein steps b) to d) take place in a single pass of the blank through a process station.

15. The method according to claim 13, wherein step e) takes place in a second pass of the blank through a die station.

16. A press apparatus configured to perform the method of any one of claims 9 to 15.

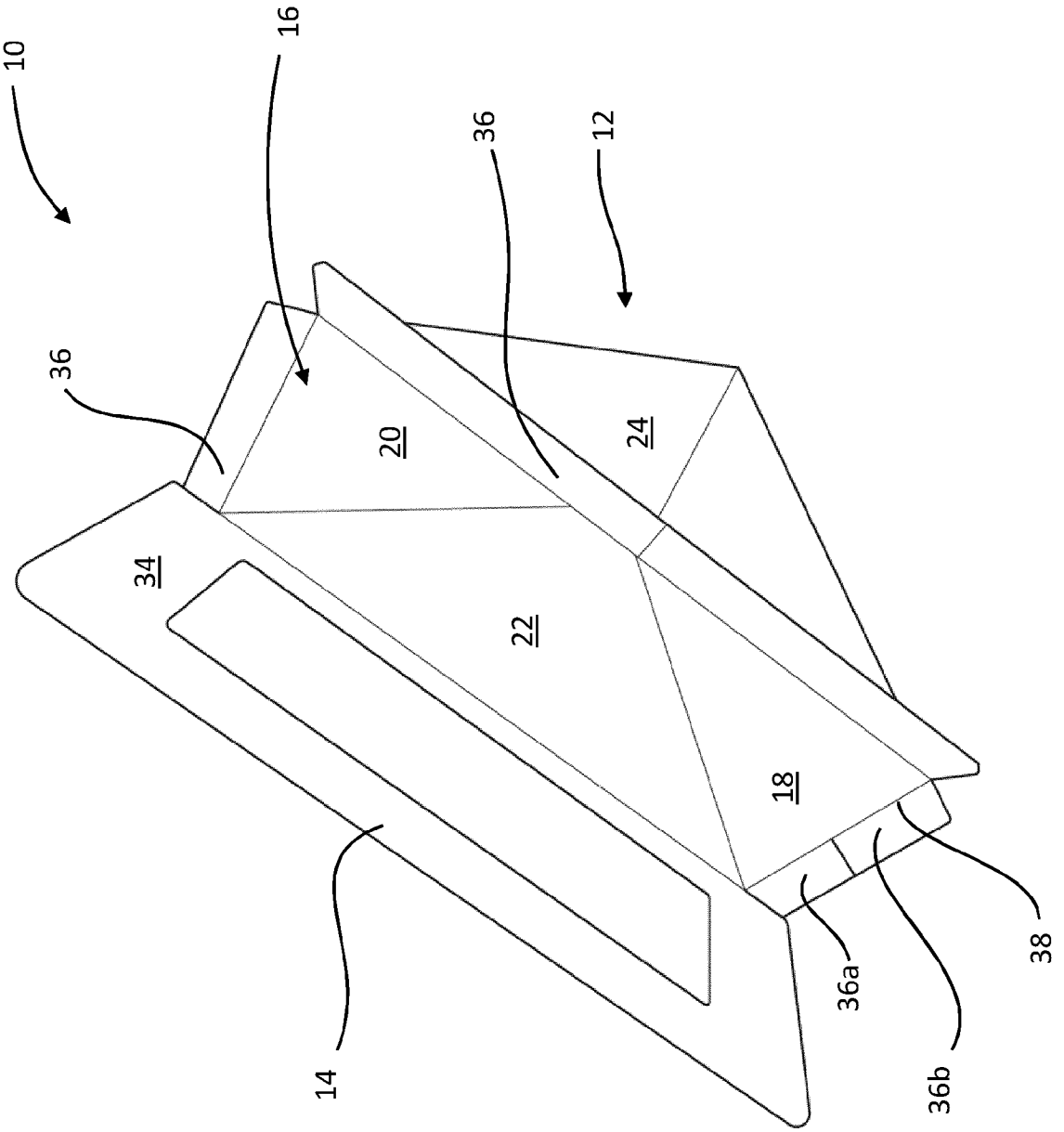

Fig. 1

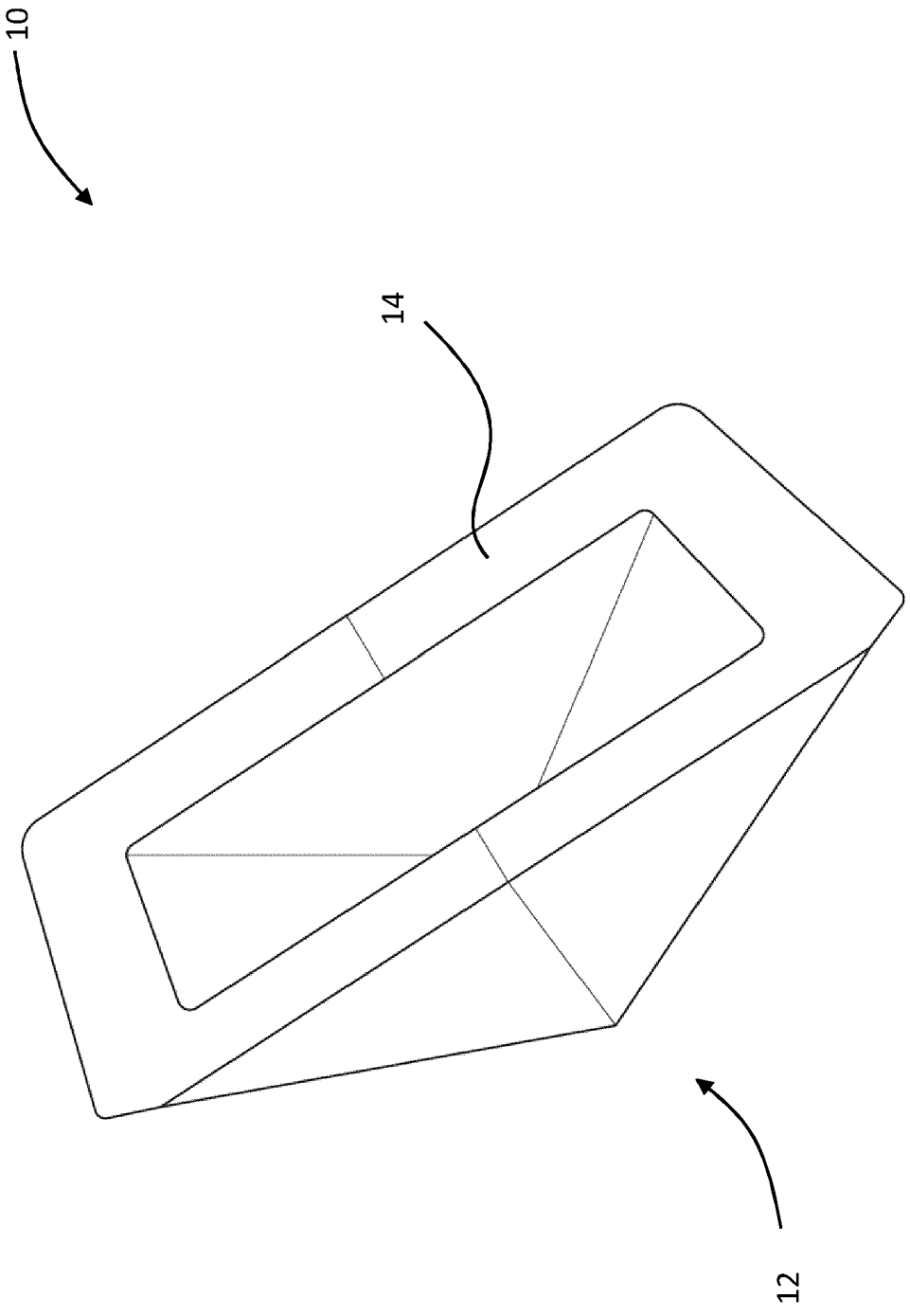

Fig. 2

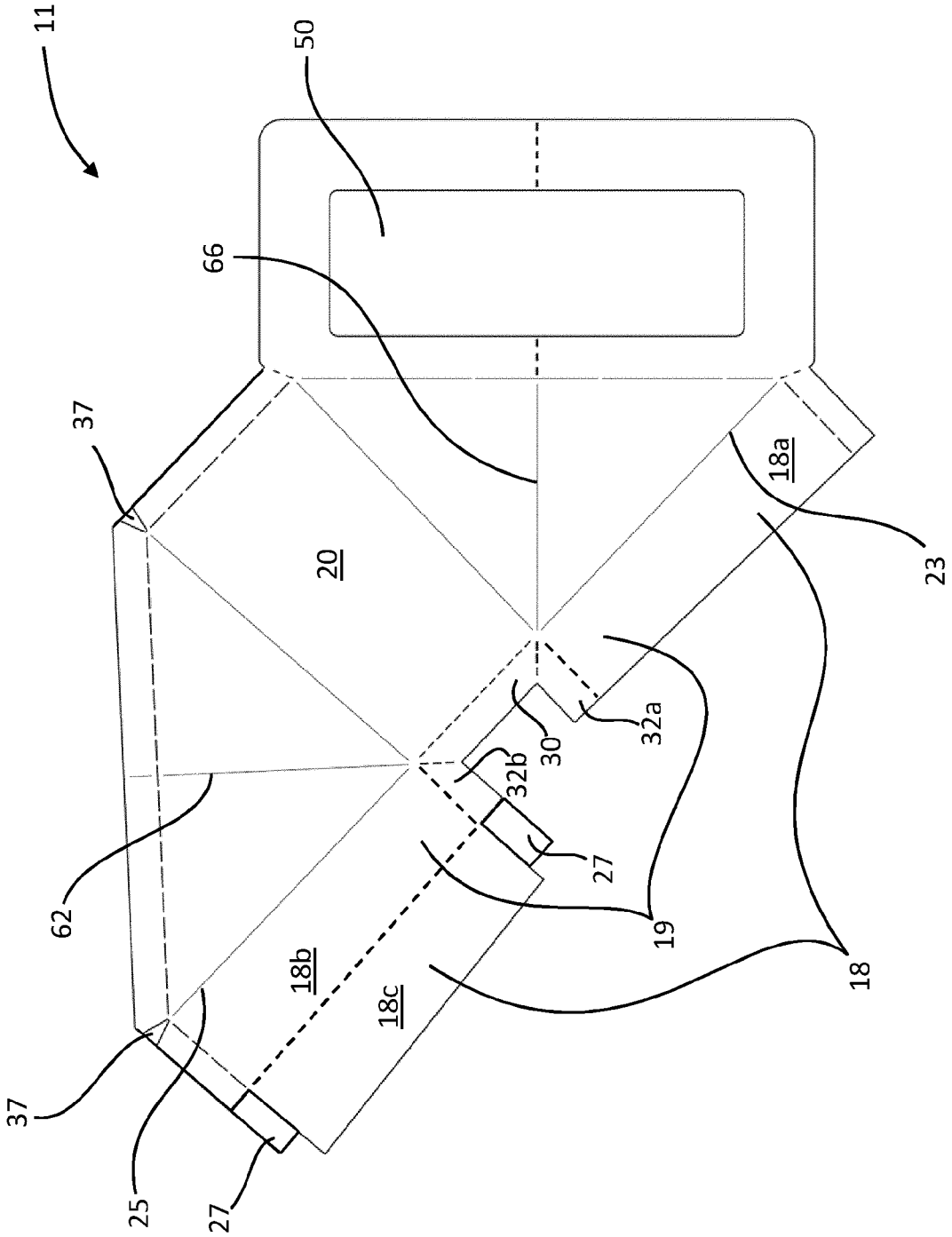

Fig. 3

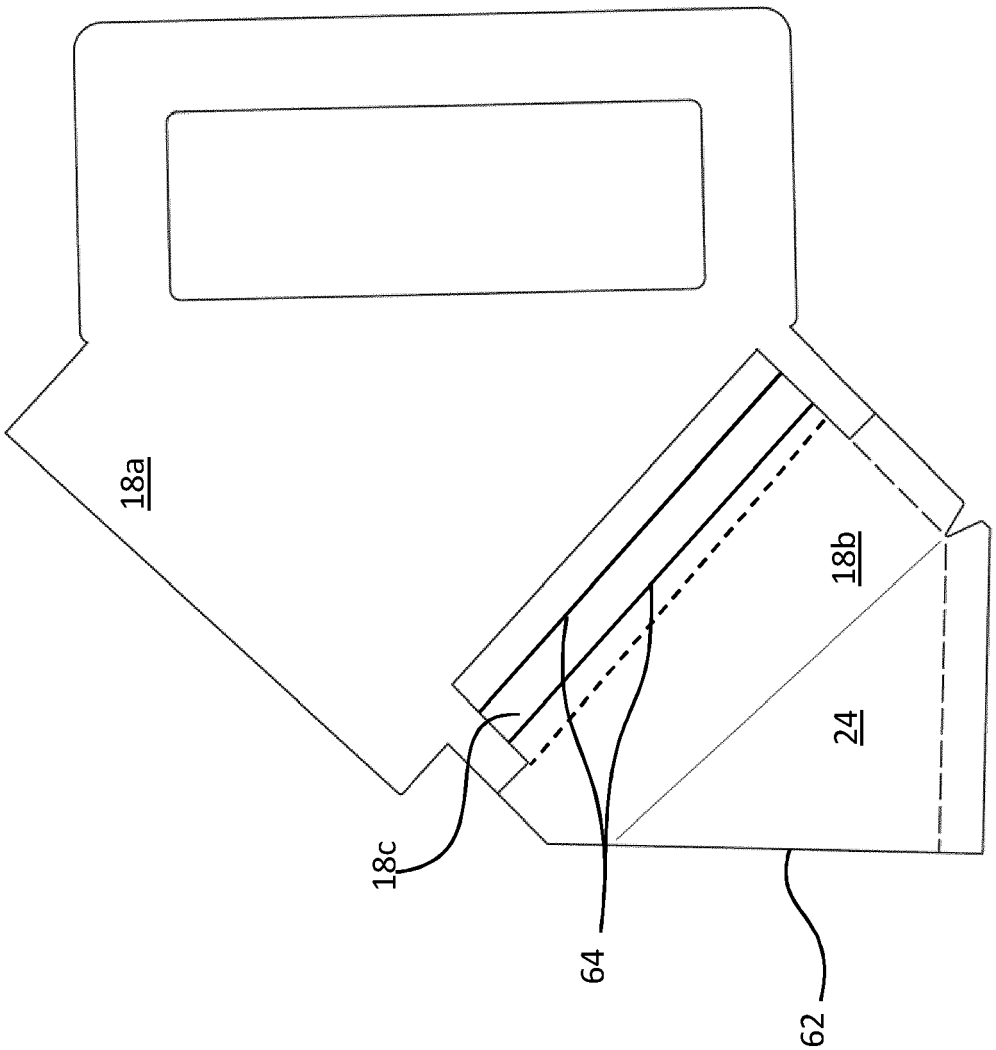

Fig. 4

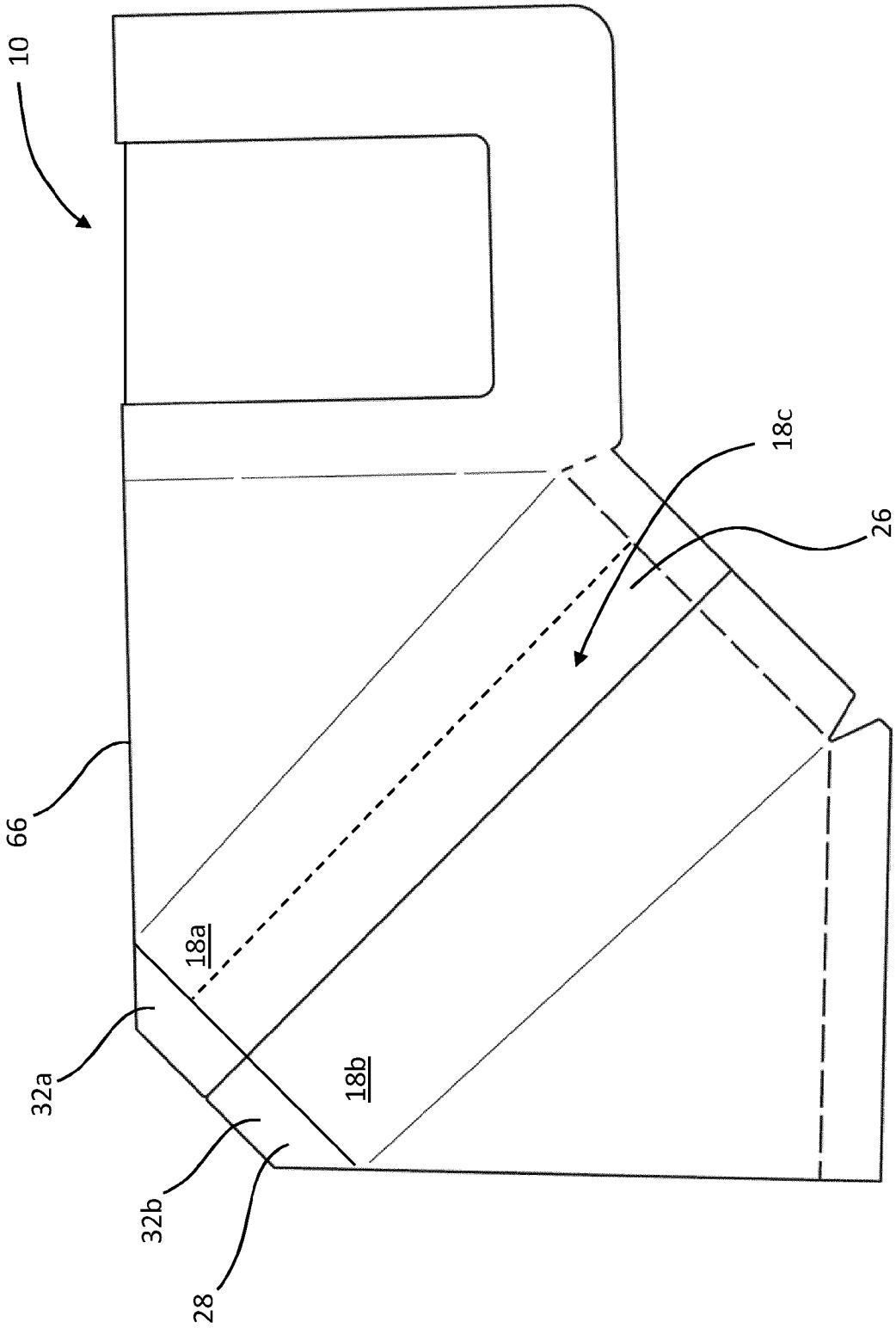

Fig. 5

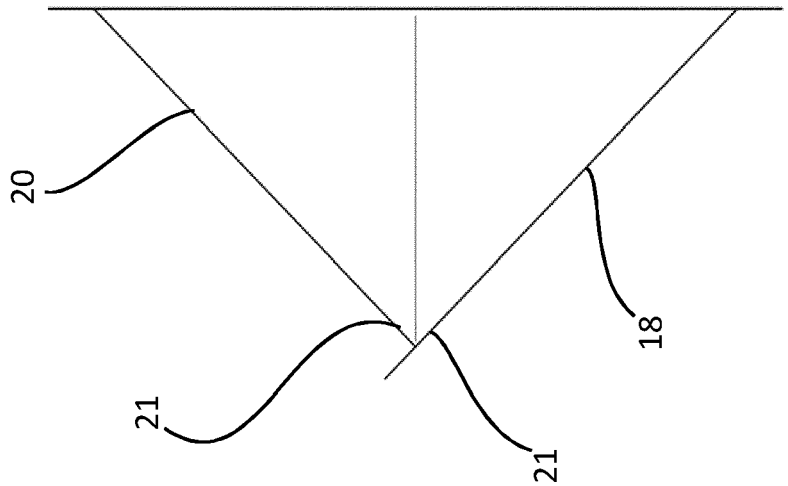

Fig. 7

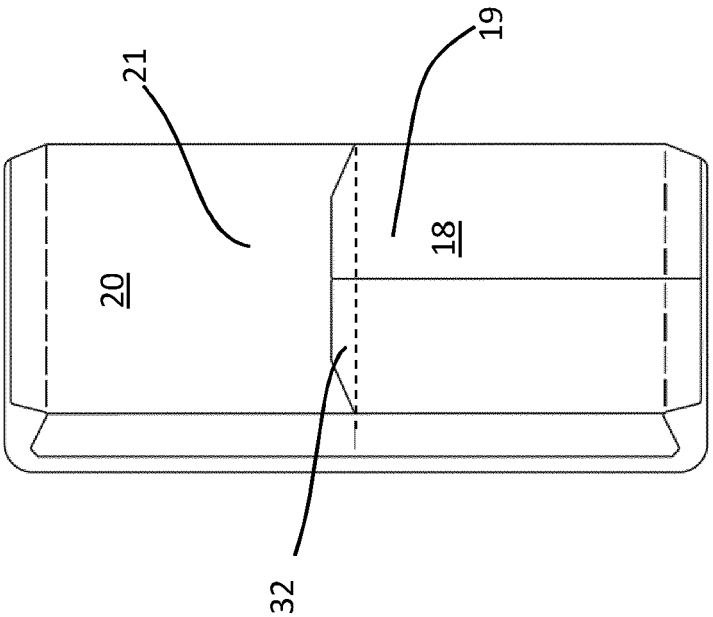

Fig. 6

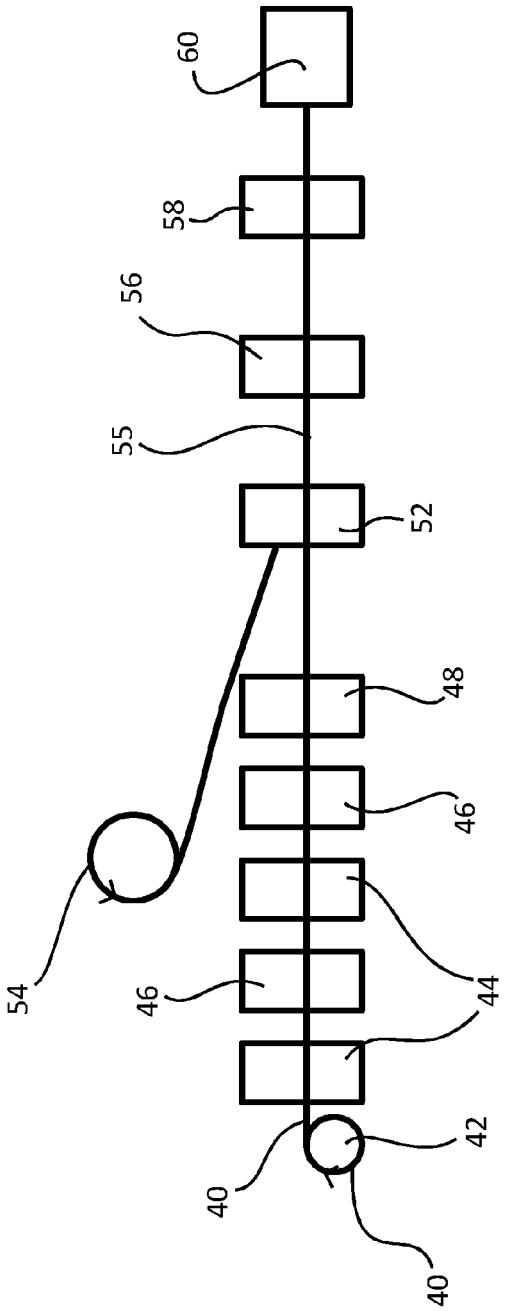

Fig. 8

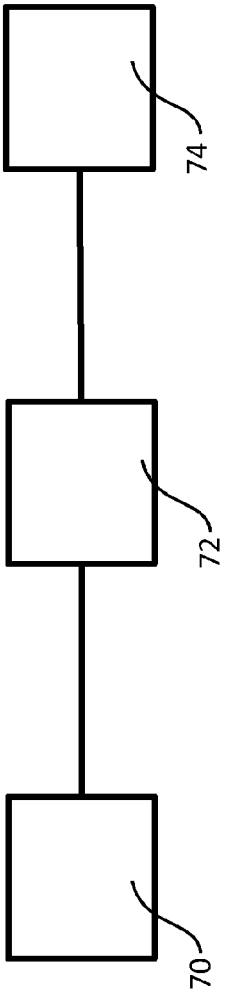

Fig. 9

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EUROPEAN SEARCH REPORT

Application Number
EP 21 19 0298

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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1 The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	15 January 2022	Derrien, Yannick

CATEGORY OF CITED DOCUMENTS

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