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(54) **Vertical extension collapsible bearing structure, particularly for platforms and floor boarding**

Senkrecht ausziehbare und zusammenfaltbare Tragstruktur insbesondere für Plattformen und Fussböden

Structure porteuse repliable et verticalement extensible particulièrement pour plates-formes et planchers

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(73) Proprietor: **Braghieri, Gilberto**
20070 Corno Giovane (LO) (IT)

(72) Inventor: **Braghieri, Gilberto**
20070 Corno Giovane (LO) (IT)

(74) Representative: **Gotra, Stefano**
Bugnion S.p.A.
Via Garibaldi 22
43100 Parma (IT)

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EP 0 884 425 B1

Description

[0001] The present industrial invention concerns a collapsible bearing structure with vertical extension, particularly for platforms and floor boarding.

[0002] Articulated folding structures made of pairs of crossing tubular elements hinged to each other at the point of intersection and with their ends hinged in turn in articulation joints are already known for example in CA-A-2114767 of the same Applicant.

[0003] Such articulation joints comprise a square shape block that on one of its larger faces shows four cavities, open towards respective side walls of the block, destined to the housing and hinging of respective tubular elements, in such a way as to enable the articulated coupling of four tubular elements developing on planes orthogonal to each other.

[0004] In addition, these joints can have a through hole perpendicular to the face provided with the aforementioned cavities, which can be used for the coupling with a further tubular element.

[0005] The pairs of tubular elements, articulating in the structure, define planes respectively perpendicular and parallel to the floor and bearing plates are laid and fixed on the latter, maintaining the structure in the desired position.

[0006] An inconvenience of these structures realised by composition of these tubular elements and articulation joints is linked to the fact that they do not consent their use as to support consistent loads in a stable manner, in particular those which have to bear platforms, floor boarding or similar.

[0007] Object of the present invention is to realise a vertical extension bearing structure that would allow to support even considerable loads and that would also be collapsible parallel to the floor for its folding to conditions of minimum volume.

[0008] An additional object is to enable the overlaying and fixing of several similar structures for the formation of modular composite structures.

[0009] This object is achieved by a structure as characterised in claim 1.

[0010] In particular, when the structure is completely open, the telescopic elements assume a minimum fixed length, and they set themselves in a stable way between each pair of articulation joints located on the same vertical, thus guaranteeing the solidity of the structure.

[0011] During the closing stage the collapsibility of the structure is possible, since the telescopic elements adjust their length to the increased distance between the articulation joints to which they are coupled, thus allowing the lateral folding of the structure.

[0012] Two structures thus formed can be overlaid modularly in order to vary the height of the global structure.

[0013] Preferably, each telescopic element comprises two tubular elements having different diameters, slidingly engaged with each other, at least one of which is provided with fixing means.

[0014] The consequent fixing of a complex structure is obtained by coupling respective telescopic elements belonging to two different structures.

[0015] A structure thus obtained is suitable for innumerable uses, in particular for the realisation of foldable bearing structures.

[0016] One of the possible uses is illustrated as a non limiting example in the enclosed drawings, where:

Figure 1 is a perspective view of a vertical extension collapsible bearing structure according to the invention in a completely open position;
Figure 2 is a view in axial section of a pair of articulation joints and of two vertical telescopic elements coupled and fixed to each other though the same joints;
Figure 3 is a partially sectioned top view of an articulation joint of the structure according to the invention;
Figure 4 is a lateral view of said structure in a completely open position;
Figure 5 is a perspective view of said structure in a position of minimum volume;

[0017] With reference to these figures, a bearing structure indicated by 1 comprises pairs of tubular elements 4 that intersect at points 7 of mutual hinging inside vertical planes perpendicular to each other and have their ends hinged in respective cavities 5 located in respective articulation joints 2.

[0018] These articulation joints 2 are in fact blocks of substantially square shape and in one larger face they have four cavities 5 suitable to house the tubular elements 4.

[0019] These tubular elements 4 are hinged to said cavities 5 by means of pins 8 that are inserted in the cavities 5 by means of through holes located on the lateral walls of the cavities 5.

[0020] As Figures 2, 3 show, the articulation joints 2 are also provided with a central through hole 6 perpendicular to the two larger faces of the joint 2. The presence of this hole 6 makes possible the introduction of one end of a telescopic element 3, that sets itself perpendicular to the face of said joint 2.

[0021] In addition, the through hole 6 is provided with a narrowing (11) on the inside, which is suitable to form limit stop abutment for the end of the telescopic element 3 inserted into the same hole.

[0022] In particular each telescopic element 3 is formed by two tubular elements 3a and 3b, which can slide one inside the other.

[0023] When the structure is completely open, the distance between pairs of joints 2 located on the same vertical is determined by the presence of the telescopic elements 3. Indeed, in an operating condition the internal tubular element 3a is completely inserted into the external tubular element 3b and therefore the latter positions

itself in a stable way between two articulation joints 2 of the structure 1.

[0024] When the structure 1 is operating, planes parallel to the floor on which bearing landings are placed are thus identified, and the telescopic elements 3 constitute their uprights.

[0025] Structures 1 realised in this way are modularly assemblable in order to obtain a global structure, as illustrated in Figures 1 and 4 that comprises two overlaid structures 1. The fixing of the global structure thus obtained is done by coupling of the external tubular elements 3b through respective pairs of articulation joints 2 as it is evidenced in Figure 2.

[0026] Said coupling is obtained by means of fixing means 9,10, which said telescopic elements 3b are provided with. In particular said fixing means can be screw means, respectively male and female, that engage with each other inside the holes 6 of the articulation joints 2.

[0027] The presence of the telescopic elements 3, realised through the tubular elements 3a and 3b that are constrained to respective articulation joints 3, but that can slide one inside the other, enables the lateral collapsibility of the structure, as it is evident in Figure 5. In fact, during the operations of the closing of the structure 1 the distance between each pair of joints that are on the same perpendicular increases and the tubular elements 3a, 3b, that are respectively fixed to each element of said pair of joints 2, slide one on top of the other, following the closing movement.

[0028] The structure according to the invention is therefore utilisable to bear consistent loads, but it involves a minimum volume when closed.

Claims

1. Collapsible bearing structure with vertical extension, particularly for platforms and floor boarding, comprising pairs of tubular elements (4) which, intersecting at hinging points (7) define vertical planes perpendicular to each other and have their ends hinged in respective cavities (5) located in one of the larger faces of respective articulation joints (2), each one of said articulation joints (2) being provided with a central through hole (6) perpendicular to said larger face, **characterised in that** the structure also comprises vertical telescopic elements (3) which have ends set abutting in said central holes (6) and are arranged in such a way as to enable a lateral collapsibility of the structure.

2. Structure according to claim 1, **characterised in that** said telescopic elements (3) are provided with mutual fixing means (9, 10) engageable with each other inside said central holes (6) of the articulation joints (2).

3. Structure according to claim 2, **characterised in that** said fixing elements (9; 10) are screw means.

4. Structure according to any one of the previous claims, **characterised in that** said through hole (6) is provided with means (11) suitable to form a limit stop abutment for the end of the telescopic element (6) within the hole itself.

5. Structure according to claim 4, wherein said means (11) is a narrowing on the inside of the through hole (6).

6. Structure according to claim 1, wherein each telescopic element (3) is formed by two tubular elements (3a, 3b) slidable one inside the other in such a way as an internal tubular element (3a) is completely inserted in an external tubular element (3b) when the structure is completely open, while during the closing of the structure the distance between each pair of articulation joints (2) that are on the same vertical increases and the tubular elements (3a, 3b) respectively fixed to said pair of articulation joints (2) slide one on top of the other, following the closing movement and enabling the lateral collapsibility of the structure.

7. Structure according to claim 6, wherein the external tubular elements (3b) are coupled to the articulation joints (2) in such a way as to realise modular structures consisting of superimposed structures.

Patentansprüche

1. Zusammenfaltbare und senkrecht ausziehbare Tragstruktur insbesondere für Plattformen und Fussböden umfassend rohrförmige, sich an Scharnierpunkten (7) schneidende Elementepaare (4), die vertikale, senkrecht aufeinander stehende Ebenen definieren und deren Enden in entsprechenden Hohlräumen (5) angelenkt sind, die in einer der breiteren Flächen entsprechender Gelenkkupplungen (2) angeordnet sind, wobei die genannten Gelenkkupplungen (2) jeweils ein mittig angeordnetes Durchgangsloch (6) aufweisen, das senkrecht zu der genannten breiteren Fläche angeordnet ist, **dadurch gekennzeichnet, dass** die Struktur ferner senkrechte Teleskopelemente (3) aufweist, deren Enden in den genannten, mittig angeordneten Löchern (6) aufliegen und die so ausgebildet sind, dass die Struktur seitlich zusammenfaltbar wird.

2. Struktur nach Anspruch 1, **dadurch gekennzeichnet, dass** die genannten Teleskopelemente (3) Mittel zur gegenseitigen Befestigung (9, 10) aufweisen, die in den genannten, mittig angeordneten Löchern (6) der Gelenkkupplungen (2) miteinander in Eingriff gebracht werden können.

3. Struktur nach Anspruch 2, **dadurch gekennzeichnet, dass** die genannten Befestigungselemente (9; 10) Schrauben sind.

4. Struktur nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das genannte Durchgangsloch (6) einen Begrenzunganschlag für das Ende des Teleskopelementes in dem Loch (6) bildende Mittel (11) aufweist.

5. Struktur nach Anspruch 4, bei der die genannten Mittel (11) aus einer Einschnürung auf der Innenseite des Durchgangsloches (6) bestehen.

6. Struktur nach Anspruch 1, bei der die Teleskopelemente (3) jeweils aus zwei rohrförmigen Elementen (3a, 3b) bestehen, die so ineinander gleiten, dass ein inneres rohrförmiges Element (3a) vollständig in ein äusseres rohrförmiges Element (3b) eingeführt ist, wenn die Struktur vollständig geöffnet ist, während sich beim Schliessen der Struktur der Abstand zwischen jedem auf der gleichen Senkrechten angeordneten Paar Gelenkkupplungen (2) vergrössert und die rohrförmigen, jeweils an dem genannten Paar Gelenkkupplungen (2) befestigten Elemente (3a, 3b) aufeinander gleiten und dabei der Schliessbewegung folgen und das seitliche Zusammenfalten der Struktur ermöglichen.

7. Struktur nach Anspruch 6, bei dem die äusseren rohrförmigen Elemente (3b) derart mit Gelenkkupplungen (2) verbunden sind, dass sie modulare, aus übereinander liegenden Strukturen bestehende Strukturen ausbilden.

Revendications

1. Structure porteuse repliable verticalement extensible, particulièrement pour plates-formes et planchers, comprenant des paires d'éléments tubulaires (4) dont l'intersection en des points de connexion (7) définit des plans verticaux perpendiculaires entre eux, et dont les extrémités sont fixées dans des respectives cavités (5) présentes dans l'une des faces majeures des respectives jointures (2) d'articulation, chacune desquelles jointures d'articulation (2) étant pourvue d'un orifice central passant (6) perpendiculaire à ladite face majeure, **caractérisée en ce que** la structure comprend également des éléments télescopiques verticaux (3) ayant des extrémités débouchant dans lesdits orifices centraux (6), et sont disposés de manière à permettre un repliage latéral de la structure.

2. Structure selon la revendication 1, **caractérisée en ce que** lesdits éléments télescopiques (3) sont pourvus de moyens de fixation mutuelle (9, 10) pouvant s'engager réciproquement à l'intérieur desdits orifices centraux (6) des jointures d'articulation (2).

3. Structure selon la revendication 2, **caractérisée en ce que** lesdits éléments de fixation (9, 10) sont des moyens à vis.

4. Structure selon n'importe laquelle des revendications précédentes, **caractérisée en ce que** ledit orifice passant (6) est pourvu de moyens (11) aptes à la formation d'une butée d'arrêt pour l'extrémité de l'élément télescopique (6) dans l'orifice.

5. Structure selon la revendication 4, dans laquelle lesdits moyens (11) sont un rétrécissement de l'intérieur de l'orifice passant (6).

6. Structure selon la revendication 1, dans laquelle chaque élément télescopique (3) est formé de deux éléments tubulaires (3a, 3b) glissant l'un à l'intérieur de l'autre de manière à ce qu'un élément tubulaire interne (3a) soit complètement inséré dans un élément tubulaire externe (3b) lorsque la structure est complètement ouverte, alors que, pendant la fermeture de la structure, la distance entre chaque paire de jointures d'articulation (2) se trouvant sur la même ligne verticale augmente, et les éléments tubulaires (3a, 3b) respectivement fixés sur ladite paire de joints d'articulation (2) glissent l'un sur l'autre, en suivant le mouvement de fermeture et permettant le repliage latéral de la structure.

7. Structure selon la revendication 6, dans laquelle les éléments tubulaires externes (3b) sont accouplés aux jointures d'articulation (2) de manière à réaliser des structures modulaires consistant en des structures superposées.

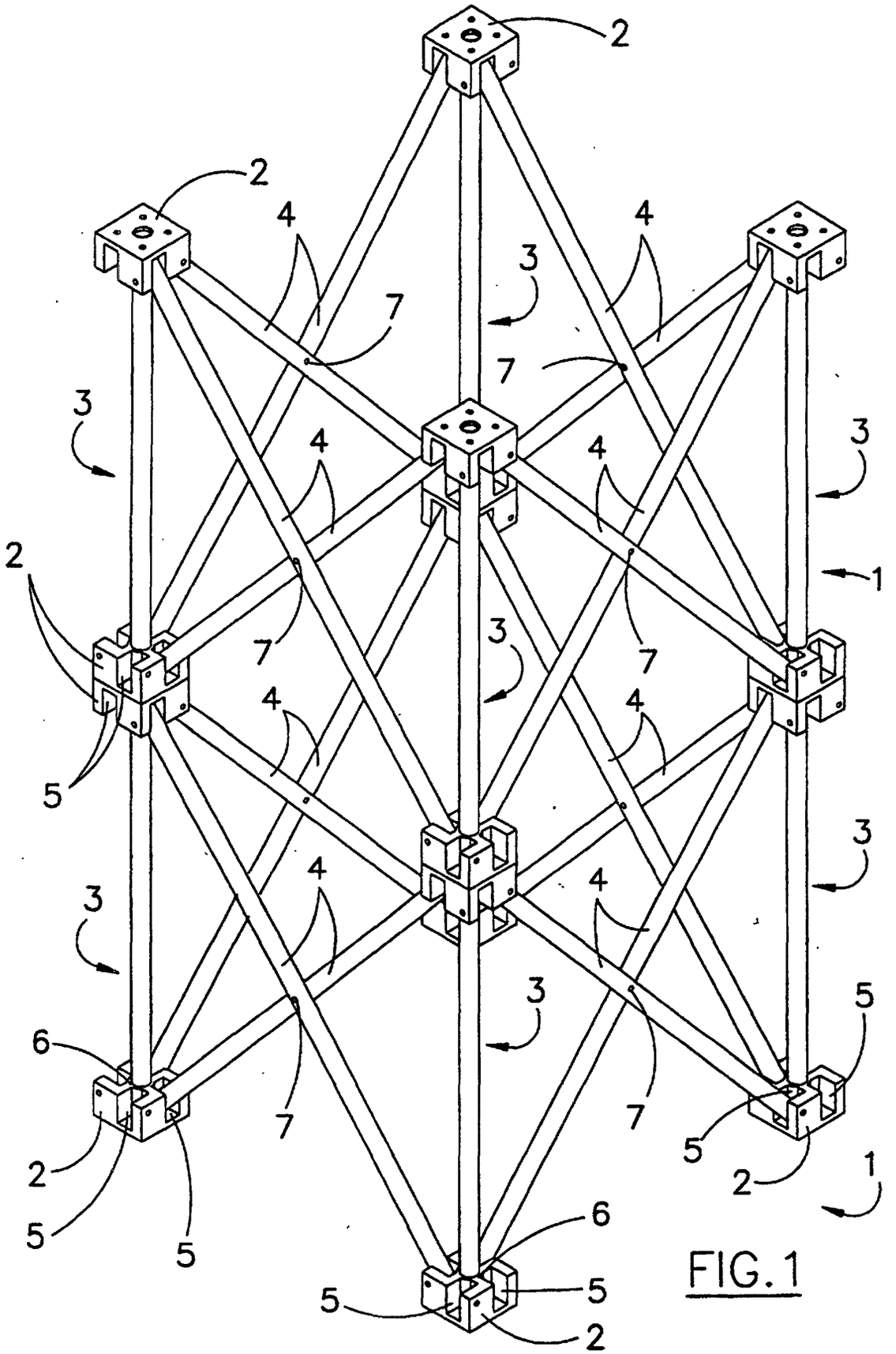


FIG.1

FIG.2

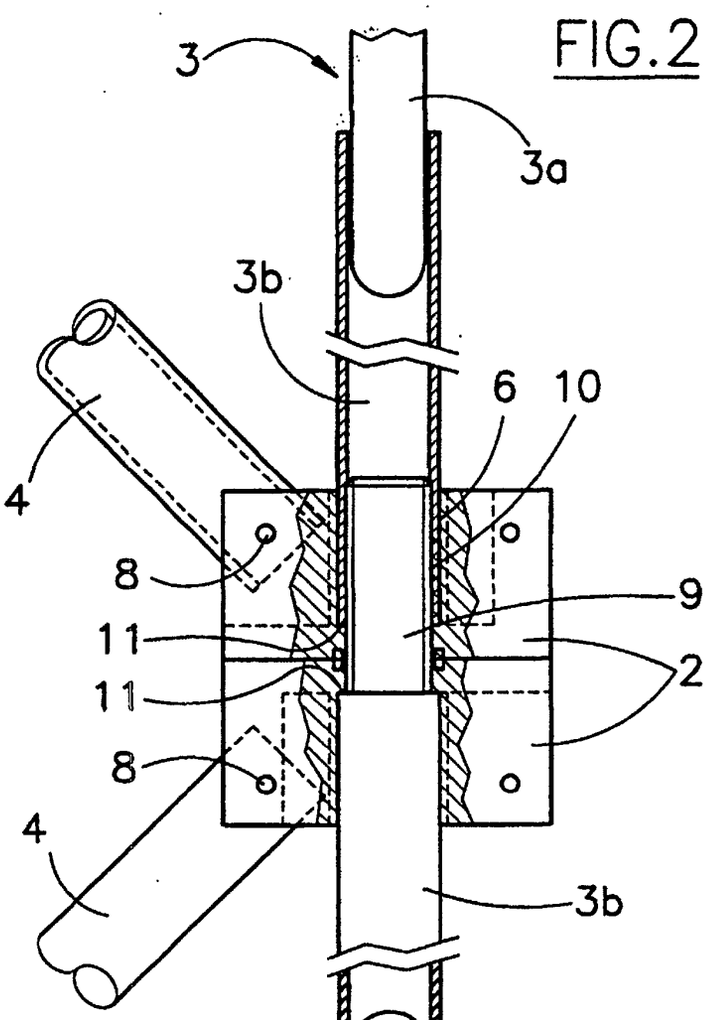
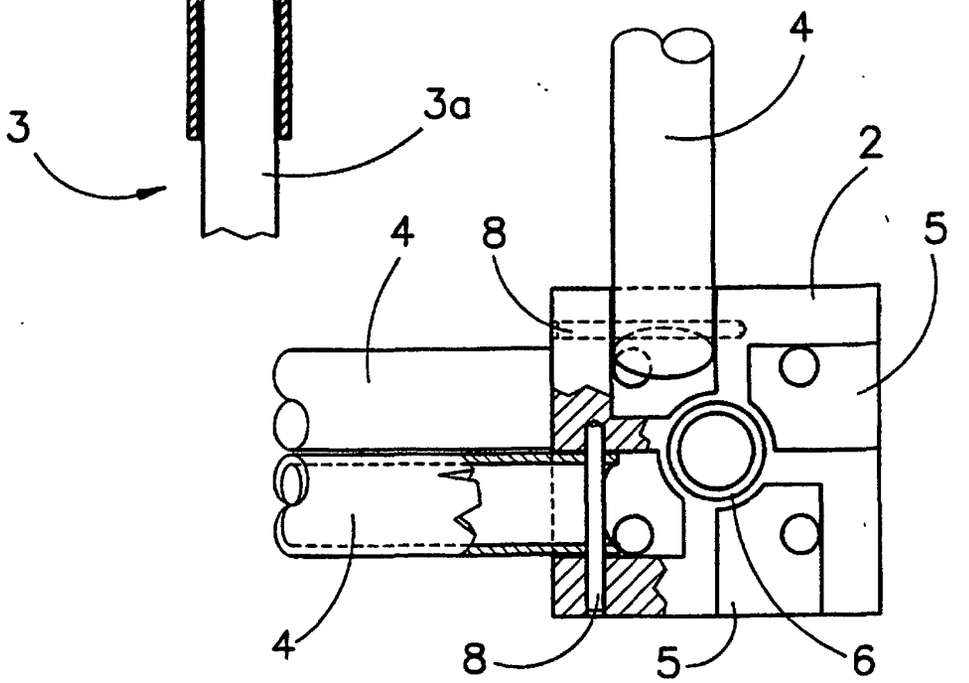


FIG.3



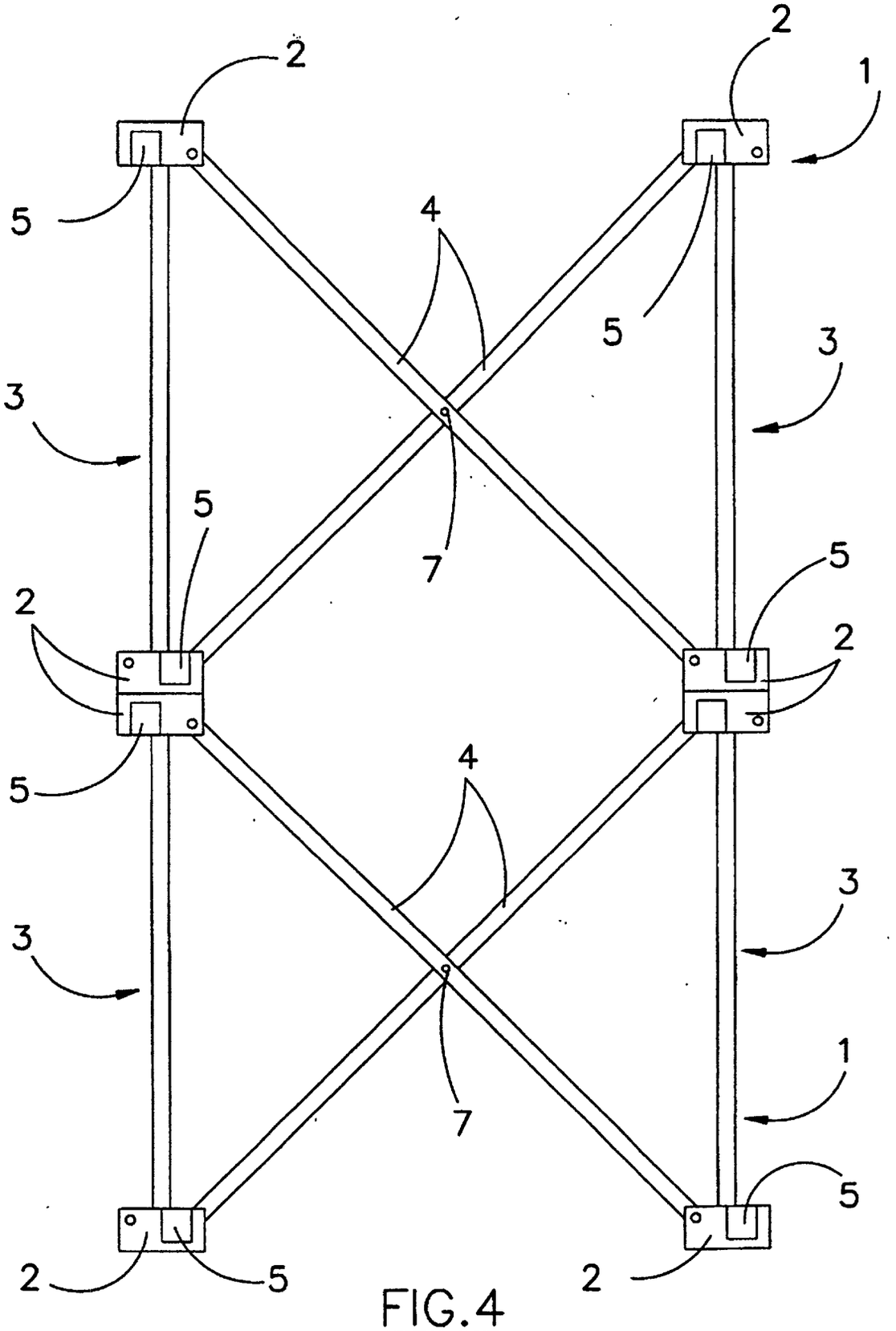


FIG.4

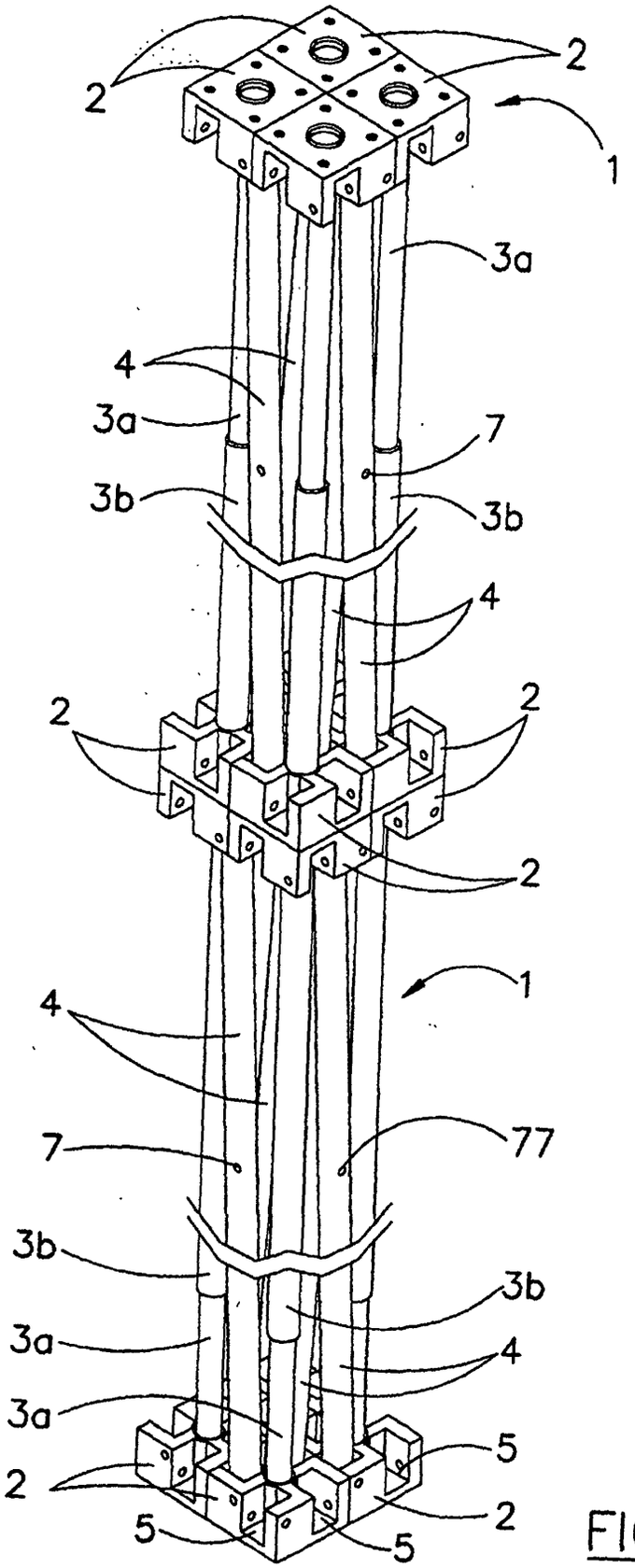


FIG.5