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E1S SSV S126

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GB 1310125 A GB 1025231 A GB 0671800 A
GB 0515819 A GB 0492810 A GB 0375162 A
GB 0336567 A GB 0243483 A

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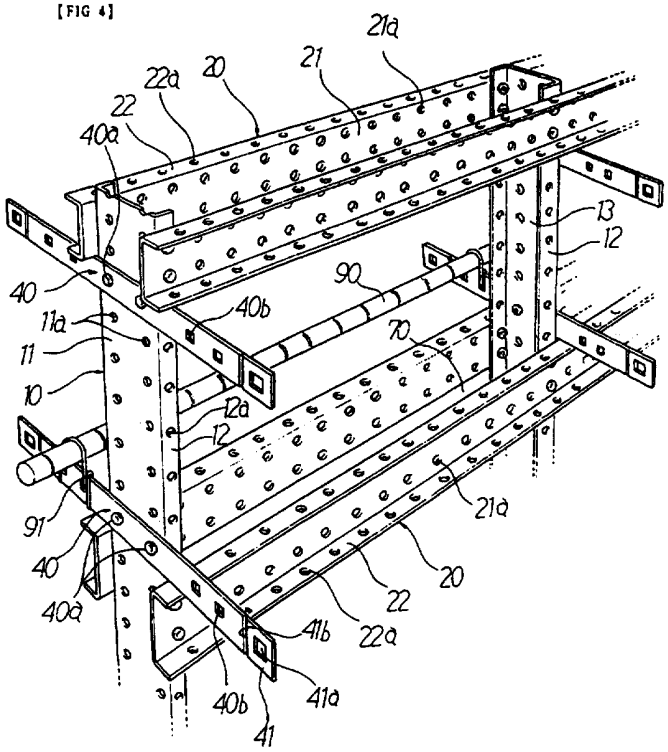
INT CL[6] E04B , E04C , E04G
On-line database - Derwent W.P.I

(54) Framework for use in concrete walls for supporting wall shuttering

(57) A framework structure for use in a concrete wall comprises spaced steel uprights (10) interconnected by beams (20) and provided with cross-members 40 which act as brackets for supporting temporary (60, not shown in Fig.4) or permanent shuttering. The framework also supports reinforcing rods (90). Insulation boards may be arranged in the channel defined between the uprights, and the ends of members (40) may be broken off at weakened portions (41b) when the framework is used with temporary shuttering.

[FIG 4]



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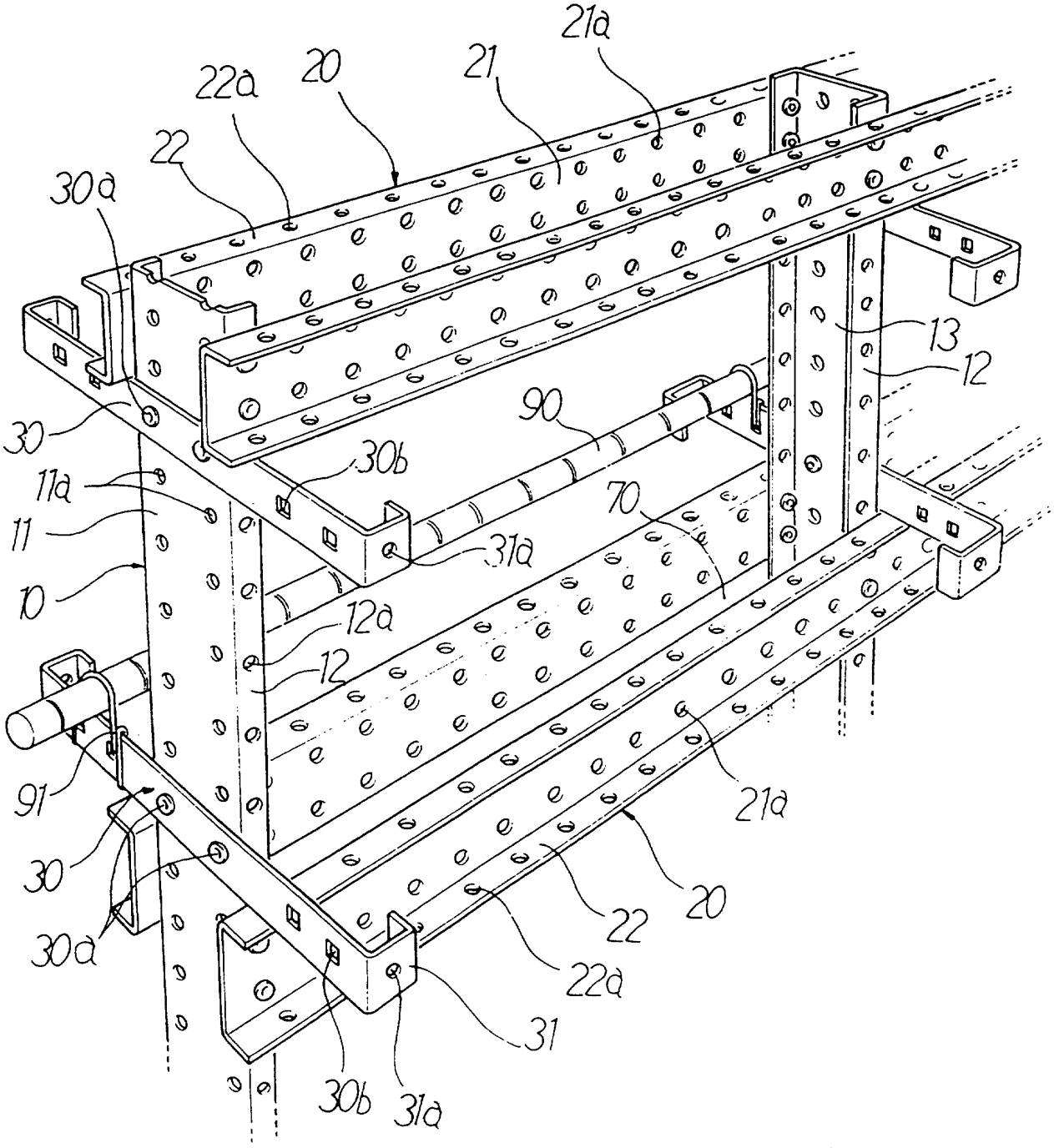
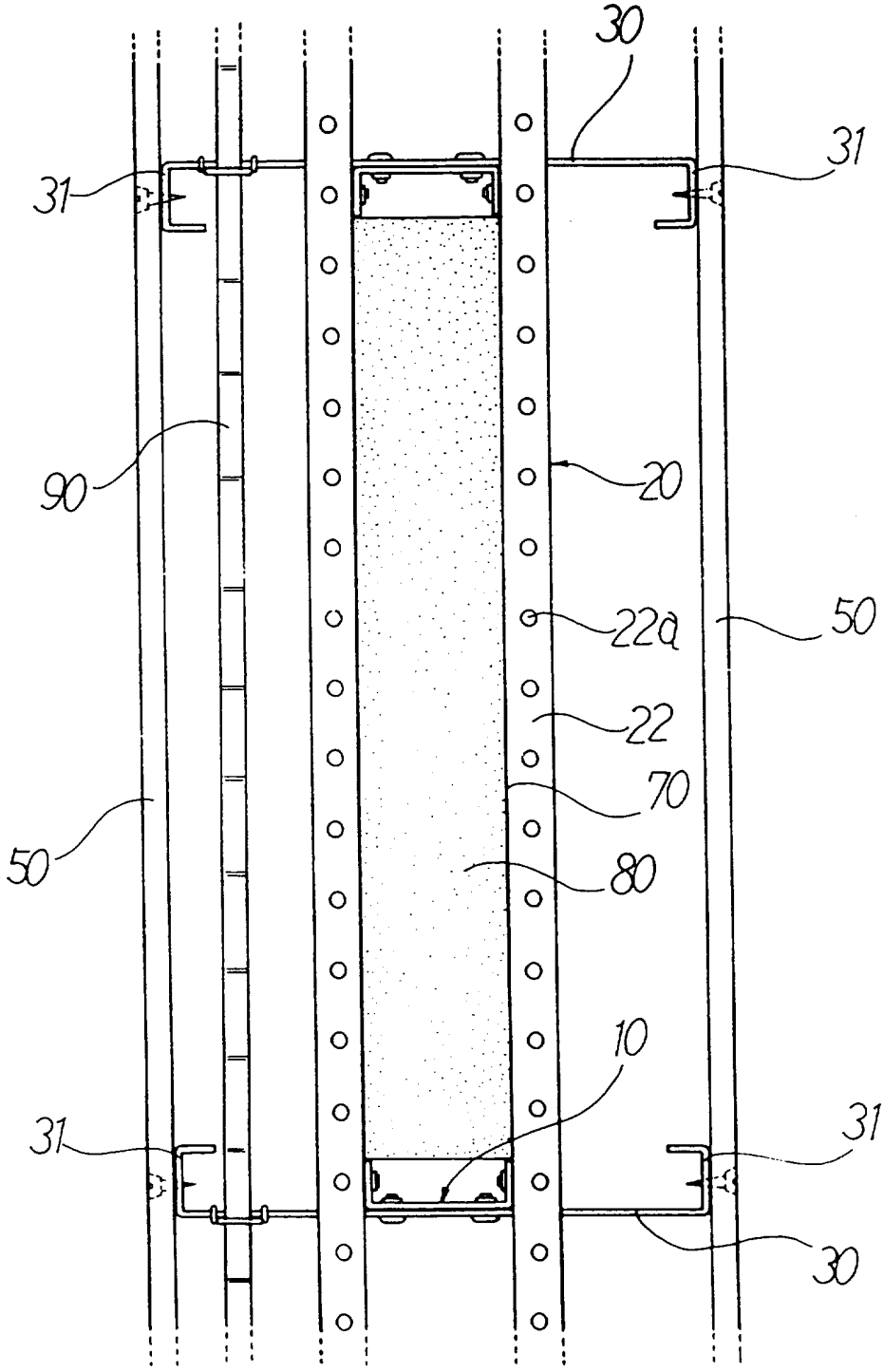
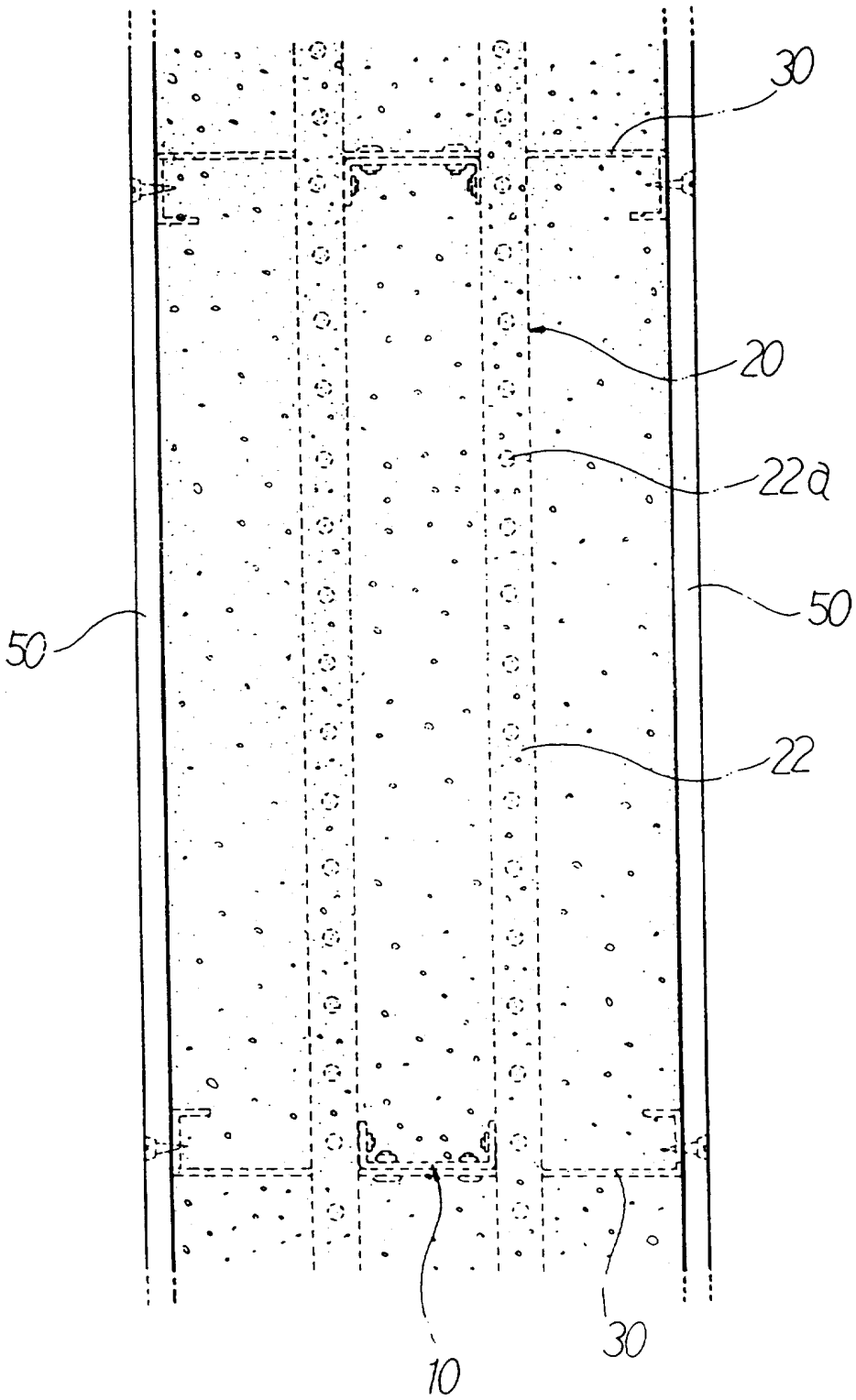
【FIG 1】


21a
22a
20
21
22
30a
13
12
90
30
30b
11a
11
70
31a
10
12a
12
91
21a
30
22
20
30a
22a
31
30b
31a

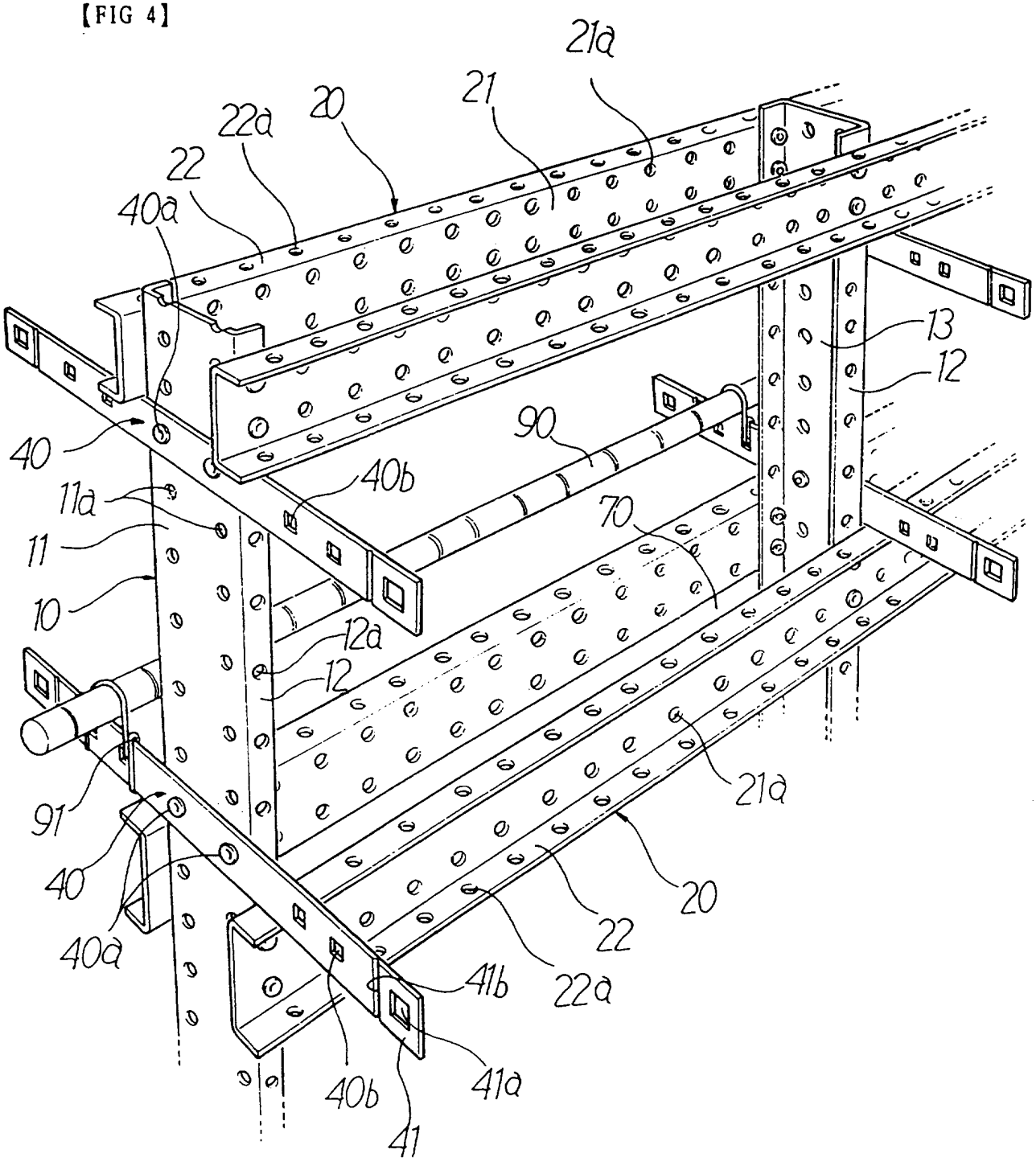
【FIG 2】



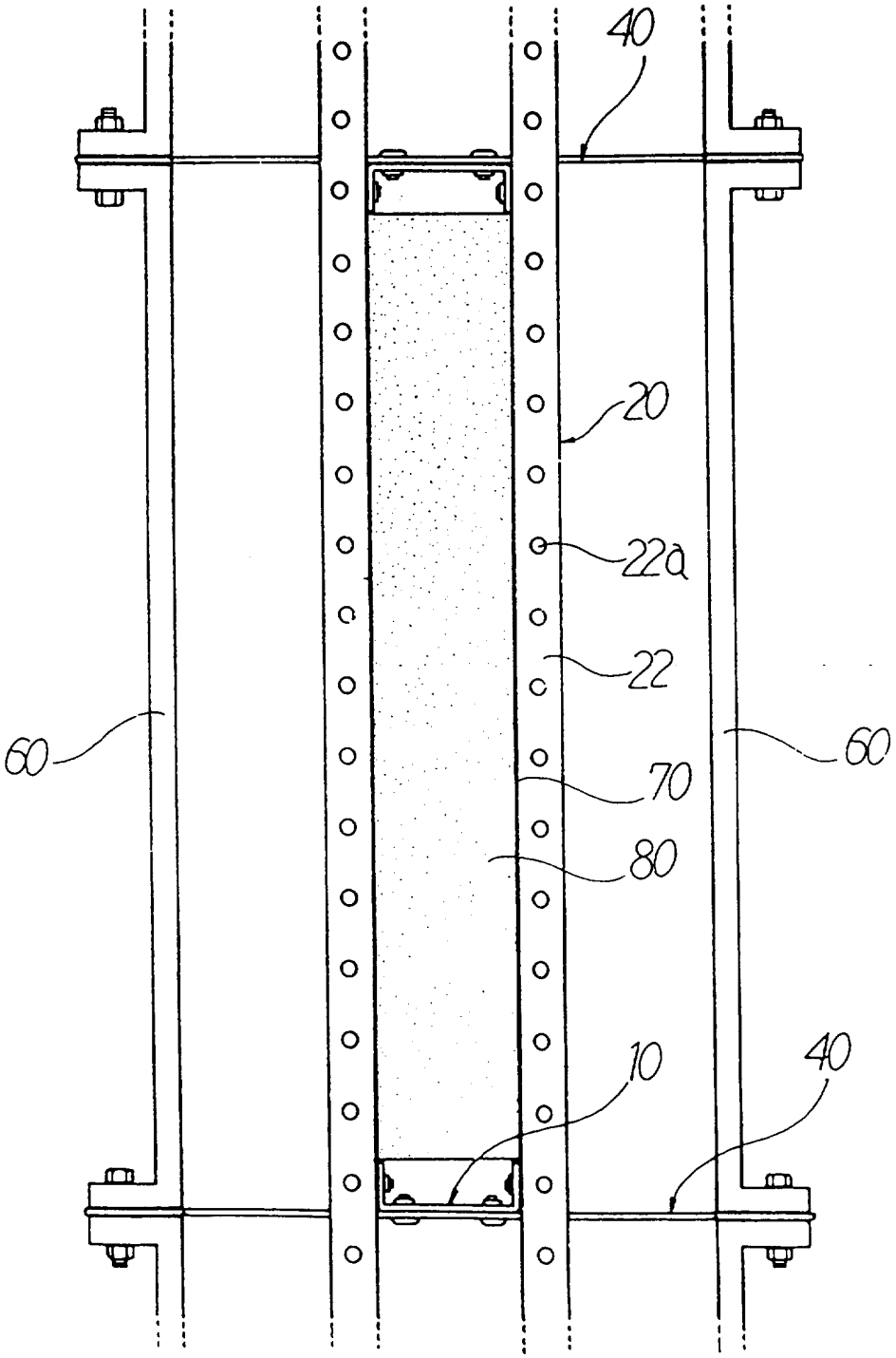
【FIG 3】



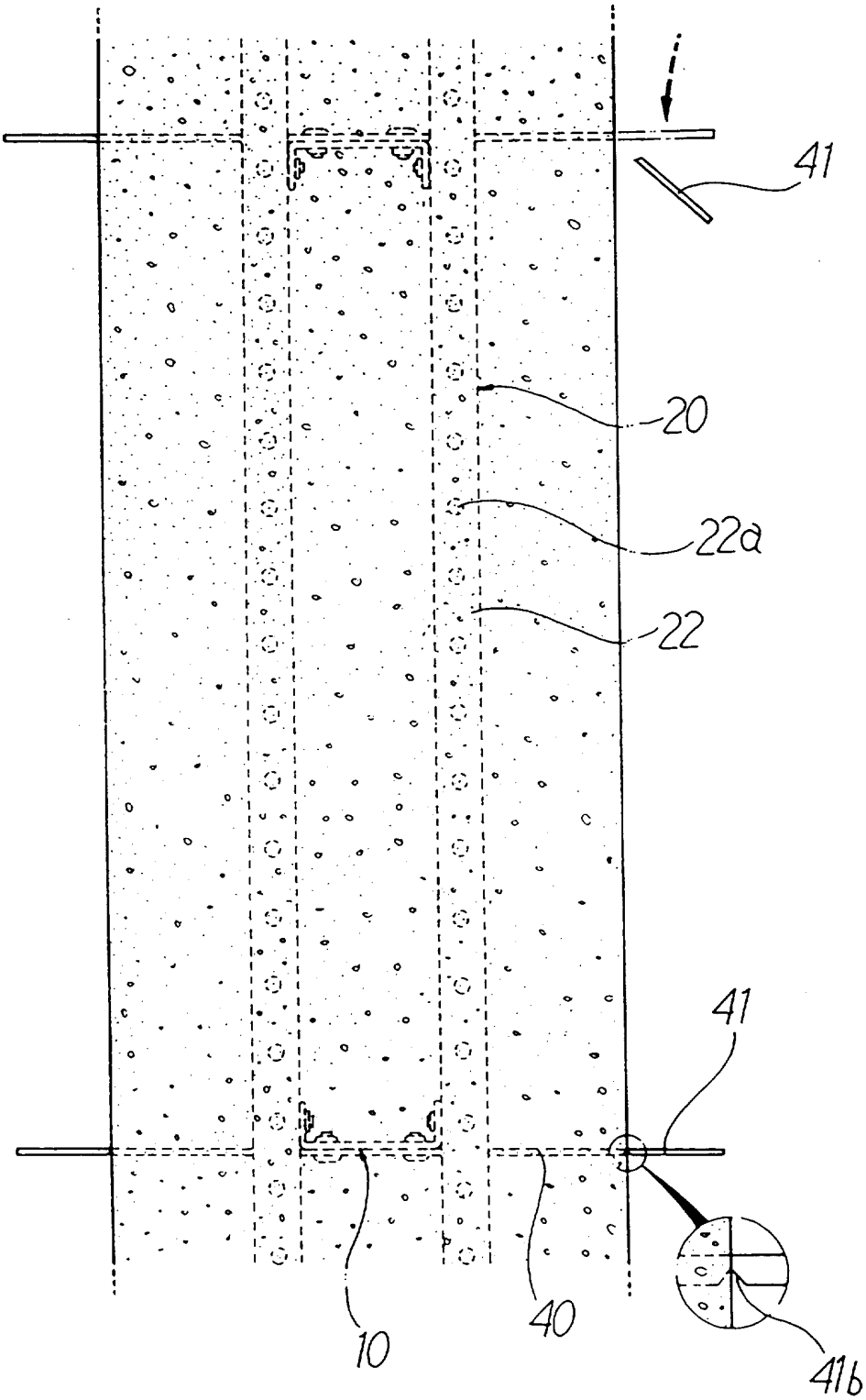
【FIG 4】


21a
21
20
22a
22
40a
40
11a
11
10
91
40
40a
40b
41
41a
41b
22a
22
20
21a
70
90
12a
12
13
12

【FIG 5】



【FIG 6】



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FRAME STRUCTURE AND METHOD OF CONSTRUCTION BY USING THE SAME

This invention relates to a frame structure, preferably a steel frame structure and a method of construction by using the same, in which the frame structure is installed as a framework of buildings in case of construction of apartment houses, buildings, factories, and the like, and more specifically, to a sectional steel-frame structure and a method of construction by using the same in which the sectional steel-frame structure may be assembled and constructed rapidly and conveniently and by using the steel-frame structure, it is possible to simultaneously perform construction work of interior/exterior materials and insulation boards and concrete pouring work, so that construction period and construction cost may be reduced considerably.

Generally, when construction of a frame structure for a concrete building is performed, reinforcing rods, section steels, beams, and the like are arranged in perpendicular and horizontal directions for inner and outer walls. Interior/exterior molding plates are installed at both sides of the arranged materials. Fresh concrete is poured in a mold formed as above. After the poured concrete is cured in the molds, reinforcing rods are arranged on the cured concrete. Molding plates are installed on the reinforcing rod. Fresh concrete is poured in the molds to form a slab. When the inner and outer walls and slabs are formed completely, removal work of the mold and construction work of the insulation boards and interior/exterior materials are performed in order.

The conventional construction process will now be explained in more detail. In case of construction of a building, after foundation work of the ground, reinforcing rods, section steels, beams, and the like are arranged on

certain portions in the perpendicular and horizontal directions and the arranged reinforcing rods are linked to each other. Wooden molds are usually installed on the inner and outer sides of the arranged reinforcing rods. The inner and outer molds may be supported by struts set up on respective outer surfaces of the interior/exterior molding plates or interval keeping means.

The conventional steel-frame structure and method of construction by using the same have, however, disadvantages that the struts and the interval keeping means are complicated to use since the struts must be respectively struck with big nails against the molding plates so that the installation and removal of the struts are difficult and the interval keeping means must be fixed between the interior/exterior molds by passing though therebetween, which is time consuming.

Further, the conventional steel-frame structure and method of construction by using the same have further problems that when the interior/exterior molding plates installed as above are removed after the walls and the slabs are completely cured as a concrete body, so that it takes too long time to remove the struts, the interval keeping means and the molding plates in order and labour cost increases heavily due to subsidiary materials cost such as the molding plates, struts and interval keeping means.

Also, the conventional method of construction has still further problems that construction cost increases considerably due to extension of construction period and heavy expense of labour cost, since the construction works of the inner and outer walls, the insulation boards, and the interior/exterior materials are performed not simultaneously but separately in such a manner that the insulation boards are installed inside an outer wall after construction work of the inner and outer walls and slabs, the construction work of the insulation work for installing insulation plates inside the outer walls and piling of bricks, and the

interior/exterior materials are performed in order.

The object of the present invention is to provide a sectional steel-frame structure in which vertical members and horizontal members as a section steel in the form of "[" may be assembled in the form of lattice, thus constructing buildings more rapidly and conveniently.

Another object of the present invention is to provide a construction method by which it becomes possible to simultaneously perform a plurality of individual works such as casting work of walls, the construction work of the interior/exterior materials and the insulation boards by using the section steel-frame structure, thus considerably reducing construction expenses and labour cost.

According to the invention there is provided a mold frame for constructing a structure comprising an inner frame formed of opposing substantially vertical member space by opposing spacer members affixed thereto defining an inner channel in the substantially vertical plane; and a plurality of brackets fixed to the inner frame and extending either side of the inner channel for supporting mold plates substantially parallel to and spaced from either side of the inner channel. It will be recognised that the invention can be placed at any other suitable orientation than vertical. It will further be recognised that any other suitable frame material than steel can be used and any other suitable mold material than concrete can be used.

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

Fig. 1 is a perspective view showing a sectional steel-frame structure according to an embodiment of the present invention;

Fig. 2 is a plan view showing inner and outer walls molding process to simultaneously perform construction of insulation boards and interior/exterior

materials by using a steel-frame structure according to the preferred embodiment of the present invention;

Fig. 3 is a plan view showing inner and outer walls molding process to perform concrete pouring construction in state as Fig. 2;

Fig. 4 is a perspective view showing a sectional steel-frame structure according to another preferred embodiment of the present invention;

Fig. 5 is a plan view showing molding plates fixing process to perform insulation construction work and concrete pouring work by using a steel-frame structure according to the preferred embodiment of the present invention; and

Fig. 6 is a plan view showing removal process of cutting plates of a bracket protruded from a concrete wall body by removing the molding plates.

In Fig. 1, a sectional steel-frame structure according to the present invention has vertical members 10, horizontal members 20 and brackets 30.

The vertical members 10 are section steel materials in the form of "[". The vertical members 10 have a number of holes 11a perforated on surfaces 11 thereof in two rows at regular intervals in a longitudinal direction and a number of holes 12a perforated on two end parts 12 at regular intervals in a longitudinal direction.

The horizontal members 20 are section steel materials in the form of "[" as the vertical members 10. The horizontal members 20 have a number of holes 21a perforated on surfaces 21 thereof in two rows at regular intervals in a longitudinal direction and a number of holes 22a perforated on two end parts 22 at regular intervals in a longitudinal direction.

The brackets 30 in the form of "⊂" has two bended portions 31, a pair of holes 30a in the centre thereof to be fixed to the vertical member 10, and a pair of steel wire inserting holes 30b between the holes 30a and the bend portions 31

to fix a reinforcing rod 90 by a steel wire 91. Screw holes 31a are perforated on the sides 31 of the brackets 30 to fix interior/exterior materials 50.

As shown in Fig. 1, a sectional steel-frame structure according to the present invention is formed as follows:

The vertical members 10 are oppositely set up with a certain interval to face inner surfaces thereof each other in order to make an insertion space 70 for inserting an insulation board 80.

The horizontal members 20 are assembled on upper and lower sides 12 of the vertical members 10 in the form of lattice by riveting or bolting through the holes 12a on the sides 12 of the vertical members 10 and the holes 21a on the surfaces 21 of the horizontal members 20 which are faced and coincided at regular intervals.

The brackets 30 are fixed on the vertical members 10 by riveting or bolting through the holes 30a of the brackets 30 and the holes 11a of the surfaces 11 of the vertical members 10.

According to the present invention, the vertical members 10, the horizontal members 20 and the brackets 30 may be assembled fast to maintain the framework of the steel-frame structure. If necessary, reinforcing rods may be easily fixed on the brackets 30 by steel wire 91 through a pair of steel wire insertion holes 30b. An insulation board 80 is inserted in insertion groove 70 formed between the vertical members 10 and the horizontal members 20. In the manner as above, operation efficiency may be improved, thus reducing the construction period and the construction expenses by reducing the consumption of manpower.

A construction method by using the sectional steel-frame structure according to the present invention will now be explained.

As shown in Fig. 2, the insulation board 80 is inserted in the insertion

groove 70 of the steel-frame structure formed as shown in Fig. 1 and interior/exterior plates 50 are fixed on both bended portions 31 of the bracket 30 by driving a well-known drill screw.

As shown in Fig. 3, fresh concrete is poured in a space formed by fixing the interior/exterior materials 50 serving as molding plates. The interior/exterior materials 50 are kept at the predetermined intervals from the horizontal member 20, since the end parts of the bracket 30 are more protruded than the horizontal member 20. Therefore, when the fresh concrete is poured, it is to prevent the sides 22 of the horizontal member 20 from being exposed out the concrete wall to be cured, so that the fresh concrete is smoothly inserted between the interior/exterior materials 50 and the horizontal members 20 in order to improve the adhesive power of the interior/exterior materials 50.

To perform the insulation construction of the outer wall, the insulation board 80 is inserted in the insertion groove 70 formed between two vertical members 10 and fresh concrete is poured in the groove 70.

When the poured concrete is cured to form a wall body, the interior/exterior materials 50 fixed to the bended surfaces 31 of the bracket 30 may be kept being fixed very solidly on both sides of the wall body including the insulation board 80.

When the insulation construction does not need, only the interior/exterior materials 50 without the insulation board 80 are fixed on the surfaces 31 of the bracket 30 by screws and fresh concrete is poured.

The reinforcing rods 90 are fixed on the bracket 30 by using steel wire 91 through the steel wire insertion holes 30b of the brackets 30 and fresh concrete is poured. In the manner as above, the reinforcing rods 90 are kept on brackets 30, thus improving arrangement maintaining power.

The sectional steel-frame structure and method of construction by using

the same have advantages that the construction period and labour cost may be reduced since the construction method does not need an installation work and a dismantlement work of the molding plates, struts and interval keeping means.

In Fig. 4, the sectional steel-frame structure according to the present invention has brackets 40 instead of the brackets 30 as the prescribed above.

Regarding the components except the brackets 40, like parts have been accorded like numerals and explanation thereof is not repeated.

The brackets 40 have two cutting plates 41 which may be cut by two cutting grooves 41b of both end parts thereof, a pair of holes 40a in the centre of the brackets 40 to fix on the vertical members 10, and a pair of steel wire insertion holes 40b between the holes 40a and the cutting plates 41 to fix reinforcing rods 90 by steel wires 91 through the steel wire insertion holes 40b. Holes 41a are formed on surfaces of both cutting plates 41 to fix molds 60.

As shown in Fig. 4, a sectional steel-frame structure according to the present invention is formed in the manner as follows.

The vertical members 10 are oppositely set up with a certain interval to face inner surfaces thereof each other in order to make an insertion space 70 for inserting an insulation board 80.

The horizontal members 20 are assembled on upper and lower sides 12 of the vertical members 10 in the form of lattice by riveting or bolting through the holes 12a on the sides 12 of the vertical members 10 and the holes 21a on the surfaces 21 of the horizontal members 20 which are faced and coincided at regular intervals.

The brackets 40 are fixed on the vertical members 10 by riveting or bolting through the holes 40a of the bracket 40 and the holes 11a of the surfaces 11 of the vertical members 10.

A method of construction by using the sectional steel-frame structure as

above will be explained in more detail hereinafter.

In case of directly wallpapering or painting on concrete wall bodies without the interior/exterior materials, an insulation board 80 is inserted in the insertion grooves 70 of the steel-frame structure formed in the manner as above.

Molding plates 60 are installed on both cutting plates 41 of the bracket 40 to coincide the inside faces of the molding plates 60 with the cutting grooves 41b of the bracket 40.

The holes 41a of the cutting plates 41 of the brackets 40 and holes of the molding plates 60 coincided each other are coupled by bolts.

Fresh concrete is poured in the space formed by fixing the molding plates 60. When the poured concrete is cured completely, the molding plates 60 are removed.

As shown in Fig. 6, the cutting plates 41 of the brackets 40 protrude out the cured concrete wall body after removal of the molding plates 60. As the cutting grooves 41b of the cutting plates 41 are coincided with the surface of the concrete wall body, the cutting plates 41 can be easily removed by hammering, so that the surface of the concrete wall body becomes smooth and additional interior/exterior plates may be adhered easily.

When the insulation construction is not needed, only the molding plates 60 are fixed on the cutting plates 31 of the bracket 40 by bolting and fresh concrete is poured.

It will be appreciated by persons skilled in the art that numerous variations and/or modifications may be made to the invention as shown in the specific embodiments without departing from the spirit or scope of the invention as broadly described. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive.

CLAIMS

1. A mold frame for constructing a structure comprising:

an inner frame formed of opposing substantially vertical members spaced by opposing spacer members affixed thereto defining a channel in a substantially vertical plane; and

a plurality of brackets fixed to the inner frame and extending either side thereof for supporting mold plates substantially parallel to and spaced from either side of the inner frame and substantially parallel to the channel.

2. A mold frame as claimed in claim 1 in which the vertical and spacer members have a plurality of predetermined fixing points allowing the dimensions of the channel to be defined.

3. A mold frame as claimed in claim 1 or claim 2 in which each bracket includes an end portion spaced from the inner frame supporting a mold plate.

4. A mold frame as claimed in claim 3 in which the end portions are connected to the brackets and severable from the brackets by a weakened portion.

5. A mold frame as claimed in claim 4 further including concrete formed about the mold frame with the mold plates removed and the end portions of the brackets severed.

6. A mold frame as claimed in claim 3 further comprising concrete formed between mold plates permanently fixed to the end portions.

7. A mold frame as claimed in any preceding claim further including an insulation element provided in the channel.

8. A mold frame as claimed in any preceding claim in which the inner frame and brackets are formed of steel frame sections.

9. A method of constructing a concrete structure comprising forming an inner frame by fixing opposing spacer members to opposing substantially vertical members to define a channel substantially in the vertical plane, fixing brackets to the inner frame extending either side of the inner frame, fixing mold plates to the brackets spaced from the inner frame and substantially parallel to the channel and pouring concrete into the mold space thus defined.

10. A method claimed in claim 9 further comprising the step of placing an insulation element in the inner channel.

11. A method as claimed in claims 9 or 10 in which the brackets include severable end pieces to which the mold plates are fixed, further comprising the steps of removing the mold plates, and severing the end pieces.

12. A structure formed by the method of any of claims 9 to 11.

13. A sectional steel-frame structure comprising:

vertical members having a number of holes perforated on surfaces thereof in two rows at regular intervals in a longitudinal direction and a number of holes perforated on two end parts at regular intervals in a longitudinal

direction and being section steel materials in the form of "[";

horizontal members having a number of holes perforated on surfaces thereof in two rows at regular intervals in a longitudinal direction and a number of holes located on two end parts at regular intervals in a longitudinal direction and being section steel materials in the form of "["; and

brackets having two bent portions, a pair of holes in the centre to be fixed to the vertical members, and a pair of steel wire inserting holes between the holes and the bent portions to fix a reinforcing rod by a steel wire, characterised in that:

the vertical members are oppositely set up with a certain interval to face inner surfaces of the other vertical member in order to make an insertion space for inserting an insulation board;

the horizontal members are assembled on upper and lower sides of the vertical members in the form of a lattice by riveting or bolting through the holes on the sides of the vertical members and the holes on the surfaces of the horizontal members which are faced and coincided at regular intervals; and

the brackets are fixed on the vertical members by riveting or bolting through the holes of the brackets and the holes of the surfaces of the vertical members.

14. A sectional steel-frame structure comprising:

vertical members having a number of holes perforated on surfaces thereof in two rows at regular intervals in a longitudinal direction and a number of holes perforated on two end parts at regular intervals in a longitudinal direction and being section steel materials in the form of "[";

horizontal members having a number of holes perforated on surfaces thereof in two rows at regular intervals in a longitudinal direction and a number

of holes located on two end parts at regular intervals in a longitudinal direction and being section steel materials in the form of "["; and

brackets having two cutting plates severable by cutting cutting grooves at both end parts thereof, a pair of holes in the centre of the brackets to fix on the vertical members, a pair of steel wire insertion holes between the holes and the cutting plates to fix a reinforcing rod by steel wires through the steel insertion holes, and holes formed on surfaces of both cutting plates to fix molding plates,

characterised in that:

the vertical members are oppositely set up with a certain interval to face inner surfaces of the other vertical member in order to make an insertion space for inserting an insulation board;

the horizontal members are assembled on upper and lower sides of the vertical members in the form of a lattice by riveting or bolting through the holes on the sides of the vertical members and the holes on the surfaces of the horizontal members which are faced and coincided at regular intervals; and

the brackets are fixed on the vertical members be riveting or bolting through the holes of the brackets and the holes of the surfaces of the vertical members.

15. A method of construction by using a sectional steel-frame structure comprising the process of:

assembling the sectional steel-frame structure as claimed in claim 13;

inserting an insulation board in an insertion space between the vertical members;

fixing interior/exterior materials on two bended portions of the bracket by driving screws; and

pouring fresh concrete.

16. A method of construction by using the sectional steel-frame structure comprising the process of:

assembling the sectional steel-frame structure as claimed in claim 14;

inserting an insulation board in an insertion space between the vertical members;

fixing molding plates on cutting plates of the bracket by bolting and pouring fresh concrete in the mold;

removing the molding plates after the poured concrete is cured; and

cutting cutting plates of the bracket protruded out of a concrete wall body after removal of the molds.

The Patent Office

14

Application No: GB 9724124.4
Claims searched: 1-16

Examiner: Mr D. J. Lovell
Date of search: 12 February 1998

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): E1D (DF142, DF193, DLEA, DLEE, DLEJ, DPN) E1S (SSV)

Int Cl (Ed.6): E04B, E04C, E04G

Other: On-line database - Derwent W.P.I

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
A	GB 1310125	Thorgusen	
A	GB 1025231	Wood	
A	GB 671800	Antill	
A	GB 515819	Scott	
A	GB 492810	Robson	
A	GB 375162	Thompson	
A	GB 336567	Jaklin	
A	GB 243483	Moir	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.