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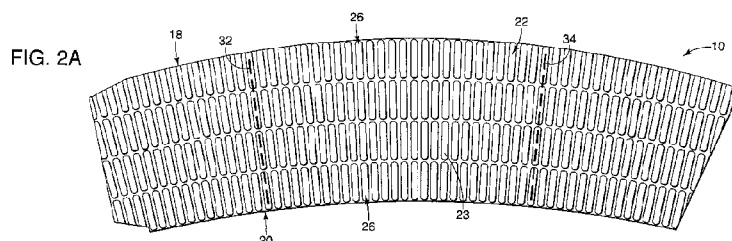
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(54) Title: PROTECTIVE SLEEVE



(57) Abstract: A container (12) and a sleeve (10) for a container are disclosed that employ unique air channels to divert heat from a hot beverage via hot air escaping upward and downward. The surface of the container and sleeve include raised images, depressed images (22), or a combination of both which are generally aligned in substantially vertical columns. The space between the columns (26) defines the air channels. The air channels are substantially uninterrupted and facilitate the upward and downward escape of hot air. The images are applied, such as by embossing and/or debossing, which facilitates manufacturing material efficiency and therefore reduces material costs and environmental waste. A blank for a container or sleeve and a method of making a sleeve are also disclosed.



PROTECTIVE SLEEVE

BACKGROUND

[0001] Hot and cold beverages or foods (e.g., coffee, tea, soft drinks, soup, and the like) may present a handling problem to consumers when dispensed into containers such as drinking cups. For example, single-wall paper, and plastic drinking cups often do not provide sufficient thermal insulating properties when filled with hot or cold beverages. As a result, handling of such containers may be uncomfortable to the consumer.

BRIEF SUMMARY

[0002] A container and a protective sleeve for encircling a container are disclosed. The container and the sleeve include a body having a first edge and a second edge and a surface between the edges. Uniquely designed raised and/or depressed images are applied to the surface in a pattern which may be ordered or random. The pattern of raised and/or depressed images generally creates substantially uninterrupted air channels from the first edge to the second edge.

[0003] Other systems, methods, features and advantages of the invention will be, or will become, apparent to one with skill in the art upon examination of the following figures and detailed description. It is intended that all such additional systems, methods, features and advantages be included within this description, be within the scope of the invention, and be protected by the following claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] Fig. 1 is a perspective view of a sleeve assembled with a cup.

[0005] Fig. 2A is a view of an unassembled sleeve.

[0006] Fig. 2B is a top view of an assembled sleeve.

[0007] Fig. 3 is a graph illustrating an exemplary image.

[0008] Fig. 4A is a view of an unassembled sleeve.

[0009] FIG. 4B is a top view of an assembled sleeve.

[0010] Fig. 5A is a view of an unassembled sleeve.

[0011] Fig. 5B is a top view of an assembled sleeve.

- [0012] Fig. 6A is a view of an unassembled sleeve.
- [0013] Fig. 6B is a top view of an assembled sleeve.
- [0014] Fig. 7 is an exemplary view of unassembled sleeves.
- [0015] Fig. 8 is an exemplary view of an unassembled sleeve.
- [0016] Fig. 9 is an exemplary view of an unassembled sleeve.
- [0017] Fig. 10 is an exemplary view of an unassembled sleeve.
- [0018] Fig. 11 is an exemplary view of an unassembled sleeve.
- [0019] Fig. 12 is an exemplary view of an unassembled sleeve.
- [0020] Fig. 13 is an exemplary view of an unassembled sleeve.
- [0021] Fig. 14 is an exemplary view of an unassembled sleeve.
- [0022] Fig. 15 is an exemplary view of an unassembled sleeve.
- [0023] Fig. 16 is an exemplary view of an unassembled sleeve.
- [0024] Fig. 17 is an exemplary view of an unassembled sleeve.
- [0025] Fig. 18 is a perspective view of an exemplary container.
- [0026] Fig. 19 is a flow diagram of a method of making a protective sleeve.

DETAILED DESCRIPTION

[0027] A container and a protective sleeve for use with a container are disclosed. The sleeve may be used with a container, such as a cup, including the container disclosed herein. When placed on a container, such as a cup, the sleeve may provide a thermal barrier between the container and a hand of a user. The width of the sleeve from top to bottom may approximate the width, for example, of at least two fingers of an adult human hand, and the shape may accommodate placing a thumb and at least three fingers on the sleeve.

[0028] The container may be used alone or with a sleeve, for example, but not limited to, the sleeve disclosed herein. The container may be, for example, a cup, a soup container, or another container for retaining liquids such as coffee, tea, soft drinks, soup, and the like. The container may be manufactured applying the same principles as disclosed herein for the sleeve, for example, by slight size and shape modifications to the sleeve blank and the addition of a container bottom and optional container lip.

[0029] The present disclosure relates to the application to a sleeve blank or container blank of uniquely designed raised and/or depressed images. The images may be applied to a surface of the blank in a pattern which may be ordered or random. For example, the images may be applied as columns of images. The columns may be arranged such that air gaps remain between them. The air gaps may provide air channels which may provide horizontal insulation. The channels may be continuous and substantially uninterrupted. The thermal properties of the sleeve or container may be enhanced by the presence of the disclosed channels, for example, by reducing the rate of heat transfer between a container and a hand gripping the container.

[0030] The images may be applied to a surface of the sleeve and/or container blank by a process of embossing, debossing or both (e.g., in-line or off-line rotary or platter die). The use of embossing, debossing, or both to apply substantially uninterrupted air channels to the container or sleeve may reduce the amount of sheet material used as compared to containers or sleeves that use other methods of creating air channels, such as corrugating. For example, embossing, debossing, or both may be used to create air channels on a single sheet of material thereby approximating the thermal barrier of a multiple sheet sleeve. Reducing the amount of sheet material used in manufacturing protective sleeves may cause waste reduction, which may be better for the environment. The present disclosure illustrates many different image arrangements and shapes, all of which are illustrative and non-limiting.

[0031] A protective sleeve **10** may be positioned in combination with a container **12** as in FIG. 1. The container **12** may be tapered and may have a base **14** and a rim **16**. The container **12** may be manufactured of plastic, foam, paper, or any other material, and may be adapted to hold hot or cold food or beverages.

[0032] The sleeve **10** may be combined with the container **12** such that the sleeve **10** fully encircles the circumference of the container **12**. The sleeve **10** may be attached to the container **12**, such as by friction or by fugitive or non-fugitive glue. Alternatively, the sleeve may be integral with the container. The sleeve **10** may be manufactured of, for example, paperboard, cardboard, plastic, foam,

cellulosic fiber, white virgin paper, brown recycled paper, or other materials and may be recyclable or compostable.

[0033] The sleeve 10 may include a first edge 18 and a second edge 20, which may be the top and bottom of the sleeve, or vice versa. The first edge 18 and the second edge 20 may be sized to fit a container 12, including a tapered or untapered container.

[0034] The protective sleeve 10 may be formed by fastening the ends of the elongate blank of the sleeve 10 together to form a continuous circle. The joined ends of the sleeve may be fastened by, for example, glue, a notch and slot arrangement, or other methods. The sleeve 10 may be affixed to the container by inserting the container into an assembled sleeve, or alternatively, wrapping the elongate blank of the sleeve 10 around the container.

[0035] FIG. 2A illustrates an exemplary sleeve 10 in an unassembled state. The blank 10 in this and the following examples, Figs. 2A, 4-17 (shown as a sleeve blank), may, with slight modifications (e.g., in size or shape), be useful as a blank for either a container, Fig. 18, 1800 or a sleeve Fig. 1, 10. The sleeve 10 may include a first edge 18 and a second edge 20, which may be the top and bottom of the sleeve 10, or vice versa. The sleeve 10 may further include a first surface 21 and a second surface 23 extended between the first edge 18 and the second edge 20. The first surface 21 and the second surface 23 may be the inside surface and the outside surface of the sleeve or container, or vice versa. For example, the first surface Fig. 2B, 21 may be the outside surface, which may contact the user's hand and the second surface 23 may be the inside surface which may contact the container Fig. 1, 12.

[0036] In this example, the sleeve 10 includes raised images 22. The images 22 of this example may be applied to the sleeve 10 by the process of embossing and/or debossing (e.g., rotary or in line die) and may be arranged in columns 26 that begin at the top 18 of the sleeve or container blank 10 and terminate at the bottom 20 of the sleeve or container blank 10. The images 22 may be positioned to form a pattern on the sleeve 10 as in this example, and/or the images 22 may be randomly placed on the sleeve 10 as in other examples disclosed herein.

Additionally, the images **22** may be positioned such that the columns **26** follow the arc of the sleeve, or they may be positioned such that they are horizontal with the plane of the sheet material.

[0037] Each image **22** may have a shape. This example illustrates a generally rectangular image **22** with curved ends. However, the image **22** may be of any shape, for example but not limited to, square, polygon, triangle, circle, diamond, or any combination of these. The image **22** of this example may have a depth of, for example, 1mm to 3mm. However, other depths may be used.

[0038] The images **22** of this example may be applied to the sleeve **10** in columns **26**, such as from the first edge **18** to the second edge **20** of the sleeve **10**. The images **22** may be spaced one from another or may be continuous. If spaced one from another, the images **22** may have a gap from the closest gap feasibly possible based on manufacturing capabilities, to several millimeters, or, more specifically, approximately 2 mm to approximately 5 mm. The images **22** of the sleeve **10** may be arranged to define an air gap or air channel, for example, the images **22** may be arranged in columns **26** which are spaced to define air channels. The air channel between the columns **26** may be, for example but not limited to 1mm to 5mm. The air channel may be continuous or substantially uninterrupted such that air may flow freely through the channel (as opposed to being maintained in discrete pockets between the images **22**).

[0039] The air channels may have vertical pitch of, specifically but not limited to, approximately $\Theta=0^\circ$ to approximately $\Theta=60^\circ$, preferably to approximately $\Theta=45^\circ$ with reference to the vertical axis from the top to the bottom of the sleeve **10**. The air channels **24** may contribute to diversion of heat from the hot beverage via hot air escaping upward or downward away from a user's hands or fingers, and consequently, may contribute to the horizontal thermal insulation. The diversion of heat may increase the user's holding comfort. Additionally, the channels may add rigidity to the sleeve without using extra material.

[0040] Fig. 2B is a cross sectional view of an assembled sleeve or container blank **10**. This view illustrates a cross sectional view air channels which may be created by the application of images Fig. 2A, **22**, for example, in columns **26** of

recessed or raised images Fig. 2A, **22**. (With minor modifications, a cross section of a container Fig. 18, **1800** would appear similar.) The sleeve **10** blank may contain fold lines, **32** and **34**, such that, when removed from a cup, the sleeve **10** can be collapsed into a flat plane. Collapsing into a flat plane may permit the sleeves to be efficiently packed in ready-to-use form. The flat-plane form of the sleeve **10** may also provide efficiencies for storing, for example, on counter tops, in storage containers, in boxes, on shelves, and etc.

[0041] The sleeve **10** may be converted from collapsed form to uncollapsed form by, for example, pushing inward on the fold lines **32** and **34**. The uncollapsed form of the sleeve **10** may define an opening through which a container Fig. 1, **12** may be inserted.

[0042] Figure 3 illustrates a three dimensional rendering of an exemplary isolated image **22**. In this example, the image **22** is a truncated semi-cylindrical shape. As illustrated, if viewed in an X-Y-Z plane, the image may have a generally polygonal planar shape, for example, if viewed in an x-y plane. Additionally, the thermal channels may have a curvilinear vertical or z-directional shape.

[0043] FIG.4A illustrates a blank of an exemplary sleeve **10**. The blank **10** may, with slight modifications (e.g., in size or shape), also be useful as a blank for a container, Fig. 18, **1800**. In this example, the sleeve or container blank **10** has a pattern made up of individual images **52** which may be depressed images. The images **52** may be applied to the sleeve **10** by the process of embossing and/or debossing and may be arranged in columns **56** that begin at the top **18** of the sleeve **10** and terminate at the bottom **20** of the sleeve **10**.

[0044] Each image **52** may have a shape. This example illustrates and generally rectangular image **52** with curved ends. However, the image **52** may be of any shape, for example but not limited to, square, polygon, triangle, circle, oval, diamond, or any combination of these. The image **52** of this example may have a depth of, for example, 1mm to 3mm. However, other depths may be used.

[0045] In this example, the sleeve includes depressed images **52**. The images **52** of this example may be applied to the sleeve **10** by the process of embossing

and/or debossing (e.g., in-line or off-line rotary or platter die) in columns **56** that begin at the top **18** of the sleeve **10** and terminate at or near the bottom **20** of the sleeve **10**. The depressed images **52** may be positioned to form a pattern on the sleeve **10** as in this example, and/or the images **52** may be randomly placed on the sleeve **10**. The images **52** may be spaced one from another or may be continuous. If spaced one from another, the images **52** may have a gap from the closest gap feasibly possible based on manufacturing capabilities to several millimeters, or more specifically to, for example but not limited, to approximately 1mm to approximately 5mm. The columns **56** of images **52** may also be spaced one from another. The gap between the columns **56** may be, for example but not limited to 1mm to 5mm.

[0046] The gap between the columns **56** may define or create air channels. The air channels may have a vertical pitch of approximately $\Theta=0^\circ$ to approximately $\Theta=60^\circ$, preferably to approximately $\Theta=45^\circ$ with reference to the vertical axis from top **18** to bottom **20** of the sleeve **10**. The air channels may be continuous or substantially uninterrupted such that air may flow freely through the channel. The air channels may contribute to heat diversion from, for example, a hot beverage via air escaping upward and/or downward away from a user's hands or fingers. The diversion of heat may increase the horizontal thermal insulation of the sleeve; hence the user's holding comfort. Additionally, the channels may add rigidity to the sleeve or container without using extra material.

[0047] Fig. 4B is a cross sectional view of a sleeve Fig. 1, **10** (and with minor modifications may also approximate the appearance of a container Fig. 18, **1800** in cross section). This view illustrates the air channels which may be created by the application of images, for example, in columns **56** of depressed images Fig. 4A, **52** that may begin at or near the top **18** of the sleeve **10** and terminate at the bottom **20** of the sleeve **10**.

[0048] FIG.5A illustrates a blank of an exemplary sleeve **10**. The blank **10** in this example may, with slight modifications (e.g., in size or shape), be useful as a blank for a container, Fig. 18, **1800**. In this example, the surface of the sleeve **10** includes a pattern made up of individual images **62**, **68** some of which may be

depressed images 62 and some of which may be raised images 68. The images 62, 68 of this example may be arranged in columns 66, 69 that begin at or near the top 18 of the sleeve 10 and terminate at or near the bottom 20 of the sleeve 10. The columns may consist uniformly of depressed images 62 as in 66, raised images 68 as in 69, or a combination of these.

[0049] Each image 62, 68 may have a shape. The shape of the images 62, 68 may be the same or may differ one from the other. This example illustrates a generally rectangular image 62, 68 with curved ends. However, the images 62, 68 may be of any shape, for example but not limited to, square, polygon, triangle, circle, oval, diamond, or any combination of these. The images 62, 68 of this example may have a depth of, for example, 1mm to 3mm. However, other depths may be used.

[0050] As discussed above, the images 62, 68 of this example may be applied to the sleeve 10 in columns 66, 69 that may begin at or near the top 18 of the sleeve and may terminate at or near the bottom 20 of the sleeve. The images 62, 68 may be spaced one from another or may be continuous within its respective column 66, 69. If spaced one from another, the images 62, 68 may have a gap from the closest gap feasibly possible based on manufacturing capabilities, to several millimeters, or more specifically to for example but not limited to approximately 1mm to approximately 5mm. The columns 66, 69 of images 62, 68 may also be spaced one from another. The gap between the columns 66, 69 may be, for example but not limited to approximately 1mm to approximately 5mm.

[0051] The sleeve may also contain air channels, which may be the result of the gaps between the columns 66, 69. The air channels may have a vertical pitch of, for example but not limited to, approximately $\Theta=0^\circ$ to approximately $\Theta=60^\circ$, preferably to approximately $\Theta=45^\circ$ with reference to the vertical axis from top 18 to bottom 20 of the sleeve 10. The air channels may be substantially uninterrupted and may contribute to heat diversion from, for example, a hot beverage via air escaping upward or downward away from a user's hands or fingers. The diversion of heat may contribute to horizontal thermal insulation and may increase the user's

holding comfort. Additionally, the channels may add rigidity to the sleeve without using extra material.

[0052] Fig. 5B is a cross sectional view of a sleeve Fig. 1, 10. (With minor modifications, it demonstrates the appearance of the cross section of a container Fig. 18, 1800.) This view illustrates the air channels which may be created by the application of images 62, 68, for example, in depressed columns 66, or raised columns 69.

[0053] FIG.6A illustrates a blank of an exemplary sleeve 10. The sleeve 10 blank in this example may, with slight modifications (e.g., in size or shape), be useful as a blank for a container, Fig. 18, 1800. In this example, the sleeve 10 has a pattern made up of individual images 72, 78 some of which may be depressed images 72 and some of which may be raised images 78. The images 72, 78 of this example may be arranged, for example, in mixed pairs 76 of depressed images 72 and raised images 78. Alternatively, the images 72, 78, may be arranged in pairs 76 of depressed images 72 only and raised images 78 only, or further, in triplets, quadruplets, or otherwise. Additionally or alternatively, the images 72, 78 may be arranged so that they alternate in repeating or random patterns such as: depressed image 72, depressed image 72, raised image 78; raised image 78, raised image 78, depressed image 72; and others. The images 72, 78 may alternate (e.g., depressed image 72, raised image 78) across rows (as illustrated by the row marked by line 77) or the images 72, 78 may alternate (e.g., depressed image 72, raised image 78) down columns 79. For example, the images 72, 78 may alternate across both rows 77 and also alternate down columns 79. In another example, the images 72, 78 may alternate across rows 77 but not columns 79. Other examples of arrangements are also contemplated.

[0054] Each image 72, 78 may have a shape. The shape of the images 72, 78 may be the same or may differ one from the other. This example illustrates a generally rectangular image 72, 78 with curved ends. However, the images 72, 78 may be of any shape, for example but not limited to, square, polygon, triangle, circle, or any combination of these. The images 72, 78 of this example may have

a depth of, for example, approximately 1mm to approximately 3mm. However, other depths may be used.

[0055] As discussed above, the images 72, 78 of this example may be applied to the sleeve 10 in pairs 76 or otherwise. The pairs 76 of images 72, 78 may be arranged in an offset arrangement as shown and may be spaced one from another or may be continuous within the pair 76. If spaced one from another, the images 72, 78 may have a gap from the closest gap feasibly possible based on manufacturing capabilities, to several millimeters, or for example but not limited to approximately 2mm to approximately 5 mm. The pairs 76 may also be spaced one from another and, for example, off set. The gap between the pairs 76 in any direction may be, for example but not limited to approximately 1mm to approximately 5mm.

[0056] The images 72, 78 may be arranged to define an air channel. For example, the gaps between the columns 79 of the sleeve 10 may define air channels. The air channels may have a vertical pitch of, for example but not limited to, approximately $\Theta=60^\circ$. Preferably to approximately $\Theta=45^\circ$ to approximately $\Theta=30^\circ$ with reference to the vertical axis from top 18 to bottom 20 of the sleeve 10. The air channels may be substantially uninterrupted and may contribute to heat diversion from, for example, a hot beverage via hot air escaping upward or downward away from a user's hands or fingers. The diversion of heat may contribute to horizontal thermal insulation and may increase the user's holding comfort. Additionally, the channels may add rigidity to the sleeve without using extra material.

[0057] Fig. 6B is a cross-sectional view of a sleeve 10 and may also approximate the appearance of the cross section of a container Fig. 18, 1800. This view illustrates the air channels which may be created or defined by columns 79 of depressed images 72 alternating with raised images 78, which may be, for example, embossed and/or debossed.

[0058] Figs. 7-18 illustrate several contemplated variations image shapes, image application, and column arrangement.

[0059] Fig. 7 illustrates an arrangement of sleeve **10** blanks, for example, as cut lines **85** on sheet material **84**. The sheet material **84** may contain one or more blanks of a sleeve **10**, although not illustrated, the sheet material may also contain one or more blanks of a container Fig. 18, **1800**. The blank **10** in this example may, with slight modifications (e.g., in size or shape), be useful as a blank for a container, Fig. 18, **1800**. The sleeve **10** blanks may be positioned on the sheet material **84** in a repeating pattern.

[0060] As in this example, the images **82**, which may be raised images or depressed images, may be applied to the entire sheet material **84**. After applying the images **82** the sleeves may be isolated from the sheet material by releasing the sleeve **10** blanks along their cut lines **85**. This example also illustrates how images **82** may be created in different shapes. In this example, the images **82** are shown as generally triangular. The images **82** of this example may be applied to the sleeve **10** blank by the process of embossing and/or debossing (e.g., in-line or off-line rotary or platen die) and may be arranged in columns **83** that begin at the top **18** of the sleeve **10** and terminate at or near the bottom **20** of the sleeve **10**. The images **82** may be positioned to form a pattern on the sleeve **10** as in this example, or the images **82** may be randomly placed on the sleeve as in the other examples disclosed herein. Additionally, the images **82** may be arranged horizontal with the plane of the sheet material as shown or may follow the arc of the sleeve **10**, as in the illustrations above (e.g., Fig. 2A).

[0061] Fig. 8 illustrates a blank containing another exemplary sleeve **10** and illustrating the variation of possible shapes and designs of applied images **87**, **88**. In this example, the images **87**, **88** are shown as generally triangular. The images **87**, **88** of this example may be applied to the sleeve **10** as raised images **87** or as depressed images **88** by the process of embossing and/or debossing (e.g., in-line or off-line rotary or platen die) and may be arranged in columns **85**, **86** that begin at the top **18** of the sleeve **10** and terminate at or near the bottom **20** of the sleeve **10**. In this example, the images **87**, **88** are arranged in alternating raised image columns **85** and depressed image columns **86**. The images **87**, **88** may be positioned to form a pattern on the sleeve or container blank **11** as in this example,

or the images **87**, **88** may be randomly placed on the sleeve as in the examples above. Alternatively, the patterns may be alternated in other ways, such as repeating patterns of: embossed image column **85**, raised image column **85**, depressed image column **86**; raised image column **86**, depressed image column **86**, raised image column **85**; and others.

[0062] The gap between the columns **85**, **86** may be air channels which may have a vertical pitch of, for example but not limited to, approximately $\Theta=0^\circ$ to approximately $\Theta=60^\circ$, preferably to approximately $\Theta=45^\circ$ with reference to the vertical axis from top **18** to bottom **20** of the sleeve **10**. The air channels may facilitate heat via hot air flow up or down away from a users hand.

[0063] Fig. 9 illustrates a variation in the image shapes, image application, and column arrangement. In this example, the image **94** may be oblong and may be applied to the sleeve **10** in various sizes. Any number of sizes may be applied. As discussed above, the images **94** may be raised, depressed, or a combination of these and may be applied by, for example, embossing and/or debossing. The images **94** may be applied in columns from the top **18** of the sleeve **10** to the bottom **20** of the sleeve **10**. The images **94** may be arranged one above each other within a column **96**. Each column **96**, may be made up of images **94** of the same size, or of various sizes. As discussed above, the images **94** within a column **96** may be continuous, or may be spaced one from another. The columns **96** may be spaced one from another, the spaces between the columns defining air channels. The columns **96** and/or air channels may be arranged such that they follow the arc of the sleeve, or alternatively, the columns **96** and/or air channels may be arranged horizontal to the plane of the sheet material as in Fig. 10.

[0064] Fig. 11 illustrates an alternative pattern of images **112** which may be oblong and may be applied to the sleeve or container blank **11** in a uniform size. As discussed above, the images **112** may be raised, depressed, or a combination of these and may be applied by, for example, embossing and/or debossing. The images **112** may be applied in columns **114** from the top **18** of the sleeve **10** to the bottom **20** of the sleeve **10**. The images **112** may be arranged one above each other within a column **114**. Each column **114** may be made up of images **112** of

the same size. Each column 114 may be spaced one from another, for example, approximately 1mm to 5mm apart and further, each column 114 may be offset from the neighboring column 114. The spaces between the columns may define air channels which may have a vertical pitch of for example but not limited to approximately $\Theta=60^\circ$, preferably to approximately $\Theta=45^\circ$ to approximately $\Theta=30^\circ$ with reference to the vertical axis from the top 18 to bottom 20 of the sleeve or container blank 10. As discussed above, the images 112 within a column 114 may be continuous, or may be spaced one from another. The columns 114 may be arranged horizontal to the plane of the sheet material as shown, or alternatively, the columns 114 may be arranged such that they follow the arc of the sleeve.

[0065] Figs. 12 and 13 illustrate an alternative pattern of images 120, 130 which may be oblong and may be applied to the sleeve 10 in a uniform size as shown or in varying sizes. As discussed above, the images 120, 130 may be raised, depressed, or a combination of these and may be applied by, for example, embossing and/or debossing. The images 120, 130 may be applied in columns 122, 132 from the top 18 of the sleeve or container blank 11 to the bottom 20 of the sleeve or container blank. The images 120, 130 may be arranged on above each other within a column 122, 132. Each column 122, 132 may be spaced one from another, for example, approximately 1mm to 5mm apart and additionally, each column 122, 132 may be offset from the neighboring column. The spaces between the columns may define air channels which may have a vertical pitch of for example but not limited to approximately $\Theta=0^\circ$ to approximately $\Theta=60^\circ$, preferably to approximately $\Theta=45^\circ$ with reference to the vertical axis from top 18 to bottom 20 of the sleeve 10. As discussed above, the images 120, 130 within a column 124, 134 may be continuous, or may be spaced one from another. Figs. 12 and 13 illustrate images 120, 130 which are placed closely together relative to the placement of the images in Figs. 10 and 11. The columns 132 may be arranged horizontal to the plan of the sheet material as shown in Fig. 13, or alternatively, the columns 122, 132 may be arranged such that they follow the arc of the sleeve or container blank as shown in Fig. 12.

[0066] Figs. 14 and 15 illustrate a surface on which the images **140**, **150** are moved increasingly close together in rows **142**, **152** while still maintaining air channels which may permit horizontal and near vertical heat flows. The images **140**, **150** may be aligned horizontal with the plane of the sheet material as shown in Fig. 14, or may be aligned with the arc of the sleeve or container blank as in Fig. 15.

[0067] Figs. 16 and 17 illustrate further variations of image shape, placement, and column arrangement which may facilitate multidirectional heat or hotair flow up or down away from a users hand. Figs. 16 and 17 illustrate images **160**, **170** which are generally trapezoidal. The images are aligned in columns which are offset from neighboring columns and create horizontal and other directional air channels as discussed above.

[0068] While the disclosure above primarily references the sleeve, a container embodiment is described in Fig. 18, which illustrates a cut away view of a container imprinted with images as described above. Any of the sleeve blanks illustrated in Figs. 1-17 may be easily modified to form a container with the same features. The container **1800** may include a lip **1810**, images **1802** arranged in columns **1804** defining air channels, a bottom, and an optional exterior liner or outer wrap **1808**. The images **1802** imprinted on the container **1800** (for example, by embossing or debossing) may be of any of the patterns disclosed or described above. The air channels are substantially uninterrupted and facilitate horizontal insulation.

[0069] Fig. 19 shows an exemplary method for forming a sleeve Fig. 1, **10** or container Fig. 18, **1800**. Box **90** may contain a step of applying images to a sheet material by embossing and/or debossing (e.g., in-line or off-line rotary or platen die), box **91** may contain a step of cutting a sleeve **10** or container blank Fig. 18, **1800** to a sheet material, for example, with cut lines; and box **92** may contain the step of releasing the sleeves from the sheet material at their cut lines. The sequence of the steps may be altered and additional steps may be added.

[0070] While various embodiments of the invention have been described, it will be apparent to those of ordinary skill in the art that many more embodiments and implementations are possible that are within the scope of the invention.

WE CLAIM:

1. A sleeve for encircling a container, comprising:
a body having a first edge and a second edge and a surface between the edges;
wherein the sleeve includes raised or depressed images over the surface;
wherein the images are arranged in columns that begin at the first edge of the sleeve and terminate at the second edge of the sleeve; and
wherein the gaps between the columns define substantially uninterrupted air channels from the first edge to the second edge.
2. The sleeve of claim 1, wherein the image further comprise a generally rectangular shape with curved ends.
3. The sleeve of claim 2, wherein the rectangular shape is a planar polygon in the X-Y plane and is curvilinear in the Z plane.
4. The sleeve of claim 1, wherein the image has a depth of several mm, preferably 1 mm to approximately 5 mm.
5. The sleeve of claim 1, wherein the images are spaced substantially vertically one from another creating columns.
6. The sleeve of claim 1, wherein the channels have a vertical pitch of approximately $\Theta=0^\circ$ to approximately $\Theta=60^\circ$, preferably to approximately $\Theta=45^\circ$ with reference to the vertical axis from top to bottom of the sleeve.
7. The sleeve of claim 1, wherein the columns of images are spaced from each with a gap of several mm, preferably approximately 1 mm to approximately 5 mm.
8. The sleeve of claim 1, wherein the images are arranged in pairs comprising a raised image and a depressed image.
9. The sleeve of claim 8, wherein the images are further arranged in an offset pattern defining substantially vertical air channels.
10. The sleeve of claim 1, wherein the surface comprises columns of raised images alternating with columns of depressed images.

11. The sleeve of claim 1, wherein the surface comprises columns of raised images.
12. The sleeve of claim 1, wherein the surface comprises columns of depressed images.
13. A method for forming a sleeve, comprising:
 - applying images to the surface of a sheet material wherein the images are arranged in columns that begin at the first edge of the sleeve and terminate at the second edge of the sleeve;
 - wherein the columns are spaced one from another creating gaps;
 - the gaps between the columns defining substantially uninterrupted air channels; and
 - applying cut lines defining a blank to the sheet material;
 - wherein the blank comprises an elongate body have a first edge and a second edge.
14. The method of claim 13 wherein the images are raised.
15. The method of claim 13 wherein the images are depressed.
16. The method of claim 13 wherein images are applied by embossing.
17. The method of claim 13 wherein the images are applied by debossing.
18. The method of claim 13 wherein the images are applied by a combination of embossing and debossing.
19. The method of claim 13 further comprising cutting the blanks from the sheet material.
20. The method of claim 13 further comprising joining the ends of the blank to form a sleeve.
21. A container including sides, a body, and an opening for receiving liquids, the body further comprising:
 - a first edge and a second edge and a surface between the edges;

wherein the container includes raised or depressed images over the surface;

the images are arranged in columns that begin at the first edge of the sleeve and terminate at the second edge of the sleeve; and

wherein the gaps between the columns define substantially uninterrupted air channels from the first edge to the second edge.

22. The container of claim 21, wherein the image further comprise a generally rectangular shape with curved ends.

23. The container of claim 22, wherein the rectangular shape is a planar polygon in the X-Y plane and is curvilinear in the Z plane.

24. The container of claim 21, wherein the image has a depth of several mm, preferably approximately 1mm to approximately 5mm.

25. The container of claim 21, wherein the images are spaced substantially vertically one from another creating columns.

26. The container of claim 21, wherein the channels have a vertical pitch of approximately $\Theta=0^\circ$ to approximately $\Theta=60^\circ$, preferably to approximately $\Theta=45^\circ$ with reference to the vertical axis from top to bottom of the sleeve.

27. The container of claim 21, wherein the columns of images are spaced from each with a gap of several mm, preferably approximately 1mm to approximately 5mm.

28. The container of claim 21, wherein the images are arranged in pairs comprising a raised image and a depressed image.

29. The container of claim 28, wherein the images are further arranged in an offset pattern defining vertical air channels.

30. The container of claim 1, wherein the surface comprises columns of raised images alternating with columns of depressed images.

31. The container of claim 21, wherein the surface comprises columns of raised images.

32. The container of claim 21, wherein the surface comprises columns of depressed images.

33. The container of claim 21 further including an outer wrap.

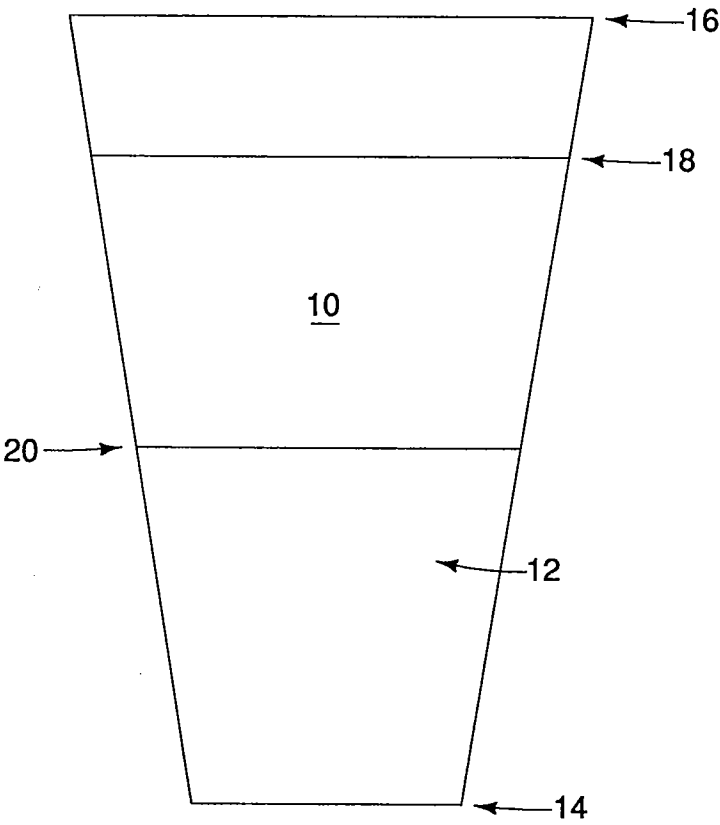


FIG. 1

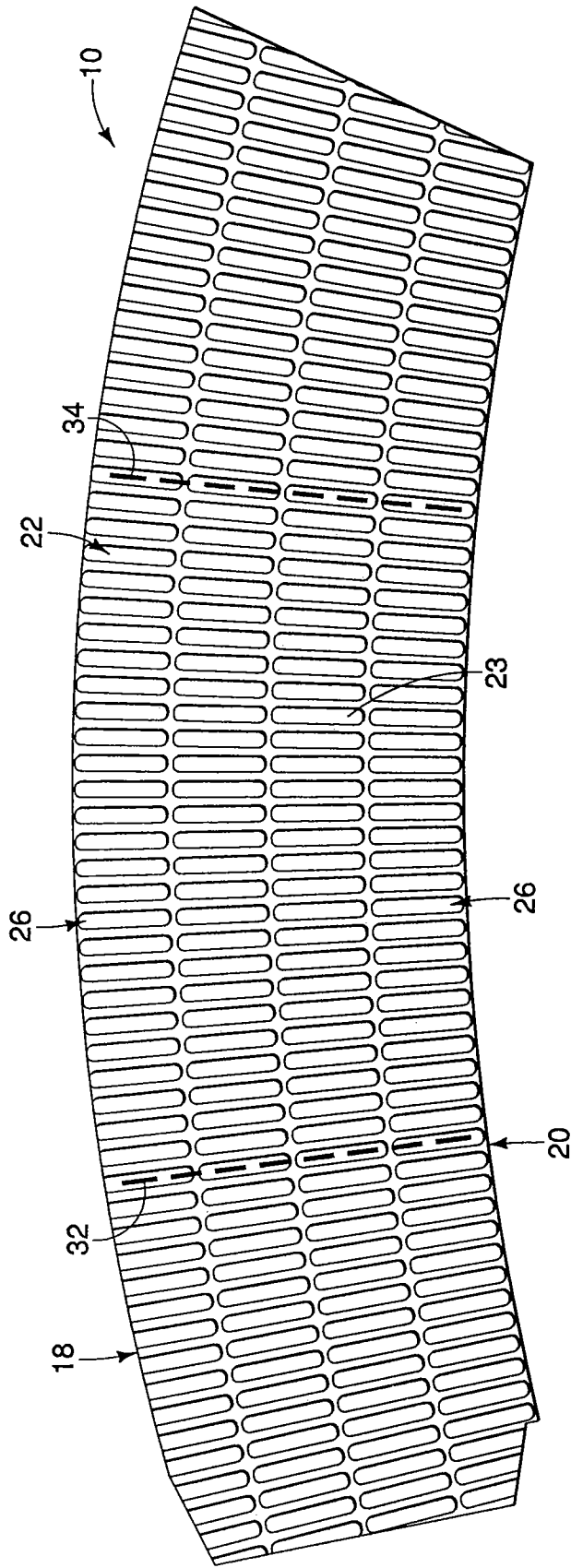


FIG. 2A

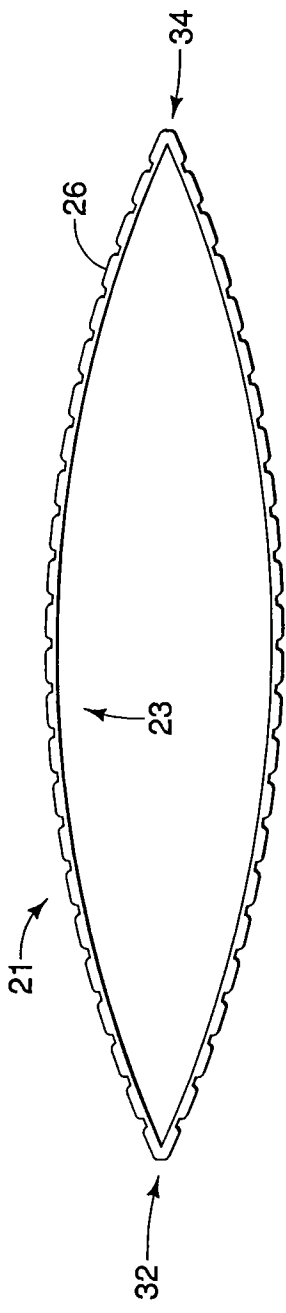


FIG. 2B

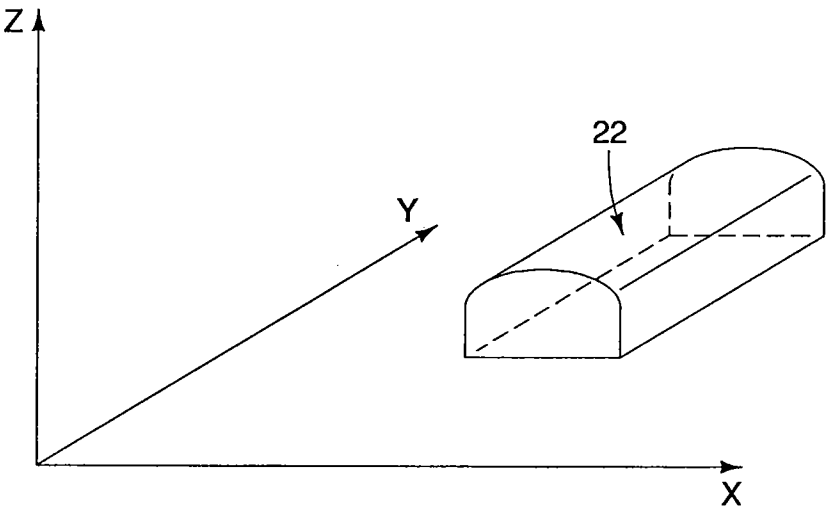
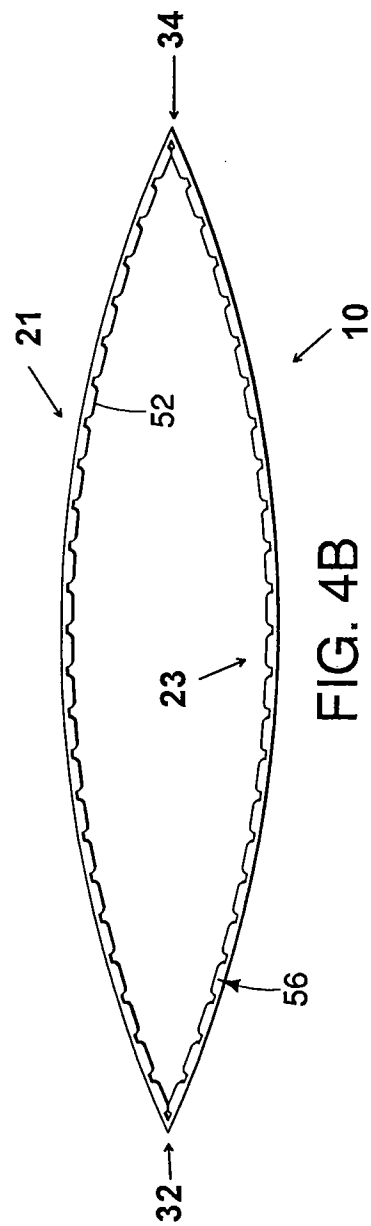
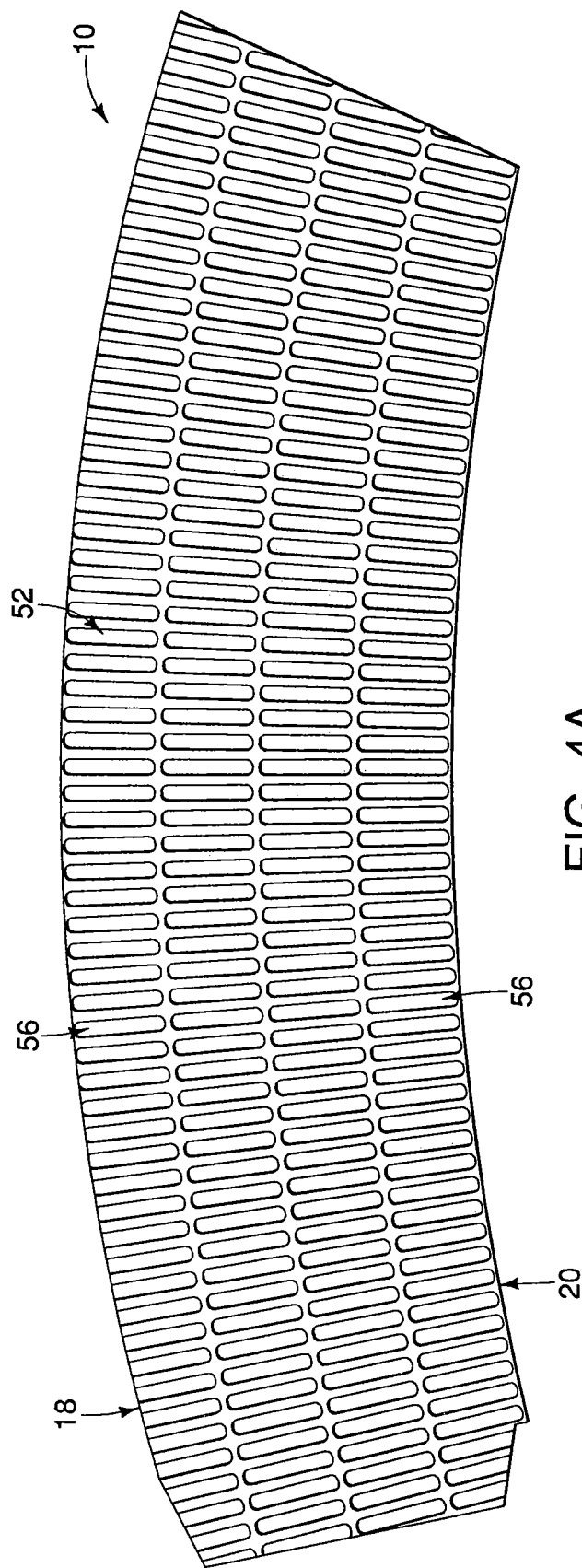


FIG. 3



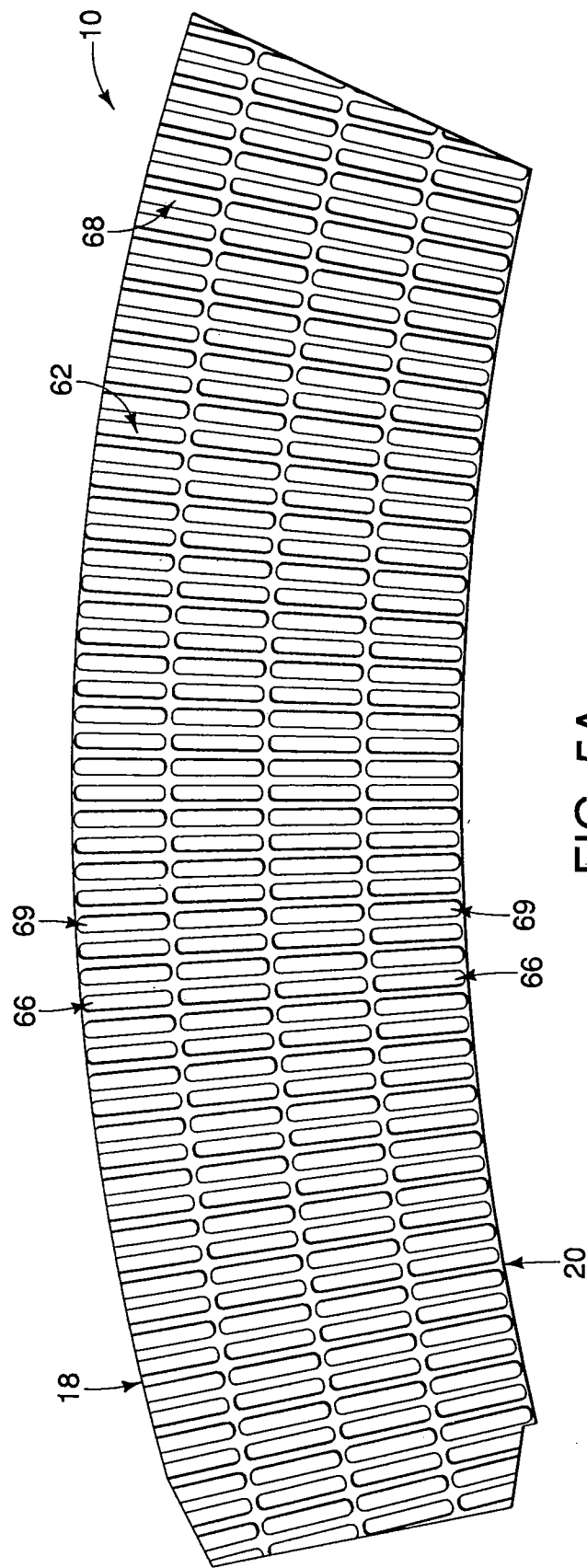


FIG. 5A

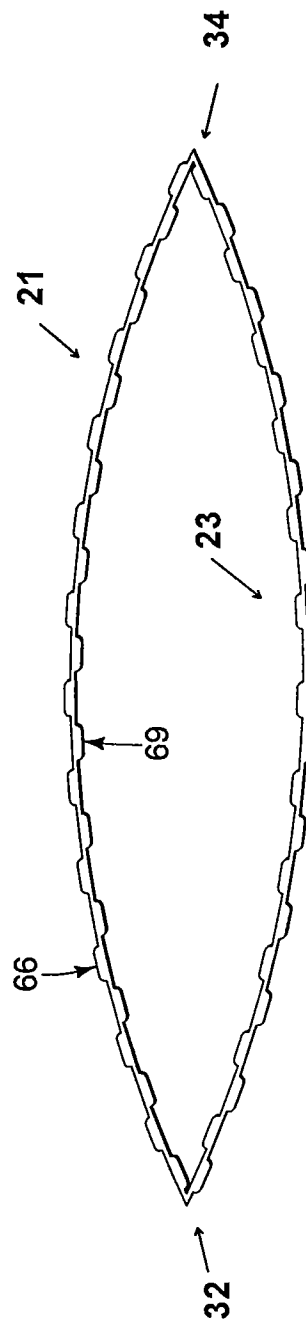


FIG. 5B

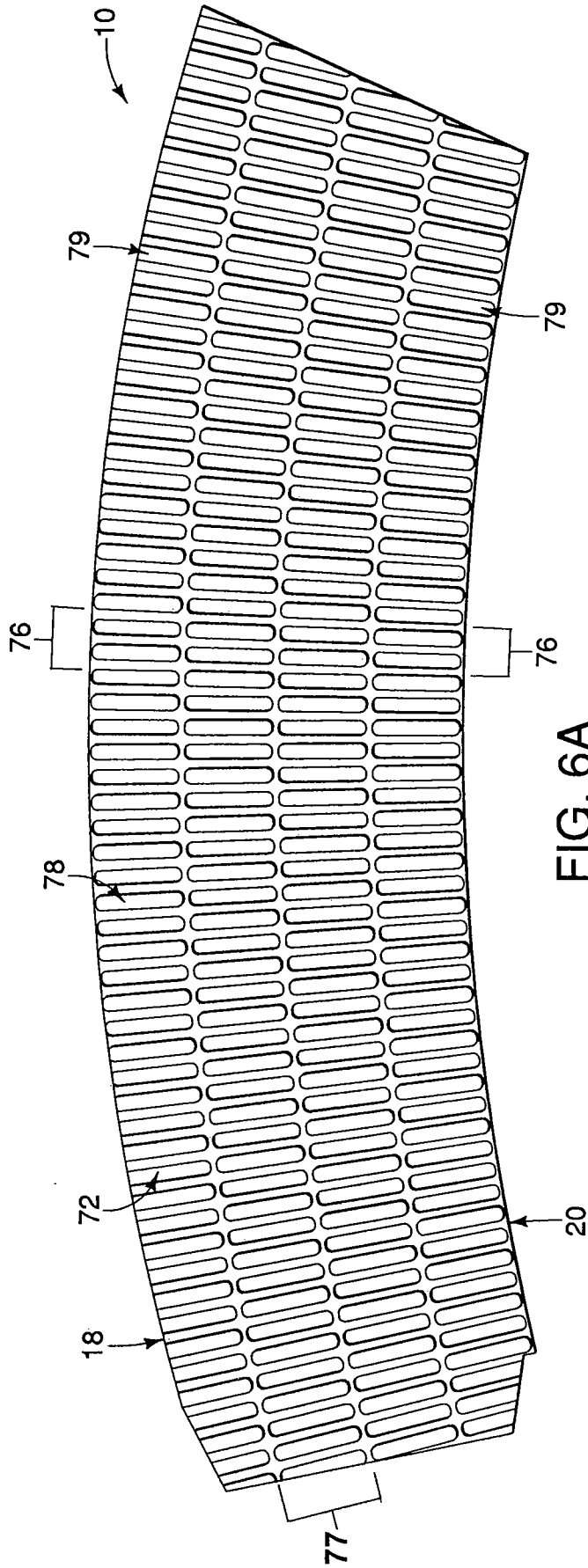


FIG. 6A

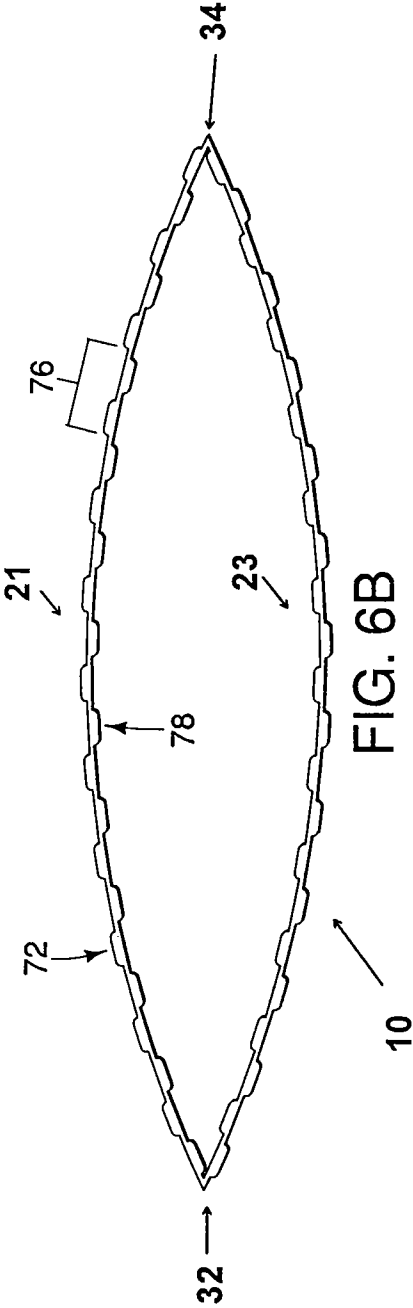


FIG. 6B

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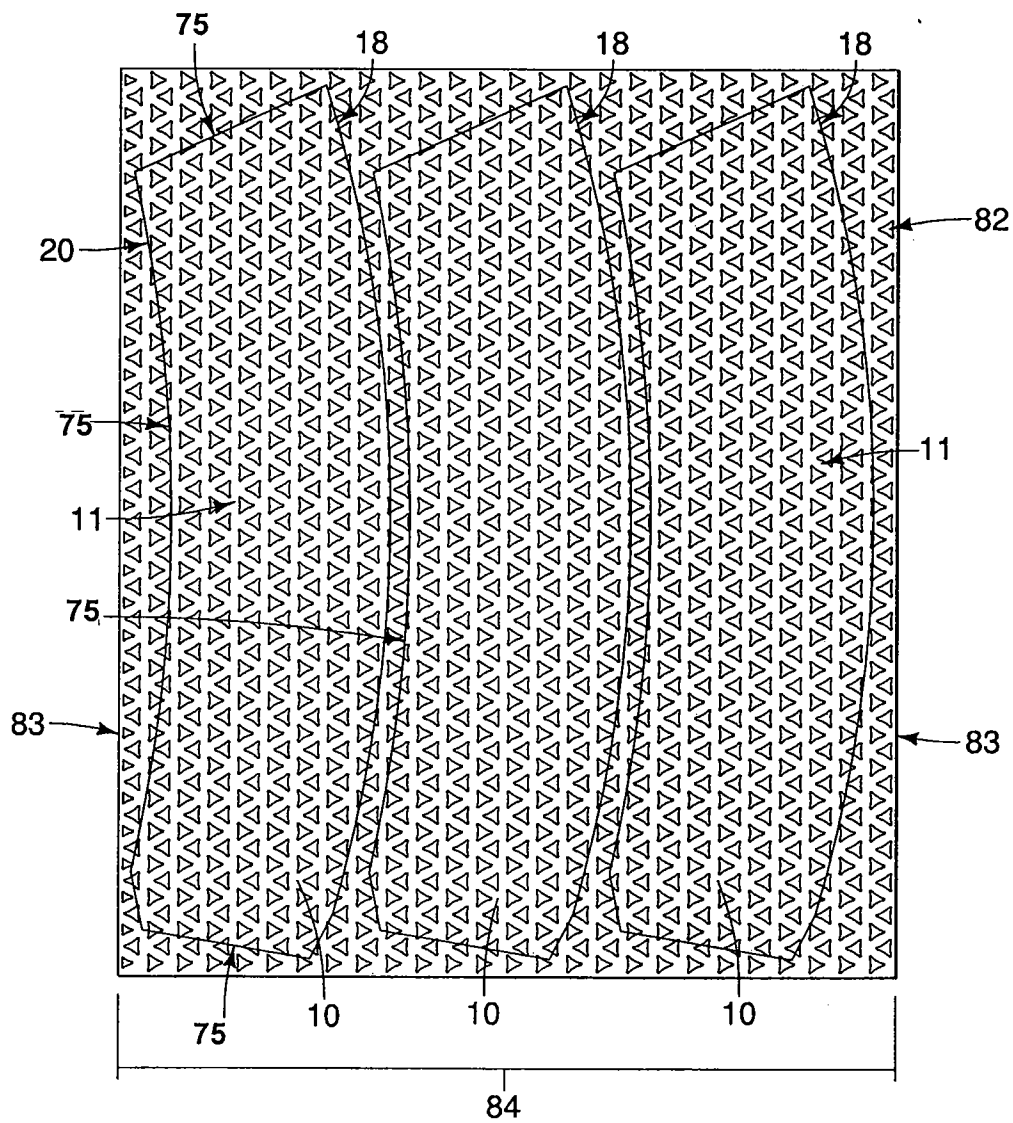


FIG. 7

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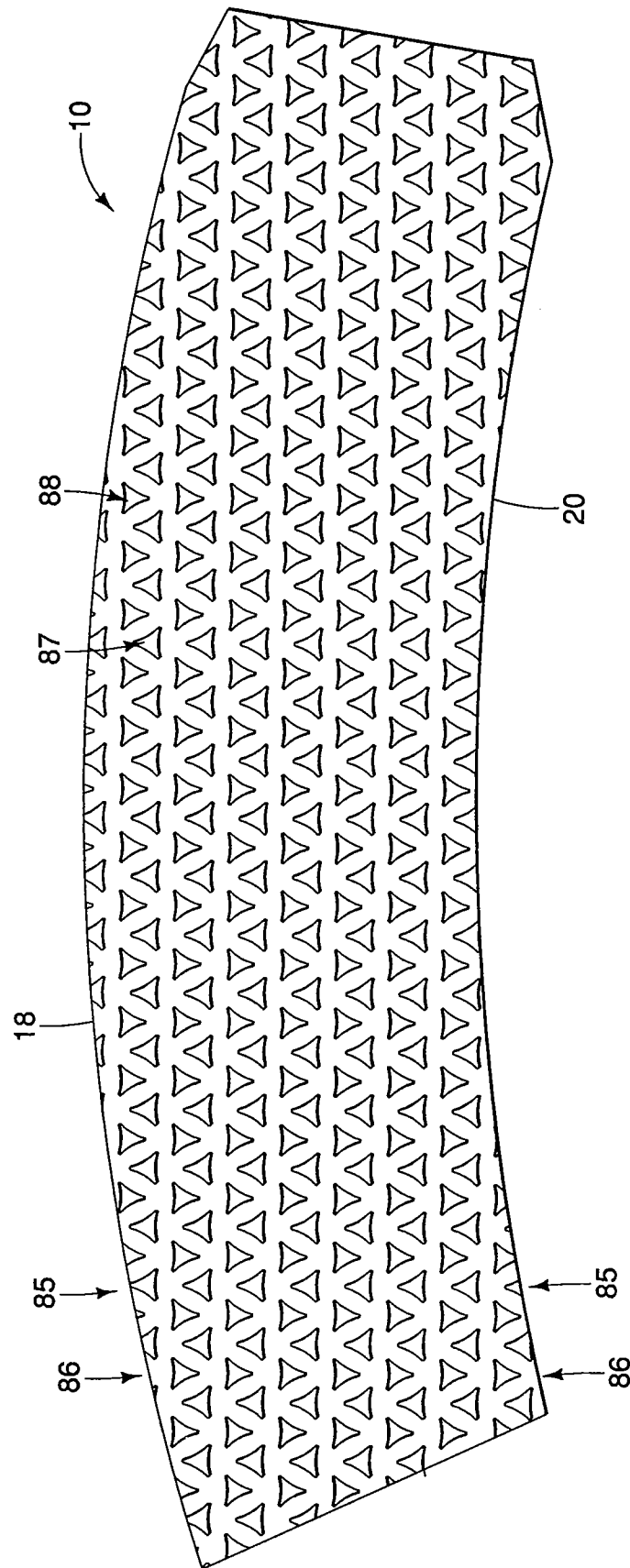
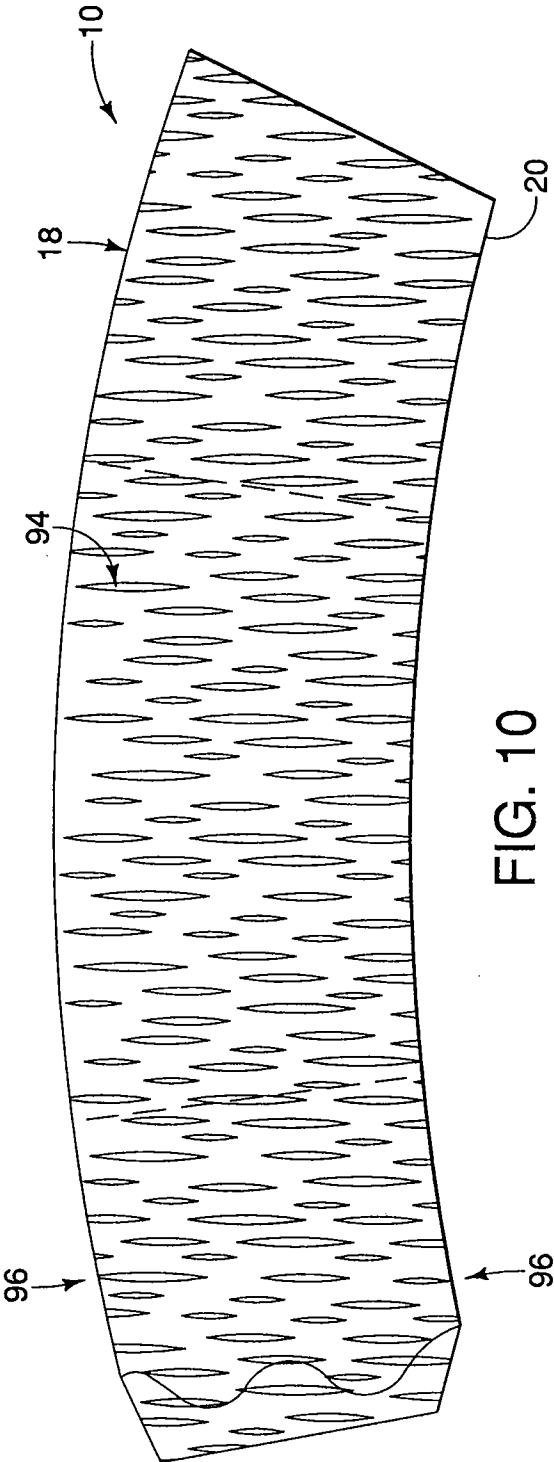
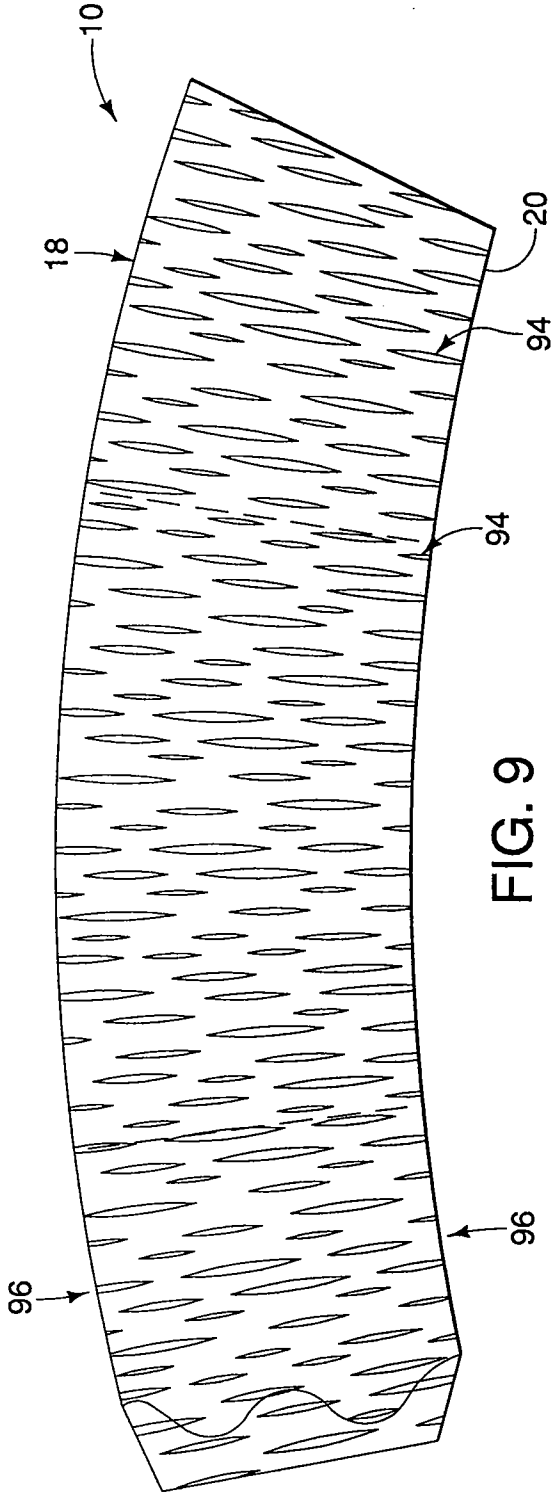


FIG. 8



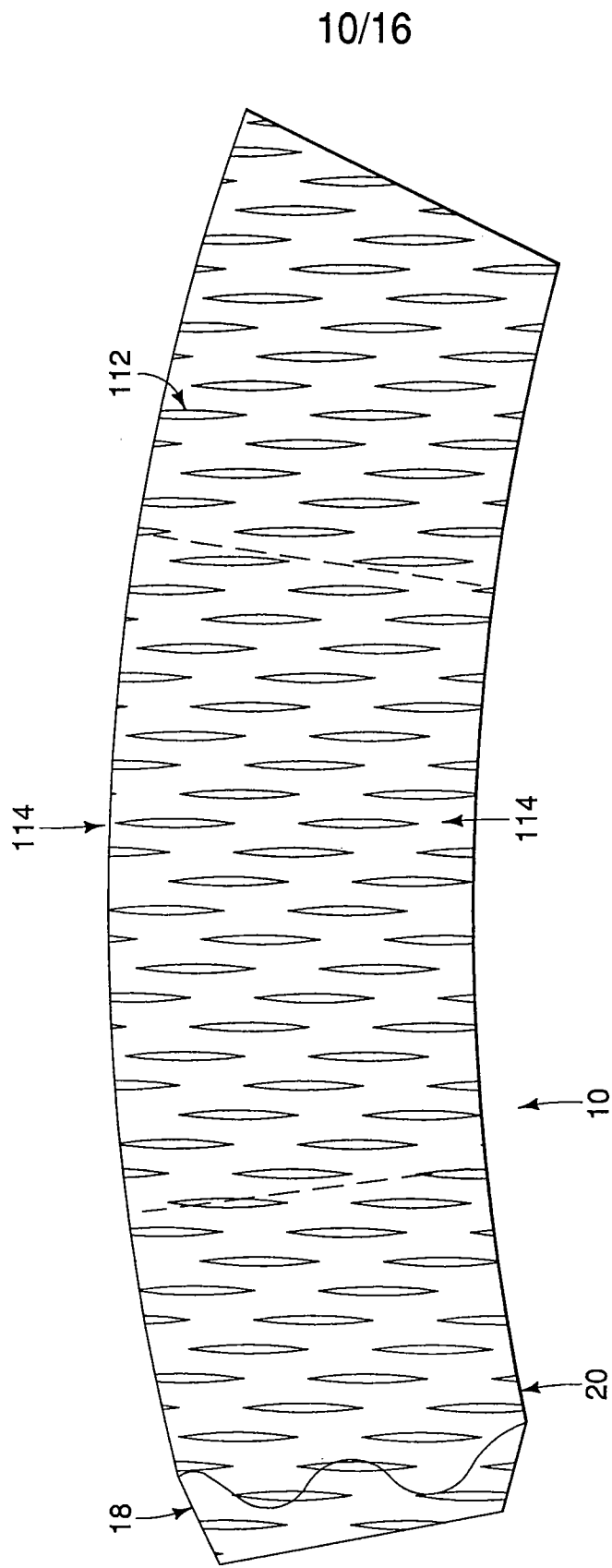
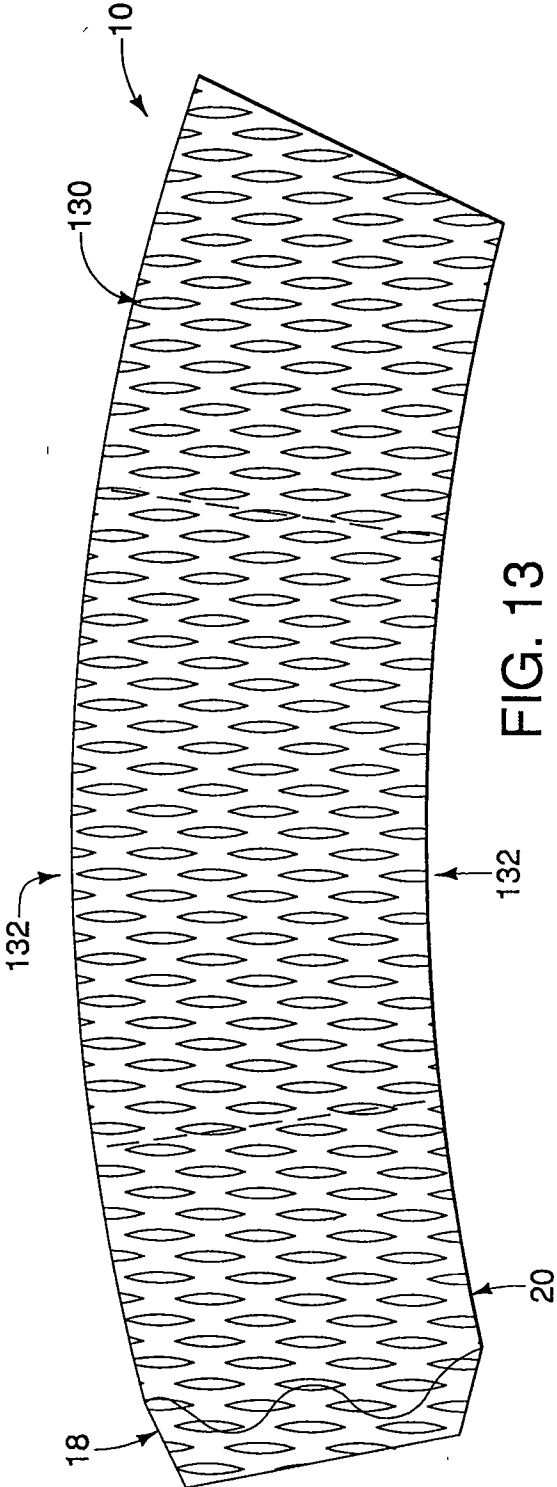
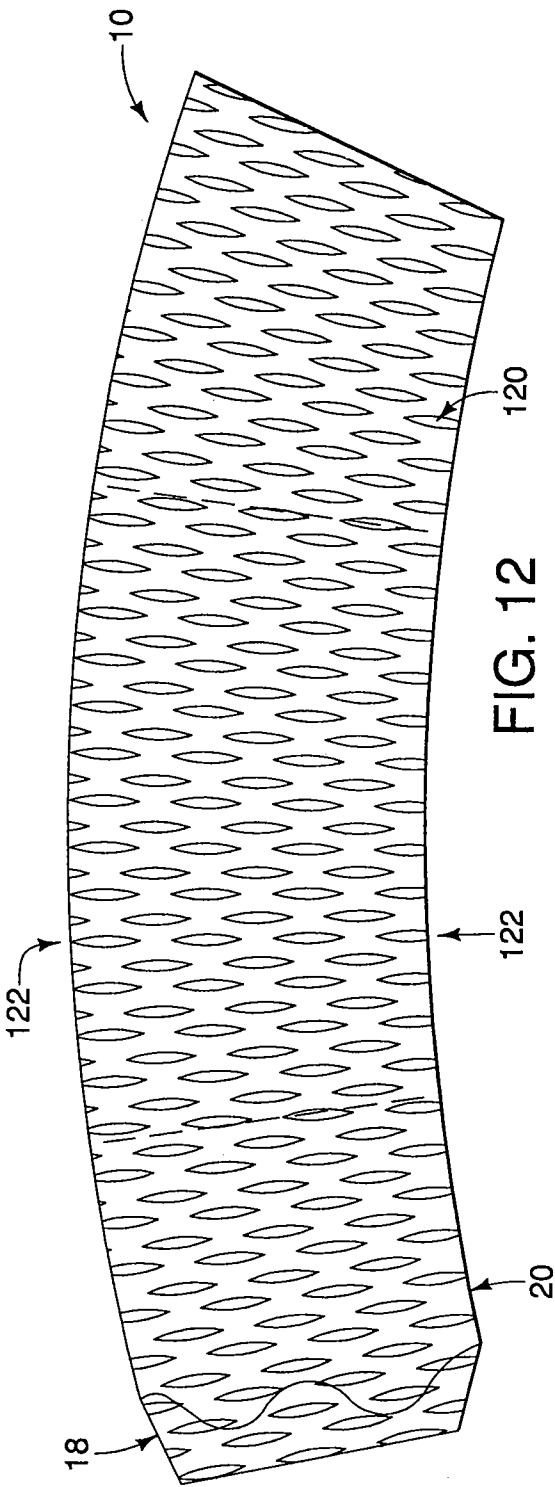


FIG. 11



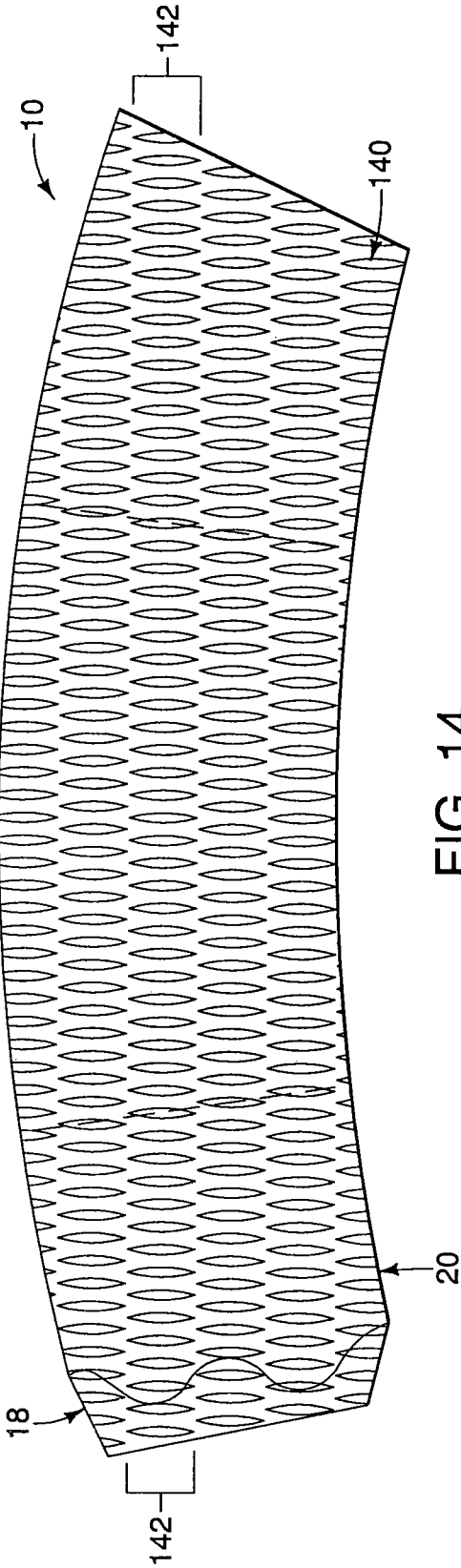


FIG. 14

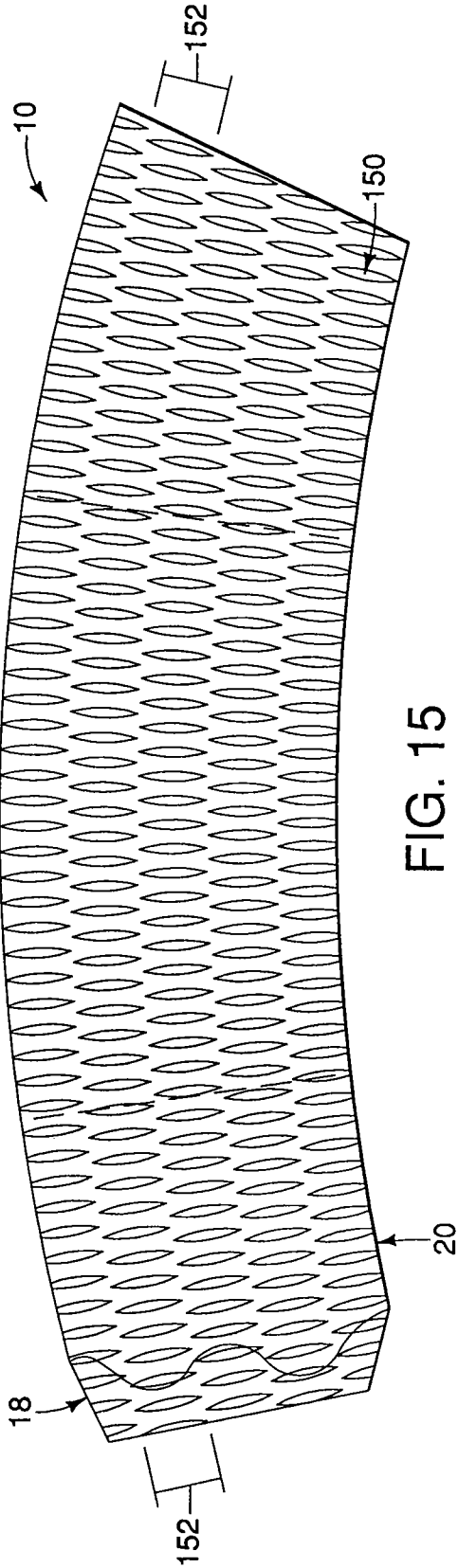
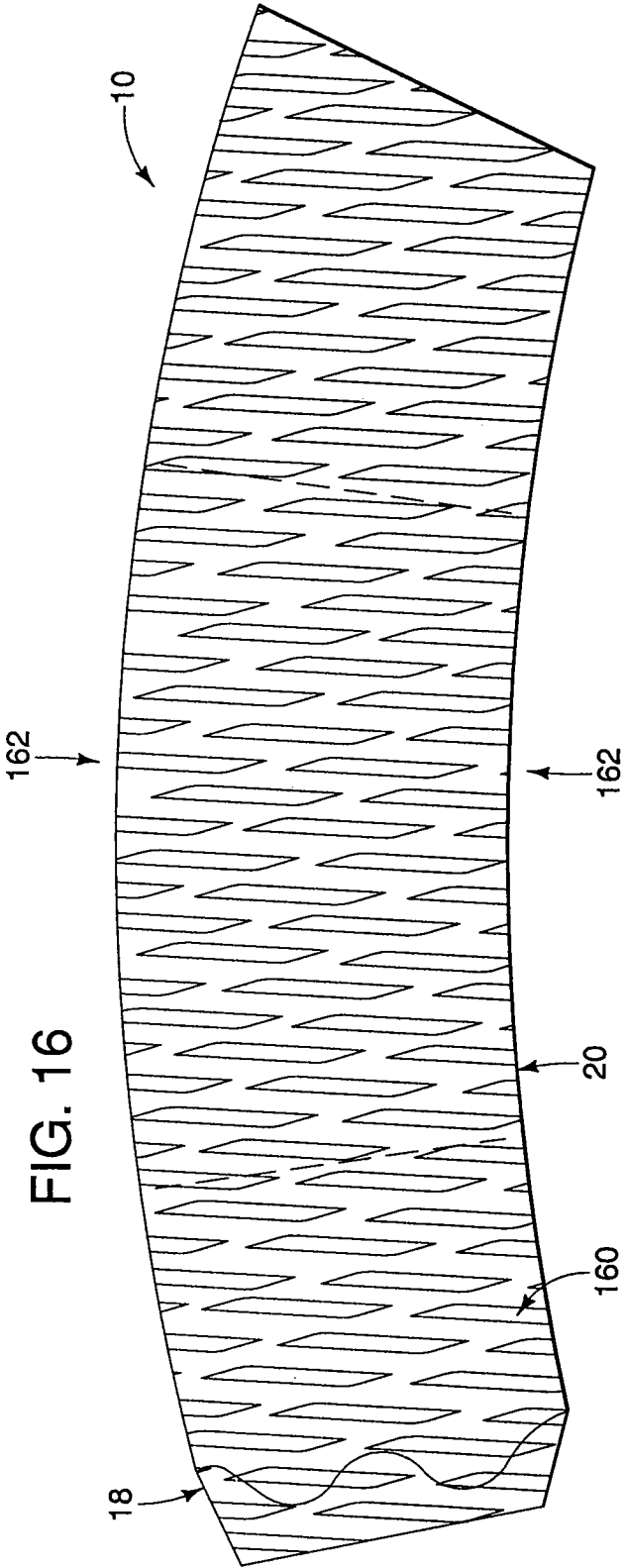


FIG. 15



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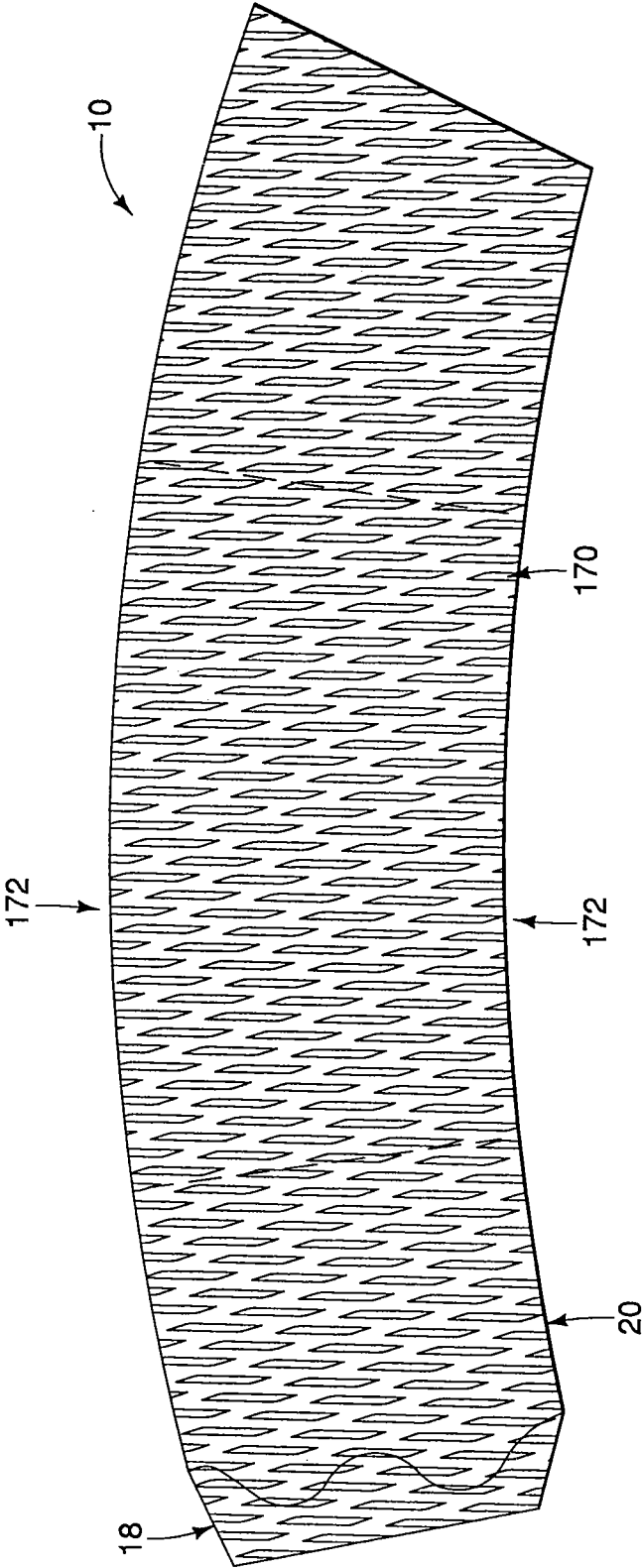


FIG. 17

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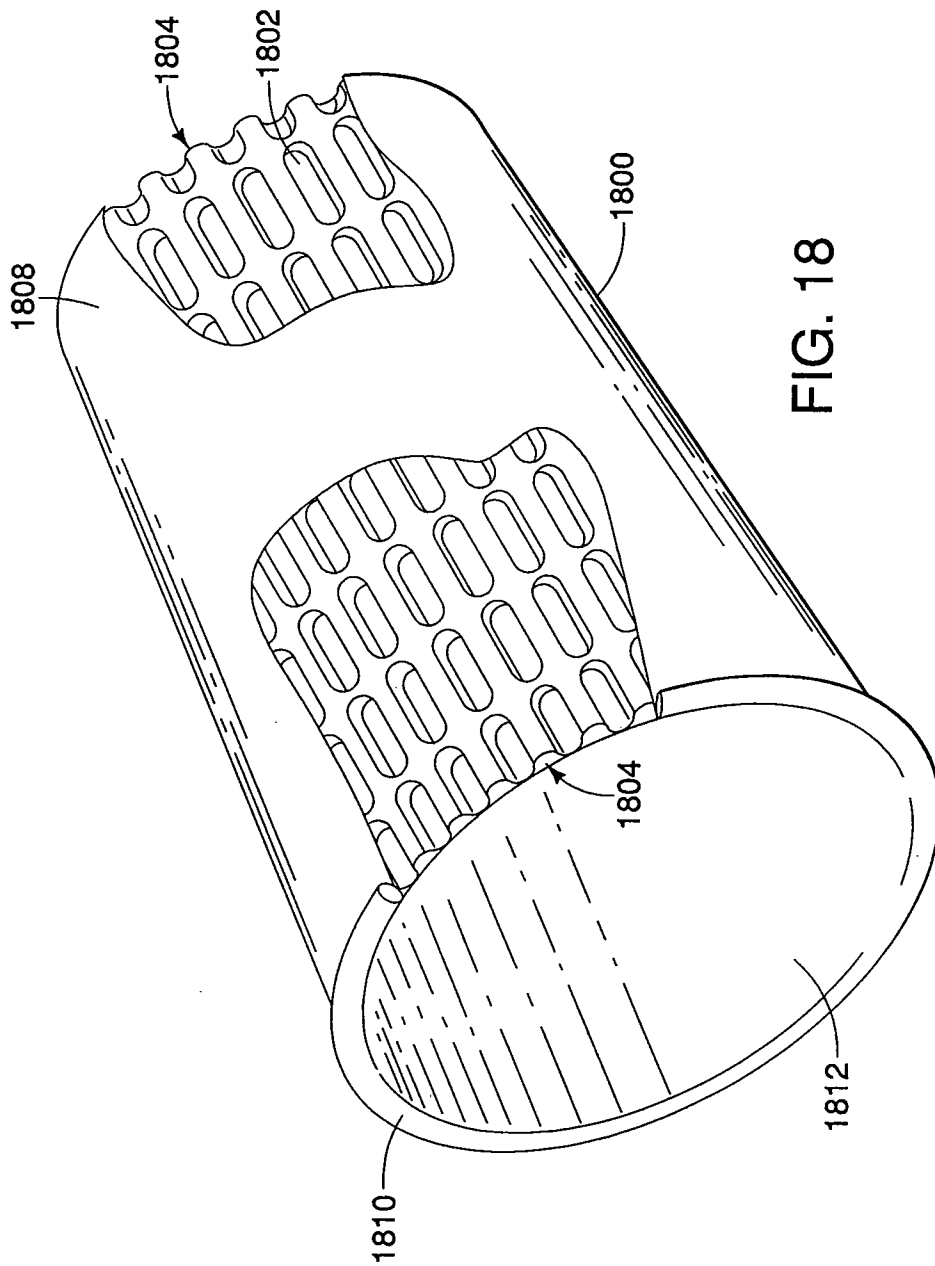


FIG. 18

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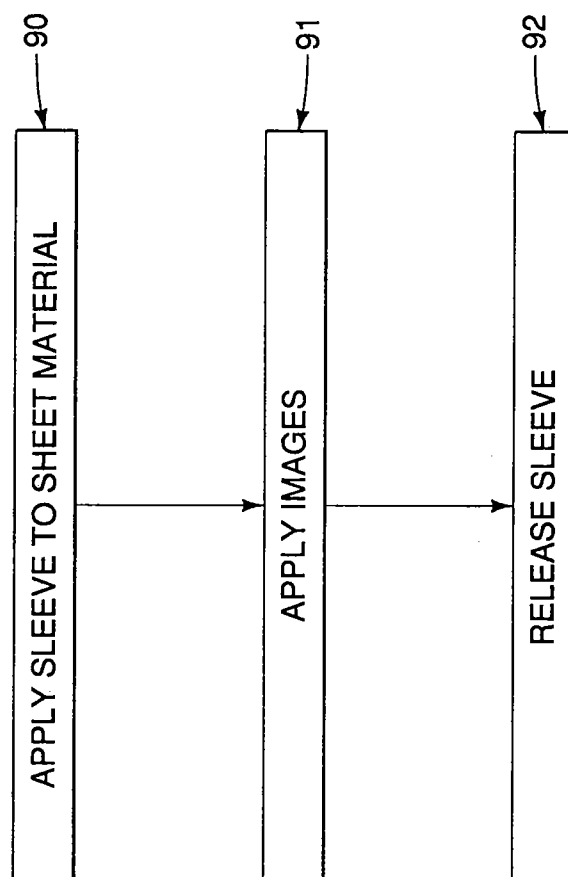


FIG. 19

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2010/020705

A. CLASSIFICATION OF SUBJECT MATTER INV. A47G23/02 B65D25/20 ADD.		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) A47G B65D		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, INSPEC		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 601 728 B1 (NEWKIRK RAYMOND [US] ET AL) 5 August 2003 (2003-08-05) column 3, line 25 - column 5; figures -----	1-33
X	US 5 826 786 A (DICKERT JAMES [US]) 27 October 1998 (1998-10-27) page 3, paragraph 2; figure 5 -----	1-33
X	US 5 205 473 A (COFFIN SR DAVID W [US]) 27 April 1993 (1993-04-27) column 2, line 45 - column 4, line 61; figures 1-4 -----	1-33
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<div style="display: flex; justify-content: space-between;"> <input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex. </div>		
<div style="display: flex;"> <div style="flex: 1;"> <p>* Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="flex: 1;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p> </div> </div>		
Date of the actual completion of the international search <div style="text-align: center; font-weight: bold;">21 June 2010</div>		Date of mailing of the international search report <div style="text-align: center; font-weight: bold;">28/06/2010</div>
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer <div style="text-align: center; font-weight: bold;">Van Bastelaere, Tiny</div>

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2010/020705

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2010/020705

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