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(54) **COGGING STRUCTURE**

VERBINDUNGSSTRUKTUR

STRUCTURE D'ASSEMBLAGE

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Description

[0001] The invention relates to a cogging structure composed of the cogging elements, where cogging elements are arranged in two intersecting planes.

[0002] Cogging joints can be used in building walls for houses and cabins, and may also be employed in other building structures such as sandpits, sheltering walls and play apparatus. Cogging joints are made by placing each of the cogging elements, usually logs, in an intersecting plane, each of which forms a wall of the building structure. Traditional cogging joints are made by placing ends of the cogging elements in the two walls alternately on top of each other in a line of intersection between the planes, this line of intersection thus forming a corner for the walls. Notches cut near the ends of the cogging elements on one or both of the cogging elements' top and bottom have a total height corresponding to the height of the cogging elements, with the result that intersecting cogging elements abut closely against each other. Notches are normally used with a height of approximately $\frac{1}{4}$ of the height of the cogging elements both on the top and bottom of the cogging elements, with the result that the height of the cogging elements is displaced by a half cogging element height between the planes.

[0003] In the contact surfaces on the top and bottom the cogging elements may have tongue and groove joints in order to improve the closeness between cogging elements in the same wall.

[0004] US 4 056 906 describes a building constricted in log-cabin style with outer walls formed from superposed wooden boards which, on adjacent walls meeting at a corner joint, are relatively offset by half the height of a board. Each board terminates at the joint in a tongue of reduced height and thickness lying flat against a side of a reduced neck of an associated junction block, also of wood, whose enlarged head partly overlies the tongues of two boards of the orthogonally adjoining wall. The tongues and associated blocks may be positively interlinked by mating ribs and grooves, a dove-tail fit or other surface formations; they could also be held together by nails and/or glue.

[0005] Aligned pairs of boards of the same wall can be held together by similar blocks offset from them by half their height.

[0006] The notches in the ends of the cogging elements can be made by hand, which is time-consuming and demands a high degree of skill. The notches can also be machine-made, which is less time-consuming than doing it by hand, but is still more time-consuming and costly than producing the materials only as logs without notches. This is one of the reasons why making clogging joints is seldom used as a building technique.

[0007] Another problem associated with making cogging joints is that a close and rigid joint between the cogging elements in the corner requires a close fit between the notches in two intersecting clogging elements. This is a requirement which conflicts with the desire for a cer-

tain amount of clearance to enable the cogging elements to be assembled, and to compensate for inaccuracies in the cogging elements and the building structure.

[0008] FI 98 470 relates to a corner-connection of a timber house in which the walls are preassembled to elements in which timber of solid tree are secured to each other by means of vertical tie rods extending through the element. Sides of the ends of both elements which are to be connected to each other as well as the connecting surfaces of two support timbers are bevelled with the same slanting, and the elements and the support timber are crosswise connected. The connection is locked in at least two places by connecting means which force the bevelled surfaces of the elements and the support timber towards each other.

[0009] The object of the invention is to provide cogging elements which can be manufactured in a rational manner, and when assembled in a cogging structure provide close and rigid joints between the cogging elements in the corners. A further object is that the cogging structure should be easy to assemble and dismantle, thus enabling the cogging structure to be employed as a temporary structure.

[0010] The object is achieved according to the invention with a cogging structure of the type mentioned in the introduction which is characterized by the features set forth in the claims.

[0011] The invention therefore relates to a cogging structure according to appended claim 1. A cogging element has contact surfaces for abutment against adjacent cogging elements in a common plane or against a base, and lateral surfaces for the formation of the sides of the cogging structure. At least one end of the cogging element has bevelled end surfaces which form angles with the lateral surfaces and are adapted to fit corresponding bevelled end surfaces in ends of other cogging elements in an intersecting plane, and the end of the cogging element is adapted to be fastened to or provided with at least one fastening element for fastening to a corresponding end of another cogging element in extension of the cogging element in the same plane.

[0012] The angles between the two planes are often 90° , and the angles between the bevelled end surfaces and the lateral surfaces in this case are preferably 135° , since this means that the angles between the end surfaces and the lateral surfaces everywhere can be identical.

[0013] The cogging elements can be divided into two types: elongated elements which are used in walls and other elongated structures, and which can have bevelled end surfaces at both ends, and short corner elements which are normally placed in extension of the elongated element, on the opposite side of the line of intersection between the two planes of cogging elements.

[0014] The corner elements may be provided with through-going screw holes which are parallel to the contact surfaces and the lateral surfaces, and the fastening elements may be composed of screws which extend

through the screw holes in the corner elements and into the ends of the elongated elements. The ends of the cogging elements preferably have transverse surfaces intersecting the end surfaces, thus making room for the fastening elements.

[0015] A common cogging structure is an L-corner where two walls in an intersecting plane are terminated. The two walls will then consist of elongated cogging elements, with lengths which are adapted to the length of the wall, or the distance from the corner to an opening in the wall, for example for a window. Corner elements in extension of the elongated cogging elements, on the opposite side of the line of intersection between the walls, form outer elements in the corner.

[0016] Another type of cogging structure is a T-corner where a wall is terminated against a through-going wall, which is used in log houses where an inner wall is terminated against an outer wall. The through-going wall (the outer wall) consists of elongated cogging elements on both sides of the corner. The terminated wall (the inner wall) consists of elongated cogging elements, which are terminated by corner elements on the opposite side of the line of intersection between the two walls.

[0017] In the case of a through-going wall, the ends of the elongated cogging elements, which from each side face the line of intersection between the planes, may be connected to fastening elements composed of screws with threads at both ends. A joint of this kind may also be employed if one or both of the cogging elements are corner elements. In this case the cogging elements are screwed together before being assembled in the cogging structure, thus simplifying the assembly process.

[0018] The cogging elements may also be employed in a number of other structures, such as sheltering walls, sandpits, foundations for outdoor stages, barriers for persons or vehicles, supporting structures for stones or earth in footpaths or gardens and other provisional or permanent structures where the two planes only to a limited extent can be characterized as a wall.

[0019] The cogging elements may be made of logs, but a number of other materials may also be employed, for example plastic materials or concrete materials, such as light concrete, which compared to timber have the advantage of being rotproof.

[0020] The invention will now be explained in more detail in connection with a description of a specific embodiment, and with reference to the drawings, in which:

fig. 1 is a perspective view of an elongated cogging element according to the invention,

fig. 2 is a perspective view of a corner cogging element according to the invention,

fig. 3 is a perspective view of an assembled elongated cogging element and a corner cogging element, and

fig. 4 is a perspective view of a cogging structure according to the invention.

[0021] Fig. 1 is a perspective view of a cogging element for a cogging structure according to the invention, in the form of an elongated cogging element 11. The top and bottom form contact surfaces 12 for abutting against adjacent cogging elements in a common plane or against a base. The elongated cogging element 11 further has lateral surfaces 13 for the formation of the sides of the cogging structure. An end 14 of the elongated cogging element 11 has bevelled end surfaces 15 which form angles 16 with the lateral surfaces 13, and which are adapted to fit corresponding bevelled end surfaces in ends of other cogging elements in an intersecting plane, which will be discussed in more detail later. The opposite end of the elongated cogging element 11 is not shown. The opposite end may correspond to the end 14 or be designed in another appropriate manner, for example square cut at an opening in a wall, for example for a window.

[0022] Fig. 2 is a perspective view of another cogging element according to the invention, in the form of a corner cogging element 21. As in the case of the elongated cogging element 11, the top and bottom form contact surfaces 22 for abutting against adjacent cogging elements in a common plane or against a base. The corner element 21 further has lateral surfaces 23 for the formation of sides of the cogging structure. An end 24 of the corner element 21 has bevelled end surfaces 25 which form angles 26 with the lateral surfaces 23, and which are adapted to fit corresponding bevelled end surfaces in ends of other cogging elements in an intersecting plane. The opposite end 28 of the corner element 21 is square cut.

[0023] The cogging elements' ends 14 and 24 respectively are adapted to be fastened to or provided with at least one fastening element in the form of a screw for fastening to a corresponding end 24 and 14 respectively of another cogging element 21 and 11 respectively in extension of the cogging element 11 and 21 respectively in the same plane. For the corner element 21 this is achieved by the corner element 21 being provided with a through-going screw hole 29 which is parallel to the contact surfaces 22 and the lateral surfaces 23.

[0024] Fig. 3 illustrates the elongated cogging element 11 and the corner cogging element 21 assembled by a fastening element in the form of a screw 31 which extends through the screw hole 29 in the corner elements 21 into the end 14 of the elongated element 11. The elongated element 11 is adapted to be fastened by the screw 31, the elongated element being composed of a wooden beam, into which the screw 31 can be inserted. The cogging elements' ends 14, 24 have transverse surfaces 17, 27 which intersect the end surfaces 15, 25. This makes room for the screws and simplifies the assembly of the cogging elements. In order to facilitate the insertion of the screws 31, the transverse surfaces 17 may have a

hole adapted to the dimension of the threads on the screw 31. Alternatively, the screws 31 may be of the self-drilling type, which can be screwed into the transverse surfaces 17, 27 without preliminary drilling thereof.

[0025] Fig. 4 is a perspective view of a cogging structure according to the invention. The cogging structure is composed of 3 elongated cogging elements 11 with associated corner elements 21 which are arranged in extension of one another in the same plane, and 2 intersecting elongated cogging elements 11' with associated corner elements 21' which are arranged in extension of each other in an intersecting plane. The cogging elements are placed on top of each other on the contact surfaces 12, 12', 22, 22', and the lateral surfaces 13, 13', 23, 23' together form the sides of the cogging structure.

[0026] The cogging elements' ends 14, 24, 14', 24' face a line of intersection 32 between the planes. The ends 14, 24 of the cogging elements 11, 21 are connected by screws 31. with screw heads 33, while the ends 14', 24' of the cogging elements 11', 21' are connected by corresponding screws, whereof only the screw heads 33' are visible.

[0027] Bevelled end surfaces 15, 25 of the cogging elements 11, 21 abut against adjacent end surfaces 25' of the cogging elements 21' in the other plane. The cogging elements 11' similarly have non-illustrated end surfaces abutting against the end surfaces 15, 25.

[0028] The cogging structure in fig. 4 forms a 90° corner, and since for purposes of standardisation it is desirable for the ends of the cogging elements to be as uniform as possible, all the angles 16, 26, see figs. 1 and 2, between the end surfaces 15, 25 and the lateral surfaces 13, 23 have been chosen to be 135°. If there are other angles between the planes forming part of the cogging structure, the angles will be able to be adapted thereto.

[0029] In the cogging structure in fig. 4 the cogging elements in the same plane on one side of the line of intersection 32 are composed of elongated elements and on the other side of the line of intersection of corner elements, and the fastening elements are composed of screws 31 which extend through the corner elements 21, 21' into the ends 14, 14' of the elongated elements 11, 11'.

[0030] In another non-illustrated cogging structure, the cogging elements in the same plane on both sides of the line of intersection 32 may be composed of elongated elements. This may, for example, be a cogging structure where an inner wall is terminated against an outer wall in a house, and where the outer wall thus extends through the corner with elongated cogging elements on both sides of the corner. The fastening elements connecting the elongated cogging elements in extension of one another may be composed of screws with threads at both ends, which are screwed into the ends of two elongated cogging elements. This operation may be performed by holding one of the elongated cogging elements steady while the other elongated cogging element is rotated. In this case the screwing operation is preferably performed before the elongated cogging elements are assembled

in the hogging structure. Alternatively, the elongated cogging elements may be assembled with screws which have right-hand threads at one end and left-hand threads at the other end, and preferably a spanner holding portion in the middle. The screw can thereby be inserted in the ends of both the two elongated cogging elements simultaneously, and drawn together by a spanner to the desired tightness of the cogging joint. The inner wall may be connected to the outer wall by corner elements which are fastened by the type of screws illustrated in fig. 4.

[0031] The cogging elements according to the invention may be manufactured by machine in standardised dimensions, for example from logs, thereby achieving a national production. The cogging elements are joined in the same way regardless of the kind of cogging structure and the kind of corner which has to be built, and the cogging structure is therefore easy to assemble. Dismantling is performed in the reverse order to assembly, and consequently is also simple. The cogging structure according to the invention can therefore advantageously be employed as a provisional structure, for example for the erection of structures at trade fairs or open-air stages.

[0032] After the cogging elements have been assembled, the screws can be tightened by suitable tools so that adjacent end surfaces are pressed against one another. Close and rigid joints are thereby achieved between the cogging elements in the corners. On account of setting, the corners may loosen - somewhat after a time. In this case the corners can easily be made firm again by re-tightening the screws.

[0033] The fastening elements can be designed in several ways. Instead of only one screw between two cogging elements in extension of each other, several screws may be employed, if this is practical. It is also possible to use other types of screws, for example stud screws which have threads at one end for fastening to the ends of the elongated cogging elements, and at the other end have threads for a nut. These stud screws may be permanently screwed into the ends of the elongated cogging elements. In the case of cogging structures which will be used for provisional structures, and which will be assembled and dismantled several, times, for example for use in trade fairs, a practical possibility is to furnish the ends of the elongated cogging elements with recessed nuts with internal threads which match corresponding threads on the screws, thus preventing repeated assembly and dismantling of the corners from causing wear on the threads in the screw hole in the ends of the cogging elements.

[0034] The screw heads may also be provided with decorative heads, thus giving the cogging structure an aesthetically more attractive appearance. The ends of several corner cogging elements located in the same plane may be provided with a decorative board covering the screw heads. Another alternative is to widen the outermost portions of the screw holes in the corner elements, thus enabling the screw heads to be recessed, and pack the screw holes with aesthetically attractive plugs or stop-

pers.

Claims

1. A cogging structure comprising cogging elements, which cogging elements (11, 21) each have contact surfaces (12, 22) for abutment against adjacent cogging elements (11, 21) in a common plane or against a base, and lateral surfaces (13, 23) for the formation of the sides of the cogging structure, in which at least one end (14, 24) of each cogging element (11, 21) has bevelled end surfaces (15, 25) which form angles (16, 26) with the lateral surfaces (13, 23) and are adapted to corresponding bevelled end surfaces (25') in ends of other cogging elements (11', 21') in an intersecting plane, wherein each of the cogging elements' ends (14, 24) is adapted to be fastened to or provided with at least one fastening element (31) in the form of a screw for fastening to a corresponding end (24, 14) of another cogging element (21, 11) in extension of the cogging element (11, 21) in the same plane, said cogging elements being arranged in two intersecting planes, whereby ends (14, 24; 14', 24') of cogging elements (11, 21; 11', 21') in each of the planes face a line of intersection (32) between the planes, with bevelled end surfaces (15) abutting against adjacent bevelled end surfaces (25') on cogging elements in the other plane, **characterised in that** ends of cogging elements in extension of one another (11, 21; 11', 21') in the same plane are connected by said fastening elements (31).
2. A cogging structure according to claim 1, **characterised in that** cogging elements in the same plane on one side of the line of intersection (32) are composed of elongated elements (11) and on the other side of the line of intersection are composed of corner elements (21).
3. A cogging structure according to claim 2, **characterised in that** the fastening elements are composed of screws (31) which extend through the corner elements (21, 21') into the ends (14, 14') of the elongated elements (11, 11').
4. A cogging structure according to claim 1 or 2, **characterised in that** the fastening elements are composed of screws with threads at both ends.
5. A cogging structure according to claim 1 or 4, **characterised in that** cogging elements in the same plane on both sides of the line of intersection (32) are composed of elongated elements (11, 11').

Patentansprüche

1. Verbindungsstruktur, aufweisend Verbindungselemente, wobei jedes der Verbindungselemente (11, 21) Kontaktflächen (12, 22) zum Anstoßen an angrenzende Verbindungselemente (11, 21) in einer gemeinsamen Ebene oder an eine Basis aufweist, und Seitenflächen (13, 23) für das Ausbilden der Seiten der Verbindungsstruktur, bei der mindestens ein Ende (14, 24) eines jeden Verbindungselements (11, 21) abgeschrägte Endflächen (15, 25) aufweist, die Winkel (16, 26) mit den Seitenflächen (13, 23) ausbilden und in einer Schnittebene zu entsprechenden abgeschrägten Endflächen (25') der Enden anderer Verbindungselemente (11', 21') ausgelegt sind, wobei jedes der Verbindungselementenden (14, 24) ausgelegt ist, um befestigt zu sein an oder bereitgestellt zu sein mit mindestens einem Befestigungselement (31) in Form einer Schraube zur Befestigung an einem entsprechenden Ende (24, 14) eines anderen Verbindungselements (21, 11) in Verlängerung des Verbindungselements (11, 21) in der gleichen Ebene, wobei die Verbindungselemente in zwei sich überschneidenden Ebenen angeordnet sind, wodurch Enden (14, 24; 14', 24') von Verbindungselementen (11, 21; 11', 21') in jeder der Ebenen einer Schnitteinie (32) zwischen den Ebenen gegenüberstehen, mit abgeschrägten Endflächen (15), die an angrenzende abgeschrägte Endflächen (24') von Verbindungselementen in der anderen Ebene anstoßen, **dadurch gekennzeichnet, dass** Enden von Verbindungselementen in Verlängerung voneinander (11, 21; 11', 21') in derselben Ebene durch die Befestigungselemente (31) verbunden sind.
2. Verbindungsstruktur gemäß Anspruch 1, **dadurch gekennzeichnet, dass** Verbindungselemente in der gleichen Ebene auf einer Seite der Schnitteinie (32) aus länglichen Elementen (11) zusammengesetzt sind und auf der anderen Seite der Schnitteinie aus Ekelementen (21) zusammengesetzt sind.
3. Verbindungsstruktur gemäß Anspruch 2, **dadurch gekennzeichnet, dass** die Befestigungselemente aus Schrauben (31) aufgebaut sind, die sich durch die Ekelemente (21, 21') in die Enden (14, 14') der länglichen Elemente (11, 11') erstrecken.
4. Verbindungsstruktur gemäß Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die Befestigungselemente aus Schrauben mit Gewinden an beiden Enden aufgebaut sind.
5. Verbindungsstruktur gemäß Anspruch 1 oder 4, **dadurch gekennzeichnet, dass** Verbindungselemente in der gleichen Ebene auf beiden Seiten der

Schnittlinie (32) aus länglichen Elementen (11, 11') zusammengesetzt sind.

an niveau des deux extrémités.

Revendications

1. Structure d'assemblage comprenant des éléments d'assemblage, lesquels éléments d'assemblage (11, 21) présentent chacun des surfaces de contact (12, 22) destinées à venir en butée contre des éléments d'assemblage adjacents (11, 21) dans un plan commun ou contre une base, et des surfaces latérales (13, 23) pour la formation des côtés de la structure d'assemblage, dans laquelle au moins une extrémité (14, 24) de chaque élément d'assemblage (11, 21) présente des surfaces d'extrémité en biseau (15, 25) qui forment des angles (16, 26) avec les surfaces latérales (13, 23) et qui sont adaptées à des surfaces d'extrémité en biseau correspondantes (25') à des extrémités d'autres éléments d'assemblage (11', 21') dans un plan d'intersection ; dans laquelle chacune des extrémités des éléments d'assemblage (14, 24) est adaptée pour être fixée à, ou dotée d'au moins un élément de fixation (31) sous la forme d'une vis pour la fixation à une extrémité correspondante (24, 14) d'un autre élément d'assemblage (21, 11) dans le prolongement de l'élément d'assemblage (11, 21) dans le même plan, lesdits éléments d'assemblage étant disposés dans deux plans d'intersection ; grâce à quoi les extrémités (14, 24; 14', 24') des éléments d'assemblage (11, 21; 11', 21') dans chacun des plans font face à une ligne d'intersection (32) entre les plans, les surfaces d'extrémité en biseau (15) venant en butée contre des surfaces d'extrémité en biseau adjacentes (25') sur des éléments d'assemblage dans l'autre plan, **caractérisée en ce que** les extrémités des éléments d'assemblage dans le prolongement les uns des autres (11, 21; 11', 21') dans le même plan sont connectées par lesdits éléments de fixation (31).
2. Structure d'assemblage selon la revendication 1, **caractérisée en ce que** les éléments d'assemblage dans le même plan d'un côté de la ligne d'intersection (32), se composent d'éléments allongés (11) et de l'autre côté de la ligne d'intersection, se composent d'éléments de coin (21).
3. Structure d'assemblage selon la revendication 2, **caractérisée en ce que** les éléments de fixation se composent de vis (31) qui s'étendent à travers les éléments de coin (21, 21') dans les extrémités (14, 14') des éléments allongés (11, 11').
4. Structure d'assemblage selon la revendication 1 ou la revendication 2, **caractérisée en ce que** les éléments de fixation se composent de vis avec des filets

5. Structure d'assemblage selon la revendication 1 ou la revendication 4, **caractérisée en ce que** les éléments d'assemblage dans le même plan des deux côtés de la ligne d'intersection (32), se composent d'éléments allongés (11, 11').

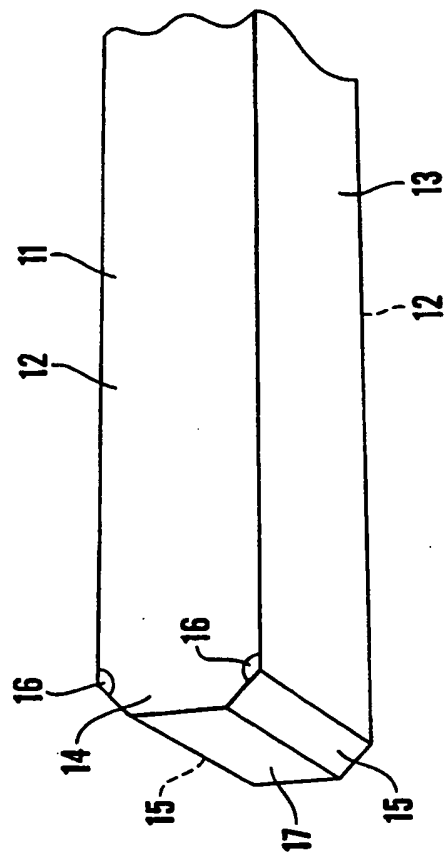


Fig. 1

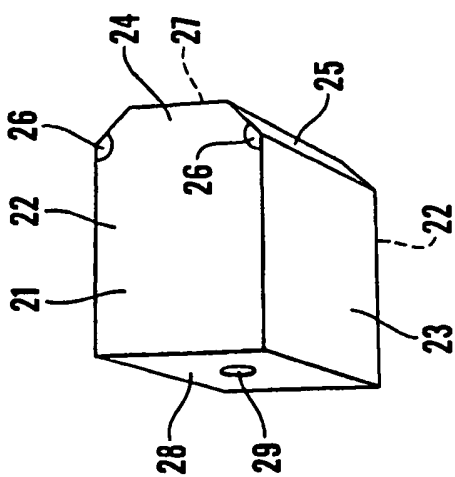


Fig. 2

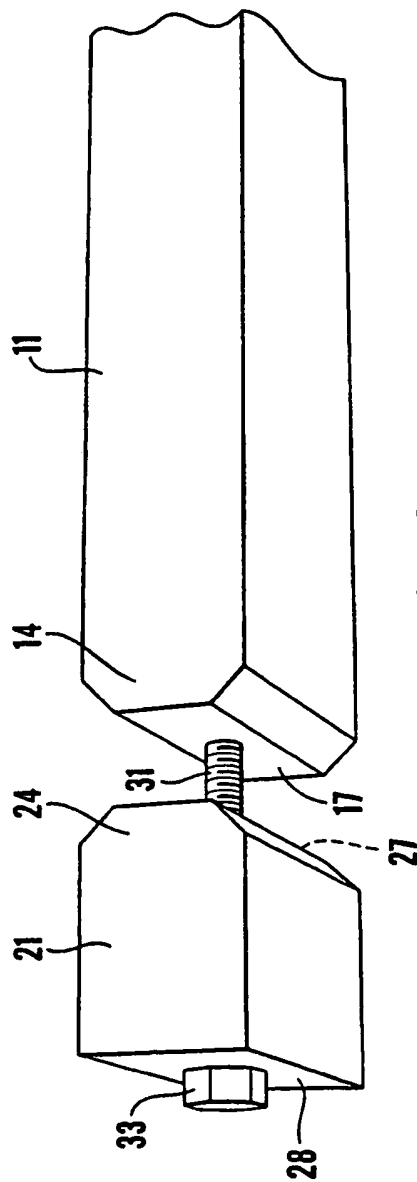


Fig. 3

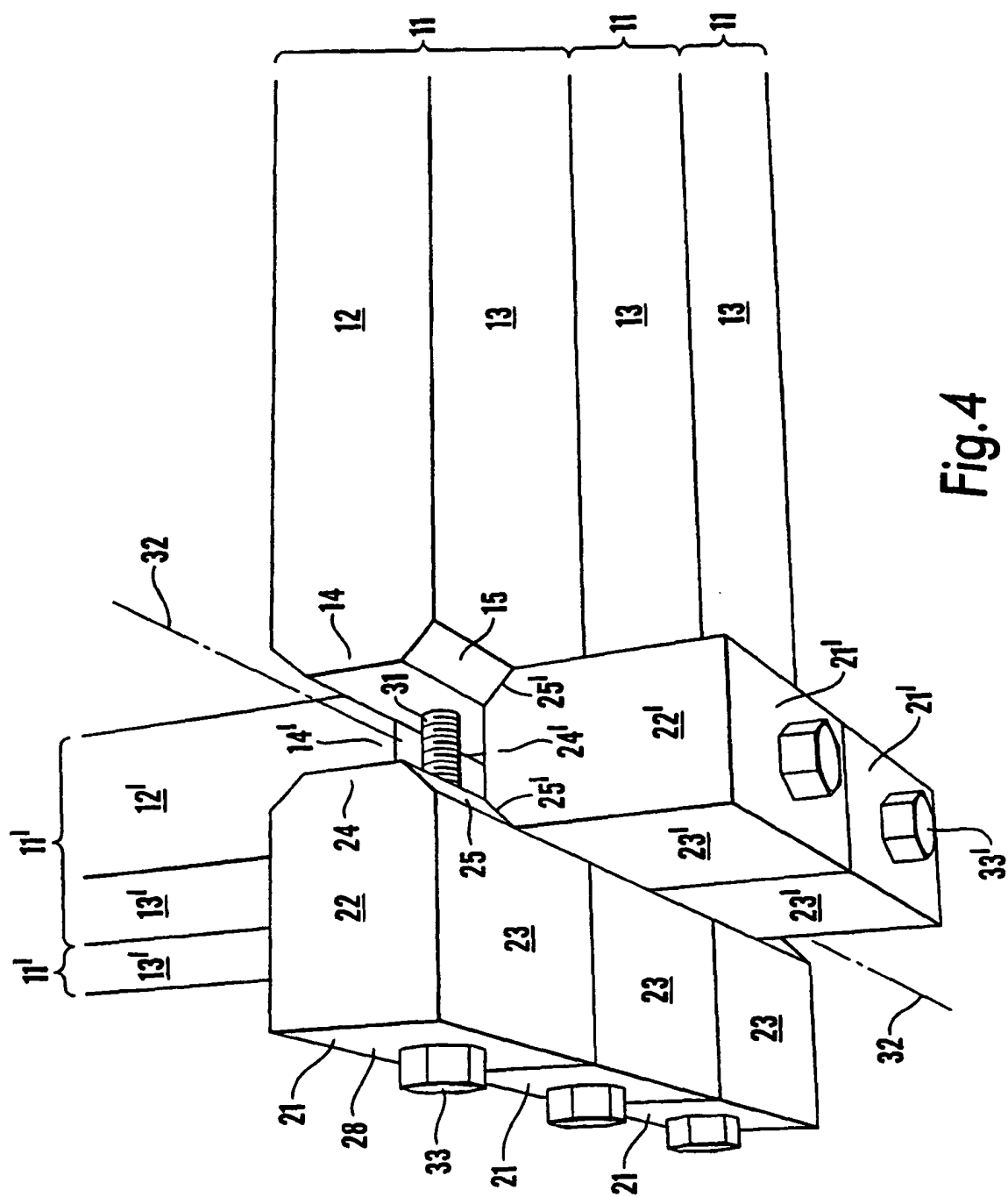


Fig. 4

REFERENCES CITED IN THE DESCRIPTION

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