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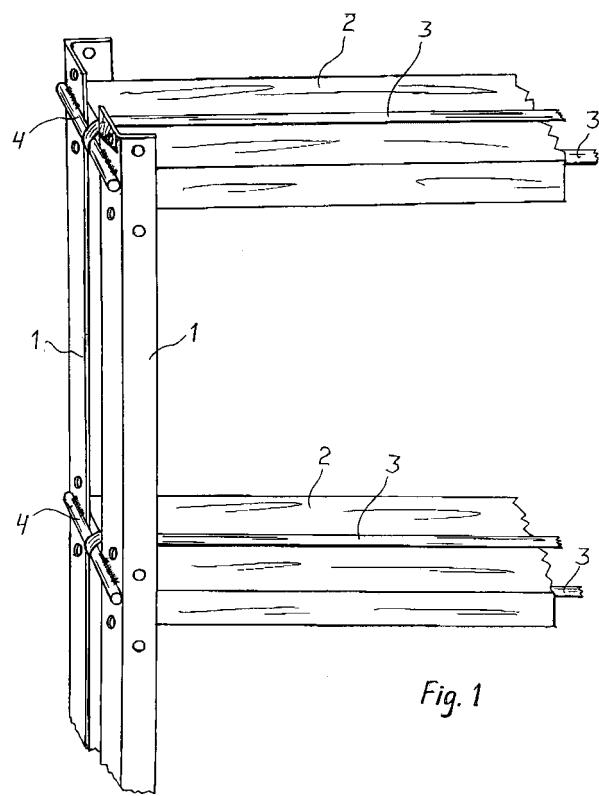
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### (54) A method for manufacturing a building by using a frame element, a frame element and tightening and locking pieces for a frame element

(57) A method to manufacture a house using a multi-purpose frame element, whereby the frame element is formed of two metal profile joists, at a distance from each other, and of wooden beams (2) placed between them to adjust their distance from installed wooden beams (2). The length of the frame element is adjusted by means of the length chosen for wooden beams (2) and said

wooden beams (2) are bound to the metal profiles by means of a tightening and locking stretching member (3), which is fitted to be fitted to twine both around wooden beam (2) in its longitudinal direction and around attaching part (4) included in the metal profile joist (1) and the formed frame element is used as support frame for the needs of the building industry.



## 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, to wooden beams installed between them to adjust the distance, and to 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 loosened 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]** In order to eliminate above presented disadvantages a new frame element is developed and by means of it a manufacturing method 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.

**[0004]** 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.

**[0005]** 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.

**[0006]** Characteristic of the of the tightening and locking pieces according to 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.

**[0007]** 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.

**[0008]** In the following the invention is disclosed with the reference to the enclosed drawing, where

- 40 Figure 1 presents the end of the frame element diagonally seen.
- Figure 2 presents the joint of two frame elements diagonally seen from above.
- 45 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.
- 50 Figure 7 presents the locking pieces seen from the side.

**[0009]** 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.

**[0010]** 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 the 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.

**[0011]** 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.

**[0012]** 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 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 assemblies quite well.

**[0013]** Figure 5 shows a the 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.

**[0014]** Figures 6 and 7 show locking pieces 15 ad 16. 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.

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## 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 beams (1);(2) are bound in each other, for instance by means of stretching members, **characterized in that** the formed frame element is at 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 the building, most suitably of the same 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 the said joists will be horizontal in the bottom and top edges of the element.
3. A method to manufacture a house using a multi-purpose frame element, whereby, the frame element is formed of two metal profile joists at a distance from each other and of wooden beams (2) installed be-

tween them, whereby the length of the frame is ad-  
justed by means of the length chosen for wooden  
beams (2), **characterized in that** said wooden (2)  
beams are bound to said metal profile joists by  
means of a tightening and locking stretching member  
(3), which is fitted to twine both around wooden beam  
(2) in its longitudinal direction and around attaching  
part (4) included in metal profile joist 1 and the frame  
element is used as support frame for the needs of  
the building industry, as support frame of a founda-  
tion, as frame of the casting mould of a wall, frame  
element of a wall, for instance as bearing element.

4. A method according to claim 1 or 3, **characterized in that** using frame element (1, 2), the casting mould frame, the plate structure working as surface, as plywood board or board of insulating material, is sup-  
ported by the frame element. 15

5. A method according to claim 1 or 3, **characterized in that** frame elements (1, 2), placed side by side, are bound together with quick-pressing means (8, 11, 15, 16) pressing metal profiles (1) against each other. 20

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6. A multi-purpose frame element for the needs of the building industry, which element is formed of two metal profile joists at a distance from each other and of wooden beams (2) installed between them to reg-  
ulate their distance, whereby each wooden beam (2) is tightened between said metal joists by means of lockable stretching member (3), **characterized in that** stretching member (3) is fitted to twine both around the wooden beam and in its longitudinal di-  
rection around fastening part (4) included in the met- 30

al profile beam. 35

7. A method according to claim 6, **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 attaching parts (4). 40

8. A method according to claim 6, **characterized in that** the stretching member is a tightening and lock-  
ing band (3), as a packing band. 45

9. A method according to claim 6, **characterized in that** the attaching part is a profile bar (4) joining metal joists (1). 50

10. Tightening and locking pieces of frame elements, by means of which successive frame elements (1);(2), as to their edges furnished with metal profile laths and when functioning as mould, are connected to each other, while said tightening and locking pieces have a hooked form to be fitted behind the edge of metal profile lath (1), **characterized in that** the lock-  
ing pieces are formed of two pieces of different length 55

(15);(16) placed within each other, whereby the crooked form of the other (15) is placed among the successive elements behind the edge of (lath (1) of the first element and the hooked form of the other piece (16) is placed behind the edge (lath (1) of the second element, the smaller piece (15) inside piece (16) is movable 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 (11) between them.

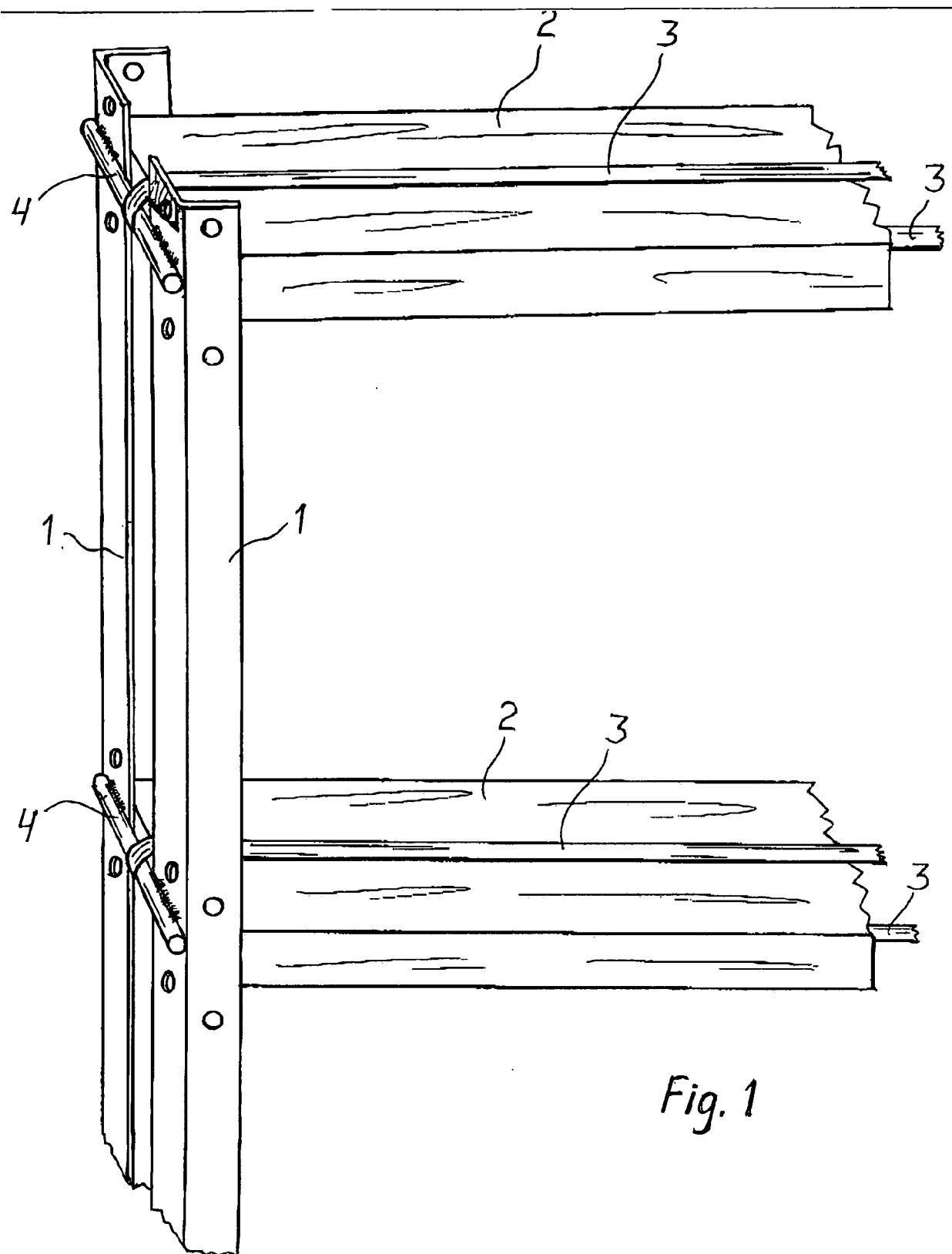


Fig. 1

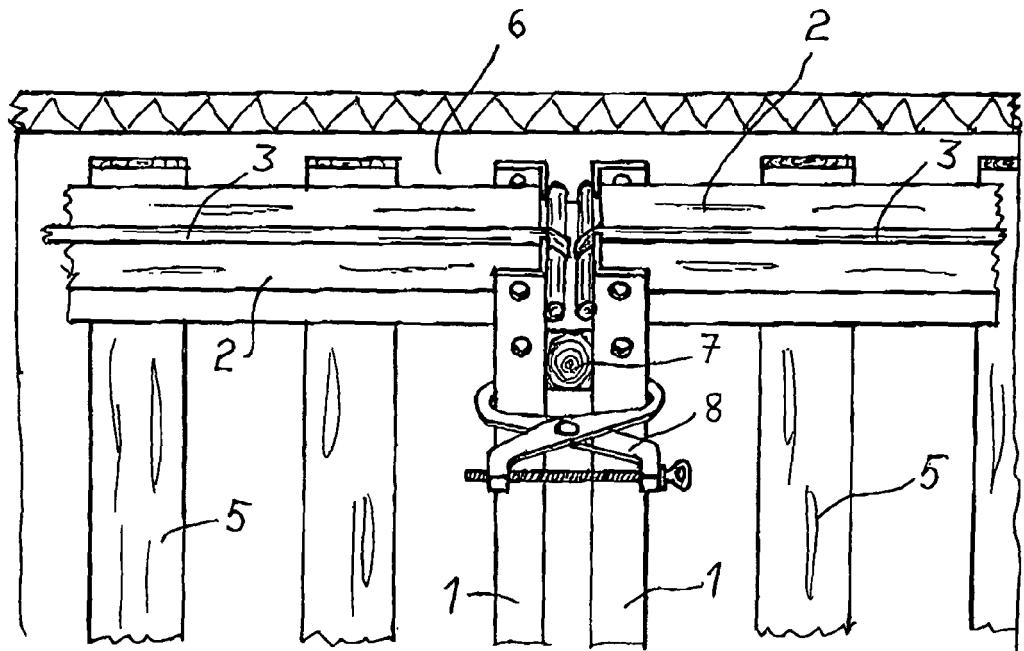


Fig. 2

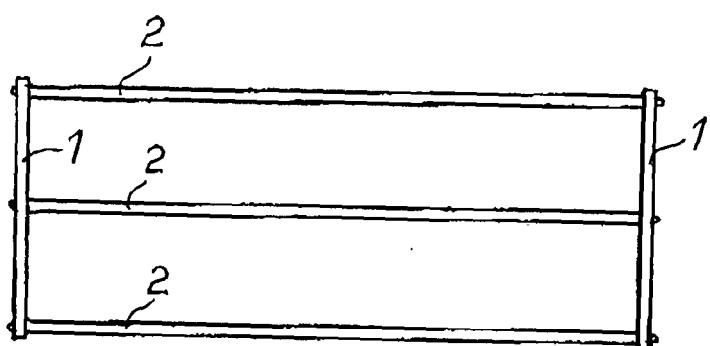


Fig. 3

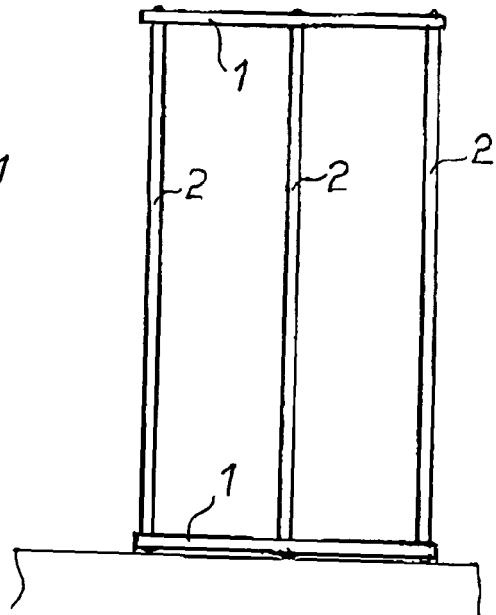


Fig. 4

