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(71) Applicant:
CONCEPT PACKAGING LIMITED
Bradford, West Yorkshire BD7 2NX (GB)

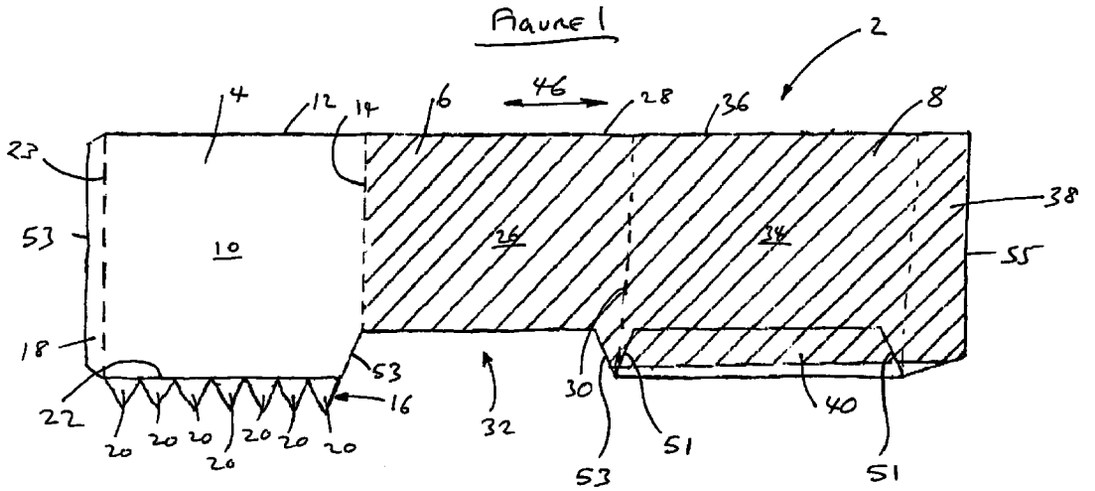
(72) Inventor: **Hallam, Christopher**
Bradford, West Yorkshire BD7 2NX (GB)

(74) Representative:
Brandon, Paul Laurence et al
APPLEYARD LEES,
15 Clare Road
Halifax HX1 2HY (GB)

(54) Tubular carton as well as method and apparatus for manufacturing the carton

(57) The present invention relates to cartons, methods of constructing cartons and to blanks (2) for cartons. The present invention also relates to apparatus for manufacturing cartons from carton blanks. The present invention provides a tubular carton comprising at least two layers (4,6,8), characterised in that the carton wall is of substantially even thickness along the length thereof.

Figure 1



EP 0 949 151 A2

Description

Field of the Invention

[0001] The present invention relates to cartons, methods of constructing cartons and to blanks for cartons. The present invention also relates to apparatus for manufacturing cartons from carton blanks.

Background to the Invention

[0002] Various boundary wall constructions have been suggested in the prior art including those in United States patent US 5,383,595, United States patent US 5,425,498, United Kingdom patent application nos. GB 2,294,021, GB 2,310,200 and GB 2,312,204.

[0003] It is now desired to provide a carton with a simple to manufacture yet neat and sturdy boundary wall capable of supporting a base or lid insert.

Summary of the Invention

[0004] According to the present invention in a first aspect, there is provided a tubular carton comprising at least two layers, characterised in that the carton wall is of substantially even thickness along the length thereof.

[0005] Suitably, the carton wall of the tubular carton comprises a first side wall of a first length having a plurality of inwardly directed tabs along a length thereof. Suitably, there is provided a second side wall of a second length within which second wall the first wall is substantially located, whereby the perimeter length of the carton is substantially less than the aggregate of the first and second lengths.

[0006] Suitably, the perimeter length is approximately the first length.

[0007] Suitably a third side wall is provided about the second side wall.

[0008] Suitably, the third side wall comprises a turned up marginal flange and the second side wall comprises a recess substantially corresponding to the turned up marginal flange.

[0009] Suitably, the carton further comprises support means comprising a plurality of tabs capable of being inwardly directed (relative to the first panel) to form a support. Suitably, the tabs comprise generally triangular shapes. More suitably, the tabs comprise shapes corresponding to the carton shape (in cross-section).

[0010] The tabs may form the support for an inserted base member, or may themselves comprise the base member.

[0011] Suitably, at least one of the tabs is attached, typically by gluing to another tab.

[0012] Suitably, the marginal region for turning up can be turned up to provide a double thickness. Suitably, the ends of the turned up marginal region are inclined.

[0013] Suitably, the first and second panels are dimensioned whereby the ends thereof when formed into a carton are not aligned.

[0014] Suitably, the tubular carton comprises an outer third panel including a turned up marginal region for providing a tube end, and the second panel includes a recess substantially corresponding to the turned up marginal region.

[0015] Suitably, the carton comprises an insert supported by the support means. Optionally, a further insert may be supported by the support means, whereby the support means is sandwiched between the insert and the further insert.

[0016] Suitably, the first, second and (if present) third panels are dimensioned whereby the ends thereof overlap. By not aligning the ends, surprisingly it has been found that this provides a more pleasing shape avoiding distorting effects in prior art constructions.

[0017] Suitably, the carton is constructed from a one-piece blank. Alternatively, the first and second panels are formed from a blank and the third panel is formed from a separate blank.

[0018] Suitably, the carton of the first aspect of the invention is formed from a carton blank comprising a first panel with an edge including a turned up marginal flange and a second panel connected to the first panel, which second panel comprises a recess substantially corresponding to the turned up marginal flange.

[0019] This carton is easy to roll around a mandrel into an even shape with a well defined end. The turned up flange provides the end without a raw edge, whilst the recess on the second panel ensures that the carton can be wound from the blank without undue difficulty. Notably, the blank is of substantially even thickness along its length despite the turned up flange; the corresponding recess compensating for the extra thickness of the turned up flange.

[0020] Suitably, the turned up flange is a double thickness layer.

[0021] Suitably, the tubular carton comprises a third panel of a first length having a plurality of inwardly directed tabs along a length thereof and the second panel is of a second length within which second wall the first wall is substantially located, whereby the perimeter length of the carton is substantially less than the aggregate of the first and second lengths.

[0022] Suitably, the perimeter length is approximately the first length.

[0023] Suitably, the tubular carton comprises an outer panel including a turned up marginal region for providing a tube end, an intermediate panel including a recess substantially corresponding to the turned up marginal region and an inner panel including means for providing support for an insert.

[0024] Suitably, the carton comprises an insert supported by the support means. Optionally, a further insert may be supported by the support means, whereby the support means is sandwiched between the insert and the further insert.

[0025] Suitably, the support means comprises a plu-

rality of tabs inwardly directed (relative to the first panel) to form a support for an insert. Suitably, the tabs comprise generally triangular shapes. Alternatively, the tabs correspond to the intended shape of the carton (in cross-section). Suitably, the tabs are provided along the majority of the internal diameter of the carton. Suitably, the tabs are provided along substantially the entire internal diameter of the carton. Suitably, the tabs are adjacent one another. Suitably, the tabs are joined by a crease line to the main area of the third panel.

[0026] Suitably, the first, second and (if present) third panels are dimensioned whereby the ends thereof overlap. By not aligning the ends, surprisingly it has been found that this provided a more pleasing shape.

[0027] Suitably, the carton is constructed from a one-piece blank. Alternatively, the first and second panels are formed from a blank and the third panel is formed from a separate blank.

[0028] According to the present invention in a second aspect, there is provided a blank or blanks for a tubular carton according to the first aspect of the invention, the blank or blanks comprising a first panel including a marginal region for turning up, a second panel including a recess substantially corresponding to the marginal region for turning up and a third panel including means for providing support for an insert, whereby the first, second and third panels are suitable to be formed with the second panel between the first and third panels thereby to form a tubular carton.

[0029] Such an arrangement can conveniently be formed into a carton of even thickness which makes it easier to manufacture.

[0030] Suitably, the blank is of a one piece construction. This is convenient for forming cartons on a mandrel. Here, the uniform thickness is particularly advantageous because otherwise when wound (in a convolute manner) on a mandrel, the carton would tend towards a conical shape and the ends thereof would "creep" along the mandrel.

[0031] Suitably, the support means comprises a plurality of tabs capable of being inwardly directed (relative to the first panel) to form a support for an insert. Suitably, the tabs comprise generally triangular shapes. Suitably, the tabs are provided along the majority of the length of the third panel. Suitably, the tabs are provided along substantially the entire length of the third panel. Suitably, the tabs are adjacent one another. Suitably, the tabs are joined by a crease line to the main area of the third panel.

[0032] Suitably, the marginal region for turning up can be turned up to provide a double thickness turned up marginal region. Suitably, the ends of the turned up marginal region are inclined.

[0033] Suitably, the first, second and (if present) third panels are dimensioned whereby the ends thereof when formed into a carton are not aligned. By not aligning the ends, surprisingly it has been found that this provides a more pleasing shape.

[0034] Suitably, the blank comprises a tab at an edge of the first panel, which tab is foldably connected to the first panel.

[0035] Alternatively, the first and second panels are formed from a blank and the third panel is formed from a separate blank.

[0036] According to the present invention in a third aspect, there is provided a method of constructing a carton, the method comprising the steps of providing a blank or blanks according to the second aspect of the invention, applying adhesive to at least two of the panels and forming the blank or blanks into a tubular carton.

[0037] Suitably, the adhesive is provided to the first and second panels whereby in the formed carton there is adhesive between the interior of the first panel and exterior of the second panel and between the interior of the second panel and exterior of the third panel.

[0038] Suitably, the blank or blanks is or are convolute wound around a mandrel to form the tubular carton. The mandrel may be circular cylindrical.

[0039] Suitably, the blank is wound around a mandrel which mandrel exerts a holding force on the blank. Suitably, the holding force is a suction force through holes in the mandrel.

[0040] Suitably, the blank is engaged with a mandrel about which the blank is wound. Suitably, the engagement is by a tab of the blank in a slot of the mandrel.

[0041] Suitably, the tubular carton comprises a triple layer convolute spiral wound side wall.

[0042] According to the present invention in a fourth aspect, there is provided a method of manufacturing a tubular carton, which method comprises the steps of: providing a carton blank and convolute winding the blank into a tubular carton, which carton has a circumferential perimeter length less than half of the length of the blank, whereby a triple layer side wall is produced.

[0043] Suitably, the circumferential perimeter length is less than a third of the length of the blank.

[0044] Suitably, adhesive is provided between at least two layers of the side wall. Preferably, adhesive is provided between each layer of the side wall.

[0045] Suitably, the blank is wound around a mandrel.

[0046] Suitably, the blank is modified according to the second aspect of the invention.

[0047] According to the present invention in a fifth aspect, there is provided an apparatus for manufacturing cartons from carton blanks, which apparatus comprises a rotatable mandrel and means for applying a suction force to the exterior of the mandrel.

[0048] Suitably, the suction force is provided by a reduced pressure source in fluid communication with a plurality of holes on the exterior of the mandrel.

[0049] Suitably, the mandrel comprises means for engaging a tab of a carton blank, which means preferably comprises a longitudinal slot in the mandrel.

Brief Description of the Drawings

[0050] The present invention will now be described, by way of example only, with reference to the drawings that follow; in which:

Figure 1 is a plan view of a blank according to the present invention.

Figure 2 is a schematic perspective view of a carton formed from the blank of Figure 1.

Figure 3 is an end view of the carton shown in Figure 2.

Figure 4 of the drawings that follow is a highly schematic and enlarged end elevation of a carton as shown in Figure 2, with the end features omitted for clarity.

Figure 5 is a schematic and enlarged for clarity cross-sectional view on the line V-V of Figure 3.

Figure 6 is a view similar to Figure 5 showing an extra insert.

Figure 7 is an exploded plan view of blanks for a carton according to a second embodiment of the present invention.

Figure 8 is a plan view of a blank for a carton according to a third embodiment of the present invention.

Figure 9 is a schematic perspective illustration of an apparatus for manufacturing cartons according to the present invention.

[0051] For ease of reference, like reference numerals have been used for corresponding integers in the drawings.

Description of the Preferred Embodiments

[0052] Referring to Figure 1 of the drawings that follow, there is shown a carton board blank 2 for forming a tubular carton. The blank 2 comprises an inner panel 4, an intermediate panel 6 and an outer panel 8. In this embodiment the panels 4, 6, 8 are joined and contiguous, formed from a single piece of carton board. At this stage the distinction between the panels 4, 6, 8 although clear, is somewhat arbitrary as they are not separated by crease, fold or score lines. The distinction becomes more evident when the blank 2 is convolute wound to form a tubular carton as described below.

[0053] The inner panel 4 comprises a generally rectangular main area 10 having a flat upper edge 12, a juncture 14 (not a fold or crease line) at a side edge with intermediate panel 6, a saw tooth arrangement 16 along its lower edge and an extension tab 18 at the edge opposite juncture 14. The saw tooth arrangement 16 comprises a plurality of generally triangular tabs 20 extending from main area 10 and joined thereto by a crease line 22. At the edge distant from intermediate panel 6 is a scored (or kiss-cut) line 23 about 10mm in from the end.

[0054] Intermediate panel 6 comprises a generally rectangular main area 26 having a flat upper edge 28, a juncture 14 separating it from inner panel 4, a juncture 30 separating it from outer panel 8 and at its lower edge a recess 32.

[0055] The outer panel 8 comprises a generally rectangular main area 34 having a flat upper edge 36, a juncture 30 separating it from intermediate panel 6, an extension flange 38 at its edge opposite juncture 30 and at its bottom edge a pre-turned up panel 40 (ie of double thickness) corresponding to recess 32. The extension flange 38 comprises an elongate generally rectangular panel.

[0056] The upper edges 12, 28, 36 form a continuous flat upper edge along the blank.

[0057] The pre-turned up panel 40 of outer panel 8 has a lower edge 44 that projects slightly beyond crease line 22 which separates the saw tooth arrangement 16 from main area 10 of inner panel 4.

[0058] The main areas 10, 26, 34 of the panels 4, 6, 8 are of substantially similar lengths (being in the direction of arrow 46).

[0059] A method of manufacture of a tubular carton from blank 2 will now be described.

[0060] The turned up panel 40 is glued in place.

[0061] The main areas 26, 34 of the intermediate and outer panels 6, 8 respectively and the extension flange 38 are coated with an adhesive as shown by the shaded area of Figure 1. The blank 2 is then wound around a mandrel (Figure 9) led by inner panel 4. Referring to Figure 9 of the drawings that follow a rotatable mandrel 100 is shown for use in the manufacture of a carton according to the present invention. The mandrel 100 comprises a hollow tubular body 102 and a longitudinal slot 106. The interior of slot 106 is connected to a reduced pressure (vacuum) source 108. The mandrel need not be circular in cross-section although often it will be. Alternative shapes include triangles and rectangles. The setting adhesive between the three panels 4, 6, 8 secures the carton in its desired shape. Adhesive lies between the exterior of inner panel 4 and the interior of intermediate panel 6, and between the exterior of intermediate panel 6 and the interior of outer panel 8.

[0062] To form the carton about the mandrel 100, the extension tab 18 is inserted in to the longitudinal slot 106 to effectively anchor the blank relative to the mandrel 100. Reduced pressure is applied to the slot 106 of mandrel 100 from source 108. The mandrel 100 is then rotated and the blank pressed against it as it rotates. The blank 2 is encouraged to lie against the mandrel

100 by the reduced pressure exerting a sucking force through slot 106. The blank 2 is held in place for a length of time sufficient for the adhesive to hold the panels thereof relative to one another. The made-up carton is then slid off the mandrel 100 longtidinally.

[0063] Referring to Figures 2-6, there is shown a circular cylindrical tubular carton 50 formed from blank 2. The exterior surface of carton 50 is the non-adhesive coated side of outer panel 8. The interior surface of carton 50 is the main area 10 of inner panel 4 (the same side as that to which adhesive is applied to intermediate and outer panels 6, 8 respectively as shown in Figure 1).

[0064] When formed into this tubular carton 50, the juncture lines 14, 30 are aligned. Thus, the main areas 10, 26, 34 overlap and are aligned. However, it is noted that the extension flange 18 and extension flange 38 ensure that opposite ends of the blank 2 are not aligned, ie the ends 53, 55 of blank 2 (see Figure 1) extend beyond each other. Furthermore, the ends 53, 55 are separated from juncture 30 which can have a weak point at the edge with the pre-turned up panel 40. Thus the weaker areas in the carton are misaligned, they do not coincide. This has been found to enhance the appearance of the carton 50 enabling it to better hold its shape and to avoid unsightly bulges. The overlap need only be by a few millimetres.

[0065] Referring to Figure 4, there is shown a highly schematic representation of the carton 50 from which it can be seen that the blank 2 forms a convolute, spiral wound side wall with no reverses of direction of the blank in the construction. It is further noted that the ends 53, 55 of the blank 2 are misaligned. The juncture 30 is misaligned with ends 53, 55. The position of juncture 30 is indicated schematically in Figure 4.

[0066] The pre-turned up panel 40 lies in and substantially fills the corresponding recess 32 which is designed to receive it. Thus, the double thickness of the pre-turned up panel 40 is compensated for by recess 32. The pre-turned up panel 40 provides a rigid bottom without a raw edge.

[0067] The end edges 51 of pre-turned up panel 40 are taken away at an angle to minimise the distorting effect of the joins and thus enhancing the aesthetics of the carton. If the panel were to be taken straight up then the weakness would be exaggerated for the entire depth of the panel leading to potential deformation. The recess 32 has corresponding inclined ends 53.

[0068] The generally triangular tabs 20 are folded to project inwardly relative to the circumference of the carton 50 to form a location and support platform for an insert 52. The tabs 20 are dimensioned whereby there are diverging gaps between them as they extend inwardly of the perimeter edge. In this case the insert 52 is a circular cut out dimensioned to fit snugly into carton 50.

[0069] As the crease line 24 is slightly higher than the lower edge 44 of pre-turned up panel 40, when the generally triangular tabs 20 are folded in, the lower edge 44 forms a neat end to the carton 50, without a raw edge. Furthermore, as shown in Figure 5 a further insert 54 may be inserted to sandwich the generally triangular tabs 20 between two such inserts 52, 54 to provide a rigid base or lid structure.

[0070] Thus, preferred embodiments of the present invention can provide a pleasing tubular carton structure with tabs to provide support for a base structure, the tabs being sandwiched between a pair of disc inserts.

[0071] By way of example, in a typical carton having a diameter in the range 30-40mm, the gap between the in-turned generally triangular tabs 20 and the lower edge 44 of pre-turned up panel 40 is 1-3mm.

[0072] The three layer construction of carton 50 provided by inner, intermediate and outer panels 4, 6, 8 respectively is advantageous. The inner panel 4 provides the support structure for an insert without having to be concerned about the shape of the exterior of inner panel 4 as it is unseen. The intermediate and outer panels 6, 8 cooperate to provide a rigid, neat and convenient to manufacture bottom edge.

[0073] It will be appreciated that the arrangement providing an insert support structure shown at an end of the carton 50, can be provided at the other or both ends of a carton. Thus the arrangement can provide a lid and/or base structure.

[0074] Optionally, the inner, intermediate and outer panels 4, 6, 8 may be formed from separate pieces (ie the junctures 14 and 30 become cut lines).

[0075] In a modification of the present invention, as shown in Figure 7 of the drawings that follow (in which corresponding reference numerals have been used), the inner panel 4 can be provided on a separate piece to the intermediate and outer panels 6,8 respectively. The intermediate and outer panels 6, 8 respectively remain connected at juncture 30. The inner panel 4 is placed to overlie, main area 10 on main area 26, intermediate panel 6. This embodiment has the advantage that the inner panel 4 can, if desired, be printed separately. Otherwise it can produce a carton substantially similar to that shown in Figures 2-6.

[0076] Referring to Figure 8 of the drawings that follow, there is shown a carton board blank 2 similar to that of Figure 1 and in relation to which corresponding reference numerals have been used. The embodiment of Figure 8 differs from that of Figure 1 in that in place of triangular tabs 20 it has three circular tabs 300, corresponding to the intended circular (in cross-section) shape of the eventual tubular carton. During the manufacturing process, faces of the circular tabs 300 that lie against one another are glued together by an adhesive.

[0077] In this embodiment the other significant modification is that a reverse crease 302 is provided approximately 5mm from the distal end of the extension flange 38. The crease 302 is used to bias the end 55 inwards in the made up tubular carton. This appears to ease

some of the lifting pressure from the exposed end 55 when the carton is made up. The made up carton will have an exterior appearance corresponding to that of Figure 2 as will be apparent to those skilled in the art.

[0078] In an alternative embodiment to the mandrel design shown in Figure 9, the slot 106 need not be present, but a plurality of suction holes (not shown) can be provided in the exterior of the mandrel 100 to engage the carton blank. In this case the holes are in fluid communication with the reduced pressure source.

[0079] The method of manufacture of the various embodiments of the invention described herein is substantially similar.

[0080] Although the cartons shown are circular cylindrical, they need not be. Cartons of other shapes including triangles, rectangles, squares etc (in cross-section) can be made, with curved or sharp corners as desired. When used on sharper curves, the tabs 20 will be narrower. The converse is true for wider curves. In the extreme case of a straight edge, only one tab 20 need be provided.

[0081] The reader's attention is directed to all papers and documents which are filed concurrently with or previous to this specification in connection with this application and which are open to public inspection with this specification, and the contents of all such papers and documents are incorporated herein by reference.

[0082] All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

[0083] Each feature disclosed in this specification (including any accompanying claims, abstract and drawings), may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

[0084] The invention is not restricted to the details of the foregoing embodiment (s). The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any accompanying claims, abstract and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.

Claims

1. A tubular carton comprising at least two layers, characterised in that the carton wall is of substantially even thickness along the length thereof.

2. A tubular carton according to claim 1, in which the carton wall of the tubular carton comprises a first side wall of a first length having a plurality of inwardly directed tabs along a length thereof.

3. A tubular carton according to claim 1 or claim 2, in which there is provided a second side wall of a second length within which second wall the first wall is substantially located, whereby the perimeter length of the carton is substantially less than the aggregate of the first and second lengths.

4. A tubular carton according to any preceding claim, in which the carton further comprises support means comprising a plurality of tabs capable of being inwardly directed (relative to the first panel) to form a support.

5. A tubular carton according to any preceding claim, in which the carton of the first aspect of the invention is formed from a carton blank comprising a first panel with an edge including a turned up marginal flange and a second panel connected to the first panel, which second panel comprises a recess substantially corresponding to the turned up marginal flange.

6. A tubular carton according to any preceding claim, in which the first, second and (if present) third panels are dimensioned whereby the ends thereof overlap.

7. A tubular carton according to any preceding claim, in which the carton is constructed from a one-piece blank.

8. A blank or blanks for a tubular carton according to any preceding claim, the blank or blanks comprising a first panel including a marginal region for turning up, a second panel including a recess substantially corresponding to the marginal region for turning up and a third panel including means for providing support for an insert, whereby the first, second and third panels are suitable to be formed with the second panel between the first and third panels thereby to form a tubular carton.

9. A method of constructing a carton, the method comprising the steps of providing a blank or blanks according to the second aspect of the invention, applying adhesive to at least two of the panels and forming the blank or blanks into a tubular carton.

10. A method of manufacturing a tubular carton, which method comprises the steps of: providing a carton blank and convolute winding the blank into a tubular carton, which carton has a circumferential perimeter length less than half of the length of the blank, whereby a triple layer side wall is produced.

11. An apparatus for manufacturing cartons from carton blanks, which apparatus comprises a rotatable mandrel and means for applying a suction force to

the exterior of the mandrel.

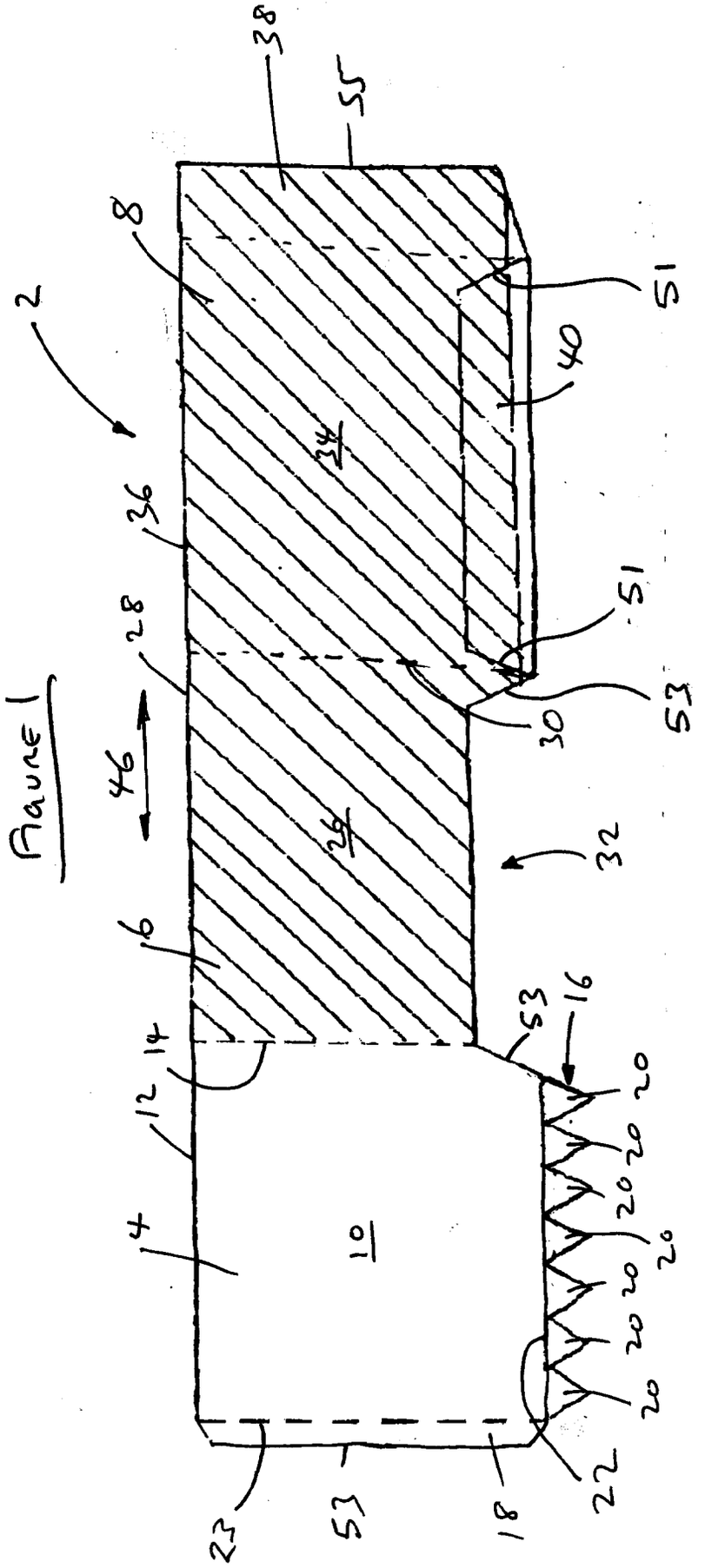

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FIGURE 1

FIGURE 2

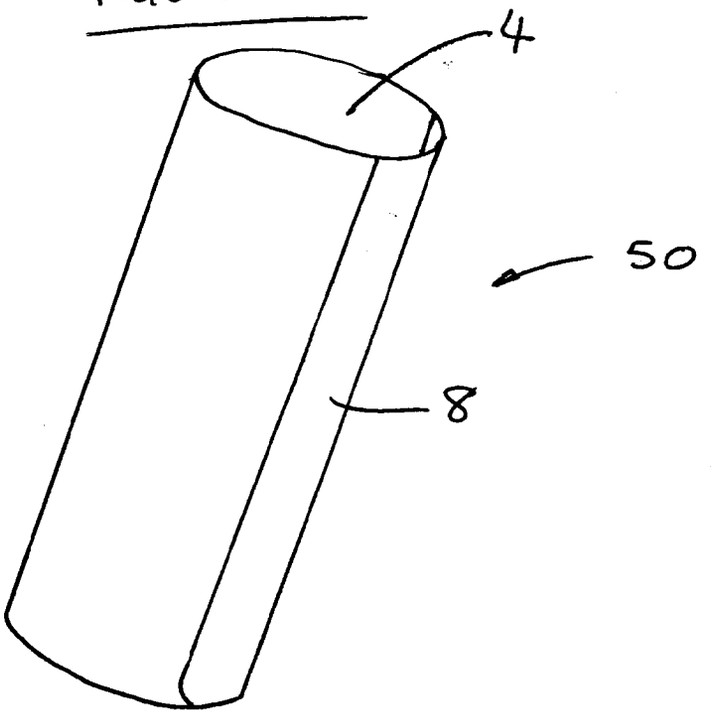


FIGURE 5

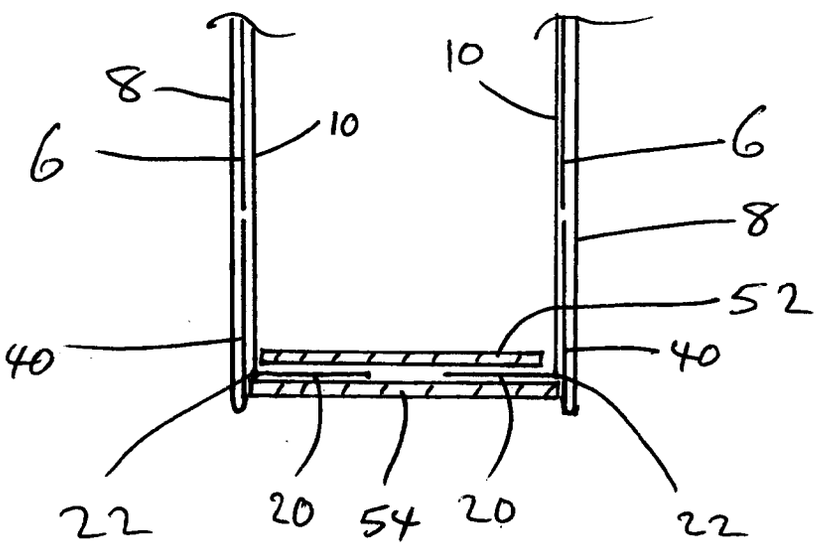


Figure 3

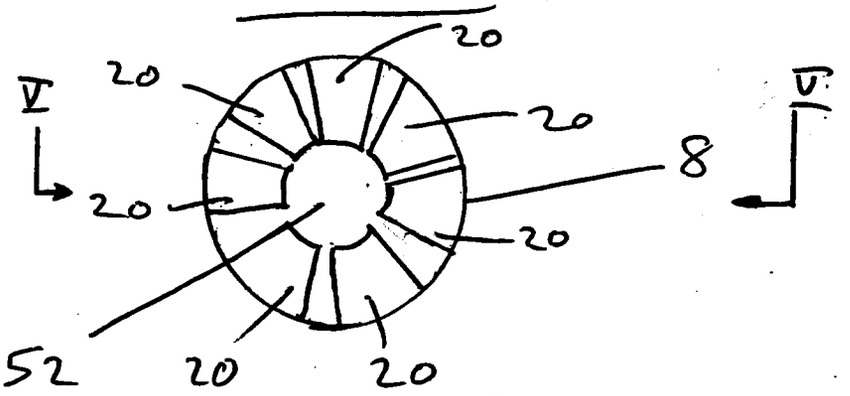


Figure #5

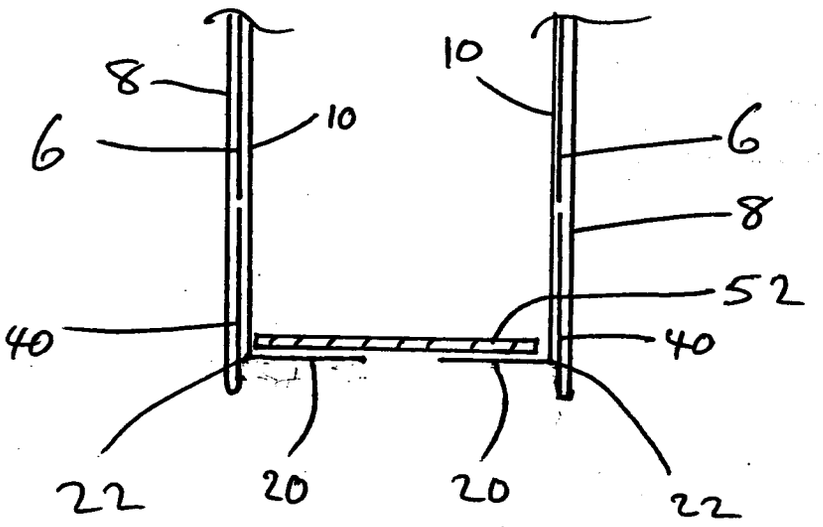


Fig 4

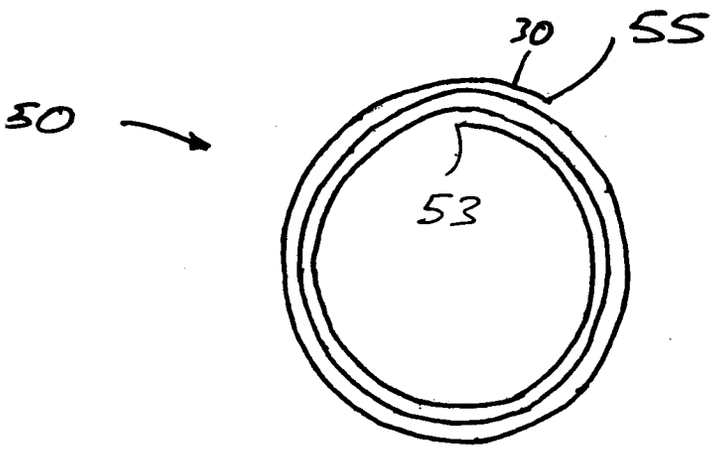
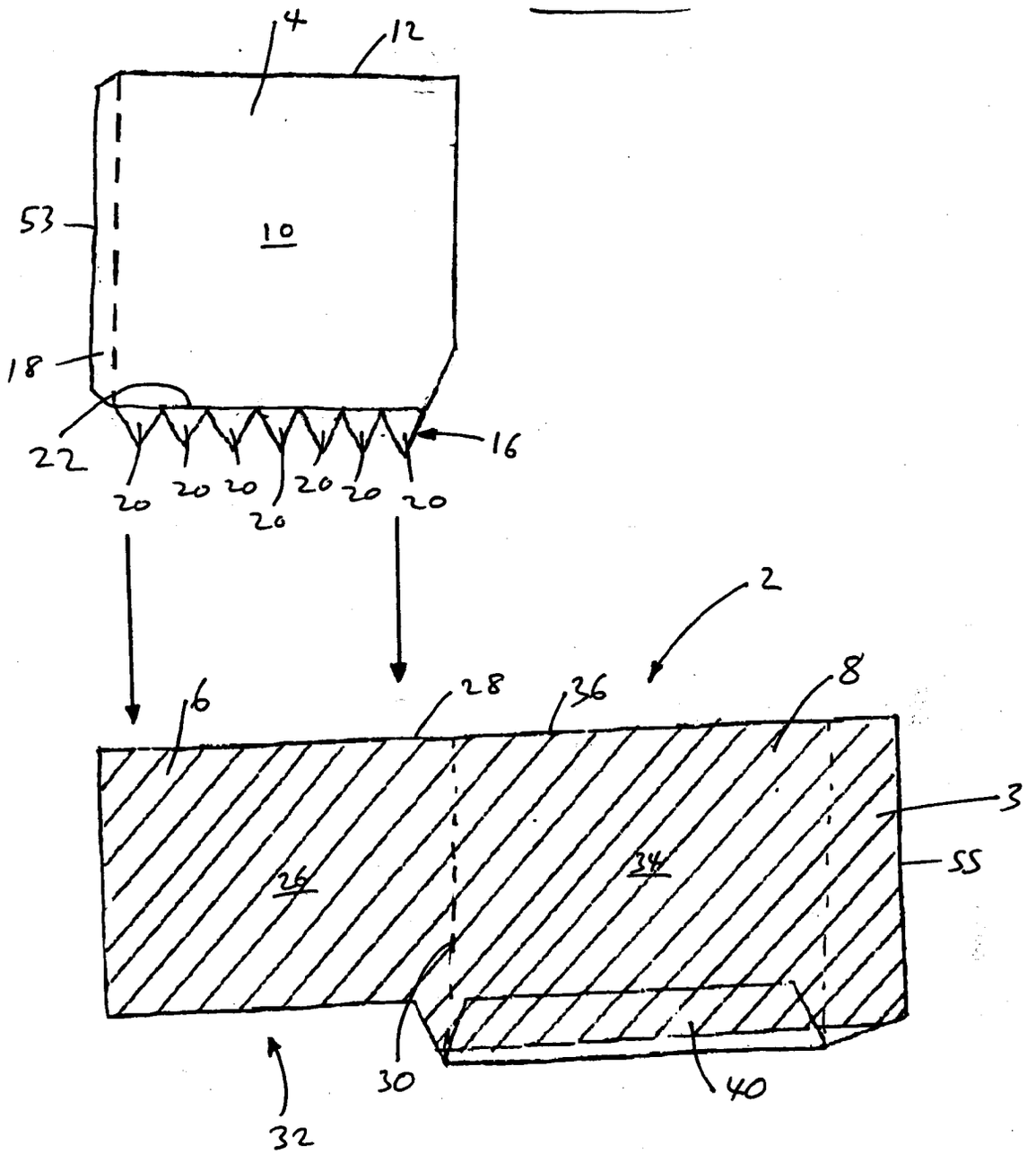


FIGURE 7



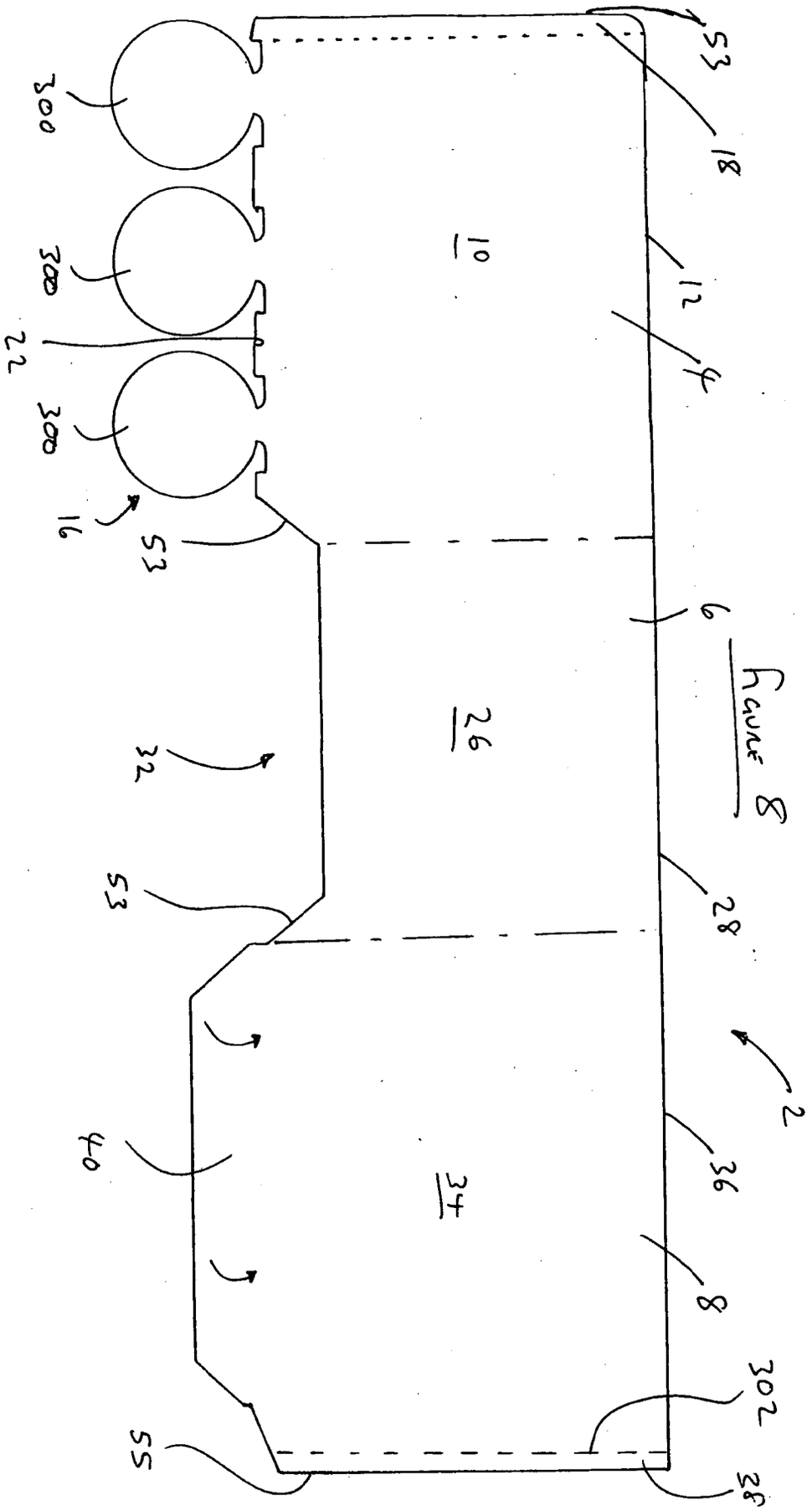


Figure 8

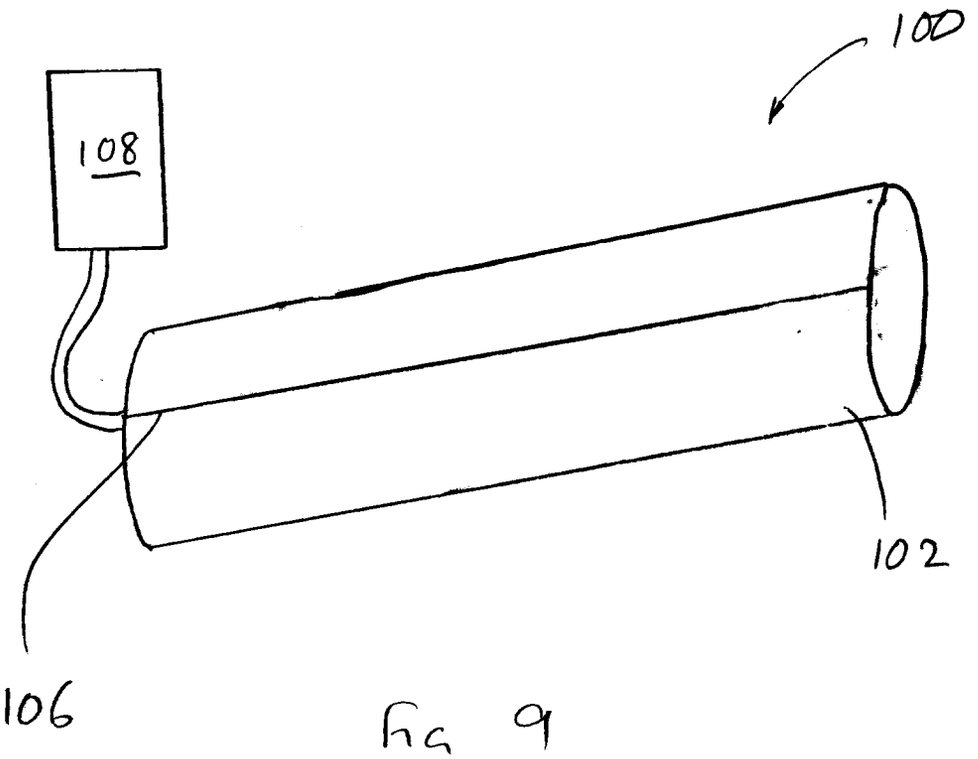


Fig 9