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(54) **A method for manufacturing a building by using a frame element, a frame element and tightening and locking pieces for a frame element**

Verfahren zum Bau eines Gebäudes durch Nutzung eines Rahmenelementes, Rahmenelement sowie Spann- und Verriegelungsvorrichtung für ein Rahmenelement

Méthode de construction d'un bâtiment par l'emploi d'un cadre, cadre ainsi que pièce de serrage et de fixation pour un cadre

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Description

[0001] The invention relates to a method to manufacture a building using a multi-purpose frame element, and to a frame element, whereby the frame element is formed of two metal profile joists at a distance from each other and, two wooden beams installed between them to adjust the distance, and two pieces meant for the mutual tightening and locking of the frame elements.

[0002] Previously known as frame element are elements according to the above preamble, the assembly of which is secured with binding and tightening bars among themselves, which for instance by means of the threaded portions in the bar heads can, on using nuts, be rotated among themselves so that the wooden beams remain between the said profiles. These elements have been used as frame of concrete forms, whereby they have been repeatedly dismantled and assembled. This kind of frequent dismantling and assembling of such a frame element is complicated and also slow. Accordingly the use of elements comes into question especially when they need not to be dismantled and reassembled. The elements are thus installed and dismantled as a whole. This causes a disadvantage, since the elements must be transported and stored as quite great pieces, whereby they take much space. The construction includes separate bars, the length of which must be changed if the length of the element varies. Changes of length must be done keeping bars of different length in store. The bars including nuts are easily loosed and the bars can easily get twisted within the construction industry. Known frame elements are best suited to support sheet forms used in concrete form, when the formed supporting wall is vertical.

[0003] EP0202927 describes a multi-purpose frame element according to the preamble of claim 5 and a method of manufacturing a house using said frame according to claim 1.

[0004] In order to eliminate the above presented disadvantages a new frame element according to claim 5 is developed and by means of it a manufacturing method according to claim 1 of a building to be made, thanks to which a remarkable improvement of frame element dismantling, assembling and diversification of use is achieved. Characteristic of the manufacturing method of a building using a versatile frame element according to the invention is that the formed frame element is at first used as support frame for the needs of the building industry, as support frame of the casting mould of a foundation and then it is removed and erected to form a portion of the building most properly of the wall frame of the same building.

[0005] Characteristic of the manufacturing method of a building, by using a versatile frame element according to the invention, is that the length of the frame element is adjusted by means of a chosen length of the wooden beams and said wooden beams are attached to the metal profiles by means of a tightening and locking and locking

organ, which is fitted to twine both around the wooden beam and in its longitudinal direction and to twine around a binding part included in the metal profile beam and that the formed frame is used as support frame for the needs of the building industry, as support frame of the casting mould of a foundation as frame element of a wall or, for instance, a bearing element.

[0006] Characteristic of the frame element of the invention is that each wooden beam is tightened by means of a stretching member between said metal joists, which is fitted to twine both around the wooden beam and in its longitudinal direction and around the attaching part included in the metal profile beam.

[0007] Characteristic of the tightening and locking pieces, which are not part of the invention, is that the locking pieces are formed of two pieces of different length placed mutually within each other, both of them having a crooked form fitted behind the edge of the metal profile lath so that the crooked form of the one piece is placed behind the edge of the first element lath of elements one after another and that the crooked form of the other piece is placed behind the edge of the second element lath, the smaller piece inside the piece movable inside the other piece in order to compensate the variation of distance between the laths, and that for locking of the pieces it is possible to strike a wedge-like part between them.

[0008] The advantage of the invention is that the frame elements can be stored up and transported in a small space. Wooden joists need no storing at all, as they can be cut to size from timber available on building site. When for binding the element a packing band is used, it will in no way restrict the length of the element. The packing band is easily mechanically tightened and locked. Likewise, the removal of it is quickly done cutting the band with clippers. The metal profile joists that come to the element ends are most suitably two joists side by side bound together, between of which a gap remains. The elements can be used in any position ever and can be easily bound as extension of each other. As to its length an element made 2,4 m, long is for instance, after having functioned as casting mould, also suitable installed vertically as the frame of a building.

[0009] In the following the invention is disclosed with the reference to the enclosed drawing, where

Figure 1 presents the end of the frame element diagonally seen.

Figure 2 presents the joint of two frame elements diagonally seen from above.

Figure 3 presents a complete frame element.

Figure 4 presents a frame element erected.

Figure 5 presents the binding of consecutive elements seen from above.

Figure 6 presents loose locking pieces, which are not part of the invention.

Figure 7 presents the locking pieces, which are not part of the invention, seen from the side.

[0010] Figure 1 shows a frame element according to the invention, the one end of which is shown partly. The frame element has in both ends a metal profile joist 1 and wooden beams 2 placed between them. The metal profile joists are formed of two L-profiles side by side, which are bound together by means of a welded binding piece 4. Then between L-profiles a space remains for stretching band 3, by means of which wooden beams are tightened between the profiles. The shape of attaching piece 4 is most suitably round, whereby no sharp fold will be formed in band 3. The stretching of band centres the wooden beam in regard to attaching piece 4. The breadth of wooden beam 2 is chosen so that it fits just between profile joists 1. Profile joists 1 are furnished with necessary holes for other bindings that may possibly happen.

[0011] Figure 2 shows the joint of two horizontal frame elements, where for the locking of joint a mechanically tightened jaw device 8 is used. Between the elements an intermediate wooden piece 7 is placed so that attaching pieces 4 would not be bearing. The frame elements in figure 2 are formed to support a concrete mould. Insulating plate 6 works as concrete mould, which is supported by means of planks 5 connected to the frame element, for instance by means of hooks shot in the element. Insulation plate 6 must not necessarily be tied and no holes made in, it stays in place due to concrete mass cast against it. Moulds are elements removed, when the cast has hardened. Insulation plates that have worked as casting surface are to suitable part left in place. Removable insulating plates are for instance used as frost insulation of the building, whereby, inspected as a whole, from the casting moulds no waste at all is left over.

[0012] Figure 3 shows a frame element with measures most suitably 1200 x 2400 (mm). As casting mould of a foundation it is usually mounted horizontally according to figure 3. If the mould must be higher, a corresponding one is placed on it. Figure 4 shows a frame element erected on the foundation, whereby it can immediately, after having been freed from the foundation casting, be moved to work as a wall frame. Metal profile joists 1 work as bottom and top joists. The roof truss construction of the building to be formed is easily attached to the metal top beam. The metal bottom beam is for instance attached to weatherproofed timber placed on the foundation surface.

[0013] Attaching with band according to the invention facilitates remarkably the dismantling and assembly of the frame elements. Already due to attaching with band the frame stays reliably in its rectangular form. The assembly of the of the element can of course be secured, for instance with a stretching resisting band, which is attached diagonally or in diagonal direction on the other side or on both sides of the element. On the whole, the frame element can be re-circulated on the building site, if it is not dismantled in between. If it is dismantled in between, as waste go only the stretching bands. Of course, in some stage as waste go also the wooden beams, but they endure many dismantles and assem-

blies quite well.

[0014] Figure 5 shows a tightened locking of two successive elements, where by means of two locking pieces 15 and 16, and by means of wedge 11 hit between them, the successive elements are bound and locked so that they become bound among themselves from metal profile joists 1. In both locking pieces 15 and 16 there is a portion placed behind the edge of metal profile joist 1, which is best illustrated in figure 6. The distance of metal profile joists 1 can change, and in spite of that, locking pieces 15, 16 can be fixed in place. Further, figure 5 shows stretching member 9, which connects the elements on both sides of the mould, and which in the casting space is protected with a tube 10. The casting space is a space between insulating plates 6. Stretching member 9 is locked against locking pieces 15 and 16 leaning on them, using for instance flange 12, through which the end of the stretching member the is running is taken through bushing 13. The bushing has a side screw 14, with which the bushing is fixed to stretching member 9. On using stretching member 9 in connection with the locking pieces the, locking becomes completely ensured. Locking is made also without stretching member 9. Then vertical bar 17 in piece 15 ensures the pieces 15 and 16 remaining mutually within each other. The way of locking is cannot in any way turn the metal profile joists 1 but only press them against each other.

[0015] Figures 6 and 7 show locking pieces 15 and 16, which are not part of the invention. Piece 15 has a bar 17 welded on it, which prevents piece 15 from turning out from piece 16 inside, when wedge 11 is hit in place and when tightening and locking are in function. The locking arrangement is suited for locking of elements one after another, when there are in the element edges metal profile laths 1 in the way shown in figures 1, 2 and 5.

Claims

1. A method to manufacture a house using a multi-purpose frame element, whereby the frame element is formed of two metal profile joists (1) at a distance from each other, and of wooden beams (2) installed between them to regulate their distance, by means of the length of which the length of frame elements is adjusted and said wooden beams (2) are bound to said metal profile joists by means of a tightening and locking stretching member (3), **characterized in that** said means of tightening and locking stretching member (3) is fitted to twine both around wooden beam (2) in its longitudinal direction and around an attaching part (4) included in said metal profile joist (1) and the formed frame element is first used as support frame for the needs of the building industry, as support frame of a casting mould of a foundation and then it is removed and erected in order to form a portion of wall frame of the building.

2. A method according to claim 1, **characterized in that** as casting mould frame the element is placed so that the metal profile joists (1) will be vertical and as frame element of a wall said joists will be horizontal in the bottom and top edges of the element. 5
3. A method according to claim 1, **characterized in that** using frame element, the casting mould frame, the plate structure working as surface, as plywood board or board of insulating material, is supported by the frame element. 10
4. A method according to claim 1 or 3, **characterized in that** frame elements, placed side by side, are bound together with quick-pressing means (8, 11, 15, 16) pressing metal profile joists (1) against each other. 15
5. A multi-purpose frame element for the needs of the building industry, which element is formed of two metal profile joists (1) at a distance from each other and of wooden beams (2) installed between them to regulate their distance, whereby each wooden beam (2) is tightened between said metal joists by means of a lockable stretching member (3), **characterized in that** said stretching member (3) is fitted to twine both around the wooden beam in its longitudinal direction and around an attaching part (4) included in the metal profile joist. 20
6. A multi-purpose frame element according to claim 5, **characterized in that** the metal profile joist is formed of two profiles, most suitably L-profiles (1) connected to each other side by side by means of the attaching parts (4). 25
7. A multi-purpose frame element according to claim 5, **characterized in that** the stretching member is a tightening and locking band (3), as a packing band. 30
8. A multi-purpose frame element according to claim 5, **characterized in that** the attaching part (4) is a profile bar joining metal joists (1). 35

Patentansprüche

1. Ein Verfahren zum Bau eines Hauses unter Verwendung eines Vielzweck-Rahmenelements, wobei das Rahmenelement aus zwei metallischen Profilträgern (1), die in einer Distanz zueinander sind, und aus Holzbalken (2) gebildet ist, die zwischen ihnen angeordnet sind, um ihre Distanz zu regulieren, durch die Länge auf welche die Länge der Rahmenelemente eingestellt ist, und wobei die Holzbalken (2) mit den besagten metallischen Profilträgern mittels eines straffenden, verschließbaren, sich ausdehnenden Glieds (3) verbunden sind, **dadurch gekennzeichnet, dass** besagte Mittel des straffenden, verschließbaren, sich ausdehnenden Glieds (3) so befestigt ist, dass es sich um den Holzbalken (2) in seine Längsrichtung und um einen in den besagten metallischen Profilträgern (1) umfassten Befestigungsabschnitt (4) verdreht, und dass das gebildete Rahmenelement zunächst als Trägerrahmen für den Bedarf der Bauindustrie genutzt wird, als ein Trägerrahmen für eine Gießform eines Fundaments, das anschließend entfernt und aufgestellt wird, um einen Teil eines Wandrahmens des Gebäudes zu bilden. 50
2. Ein Verfahren gemäß Anspruch 1, **dadurch gekennzeichnet, dass** als Gussformenrahmen das Element so positioniert wird, dass die metallischen Profilträger (1) vertikal stehen und dass die besagten Träger als Rahmenelement einer Wand, horizontal in Bezug auf die Ober- und die Unterkante des Elements sind. 55
3. Ein Verfahren gemäß Anspruch 1, **dadurch gekennzeichnet, dass** wenn das Rahmenelement verwendet wird, das Gussformenwerkzeug, die Plattenstruktur als Oberfläche, wie Sperrholzplatten oder Isolierplatten, vom Rahmenelement getragen werden.
4. Ein Verfahren gemäß Anspruch 1 oder 3, **dadurch gekennzeichnet, dass** die Rahmenelemente, die Seite an Seite positioniert sind, mit Hilfe von Schnellverschlussmitteln (8, 11, 15, 16) miteinander verbunden werden, die die metallischen Profilträger (1) gegeneinander drücken.
5. Ein Mehrzweck-Rahmenelement für den Bedarf der Bauindustrie, dessen Element aus zwei metallischen Profilträgern (1), die in einer Distanz zueinander sind, und aus Holzbalken (2) gebildet ist, die zwischen ihnen angeordnet sind, um ihre Distanz zu regulieren, und wobei jeder Holzbalken (2) mit den besagten metallischen Profilträgern mittels eines verschließbaren, sich ausdehnenden Glieds (3) verbunden sind, **dadurch gekennzeichnet, dass** das besagte sich ausdehnende Glied (3) so befestigt ist, dass es sich um den Holzbalken in seine Längsrichtung und um einen in den besagten metallischen Profilträgern umfassten Befestigungsabschnitt (4) verdreht.
6. Ein Mehrzweck-Rahmenelement gemäß Anspruch 5, **dadurch gekennzeichnet, dass** der metallische Profilträger aus zwei Profilen gebildet ist, die am bevorzugtesten L-Profile (1) sind, die Seite an Seite miteinander mittels der Befestigungsteile (4) verbunden werden.
7. Ein Mehrzweck-Rahmenelement gemäß Anspruch

den sind, **dadurch gekennzeichnet, dass** besagte Mittel des straffenden, verschließbaren, sich ausdehnenden Glieds (3) so befestigt ist, dass es sich um den Holzbalken (2) in seine Längsrichtung und um einen in den besagten metallischen Profilträgern (1) umfassten Befestigungsabschnitt (4) verdreht, und dass das gebildete Rahmenelement zunächst als Trägerrahmen für den Bedarf der Bauindustrie genutzt wird, als ein Trägerrahmen für eine Gießform eines Fundaments, das anschließend entfernt und aufgestellt wird, um einen Teil eines Wandrahmens des Gebäudes zu bilden.

2. Ein Verfahren gemäß Anspruch 1, **dadurch gekennzeichnet, dass** als Gussformenrahmen das Element so positioniert wird, dass die metallischen Profilträger (1) vertikal stehen und dass die besagten Träger als Rahmenelement einer Wand, horizontal in Bezug auf die Ober- und die Unterkante des Elements sind.

3. Ein Verfahren gemäß Anspruch 1, **dadurch gekennzeichnet, dass** wenn das Rahmenelement verwendet wird, das Gussformenwerkzeug, die Plattenstruktur als Oberfläche, wie Sperrholzplatten oder Isolierplatten, vom Rahmenelement getragen werden.

4. Ein Verfahren gemäß Anspruch 1 oder 3, **dadurch gekennzeichnet, dass** die Rahmenelemente, die Seite an Seite positioniert sind, mit Hilfe von Schnellverschlussmitteln (8, 11, 15, 16) miteinander verbunden werden, die die metallischen Profilträger (1) gegeneinander drücken.

5. Ein Mehrzweck-Rahmenelement für den Bedarf der Bauindustrie, dessen Element aus zwei metallischen Profilträgern (1), die in einer Distanz zueinander sind, und aus Holzbalken (2) gebildet ist, die zwischen ihnen angeordnet sind, um ihre Distanz zu regulieren, und wobei jeder Holzbalken (2) mit den besagten metallischen Profilträgern mittels eines verschließbaren, sich ausdehnenden Glieds (3) verbunden sind,

dadurch gekennzeichnet, dass das besagte sich ausdehnende Glied (3) so befestigt ist, dass es sich um den Holzbalken in seine Längsrichtung und um einen in den besagten metallischen Profilträgern umfassten Befestigungsabschnitt (4) verdreht.

6. Ein Mehrzweck-Rahmenelement gemäß Anspruch 5, **dadurch gekennzeichnet, dass** der metallische Profilträger aus zwei Profilen gebildet ist, die am bevorzugtesten L-Profile (1) sind, die Seite an Seite miteinander mittels der Befestigungsteile (4) verbunden werden.

7. Ein Mehrzweck-Rahmenelement gemäß Anspruch

5, **dadurch gekennzeichnet, dass** das sich ausdehnende Glied ein Zug- und Verschlussband (3), wie Verpackungsband, ist.

8. Ein Mehrzweck-Rahmenelement gemäß Anspruch 5, **dadurch gekennzeichnet, dass** das Befestigungsteil (4) eine mit den metallischen Profilträgern (1) verbindende Profilstange ist.

Revendications

1. Procédé de fabrication d'une maison en utilisant un élément de châssis à fins multiples, dans lequel l'élément de châssis est formé de deux poutrelles métalliques profilées (1) à une certaine distance l'une de l'autre et de poutres de bois (2) installées entre eux pour réguler leur distance dont la longueur permet d'ajuster la longueur des éléments de châssis et lesdites poutres de bois (2) sont liées auxdites poutrelles métalliques profilées par des moyens formés d'un élément extenseur de serrage et de verrouillage (3), **caractérisé en ce que** lesdits moyens formés de l'élément extenseur de serrage et de verrouillage (3) sont ajustés à la fois autour d'une poutre de bois (2) dans sa direction longitudinale et autour d'une pièce de fixation (4) comprise dans ladite poutrelle métallique profilée (1) et le premier élément de châssis formé est tout d'abord utilisé comme châssis de support pour les besoins de l'industrie du bâtiment, comme châssis de support d'un moule de coulée d'une fondation et est ensuite retiré et dressé pour former une partie d'un châssis de mur du bâtiment.

2. Procédé selon la revendication 1, **caractérisé en ce que**, en tant que châssis du moule de coulée, l'élément est placé de sorte que les poutrelles métalliques profilées (1) soient verticales et, comme élément de châssis de ladite paroi, lesdites poutrelles seront horizontales sur les bords inférieur et supérieur de l'élément.

3. Procédé selon la revendication 1, **caractérisé en ce que**, en utilisant un élément de châssis, le châssis de moule de coulée et la structure de plaque opérant comme surface, comme plaque de contre-plaqué ou plaque de matériau isolant sont supportés par l'élément de châssis.

4. Procédé selon la revendication 1 ou la revendication 3, **caractérisé en ce que** des éléments de châssis, placés côte à côte, sont liés l'un à l'autre par des moyens de compression rapide (8, 11, 15, 16) pressant les poutrelles métalliques profilées (1) l'une contre l'autre.

5. Élément de châssis à fins multiples pour les besoins de l'industrie du bâtiment, lequel élément est formé

de deux poutrelles métalliques profilées (1) à une certaine distance l'une de l'autre et de poutres en bois (2) installées entre elles pour réguler leur distance, de sorte que chaque poutre de bois (2) soit serrée entre lesdites poutrelles métalliques au moyen d'un élément extenseur verrouillable (3), **caractérisé en ce que** ledit élément extenseur (3) est ajusté pour se bloquer à la fois autour de la poutre de bois dans sa direction longitudinale et autour d'une pièce de fixation (4) comprise dans la poutrelle métallique profilée.

6. Élément de châssis à fins multiples selon la revendication 5, **caractérisé en ce que** la poutrelle métallique profilée est formée de deux profilés, très commodément de profilés en L (1) raccordés l'un à l'autre côte à côte au moyen des pièces de fixation (4).

7. Élément de châssis à fins multiples selon la revendication 5, **caractérisé en ce que** l'élément extenseur est une bande de serrage et de verrouillage (3) sous la forme d'une bande de serrage.

8. Élément de châssis à fins multiples selon la revendication 5, **caractérisé en ce que** la pièce de fixation (4) est une barre profilée joignant les poutrelles métalliques (1).

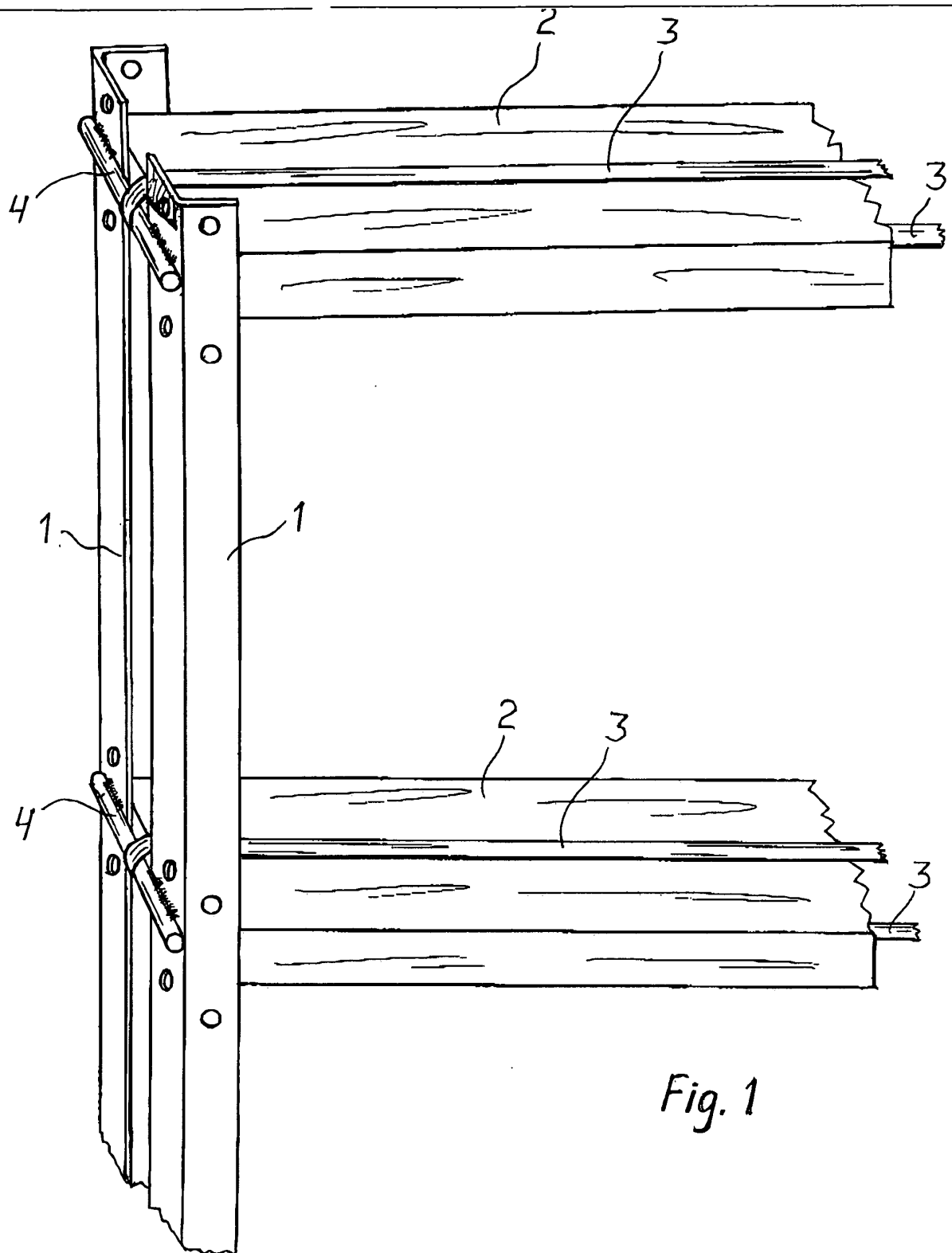


Fig. 1

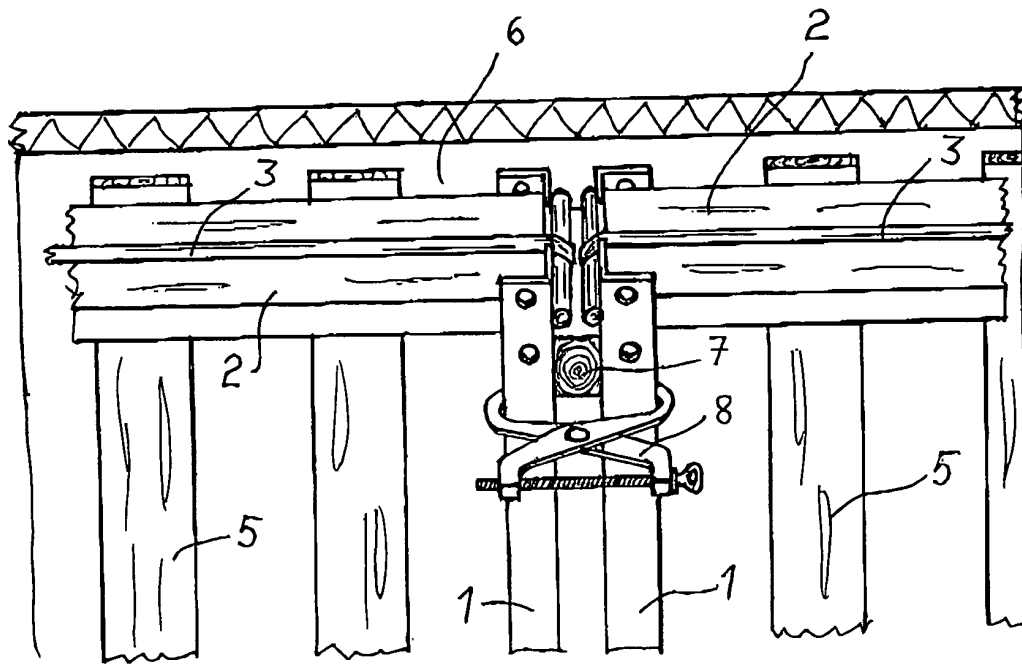


Fig. 2

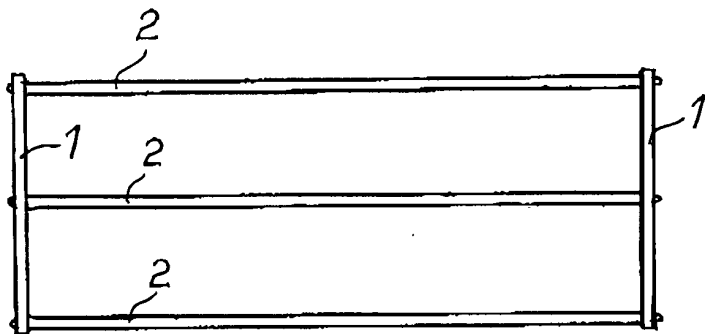


Fig. 3

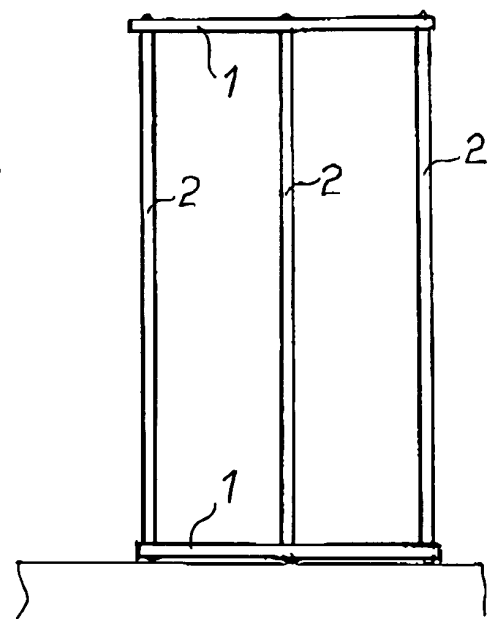
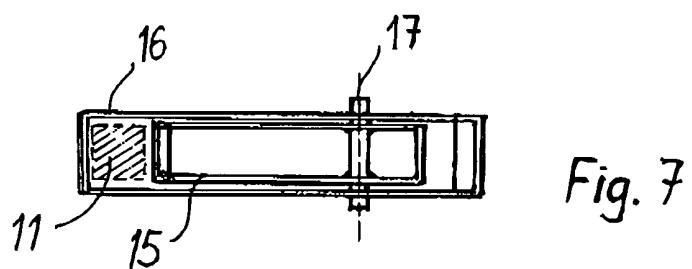
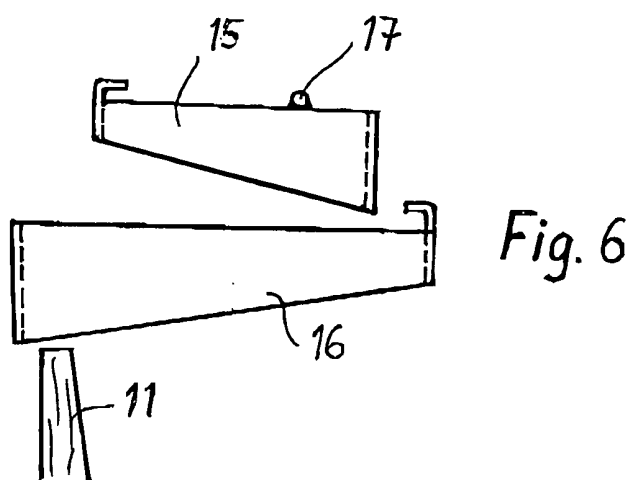
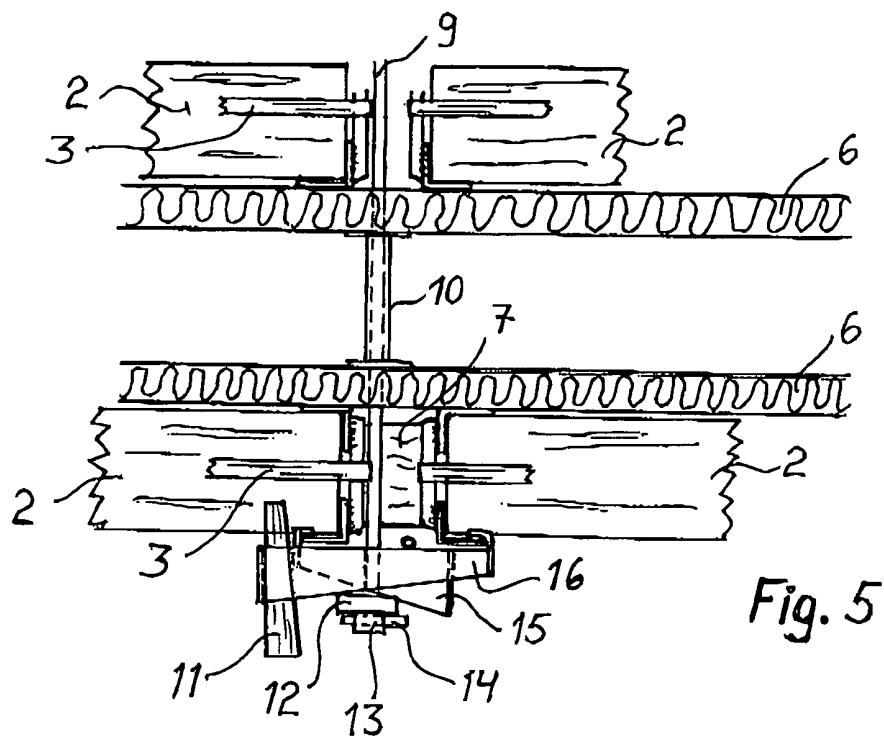


Fig. 4



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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