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(54) CONSTRUCTION-SET ELEMENT (VARIANTS)

(57) Construction-set elements for use in kits for children and in puzzles. The constructor-set element of the first embodiment comprises a base and an interlocking joint. The base is flat and has the shape of a rectangle, the sides of which are multiples of "a". The interlocking joint is created by positioning four types of protrusions on the base. The protrusions of the first group are cross-shaped in cross-section. The protrusions of the second group are tubular with a square-shaped cross-section. The protrusions of the third group are in the form of rectangular plates having ledges along the short sides thereof, the ledges angled toward one another with the formation of a gap. In the fourth group, the protrusions are in the form of corners, the shelves of which are arranged perpendicular to the plane of the base at its adjacent ends flush with these ends. All protrusions are placed on the base in accordance with the grid. The protrusions of the first group are located at the intersection of the lines of the coordinate grid, the protrusions of the second group are at the intersections of the diagonals of the grid cells, the protrusions of the third group are in the middle between the flanks of the adjacent protrusions of the first group located flush with the ends of the base, the protrusions of the fourth group are at the corners of the base. The sharp parts of protrusions are connected by bridges to make it easier to use construction-set elements by yanger pre-schooling children. The constructor-set element of the second embodiment comprises three of the four above-mentioned groups of protrusions. Both embodiments of the invention are provided with bridges between the protrusions edges of the different protrusions to facilitate the force in connecting the construction-set elements. 2 independent claims, 8 dependent claims, 16 Figures.

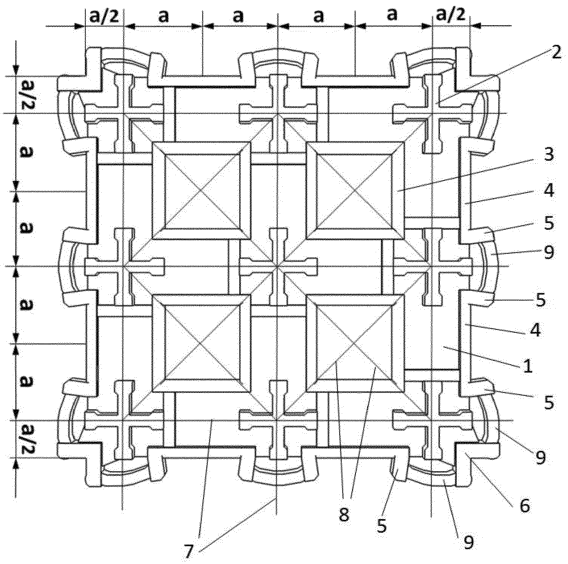

FIG.1

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Description

TECHNICAL FIELD

[0001] This invention relates to construction-set elements (components), that can be used both in toy construction sets and puzzles, for children's development of small motor skills of fingers and hands (suitable for children of younger preschool age).

BACKGROUND OF THE INVENTION

[0002] One known analog from prior art is the construction-set element from the author Sokolov D. (Russian Pat. No. 2525782, priority 07.06.2013).

[0003] The construction-set element contains a flat rectangular base and a connecting assembly. The connecting assembly is formed of four groups of protrusions (protrusions of four types), provided on the base. The protrusions of the first group have a cruciform cross-section. The protrusions of the second group are tubular with a square-shaped cross-section. The protrusions of the third group are in the form of rectangular plates having barrier-walls along the short sides thereof, the barrier-walls being angled toward one another with the formation of a gap. In the fourth group, the protrusions are positioned at the corners of the base and are made in the form of L-shaped elements, the sides of which are perpendicular to the plane of the base

[0004] Common features of the claimed technical solution and the known analogue are the configuration of a construction element for both embodiments of construction-set elements. There is a flat base having two sides, a rectangular form, base edges having lengths in multiples of <<a>>. An interlocking joint created by positioning four types of protrusions on the base together as one unit. A first protrusion type is made with a cross-shaped cross-section. A second protrusion type is made tubular with a cross-section in a form of squard. A third protrusion type is made in the form of a rectangular plate with ledges along short sides of the rectangular plate. The ledges angled towards each other with a gap formed between their ledge end parts. A fourth protrusion type is made in the form of a corner, having shelves positioned perpendicular to each other and extending outwardly from the base flush with the base ends. All protrusions are positioned on the base in accordance with a coordinate grid of lines. The protrusions of the first protrusion type are positioned at points where the coordinate grid lines intersect, the protrusions of the second protrusion type are positioned at points where diagonals of the cells of the coordinate grid intersect, the protrusions of the third protrusion type are positioned in a middle between neighboring protrusions of the first protrusion type flush with the base ends, and the protrusions of the fourth protrusion type are positioned at corners of the base.

[0005] A construction element implemented according to the second embodiment comprises only three of four four types of protrusions (the first, second and third protrusion types).

[0006] A disadvantage of the construction-set elements known form prior art is complexity to use them by children of yanger age in which the process of ossification of the hand and fingers does not end completely even before the beginning of schooling, and therefore small and precise movements of the fingers and hands can be difficult and tedious when they press their fingers on the edges of construction-set elements (for example, the edges, shelves of the corners of the some protrusions of the elements of the said prior art), when a child needs to apply sufficient force with his fingers to connect the elements together.

SUMMARY OF THE INVENTION

[0007] The object of the claimed invention is to create a construction element which provides decreasing stress on fingers in the process of pressing construction-set elements when assembling (joining) them, making easier their use for children of different age groups.

[0008] The technical result includes widening functional possibilities of the construction-set elements due to the increased convenience of use, in particular, widening applicability of the construction-set for the children's age group in the direction of reducing the age of children who are comfortable with using such a construction-set elements for development design skills, for development of fine hand motor skills and the formation of fine movements of the hands and fingers in the conditions of decreasing fatigue of the muscles of the fingers and palms of children due to increased ease of use due to the transfer of the main pressure to the finger tips of the child and any person using the construction-set elements from the edges of the construction-set elements on bridges between separate parts of the construction-set elements, that is especially important in the system of corrective-developing children's education. In addition, ease of use is provided by the fact that the presence of bridges prevents the creation of "incorrect" connections of the construction-set elements with each other. In case of "incorrect" connection, the construction-set elements are displaced relative to each other in the wrong way, which prevents further joining of construction-set elements to create a single structure.

[0009] The technical result of the first embodiment of the construction-set element is achieved in that there are bridges in the construction-set element containing the base and the connecting unit.

[0010] The base is made flat (two-sided) and has a rectangular form, with sides made in multiples of <<a>>, which has preliminary defined value. The interlocking joint is created by positioning protrusions on the base, which form four groups of protrusions. All protrusions are positioned on the base in accordance with the imaginary orthogonal coordinate grid of mutually perpendicular lines parallel to base edges where the distance between

neibouring grid lines is equal to <<2a>>. The distance between base edges (ends) and neibouring grid lines is equal to <<0,5a>>. The protrusions on the base are fulfilled with the base together as one unit.

[0011] The first group of protrusions is positioned at least on one side of the base made with a cross-shaped cross-section with a distance between opposite ends of a cross equal to <<a>>. Crosshairs of the protrusion' foundations coincide with the crosshairs of the grid lines. The height of the protrusions in the first group is greater than <<0.5a>> but no greater than <<a>>.

[0012] The second group has protrusions positioned on at least one side of the base, they are made tubular, with cross-sections in the form of a square having side length in the channel of tubular protrusion equal to <<a>>. They are arranged so that the sides of the square inner section of the tubular protrusion are parallel to the lines of the imaginary grid, and the intersection point of the diagonals of the square inner section of the protrusion coincides with the intersection point of the diagonals of the grid cell in which this protrusion is located.The height of the protrusions in the second group is equal to <<0.5a>>.

[0013] In the third group, protrusions positioned between end parts of neibouring protrusions of the first type and are made in the form of rectangular plates, positioned with its midline on the ends of the base, flush with these ends, and having ledges with width equal to <<a>> along the short sides protruding not more than <<0.5a>> from the base ends (that is, the long sides of the plates are parallel to the base and the short sides are perpendicular to the base, and the line of connection of each plate with the edge of the base goes along the line connecting centers of its short sides, which have lengthes equal to <<a>>). The ledges are angled towards each other with a gap formed between their end parts no greater than <<a>>.

[0014] Protrusions in the fourth group are made in the form of corners, having shelves positioned perpendicular to the base planes on its adjacent ends and flush with these ends. Shelves have a length equal to <<a>> and a width no greater than <<0.5a>>. These protrusions positioned on the base corners.

[0015] The nearest edges of the neibouring protrusions of the third group are interconnected by bridges, there are bridges provided to the protrusions of fourth group as well, which connect the sides of rectangular plates perpendicular to the base and connect the shelves of the corners of these protrusions (which are the sides of the rectangular plates perpendicular to the base and protruding out beyond the base) with neibouring ledges (5) of the protrusions of the third group.

[0016] The technical result of the second construction-set element embodiment is achieved due to the construction-set element containing a base and interlocking joint has bridges. The base is made flat and has a rectangular form, with at least one side equal to <<a>>, which has preliminary defined value, and the other side is equal to a multiple of <<a>>. The interlocking joint is created by positioning protrusions on the base which form three groups of protrusions. Protrusions on the base are fulfilled with the base together as one unit.

[0017] The first group of protrusions is positioned at least on one side of the base and having cross-shaped cross-sections with distance between opposite ends of the cross equal to <<a>>. The height of the protrusions in the first group is greater than <<0.5a>> but no greater than <<a>>.

[0018] The second group has protrusions made in the form of rectangular plates, positioned with its midline on the ends of the base, flush with these ends, and having ledges with width equal to a along the short sides protruding not more than <<0.5a>> from the base ends. The ledges are angled towards each other with a gap formed between their end parts no greater than <<a>>.

[0019] Protrusions in the third group are made in the form of corners, having shelves positioned perpendicular to the base planes on its adjacent ends and flush with these ends. Shelves have a length equal to <<a>> and a width no greater than <<0.5a>>.

[0020] All protrusions are positioned on the base in accordance with the coordinate grid of mutually perpendicular lines parallel to base edges. The distance between neighboring lines of the coordinate grid is equal to <<2a>>. The distance between the base edges and neighboring lines on the coordinate grid is <<0.5a>>.

[0021] Protrusions of the first group are positioned at points where the grid lines intersect. Protrusions of the second group are positioned in the middle between the neighboring protrusions of the first group that are positioned flush with the ends of the base. Protrusions of the third group are positioned in the corners of the base.

[0022] The nearest edges of neibouring protrusions of the second group are interconnected by bridges, as well as bridges of the third group that connect the sides of rectangular plates perpendicular to the base and the ledges of the protrusions of the second group, which are adjacent to them. The bridges can be of different shapes and widths.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023]

FIG. 1 shows construction-set element implemented according to the first embodiment with 9 protrusion of the first group (2), with 4 protrusion of the second group (3), with 8 protrusions of the third group (4) and with 4 protrusion of the fourth group (6) and with base having size <<5a>> by <<5a>>. The bridges (9) are visible there, they connect nearest ledges of neibouring protrusions of the third group (4) to each other. There are bridges (9) between sides of rectangular plates of protrusion of the fourth group (6) and neibouring to them ledges (5) of protrusions of the third group (4).

FIG. 2 shows an isometric view of the construction-set element given in Fig.1.

FIG. 3 shows construction-set element implemented according to the second embodiment with 3 protrusions of the first group, with 4 protrusion of the second group (4), with 4 protrusion of the third group (6) and with base having size <<5a>> by a <<a>>.

FIG. 4 shows an isometric view of the construction-set element given in Fig.3.

FIG. 5 shows two construction-set elements given in Fig.4 before connection.

FIG. 6 shows two construction-set elements given in Fig.4 after connection.

FIGS. 7-8 show construction-set elements similar to those shown in Fig.5-6 before and after connection for the case when construction-set elements do not have bridges.

FIG. 9 shows the connection of the construction-set element implemented according to the first embodiment with the construction-set element implemented according to the second embodiment before the connection of protrusions of the second group of the first constraction-set element with protrusions of the second group of the second constraction-set element

FIG. 10 shows the the same elements shown in Fig. 9 after connection.

FIGS. 11-12 show construction-set elements similar to those shown in Fig.9-10 before and after connection for the case when construction-set element similar to the second embodiment do not have bridges.

FIG. 13 shows one construction-set element implemented according similarly to the second embodiment but witout bridges and the second construction-set element implemented to the first embodiment before the attempt of "incorrect" connection of the construction-set elements with each other.

FIG. 14 shows connection of one construction-set element implemented according similarly to the second embodiment but witout bridges and the second construction-set element implemented to the first embodiment with non-successfull "incorrect" connection of the construction-set elements with each other.

FIG. 15 shows one construction-set element implemented according to the second embodiment and the second construction-set element implemented according to the first embodiment before the attempt of "incorrect" connection of the construction-set elements with each other.

FIG. 16 shows that the "incorrect" connection of one construction-set element implemented according to the second embodiment and the second construction-set element implemented to the first embodiment is impossible.

DETAILED DESCRIPTION OF THE INVENTION

[0024] Here we describe a construction element with bridges according to the first embodiment (see for example the lower constraction-set element in the FIGS. 1-2, 13-16).

[0025] The construction-set element implemented according to the first embodiment (FIGS. 1-2, 13-16) contains a base 1, made flat and having a rectangular form, with sides made in multiples of <<a>>, which has preliminary defined value, and an interlocking joint, created by positioning protrusions on the base, which form four groups of protrusions. The protrusions on the base are fulfilled with the base together as one unit.

[0026] The first group of protrusions 2 is positioned at least on one side of the base 1. The height of the protrusions 2 (see FIG. 1) <<H1>> in the first group is greater than <<0.5a>> but no greater than <<a>>. The first group of protrusions 2 are made with a cross-shaped cross-section where a distance between opposite ends of the cross is equal to <<a>>. The protrusions 3 are of the second group according to the first embodiment are also positioned at least on one side of the base 1. The height of the protrusions 3 is equal to <<0.5a>>. The protrusions 3 are made tubular, with cross-sections in the form of a square having side length in channel of the tubular protrusion 3 equal to <<a>>. In the third group, protrusions 4 according to the first embodiment (see FIGS. 1-2) are made in the form of rectangular plates, positioned with its longest midline on the ends of the base 1, and having ledges 5 along their short sides. The ledges 5 with width equal to <<a>> are made protruding from the base ends by a length which is not more than <<0.5a>>. They angled towards each other with a gap formed between their end parts no greater than <<a>>. Ledges 5 are angled towards each other with a gap <<.DELTA.>> formed between their end parts no greater than <<a>>. Protrusions 6 in the fourth group according to the first embodiment are made in the form of corners, having shelves positioned perpendicular to the base 1 planes on its adjacent ends and flush with these ends, The shelf length is equal to <<a>> and width is no greater than <<0.5a>>. I.e. these shelves in fact are the faces of the dihedral angle formed by two rectangular plates that are perpendicular to the base and to each other and pass through the corners of the base (taken out beyond it), so that the planes of the plates located on the inner sides of the dihedral angle are flush with the base ends of the parallel plates, while the lengths of the sides of the rectangular plates perpendicular to the base are <<a>>, while the midpoints of the sides of the rectangular plates forming the edge of the dihedral angle are on the corners of the base, the lengths of the sides of the rectangular plates parallel to the base have a length of no more than <<0.5a>>.

[0027] Protrusions 2, 3, 4, 6 are positioned on the base 1 in accordance with the coordinate grid 7 (see FIG. 1) of mutually perpendicular lines parallel to base 1 edges. The distance between neighboring lines of the coordinate

grid 7 is equal to <<2a>>, wherein the distance between the base 1 edges and neighboring lines on the coordinate grid 7 is equal to <<0.5a>>. In the first group according to the first embodiment protrusions 2 are positioned at points where the coordinate grid 7 lines intersect. In the second group according to the first embodiment protrusions 3 are positioned at points where the diagonals 8 (see FIG. 1) of the cells of the coordinate grid 7 intersect. Protrusions 4 of the third group according to the first embodiment are positioned in the middle between the neighboring protrusions 2 of the first group that are positioned flush with the ends of the base 1. In the fourth group according to the first embodiment protrusions 6 are positioned in the corners of the base 1.

[0028] In order to achieve the claimed technical result, the protrusions of the third group 4 are provided with bridges 9 connecting the nearest ledges 5 of the neibouring protrusions 4 to each other. The protrusions of the fourth group 6, which connect the shelves of the corners of these protrusions and neibouring ledges 5 of the protrusions of the third group 4, are also provided with bridges 9. These bridges 9 can have a width that coincides with the width of the ledges 5 or even somewhat narrower. In addition, the bridges 9 can be made flat, convex or concave.

[0029] Here we describe a construction-set element according to the second embodiment (FIGS. 3-6).

[0030] Construction-set element according to the second embodiment contains a base 1, made flat and having a rectangular form, with at least one side equal to <<a>>, which has preliminary defined value, the other a multiple of <<a>>, and an interlocking joint, created by positioning protrusions on the base 1, which form three groups of protrusions. The first group of protrusions 2 according to the second embodiment are similar to of protrusions 2 according to the first embodiment. They are positioned at least on one side of the base 1. The height of the protrusions 2 is greater than <<0.5a>> but no greater than <<a>>. The protrusions 2 are made with cross-shaped cross-sections with a distance between opposite cross ends equal to <<a>>. In the second group according to the second embodiment, protrusions 4 are similar to protrusions 4 of the third group according to the first embodiment and made in the form of rectangular plates, positioned with its long midline on the ends of the base 1, and having ledges 5 along short sides, flush with base ends. Ledges 5 with a width length equal to <<a>> (see FIG. 3) are protruding from the base ends by a length (see FIG. 3), which is not more than <<0.5a>>. Ledges 5 angled towards each other with a gap <<.DELTA.>> formed between their end parts no greater than <<a>> (see FIG. 3). Protrusions 6 in the third group according to the second embodiment are similar to protrusions 6 of the third group according to the first embodiment. They are made in the form of corners, having shelves positioned perpendicular to the base 1 planes on its adjacent ends and flush with base ends, with a length equal to <<a>> and width no greater than <<0.5a>>. Protrusions 2, 4 and 6 are positioned on the base 1 according to the coordinate grid 7 of mutually perpendicular lines parallel to base 1 edges, wherein the distance between neighboring lines of the coordinate grid 7 is equal to <<2a>>, wherein the distance between the base 1 edges and neighboring lines on the coordinate grid 7 is <<0.5a>>. Protrusions 2 of the first group according to the second embodiment are positioned at points where the coordinate grid 7 lines intersect. Protrusions 4 of the second group according to the second embodiment are positioned in the middle between the neighboring protrusions 2 of the first group that are positioned flush with the ends of the base 1. Protrusions 6 of the third group according to the second embodiment are positioned in the corners of the base 1.

[0031] To achieve the claimed technical result, the protrusions of the second group 4 are provided with bridges 9 connecting the nearest ledges 5 of the neibouring protrusions 4 to each other, and the protrusions of the third group 6 are provided with bridges 9 connecting the shelves of the corners these protrusions 6 and the neibouring ledges 5 of the protrusions of the second group 4. These bridges 9 can have a width that coincides with the width of the ledges 5 or even somewhat narrower. In addition, the bridges 9 can be made flat, convex or concave.

[0032] For the construction-set elements with and without bridges, a big difference is visible (see FIGS. 5-10) in the usability, because in the absence of bridges, one has to deal with the edges of the protrusion elements (see FIGS. 7-8). For the case when the construction-set element do not have bridges, you can see a lot of sharp edges (ribs of protrusions), which have to be pressed with your fingers to bring the elements into the connection.

[0033] In addition, FIG. 9 shows the construction-set elements before the connection (joining), one of which is implemented according to the second embodiment (upper), and the other (lower) according to the first embodiment. The engagement (connection) occurs by protrusions of the second group of the upper element of the construction-set element with protrusions of the second group of the lower construction-set element, and in FIG. 10 shows the same construction-set elements, only after connection.

[0034] Protrusions of interlocking joints, for a more precise positioning of construction elements during connection with each other, can be implemented with bevels, rounded off, sloped, and so forth. The base 1 can also be made with various openings to conserve materials.

[0035] Positioning of interlocking joints on base 1 is presented in FIGS. 2, 4, 9, in particular. Due to form of protrusions and their positioning on base 1 reliable connecting construction-set elements to one another, the protrusions of different construction-set elements interlock with each. Interlocking is based on the force of friction, occurring between protrusions during close contact and/or when they are placed between other protrusions

and the presence of bridges makes it convenient, painless to use the construction-set elements, which can connect with each other from either side, allowing you to collect complex 3D models. The presence of bridges prevents an incorrect connection. From Fig. 11-12 it is clearly visible. There, two construction-set elements are shown before and after connection, similar to the construction-set elements shown in FIG. 9-10, but for the case when the construction-set element similar to the to the second embodiment does not have bridges, you can see a lot of sharp edges that you have to press to bring the elements into the connection, while connecting the elements of the designer one of which is made in the second embodiment, but without bridges 9, and the other in the first embodiment, the connection is performed by engaging the protrusions of the second group 3 of the first construction-set element and the second group of the second construction-set element, there may be a situation of incorrect connection, 5 of the protrusions of the second group 4 of the construction-set element according to the second embodiment do not fall into the protrusion of the second group 3 of the construction-set element made according to the first embodiment, but between the protrusions, when attempting the same connection of the construction-set element made in the second embodiment (the upper construction-set element), the bridge 9 rests against the ledge 5 of the protrusion of the second group 3 of the lower construction-set element implemented according to the first embodiment, do not allow connect construction-set elements in a wrong way.

[0036] In FIG. 13 is an illustration of a construction-set element implemented like according to the second embodiment, but without a bridge, and a construction-set element implemented like according to the first embodiment before attempting to make a wrong (incorrect) connection, and FIG. 14 shows the wrong connection itself. FIG. 15 shows an image of construction-set element implemented according to the second embodiment and the construction-set element implemented according to the first embodiment before attempt of an incorrect connection, and in FIG. 16 shows an image with an unsuccessful result of that wrong connection for the same construction-set elements. These examples illustrate the fact that the presence of bridges contributes to an accurate (correct and strong) connection of the construction-set elements, which significantly enhances the usability of construction-set elements.

Claims

1. A construction-set element, comprising: a flat base (1) having two sides, a rectangular form, base edges having lengths in multiples of <<a>> which has preliminary defined value, and an interlocking joint created by positioning four types of protrusions on the base (1) and fulfilled with the base (1) as one unit, wherein:

a first protrusion type (2) is positioned on at least one side of the base (1), with a height greater than <<0.5a>>, but not greater than <<a>>, made with a cross-shaped cross-section, where a distance between opposite ends of the cross-shaped cross-section is equal to <<a>>,

a second protrusion type (3) is positioned on at least one side of the base (1), with a height equal to <<0.5a>>, made tubular with a cross-section in a form of square having sides equal to <<a>>,

a third protrusion type (4) is made in the form of a rectangular plate with ledges and a long midline, positioned so that the long midline of the rectangular plate is along the base edges and the ledges (5) extend from short sides of the rectangular plate, the ledges (5) having ledge end parts that have a width equal to <<a>>, protruding not more than <<0.5a>> from the base edges, angled towards each other with a gap formed between their ledge end parts no greater than <<a>>,

a fourth protrusion type (6) is made in the form of a corner, having shelves positioned perpendicular to each other and extending outwardly from the base (1) and having a length equal to <<a>> and a width not greater than <<0.5a>>, wherein

all protrusions are positioned on the base (1) in accordance with a coordinate grid of lines (7), wherein a distance between neighboring parallel coordinate grid lines (7) on the coordinate grid is equal to <<2a>>, a distance between a base (1) edge and a neighboring parallel coordinate grid line on the coordinate grid is equal to <<0.5a>> and cells of the coordinate grid are formed by pairs of intersecting parallel neighboring coordinate grid lines, where those mutually perpendicular grid lines (7) are parellel to the base edges and

the protrusions of the first protrusion type (2) are positioned at points where the coordinate grid lines intersect,

the protrusions of the second protrusion type (3) are positioned at points where diagonals (8) of the cells of the coordinate grid intersect,

the protrusions of the third protrusion type (4) are positioned in a middle between neighboring protrusions of the first protrusion type (2) and flush with the base (1) ends,

the protrusions of the fourth protrusion type (6) are positioned at corners of the base (1),

characterised by that

the protrusions of the third group (4) are provided with bridges (9) connecting the nearest ledges (5) of the neighboring protrusions (4) to each other,

the protrusions of the fourth group (6) are provided with bridges (9) connecting the shelves of

the corners of these protrusions, which are the sides of the rectangular plates perpendicular to the base and protruding out beyond the base, with the adjacent ledges (5) of the protrusions of the third group (4).

2. A construction-set element as defined in claim 1 **characterized in that** bridges (9) width is the same as width of ledges (5).

3. A construction-set element as defined in claim 1 **characterized in that** bridges (9) are flat.

4. A construction-set element as defined in claim 1 **characterized in that** bridges (9) are concave.

5. A construction-set element as defined in claim 1 **characterized in that** bridges (9) are convex.

6. A construction-set element, comprising: a flat base (1) having two sides, a rectangular form with at least one base edge having a first length equal to <<a>> which has preliminary defined value, and another base edge having a second length that is a multiple of <<a>>, and an interlocking joint, created by positioning three types of protrusions on the base (1) and fulfilled with the base (1) as one unit, wherein:

a first protrusion type (2) is positioned on at least one side of the base (1), with a height greater than <<0.5a>>, but not greater than <<a>>, made with a cross-shaped cross-section, where a distance between opposing ends of the cross-shaped cross-section is equal to <<a>>,
a second protrusion type (4) is made in the form of a rectangular plate with ledges and a long midline, positioned so that the long midline of the rectangular plate is along the base (1) edges of the second length and the ledges extend from short sides of the rectangular plate and the ledges having ledge end parts that have a width equal to <<a>> flush with the base (1) ends protruding not more than <<0.5a>> from the base edges of the second length, and angled towards each other with a gap formed between their with ledge end parts no greater than <<a>>,
a third protrusion type (6) is made in the form or a corner, having shelves positioned perpendicular to each other and extending outwardly from the base (1) flush with the base (1) ends and having a length equal to <<a>> and a width not greater than <<0.5a>>, wherein
all protrusions are positioned on the base (1) in accordance with a coordinate grid of lines, wherein a distance between neighboring parallel coordinate grid lines on the coordinate grid is equal to <<2a>> and a distance between a base edge and a neighboring parallel coordinate grid line on the coordinate grid is equal to <<0.5a>>, wherein
the protrusions of the first protrusion type (2) are positioned at points where the coordinate grid lines intersect,
the protrusions of the second protrusion type (4) are positioned in a middle between neighboring protrusions of the first protrusion type flush with the base (1) ends and
the protrusions of the third protrusion type (6) are positioned at corners of the base (1),
characterised by that
the protrusions of the second protrusion group (4) are provided with bridges (9) connecting the nearest ledges (5) of the neighboring protrusions (4) to each other,
the protrusions of the third group (6) are provided with bridges (9) connecting the shelves of the corners of these protrusions (6) and the adjacent ledges (5) of the protrusions of the second group (4).

7. A construction-set element as defined in claim 6 **characterized in that** bridges (9) width is the same as width of ledges (5).

8. A construction-set element as defined in claim 6 **characterized in that** bridges (9) are flat.

9. A construction-set element as defined in claim 6 **characterized in that** bridges (9) are concave.

10. A construction-set element as defined in claim 6 **characterized in that** bridges (9) are convex.

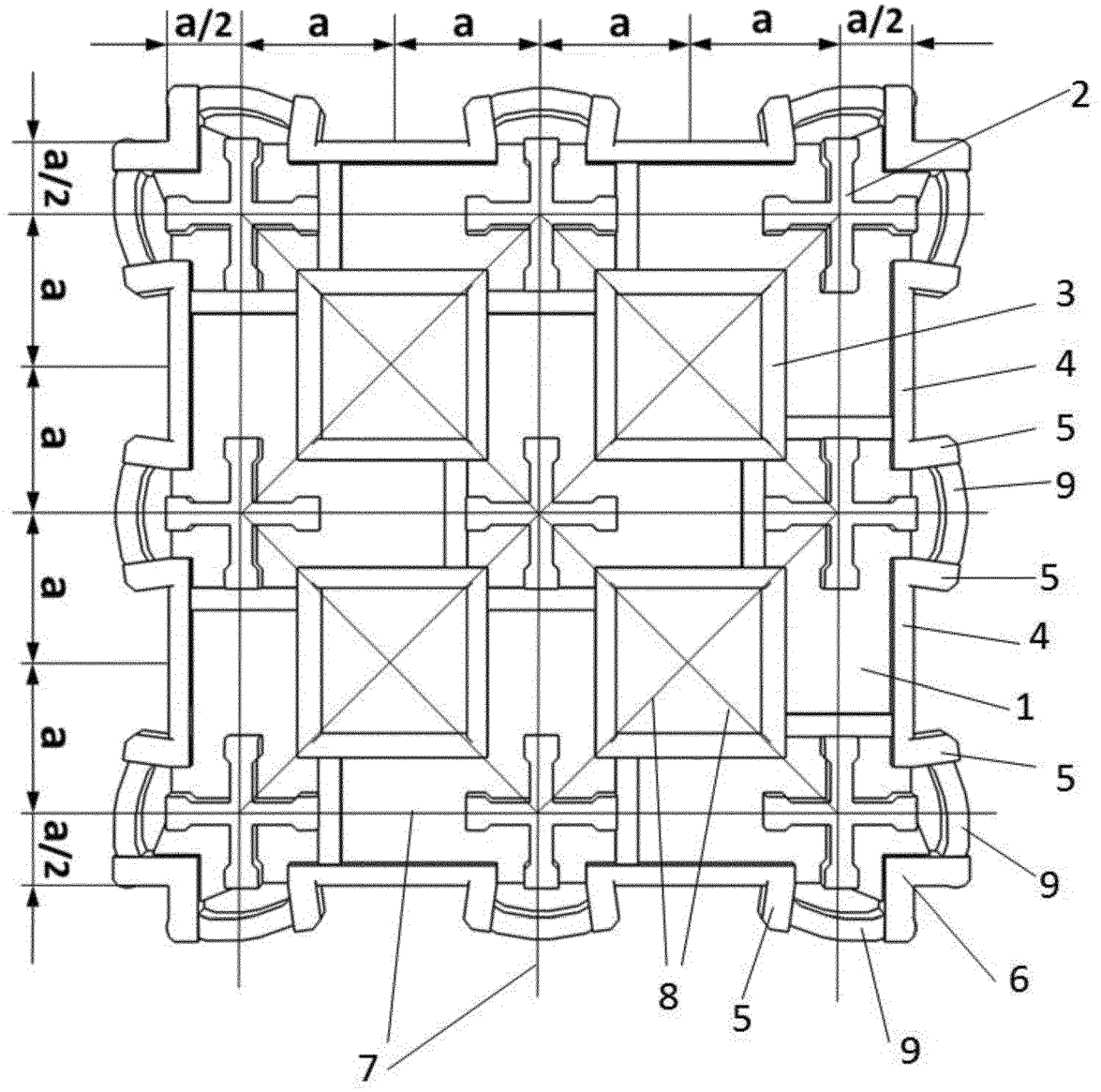

FIG.1

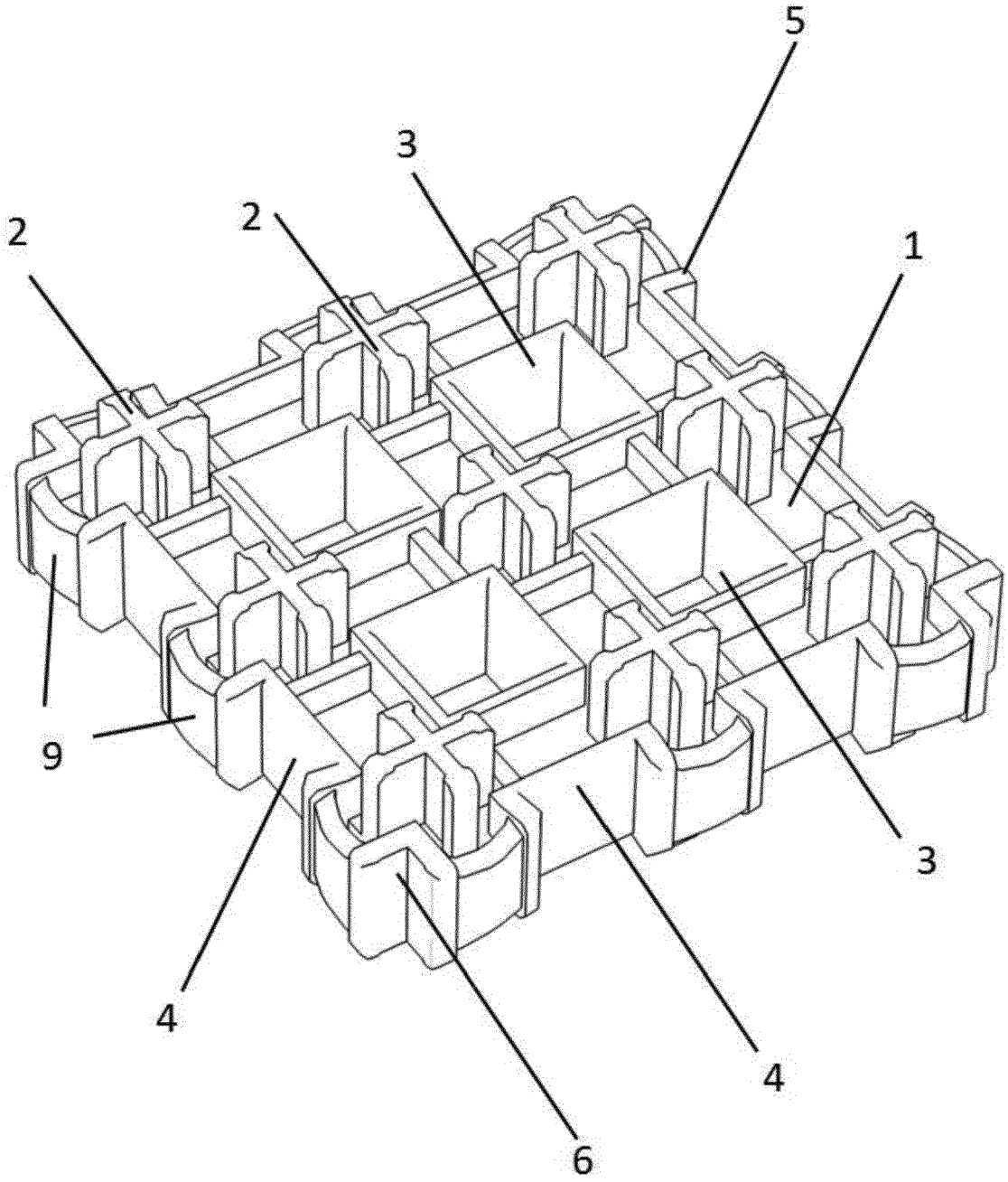

FIG.2

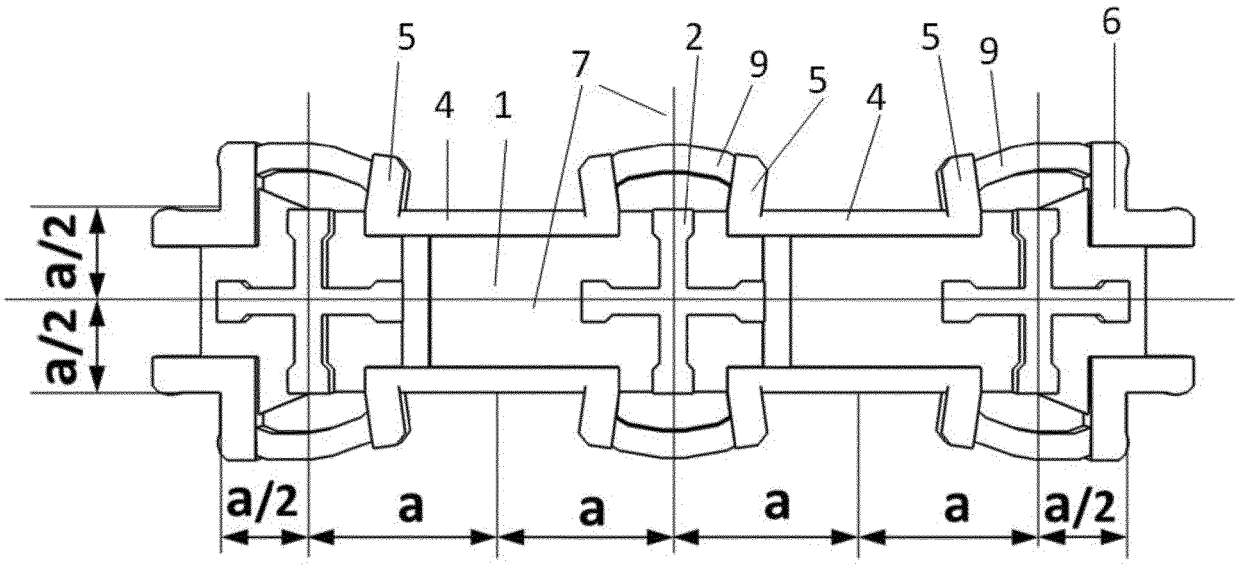

FIG.3

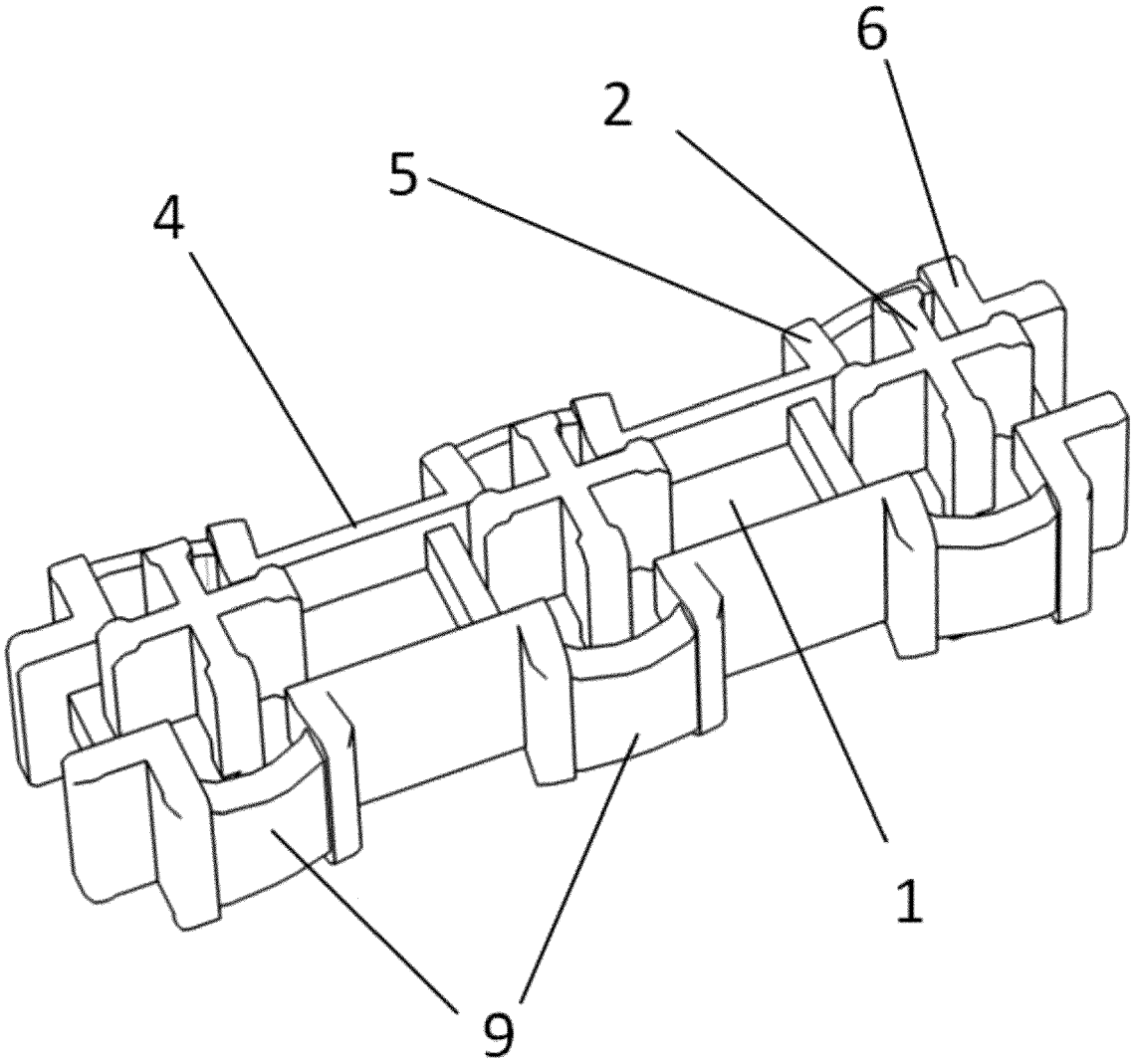

FIG.4

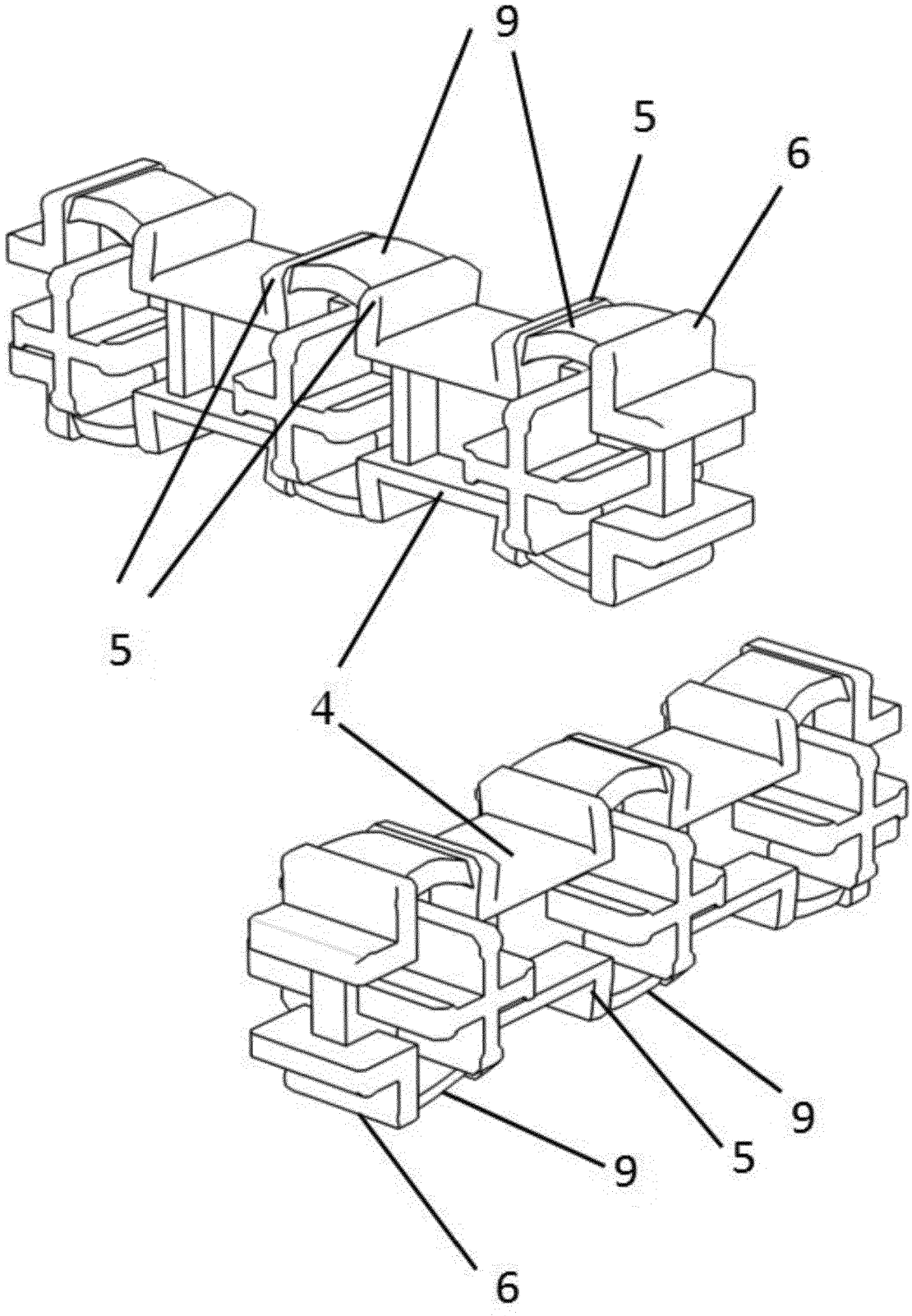

FIG.5

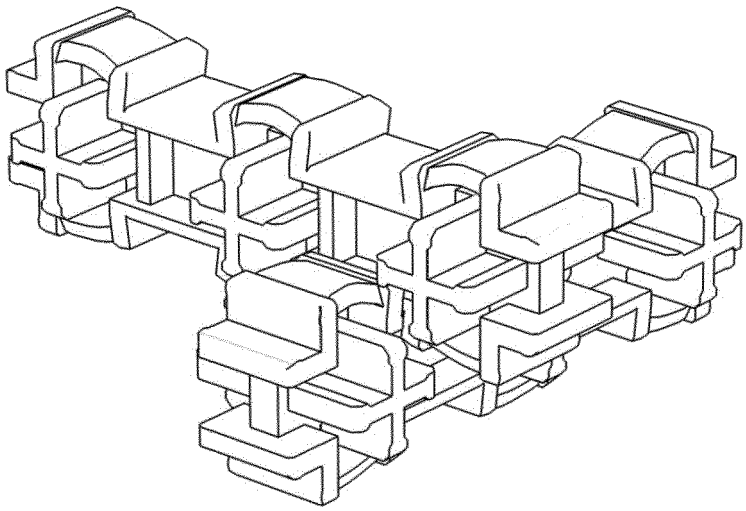

FIG.6

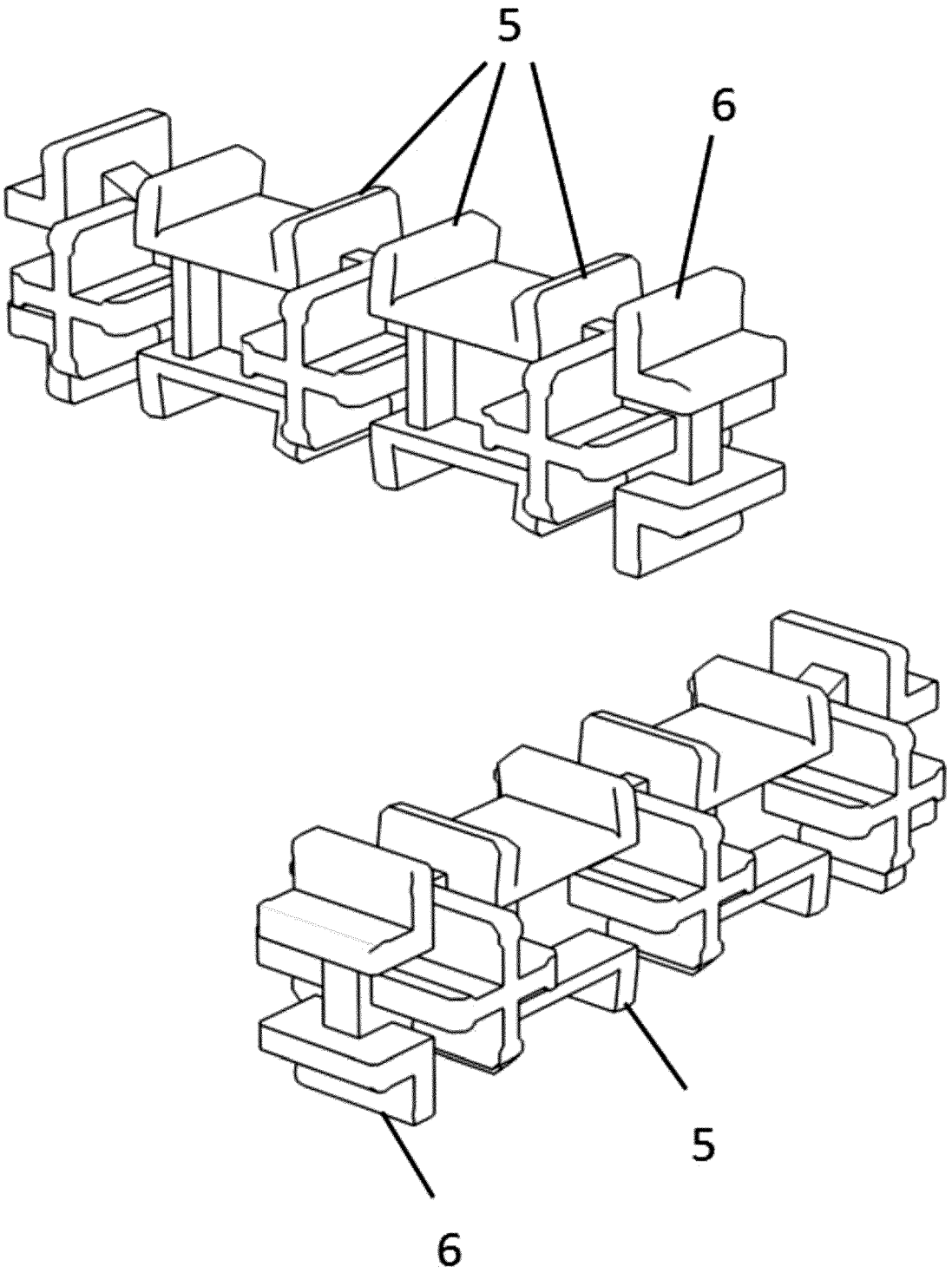

FIG.7

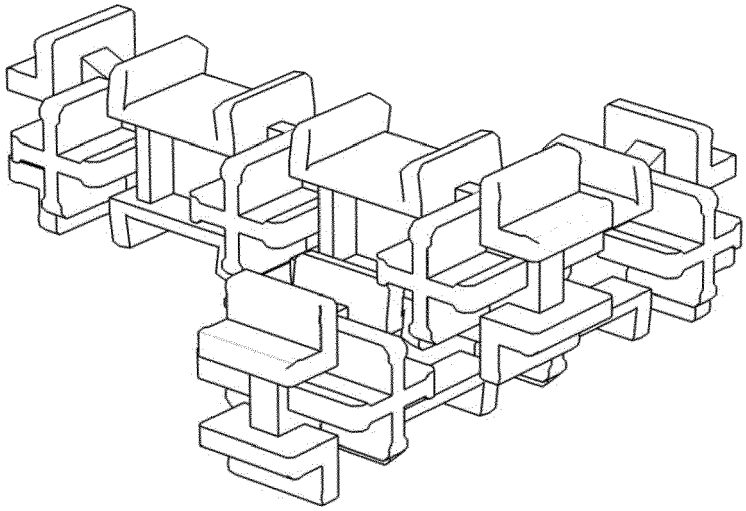

FIG.8

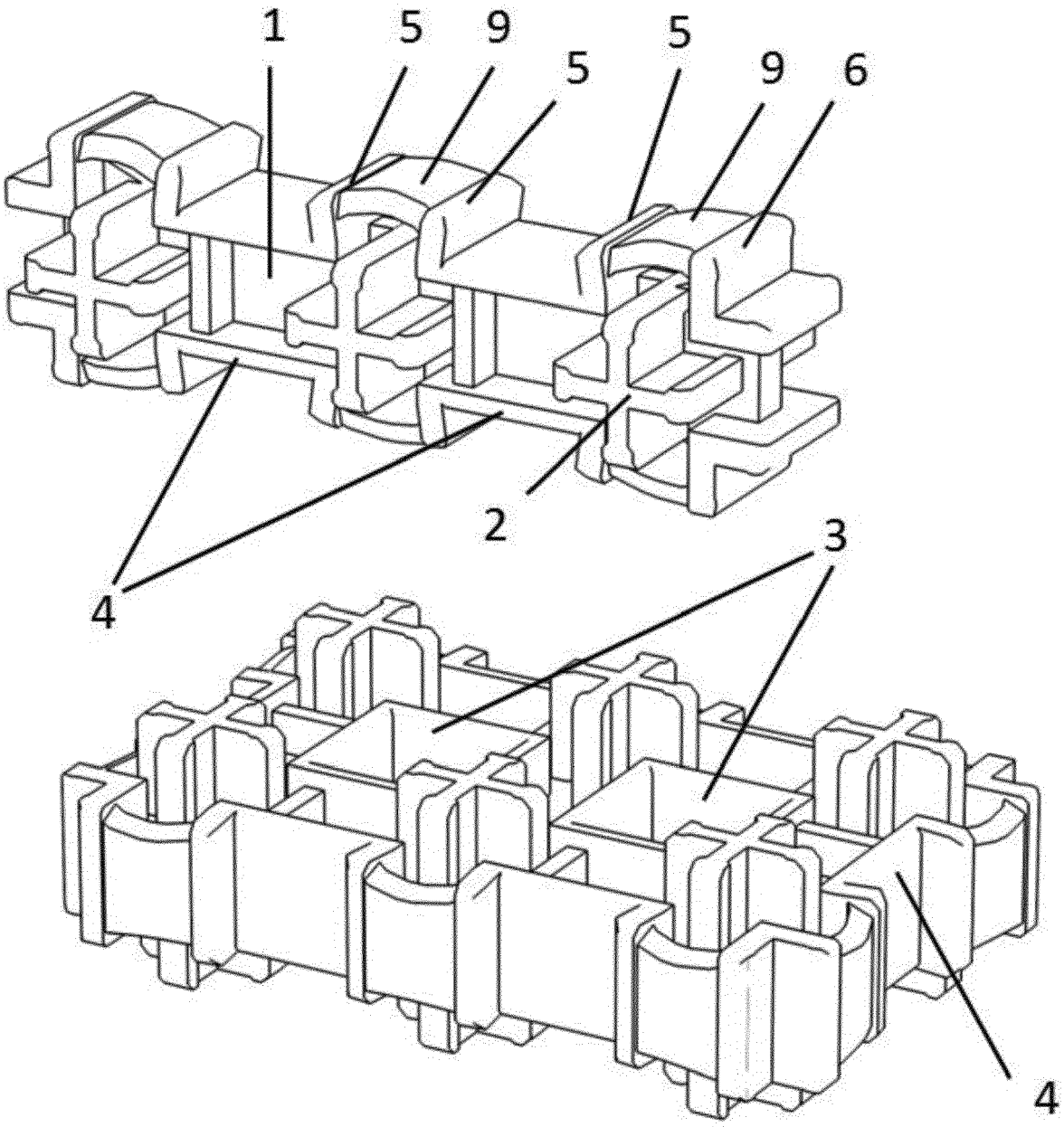

FIG.9

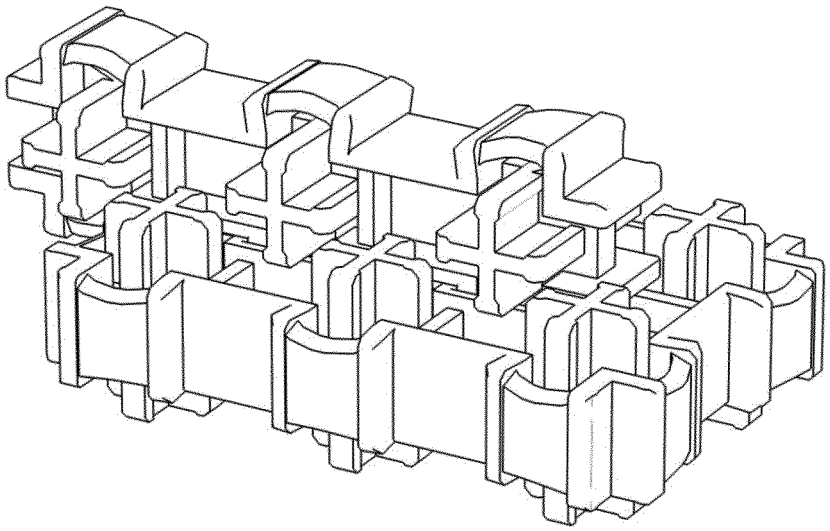

FIG.10

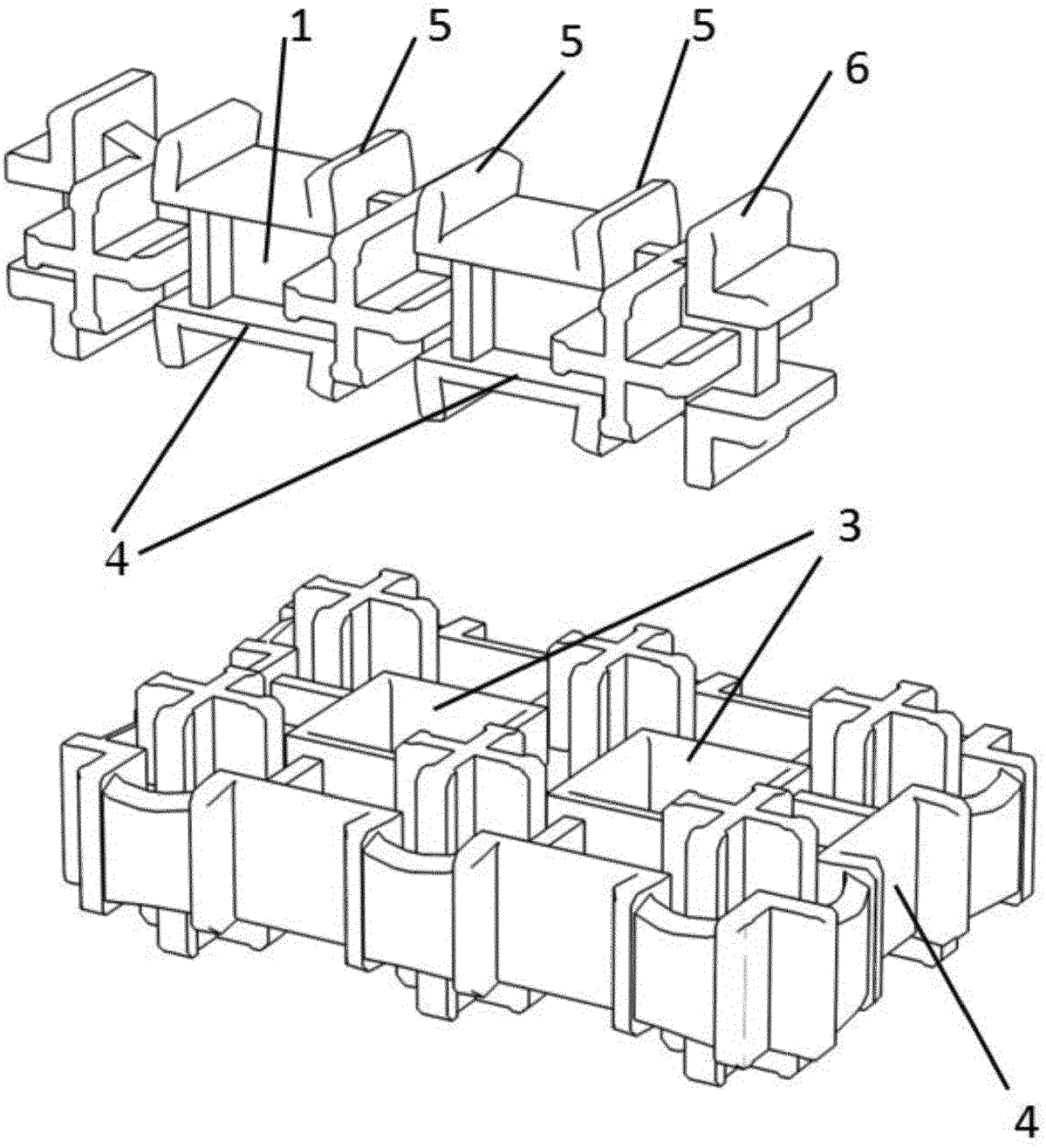

FIG.11

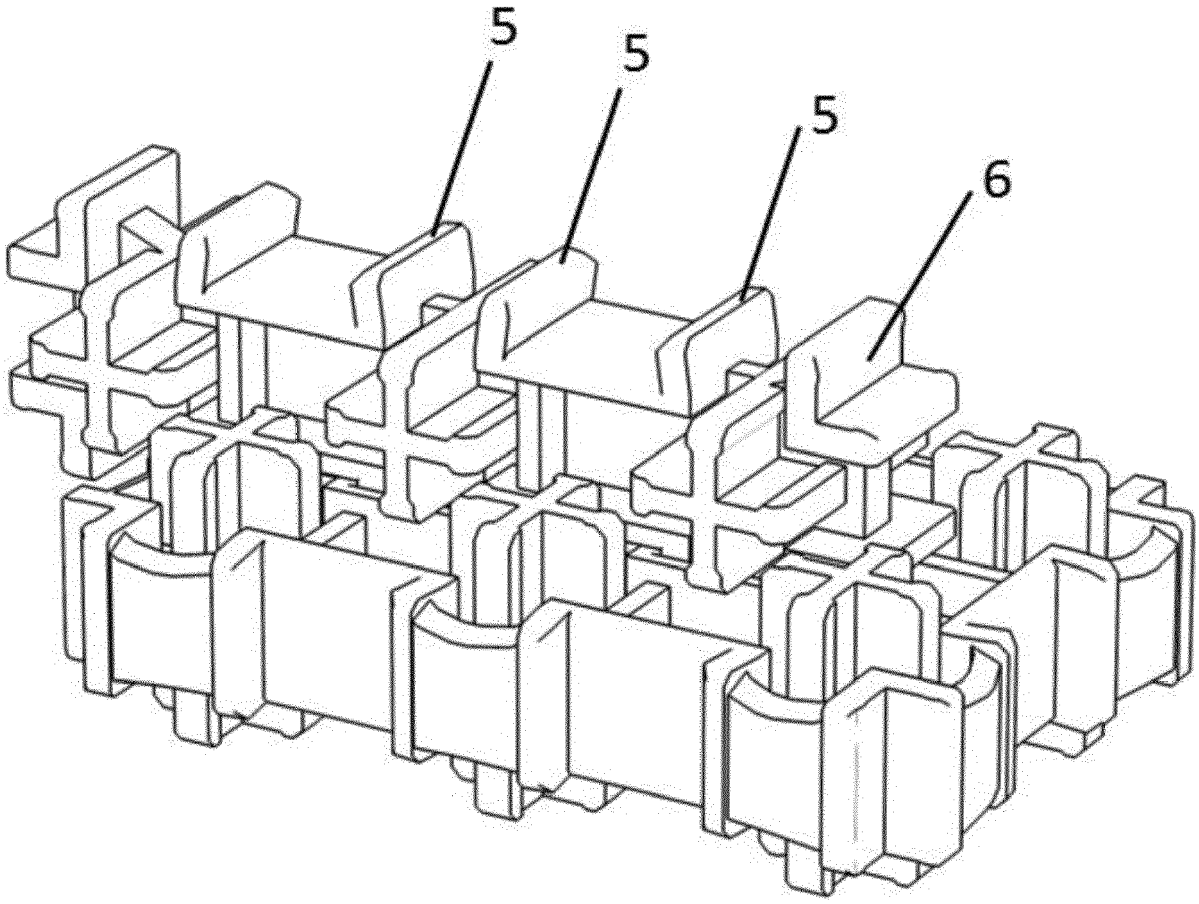

FIG.12

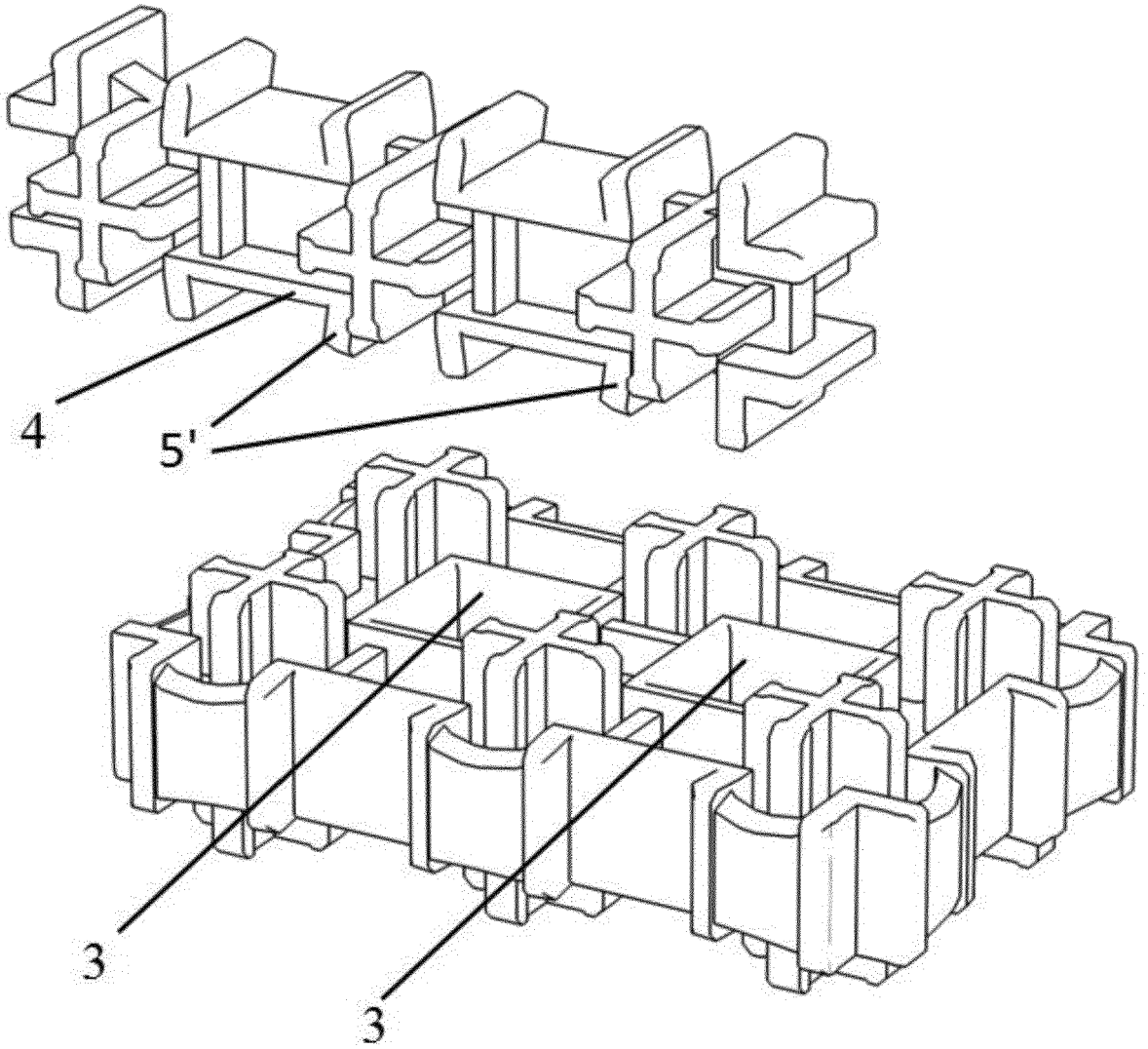

FIG.13

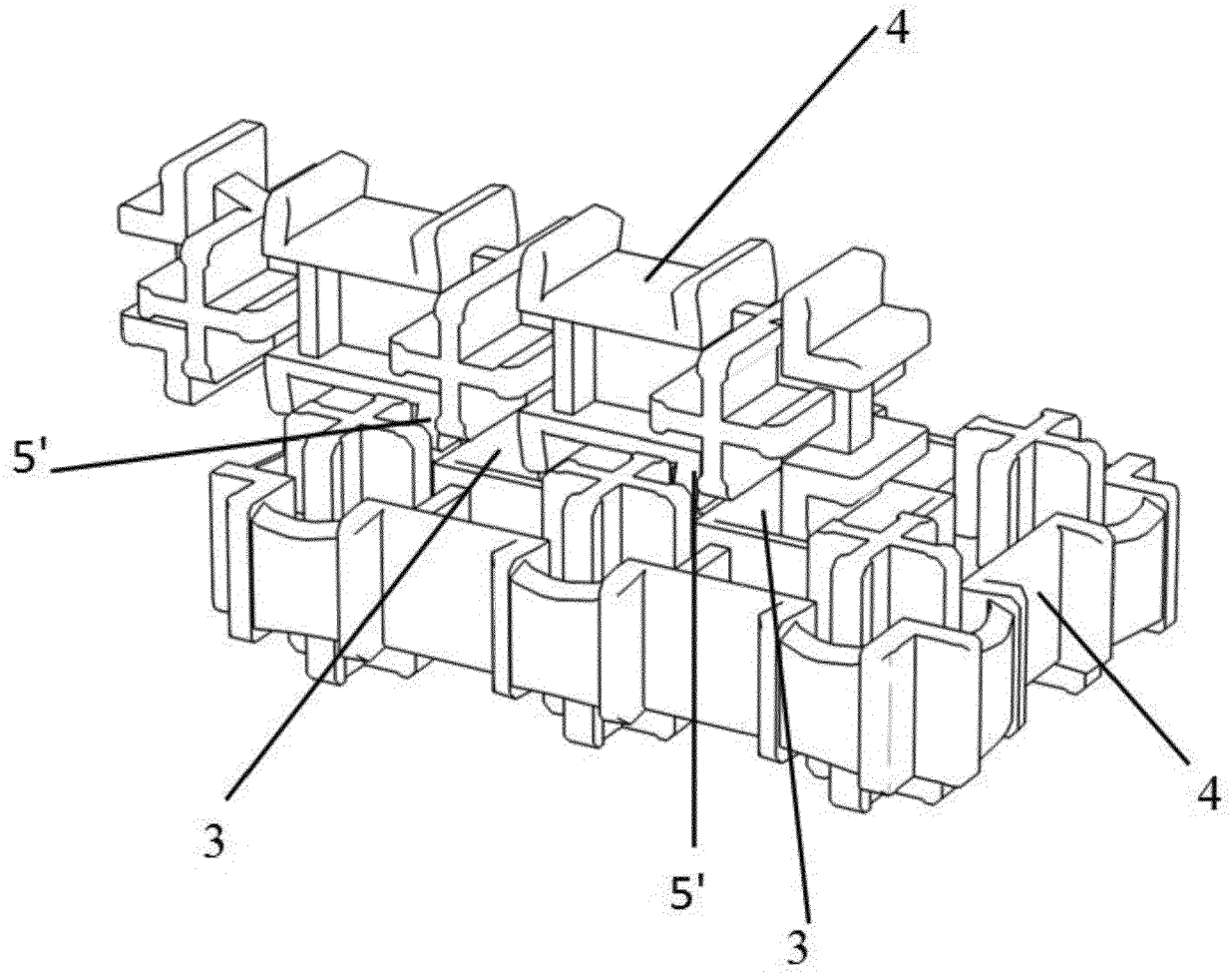

FIG.14

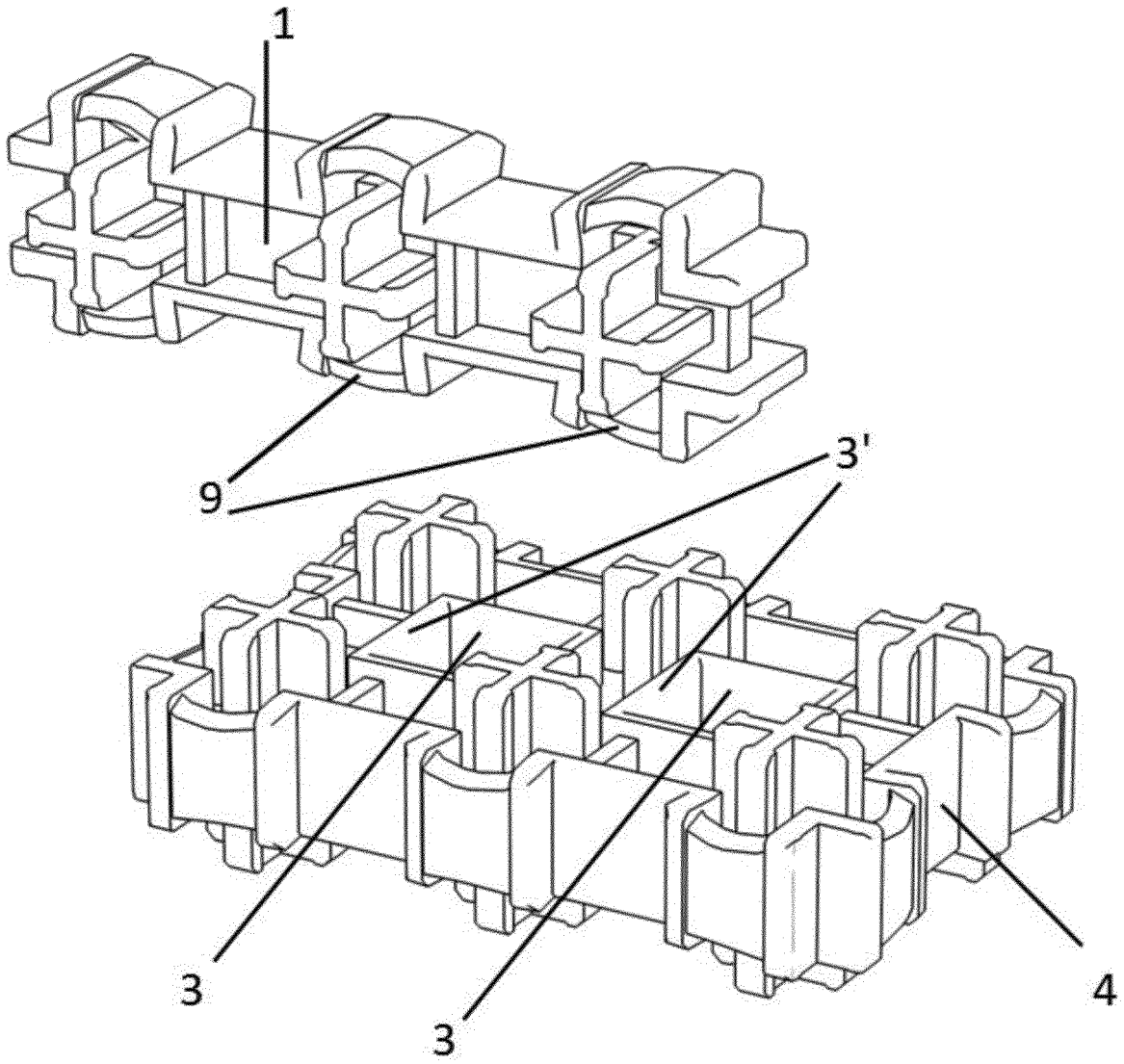

FIG.15

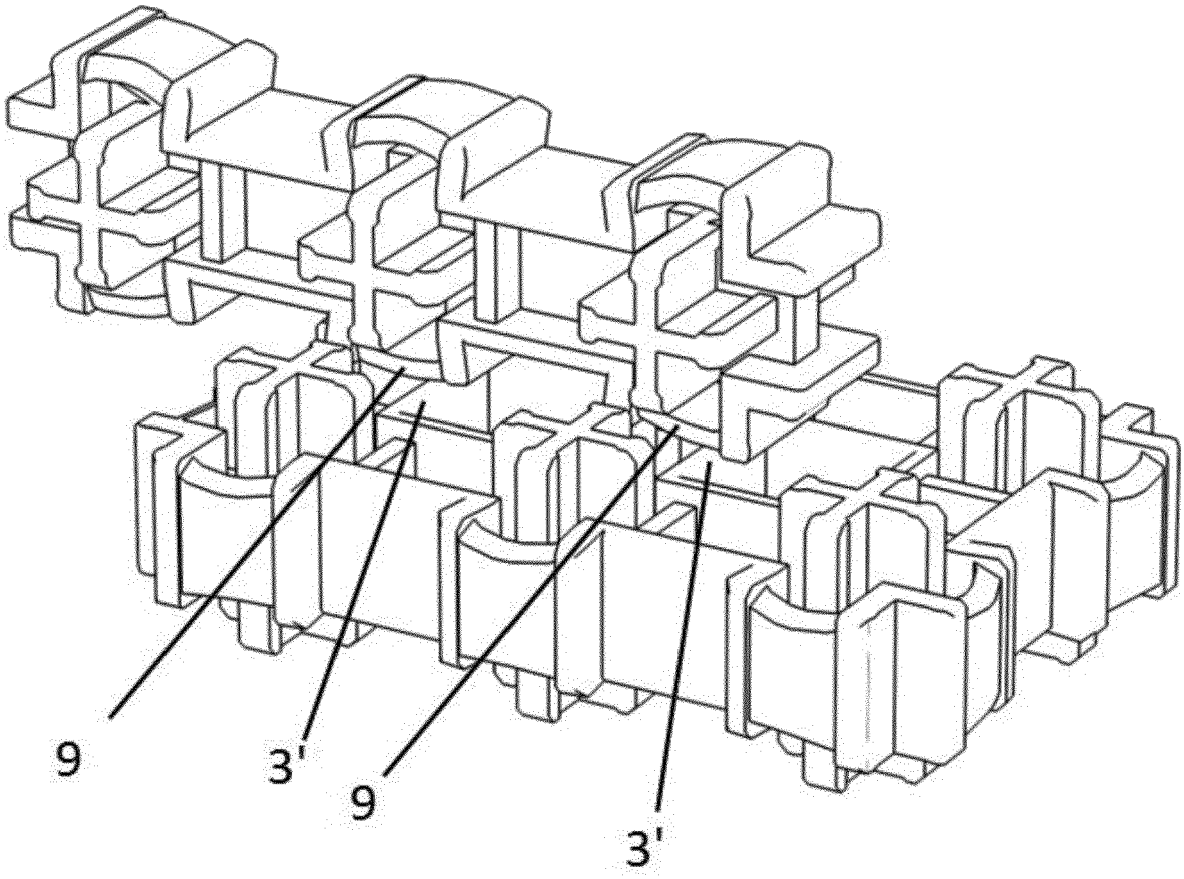

FIG.16

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EUROPEAN SEARCH REPORT

Application Number
EP 18 19 7099

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	WO 2014/196893 A1 (SOKOLOV DMITRIY ANDREYEVICH [RU]) 11 December 2014 (2014-12-11) * paragraph [0038] - paragraph [0040]; figure 5 *	1-10	INV. A63H33/00
A	EP 0 490 033 A1 (CONNECTOR SET TOY CO [US]) 17 June 1992 (1992-06-17) * column 1, line 22 - line 50; figures 1, 2, 16, *	1-10	
A	WO 2014/054962 A1 (SOKOLOV DMITRIY ANDREYEVICH [RU]) 10 April 2014 (2014-04-10) * paragraph [0059] - paragraph [0063]; figures 13, 16 *	1-10	
A	US 2003/082986 A1 (WIENS BENJAMIN I [CA] ET AL) 1 May 2003 (2003-05-01) * paragraph [0315]; figure 1 *	1	TECHNICAL FIELDS SEARCHED (IPC)
A	US 8 968 046 B2 (COCHELLA CHRISTOPHER [US]; BUILDING CREATIVE KIDS LLC [US]) 3 March 2015 (2015-03-03) * column 5, line 57 - column 6, line 14; figure 3F *	1	A63H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	20 November 2018	Brumme, Ion

CATEGORY OF CITED DOCUMENTS

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20-11-2018

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2014196893 A1	11-12-2014	BR 112015030117 A2	25-07-2017
		CN 105283236 A	27-01-2016
		EA 201501074 A1	31-05-2016
		EP 2995357 A1	16-03-2016
		HK 1215937 A1	30-09-2016
		IL 242777 A	29-12-2016
		JP 5976964 B2	24-08-2016
		JP 2016521584 A	25-07-2016
		US 2016082361 A1	24-03-2016
		WO 2014196893 A1	11-12-2014
EP 0490033 A1	17-06-1992	AR 247344 A1	29-12-1994
		AT 124877 T	15-07-1995
		AU 650284 B2	16-06-1994
		BR 9105342 A	25-08-1992
		CA 2051905 A1	12-06-1992
		CN 1062096 A	24-06-1992
		CS 9103444 A3	12-08-1992
		DE 69111204 D1	17-08-1995
		DE 69111204 T2	08-02-1996
		DK 0490033 T3	21-08-1995
		EP 0490033 A1	17-06-1992
		ES 2075290 T3	01-10-1995
		FI 914444 A	12-06-1992
		GR 3017720 T3	31-01-1996
		HK 7096 A	26-01-1996
		HU 215667 B	01-02-1999
		IL 99621 A	26-05-1995
		JP 2667939 B2	27-10-1997
		JP H04276285 A	01-10-1992
		KR 0132210 B1	18-04-1998
		NO 913681 A	12-06-1992
		NZ 239996 A	26-05-1994
		PL 292704 A1	10-08-1992
		RO 111247 B1	30-08-1996
		RU 2085245 C1	27-07-1997
		SK 279903 B6	07-05-1999
		YU 179891 A	31-01-1995
WO 2014054962 A1	10-04-2014	NONE	
US 2003082986 A1	01-05-2003	NONE	
US 8968046 B2	03-03-2015	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- RU 2525782 **[0002]**