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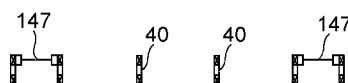


Fig. 3a

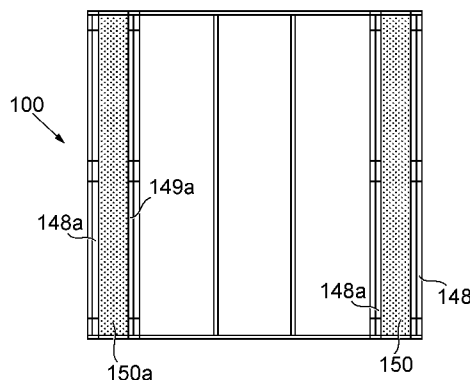


Fig. 3b

(57) Abstract: The invention relates to a racking restraint system formable from a plurality of timber framed panels. The invention further relates to a timber frame for use in a racking restraint system, comprising a top rail and a bottom rail in parallel orientation relative to one another, a pair of end posts each extending substantially perpendicularly between and being attached to the top rail and the bottom rail; and at least one joist comprising a first chord and a second chord and having a web therebetween, wherein the first and the second chords of the joist each extend between the top rail and the bottom rail and are attached thereto.



Racking Restraint System

The invention relates to a racking restraint system configured to improve structural stability in timber framed constructions. The invention further relates to a timber frame for assembly into a racking restraint system and a timber framed panel formable from a timber frame of the invention.

A process known as “racking” is known to occur in response to wind loads being applied to the timber framed panels of a timber framed construction.

During racking, a timber framed panel is deformed from a rectangular shape to an oblique angled quadrilateral shape in response to a load, such as a wind load for example, being applied to it.

At present, structural stability to prevent walls in a timber framed building from “racking” may be achieved by nailing a sheathing board to the external face of a timber frame forming a so-called “open panel” having a single board on a single face of the timber frame (See Figure 1a). The nail fixings and the board together resist racking. The sheathing board is formed of either oriented strand board (OSB) or plywood. Alternative solutions to racking in panels include the use of diagonal braces being included in the timber framed panel to resist the racking forces.

One of the drawbacks of using a sheathing board as a solution to the problems associated with racking is that the sheathing board is fixed to the timber frame by nailing to the top and bottom rails and to the vertical studs within the timber frame. Failure is known to occur as the sheathing board is pulled through the nails at the leading corner of the timber framed panel as racking occurs (See Figure 1b).

It is an aim of the present invention to obviate one or more of the drawbacks associated with known timber frame constructions.

The present invention provides a timber frame comprising a top rail and a bottom rail in parallel orientation relative to one another, a pair of end posts each extending substantially perpendicularly between and being attached to the top rail and the bottom rail; and at least one joist comprising a first chord and a second chord and having a web therebetween, wherein the first and the second chords of the joist each extend between the top rail and the bottom rail and are attached thereto.

In preferred embodiments, the top rail, bottom rail and the pair of end posts are arranged relative to one another so as to form a generally rectangular perimeter of the frame.

Preferably the end posts are vertically oriented when the timber frame is *in situ* in a timber framed construction.

The top and bottom rails and the pair of end posts preferably provide a perimeter of the frame. More specifically, the end posts are each attached at opposing ends of each of the top rail and the bottom rail with one end post at each end of the frame. Alternatively, the top rail and/or the bottom rail may provide one or more overhangs when attached to the pair of end posts. More specifically, the end posts may each extend between the top rail and the bottom rail spaced apart from one or more of the ends of each of the top rail and/or the bottom rail.

In preferred embodiments, the longitudinal axis of the at least one joist is perpendicular to the longitudinal axes of the top rail and the bottom rail

such that the first and the second chords thereof extend perpendicularly between the top and bottom rails of the frame.

In embodiments of the frame, the at least one joist extends between and is attached to the top rail and the bottom rail between the pair of end posts of the frame. More specifically, the longitudinal axis of the at least one joist is arranged in parallel orientation with the end posts of the frame.

The timber frame may further comprise at least one vertical stud extending between and being attached to the top rail and the bottom rail. More specifically, the at least one vertical stud may extend between and be attached to the top rail and the bottom rail between the pair of end posts. More specifically the at least one vertical stud is preferably arranged in parallel orientation with the end posts of the frame. It will be understood that, when present, the at least one vertical stud is preferably arranged in parallel orientation with the longitudinal axis of the at least one joist.

In embodiments of the invention, the frame comprises a plurality of vertical studs each extending between and being attached to the top rail and the bottom rail between the pair of end posts. More specifically, each of the plurality of vertical studs is preferably arranged in parallel orientation with the end posts of the frame. It will be understood that, when present, each of the plurality of vertical studs is preferably arranged in parallel orientation with the longitudinal axis of the at least one joist.

Preferably the vertical stud(s) are perpendicular to the longitudinal axes of the top rail and the bottom rail.

In embodiments of the invention, the first chord of the joist and an end post are one and the same.

In alternative embodiments of the invention, the second chord of the joist and an end post are one and the same.

In embodiments of the invention, the first chord or the second chord are the at least one vertical stud.

In embodiments, the at least one joist is disposed within the frame. More specifically, the at least one joist is disposed entirely within the perimeter of the frame. In this way, the depth dimension of the timber frame is not substantially or, indeed, not at all increased by the presence of the at least one joist.

In embodiments of the invention, the timber frame comprises a plurality of joists, each joist comprising a first chord and a second chord and having a web therebetween. More specifically, the first and the second chords of one or more of the joists each extend between the top rail and the bottom rail and are attached thereto.

More specifically, each one of the plurality of joists is disposed within the perimeter of the frame.

In embodiments comprising at least two joists, the first or second chord of one of the joists and the first or the second chord of another of the joists may form the pair of end posts of the frame.

In embodiments of the invention, the first and/or the second chord(s) of a joist are located adjacent an end post and/or a vertical stud of the frame. In such embodiments, the first and the second chords of the joist may be attached to the adjacent end post and/or vertical stud.

The at least one joist may be an I-joist or a metal web joist of generally I-shaped vertical cross-section. It will be understood that the I-joist or the metal web joist is oriented in the frame such that the longitudinal axis of the joist is substantially perpendicular to the longitudinal axes of the top rail and the bottom rail.

By providing the joist as part of the timber frame, the timber frame has improved resistance to racking forces than would otherwise be the case.

Furthermore, by providing the joist as part of the timber frame, insulating material may be packed about the web area of the joist, thereby reducing the size of the cold bridge area(s) of the frame provided by the end posts and, if present, the vertical stud(s).

Fixing means may be provided for attaching the elements of the frame to one another. The elements of the frame include, the top rail, end posts, bottom rail, the at least one joist and, if present, the at least one vertical stud.

Suitable fixing means include, but are not limited to, nails, screws, adhesive or other similar known fixing means.

The present invention further provides a timber framed panel comprising a timber frame according to the invention and one or more boards attached at one or both faces of the timber frame.

In this way, the panel provides an assembly wherein the sides, top and bottom of the assembly are formed by the end posts and top and bottom rails of the timber frame respectively. The panel may provide an enclosed

assembly wherein faces of the assembly are formed by the one or more boards.

When the panel comprises a board attached at one face of the timber frame, the panel is known as an “open panel”. When the panel comprises a board attached at each face of the timber frame, the panel is known as a “closed panel”.

The timber frame is formable into a panel by attaching at least one board to a face of the frame. More specifically, the panel comprises a timber frame as herein described and a board attached to a face of the frame. The board may be plywood, plasterboard, oriented strand board (OSB), multi-density fibreboard (MDF), fibreboard, composite board materials or similar.

In embodiments, the panel may comprise a timber frame as herein described and a pair of boards, wherein each of the boards is attached to an opposing face of the frame. In this way, a closed panel is formed.

When the, or each, board of the panel is plasterboard, the fire-resistance of the panel is improved over embodiments wherein the, or each, board of the panel is oriented strand board.

The present invention further provides a kit for a timber framed panel, the kit comprising a timber frame, at least one board attachable to a face of the timber frame; and fixing elements for attaching the at least one board to the timber frame.

The kit may further comprise a further board attachable to the opposing face of the timber frame.

Preferably, the timber frame of the kit is a timber frame as herein described.

The present invention further provides a racking restraint system comprising a plurality of timber framed panels as herein described.

Throughout the description and claims of this specification, the words “comprise” and “contain” and variations of the words, for example “comprising” and “comprises”, means “including but not limited to”, and is not intended to (and does not) exclude other components, integers or steps.

Throughout the description and claims of this specification, the words “top”, “bottom”, “vertical” are not intended to limit the apparatus to a particular orientation but are intended to show the orientation of the elements of the apparatus relative to one another only.

When referred to herein, “rectangle” and “rectangular” shall be taken as including square.

Throughout the description and claims of this specification, the singular encompasses the plural unless the context otherwise requires. In particular, where the indefinite article is used, the specification is to be understood as contemplating plurality as well as singularity, unless the context requires otherwise.

Embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1a shows a timber framed panel according to the prior art;

Figure 1a shows the timber framed panel according of Figure 1a following application of a racking force thereto;

Figure 2a depicts a timber frame according to an embodiment of the invention in top plan view with the top and bottom rails removed;

Figure 2b depicts the timber frame according to Figure 2a in front view with the top and bottom rails in place;

Figure 3a depicts a timber frame according to an alternative embodiment of the invention in top plan view with the top and bottom rails removed;

Figure 3b depicts the timber frame according to Figure 3a in front view with the top and bottom rails in place;

Figure 4a depicts a timber frame according to a further alternative embodiment of the invention in top plan view with the top and bottom rails removed;

Figure 4b depicts the timber frame according to Figure 4a in front view with the top and bottom rails in place;

Figure 5a depicts a timber frame according to a yet further alternative embodiment of the invention in top plan view with the top and bottom rails removed;

Figure 5b depicts the timber frame according to Figure 5a in front view with the top and bottom rails in place;

Figure 6a depicts a timber frame according to a third further alternative embodiment of the invention in top plan view with the top and bottom rails removed; and

Figure 6b depicts the timber frame according to Figure 6a in front view with the top and bottom rails in place.

While the invention is susceptible to various modifications and alternative forms, specific embodiments thereof are shown by way of example in the drawings and will herein be described in detail. It should be understood that the drawings and detailed description thereto are not intended to limit the invention to the particular form disclosed, but on the contrary, the intention is to cover all modifications, equivalents and alternatives falling within the spirit and scope of the invention as defined by the appended claims.

Further, although the invention will be described in terms of specific embodiments, it will be understood that various elements of the specific embodiments of the invention will be applicable to all embodiments disclosed herein.

In the drawings, similar features are denoted by the same reference signs throughout.

Figures 1a and 1b depict a timber frame according to the prior art. In the top representation of Figure 1a, the front view of the timber frame, generally denoted by the reference numeral 1, is shown. In the bottom representation of Figure 1a, the top plan view of the timber frame 1 is shown.

In the prior art timber frame 1, there is provided a top rail 2 and a bottom rail 3 in parallel relation to one another. Extending perpendicularly between top rail 2 and bottom rail 3 and are attached by fixing elements (not shown) thereto are two end posts 5, 6. The end post 5 is attached to an end of each of top rail 2 and bottom rail 3. End post 6 is attached to the opposing end of each of top rail 2 and bottom rail 3. End posts 5 and 6 are in parallel relation to one another. The assembly formed by top rail 2, bottom rail 3 and end posts 5, 6 forms the basis of the timber frame 1. Three vertical studs 4 extend perpendicularly from top rail 2 to bottom rail 3 and are attached by fixing elements (not shown) thereto. The vertical studs are in parallel relation to one another and to end posts 5, 6.

The top rail 2, bottom rail 3, end posts 5, 6 and vertical studs 4 are all formed of timber.

Diagonal braces 7 extend between the top rail 2 and the bottom rail 3 at an angle of less than 90° to the longitudinal axis of the top rail 2 and the bottom rail 3. Two diagonal braces 7 cross over one another over a vertical stud 4 and are attached thereto. The diagonal braces give resistance to racking forces applied to the timber frame.

Figure 1b shows what happens to the frame 1 of Figure 1a when a wind force F is applied thereto. The top rail 2 and bottom rail 3 are no longer perpendicular to any of end posts 5, 6 and vertical studs 4. A leading edge 15 of the frame 1 is created as the frame 1 is caused to lean over away from the direction of application of the force. A known disadvantage of such a system is that the fixings elements (not shown) at leading edge 15 come under great strain and are caused to pull through the diagonal brace 7 in the region of the leading edge 15.

In place of the diagonal braces 7 may be sheathing boards. In such known examples, the sheathing board is fixed to the frame top and bottom rails 5, 6 and vertical studs 4 by nailing at 150mm centres 8. Failure is then likely to occur as the sheathing board is pulled through the nails at the leading corner 15.

In known systems, racking forces are traditionally restrained in timber frame panels by a sheathing board being fixed to the outside face of the timber framed unit. The sheathing board is typically orientated strand board (OSB) or plywood.

Racking resistance is stopping the panel being pushed out of shape due to wind loads, the racking load is force that the panel can withstand.

Figure 2a and Figure 2b depict a first embodiment of a timber frame according to an embodiment of the present invention. Referring to Figure 2b, the timber frame 10 is formed of an assembly comprising top rail 42, bottom rail 43, end post 45 and end post 46. Top rail 42 and bottom rail 43 are parallel to one another and will be horizontal to the ground in use. End posts 45, 46 are parallel to one another and extend perpendicular to top rail 42 and bottom rail 43. End posts 45, 46 are attached to top rail 42 and bottom rail 43 by nails, timber joints and/or adhesive (not shown). Two metal web I-joists 47 form the racking resistant bracing in the depicted embodiment. As best shown in Figure 2a, the joists 47 extend between an end post 45, 46 and a vertical stud 40 and are attached thereto by fixing elements (not shown). Referring to Figure 2b, the metal web I-joist has a first chord (48, 48a) and a parallel second chord (49, 49a) with a herringbone metal web (50, 50a) therebetween. The first chord (48, 48a) and a parallel second chord (49, 49a) are attached at their ends to

top rail 42 and at the opposing end to bottom rail 43. The longitudinal axis of each of the joists 47 is arranged to be perpendicular to the top rail 42 and the bottom rail 43 and to be parallel to the longitudinal axes of the vertical studs 40 and the end posts 45, 46.

The first chord (48, 48a) of each joist is attached to an end post 45, 46 of the frame of the timber frame 10. The second chord (49, 49a) of each joist is attached to an adjacent vertical stud 40 of the timber frame 10.

The vertical studs 40 are each provided by a joist of I-shaped cross section. The web section of each vertical stud 40 is arranged to be perpendicular to the web section 50, 50a of joists 47.

Although not shown in the depicted embodiments, the spaces within the frame between the end posts and the vertical studs and about the web of the joist may be packed with insulating material. In this way, the thermal efficiency of the timber frame and a panel formed from such a frame is maximised.

Figure 3a and Figure 3b depicted an alternative embodiment of a timber frame according to the present invention. The depicted embodiment differs from that shown in Figures 2a and 2b only in that the joists 147 are a wooden joist wherein the first 148, 148a and the second chords 149, 149a are timber and the web 150, 150a extending therebetween is oriented strand board, plywood, multi-density fibreboard (MDF), fibreboard, composite board materials or similar.

In each of the depicted embodiments shown in Figures 2a, 2b, 3a, 3b, 5a, 5b, 6a and 6b, the timber frame has a depth dimension equal to the distance between the outer faces of the first and second chords of joists 47, 147 and a width dimension delimited by the end posts. The height of

the frame 1, 10, is delimited by the top rail and the bottom rail. Thus, the perimeter of each frame 1,10 defines the size of the timber frame and the joists 47, 147 are disposed within the perimeter of the frame.

Figure 4a and Figure 4b differ from the other depicted embodiments in that the end posts 245 and 246 are provided by a chord of a joist 247 and in that the vertical studs 240 are provided by timber studs rather than by I-joists.

It will be readily understood that the vertical studs 240 may be used in place of vertical studs 40 in the embodiments depicted in Figures 2a, 2b, 3a and 3b. Embodiments in which vertical studs 240 are used in place of vertical studs 40 of Figures 2a, 2b, 3a and 3b are shown in Figures 5a, 5b, 6a and 6b respectively.

Likewise, the end posts 245, 246 may be used in place of end posts 45, 46 in alternative arrangements of the embodiments shown in Figures 2a, 2b, 3a and 3b.

Each of the timber frames 10, 100, 200, 250, 300 may be formed into an open timber framed panel by attaching a sheathing board (not shown) to a face of the unit. The sheathing board may be formed of OSB, plywood, multi-density fibreboard (MDF), fibreboard, composite board materials or similar. A pair of sheathing boards may be attached to opposing faces of a single timber frame 10, 100, 200, 250, 300 so as to form a so-called "closed panel".

A number of timber framed panels so formed can then be joined together to form a racking restraint system having resistance to racking forces applied thereto. In such a racking restraint system, an end post of one

timber framed panel will be attached to an end post of the adjacent timber framed panel.

Claims

1. A timber frame comprising a top rail and a bottom rail in parallel orientation relative to one another, a pair of end posts each extending substantially perpendicularly between and being attached to the top rail and the bottom rail; and at least one joist comprising a first chord and a second chord and having a web therebetween, wherein the first and the second chords of the joist each extend between the top rail and the bottom rail and are attached thereto.
2. A timber frame according to claim 1, wherein the end posts are each attached at opposing ends of each of the top rail and the bottom rail.
3. A timber frame according to claim 1 or claim 2, wherein the longitudinal axis of the at least one joist is perpendicular to the longitudinal axes of the top rail and the bottom rail such that the first and the second chords of the joist extend perpendicularly between the top and bottom rails of the frame.
4. A timber frame according to any one of claims 1 to 3, wherein the at least one joist extends between and is attached to the top rail and the bottom rail between the pair of end posts of the frame.
5. A timber frame according to any one of claims 1 to 4, wherein the longitudinal axis of the at least one joist is arranged in parallel orientation with the end posts of the frame.
6. A timber frame according to any one of claims 1 to 5, further comprising at least one vertical stud extending between and being attached to the top rail and the bottom rail between the pair of end posts.

7. A timber frame according to claim 6, wherein the at least one vertical stud is arranged in parallel orientation with the end posts of the frame.
8. A timber frame according to any one of claims 1 to 7, comprising a plurality of vertical studs each extending between and being attached to the top rail and the bottom rail between the pair of end posts.
9. A timber frame according to claim 8, wherein each of the plurality of vertical studs is arranged in parallel orientation with the end posts of the frame.
10. A timber frame according to any one of claims 6 to 9, wherein the vertical stud(s) are perpendicular to the longitudinal axes of the top rail and the bottom rail.
11. A timber frame according to any one of claims 1 to 10, wherein the at least one joist is disposed within the frame
12. A timber frame according to any one of claims 1 to 11, comprising a plurality of joists, each joist comprising a first chord and a second chord and having a web therebetween wherein the first and the second chords of one or more of the joists each extend between the top rail and the bottom rail and are attached thereto.
13. A timber framed panel comprising a timber frame according to any one of claims 1 to 12 and a board attached to a face of the frame.
14. A timber framed panel according to claim 13, comprising a timber frame according to any one of claims 1 to 12 and a pair of boards, wherein each of the boards is attached to an opposing face of the frame.

15. A timber framed panel according to claim 13 or claim 14, comprising a timber frame according to any one of claims 1 to 12 and one or more boards attached at one or both faces of the timber frame.

16. A timber framed panel according to any one of claims 13 to 15, wherein the panel is an enclosed assembly wherein the sides, top and bottom of the assembly are formed by the end posts and top and bottom rails of the timber frame respectively and the faces of the assembly are formed by the one or more boards.

17. A kit for a timber framed panel, the kit comprising a timber frame according to any one of claims 1 to 12, at least one board attachable to a face of the timber frame; and fixing elements for attaching the at least one board to the timber frame.

18. A kit for a timber framed panel according to claim 17, further comprising a further board attachable to the opposing face of the timber frame.

19. A racking restraint system comprising a plurality of timber framed panels according to any one of claims 13 to 16.

20. A timber frame substantially as herein described with reference to the accompanying drawings and related description.

21. A timber framed panel substantially as herein described with reference to the accompanying drawings and related description.

22. A kit for a timber framed panel, substantially as herein described with reference to the accompanying drawings and related description.

1 / 6

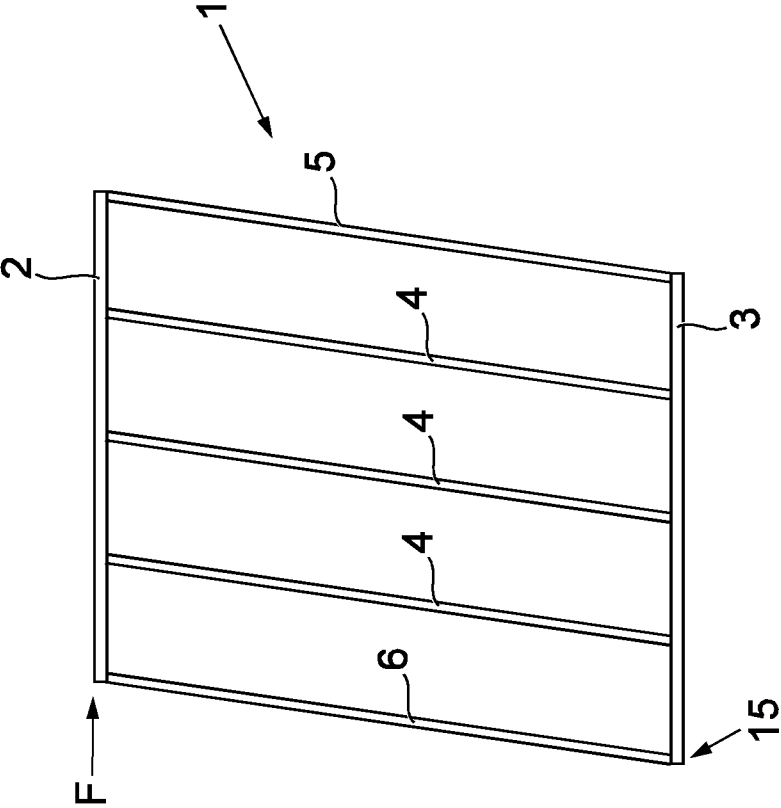


Fig. 1b

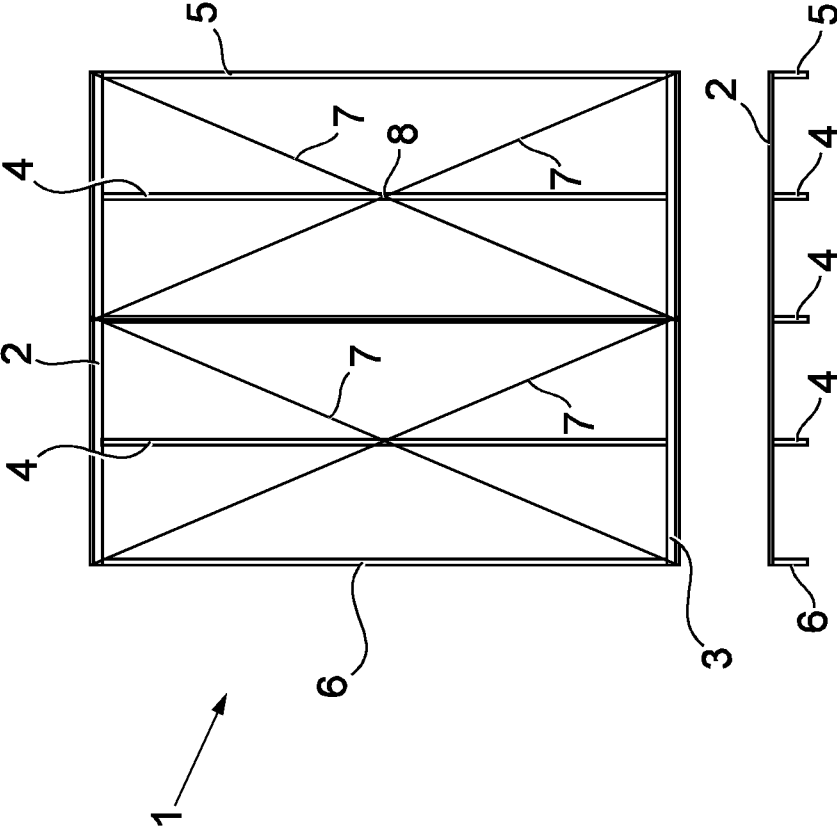


Fig. 1a

PRIOR ART

2 / 6

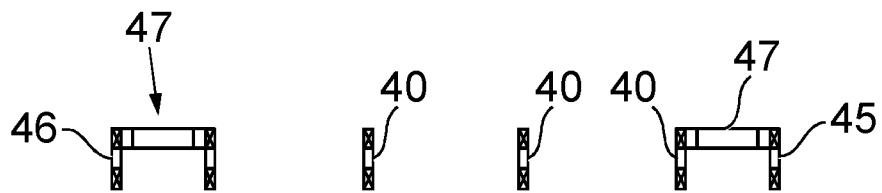


Fig. 2a

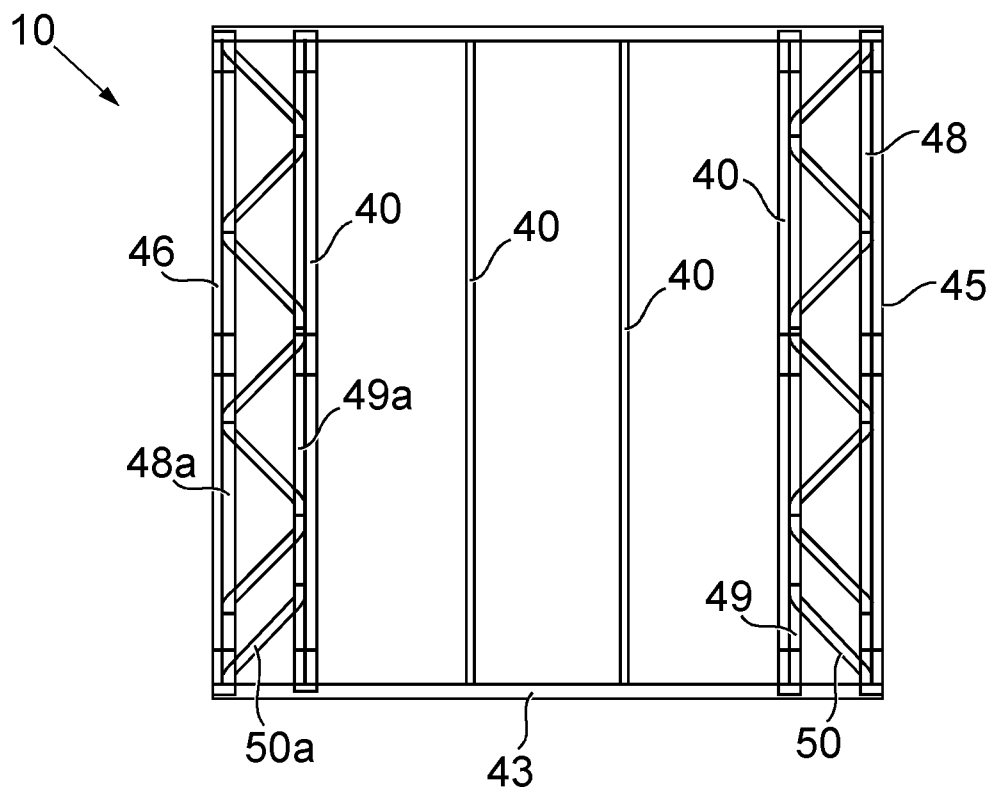
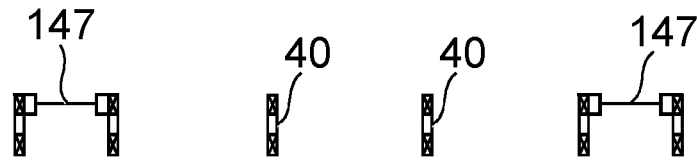
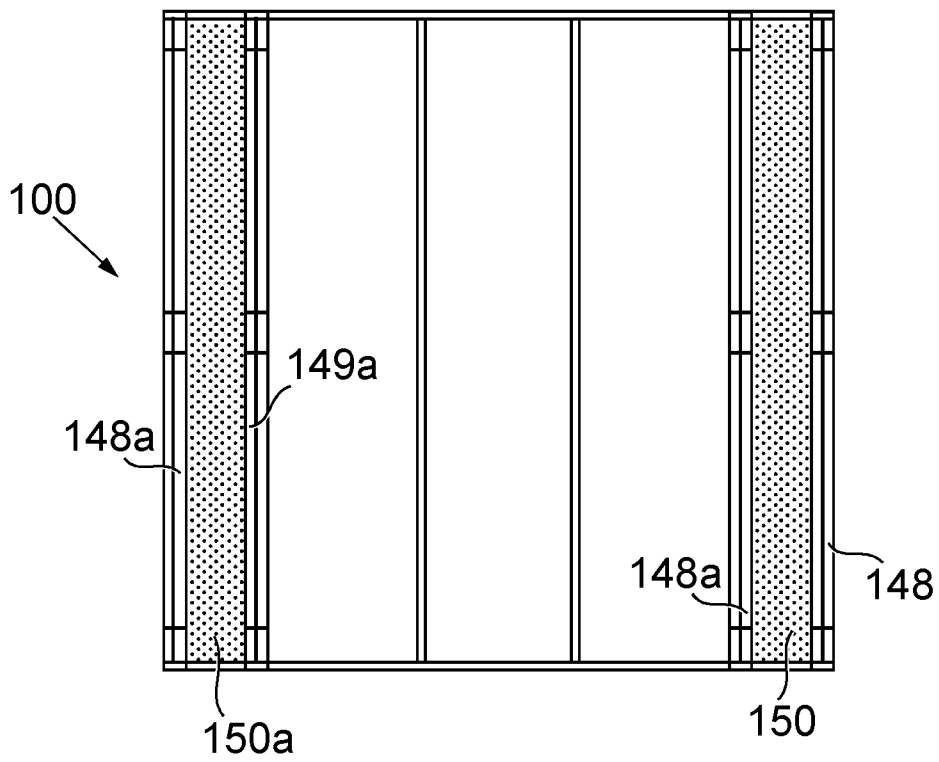


Fig. 2b

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*Fig. 3a**Fig. 3b*

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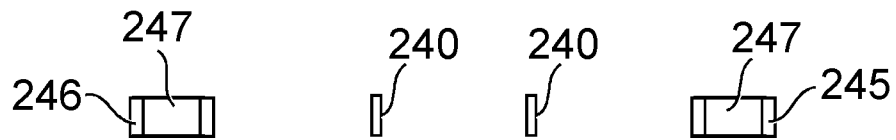


Fig. 4a

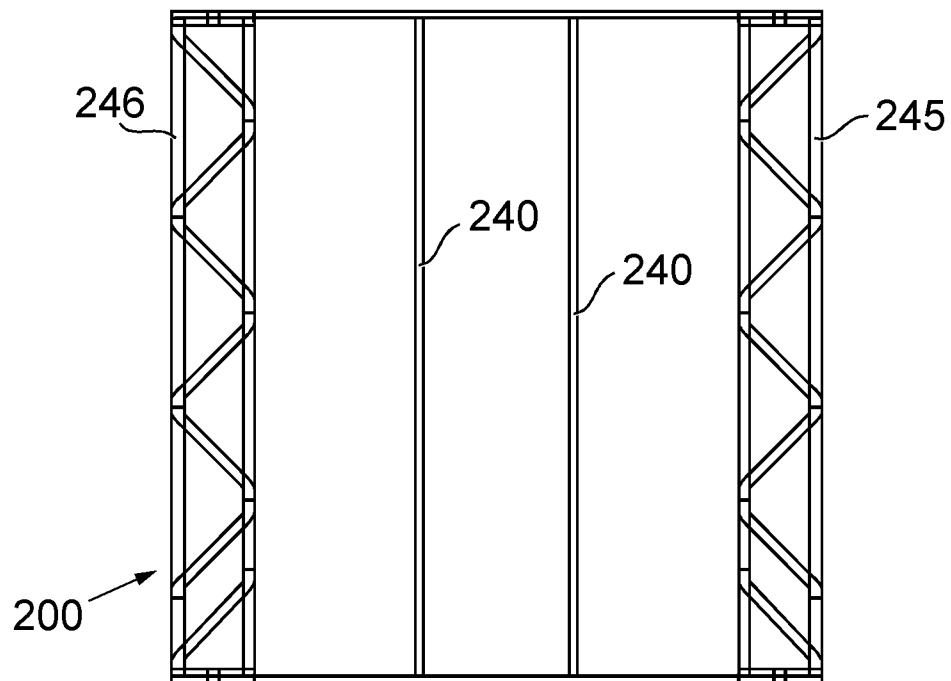


Fig. 4b

5 / 6

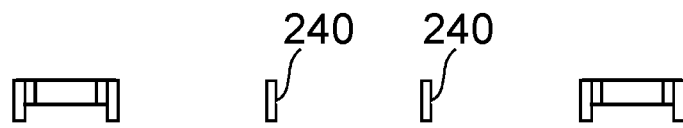


Fig. 5a

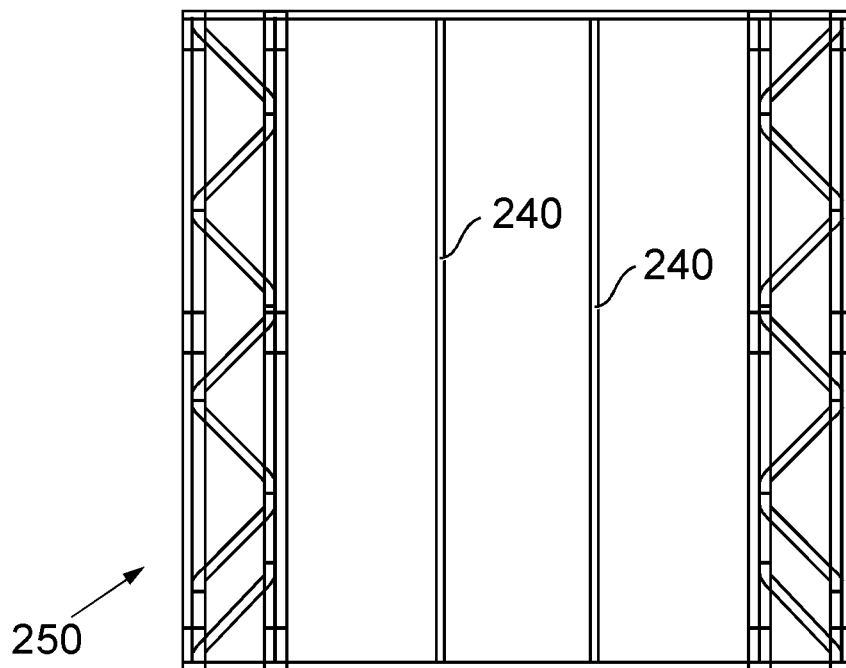


Fig. 5b

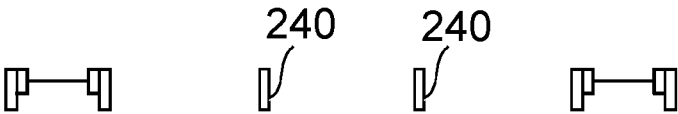


Fig. 6a

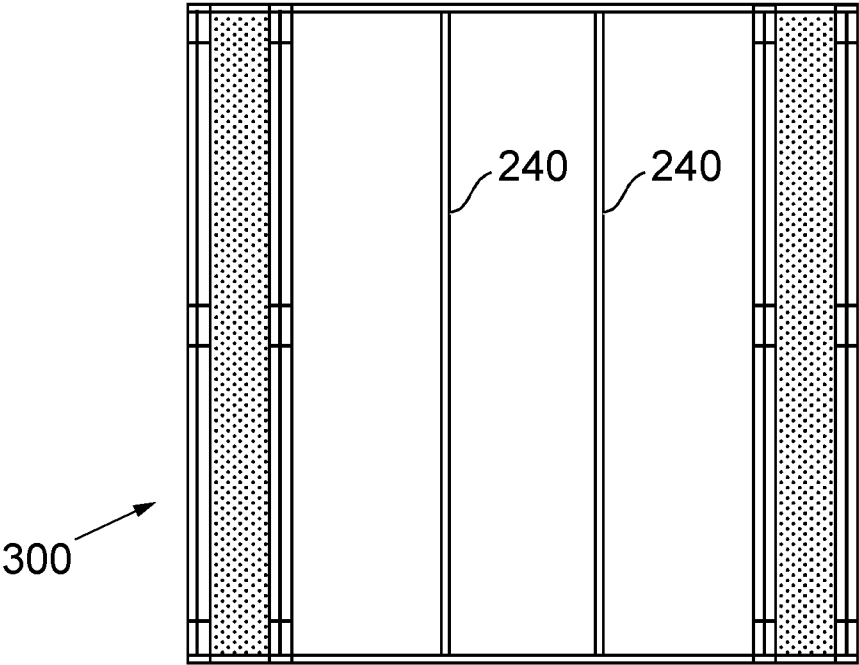


Fig. 6b

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2012/052967

A. CLASSIFICATION OF SUBJECT MATTER
INV. E04B1/26
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
E04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 609 920 A1 (MITEK HOLDINGS INC [US]) 28 December 2005 (2005-12-28) column 3, paragraph 16 - column 7, paragraph 40; figures 1-6 -----	1-19



Further documents are listed in the continuation of Box C.



See patent family annex.

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

17 October 2012

Date of mailing of the international search report

31/10/2012

Name and mailing address of the ISA/

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Authorized officer

Dieterle, Sibille

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2012/052967

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claims Nos.: 20-22
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
see FURTHER INFORMATION sheet PCT/ISA/210
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: 20-22

Claims 20-22 contain a reference to the description and the drawings. According to Rule 6.2(a) PCT, claims should not contain such references except where absolutely necessary, which is not the case here.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.2), should the problems which led to the Article 17(2) declaration be overcome.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2012/052967

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1609920	A1	28-12-2005	CA 2510216 A1 21-12-2005
			EP 1609920 A1 28-12-2005
			NZ 540883 A 29-09-2006
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