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

(11) EP 1 894 852 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
25.08.2010 Bulletin 2010/34

(51) Int Cl.:
B65D 85/52 *(2006.01)* ***B65D 77/04*** *(2006.01)*
B65D 5/00 *(2006.01)* ***B65D 5/20*** *(2006.01)*

(21) Application number: **07115053.6**

(22) Date of filing: **27.08.2007**

(54) **Carrier, packaging system and method for packaging trays of plantlets**

Träger, Packsystem und Verfahren zum Verpacken von Trays für Pflanzlinge

Support, système de conditionnement et procédé pour conditionner des plateaux pour des plantules

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE SI SK TR

(30) Priority: **31.08.2006 US 513599**

(43) Date of publication of application:
05.03.2008 Bulletin 2008/10

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Description

TECHNICAL FIELD

[0001] The subject matter described herein relates generally to systems, apparatuses, and methods for transporting plantlets. More particularly, the subject matter disclosed herein relates to the packaging of plantlets for transport employing carton carriers on which trays of plantlets may be placed.

BACKGROUND

[0002] Shipping of plantlets, such as small or fragile plants, seedlings, cuttings, or the like, that have yet to reach maturity has always posed certain challenges for growers, distributors, and retailers. Keeping the plants in a viable condition and protecting them from handling damage are primary concerns during shipping. Further, distributors need to be able to ship plantlets in bulk to help maximize efficiencies associated with delivery and handling to lower the cost associated with each plantlet.

[0003] Often, multiple trays of plantlets are stacked within a box container for bulk shipment of plantlets. E.g., NL 9000582 A describes a box for packaging small plantlets on trays. It discloses the features of the preamble of claim 1. The trays provide a holding area for soil to provide nutrients and water to each plantlet during shipment. To prevent the plantlets from being crushed or damaged by the stacking of the trays, the trays are often placed on stackable carton carriers that are insertable and stackable within the box container. E.g., US 3,119,492 A describes tray packages for holding sensitive plates. While carton carriers may be made of many different materials, corrugated fiberboard carton carriers are typically used due to the fact that they are sturdy and inexpensive. Prefabricated corrugated fiberboard carton carriers that are reinforced on their bottoms and sides provide great durability. Such prefabricated carton carriers also greatly increase cost of the shipment of the plantlets due to their preassembly and bulk.

[0004] Unassembled flat sheets of corrugated fiberboard, typically referred to as blanks, may also be used to create cartons that are stackable within boxes for holding trays of plantlets. Blanks may be used that provide support on all sides and the bottom of the carton carriers when assembled. However, these blanks have complex folding instructions and are often complicated to assemble. The number of folds to be made and the specific order in which the folding of the blanks must occur to create these carton carriers greatly impede the packaging of plantlets within the fields and green houses where the plantlets are to be packed. Therefore, the cost of assembly greatly increases the shipment cost associated with the plantlets.

[0005] Simple blanks have been developed that can be formed into carton carriers having two walls which run parallel to each other. These carton carriers are easy to create from their corresponding blanks. The workers who load the plantlets can easily form a carton carrier by folding a first side and a second side of the blank to create the two parallel walls, In this manner, the carton carrier is formed by the parallel side walls having a bottom panel disposed between the side walls. The bottom panel provides a surface on which the tray of plantlets may rest. The side walls may also provide support for other carton carriers to be stacked above. By easily forming a carton carrier having two side walls, loading efficiencies can increase, thereby decreasing loading times and shipping cost associated with the plantlets.

[0006] While blanks used to form these two-sided carton carriers can increase loading efficiencies, other problems arise with these carton carriers when they are used to ship trays of plantlets. Due to the nature of the plantlets and plantlet trays to be shipped, these two-sided carton carriers tend to bend along the bottom panel of the carton carrier parallel to the side walls. This bending of the carton carriers leads to an increased chance of plant damage and the collapsing of stacks of carton carriers within the shipping box.

[0007] Also, the plantlet trays help to hold moisture within the soil in which the plantlets are placed to help sustain the plantlets. This moisture often evaporates within the box. The fiberboard of the carton carriers absorbs this moisture causing the carrier to lose strength. This is especially true on the bottom panel on which a plantlet tray rests. The weight of the plantlet tray causes the now moist bottom panel to sag. The sagging bends the carton carrier and the trays under its own weight, thereby increasing the chances of the sagging carton carrier to collapse and also causing the trays to bend inward which can lead to damage of the plantlets.

[0008] In light of the above, a need exists for improved handling of plantlet trays within transport boxes, particularly with regard to decreasing the likelihood of damage to the plantlets within the transport boxes, while not negatively effecting loading efficiencies of these boxes.

SUMMARY

[0009] In accordance with this disclosure, novel packaging systems, apparatuses, and methods are provided for improving handling and shipment of plantlets.

[0010] It is a principal purpose of the present disclosure therefore to provide novel packaging systems, apparatuses, and methods for transporting trays of plantlets, such as within carton carriers and plantlet transport boxes. This and other purposes as may become apparent from the present disclosure are achieved, at least in whole or in part, by the subject matter described herein.

[0011] In one embodiment, the invention relates to a carton carrier for transporting trays of plantlets comprising the features of claim 1.

[0012] In one embodiment, the invention relates to a packaging system for transporting plantlet trays according to claim 15.

[0013] In one embodiment, the invention relates to a method of preparing trays of plantlets for shipping, the method comprising the steps of claim 21.

[0014] The respective dependent claims indicate variations of the various aspects of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] A full and enabling disclosure of the present subject matter including the best mode thereof to one of ordinary skill of the art is set forth more particularly in the remainder of the specification, including reference to the accompanying figures in which:

Figure 1 shows a schematic perspective view of an embodiment of a carton carrier according to the present subject matter;

Figure 2 shows a schematic vertical cross-sectional view of the embodiment of the carton carrier of Figure 1 along lines I-I;

Figure 3 shows a perspective view of an embodiment of a blank used to create a carton carrier according to the present subject matter;

Figure 4 shows a schematic perspective view of the blank of Figure 3 used to create a carton carrier according to the present subject matter;

Figure 5 shows a perspective view of the blank of Figure 3 folded to form at least a portion of a carton carrier according to the present subject matter;

Figure 6 shows a schematic perspective view of an embodiment of a carton carrier used in a packaging system according to the present subject matter;

Figure 7 shows a perspective view of an embodiment of a packaging system according to the present subject matter;

Figure 8 shows a perspective view of the packaging system according to Figure 7;

Figure 9 shows a perspective view of the packaging system according to Figure 7;

Figure 10A shows a perspective view of the packaging system according to Figure 7;

Figure 10B shows a perspective view of the packaging system according to Figure 7;

Figure 11 shows a schematic side elevation view of an embodiment of a carton carrier according to the present subject matter;

Figure 12A shows a schematic perspective view of an embodiment of a packaging system according to the present subject mater; and

Figure 12B shows a schematic perspective view of the packaging system according Figure 12A.

DETAILED DESCRIPTION

[0016] Reference will now be made in detail to presently preferred embodiments of the present subject matter, one or more examples of which are shown in the Figures. Each example is provided to explain the subject matter and not as a limitation. In fact, features illustrated or described as part of one embodiment can be used in another embodiment to yield yet another embodiment. It is intended that the present subject matter covers such modifications and variations.

[0017] Figure 1 illustrates a carton carrier, generally designated as **10,** for use in transporting a tray, generally designated as **50,** of plantlets. Carton carrier **10** has a bottom panel **12** on which tray **50** may reside. Carton carrier **10** includes end walls, generally designated as **20,** on either end of carton carrier **10.** Further, carton carrier **10** has supporting side walls, generally designated as 30, that extend upward from the sides of carton carrier **10.** Supporting side walls **30** may permit the stacking of other carton carriers thereon. Each supporting side wall **30** may have an outer side panel **32**, a top shelf panel **34** and an inner side wall panel **36.** The top shelf panels **34** can create upper support surfaces, or shoulders, on which another carton carrier may be placed when the carton carriers are inserted into a transport box. Carton carrier **10** may be dimensioned such that tray **50** fits securely between supporting side walls **30** and end walls **20.** For example, supporting side walls **30** and end walls **20** may abut against sides **52** and ends **54** of tray **50,** respectively.

[0018] Carton carrier **10** may be made from any suitable material. For example, carton carrier **10** may be constructed from plastic, cardboard, fiberboard, or the like. For instance, carton carrier **10** can be made of a fiberboard, such as corrugated cardboard. Preferably, carton carrier **10** may be formed from the folding of a single blank as will be described below.

[0019] Figure 2 illustrates a cross-sectional view of carton carrier **10** shown in Figure 1 along the lines I-I. Supporting side walls **30** may have a triangular cross-sectional shape, such as an inverted triangular cross-section. However, the supporting walls **30** may also have other cross-sectional shapes, for example, rectangular, trapezoidal, or the like. Outer side wall panels 32 form the outside of supporting side walls **30.** Top shelf panels **34 forming** upper support surfaces that can extend substantially parallel to bottom panel **12** of carton carrier **10** to provide a surface on which another carton carrier **10** may be placed, thereby permitting carton carriers **10** to be stackable.

[0020] Supporting side walls **30** have a height D_1 that provides sufficient space D_2 above tray **50,** which is placed on bottom panel **12.** This space D_2 permits the plantlets that reside in tray **50** to extend upward without damage by another carton carrier **10** that may be placed upon upper support surfaces of supporting side walls **30.** Thus, the space $\mathbf{D_2}$ between a top **56** of tray **50** may be great enough for the stalk or stem of the plantlets to stand upright in its natural posture without any unnecessary or harmful bending. Therefore, depending on the type of plantlet being transported, height D_1 of the supporting

side walls 30 and the space D_2 **above** the tray **50** may vary.

[0021] By having an inverted triangular cross-sectional shape with inner side wall panel **36** and outer side wall panel **32** converging at bottom panel **12** of carton carrier **10,** supporting side walls **30** also help to secure tray **50** within carton carrier **10** when carton carrier **10** is placed within a transport box. By having inner side wall panels **36** of supporting side walls **30** extending upwardly and inwardly at an acute angle α from the base **12** when carton carrier **10** is within a box, inner side wall panels **36** can help to keep tray **50** secured in carton carrier **10** by abutting sides **52** of tray **50** about top **56** of tray **50** at an angle to hold tray **50** in place. In this manner, carton carrier **10** may help to prevent a jostling of tray **50** during transport of the box in which carton carrier **10** is placed. By minimizing movement of tray **50** in a vertical direction, supporting side walls **30** help to prevent damage to the plantlets placed in tray **50.**

[0022] Figure 3 illustrates a blank, generally designated as **60,** that may be used to form a carton carrier **10.** Blank **60** can be folded along its creases to form end walls **20** and supporting side walls **30** of a carton carrier **10** described above. Blank **60** may be made of material such as plastic, cardboard, fiberboard, or the like. For example, blank **60** may be formed out of cardboard. Such cardboard may be corrugated. The corrugations within the cardboard add strength to the different panels within blank **60** to create a sturdier carton carrier **10**. Blank **60** includes bottom panel **12** formed between a first end crease **14**, a second end crease **16**, a first side wall crease **18** and a second side wall crease **19**.

[0023] The first and second end creases **14** and **16** may define first and second ends of bottom panel **12.** Further, first side wall crease **18** and second side wall crease **19** may define first and second sides, respectively, of bottom panel **12.**

[0024] Blank **60** also includes end wall panels **22** on opposite sides of first end crease **14** and second end crease **16** from bottom panel **12.** End wall panels **22** can be folded upward along first and second creases **14, 16** from bottom panel **12** to form end walls **20** of carton carrier **10.** On the opposite sides of the first and second side wall creases **18, 19** from bottom panel **12,** blank **60** includes outer side wall panels **32,** top shelf panels **34** and inner side wall panels **36** used to form supporting side walls **30.** Extending out from the sides of bottom panel **12,** each outer side wall panel **32** follows the respective side wall creases **18,19.** Each of outer side wall panels **32** are followed by the respective top shelf panel **34** which is then followed by the respective inner side wall panel **36.**

[0025] Each inner side wall panel **36** and top shelf panel **34** may be folded along supporting wall creases **38** as each outer side wall panel is folded along side wall creases **18, 19** to form supporting side wall **30.** The inner side wall panels 36 may be secured on or about the bottom panel **12** in a variety of ways. For example, glue, glue strips, tape, staples, or the like may be used to hold inner side wall panels **36** to bottom panel **12.**

[0026] Other mechanical means may also be used. For instance, on an outer edge **40** of inner side wall panel **36,** one or more jags **42** may extend outward from blank **60.** These jags **42** may fit into corresponding sleeves or slots **44** cut into blank **60** along each of the side wall creases **18, 19** when top shelf panels **34** and inner side wall panels **36** are folded inward along supporting wall creases **38** as outer side wall panels **32** are folded upward along side wall creases **18,19** to form support walls **30.** Top shelf panel **34** may have finger apertures **46** cut into blank **60.** These finger apertures **46** permit easy insertion and removal of carton carrier **10** from the transport box in which it will be placed and/or removed.

[0027] Figure 4 illustrates a blank **60** with tray **50** of plantlets placed on bottom panel **12.** Tray **50** may be placed on bottom panel **12** and outer side wall panels **32** may be folded up along side wall creases **18, 19** in directions A_1**.** Top shelf panel **34** may be folded around supporting wall creases **38** in directions A_2**,** while inner side wall panel **36** may be folded over around supporting wall creases **38** in directions A_3 to form supporting side walls **30.** Once the outer side wall panels **32,** top shelf panels **34,** and inner side wall panels **36** are folded around and jags **42** are inserted into sleeves **44** (see Figure 3), the supporting side walls **30** of carton carrier 10 are formed. Similarly, the supporting side walls **30** may be formed before tray 50 is placed on bottom panel **12.**

[0028] If the blank is made from corrugated cardboard as shown in Figure 4, ribs **62** may run perpendicular to side wall creases **18, 19** and supporting side walls 30, while running parallel to end creases **14, 16** and end walls **20**. These ribs **62** within the corrugation can also help stabilize carton carrier **10**. Also, blank **60** can be different sizes depending on the size of tray **50** which is to be used. Similarly, bottom panel **12** can be different widths and lengths and the panels, which form end walls and side walls may be different heights depending on the size of the tray and the size of the plantlets being transported.

[0029] As shown in Figure 5, once outer side wall panels **32** are folded along side wall creases **18**, **19,** and top shelf panel **34** and inner side wall panel **36** are folded over along supporting wall creases **38** to form supporting side walls **30,** end panel **22** can be folded up to form end walls **20** to finish forming carton carrier **10.** However, with carton carrier **10** outside the box, the support walls **30** do not necessarily have to reside up against tray **50.** Further, end walls **20** will not necessarily have to reside against ends **54** of tray **50** even when carton **carrier 10** is outside the transport box in which it will be inserted.

[0030] Figure 6 illustrates a carton carrier **10** being placed into a transport box **70,** once supporting side walls **30** are formed and tray **50** of plantlets are placed on bottom panel **12** of carton carrier **10.** As can been seen from Figure 6, end panels **22** which form end walls **20** now have to be folded into a standing position to fit into a

transport box, generally designated as **70.** Transport box **70** may have an interior **72** which is generally similar to the shape of the outer perimeter formed by supporting side walls **30** and end walls **20** of carton carrier **10** once carton carrier **10** is placed into transport box **70.** End panels **22** do not have to be folded along first and second end creases **14, 16** (see Figure 4) to form end walls **20** until carton carrier **10** is placed within transport box **70.** As carton carrier **10** is lowered into the interior **72** in direction **B,** end walls **74** of transport box **70** fold end panels **22** in a direction **C** along first and second end creases **14, 16** to form end walls **20.** Carton carrier **10** may be lowered into transport box **70** by using finger apertures **46** to lower carton carrier **10** into interior **72** of transport box **70.** Once carton carrier **10** is lowered into transport box **70,** transport box **70** may hold supporting side walls **30** and end walls **20** in an upright, or standing, position as shown in Figure 1. At this point, carton carrier **10** is supported on four sides. End walls **20** help create a sturdier carton **10** by adding greater support in a direction perpendicular to supporting side walls **30** to prevent sagging of bottom panel **12.**

[0031] Figure 7 shows a carton carrier **10** being placed within a transport box **70.** A tray **50** may be placed upon bottom panel **12** of carton carrier **10,** and the panels that form supporting side walls **30** can be quickly folded to create the supporting side walls **30** in a timely manner. Top shelf panels **34** define finger apertures **46** therein to allow carton carrier **10** to be lowered into transport box **70.** As carton carrier **10** is placed within transport box **70,** end walls **74** of transport box **70** force end panels **22** upward to form end walls **20** of carton carrier **10.** Carton carrier **10** is then pushed downward into transport box 70 to until it rests firmly against an upper support surface of another carton carrier or against the bottom of transport box **70.**

[0032] Figure 8 shows a carton **10** disposed within transport box **70.** Carton carrier **10** has tray **50** disposed therein for carrying plantlets. Tray **50** resides on a bottom panel of the carton **10.** Transport box **70** supports supporting side walls **30** and end walls **20** of carton carrier **10** in upright positions to provide the desired protection to the plantlets that may be disposed within tray **50.** Side walls **76** of transport box **70** may help to support supporting side walls **30** of carton carrier **10** in an upright position and may push supporting side walls **30** against sides **52** of tray **50.** End walls **74** of transport box **70** may help to support end walls **20** of carton carrier **10** in an upright position and may push end walls **20** against ends **54** of tray **50**. Top shelf panels **34** provide upper support surfaces which allow for the stacking of a similar carton carrier within transport box **70** on top of upper support surfaces.

[0033] As stated above, height **H** (see Figure 6) of transport box **70** may correspond to a height of a select number of carton carriers **10** that may fit within transport box **70.** For example, as shown in Figure 9, height **H** of box **70** may permit six carton carrier **10** to be stacked within interior **72** of **box 70** with the last carton being flush with an outer edge **73** of the interior **72** of transport **box 70.** At this point, inner lids **78** and outer lids **79** may be closed onto the top carton carrier **10** to form a top wall of transport box **70.** Since top carton carrier **10** is flush with outer edge **73** of interior **72** of transport box **70,** this carton carrier **10** will also be flush with a top wall formed by inner lids **78** and outer lids **79** once these lids **78, 79** are folded into a closed position.

[0034] As shown in Figures 10A and 10B, inner lids **78** may be folded into a closed position with the outer lids **79** folded on top of the inner lids **78** and secured to form a top wall 80 of transport box **70.** Similar inner and outer lids may be folded and secured in a closed position to form a bottom wall of transport box **70.** The folding closed and securing of inner lids **78** and outer lids **79** further facilitate quick and easy shipment of the trays of plantlets. With the trays securely placed between the supporting side walls of the carton carrier and the carton carrier placed securely within transport box **70,** movement of the trays within transport box **70** is minimized or prevented.

[0035] The inner and outer lids **78, 79** for both the top and the bottom of transport box **70** may have lengths and widths that permit full coverage of the opening of interior **72** of transport box **70** when each set of lids are folded into a closed position. For example, the edges **82** of inner lids **78** may abut against one another and the edges **84** of outer lids **79** may abut against one another. Alternatively, edges **82** of inner lids **78** may overlap one another when the inner lids **78** are folded in a closed position, while edges **84** of outer lids **79** may overlap one another when the inner lids **78** are folded in a closed position. By providing full coverage of the opening of interior **72** of transport box **70** with each set of lids **78, 79,** the plantlets contained within transport box **70** are better insulated against outside temperatures. Also, with each carton carrier **10** (see Figure 1) having end walls **20** and supporting walls **30,** at least two layers of walls exist between the plantlets within the trays in carton carriers **10** and the outer environment surrounding transport box **70.** Further, the strength in the width and length directions can be maximized.

[0036] Figure 11 illustrates a side view of a carton **carrier 10** having a tray **50** residing upon bottom panel 12 of carton carrier **10** as carton carrier 10 resides within a transport box. The weight of tray **50** creates a downward force $\mathbf{F_1}$ on the carton carrier 10. This created force $\mathbf{F_1}$ causes carton carrier **10** to want to bow inward in the directions $\mathbf{E_1}$ and $\mathbf{E_2}$ and thereby bend bottom panel 12 outward. By having end walls **20** folded upward and perpendicular to supporting side walls **30,** end walls **20** counteract the tendency of carton carrier **10** to bow inward caused by force $\mathbf{F_1}$**.** End walls **20,** which run perpendicular to supporting side walls **30,** resist the bowing tendency by adding strength to carton carrier **10** in a width direction on either end of carton carrier **10.** Even after carton carrier **10** is dampened through absorption of

moisture from trays **50,** end walls **20** still help to minimize any sagging of bottom panel **12** due to the added stability by end walls **20.** In this manner, the sturdiness and stability of carton carrier 10 is greatly increased over carton carriers which have only two parallel side walls. At the same time, the amount of time needed to assemble cartons 10 is not increased, because no extra steps are needed to form end walls **20** within carton carrier **10.** This is due to the fact that end walls **20** may be pushed into place by placement of carton carrier **10** within the transport box used to ship the plantlets to a desired location.

[0037] By having both end walls **20** and supporting side walls **30** within carton carrier **10,** carton carrier **10** is made more stable and less likely to bend or collapse because end walls **20** and supporting side walls **30** add support in three different directions. As seen in Figure 12A, supporting side walls **30** provide stability in a length direction **Z** with its inner side wall panel **36** and outer side wall panel **32** as well as top shelf panel **34.** Further, these panels **32, 34, 36** of supporting side wall 30 also provide stability in carton carrier 10 in a height direction **Y**. Finally, by having end wall panels **22** that fold up to create end walls 20 of carton carrier 10, stability is created in a width direction **X** of carton carrier 10. By having added stability in carton carrier 10 in width direction **X**, height direction **Y**, and length direction **Z**, a more stable carton carrier is created for placement of a tray **50** thereon. The added stability by supporting side walls 30 and end walls **20** in the directions **X, Y**, and **Z** help to minimize sagging or bending of carton carrier **10** and thereby tray **50** which is placed thereon. Thus, damage to the plantlets within tray **50** due to the stability of carton carrier 10 can be minimized.

[0038] Transport box **70** with its end wall **74,** side wall **76,** inner lids **78** and outer lids **79** add stability in three directions as well. As shown in Figure 12B, side walls **76** add stability in direction **Y** and direction **Z.** End walls **74** add stability in direction **X** and direction **Y,** while outer lids **79** add stability in direction **Z** and inner lids **78** add stability in direction **X** as shown in Figure 12A.

[0039] Further, depending on the corrugation of the fiberboard used to create carton carrier **10,** the ribs within the corrugation can also help stabilize carton carrier **10** in different directions. For example, the ribs of corrugation that run perpendicular to supporting side walls **30** may help to reinforce the stability of carton carrier **10** in both the height direction **Y** and the width direction **X.** Tray **50** placed within carton carrier **10** may also help to stabilize carton carrier **10** in both the width direction **X** and the length direction **Z** depending on the stability of tray **50.** Similarly, transport box **70** may be made of a corrugated fiberboard such that the ribs of the corrugation help to reinforce the stability of transport box **70** for protection of the plantlets contained within the trays on carton carrier **10** within transport box **70.** The ribs of the corrugation of the transport box 70 may reinforce transport box **70** in any or all of directions **X**, **Y,** and **Z.**

[0040] The packing systems and apparatuses disclosed above are designed to be efficient in loading and unloading of boxes, while creating greater strength in the box with minimal use of a carton. Such a system reduces the labor cost of packing and unloading of plantlets, thereby reducing the overall cost associated with the plantlets. The system is easy to understand and can increase efficiency of packing and shipping plantlets, even in high volume production environments including third world countries where education of the work force may be limited.

[0041] The embodiments of the present disclosure shown in the drawings and described above are exemplary of numerous embodiments that can be made within the scope of the appending claims. It is contemplated that the configurations for packaging trays of plantlets for transport can comprise numerous configurations other than those specifically disclosed. Thus, it is the applicant's intention that the scope of a patent issuing herefrom will only be limited by the scope of the appending claims.

Claims

1. A carton carrier (10) for transporting trays (50) of plantlets, the carton carrier (10) comprising:

(a) a bottom panel (12) having first and second ends and first and second sides, the bottom panel (12) being configured to receive plantlet trays, and
(b) supporting side walls (30) extending upwardly from the first and second sides of the bottom panel (12), the supporting side walls (30) defining an upper support surface or shoulder and providing stability in a length direction (Z) of the carton carrier (10), **characterized in that** the carton carrier (10) further comprises
(c) end wall panels extending outwardly from the first and second ends of the bottom panel (12), the end wall panels configured to be foldable upwardly from the bottom panel (12) by end walls of a transport box (70) while the carton carrier (10) is lowered, into an interior of the transport box (70) to form end walls (20) and to create stability in a width direction (X) of the carton carrier (10).

2. The carton carrier (10) as in claim 1, wherein each supporting side wall (30) of the carton carrier (10) comprises an inner side wall panel (36), an outer side wall panel (32), and a top shelf panel (34).

3. The carton carrier (10) as in claim 2, wherein each supporting side wall (30) of the carton carrier (10) has a triangular cross-section.

4. The carton carrier (10) as in claim 3, wherein each

top shelf panel (34) of the carton carrier (10) is disposed between the corresponding inner side wall panel (36) and the corresponding outer side wall panels (32).

5. The carton carrier (10) as in claim 4, wherein the triangular cross-section of each supporting side wall (30) comprises the top shelf panel (34) forming the upper support surface of the respective supporting side wall (30) and the corresponding inner side wail panel (36) and corresponding outer side wall panel (32) converging at a respective side of the bottom panel (12).

6. The carton carrier (10) as in claim 5, wherein the carton carrier (10) is arranged to reside a plantlet tray (50) on the bottom panel (12) such that sides of the plantlet tray (50) abut the inner side wall panels (36) of the carton carrier (10) about a top surface of the plantlet tray (50).

7. The carton carrier (10) as in claim 2, wherein the carton carrier (10) is formed from a blank (60).

8. The carton carrier (1 0) as in claim 2, wherein the carton carrier (10) is arranged to reside a plantlet tray (50) on the bottom panel (12) such that the supporting side walls (30) of the carton carrier (10) have a specific height to provide space for plantlets disposed within the plantlet tray (50).

9. The carton carrier (10) as in claim 1, wherein the carton carrier (10) is fiberboard.

10. The carton carrier (10) as in claim 9, therein the fiberboard is a corrugated cardboard.

11. The carton carrier (10) as in claim 10, wherein ribs are defined by the corrugated cardboard and strengthen the carton carrier (10) in at least one of a width direction or a height direction.

12. The carton carrier (10) as in claim 1, wherein the end walls (20) of the carton carrier (10) contact the supporting side walls (30) when both the end walls (20) and the supporting side walls (30) extend upright.

13. The carton carrier (10) as in claim 1, wherein the carton: carrier (10) is arranged to reside a plantlet tray (50) on the bottom panel (12) such that the end walls (20) of the carton carrier (10) contact the ends of the plantlet tray (50) when the end walls (20) extend upright.

14. The carton carrier (10) as in claim 1, wherein the upper support surface of the supporting side walls (30) of the carton carrier (10) provides a stackable surface on which another carton carrier (10) may be placed.

15. A packaging system for transporting plantlet trays (50), the system comprising:

(a) a carton carrier (10) according to any one of claims 1 to 14; sand
(b) a transport box (70) having box side walls (76) and box end walls (74), the transport box (70) being configured to receive one or more carton carriers (10) within an interior of the transport box (70) such that the supporting walls and the end walls (20) of each carton carrier (10) inserted therein are supported by the box side walls (76) and the box end walls (74).

16. The packaging system as in claim 15, wherein multiple carton carriers (10) are stackable within the transport box (70).

17. The packaging system as in claim 16, wherein the transport box (70) has a height that permits multiple carton carriers (10) to be stacked on top of one another within the transport box (70),

18. The packaging system as in claim 17, wherein the height of the transport box (70) corresponds to a height of a specified number of carton carriers (10) such that the upper support surface of the top carton carrier (10) is flush with the top of the transport box (70) once the transport box (70) is closed.

19. The packaging system as in claim 15, wherein the transport box (10) includes inner lids (78) and outer lids (79) that form at least one of a top wall or a bottom wall of the transport box (70) when the inner and outer lids are in closed positions.

20. The packaging system as in claim 19, wherein the inner lids (78) of the transport box (70) comprise edges (82) that abut one another when the inner lids (78) are in a closed position and the outer lids (79) comprise edges (84) that abut one another when the outer lids (79) are in a closed position.

21. A method of preparing trays of plantlets (50) for shipping, the method comprising:

(a) placing a tray of plantlets (50) on a bottom panel (12) of a carton carrier;
(b) folding the carton carrier (10) along supporting wall creases to form supporting side walls (30) along first and second sides of bottom panel (12);
(c) folding the carton carrier (10) along first and second end wall creases to form end walls (20) about first and second ends of the bottom panels (12); and

(d) placing the carton carrier (10) in a box (70) having box side walls (76) and box end walls (74), such that the box side walls (76) and box end walls (74) support the supporting side walls (30) and the end walls (20) in an upright position,

wherein the step of folding the carton carrier (10) along first and second end wall creases to form end walls is performed by the step of placing the carton carrier (10) in a transport box (70).

22. The method as in claim 21, further comprising stacking multiple carton carriers (10) atop one another within the transport box (70).

23. The method as in claim 22, wherein the supporting side walls (30) define upper support surfaces or shoulders on which another carton carrier (10) may rest.

24. The method as in claim 22, wherein the transport box (70) securely holds a specified number of carton carriers (10).

25. The method as in claim 21, wherein the supporting side walls (30) have an Inverted triangular cross-section.

Patentansprüche

1. Kartonträger (10) zum Transportieren von Kleinpflanzen-Trays (50), wobei der Kartonträger (10) Folgendes umfasst:

(a) ein Bodenpanel (12) mit ersten und zweiten Enden und ersten und zweiten Seiten, wobei das Bodenpanel (12) so konfiguriert ist, dass es Kleinpflanzen-Trays aufnehmen kann, und
(b) Stützseitenwände (30), die sich von der ersten und zweiten Seite des Bodenpanels (12) nach oben erstrecken, eine obere Stützfläche oder Schulter definieren und in einer Längsrichtung (Z) des Kartonträgers (10) für Stabilität sorgen, **dadurch gekennzeichnet, dass** der Kartonträger (10) ferner
(c) Endwandpanels umfasst, die sich vom ersten und zweiten Ende des Bodenpanels (12) nach außen erstrecken und so konfiguriert sind, dass sie zur Bildung von Endwänden (20) und zur Erzeugung von Stabilität in einer Breitenrichtung (X) des Kartonträgers (10) von Endwänden einer Transportkiste (70) vom Bodenpanel (12) nach oben gefaltet werden können, während der Kartonträger (10) in ein Inneres der Transportkiste (70) abgesenkt wird.

2. Kartonträger (10) nach Anspruch 1, wobei jede Stützseitenwand (30) des Kartonträgers (10) ein inneres Seitenwandpanel (36), ein äußeres Seitenwandpanel (32) und ein oberes Regalpanel (34) umfasst.

3. Kartonträger (10) nach Anspruch 2, wobei jede Stützseitenwand (30) des Kartonträgers (10) einen dreieckigen Querschnitt hat.

4. Kartonträger (10) nach Anspruch 3, wobei jedes obere Regalpanel (34) des Kartonträgers (10) zwischen dem entsprechenden inneren Seitenwandpanel (36) und dem entsprechenden äußeren Seitenwandpanel (32) angeordnet ist.

5. Kartonträger (10) nach Anspruch 4, wobei der dreieckige Querschnitt jeder Stützseitenwand (30) das obere Regalpanel (34), das die obere Stützfläche der jeweiligen Stützseitenwand (30) bildet, und das entsprechende innere Seitenwandpanel (36) und das entsprechende äußere Seitenwandpanel (32) umfasst, die an einer jeweiligen Seite des Bodenpanels (12) zusammenlaufen.

6. Kartonträger (10) nach Anspruch 5, wobei der Kartonträger (10) so angeordnet ist, dass ein Kleinpflanzen-Tray (50) auf dem Bodenpanel (12) untergebracht werden kann, so dass Seiten des Kleinpflanzen-Tray (50) an einer oberen Fläche des Kleinpflanzen-Tray (50) an die inneren Seitenwandpanels (36) des Kartonträgers (10) anstoßen.

7. Kartonträger (10) nach Anspruch 2, wobei der Kartonträger (10) aus einem Zuschnitt (60) gebildet ist.

8. Kartonträger (10) nach Anspruch 2, wobei der Kartonträger (10) so angeordnet ist, dass ein Kleinpflanzen-Tray (50) auf dem Bodenpanel (12) untergebracht werden kann, so dass die Stützseitenwände (30) des Kartonträgers (10) eine bestimmte Höhe haben, um Raum für im Kleinpflanzen-Tray (50) angeordnete Kleinpflanzen bereitzustellen.

9. Kartonträger (10) nach Anspruch 1, wobei der Kartonträger (10) Hartpappe ist.

10. Kartonträger (10) nach Anspruch 9, wobei die Hartpappe eine Wellpappe ist.

11. Kartonträger (10) nach Anspruch 10, wobei Rippen von der Wellpappe definiert sind und den Kartonträger (10) in einer Breitenrichtung und/oder einer Höhenrichtung verstärken.

12. Kartonträger (10) nach Anspruch 1, wobei die Endwände (20) des Kartonträgers (10) die Stützseitenwände (30) kontaktieren, wenn sich sowohl die Endwände (20) als auch die Stützseitenwände (30) auf-

recht erstrecken.

13. Kartonträger (10) nach Anspruch 1, wobei der Kartonträger (10) so angeordnet ist, dass ein Kleinpflanzen-Tray (50) auf dem Bodenpanel (12) untergebracht werden kann, so dass die Endwände (20) des Kartonträgers (10) die Enden des Kleinpflanzen-Tray (50) kontaktieren, wenn sich die Endwände (20) aufrecht erstrecken.

14. Kartonträger (10) nach Anspruch 1, wobei die obere Stützfläche der Stützseitenwände (30) des Kartonträgers (10) eine stapelbare Fläche bereitstellt, auf der ein weiterer Kartonträger (10) platziert werden kann.

15. Verpackungssystem, zum Transportieren von Kleinpflanzen-Trays (50), wobei das System Folgendes umfasst:

(a) einen Kartonträger (10) nach einem der Ansprüche 1 bis 14 und
(b) eine Transportkiste (70) mit Kistenseitenwänden (76) und Kistenendwänden (74), wobei die Transportkiste (70) so konfiguriert ist, dass sie einen oder mehrere Kartonträger (10) in einem Inneren der Transportkiste (70) aufnehmen kann, so dass die Stützwände und die Endwände (20) jedes darin eingeführten Kartonträgers (10) durch die Kistenseitenwände (76) und die Kistenendwände (74) gestützt sind.

16. Verpackungssystem nach Anspruch 15, wobei mehrere Kartonträger (10) in der Transportkiste (70) stapelbar sind.

17. Verpackungssystem nach Anspruch 16, wobei die Transportkiste (70) eine Höhe hat, die das Aufeinanderstapeln von mehreren Kartonträger (10) in der Transportkiste gestattet.

18. Verpackungssystem nach Anspruch 17, wobei die höhe der Transportkiste (70) einer Höhe einer bestimmten Anzahl von Kartonträger (10) entspricht, so dass die obere Stützfläche des obersten Kartonträgers (10) mit der Oberseite der Transportkiste (70) bündig ist, wenn die Transportkiste (70) verschlossen ist.

19. Verpackungssystem nach Anspruch 15, wobei die Transportkiste (70) innere Deckel (78) und äußere Deckel (79) aufweist, die eine obere Wand und/oder eine untere Wand der Transportkiste (70) bilden, wenn die inneren und äußeren Deckel in geschlosseiner Position sind.

20. Verpackungssystem nach Anspruch 19, wobei die inneren Deckel (78) der Transportkiste (70) Ränder (82) umfassen, die aneinander anstoßen, wenn die inneren Deckel (78) in einer geschlossenen Position sind, und die äußeren Deckel (79) Ränder (84) umfassen, die aneinander anstoßen, wenn die äußeren Deckel (79) in einer geschlossenen Position sind.

21. Verfahren zur Vorbereitung von Kleinpflanzen-Trays (50) für den Versand, mit den folgenden Schritten:

(a) Platzieren eines Kleinpflanzen-Tray (50) auf ein Bodenpanel (12) eines Kartonträgers,
(b) Falten des Kartonträgers (10) entlang Stützwandrillen zur Bildung von Stützseitenwänden (30) entlang einer ersten und zweiten Seite des Bodenpanels (12),
(c) Falten des Kartonträgers (10) entlang einer ersten und einer zweiten Endwandrille zur Bildung von Endwänden (20) um ein erstes und zweites Ende des Bodenpanels (12) und
(d) Platzieren des Kartonträgers (10) in eine Kiste (70), die Kistenseitenwände (76) und Kistenendwände (74) hat, so dass die Kistenseitenwände (76) und die Kistenendwände (74) die Stützseitenwände (30) und die Endwände (20) in einer aufrechten Position stützen,

wobei der Schritt des Faltens des Kartonträgers (10) entlang einer ersten und einer zweiten Endwandrille zur Bildung von Endwänden durch den Schritt des Platzierens des Kartonträgers (10) in die Transportkiste (70) durchgeführt wird.

22. Verfahren nach Anspruch 21, das ferner den Schritt des Aufeinanderstapelns mehrerer Kartonträger (10) in der Transportkiste (70) umfasst.

23. Verfahren nach Anspruch 22, wobei die Stützseitenwände (30) obere Stützflächen oder Schultern definieren, auf denen ein weiterer Kartonträger (10) ruhen kann.

24. Verfahren nach Anspruch 22, wobei die Transportkiste (70) eine bestimmte Anzahl von Kartonträgern (10) sicher hält.

25. Verfahren nach Anspruch 21, wobei die Stützseitenwände (30) einen umgekehrt dreieckigen Querschnitt haben.

Revendications

1. Support (10) en carton pour transporter des plateaux (50) de petites plantes, le support (10) en carton comprenant :

(a) un panneau de fond (12) comportant une première et une seconde extrémité et un premier

et un second côté, le panneau de fond (12) étant configuré pour recevoir des plateaux pour petites plantes, et

(b) des parois latérales de soutien (30) s'étendant vers le haut à partir des premier et second côtés du panneau de fond (12), les parois latérales de soutien (30) délimitant une surface de soutien supérieure ou un épaulement et assurant une stabilité dans le sens de la longueur (Z) du support (10) en carton, **caractérisé en ce que** le support (10) en carton comprend en outre

(c) des panneaux de paroi terminale s'étendant vers l'extérieur à partir des première et seconde extrémités du panneau de fond (12), les panneaux de paroi terminale étant configurés pour pouvoir être pliées vers le haut à partir du panneau de fond (12) par les parois terminales d'une caisse de transport (70) pendant qu'on descend le support (10) en carton à l'intérieur de la caisse de transport (70), afin de constituer des parois terminales (20) et créer une stabilité dans le sens de la largeur (X) du support (10) en carton.

2. Support (10) en carton selon la revendication 1, dans lequel chaque paroi latérale de soutien (30) du support (10) en carton comprend un panneau de paroi latérale intérieure (36), un panneau de paroi latérale extérieure (32) et un panneau de tablette supérieure (34).

3. Support (10) en carton selon la revendication 2, dans lequel chaque paroi latérale de soutien (30) du support (10) en carton présente une section triangulaire.

4. Support (10) en carton selon la revendication 3, dans lequel chaque panneau de tablette supérieure (34) du support (10) en carton est disposé entre le panneau de paroi latérale intérieure (36) correspondant et le panneau de paroi latérale extérieure (32) correspondant.

5. Support (10) en carton selon la revendication 4, dans lequel la section triangulaire de chaque paroi latérale de soutien (30) comprend le panneau de tablette supérieure (34) qui constitue la surface de soutien supérieure de sa paroi latérale de soutien (30) et le panneau de paroi latérale intérieure (36) correspondant et le panneau de paroi latérale extérieure (32) correspondant qui convergent le long du côté respectif du panneau de fond (12).

6. Support (10) en carton selon la revendication 5, dans lequel le support (10) en carton est configuré pour recevoir un plateau (50) de petites plantes sur le panneau de fond (12) de telle sorte que des côtés du plateau (50) de petites plantes butent contre les panneaux de paroi latérale intérieurs (36) du support (110) en carton au niveau d'une surface supérieure du plateau (50) de petites plantes.

7. Support (10) en carton, selon la revendication 2, dans lequel le support (10) en carton est façonné à partir d'une découpe (60).

8. Support (10) en carton selon la revendication 2, dans lequel le support (10) en carton est configuré pour recevoir un plateau (50) de petites plantes sur le panneau de fond (12) de telle sorte que les parois latérales de soutien (30) du support (10) en carton aient une hauteur particulière pour laisser de l'espace aux petites plantes disposées dans le plateau (50) de petites plantes.

9. Support (10) en carton selon la revendication 1, dans lequel le support (10) en carton est en panneau de fibres.

10. Support (10) en carton selon la revendication 9, dans lequel le panneau de fibres est un carton ondulé.

11. Support (10) en carton selon la revendication 10, dans lequel des nervures sont définies par le carton ondulé et renforcent le support (10) en carton dans le sens de la largeur et/ou dans le sens de la hauteur.

12. Support (10) en carton selon la revendication 1, dans lequel les parois terminales (20) du support (10) en carton sont au contact des parois latérales de soutien (30) quand tant les parois terminales (20) que les parois latérales de soutien (30) sont redressées.

13. Support (10) en carton selon la revendication 1, dans lequel le support (10) en carton est configuré pour recevoir un plateau (50) de petites plantes sur le panneau de fond (12) de telle sorte que les parois terminales (20) du support (10) en carton soient au contact des extrémités du plateau (50) de petites plantes quand les parois terminales (20) sont redressées.

14. Support (10) en carton selon la revendication 1, dans lequel la surface de soutien supérieure des parois latérales de soutien (30) du support (10) en carton constitue une surface d'empilage sur laquelle on peut placer un autre support (10) en carton.

15. Système de conditionnement pour transporter des plateaux (50) de petites plantes, le système comprenant :

(a) un support (10) en carton selon l'une quelconque des revendications 1 à 14 ; et

(b) une caisse de transport (70) comportant des parois latérales (76) de caisse et des parois terminales (74) de caisse, la caisse de transport (70) étant configurée pour recevoir un ou plu-

sieurs supports (10) en carton à l'intérieur de la caisse de transport (70) de telle sorte que les parois latérales de soutien et les parois terminales (20) de chaque support (10) en carton qui est introduit soient soutenues par les parois latérales (76) de caisse et. les parois terminales (74) de caisse.

16. Système de conditionnement selon la revendication 15, dans lequel on peut empiler de multiples supports (10) en carton à l'intérieurs de la caisse de transport (70).

17. Système de conditionnement selon la revendication 16, dans lequel la caisse de transport (70) a une hauteur qui permet d'empiler de multiples supports (10) en carton à l'intérieur de la caisse de transport (70).

18. Système de conditionnement selon la revendication 17, dans lequel la hauteur de la caisse de transport (70) correspond à la hauteur d'un nombre donné de supports (10) en carton de telle sorte que la surface de soutien supérieure du support (10) en carton de dessus soit de niveau avec le dessus de la caisse de transport (70) une fois que cette dernière est fermée.

19. Système de conditionnement selon la revendication 15, dans lequel la caisse de transport (70) comprend des couvercles intérieurs (78) et des couvercles extérieurs (79) qui constituent une paroi de dessus et/ou une paroi de fond de la caisse de transport (70) quand les couvercles intérieurs et extérieurs sont en position fermée.

20. Système de conditionnement selon la revendication 19, dans lequel les couvercles intérieurs (78) de la caisse de transport (70) comprennent des bords (82) qui sont adjacents quand les couvercles intérieurs (78) sont en position fermée et les couvercles extérieurs (79) de la caisse de transport (70) comprennent des bords (84) qui sont adjacents quand les couvercles extérieurs (79) sont en position fermée.

21. Procédé de préparation de plateaux (50) de petites plantes pour expédition, le procédé comprenant les étapes consistant à :

(a) placer un plateau (50) de petites plantes sur le panneau de fond (12) d'un support (10) en carton ;
(b) plier le support (10) en carton suivant des plis de parois de soutien pour façonner des parois latérales de soutien (30) le long de premier et second côtés du panneau de fond (12) ;
(c) plier le support (10) en carton suivant des plis de première et seconde parois terminales pour façonner des parois terminales (20) autour de première et seconde extrémités du panneau de fond (12) ; et
(d) placer le support (10) en carton dans une caisse (70) comportant des parois latérales (76) de caisse et des parois terminales (74) de caisse, de telle sorte que les parois latérales (76) de caisse et les parois terminales (74) de caisse soutiennent les parois latérales de soutien (30) et les parois terminales (20) en position verticale,

dans lequel l'étape consistant à plier le support (10) en carton suivant des plis de première et seconde parois terminales pour façonner des parois terminales s'effectue par l'opération consistant à placer le support (10) en carton dans une caisse de transport (70).

22. Procédé selon la revendication 21, comprenant en outre l'opération consistant à empiler de multiples supports (10) en carton l'un sur l'autre à l'intérieur de la caisse de transport (70).

23. Procédé selon la revendication 22, dans lequel les parois latérales de soutien (30) délimitent des surfaces de soutien supérieures ou épaulements sur lesquels peut reposer un autre support (10) en carton.

24. Procédé selon la revendication 22, dans lequel la caisse de transport (70) contient fermement un nombre donné de supports (10) en carton.

25. Procédé selon la revendication 21, dans lequel les parois latérales de soutien (30) présentent une section triangulaire inversée.

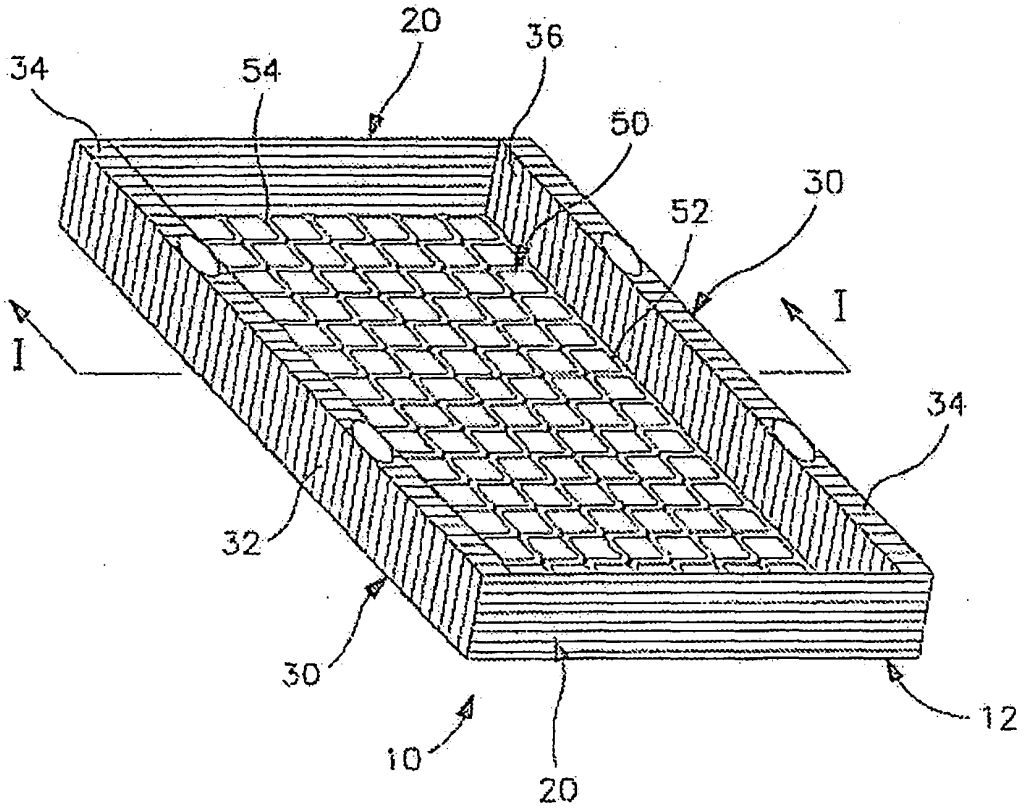


FIG. 1

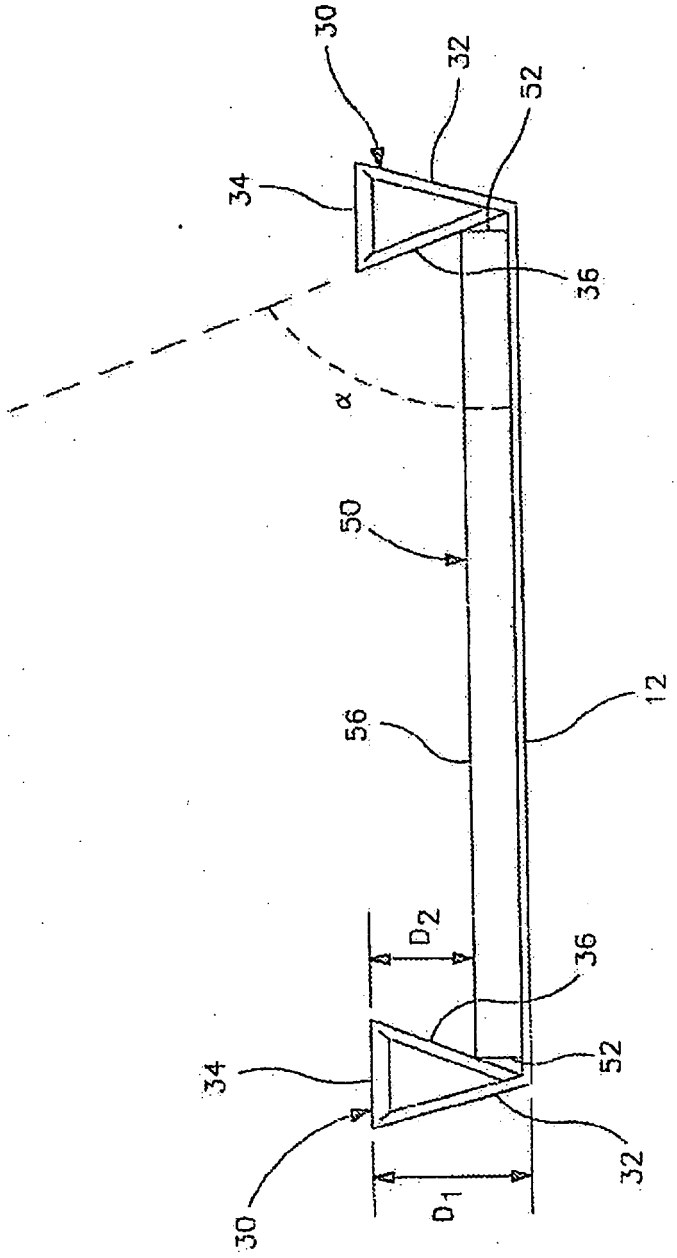


FIG. 2

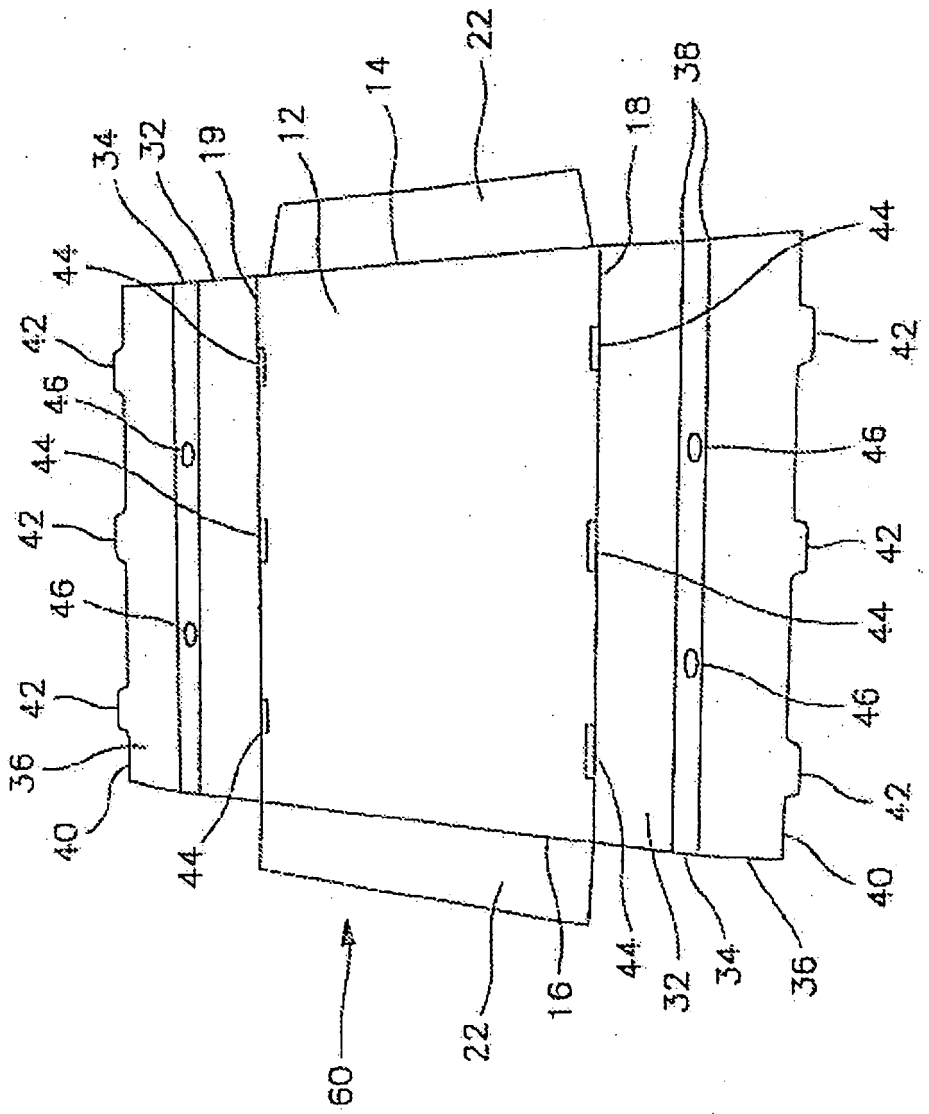

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FIG. 3

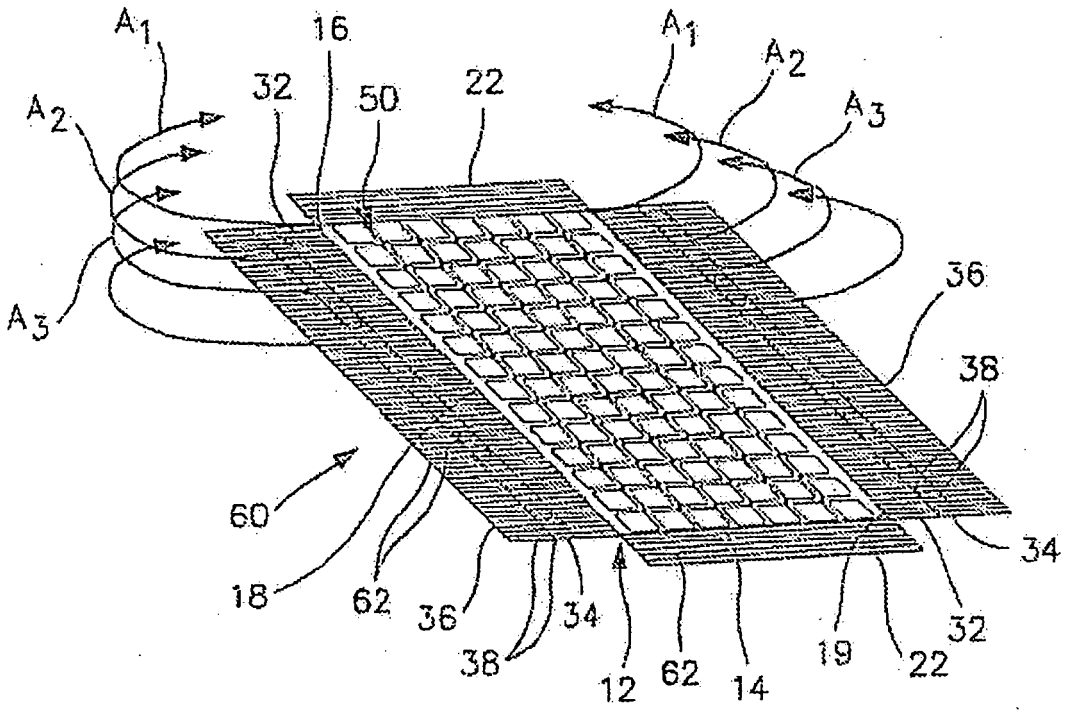

A1
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A2
A3
A1
A2
A3
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FIG. 4

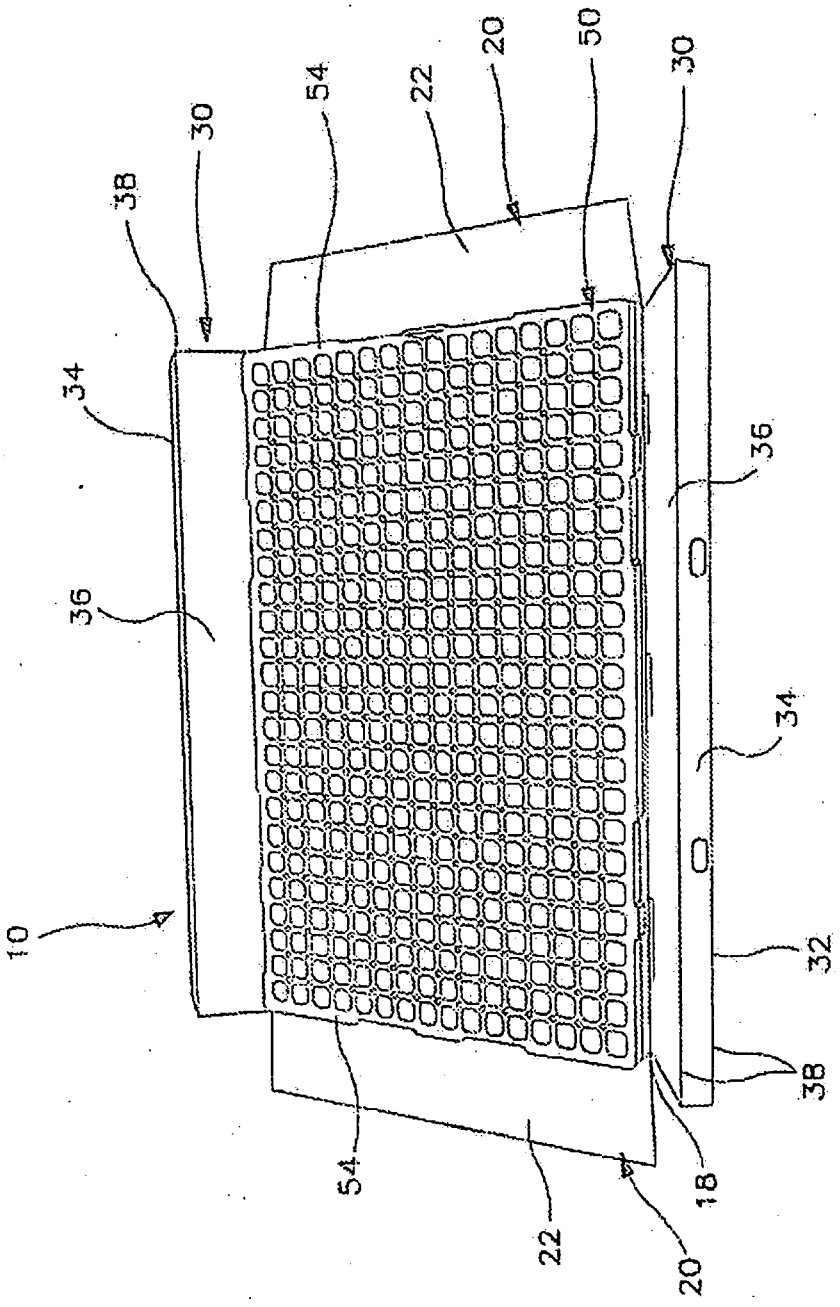


FIG. 5

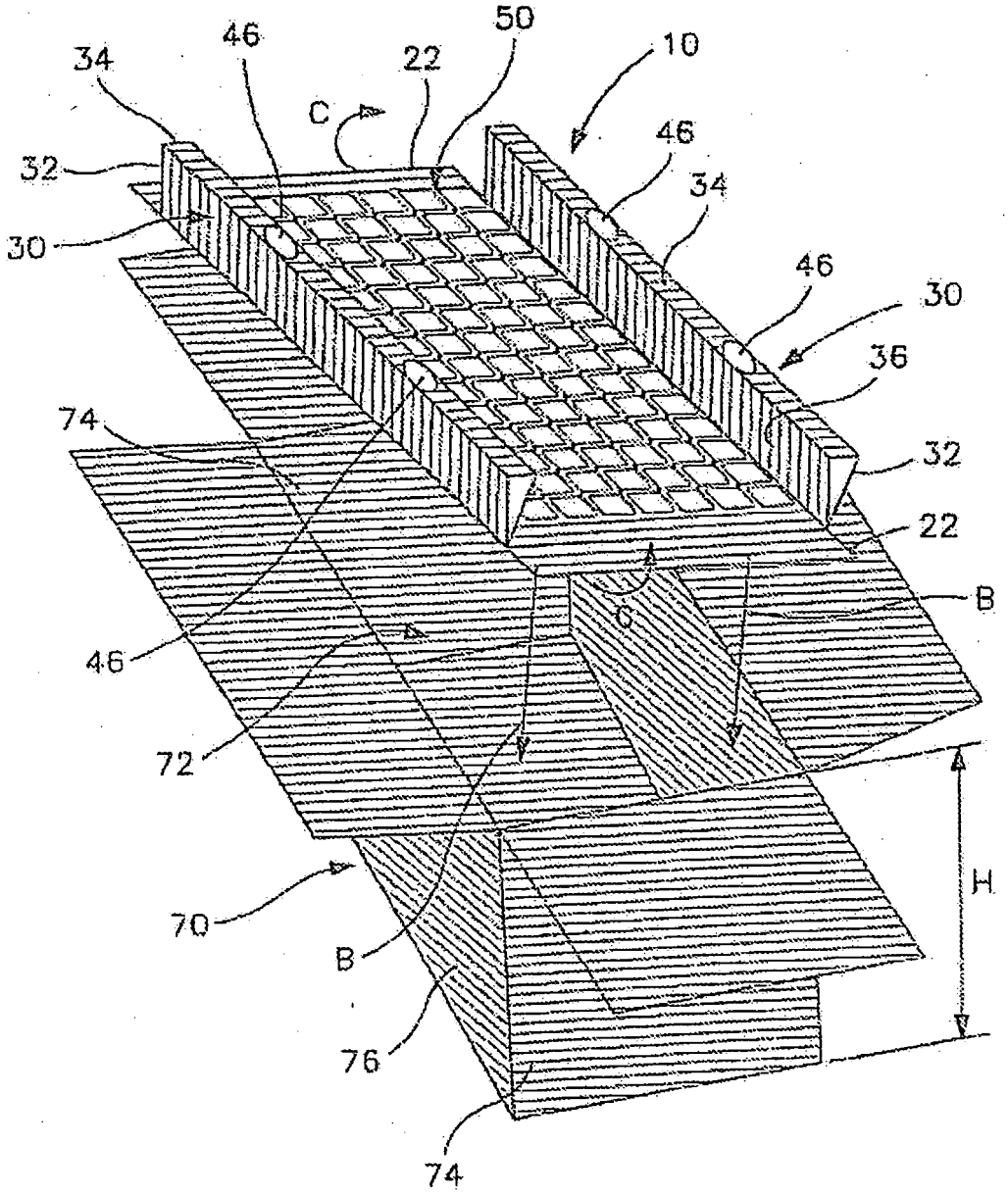


FIG. 6

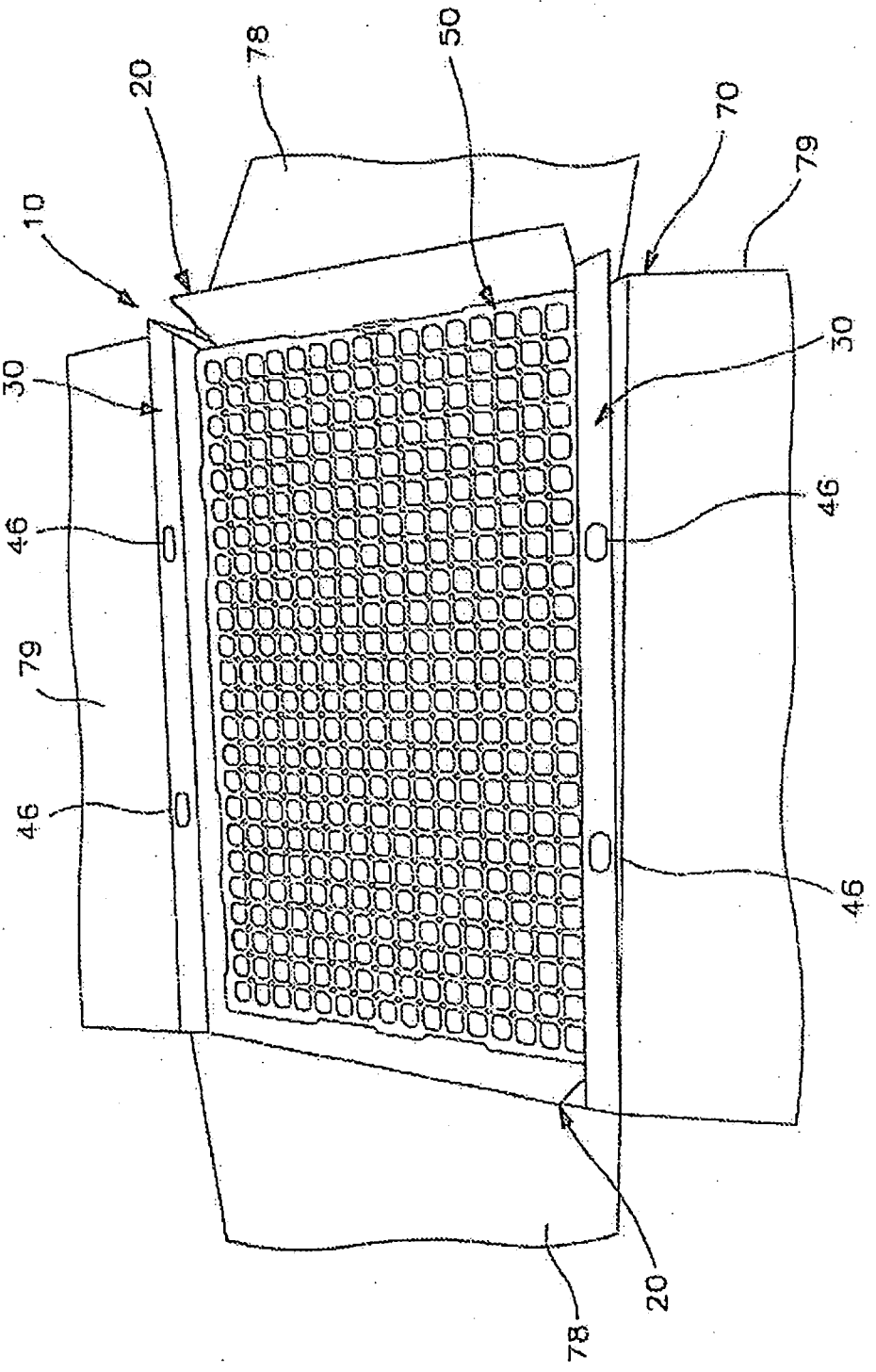


FIG. 7

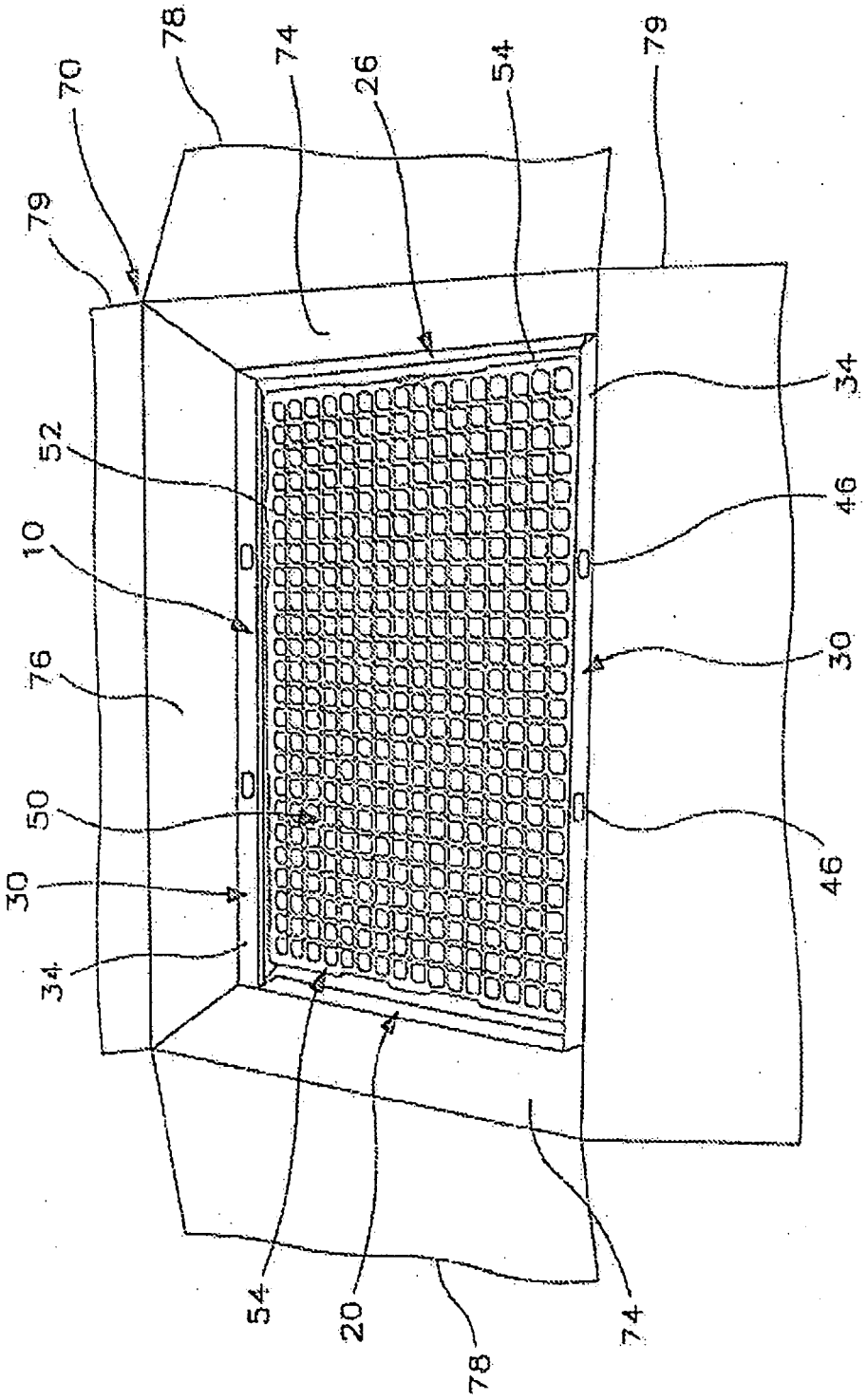


FIG. 8

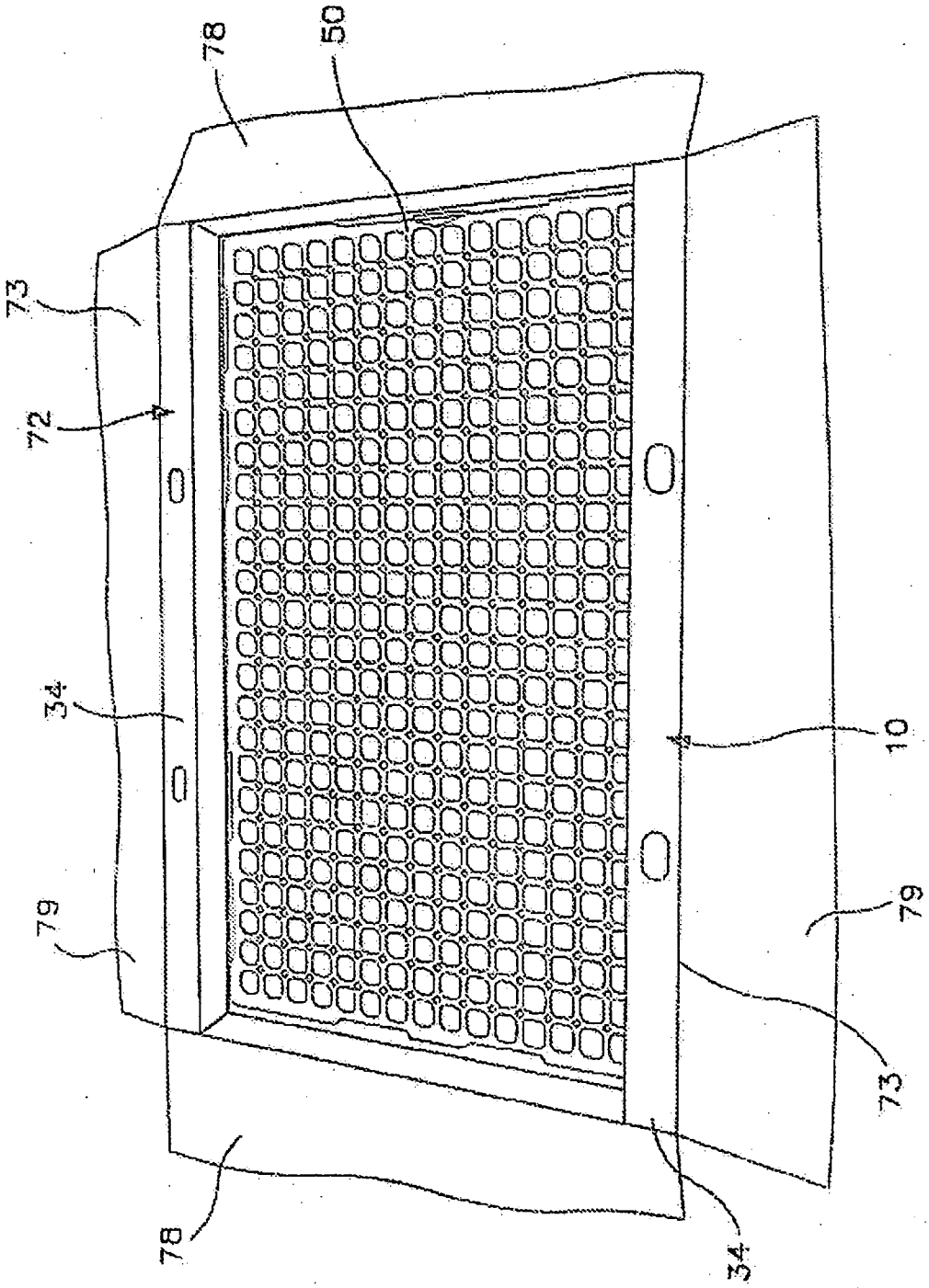


FIG. 9

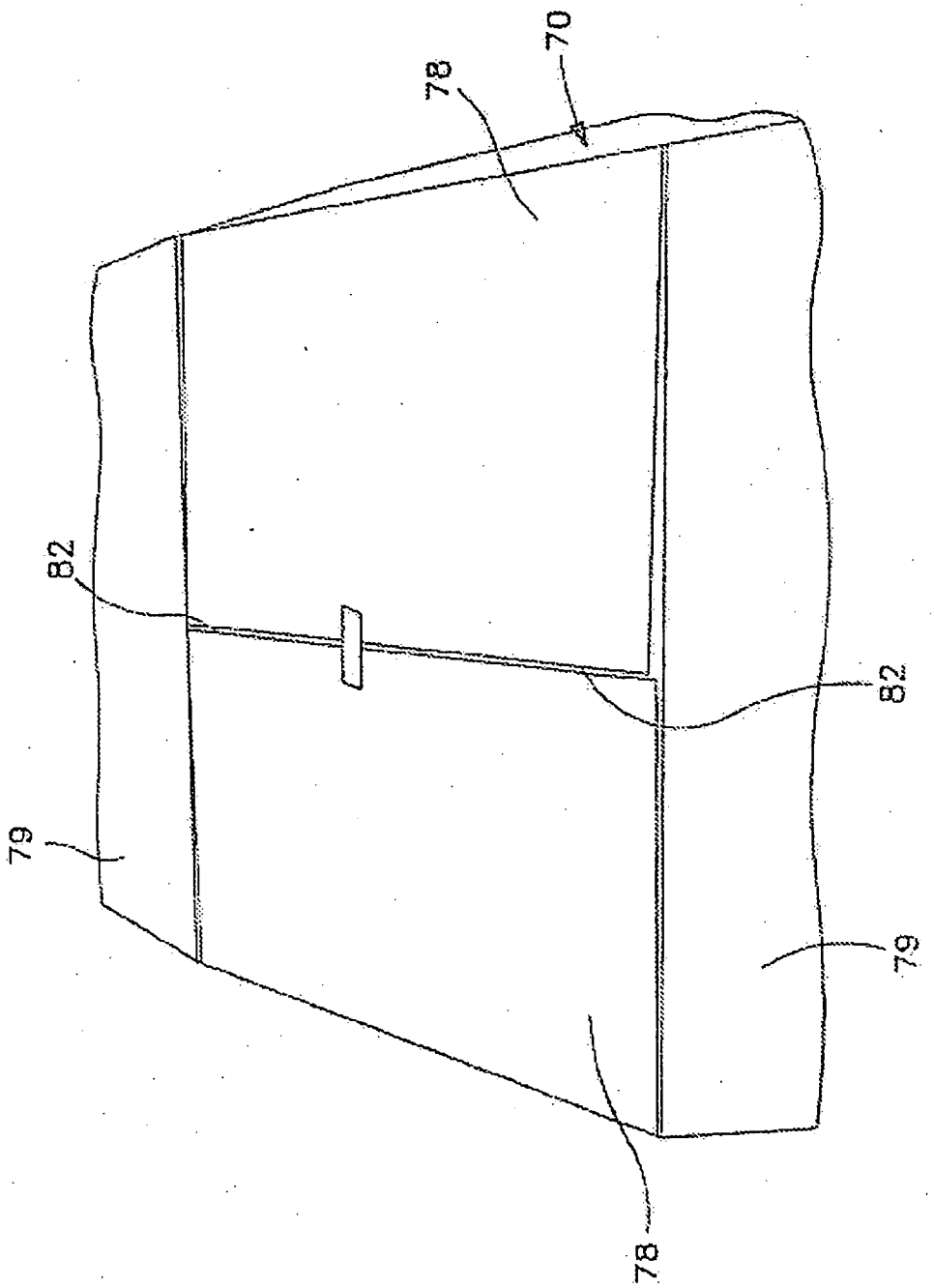


FIG. 10A

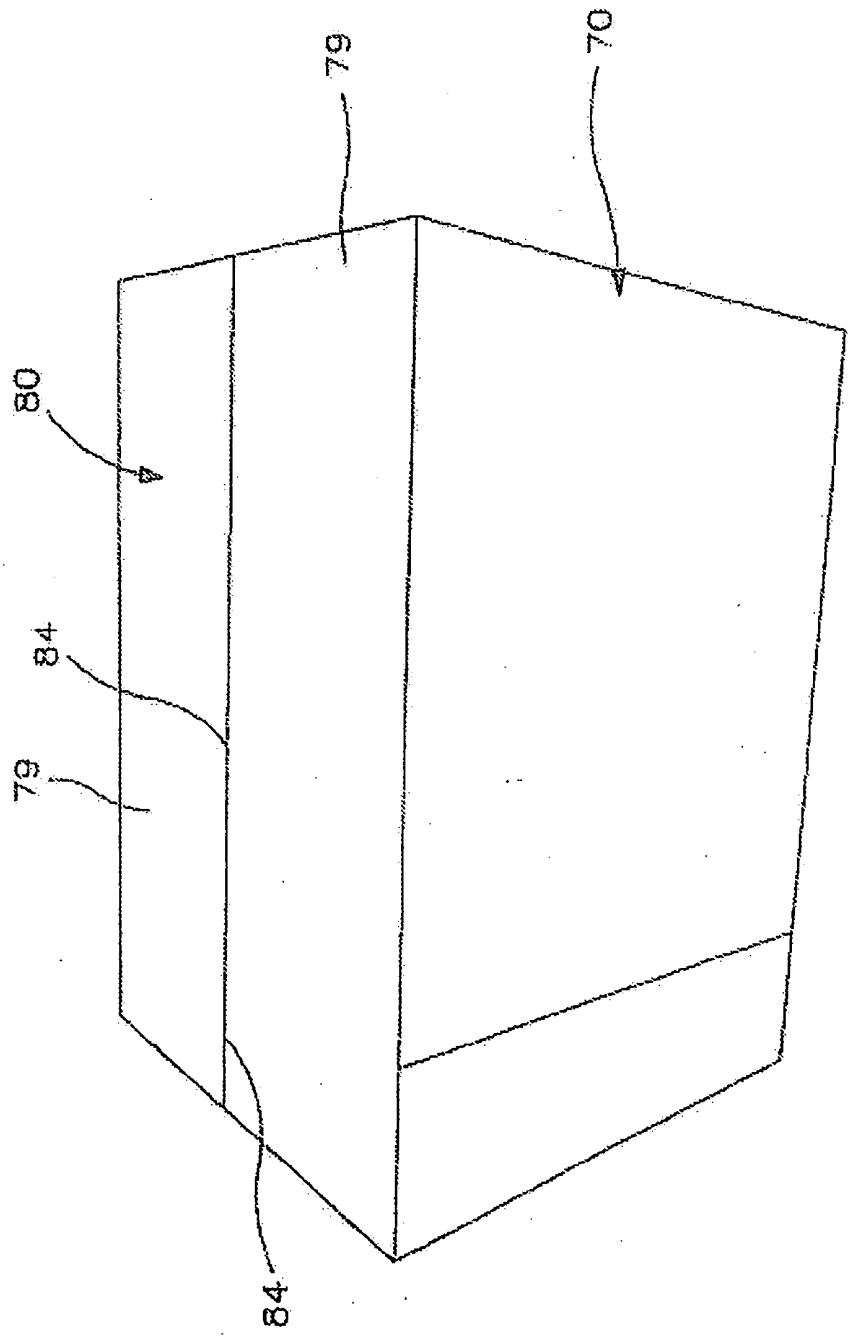


FIG. 10B

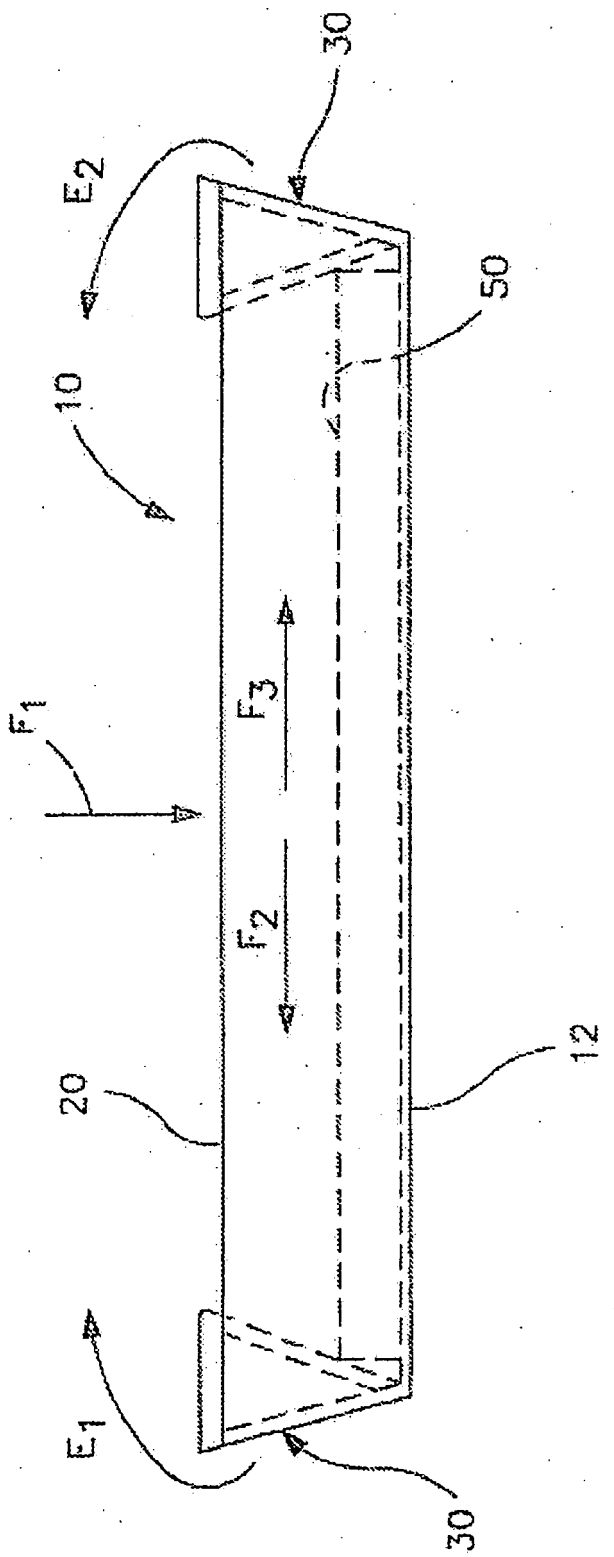


FIG. 11

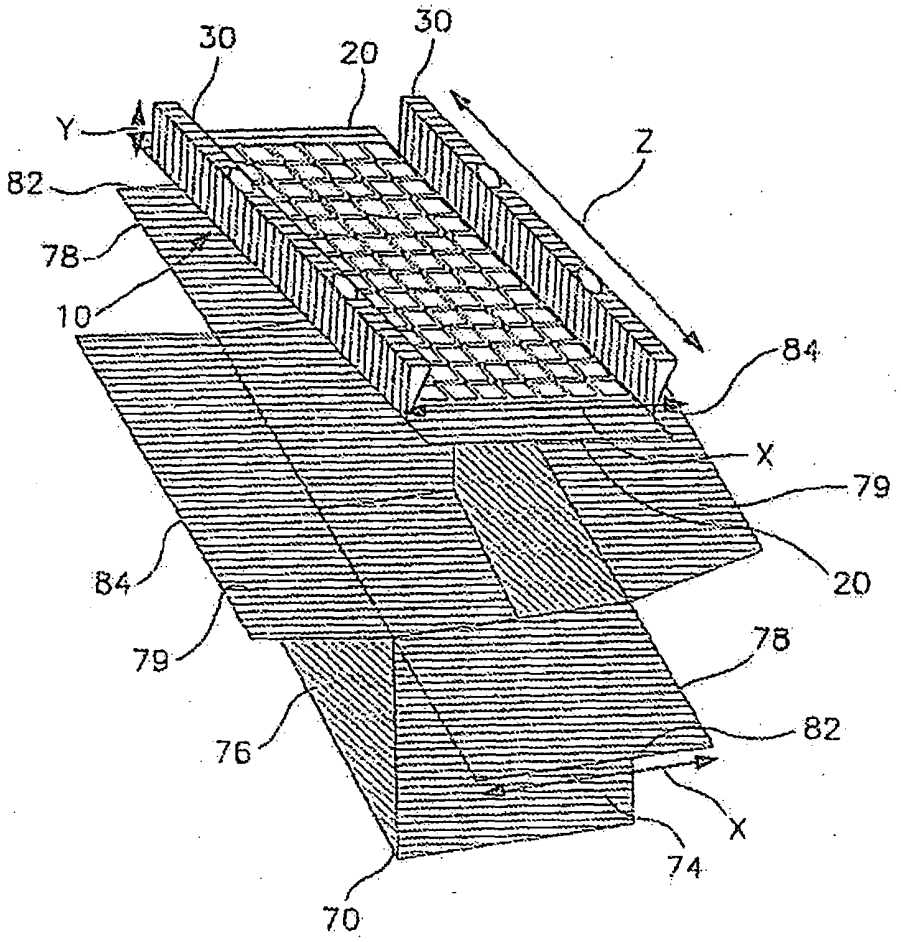


FIG. 12A

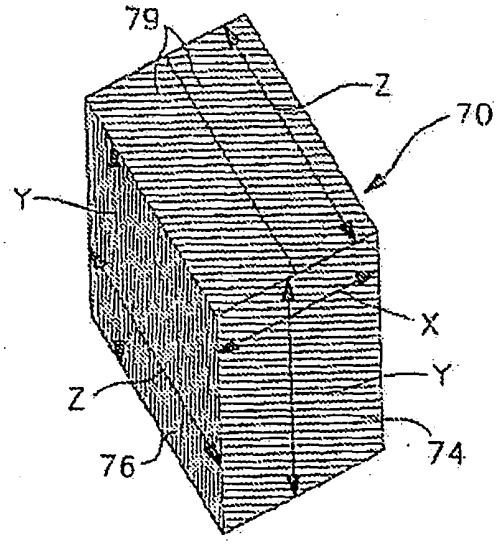


FIG. 12B

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- NL 9000582 A **[0003]**
- US 3119492 A **[0003]**