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(57)

ABSTRACT

The present invention relates to a hinge connection comprising a male member applied on a base plate, and having protrusions provided to be hinged and resiliently fitted between a pair of female members applied on a further base plate. The male member of the hinge connection is being formed by two parallel male legs, wherein each leg comprises protrusions comprising cogs or cut teeth. The female member is formed by two parallel female legs and each of the female members comprises a through hole for engaging said protrusions of the male legs. The present invention further provides construction elements comprising the hinge connection members of the instant application. In a particular embodiment such construction elements are stackable, and allow the construction of complex three-dimensional structures without loss of flexibility.

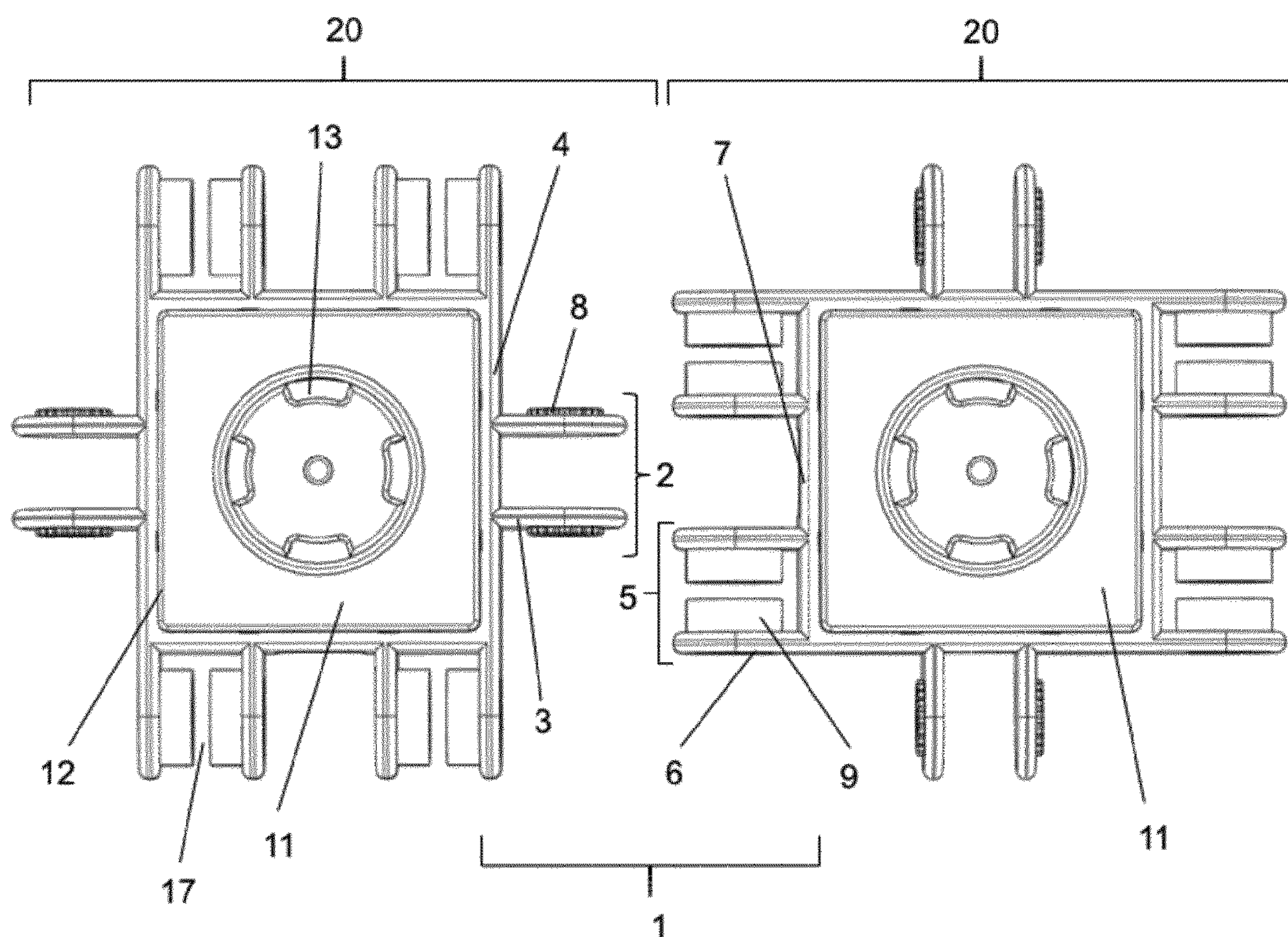


Fig. 1

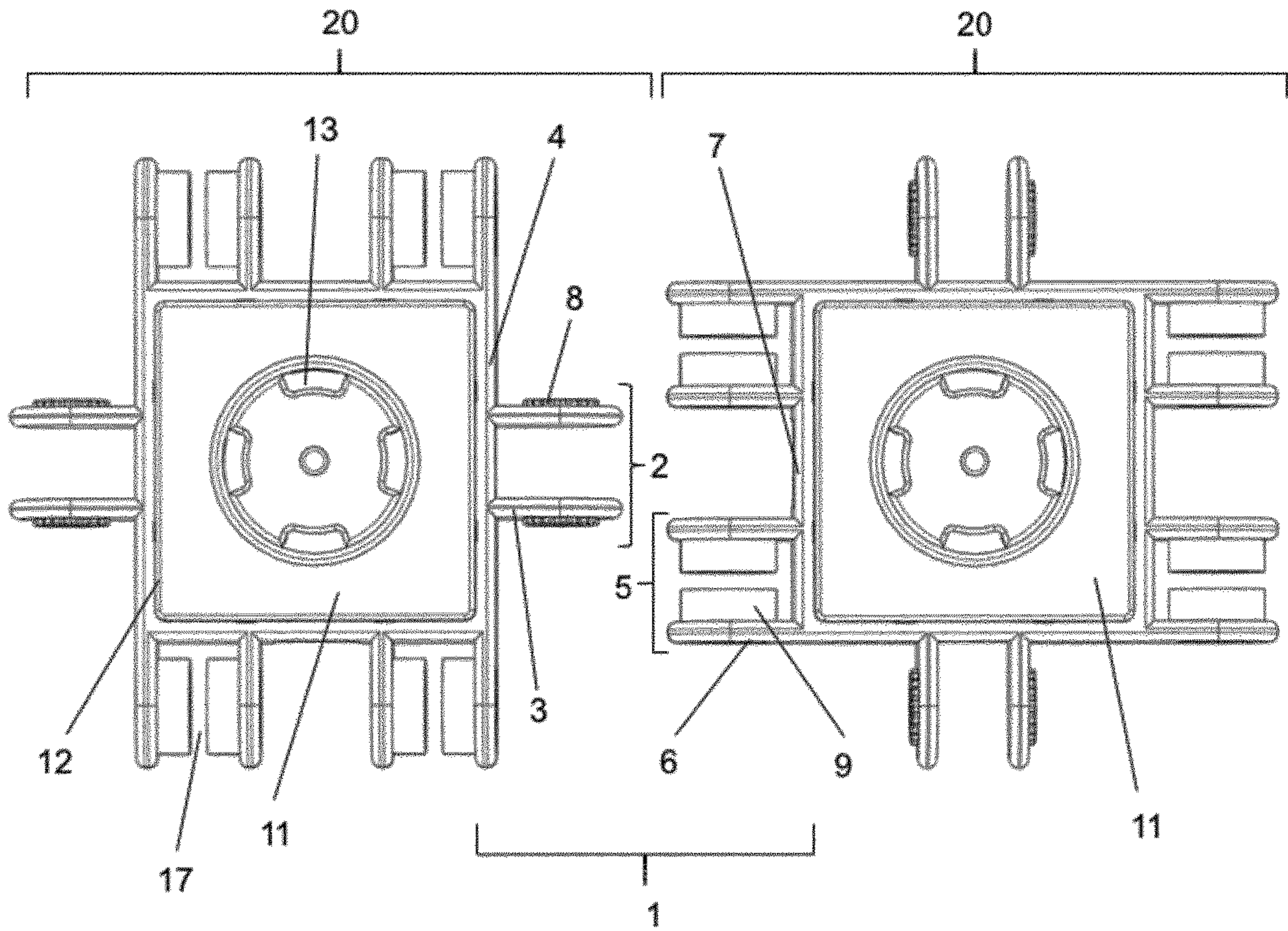


Fig. 2

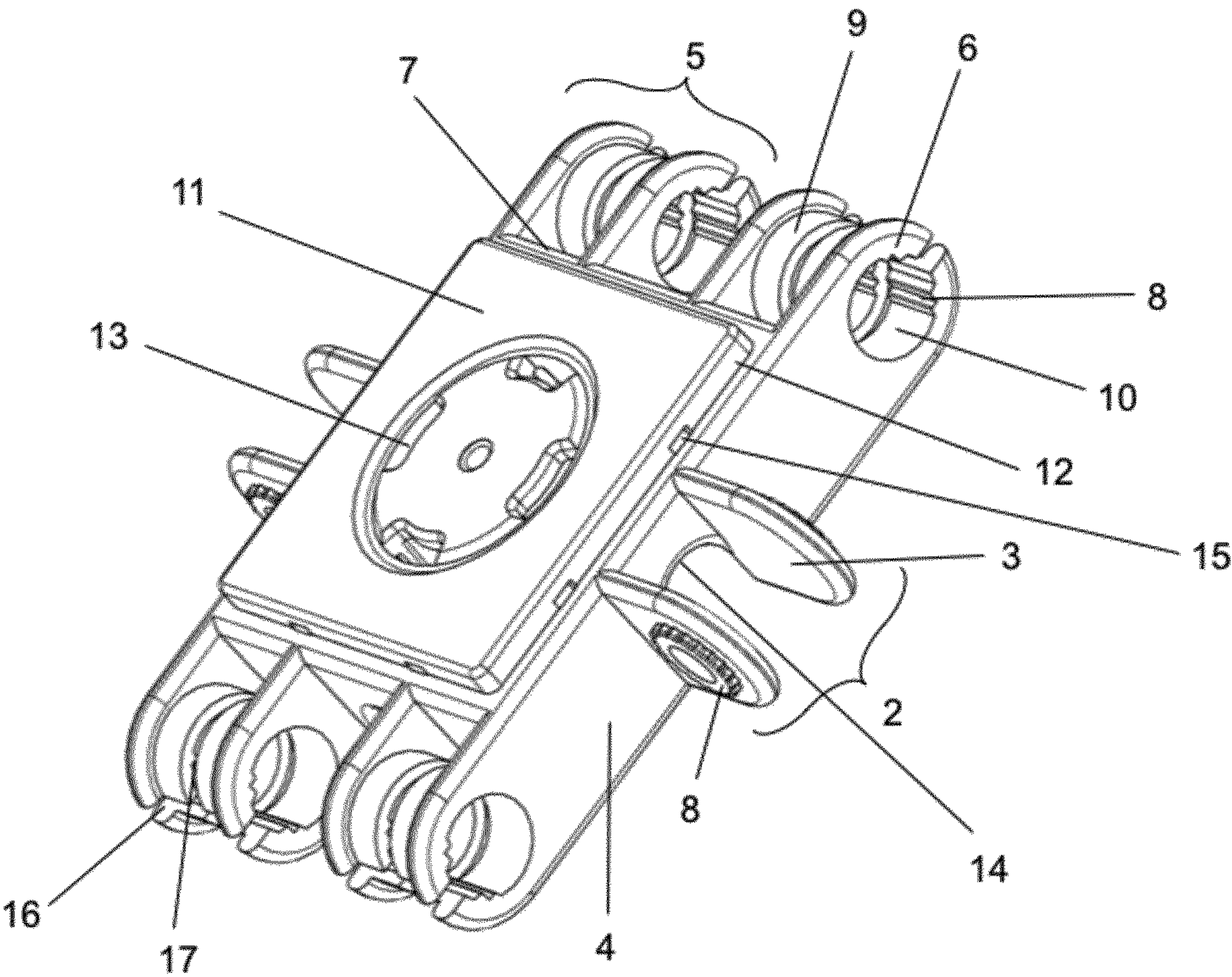


Fig. 3

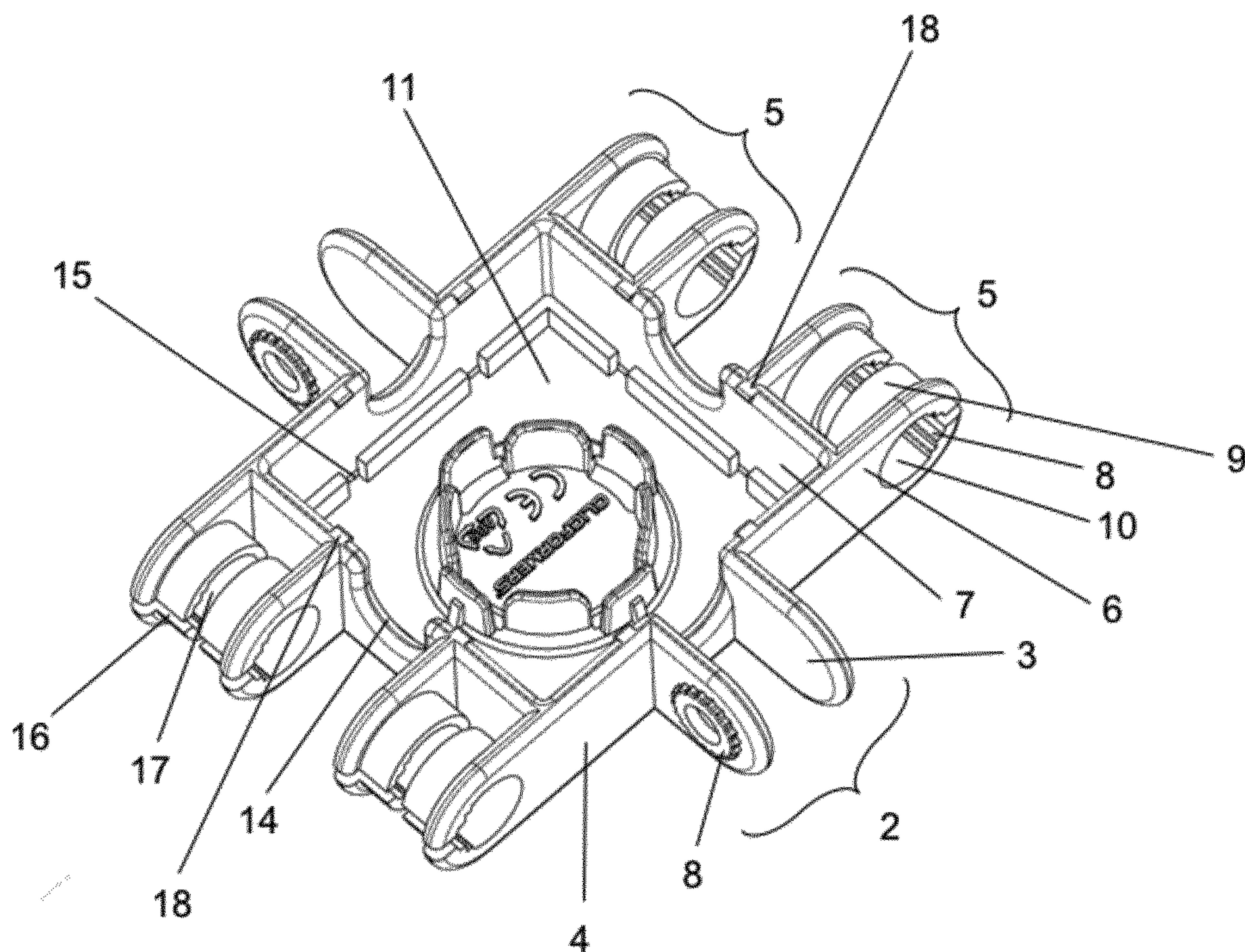


Fig. 4

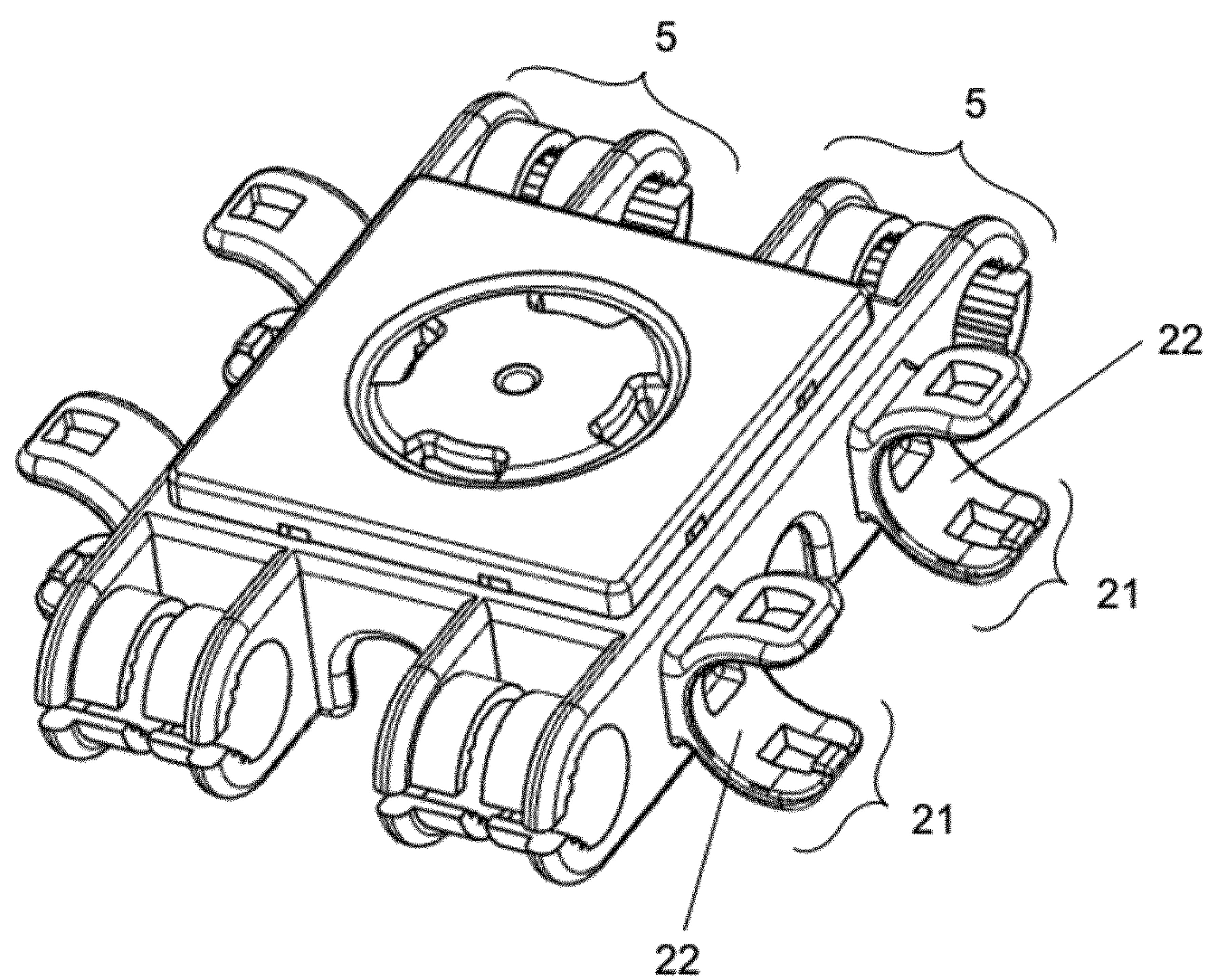
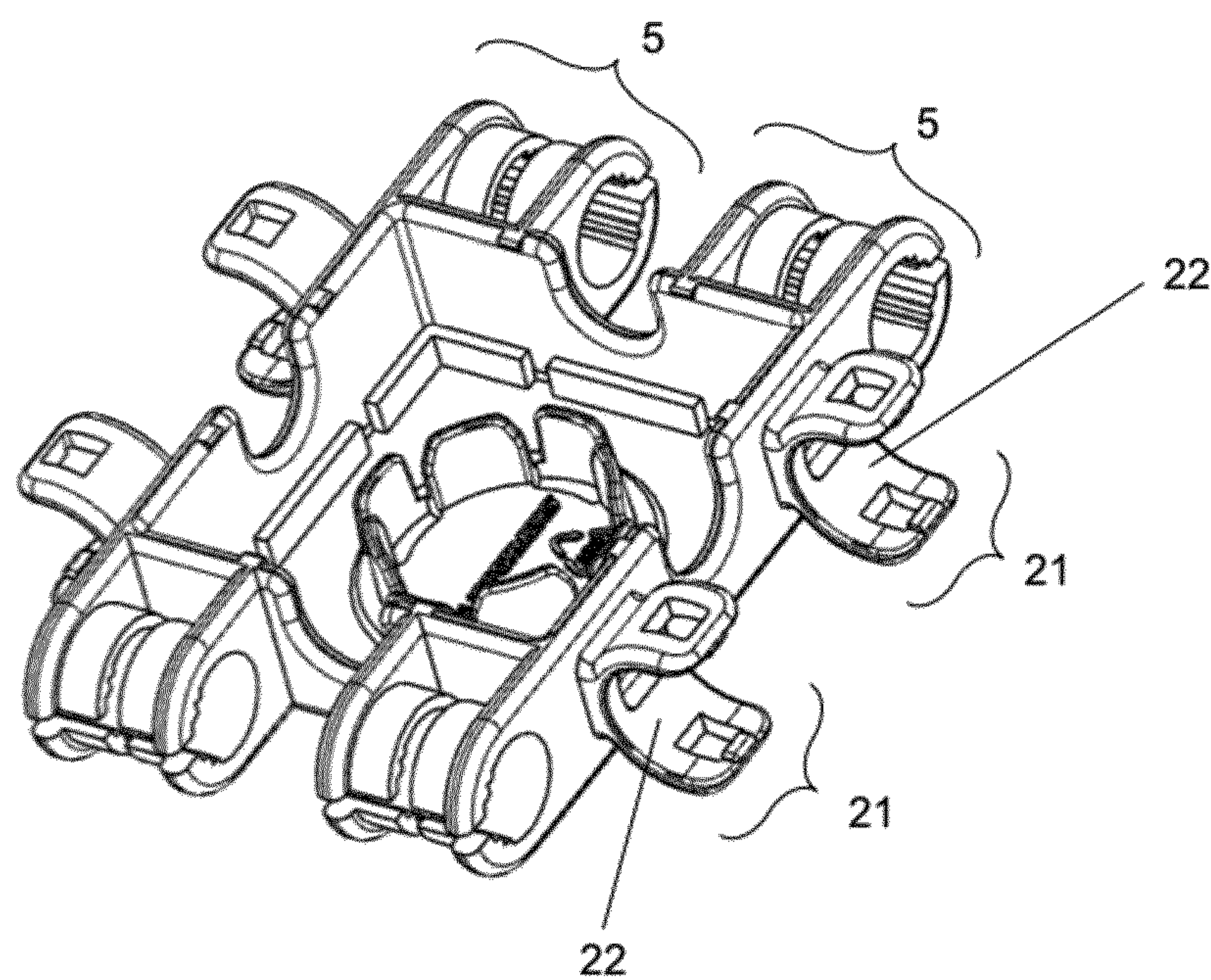


Fig. 5



STACKABLE HINGE CONNECTION**FIELD OF THE INVENTION**

[0001] The present invention relates to a hinge connection comprising a male member applied on a base plate and a pair of female members applied on a further base plate, said male member having protrusions provided to be hinged and resiliently fitted between the pair of female members applied on a further base plate. The male member of the hinge connection is being formed by two parallel male legs, wherein each leg comprises protrusions comprising cogs or cut teeth. The female member is formed by two parallel female legs and each of the female members comprises a through hole for engaging said protrusions of the male legs. The present invention further provides construction elements comprising the hinge connection members of the instant application. In a particular embodiment such construction elements are stackable, and allow the construction of complex three-dimensional structures without loss of flexibility.

BACKGROUND TO THE INVENTION

[0002] Hinge connections are regularly used for the connection between two or more construction elements, for example as used in building blocks in toys. An example of such a hinge connection is disclosed in WO9830808. Said hinge connection comprises a male member applied on a base plate and a pair of female members applied on a further base plate. The male member is hingedly and resiliently fitted between the female members, wherein the male members comprise protrusions, fitting in a through hole that is present in each female member. Said hinge connection can further form a construction element comprising at least one base plate with at least one male member and at least one further base plate with at least one pair of female members. These construction elements are for example used as building blocks and enable to create complex structures.

[0003] Typical for the hinge connection as described in WO9830808 is that the protrusions of the male members are cylindrical and have a smooth surface. The male members of the hinge connection resiliently fit between a pair of female members wherein the smooth cylindrical protrusions fit into a through hole present in each female member. A disadvantage of these smooth surfaces of both the protrusions and the through hole is that the hinge connection is not stable and quite some backlash is present. In particular, the hinge connection allows the construction elements to rotate 180°, but because of the smooth surfaces it does not allow the construction elements to stay in certain fixed positions between 0° and 180°. Under influence of time and/or gravity, constructions elements can start to bend. This is particularly disadvantageous when creating complex structures.

[0004] Another disadvantage of the hinge connection as disclosed in WO9830808 is that after fitting of the male member between a pair of female members, the hinge connection is firmly established and can only be disconnected by exerting a considerable amount of power.

[0005] It is accordingly an object of the present invention to provide an improved and robust hinge connection that can be used in the construction of complex three-dimensional structures without loss of flexibility. To said extend, the

present invention further provides stackable construction elements comprising the hinge connection members as detailed hereinafter.

SUMMARY OF THE INVENTION

[0006] It is accordingly an object of the present invention to provide a hinge connection (1) comprising a male member (2) applied on a base plate (4) and a pair of female members (5) applied on a further base plate (7) wherein said male member has protrusions (8) provided to be hinged and resiliently fitted between a pair of female members (5) applied on said further base plate (7). The male member (2) is formed by two parallel male legs (3), wherein each leg comprises one of said protrusions, wherein said female member (5) is formed by two parallel female legs (6) and wherein each of said female members comprises a through hole (10) for engaging one of said protrusions, wherein the two parallel female legs (6) are connected by an intermediary piece (9) and wherein said through hole (10) extends through said female legs (6) and said intermediary piece (9). Typical for the present invention is that the protrusions (8) on each leg of the male member comprise cogs or cut teeth and that the through hole (10) of the female member (5) comprises cogs or cut teeth to accommodate the cogs or cut teeth of said male protrusions. Further, and also typical for the present invention is that the intermediary piece (9) and/or the female legs (6) of the female members (5) are interrupted, resulting in an increased ease of use without loss of stability of the hinge connection.

[0007] In a preferred embodiment of the hinge connection (1) according to the invention, the intermediary piece (9) of the female member (5) is mounted offset from the further base plate (7). This enables to further reduce the thickness of the female members and consequently to further reduce the cooling time upon moulding and still ensure the stability of the connection. In a further and still another embodiment of the present invention, the intermediary piece (9) and the female legs (6) of the female member (5) are interrupted in the longitudinal direction (16). In another embodiment, the intermediary piece (9) of the female member (5) is interrupted in the transverse direction (17). In an even preferred embodiment, the intermediary piece (9) and the female legs (6) of the female member (5) are interrupted in the longitudinal direction (16) (in accordance with the central axis of the through hole (10)) and the intermediary piece (9) is interrupted in the transverse direction (17) (perpendicular to the central axis of the through hole (10)).

[0008] In order to improve the hinge movement of the hinge connection according to the invention, said intermediary pieces (9) are cylindrical pieces. Typical for the present invention is that the protrusions (8) of the male members (2) are protrusions comprising cogs and cut teeth and the through holes (10) of the female members (5) also comprise protrusions (8), in particular cogs or cut teeth to perfectly receive the cogs or cut teeth of said male protrusions (8) of the male members (2). In addition, the male and female members of the present invention are provided with rounded free ends, thereby facilitating the engagement or removal of the hinge connection. Preferably the male and female legs of the hinge connection comprise rounded borders to prevent injuries during the manipulation of the hinge connection.

[0009] The present invention is also directed to a construction element (20) comprising at least one male or female member of the hinge connection (1) as described

herein above. In particular, the present invention discloses a construction element (20) comprising at least one base plate (4) with at least one male member (2) having protrusions (8) wherein said male member (2) is formed by two parallel male legs (3). Typical for said male member is that it comprises protrusions (8) that comprise cogs or cut teeth.

[0010] In another embodiment, the present invention discloses a construction element (20) comprising at least one further base plate (7) with at least a pair of female members (5). Said female members (5) are formed by two parallel legs (6) connected by an intermediary piece (9) and each of said female members (5) comprise a through hole (10) for engaging one of the protrusions (8) of the male member (2). The through hole (10) of the female member (5) comprises also protrusions (8), in particular cogs or cut teeth to receive the cogs or cut teeth of said male protrusions (8). In a particular embodiment, the construction element (20) according to anyone of the embodiments herein described comprises at least one further base plate (7) with at least a pair of female members (5) further comprises two linking members (21) applied on a base plate provided to be resiliently fitted on two female members, wherein said linking members (21) comprise a C-shaped curved leg (22).

[0011] In another and preferred embodiment, the present invention discloses a construction element (20) comprising at least one base plate (4) with at least one male member (2) and at least one further base plate (7) with at least a pair of female members (5) as disclosed herein above. In yet another embodiment, the construction element (20) according to the present invention comprises two parallel base plates (4) and two parallel further base plates (7) forming together a square, wherein the two base plates (4) each comprise said male legs (3) as described above, applied symmetrically with respect to the middle of the base plate and wherein the two further base plates (7) each comprise a pair of female members (5) that extend at an extremity of the further base plate (7) in such a manner that one of the female legs (6) of said female member (5) extends in prolongation from an extremity of one of said base plates (4).

[0012] In particular, and in a preferred embodiment of the present invention, the construction element (20) comprises one or more base plates (4), or one or more further base plates (7), or a combination thereof forming a closed area, wherein said base plates are connected by a connection plate (11) extending in a plane perpendicular to said base plates. This connection plate enhances the strength of the construction element and enables also to form complex three-dimensional structures, such as for example a container.

[0013] In a further embodiment, the construction elements (20) according to the present invention comprise a connection plate (11) that connects the base plates (4) and/or the further base plates (7) and extends in a plane perpendicular to said base plates. In a preferred embodiment, said connection plate (11) connects the two base plates (4) and the two further base plates (7) of a construction element and extends in a plane perpendicular to said base plates.

[0014] As indicated herein above, the construction element (20) according to the present invention preferably comprises a connection plate (11) connected to the base plates (4) and/or further base plates (7) and extending in a plane perpendicular to said base plates. In a preferred embodiment, said connection plate (11) comprises a ridge (12) at the connections between the connection plate (11) and the base plates (4) and further base plates (7). In a

further embodiment, said ridge (12) comprises one or more openings (15); in particular one or more openings (15) at each of the connections between the connection plate (11) and the base plates (4) and/or further base plates (7). Even further, the base plates (4) and further base plates (7) of said construction element (20) comprise one or more protrusions (18); in particular at the side opposite to the side connected to the connection plate (11); more in particular at the side opposite to the side connected to the connection plate (11) and directly opposite to openings (15) at the ridge (12) of the connection plate (11). The ridge (12) in the connection plate (11) in combination with the one or more openings (15) and one or more protrusions (18) at the side opposite to the side connected to the connection plate (11) ensure that multiple construction elements (20) are stackable to each other by clicking the ridge (12) of a first construction element into the base of the three-dimensional structure formed by the combination of the connection plate (11) with the base plates (4) and/or further base plates (7) (supra) of a second construction element, and so on.

[0015] In another embodiment of the construction element (20) according to the present invention, the connection plate (11) comprises one or more apertures (13). In a preferred embodiment, the connection plate (11) comprises four apertures (13), in particular located at the centre of the connection plate (11) and positioned two by two in an opposite position; more in particular positioned in a circular groove in the connection plate (11).

[0016] The construction element (20) according to the present invention also comprises in one of its embodiments one or more cylindrical slits (14). More in particular, the base plate (4) and further base plate (7) of said construction element (20) comprise a cylindrical slit (14). Even more in particular, said cylindrical slit (14) of the base plate (4) is located in between the two parallel male legs (3) of the male member (2). In yet another embodiment, said cylindrical slit (14) of the further base plate (7) is located in between the two female members (5).

[0017] Preferably, the distance between the male legs (3) of the construction element (20) according to the present invention is equal to L, the distance between the female legs (6) is equal to L, the height of the legs is equal to L, the length of the base plates (4) is equal to 3L, and the height of the base plates is equal to L. This enhances the possibilities of forming complex structures by using several of such construction elements, since two construction elements of this type may be connected in four different ways to each other and each hinge connection provides a full 180 degrees positioning.

[0018] The present invention also provides a combination of two or more construction elements (20) according to anyone of the embodiments as described herein above; said combination comprising a hinge connection according to the invention, wherein the male member (2) of a first connection element (20) is resiliently fitted between a pair of female members (5) of a second construction element (20).

[0019] The present invention also discloses the use of a hinge connection (1), a construction element (20), or a combination of two or more construction elements as described herein above as a building toy.

[0020] The present invention further relates to a tool provided for disconnecting a connection of a female member (5) from a male member (2) of the hinge connection (1), wherein said tool comprises two spaced apart lever legs,

each lever leg being provided for being positioned between said two female legs for tilting said female member out of said male member.

[0021] Numbered Embodiments of the Present Invention are as Follows:

[0022] 1. A hinge connection (1) comprising a male member (2) applied on a base plate (4) and a pair of female members (5) applied on a further base plate (7), said male member having protrusions (8) provided to be hinged and resiliently fitted between a pair of female members (5) applied on said further base plate (7), said male member (2) being formed by two parallel male legs (3), wherein each leg comprises one of said protrusions (8), each of said female members (5) formed by two parallel female legs (6) and each of said female members (5) comprising a through hole (10) for engaging one of said protrusions (8), wherein the two parallel female legs (6) are connected by an intermediary piece (9) and wherein said through hole (10) extends through said female legs (6) and said intermediary piece (9), characterized in that

[0023] said protrusions (8) on each leg of the male member comprise cogs or cut teeth,

[0024] said through hole (10) of the female member comprises cogs or cut teeth to receive the cogs or cut teeth of said male protrusions (8), and

[0025] said intermediary piece (9) and/or the female legs (6) of the female members are interrupted.

[0026] 2. The hinge connection (1) according to embodiment 1, wherein the intermediary piece (9) of the female member (5) is mounted offset from the further base plate (7).

[0027] 3. The hinge connection (1) according to embodiment 1 or 2, wherein the intermediary piece and the female legs (6) of the female member (5) are interrupted in the longitudinal direction (16).

[0028] 4. The hinge connection (1) according to any one of the preceding embodiments, wherein the intermediary piece (9) of the female member (5) is interrupted in the transverse direction (17).

[0029] 5. The hinge connection (1) according to any one of the preceding embodiments, wherein the intermediary piece (9) is cylindrical.

[0030] 6. The hinge connection (1) according to any one of the preceding embodiments, wherein the male (2) and female (5) members are provided with rounded free ends.

[0031] 7. The hinge connection (1) according to any one of the preceding embodiments, wherein the male (3) and female (6) legs comprise rounded borders.

[0032] 8. A construction element (20) comprising at least one base plate (4) with at least one male member (2) according to anyone of embodiments 1 to 7.

[0033] 9. A construction element (20) comprising at least one further base plate (7) with at least a pair of female members (5) according to anyone of embodiments 1 to 7.

[0034] 10. A construction element (20) comprising at least one base plate (4) with at least one male member (2) according to anyone of embodiments 1 to 7, and at least one further base plate (7) with at least a pair of female members (5) according to anyone of embodiments 1 to 7.

[0035] 11. A construction element (20) according to embodiment 10 further comprising two parallel base plates (4) and two parallel further base plates (7) forming together a square, wherein the two base plates (4) each comprise said male legs (3) according to anyone of embodiment 1 to applied symmetrically with respect to the middle of the base

plate (4) and wherein the two further base plates (7) each comprise a pair of female members (5) according to anyone of embodiments 1 to 7, each female member (5) of said pair extending at an extremity of the further base plate (7) in such a manner that one of the female legs (6) of said female member (5) extends in prolongation from an extremity of one of said base plates (4).

[0036] 12. A construction element (20) according to embodiment 9 further comprising two linking members (21) applied on a base plate provided to be resiliently fitted on two female members, said female members formed by two parallel female legs and comprising a through hole and wherein the two parallel female legs are connected by an intermediary piece and wherein said through hole extends through said female legs and said intermediary piece, characterized in that the linking member (21) comprises a C-shaped curved leg (22).

[0037] 13. A construction element (20) according to anyone of embodiments 8 to 12, comprising a connection plate (11) that connects the base plates (4) and/or the further base plates (7) and extends in a plane perpendicular to said base plates.

[0038] 14. A construction element (20) according to embodiment 13 further comprising a connection plate (11) that connects the two base plates (4) and the two further base plates (7) and extends in a plane perpendicular to said base plates.

[0039] 15. The construction element (20) according to embodiment 13 or 14, wherein the connection plate (11) comprises a ridge (12) at the connections between the connection plate (11) and the base plates (4) and further base plates (7).

[0040] 16. The construction element (20) according to embodiment 15, wherein the ridge (12) comprises one or more openings (15); in particular one or more openings at each of the connections between the connection plate (11) and the base plates (4) and further base plates (7).

[0041] 17. The construction element (20) according to embodiment 16, wherein the base plates (4) and further base plates (7) comprise one or more protrusions; in particular at the side opposite to the side connected to the connection plate; more in particular at the side opposite to the side connected to the connection plate and directly opposite to openings (15) at the ridge (12) of the connection plate (11).

[0042] 18. The construction element (20) according to anyone of embodiments 13 to 17, wherein the connection plate (11) comprises one or more apertures (13).

[0043] 19. The construction element (20) according to embodiment 18, wherein the connection plate (11) comprises four apertures (13), in particular located in the centre of the connection plate and positioned two by two in an opposite position; more in particular positioned in a circular groove in the connection plate.

[0044] 20. A construction element (20) according to any one of embodiments 8 to 19, wherein the base plate (4) and/or further base plate (7) comprise a cylindrical slit (14).

[0045] 21. A construction element (20) according to embodiment 20, wherein the cylindrical slit (14) of the base plate (4) is located in between the two parallel male legs (3) of the male member (2).

[0046] 22. A construction element (20) according to embodiment 20, wherein the cylindrical slit (14) of the further base plate (7) is located in between the two female members (5).

[0047] 23. A construction element (20) according to any one of embodiments 8 to 22, wherein the distance between the female legs is equal to L, the distance between the male legs is equal to L, the height of the legs is equal to L, the length of the base plate and the further base plate is equal to 3L and the height of the base plates is equal to L.

[0048] 24. A combination of two or more construction elements (20) according to any one of embodiments 8 to 23, comprising a hinge connection according to any one of embodiments 1 to 7, wherein the male member (2) of a first construction element (20) is resiliently fitted between a pair of female members (5) of a second construction element (20).

[0049] 25. Use of a hinge connection according to any one of embodiments 1 to 7 or a construction element according to anyone of embodiments 8 to 23, or a combination of two or more construction elements (20) according to embodiment 24, as a building toy.

BRIEF DESCRIPTION OF THE DRAWINGS

[0050] With specific reference now to the figures, it is stressed that the particulars shown are by way of example and for purposes of illustrative discussion of the different embodiments of the present invention only. They are presented in the cause of providing what is believed to be the most useful and readily description of the principles and conceptual aspects of the invention. In this regard no attempt is made to show structural details of the invention in more detail than is necessary for a fundamental understanding of the invention. The description taken with the drawings making apparent to those skilled in the art how the several forms of the invention may be embodied in practice.

[0051] FIG. 1 shows a top view of a preferred embodiment of two construction elements according to the present invention.

[0052] FIG. 2 shows a top-lateral view of a preferred embodiment of a construction element according to the present invention.

[0053] FIG. 3 shows a bottom-lateral view of a preferred embodiment of a construction element according to the present invention.

[0054] FIG. 4 shows a top-lateral view of a particular embodiment of a construction element according to the present invention wherein the construction element comprises two linking members (21) applied on a base plate provided to be resiliently fitted on two female members, wherein the linking member (21) comprises a C-shaped curved leg (22).

[0055] FIG. 5 shows a bottom-lateral view of a particular embodiment of a construction element according to the present invention wherein the construction element comprises two linking members (21) applied on a base plate provided to be resiliently fitted on two female members, wherein the linking member (21) comprises a C-shaped curved leg (22).

DETAILED DESCRIPTION OF THE INVENTION

[0056] The present invention is directed to a hinge connection and a construction element comprising said hinge connection. In particular, the present invention provides an improved and robust hinge connection that can be used in

the construction of complex three-dimensional (3D) structures without loss of flexibility but with maintenance of stability.

[0057] As shown in FIG. 1, the hinge connection (1) according to the present invention comprises a male member (2) applied on a base plate (4) and a pair for female members (5) applied on a further base plate (7), wherein said male member (2) is fitted between a pair of female members (5) formed by two parallel female legs (6) on said further base plate (7). Typical for the present invention is that the male member (2) has protrusions (8) on each leg of the male member (2), wherein said protrusions (8) comprise cogs or cut teeth. These protrusions (8) are provided to have said male member (2) hinged and resiliently fitted between a pair of female members (5). Also typical for the present invention is that each of the female members (5) comprises a through hole (10) wherein said through hole (10) comprises cogs or cut teeth to receive the protrusions (8), in particular the cogs or cut teeth of the male member (5). Further, and also a crucial element of the present invention, is that the two parallel legs (6) are connected by an intermediary piece (9) wherein said through hole (10) extends through said female legs (6) and said intermediary piece (9). Typical for the present invention is that said intermediary piece (9) and/or the female legs (6) of the female member (5) are interrupted. In a particular embodiment, the intermediary piece (9) is interrupted in the transverse direction (17), as shown in FIGS. 1 and 2. In another particular embodiment, and shown in FIGS. 2 and 3, the intermediary piece (9) and both the female legs (6) are interrupted in the longitudinal direction (16). In a preferred embodiment and as shown as well in FIGS. 2 and 3, the intermediary piece (9) is interrupted in both the transverse direction (17) and the longitudinal direction (16) and the female legs (6) are interrupted in the longitudinal direction (16). The interruptions of both the intermediary piece (9) and the female legs (6) are of particular importance for the transfer of forces that are applied when creating the hinge connection (1). Even more in particular, since the interruptions (16, 17) are present in both directions, both longitudinal and transversal, the forces that are applied when creating the hinge connection are transferred in both these directions. As a result, the male member (2) is easily fitted between a pair of female members (5) thereby increasing the ease of use, without loss of stability of the hinge connection. The interruption of both the intermediary piece (9) and the female legs (6) thus facilitates the creation of the hinge connection (1). Without the presence of said interruptions, the intermediary piece (9) and the female legs (6) would be much more rigid, thereby impeding the positioning of the male member (2) in between the pair of female members (5). With the present invention, the male member (2) can be easily and transiently, though still rigidly, positioned in between said pair of female members (5), and it makes it easier to separate the hinge members when required.

[0058] As shown in FIG. 1 as well, the male (2) and female (5) members are preferably provided with rounded free ends. In another embodiment, the male (3) and female (6) legs comprise rounded borders. As a result of both the rounded free ends and the rounded borders, the hinge movement of the hinge connection is facilitated and the risk for injuries when creating complex structures with the construction elements is avoided. This is of particular importance when the construction elements are used as a toy.

[0059] The present invention further discloses a construction element (20) comprising a hinge connection (1) as outlined herein above. In one embodiment of the present invention, the construction element (20) comprises at least one base plate (4) with at least one male member (2) as detailed herein above. In another embodiment, the construction element (20) comprises at least one further base plate (7) with at least a pair of female members (5) as detailed herein above. In yet another embodiment, the construction element (20) according to the present invention comprises at least one base plate (4) with at least one male member (2) and at least one further base plate (7) with at least a pair of female members (5).

[0060] In particular, the construction element (20) of the present invention comprises at least base plates and/or further base plates forming a closed area. In a preferred embodiment, and as shown in FIGS. 1, 2 and 3, the construction element (20) according to the present invention comprises two parallel base plates (4) and two parallel further base plates (7) forming together a square. In said construction element, the two base plates (4) each comprise male legs (3) applied symmetrically with respect to the middle of the base plate (4) and wherein the two further base plates (7) each comprise a pair of female members (5) wherein each female member (5) extends at an extremity of the further base plate (7) in such a manner that one of the female legs (6) of said female member (5) extends in prolongation from an extremity of one of said base plates (4). In yet another embodiment, the construction element (20) comprises 3 base plates (2) each comprising a male member (5) and 3 other base plates without any female or male member.

[0061] Referring now to FIGS. 1 and 2, typical for the hinge connection (1) according to the present invention is that it is established via the presence of protrusions (8). Said protrusions are present on each leg (3) of the male members (2) and allow the male member to be hinged and resiliently fitted into the gear protrusions of the female member (5). Typical for the present invention is that said protrusions on each leg of the male member comprise cogs or cut teeth. These cogs or cut teeth perfectly fit into the cogs or cut teeth of the through hole (10) of the female member (5). Because of the presence of said protrusions, in particular comprising cogs or cut teeth, an improved and robust hinge connection between two construction elements is provided that can be used in the construction of complex three-dimensional structures without loss of flexibility. With the hinge connection according to the present invention, the fitting of the cogs or cut teeth of the male protrusions into the cogs or cut teeth of the female member (5) allows adjacent construction elements to be positioned in several different angles relative to each other. In particular, by fixing the relative angle between two construction elements, the 3D structure becomes more rigid, and its shape is at least partially constrained and dependent upon the choice of the fixed relative angle between any two adjacent elements included in the multi-panel structure. In a preferred embodiment, the relative angle between two construction elements according to the present invention is fixed at up to 11 discrete angles: 90°, 108°, 126°, 144°, 162°, 180°, 198°, 216°, 234°, 252°, and 270°. The ability to fix the relative angle between each pair of coupled construction elements enables a user to construct 3D structures of significant diversity in both shape and form.

With 11 possible angle choices between each pair of coupled construction elements, the shape of the possible 3D structures is practically unlimited.

[0062] In a particular embodiment of the present invention, and as shown in FIGS. 4 and 5, the construction element comprising at least one further base plate (7) with at least a pair of female member (5), further comprises two linking members (21) applied on a base plate and provided to be resiliently fitted on two female members. Said female members are formed by two parallel female legs and comprise a through hole and wherein the two parallel female legs are connected by an intermediary piece and wherein said through hole extends through said female legs and said intermediary piece. The linking members (21) of said construction element are characterized in that they comprise a C-shaped curved leg (22). As a result, the C-shaped curved legs (22) of the linking members (21) resiliently fit onto the female members of a second construction element.

[0063] As evident from FIGS. 1, 2 and 3, the construction element according to the present invention comprises a connection plate (11) that connects the base plates (4) and/or the further base plates (7) and extends in a plane perpendicular to said base plates. Said connection plate (11) enhances the strength of the construction element and enables to form a container for receiving all kind of objects or goods, for example sweets. The formed container may also be used as packaging. In a preferred embodiment, the connection plate (11) connects two base plates (4) and two further base plates (7) and extends in a plane perpendicular to said base plates. Typical for the present invention, and as can be observed in FIGS. 1 and 2, the connection plate (11) of the construction element (20) comprises a ridge (12) at the connections between the connection plate (11) and the base plates (4) and further base plates (7). In an even further embodiment, said ridge (12) comprises one or more openings (15); in particular one or more openings at each of the connections between the connection plate (11) and the base plates (4) and further base plates (7). Even further, and as shown in FIG. 3 the base plates (4) and further base plates (7) of said construction element (20) comprise one or more protrusions (18); in particular at the side opposite to the side connected to the connection plate (11); more in particular at the side opposite to the side connected to the connection plate (11) and directly opposite to openings (15) at the ridge (12) of the connection plate (11). The ridge (12) in the connection plate (11) in combination with the one or more openings (15) and one or more protrusions (18) at the side opposite to the side connected to the connection plate (11) ensure that multiple construction elements (20) are stackable to each other by clicking the ridge (12) of a first construction element into the base of the three-dimensional structure formed by the combination of the connection plate (11) with the base plates (4) and/or further base plates (7) of a second construction element, and so on. In a particular embodiment upon stacking of multiple construction elements (20), the protrusions (18) on the base plates (4) and/or further base plates (7) fit in the openings (15) at the ridge (12) of the connection plate (11).

[0064] In a particular and preferred embodiment, and as shown in FIG. 1, the distance between the female legs (6) is equal to L, the distance between the male legs (3) is equal to L, and the height of the legs is equal to L. In a further embodiment, the length of the base plate (4) and the further

base plate (7) is equal to 3L and the height of the base plate (4) and the further base plate (7) is equal to L.

[0065] The hinge connection and connection elements of the present invention are advantageously made from a material that allows repeated deflections to occur, without permanent deformation thereof. Thickness of the connection elements is chosen so as to obtain similar results. Or expressed differently, the hinge connection as detailed herein above and the construction element comprising said hinge connection are produced in a robust but still flexible material. In a particular embodiment, said hinge connection and construction element are produced in a plastic material, for example polypropylene or acrylonitrile butadiene styrene (ABS). in a preferred embodiment, the hinge connection and construction element comprising said hinge connection are produced in ABS.

[0066] The present invention is also related to a combination of two or more construction elements (20) as described herein above. Said combination comprises a hinge connection according to the present invention, wherein the male member (2) of a first construction element (20) is resiliently fitted between a pair of female members (5) of a second construction element (20).

[0067] The present invention is further related to the use of a hinge connection, a construction element, or a combination of two or more construction elements (20) as outlined herein above as a building toy. After all, said hinge connection and construction element may be used as a toy and enable to create complex structures wherein planning and use of imagination is required. This contributes to the development of a child playing with those construction elements.

[0068] The 3D structures that can be made when combining different construction elements of the present invention are formed by building up geometric shapes that include angles not limited to right angles. Such 3D structures may include, but are not limited to various forms of forts, castles, houses, furniture and toy vehicles. Although the preferred embodiments include the construction of toy-like structures, other embodiments are not so constrained. For instance, it should be understood that by varying the size, material, and structural integrity of the modular components or construction elements, more stable and/or more practical modular constructions may be formed with other embodiments. these more particular constructions may include, but are otherwise not limited to furniture, temporary housing units, modular shelters, and mobile military, medical, or emergency facilities.

[0069] In order to facilitate the enablement of the hinge connection between two or more construction elements, the present invention also provides a tool for disconnecting a connection of a female member (5) from a male member (2) of the hinge connection (1). Said tool comprises two spaced apart lever legs, each lever leg being provided for being positioned between said two female legs for tilting said female member out of said male member.

1-14. (canceled)

15. A hinge connection comprising a male member applied on a base plate and a pair of female members applied on a further base plate, said male member having protrusions and provided to be hinged and resiliently fitted between the pair of female members applied on said further base plate, said male member being formed by two parallel male legs, wherein:

each male leg comprises one of said protrusions;
each of said female members is formed by two parallel female legs and comprises a through hole for engaging one of said protrusions;
the two parallel female legs comprise an intermediary piece;
said through hole extends through said female legs and said intermediary piece;
said protrusions on each male leg of the male member comprise cogs or cut teeth;
said through hole of the female member comprises cogs or cut teeth to receive the cogs or cut teeth of said male protrusions; and
said intermediary piece of the female members is interrupted in the transverse direction.

16. The hinge connection according to claim 15, wherein the intermediary piece and the female legs of the female member are interrupted in the longitudinal direction.

17. A construction element comprising:

at least one base plate with at least one male member according to claim 15, and at least one further base plate with at least a pair of female members according to claim 15, wherein:

said male member comprising protrusions and is provided to be hinged and resiliently fitted between the pair of female members applied on said further base plate;

said male member is formed by two parallel male legs, wherein each parallel male leg comprises one of said protrusions;

each of said female members is formed by two parallel female legs and comprises a through hole for engaging one of said protrusions, wherein the two parallel female legs comprise an intermediary piece and wherein said through hole extends through said female legs and said intermediary piece;

said protrusions on each leg of the male member comprise cogs or cut teeth;

said through hole of the female member comprises cogs or cut teeth to receive the cogs or cut teeth of said male protrusions; and

said intermediary piece of the female members is interrupted in the transverse direction.

18. The construction element according to claim 17 comprising two parallel base plates and two parallel further base plates forming together a square, wherein the two base plates each comprise the male member applied symmetrically with respect to the middle of the base plate and wherein the two further base plates each comprise the pair of female members, each female member of said pair extending at an extremity of the further base plate in such a manner that one of the female legs of said female member extends in prolongation from an extremity of one of said base plates.

19. A construction element comprising:

at least one further base plate with at least a pair of female members according to claim 15; and

two linking members applied on a base plate provided to be resiliently fitted on two female members, wherein: said female members are formed by two parallel female legs and comprise a through hole;

the two parallel female legs comprise an intermediary piece;

said through hole extends through said female legs;

said intermediary piece; and

the linking members each comprise a C-shaped curved leg.

20. The construction element according to claim **17**, comprising a connection plate that connects the base plates, the further base plates, or both the base plates and further base plates extends in a plane perpendicular to said base plates.

21. The construction element according to claim **20**, wherein the connection plate comprises a ridge at the connections between the connection plate and the base plates and further base plates.

22. The construction element according to claim **21**, wherein the ridge comprises one or more openings at each of the connections between the connection plate and the base plates and further base plates.

23. The construction element according to claim **22**, wherein the base plates and further base plates comprise one or more protrusions.

24. The construction element according to claim **23**, wherein the protrusions are located at the side opposite to the side connected to the connection plate

25. The construction element according to claim **24**, wherein the protrusions are located at the side opposite to the side connected to the connection plate and directly opposite to openings at the ridge of the connection plate.

26. The construction element according to claim **20**, wherein the connection plate comprises one or more apertures.

27. The construction element according to claim **26**, wherein the connection plate comprises four apertures located in the centre of the connection plate and positioned two by two in an opposite position.

28. The construction element according to claim **27**, wherein the apertures are positioned in a circular groove in the connection plate.

29. The construction element according to claim **17**, wherein the distance between the female legs is equal to L , the distance between the male legs is equal to L , the height of the legs is equal to L , the length of the base plate and the further base plate is equal to $3L$ and the height of the base plates is equal to L .

30. A combination of two or more construction elements according to claim **17**, wherein the male member of a first construction element is resiliently fitted between a pair of female members of a second construction element.

31. The combination of two or more construction elements according to claim **30**, wherein the construction elements are provided as a building toy.

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