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(54) **Sectional toy track structure**

(57) A sectional toy track is composed of a plurality of sections (2) extending one after the other to define a trackway. Advantageously, each section (2) is made of

cardboard and has opposed longitudinal edges (5) which extend from the head end to the tail end to form lateral confining walls for the trackway portion defined by the relevant section (2).

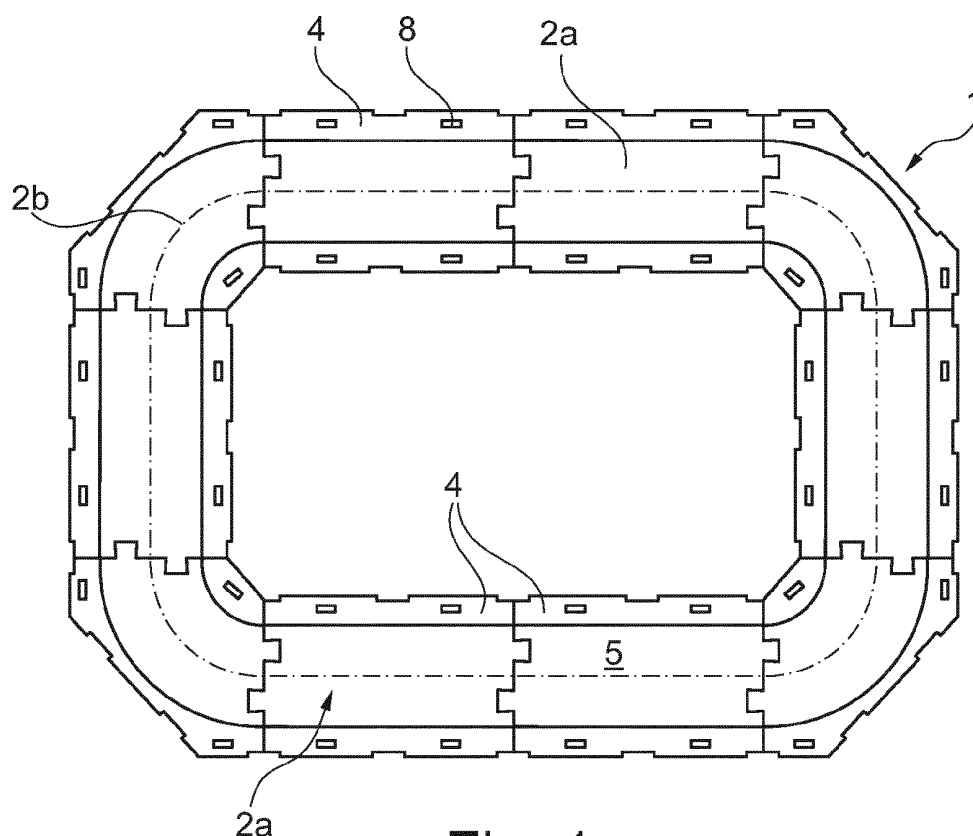


Fig. 1

Description

[0001] The present invention relates to a sectional toy track structure as defined in the preamble of claim 1, particularly a sectional track composed of a plurality of end-to-end connected modular sections, one extending the other to form a closed-loop trackway.

[0002] In the field of children games, sectional tracks are valuable products, that have always attracted the interest of children through the generations.

[0003] Tracks of various types are currently available, including electrified tracks, i.e. tracks having electric means for supplying power to toy cars and the like, and simpler tracks which simply define a trackway in which children would race toy cars, marbles and the like.

[0004] Particularly referring to the latter type of tracks, it may be appreciated that their low fabrication cost is a key to their wide commercial success. Therefore, in addition to characteristics such as modularity and assemblability of the sections that compose the track and can be interconnected in various manners to form different paths, the interconnectable sections should involve much lower fabrication costs than the corresponding assemblable sections equipped with power supply means of electrified tracks.

[0005] Furthermore, the following needs arise in connection with such track sections:

- the modular sections should allow different trackway paths to be formed using a plurality of sections of a small number of types,
- the graphical aspect of the sections should be customized to create various settings and
- the sections should be able to be stored in orderly and compact form, without losing pieces, when the track is to be disassembled.

[0006] Also, since sectional tracks are designed for children use, their modular sections should be free of any sharp edges or small parts that might be inadvertently ingested, and should also have moderate weight or hardness, to prevent injuries whenever a modular section should fall on the foot or hand of a child during track assembly.

[0007] At present, modular toy track sections are generally made of plastic or wood, and the fabrication costs of such sections are hardly reduced to a very low value.

[0008] This invention is based on the problem of providing a sectional track structure that has such structural and functional characteristics as to fulfill the above need, while obviating the drawbacks as mentioned hereinbefore.

[0009] This problem is solved by a sectional track structure according to the features of claim 1.

[0010] Further features and advantages of the sectional track of the present invention will be apparent upon reading the following description of certain exemplary embodiments thereof, which is given by way of illustration

and without limitation with reference to the accompanying figures, in which:

- Figure 1 is a plan view of a track structure of the invention, which is composed of a plurality of modular sections, here arranged to define a ring-shaped trackway;
- Figure 2 is a plan view of three sections, connected together to form a half-circle;
- Figure 3 is a perspective view of a straight modular section;
- Figure 4 is a perspective view of a curvilinear modular section;
- Figures 5 and 6 are exploded views of two portions of straight and curvilinear sections, connected together end-to-end respectively;
- Figure 7 is a plan view of the deployed die-cut sheet from which the straight modular section of Figure 3 is formed;
- Figure 8 is a plan view of the deployed die-cut sheet from which the curvilinear modular section of Figure 4 is formed;
- Figures 9 and 10 are perspective views of the die-cut sheet of Figure 7 in two successive intermediate folding steps to obtain the straight modular section of Figure 3 and
- Figure 11 is a cross-sectional view of a three-ply cardboard portion, which is used to form the modular sections of the track structure of the invention.

[0011] Referring to the accompanying figures, numeral 1 generally designates a sectional track structure according to the invention, which is generally composed of a plurality of modular sections 2 extending one after the other to form a predetermined generally closed-loop trackway. Thus, for example, Figure 1 shows a ring-shaped track of the invention, and Figure 3 shows three curvilinear modular sections 2b, joined together end-to-end to form a half-circle.

[0012] In practice, various paths may be obtained by combining a plurality of modular sections of a small number of types, e.g. straight, 90° curvilinear or 45° curvilinear sections.

[0013] Figure 3 shows a straight modular section 2, and Figure 4 shows a modular section 2b extending over a 60° arc of a circle.

[0014] Each modular section 2 extends a longitudinal center line X-X (which is straight for the section 2a or curvilinear along an arc of a circle for the section 2b) between one head end to a tail end.

[0015] As shown in Figures 1, 2 and 6, the sections 2 are mutually extended end-to-end to form a predetermined trackway, i.e. are arranged one after the other.

[0016] While the sections 2 may be simply arranged in mutually adjacent positions, a strongly preferred embodiment involves the use of engagement means that can removably hold the sections 2 to each other, one

after the other. For this purpose, in the illustrated embodiment, each section comprises mating engagement means 3 located at their head and tail ends, which can provide mating shape engagement of the head and tail ends of a pair of sections, disposed in mutually extending relation. In the illustrated example, such engagement means 3 are embodied as trapezoidal tongues and mating trapezoidal recesses.

[0017] Advantageously, the modular sections 2:

- have opposed longitudinal edges 4 which extend from the head end to the tail end to form lateral confining walls for the trackway portion defined by the relevant section 2 and
- are made of cardboard, preferably a three-ply corrugated board comprising a sandwich structure consisting of three flat layers 30 interleaved with two respective corrugated layers 31, as shown in Figure 11.

[0018] The use of a three-ply board for sections 2 provides, on the one hand, a very low-cost product, and on the other hand, a light-weight product, adapted for children use, allowing easy disposal due to its recyclability as well as freely customizable in its exterior graphical aspect.

[0019] Preferably, such three-ply corrugated board has a thickness ranging from 3 to 8 mm, preferably from 4.4 to 5.1 mm.

[0020] Advantageously, the modular section 2 is a single piece, which is formed through successive plies from a die-cut sheet having easy-folding lines.

[0021] It shall be noted that the term "*easy-folding line*", associated with a die-cut sheet or another cardboard element, is generally used herein to not only designate folding seams, but also cuts, half-cuts or fold-cuts required to obtain a 90°, 180° or the like ply orientations of one part relative to another.

[0022] The die-cut sheets that are used to form the sections 2 have, in their deployed form:

- a central portion 5 extending from the head end to the tail end to define the bottom of the section 2 and
- two opposed lateral portions 4, each extending from the head end to the tail end of the section 2 along respective longitudinal edge portions 5a of the central portion 5.

[0023] When the die-cut sheet 2 is folded to form the section 2, such two lateral portions 4 are folded over the corresponding longitudinal edge portions 5a of the central portion 5 of the section 2, thereby defining the above mentioned lateral walls that delimit the path portion formed by the relevant section 2.

[0024] In the illustrated embodiment, each lateral portion 4 of the sections 2 is hinge-connected to the corresponding longitudinal edge portion 5a of the central portion 5 of the section 2 via hinge-connection portions 6

defined by easy-folding lines 7. Therefore, at the hinge-connection portions 6, each lateral portion 4 is seamlessly and integrally connected with the corresponding longitudinal edge 5a of the central portion 5 of the section 2. Due to such hinge connection, each lateral portion 4 can pivot about the corresponding longitudinal edge 5a of the central portion 5 from a deployed operating position, in which said lateral portion is coplanar with said central portion 5 (see Figures 7 and 8) to a folded operating position (see Figures 3 and 4) in which the lateral portion is rotated through substantially 180° relative to the central portion 5 to overlie it to substantial contact with the corresponding longitudinal edge 5a of the central portion 5.

[0025] As shown in Figures 3 and 4, in the above mentioned folded operating position each lateral portion 4 is in overlying, deployed, preferably contacting relation, with the corresponding longitudinal edge 5a of the central portion 5 of each section 2.

[0026] Preferably, the parting line between the lateral portions 4 and their respective longitudinal edges 5a of the central portion 5 is defined by an alternation of said hinge-connection portions 6 and longitudinal through cuts which ensure physical discontinuity between the lateral portion 4 and the corresponding longitudinal edge 5a of the central portion 5 at said through cuts. Substantially, as shown in the figures, each lateral portion 4 is only connected to the corresponding longitudinal edge 5a of the central portion 5 via the hinge-connection portions 6.

[0027] Preferably, the hinge-connection portions 6:

- are located astride the connecting line between the lateral portion 4 and the central portion 5 of the section 2 and
- have a width, as measured in the direction Y-Y perpendicular to the longitudinal center line X-X, at the most equal to or preferably smaller than the sum of the thicknesses of the central portion 5 and the lateral portion 4.

[0028] In the preferred embodiment, since the sections 2 are formed from a single constant-thickness die-cut cardboard sheet, such width of the hinge-connection portions 6 is at the most equal to, preferably somewhat smaller than twice the thickness of the die-cut cardboard sheet.

[0029] As a result of the above mentioned position and size of the hinge-connection portions 6, in the deployed die-cut sheet such hinge-connection portions 6 counteract the rotation required to cause the lateral portions 4 to fold onto the corresponding longitudinal edges 5a of the central portion 5 of the section. This is because, as mentioned above, the transverse width of such hinge-connection portions is smaller than or at the most equal to twice the thickness of the die-cut sheet. Nevertheless, as the lateral portions 4 are slightly forced to pivot relative to the central portion 5, the hinge-connection portions 6, which are made of cardboard, slightly yield beyond a

dead center of rotation, whereupon the lateral portions 4 cannot naturally pivot back to the initial deployed configuration relative to the central portion 5, unless such rotation is forced in the direction opposite to the one imparted before.

[0030] The sections 2 include engagement means adapted to hold the lateral portions 4 in overlapped and engaged relation to the corresponding longitudinal edge portions 5a of the central portion 5. In practice, these engagement means allow the lateral portions 4 to be held in overlapped and substantially contacting relation to the corresponding longitudinal edges 5a of the central portion 5 of the sections 2. This is advantageous both in the case as shown in the figures, in which the lateral portions 4 are integrally connected to the central portion 5 by the hinge-connection portions 6 and in the case in which the portions that define the section walls are totally separate parts, independent of the central portion that defines the bottom of the section.

[0031] Preferably, these engagement means include engagement tongues 8 which are designed to be inserted in corresponding mating engagement grooves 9 when the lateral portions 4 are in overlapped relation to the longitudinal edges 5a of the central portion 5 to define the lateral walls of the section 2 (see Figures 4 and 5). Advantageously, the engagement tongues 8 and the engagement grooves 9 are directly supported by the lateral portions 4 and the longitudinal edge portions 5a of the central portion 5. Preferably, the engagement tongues 8 and the engagement grooves 9 are directly integrally formed from the die-cut sheet that is used to form the section 2 by folding, namely from the portions of such die-cut sheet that define the lateral portions 4 and the longitudinal edges of the central portion 5 of each section.

[0032] Preferably, the engagement tongues 8 are snapped into the engagement grooves. For this purpose, in the illustrated embodiment, the engagement grooves 9 are through openings formed by cutting out the die-cut sheet, and the engagement tongues are formed by cuts in the die-cut sheet and have a shank 8a connected to the rest of the die-cut sheet via an easy-folding line, and terminating at its free end in a mushroom head 8b.

[0033] It shall be noted that:

- the shank 8a is smaller and the mushroom head 8b is larger than the engagement groove 9 and
- the mushroom head 8d defines a substantially right-angled undercut relative to the shank 8a.

[0034] In view of the structure of the above engagement tongues 8, these are introduced into the engagement grooves 9 so that the mushroom head 8b juts out of its respective engagement seat 9 to entirely extend beyond the thickness of the cardboard of the die-cut sheet and that such undercut prevents the engagement tongue 8 from coming out of its respective engagement groove 9 and vice versa.

[0035] Advantageously, the engagement grooves 9

are only formed at the lateral portions 4, whereas the engagement tongues are only formed at the lateral edges 5a of the central portion 5 and are designed to be pivoted from the plane of the central portion 5 to project perpendicular thereto. Obviously, the position of the engagement grooves 9 relative to the lateral portions 4 should allow alignment of the engagement grooves 9 with the vertical of the engagement tongues 8 which project perpendicular to the plane of the central portion 5 when the central portions 4 are pivoted to overlie the longitudinal edges 5a of the central portion 5. As a result of such position of the engagement grooves 9 relative to the engagement tongues 8, once the engagement tongues 8 reach an overhanging position perpendicular to the plane of the central portion 5, the rotation of the lateral portions 4 relative to the hinge-connection elements 6 causes the mushroom heads 8b of the engagement tongues 8 to fit into their respective engagement grooves and come out from the opposite side, thereby preventing any backward movement of the lateral portions towards the initial fully deployed position or an intermediate position.

[0036] Since the engagement tongues 8 are formed in the central portion 5 of a section, multiple sections may be stacked together in slightly offset positions so that:

- the lower side of the overlying section 2 rests on the lateral portions 4 of the underlying section 2, the mushroom heads 8b of the underlying section fitting into the openings defined in the flat portion 5 of the overlying section 2, once the respective engagement tongues have been pivoted to a perpendicular overhanging position, as mentioned above.

[0037] As clearly shown in the above description, the sectional track structure of the present invention fulfills the above mentioned needs and also obviates prior art drawbacks as set out in the introduction of this disclosure. Namely, the use of cardboard affords:

- a reduction of raw material costs for the sections;
- reduced weight of the product;
- fabrication of a product that has a flattened shape before use, to reduce the dimensions of the items to be transported;
- customization of the outer surface with any desired graphical setting, free spaces being also possibly provided to be colored/customized by the final user;
- safe use of the product by children and
- easy recycling of the product, or fabrication thereof from recycled material.

[0038] It should be further noted that the use of cardboard to form the track, and hence its full recyclability helps to educate children and raise their awareness about recycling.

[0039] Those skilled in the art will obviously appreciate that a number of changes and variants may be made to the sectional track structure as described hereinbefore,

in response to specific requirements, without departure from the scope of the invention, as defined in the following claims.

Claims

1. A sectional track structure comprising a plurality of sections extending one after the other to define a trackway, wherein each section (2) of said plurality of sections (2) extends along a respective longitudinal center line (X-X) from a head end to a tail end, at which said sections (2) extend one after the other to define said trackway, wherein each section (2) comprises:

- a central portion (5) having opposed longitudinal edge portions (5a) extending parallel to said longitudinal center line (X-X)
- opposed lateral portions (4) extending from said head end to said tail end to form opposed lateral confining walls for the trackway portion defined by the corresponding central portion (5) of the relevant section (2),

characterized in that:

- each section (2) comprising said central portion (5) and said opposed lateral portions (4) is a single piece, which is formed through successive plies from a die-cut cardboard sheet having easy-folding lines and
- each lateral portion (4) is connected to the corresponding longitudinal edge portion (5a) of the central portion (5) via hinge-connection portions (6) defined by easy-folding lines (7), each lateral portion (4) of the section (2) being thus suitable to pivot about the corresponding longitudinal edge (5a) of the central portion (5) from a deployed operating position, in which said lateral portion (4) is coplanar with said central portion (5), to a folded operating position in which the lateral portion is folded to substantially lie over the corresponding longitudinal edge (5a) of the central portion (5) to form a lateral confining wall for the trackway portion defined by the corresponding central portion (5) of the relevant section (2).

2. A track structure as claimed in claim 1, wherein in said folded operating position each lateral portion (4) is in deployed and overlying relation to the corresponding longitudinal edge (5a) of the central portion (5).
3. A track structure as claimed in claim 1 or 2, wherein each section (2) comprises engagement means for holding said lateral portions (4) in overlying, engaged

relation to the corresponding longitudinal edge portion (5a) of the central portion (5).

4. A track structure as claimed in claim 3, wherein said engagement means include engagement tongues (8) which are adapted to be inserted into corresponding mating engagement grooves (9), said tongues and said engagement grooves (9) being formed in said lateral portions (4) and said longitudinal edges (5).
5. A track structure as claimed in claim 4, wherein said engagement grooves (9) and said engagement tongues (8) are both directly integrally formed from the portions of said die-cut sheet that define said lateral portions (4) and said longitudinal edges (5a) of the central portion (5) of each section (2).
6. A track structure as claimed in claim 4 or 5, wherein said engagement tongues (8) are snapped into said engagement grooves (9), so that said lateral portions (4) are held in said back-folded overlying relation to the corresponding longitudinal edge portion (5a) of the central portion (5).
7. A track structure as claimed in claim 6, wherein:
 - said engagement grooves (9) are through openings,
 - said engagement tongues (8) include a shank (8a) terminating in a mushroom head (8b), whose transverse size is larger than the transverse size of the engagement groove (9),
 - said mushroom head (8d) defining a substantially right-angled undercut relative to said shank (8a),
 said engagement tongues (8) are introduced into said engagement grooves (9) such that said mushroom head (8b) juts out of its respective engagement groove (9), so that said undercut prevents the engagement tongue (8) from coming out of its respective engagement groove (9) and vice versa.
8. A track structure as claimed in claim 7, wherein said through openings are only formed at said lateral portions (4) and said engagement tongues are only formed at said longitudinal edges (5a) of said central portion (5).
9. A track structure as claimed in any claim from 1 to 8, wherein the parting line between said lateral portion (4) and the corresponding longitudinal edge (5a) of the central portion (5) is defined by an alternation of said hinge-connection portions (6) and through cuts whereat physical discontinuity is ensured between said lateral portion (4) and the corresponding longitudinal edge (5a) of the central portion (5) of the

section (2).

10. A track structure as claimed in claim 9, wherein said hinge-connection portions (6) have a measured width perpendicular (Y-Y) to said longitudinal center line (X-X) at the most equal to or preferably smaller than the sum of the thicknesses of said central portion (5) and said lateral portion (4). 5
11. A track structure as claimed in claim 10, wherein each hinge portion (6) is placed astride the connecting line between the lateral portion (4) and the central portion (5) of the section (2). 10
12. A track structure as claimed in any claim from 1 to 11, wherein each section (2) comprises mating engagement means (3) located at said head end and said tail end, which can provide mating shape engagement of the head and tail ends of a pair of sections (2), disposed in mutually extending relation. 15 20
13. A track structure as claimed in any claim from 1 to 12, wherein said cardboard is a three-ply corrugated cardboard comprising a sandwich structure formed by three flat layers (30) spaced by two respective corrugated layers (31). 25
14. A track structure as claimed in any claim from 1 to 13, wherein in said folded operating position each lateral portion (4) is in deployed and overlying relation to the corresponding longitudinal edge (5a) of the central portion (5) of each section 2. 30
15. A track structure as claimed in claim 14, wherein in said folded operating position each lateral portion (4) is in deployed, overlying and substantially contacting relation to the corresponding longitudinal edge (5a) of the central portion (5) of each section (2). 35

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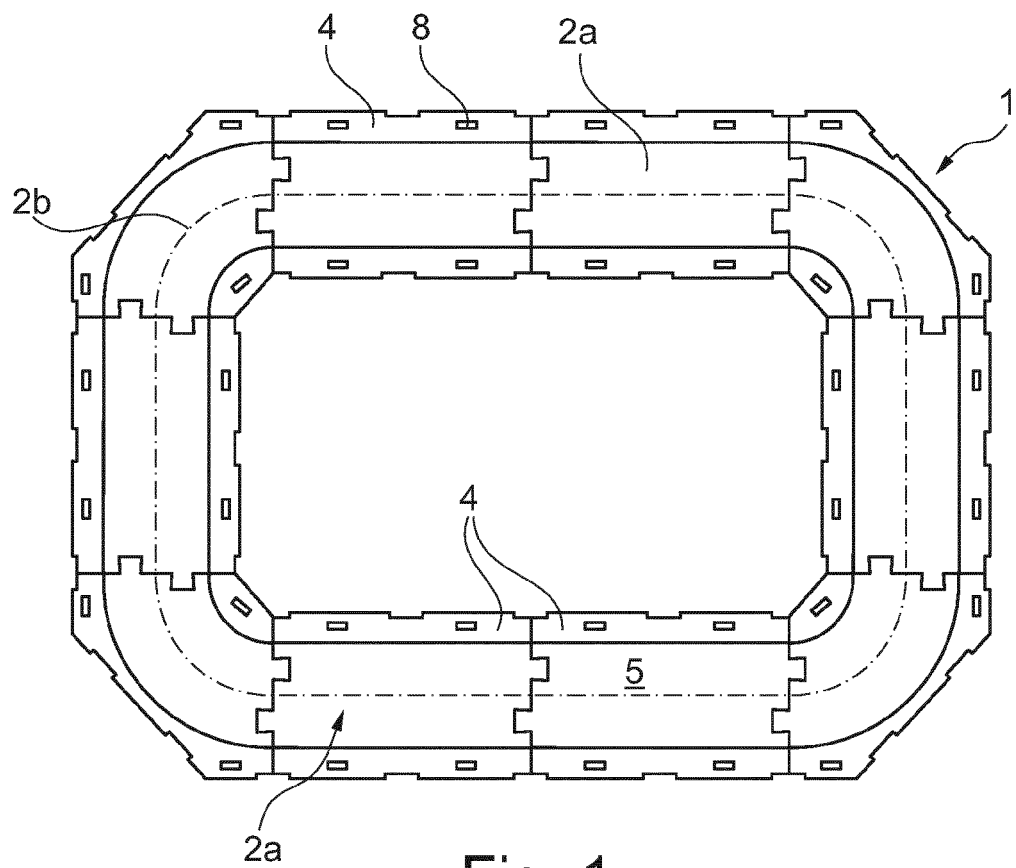


Fig. 1

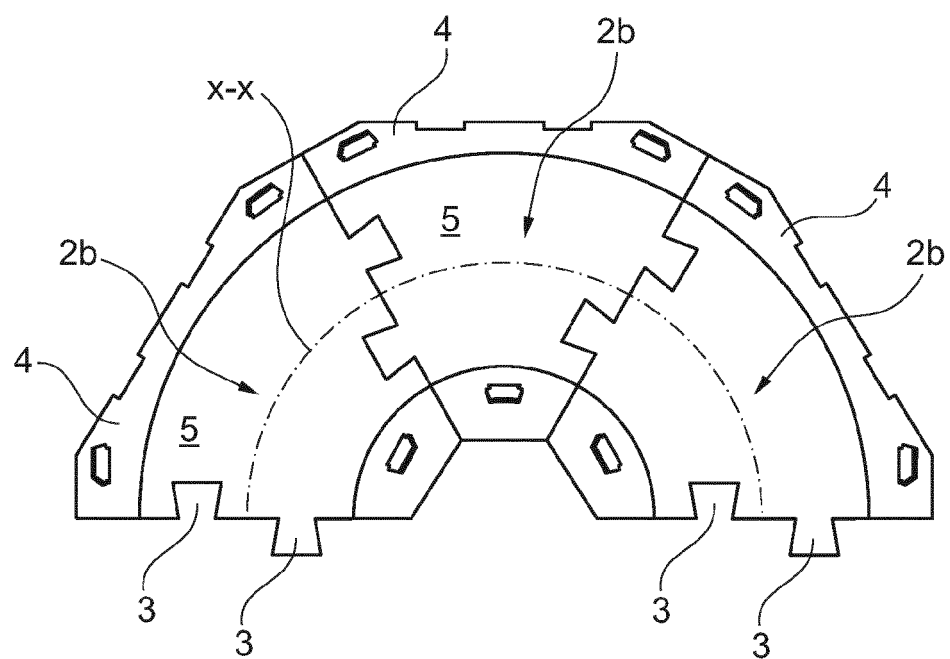


Fig. 2

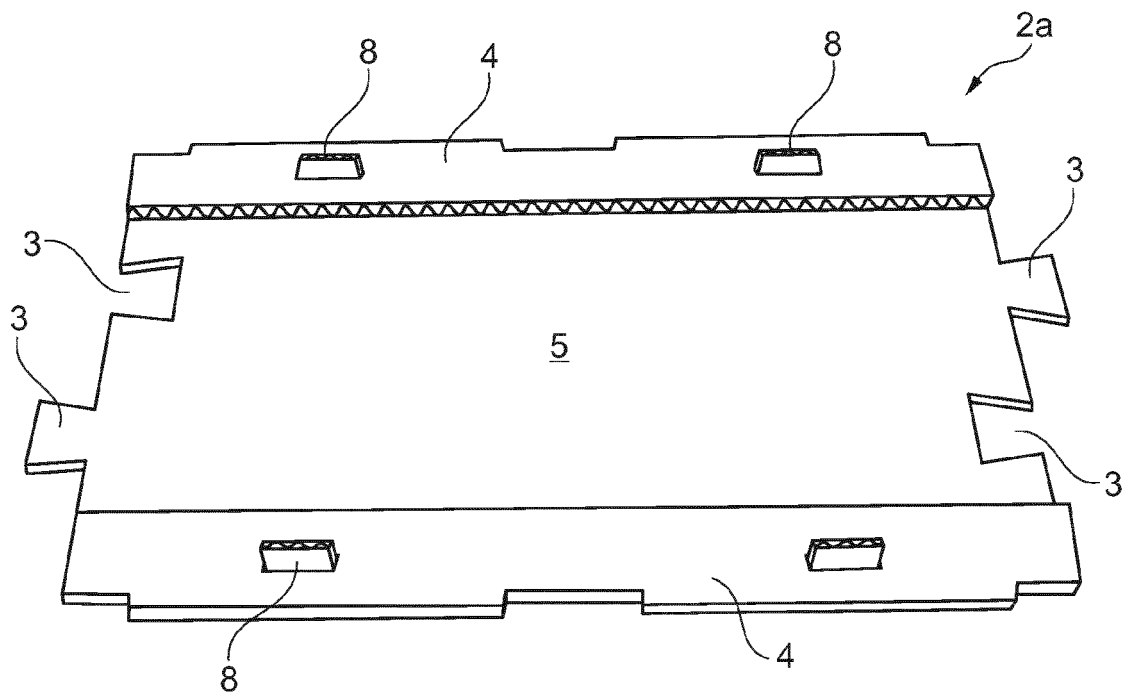


Fig. 3

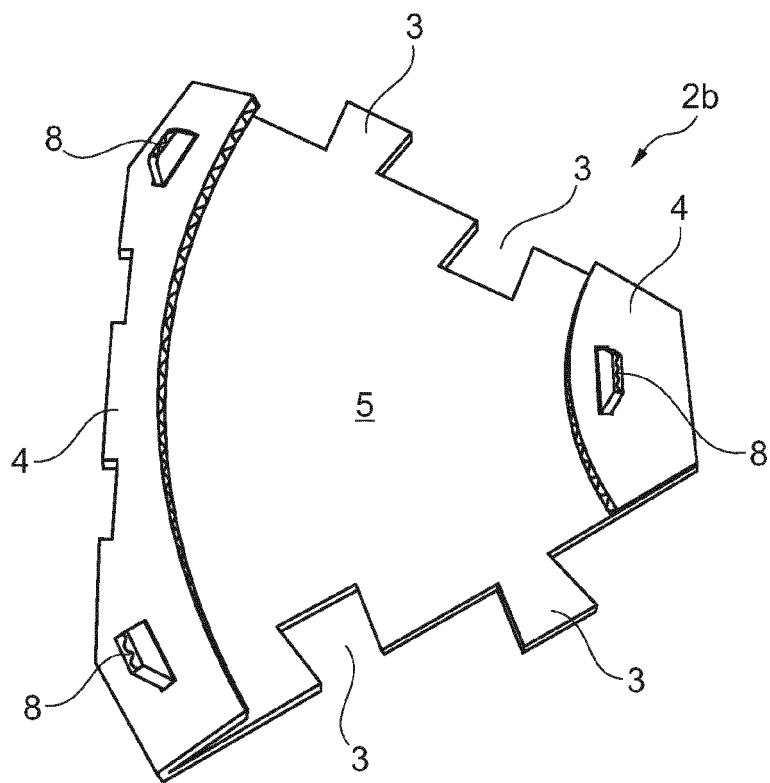


Fig. 4

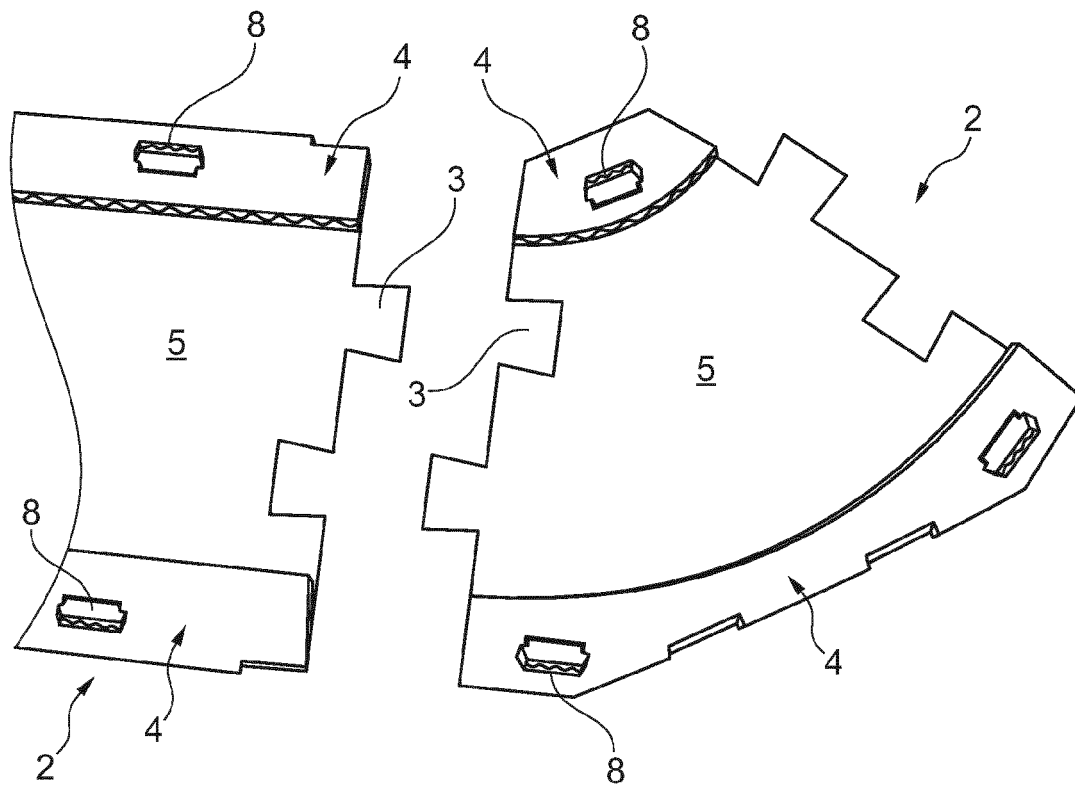


Fig. 5

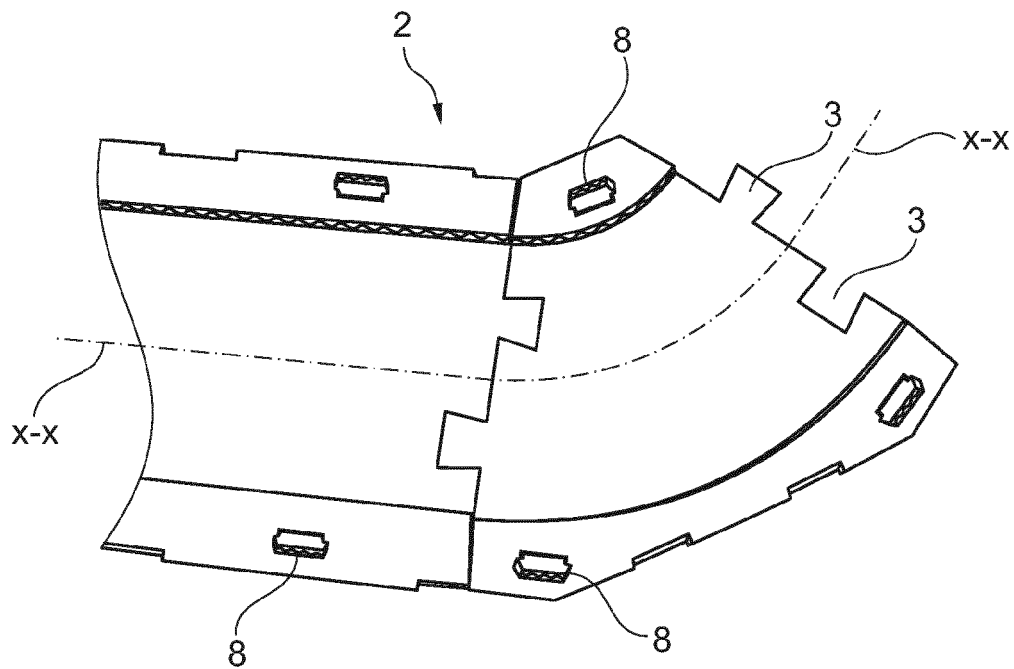


Fig. 6

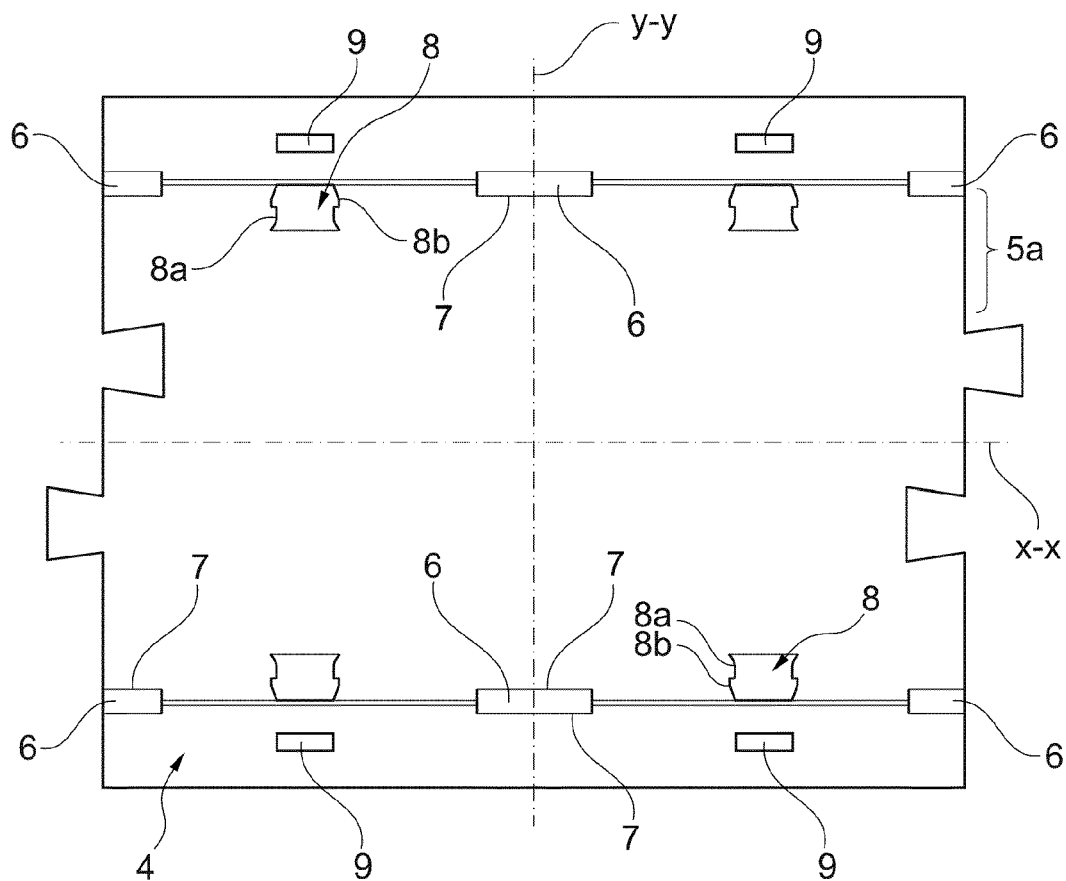


Fig. 7

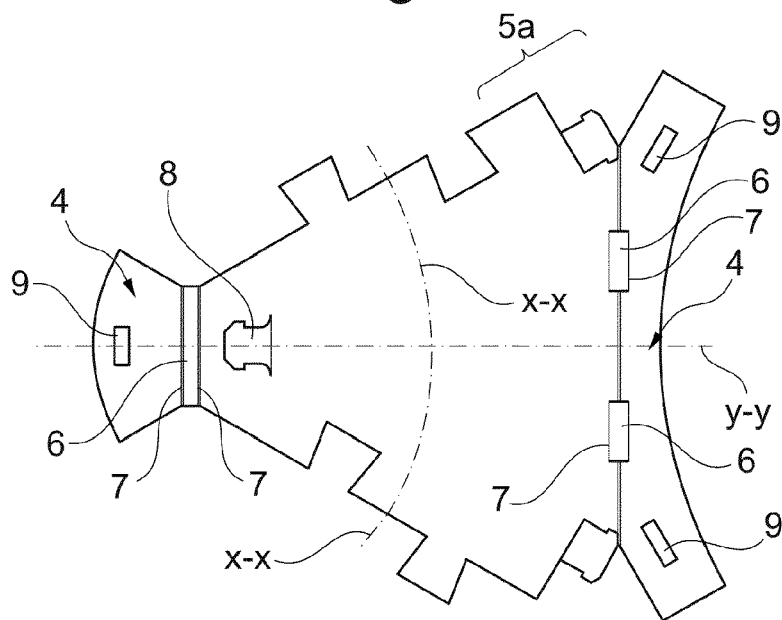


Fig. 8

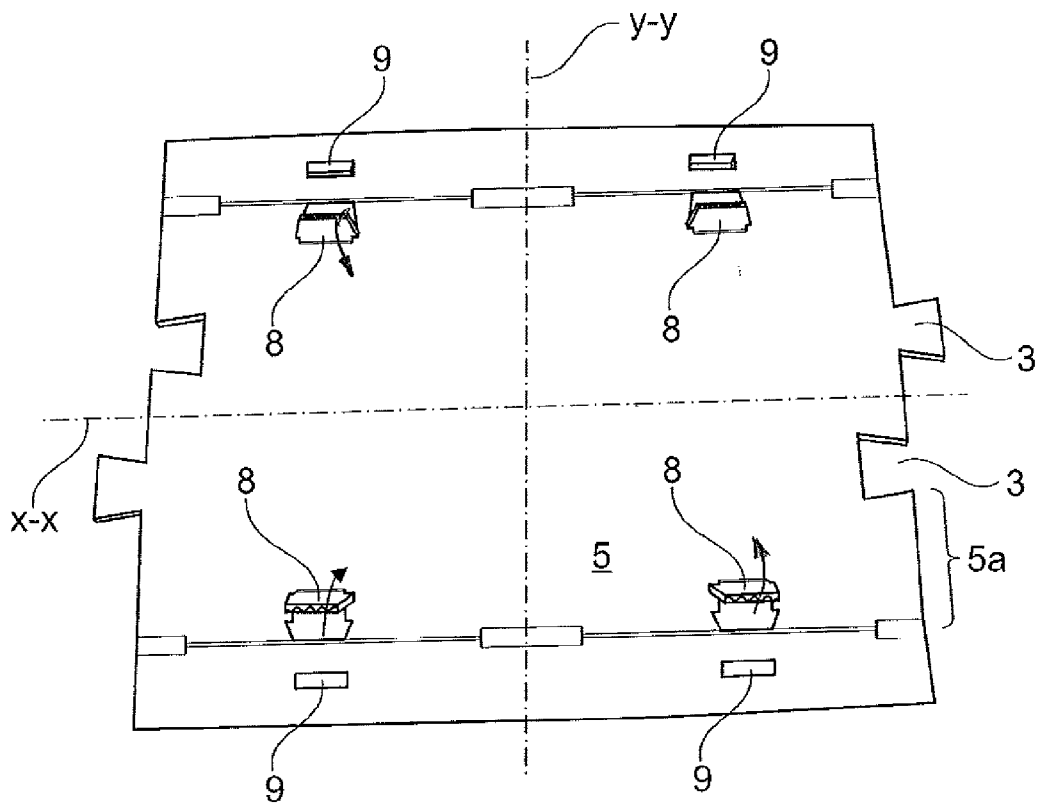


Fig. 9

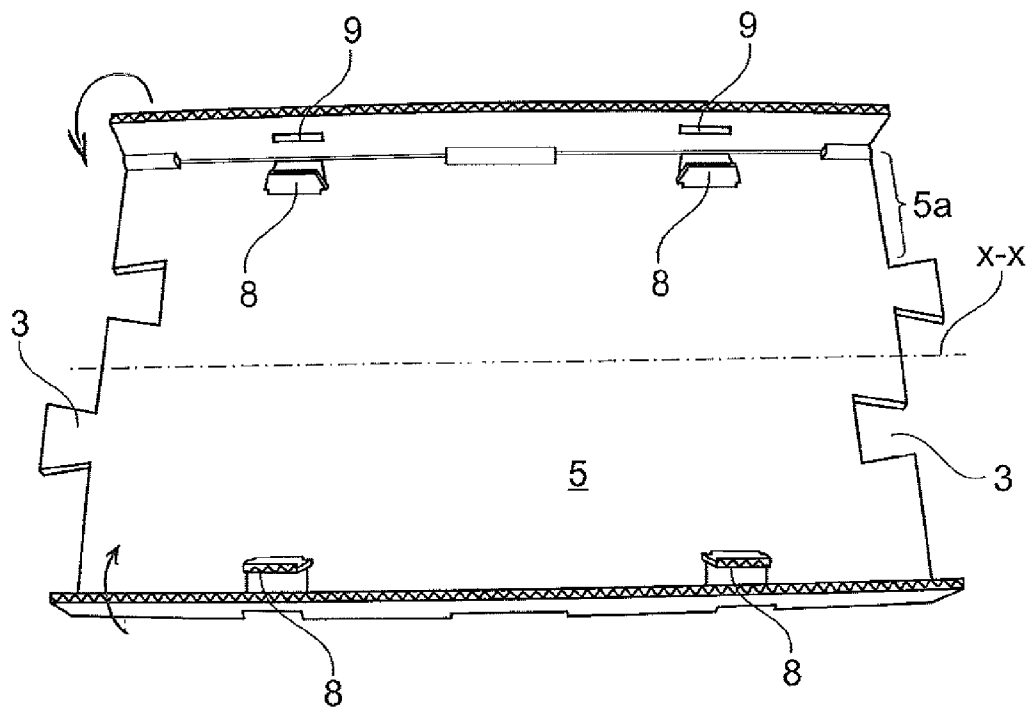


Fig. 10

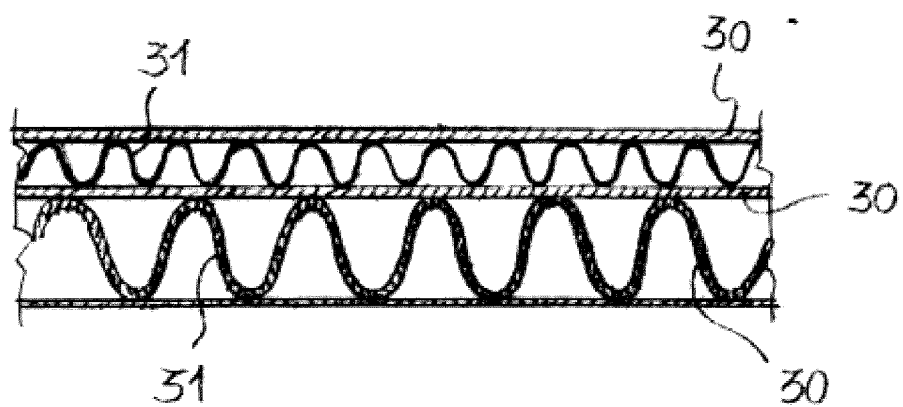


Fig. 11



EUROPEAN SEARCH REPORT

Application Number
EP 11 19 5098

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 5 203 733 A (PATCH BRYCE L [US] ET AL) 20 April 1993 (1993-04-20) * column 3, line 4 - column 4, line 54; figures 1-15 *	1	INV. A63H18/02
A	US 6 647 893 B1 (FUGITT GREGORY A [US] ET AL) 18 November 2003 (2003-11-18) * paragraph [0011]; figures 1-5 * * paragraph [0024] - paragraph [0025] *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			A63H
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 30 March 2012	Examiner Shmonin, Vladimir
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 11 19 5098

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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30-03-2012

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US 5203733	A	20-04-1993	NONE

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