



(51) International Patent Classification:

*E04B 1/16* (2006.01)      *E04B 2/86* (2006.01)  
*E04B 1/18* (2006.01)      *E04C 2/30* (2006.01)  
*E04B 1/30* (2006.01)      *E04B 1/48* (2006.01)  
*E04B 1/35* (2006.01)      *E04C 3/34* (2006.01)  
*E04H 1/00* (2006.01)      *E04B 5/40* (2006.01)  
*E04G 11/02* (2006.01)

(21) International Application Number:

PCT/AU2018/050977

(22) International Filing Date:

10 September 2018 (10.09.2018)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

2017903701      12 September 2017 (12.09.2017)      AU  
2018901613      10 May 2018 (10.05.2018)      AU

(71) Applicant: **IAVILAER PTY LTD** [AU/AU]; 281 Lewis Rd, Forrestfield, Western Australia 6058 (AU).

(72) Inventor: **JACKSON, Ian**.

(74) Agent: **ARMOUR IP PTY LTD**; PO Box 3099, Broadway Nedlands, Western Australia 6009 (AU).

(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM,

AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: BUILDING CONSTRUCTION METHOD

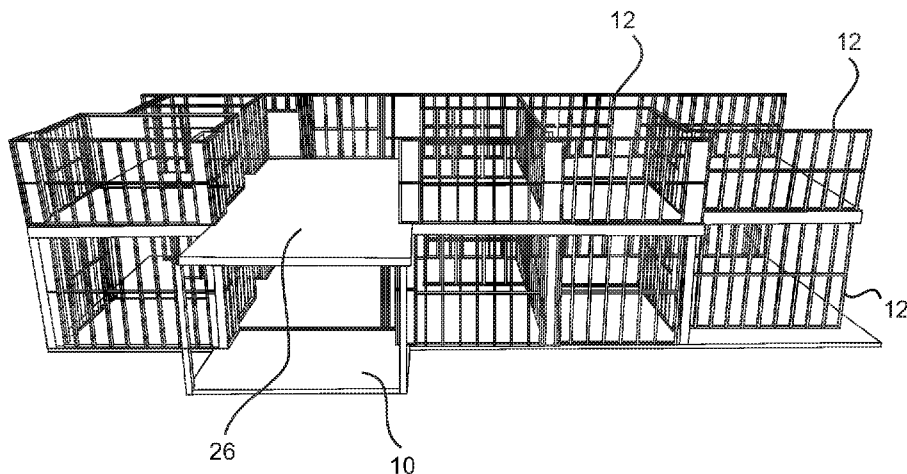


Fig. 6

(57) Abstract: A building construction method uses wall frames having a moveable top track. The track is fixed in a raised position so as to be load-bearing during construction, allowing construction work to progress quickly. When supporting concrete columns have cured, the fixing can be released allowing the track to move into a lowered position and for the building load to transfer to the columns.



## “BUILDING CONSTRUCTION METHOD”

### **Field of the Invention**

[0001] The present invention relates to the construction of buildings. It has been devised as a method for construction of multi-storey buildings, with particular application to buildings with more than two storeys.

### **Background to the Invention**

[0002] Building regulations in some countries require that, in general, a building of more than three storeys must have its load bearing walls made of concrete or masonry. These regulations are due to fire resistance requirements. It is possible to construct a building with loads carried by steel or timber frames which is structurally sound, however such frames can be significantly weakened by fire.

[0003] Buildings constructed using masonry are generally built gradually from the ground up, in courses. Beyond a certain level, it is necessary for grout in the masonry to cure before further loads are applied. In practice, this means that each storey must be allowed to cure before construction of a higher storey begins.

[0004] Buildings constructed using precast concrete can be built more quickly. Nonetheless, they can still require the individual panels to be connected to each other, typically by grouting. In addition to the inherent expense and difficulty in using precast panels (notably transport and movement costs associated with heavy panels) the use of such panels still has considerable ‘wait’ time associated with it.

[0005] In recent years, it has become more common to construct buildings using a system of ‘permanent formwork’, whereby the building walls are laid out using lightweight, hollow wall panels, and concrete is then poured into the panels and allowed to cure to provide structural strength. While the costs of transporting and moving such panels is considerably less than using precast

concrete, the system requires complete curing of the concrete within the panels of each level before a floor can be placed upon it.

[0006] All of the above systems have the further limitation that, in general, it is necessary to wait until the load bearing walls and columns have been secured and, where necessary, cured before fixing internal walls within the structure. Indeed, often it is necessary to complete the entire load-bearing structure of a building before non load-bearing walls can be located.

[0007] US patent application number 2010/0058687 describes a system of permanent formwork as described above, with the formwork partially supporting loads being placed above it. Following curing of the concrete columns, the load is shared by the concrete and the permanent formwork.

[0008] The present invention proposes an alternative construction system which seeks to alleviate some of these limitations, at least in part.

[0009] For the avoidance of doubt, the term 'columns' as used herein broadly encompasses vertical load bearing building elements; including traditional columns having a relatively even length : width ratio, blade columns, and blade walls where the length may be much greater than the width.

### **Summary of the Invention**

[0010] According to one aspect of the present invention there is provided a method of constructing a building, the method including the steps of:

forming a building frame, the frame including a plurality of vertical channels, the frame being sufficiently strong to bear load from at least one higher storey, the frame defining a load path for the load of the at least one higher storey;

at least partially forming at least one higher story;

filling the channels with a curable substance;

allowing the curable substance in the channels to cure and to form columns within the building; and

creating a break in the load path of the frame and thus transferring the load from the at least one higher storey from the building frame to the cured columns.

[0011] It will be appreciated that the transfer of load from the building frame to the cured columns is complete, with none of the final load being carried by the frame.

[0012] It will also be appreciated that building frame will bear a significant proportion of the load of the higher storey, but may not bear the entire load. In some instances, the present invention envisages sharing the entire load of the higher storey between the building frame and some temporary props. It will be understood the required number and load capacity of the temporary props will be substantially reduced when used in conjunction with the present invention.

[0013] Advantageously, this allows for building to continue while the columns cure, with the load of higher stories being borne by the building frame. On completion of the building, the cured columns become the load bearing members preferentially to the frame, thus meeting the requirements of the building codes.

[0014] It is preferred that the building frame is formed from structural steel. In a preferred embodiment the building frame is formed of cold-rolled section steel with a nominal thickness in the order of between 0.75mm and 1.6mm.

[0015] It is preferred that the curable substance is concrete.

[0016] Preferably, the method includes the step of locating deck formwork atop the building frame, with the channels fluidly connected to the deck formwork. The step of filling the channels with the curable substance can then occur at the same time as the curable substance is poured into formwork to complete a floor surface above the building frame.

[0017] It is preferred that at least some main internal wall frames are located at the same time that external wall frames are located. For instance, when apartments are being constructed frames for separating walls can be included. It is possible for the walls of an entire level to be completed at the same time, although this is not always desirable as it may make inspection difficult. The use of internal wall frames permits access for internal fitout of lower floors while higher floors are being constructed.

[0018] The building frame preferably includes vertical studs and horizontal tracks. The building frame preferably includes a load transfer means created by securing one track, preferably a top-most track, to the studs using at least one removable fixing member. The step of creating a break in the load path may be achieved by removal of the fixing member(s).

[0019] Alternatively, the building frame may include a shear head arranged to shear at a load greater than that of a single higher storey but less than the entire structure at its completed load. In this embodiment the break in the load path may be effected by allowing the shear head to shear following curing of the columns, resulting in vertical loads being taken by the columns rather than by the frame.

[0020] According to a second aspect of the present invention there is provided a wall frame component including vertical studs and horizontal tracks, the wall frame having a top-most track moveable between a relatively raised position and a relatively lowered position, the wall frame including removable fixing members which maintain the top-most track in its raised position, whereby removal of the fixing members allows the top-most track to move into its lowered position.

[0021] When the top-most track is in its relatively raised position, the wall frame component preferably includes a load path transferring load from the top-most track to the vertical studs via at least one removable fixing member. It will be appreciated that removal of the fixing members causes a break in the load path.

[0022] The top-most track may include apertures which are arranged to align with corresponding apertures in the vertical studs when the top-most track is in its relatively lowered position. In this way the top-most track may be fixed in its relatively lowered position by the use of fasteners if desired.

### **Brief Description of the Drawings**

[0023] It will be convenient to further describe the invention with reference to preferred embodiments of the present invention. Other embodiments are possible, and consequently the particularity of the following discussion is not to be understood as superseding the generality of the preceding description of the invention. In the drawings:

[0024] Figures 1 to 6 are sequential schematic views of a portion of a multi-storey building being constructed in accordance with the present invention;

[0025] Figure 7 is a front view of a wall frame component in accordance with the present invention;

[0026] Figure 8 is a perspective of an upper end of the wall frame component of Figure 7; and

[0027] Figure 9 is an end view of an upper end of the wall frame component of Figure 7.

### **Detailed Description of Preferred Embodiments**

[0028] Referring to the Figures, Figure 1 shows a schematic view of one level of a multi-storey building. The level includes a base slab 10, upon which wall frames 12 are arranged. The wall frames 12 in this embodiment have been arranged to form the layout of internal and external walls above the slab 10.

[0029] The wall frames 12 are formed from cold-rolled steel section. Typical wall thicknesses are in the order of 90mm. The steel is typically between 0.75mm and 1.6mm nominal thickness. The wall frames 12 are constructed so as to be able to bear relatively high vertical loads.

[0030] The wall frames 12 are arranged such that vertical channels 14 can be located at desired intersections. The channels 14 are created by the use of column shutters 16 located at the desired locations, as shown in Figure 2. The vertical channels 14 are generally rectangular in cross section, and are sized such that when filled with concrete to form columns the concrete columns have a greater vertical load capacity than the wall frames 12.

[0031] Once the wall frames 12 and the column shutters 16 are in position, a framework deck 20 can be fixed atop the wall frames 12, with appropriate reinforcing in place. The framework deck 20 is arranged such that voids in the deck 20 locate over the openings to the vertical channels 14. Reinforcing rods 22 are positioned within the vertical channels 14, extending above the deck 20. This can be seen in Figure 3. If required, additional temporary props can be installed beneath the deck 20.

[0032] Concrete can then be poured to simultaneously form columns 24 within the vertical channels 14 and a suspended slab 26. The wall frames 12 are sufficiently strong to take the weight of the suspended slab 26, either on their own or in conjunction with temporary props. This is shown in Figures 4 and 5.

[0033] As soon as the suspended slab 26 is dry, wall frames 12 can be located atop the suspended slab 26 to form the next floor of the building. While this is occurring, work on building services such as plumbing and electricity can commence on the wall frames 10 of the lowest floor. The concrete of the slab 26 and the columns 24 will cure to their final strength over time, but during this time the load will be taken by the wall frames 12. This can be seen in Figure 6.

[0034] The above process can be repeated for further floors.

[0035] The wall frames 12 are formed from vertical studs 30 and three horizontal tracks: a base track 32, and intermediate track 34 and a top track 36. This can be seen in Figures 7 to 9.

[0036] The vertical studs 30 each have a lower end 40 and an upper end 42. The vertical studs are slightly crimped at the lower end 40 so as to locate within the base track 32, with the base track 32 and the vertical studs 30 being of about the same width. The lower end 40 of vertical studs 30 and the base track 32 each include screw receiving apertures 44 which are inwardly indented. In this way the base track 32 can be fixed to the vertical studs 30 by means of screws 46, which are effectively countersunk so as to provide a reasonably planar surface of the wall frame 12.

[0037] The intermediate track 34 has outer ends which are crimped so as to locate within the vertical studs 30. The arrangement is such that the outside of the intermediate track 34 is generally co-planar with the outside of the vertical studs 30.

[0038] A central region of each vertical stud 30 includes screw receiving apertures 44 which are inwardly indented, as do outer ends of the intermediate track 34. In the same way as the base track, the intermediate track 34 can be fixed to the vertical studs 30 by means of screws 46, which are effectively countersunk so as to provide a reasonably planar surface of the wall frame 12.

[0039] The top track 36 and its connection to the upper end 42 of the vertical studs 30 is largely a mirror image to that of the base track 32. The vertical studs are slightly crimped at the upper end 42 so as to locate within the top track 36, with the top track 36 and the vertical studs 30 being of about the same width. The upper end 42 of the vertical studs 30, and the top track 36, each include screw receiving apertures 44 which are inwardly indented. In this way the top track 36 could be fixed to the vertical studs 30 by means of effectively countersunk screws.

[0040] The arrangement of the top track 36 differs from that of the base track 32 by the inclusion of holding screws 50.

[0041] The arrangement where the screw receiving apertures 44 of the upper end 42 of the vertical studs 30 are aligned with those of the top track 36 represents a relatively lowered position of the top track 36. In use, the top track 36 is held in a relatively raised position, with the top track 36 being fixed to the vertical studs in this relatively raised position by the holding screws 50.

[0042] In practice, the wall frames 12 as described above are built having a top track 36 held in its raised position by the holding screws 50. This means that the weight of the suspended slab 26 passes through from the top track 36 to the vertical studs 30 through the holding screws 50. The suspended slab 26 is supported by the wall frames 12 in this fashion. The wall frames 12 thus define a load path through the top track 36, the holding screws 50 and the vertical studs 30 to the slab 10.

[0043] Once the columns 24 have cured, the holding screws 50 can be removed. Removal of the holding screws 50 allows movement of the top track 36 between its relatively raised and lowered positions, relative to the slab 26. With the removal of the holding screws 50 the vertical load of the slab 26 (and higher storeys) is taken by the columns 24, with the wall frames 12 no longer being load bearing. The removal of the holding screws 50 thus creates a break in the load path defined above.

[0044] This means that, in effect, the wall frames 12 are load bearing during construction of the building, allowing for an extremely fast-paced construction. Following construction, they cease to be load bearing, with the load bearing elements being concrete as required by the building codes.

[0045] It will be appreciated that this represents a complete transfer of load from the wall frames 12 to the columns 24.

[0046] In an alternative embodiment, the holding screws 50 may be designed to shear under a particular loading, for instance the loading of two higher stories. The shearing of the holding screws 50 will serve the same purpose of transferring load from the wall frames 12.

[0047] It will be appreciated that the column shutters 16 may be non-load bearing. Alternatively, the column shutters 16 may be formed in a similar fashion to the wall frames 12 and form part of the load bearing capacity of the wall frames 12 prior to load transfer.

[0048] Modifications and variations as would be apparent to a skilled addressee are deemed to be within the scope of the present invention.

**Claims**

1. A method of constructing a building, the method including the steps of:  
forming a building frame, the frame including a plurality of vertical channels, the frame being sufficiently strong to bear load from at least one higher storey, the frame defining a load path for the load of the at least one higher storey;  
at least partially forming at least one higher story;  
filling the channels with a curable substance;  
allowing the curable substance in the channels to cure and to form columns within the building; and  
creating a break in the load path of the frame and thus transferring the load from the at least one higher storey from the building frame to the cured columns.
2. A method of constructing a building as claimed in claim 1, wherein the building frame is formed from structural steel.
3. A method of constructing a building as claimed in claim 2, wherein the building frame is formed of cold-rolled section steel with a nominal thickness in between 0.75mm and 1.6mm.
4. A method of constructing a building as claimed in any preceding claim, wherein the curable substance is concrete.
5. A method of constructing a building as claimed in any preceding claim, wherein the method includes the step of locating deck formwork atop the building frame, with the channels fluidly connected to the deck formwork.
6. A method of constructing a building as claimed in claim 5, wherein the step of filling the channels with the curable substance occurs at the same time as the curable substance is poured into formwork to complete a floor surface above the building frame.
7. A method of constructing a building as claimed in any preceding claim, wherein at least some internal wall frames are located at the same time that external wall frames are located.

8. A method of constructing a building as claimed in any preceding claim, wherein the building frame includes vertical studs and horizontal tracks and the building includes a load transfer means created by securing a track to the studs using at least one removable fixing member.
9. A method of constructing a building as claimed in claim 8, wherein a top-most track is secured to the studs using the at least one fixing member.
10. A method of constructing a building as claimed in claim 8 or claim 9, wherein the step of creating a break in the load path is achieved by removal of the removable fixing member(s).
11. A method of constructing a building as claimed in any one of claims 1 to 7, wherein the building frame includes a shear head arranged to shear at a load greater than that of a single higher storey but less than the entire structure at its completed load.
12. A method of constructing a building as claimed in claim 11, wherein the break in the load path is effected by allowing the shear head to shear following curing of the columns, resulting in vertical loads being taken by the columns rather than by the frame.
13. A wall frame component including vertical studs and horizontal tracks, the wall frame having a top-most track moveable between a relatively raised position and a relatively lowered position, the wall frame including removable fixing members which maintain the top-most track in its raised position, whereby removal of the fixing members allows the top-most track to move into its lowered position.
14. A wall frame component as claimed in claim 13 whereby, when the top-most track is in its relatively raised position, the wall frame component includes a load path transferring load from the top-most track to the vertical studs via at least one removable fixing member.
15. A wall frame component as claimed in claim 14 or claim 15, wherein the top-most track includes apertures which are arranged to align with corresponding apertures in the vertical studs when the top-most track is in its relatively lowered position.

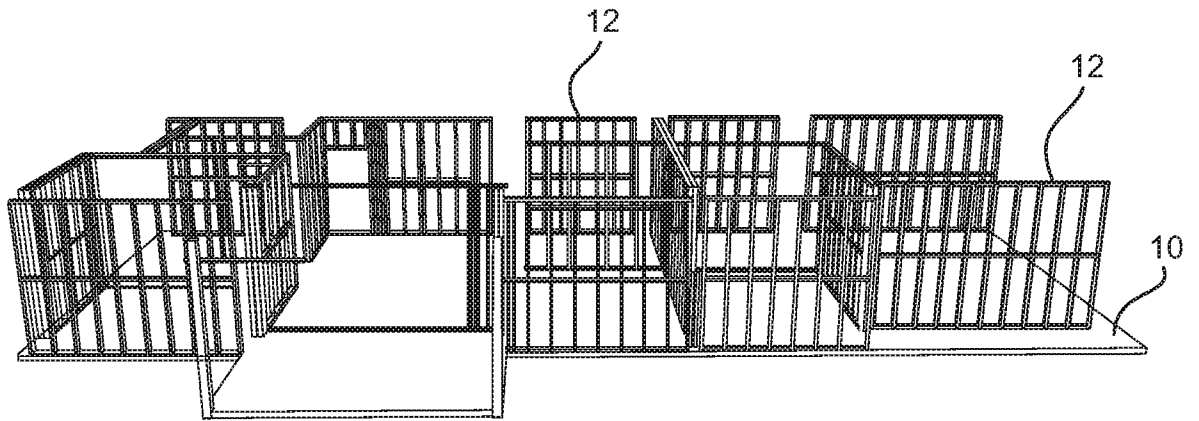


Fig. 1

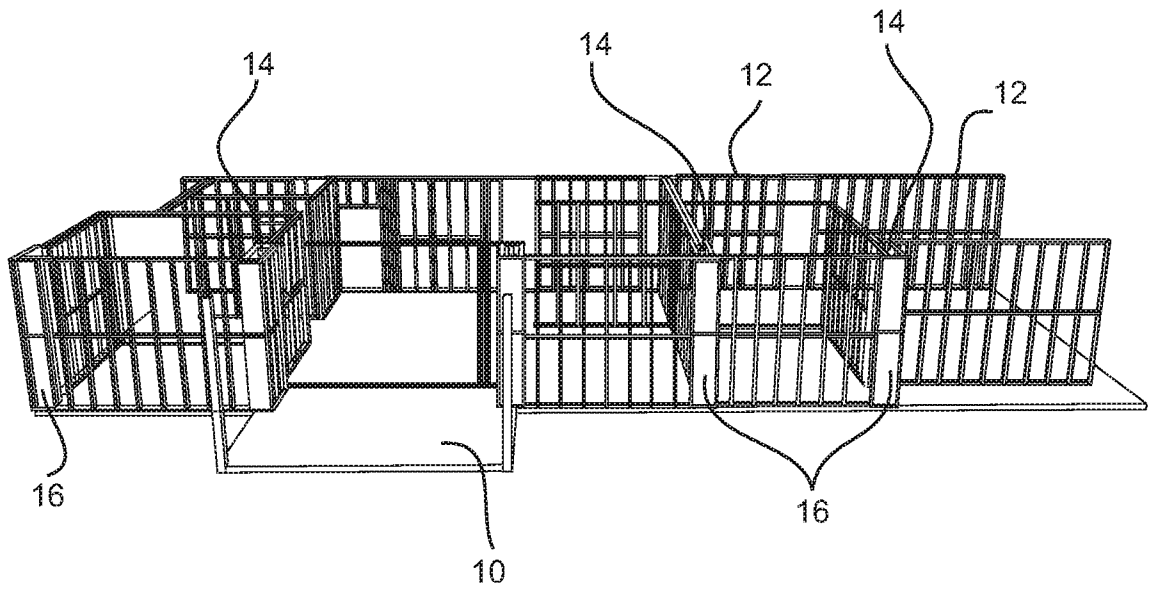


Fig. 2

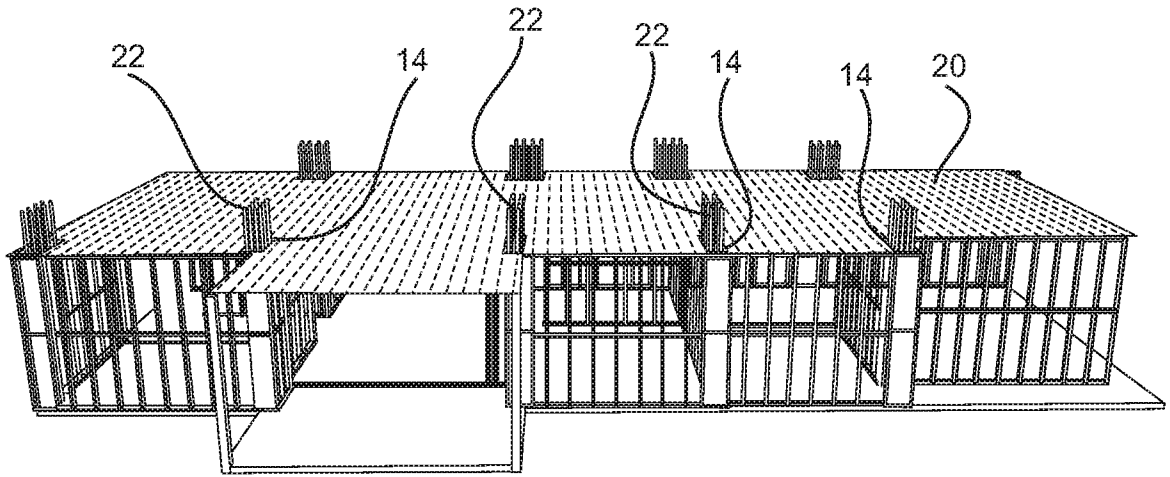


Fig. 3

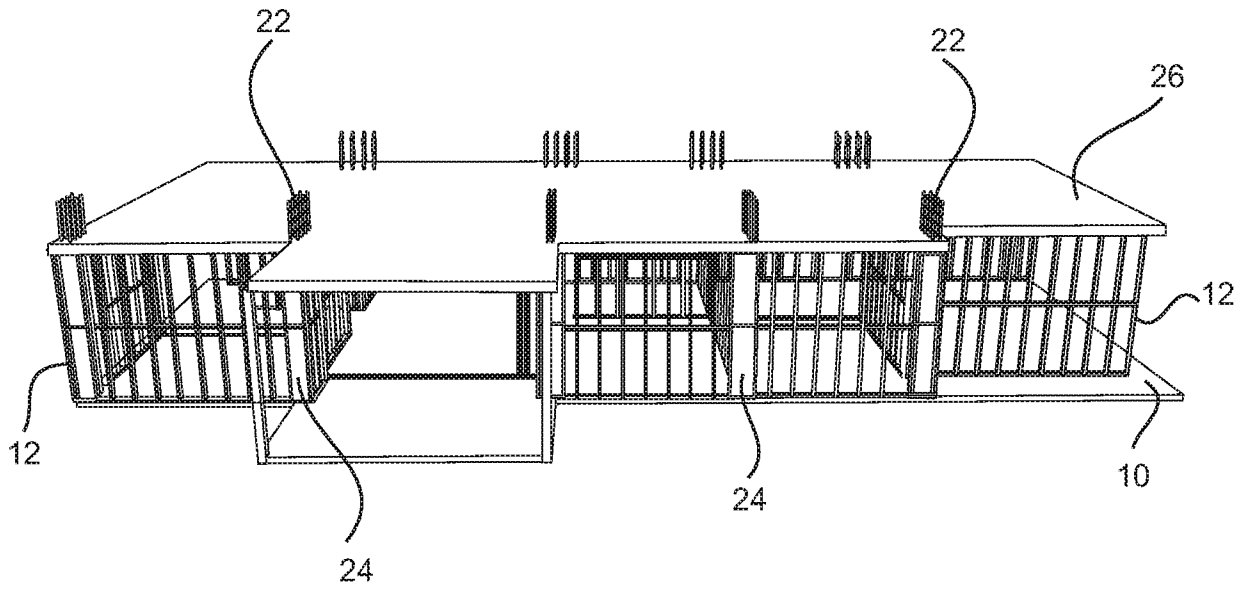


Fig. 4

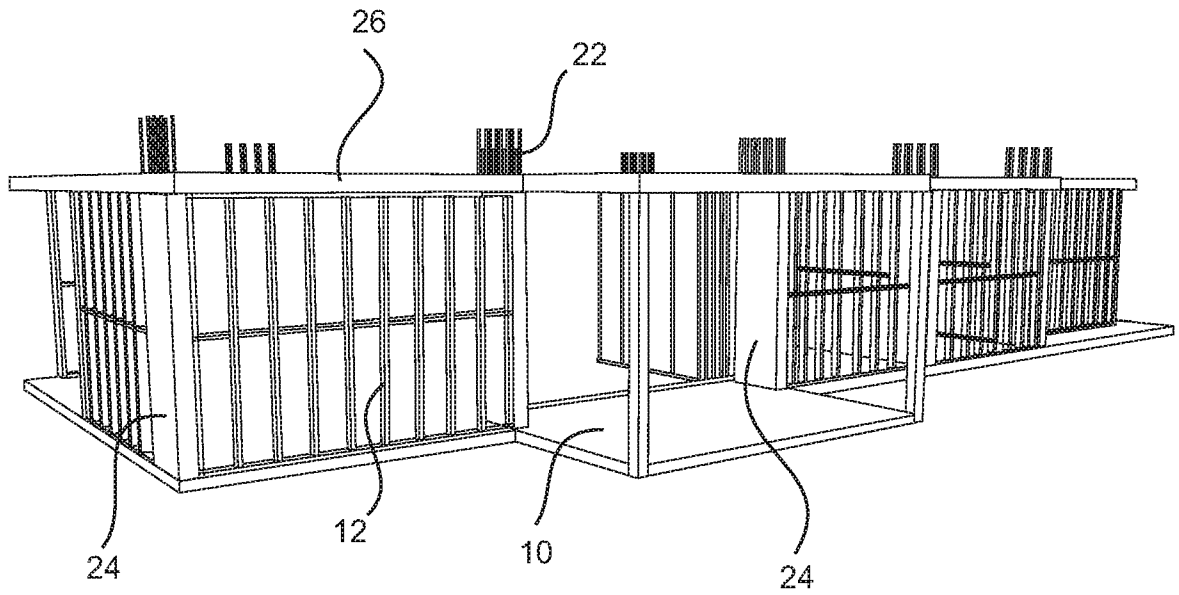


Fig. 5

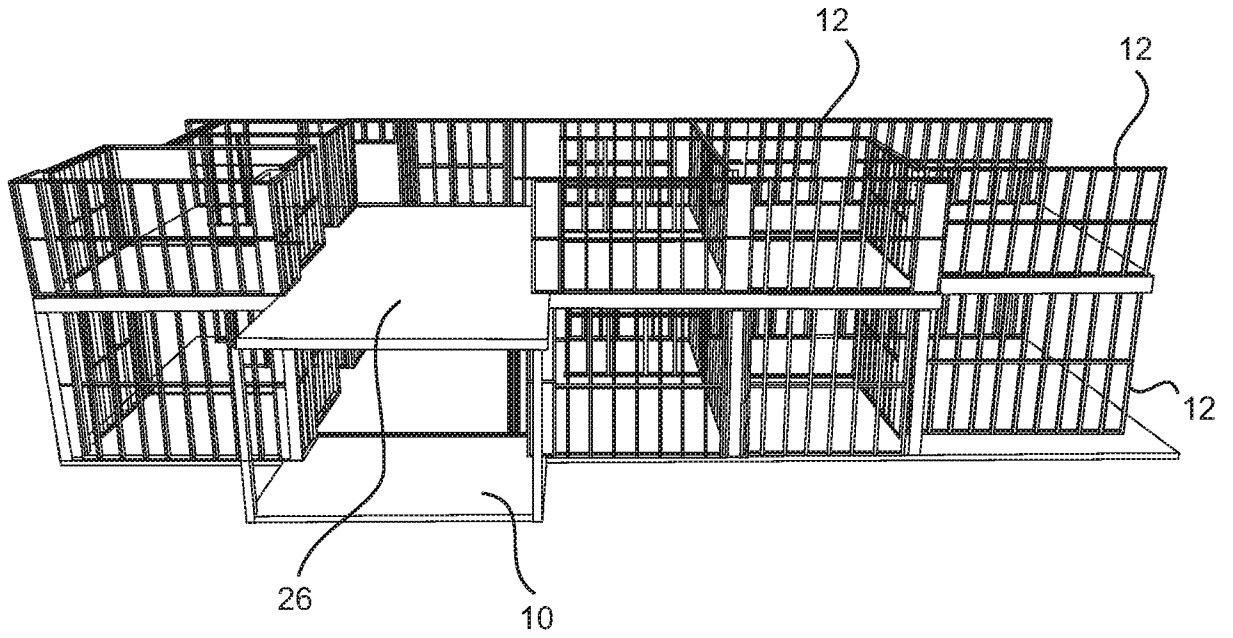


Fig. 6

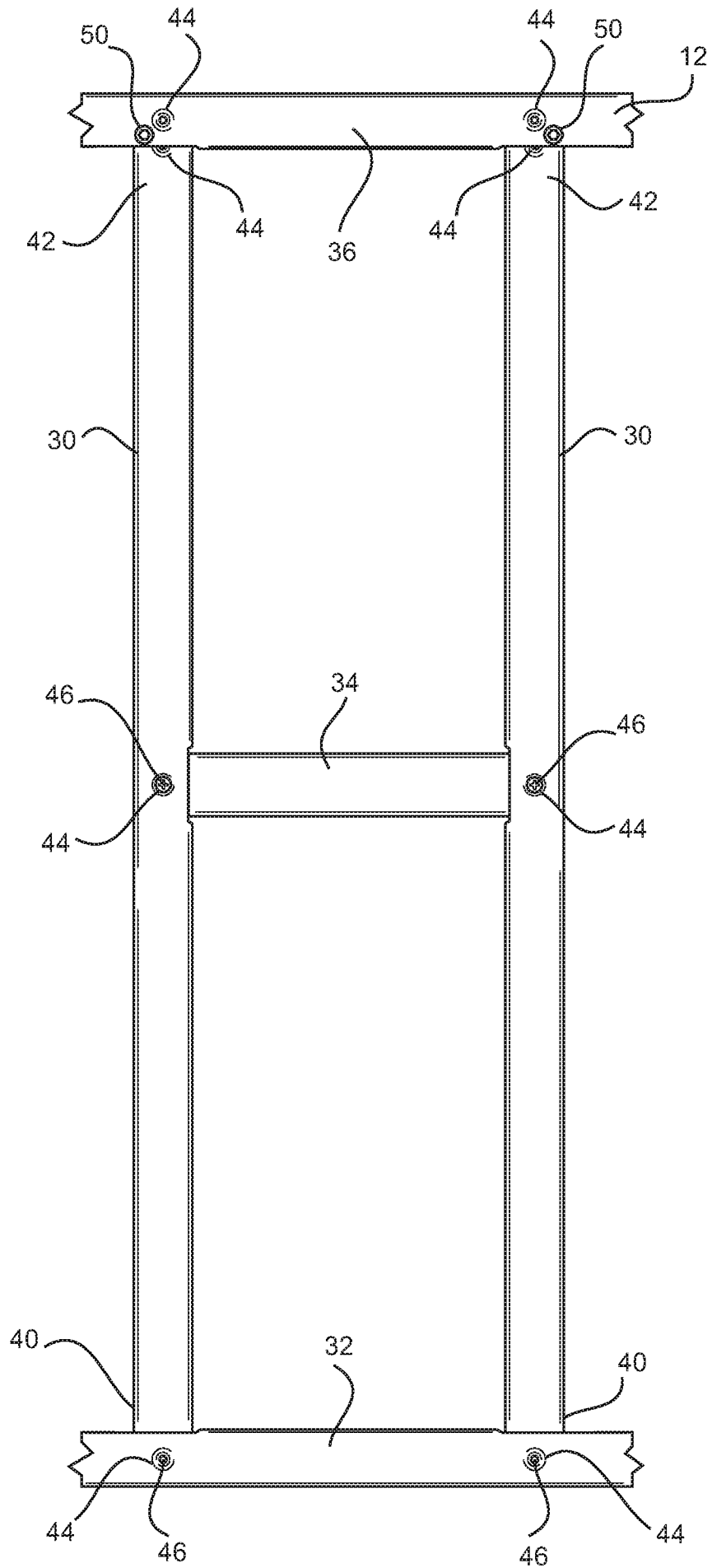


Fig. 7



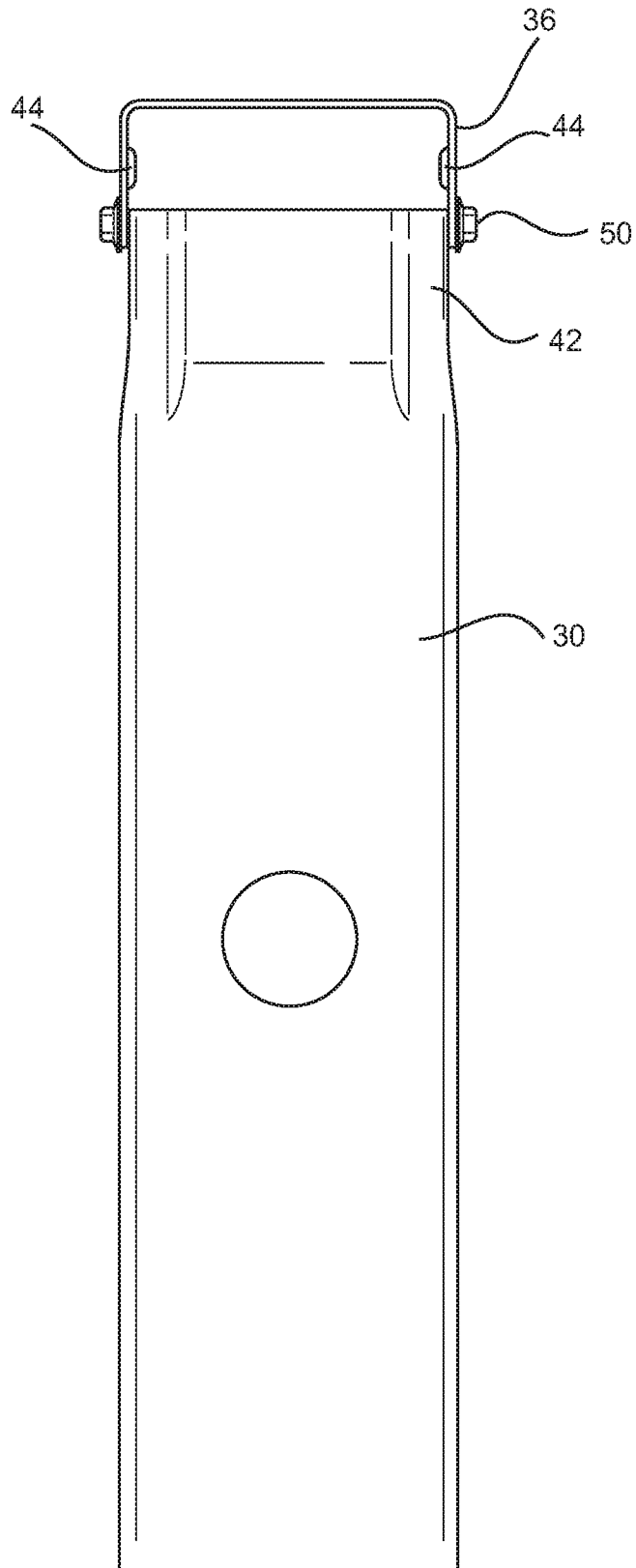


Fig. 9

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/AU2018/050977

## A. CLASSIFICATION OF SUBJECT MATTER

*E04B 1/16 (2006.01)*    *E04B 1/18 (2006.01)*    *E04B 1/30 (2006.01)*    *E04B 1/35 (2006.01)*    *E04H 1/00 (2006.01)*  
*E04G 11/02 (2006.01)*    *E04B 2/86 (2006.01)*    *E04C 2/30 (2006.01)*    *E04B 1/48 (2006.01)*    *E04C 3/34 (2006.01)*  
*E04B 5/40 (2006.01)*

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)

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)

DATABASES ( PATENW, GOOGLE PATENTS), IPC/CPC (E04B1/16, E04B1/161, E04B1/165, E04B1/18, E04B1/30, E04B1/348, E04B1/35, E04B1/3505, E04H1/00, E04B2/84, E04B2/86, E04B2/8629, E04C2/30/LOW, E04C3/30, E04C3/34, E04C3/36, E04B5/40, E04G11/36, E04C3/02/LOW, E04G11/02, E04B1/48, E04B1/483, E04B1/486), KEYWORDS (Storey, multi, pour, cement, column, steel, frame, shear, connector, exceed, load and like terms in various combinations)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	Documents are listed in the continuation of Box C	



Further documents are listed in the continuation of Box C



See patent family annex

* Special categories of cited documents:		
"A" document defining the general state of the art which is not considered to be of particular relevance	"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	
"E" earlier application or patent but published on or after the international filing date	"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	
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"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	
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family	
"P" document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search  
12 December 2018Date of mailing of the international search report  
12 December 2018

## Name and mailing address of the ISA/AU

AUSTRALIAN PATENT OFFICE  
PO BOX 200, WODEN ACT 2606, AUSTRALIA  
Email address: pct@ipaaustralia.gov.au

## Authorised officer

Bipin Sumant  
AUSTRALIAN PATENT OFFICE  
(ISO 9001 Quality Certified Service)  
Telephone No. +61262104068

INTERNATIONAL SEARCH REPORT C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		International application No. <b>PCT/AU2018/050977</b>
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2010/0058687 A1 (NORMAND) 11 March 2010 Whole document	1-12
A	WO 2014/056024 A1 (UNITISED BUILDING LIMITED) 17 April 2014 Whole document	1-12
A	US 2014/0298745 A1 (MARION INVESTMENTS LTD.) 09 October 2014 Whole document	1-12
A	WO 2006/058391 A1 (BLUESCOPE STEEL LIMITED) 08 June 2006 Whole document	1-12
A	WO 2013/091000 A1 (UNITISED BUILDING LIMITED) 27 June 2013 Whole document	1-12
A	US 3851024 A (CULL et al.) 26 November 1974 Whole document	1-12

**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:  
the subject matter listed in Rule 39 on which, under Article 17(2)(a)(i), an international search is not required to be carried out, including
2.  Claims Nos.:  
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:
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:

**See Supplemental Box for Details**

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 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.:  
**1-12**

**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.

**Supplemental Box****Continuation of: Box III**

This International Application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept.

This Authority has found that there are different inventions based on the following features that separate the claims into distinct groups:

- Claims 1-12 are directed to a method of constructing a building. The feature of creating a break in the load path of the frame and thus transferring the load from the at least one higher storey from the building frame to the cured columns is specific to this group of claims.

- Claims 13-15 are directed to a wall frame component. The feature of removal of the fixing members allowing the top-most track to move into its lowered position is specific to this group of claims.

PCT Rule 13.2, first sentence, states that unity of invention is only fulfilled when there is a technical relationship among the claimed inventions involving one or more of the same or corresponding special technical features. PCT Rule 13.2, second sentence, defines a special technical feature as a feature which makes a contribution over the prior art.

When there is no special technical feature common to all the claimed inventions there is no unity of invention.

In the above groups of claims, the identified features may have the potential to make a contribution over the prior art but are not common to all the claimed inventions and therefore cannot provide the required technical relationship. Therefore there is no special technical feature common to all the claimed inventions and the requirements for unity of invention are consequently not satisfied *a priori*.

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/AU2018/050977**

This Annex lists known patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

<b>Patent Document/s Cited in Search Report</b>		<b>Patent Family Member/s</b>	
<b>Publication Number</b>	<b>Publication Date</b>	<b>Publication Number</b>	<b>Publication Date</b>
US 2010/0058687 A1	11 March 2010	US 2010058687 A1	11 Mar 2010
WO 2014/056024 A1	17 April 2014	WO 2014056024 A1	17 Apr 2014
US 2014/0298745 A1	09 October 2014	US 2014298745 A1	09 Oct 2014
		CA 2853511 A1	20 Jun 2013
		CA 2912994 A1	20 Jun 2013
		EP 2790883 A1	22 Oct 2014
		NZ 625382 A	29 Jan 2016
		SG 11201402089U A	27 Jun 2014
		WO 2013086638 A1	20 Jun 2013
WO 2006/058391 A1	08 June 2006	WO 2006058391 A1	08 Jun 2006
		AU 2005312352 A1	08 Jun 2006
WO 2013/091000 A1	27 June 2013	WO 2013091000 A1	27 Jun 2013
US 3851024 A	26 November 1974	US 3851024 A	26 Nov 1974
		CA 921719 A	27 Feb 1973
		DE 2022965 A1	19 Nov 1970
		FR 2042608 A1	12 Feb 1971
		GB 1314876 A	26 Apr 1973
		JP S516983 B1	03 Mar 1976
		MY 7600255 A	31 Dec 1976
		NL 7006835 A	17 Nov 1970
		NL 151763 B	15 Dec 1976

**End of Annex**

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

Form PCT/ISA/210 (Family Annex)(January 2015)