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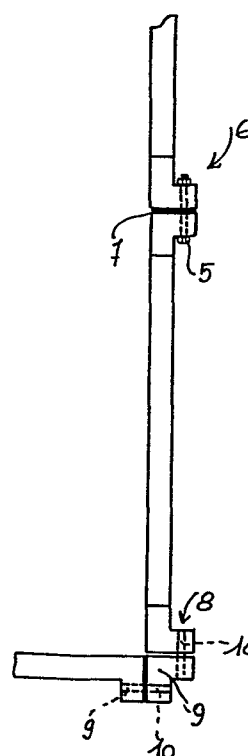
71 Applicant: Velo Dalbrenta, Gianfranco
Via Comm. Angelo Velo 14
I-35014 Fontaniva (Province of Padova)(IT)

72 Inventor: Velo Dalbrenta, Gianfranco
Via Comm. Angelo Velo 14
I-35014 Fontaniva (Province of Padova)(IT)

74 Representative: Modiano, Guido et al,
MODIANO & ASSOCIATI S.A.S. Via Meravigli, 16
I-20123 Milan(IT)

54 **Modular reinforced concrete element for prefabricating buildings.**

57 The modular reinforced concrete element comprises a self-supporting frame of reinforced concrete having a substantially L-like cross-sectional configuration and adapted for association with other like frames by mechanical fastening and sealing devices (5), any two contiguous modular elements being effective to be associated together to a corner arrangement with the interposition of a straight L-like cross-section molding (9) having holes (10) for accommodating connection bolts therethrough.



This invention relates to a modular reinforced concrete element for building prefabrication.

In the field of building prefabrication by means of reinforced concrete elements, various techniques
5 are known which allow a number of elements to be set up in suitably equipped shops and later assembled together at the job site to produce a desired building or structure.

The main problem encountered in designing
10 reinforced concrete prefabricated elements is that of producing modules which can be manufactured on an industrial, and accordingly repeatable, basis but are sufficiently flexible in application to afford adequate freedom in architectural design.

15 A further problem, unsolved heretofore, is originated by the very characteristics of the material employed, i.e. the heavy weight of the ultimate structure.

The latter factor imposes serious limitations on
20 the economy of the prefabricate since, on account of today's high transportation costs, it can only be conveniently used if the pre-fabrication shop happens to be located at a relatively modest distance from the construction site. That distance will be largely
25 dependent in practice on transportation costs and the weight of the prefabricate being shipped.

Accordingly the task of this invention is to provide an element as indicated, which can be pre-

fabricated using repetitive industrial techniques such as to lower costs and increase the production output.

Within this task it is an object of the invention to provide
5 a self-supporting modular element which can be readily assembled to other similar or complementary elements.

It is another object of this invention to provide an element as indicated, which can either be implemented as a structural bearing element for
10 subsequent completion at the job site or as a completed and finished element.

Yet another object of the invention is to provide an element as indicated, which has a relatively light weight and small dimensions, thereby its erection
15 at the construction site requires no heavy duty construction equipment.

According to one aspect of the present invention, the above task and objects as well as yet other objects such as will be apparent hereinafter, are achieved by a modular
20 reinforced concrete element for building prefabrication, characterized in that it comprises a self-supporting frame of reinforced concrete having a substantially I-like cross-sectional configuration, said frame being adapted for association with other like frames by means
25 of mechanical fastening and sealing devices.

Further features and advantages of the invention will become more apparent from the following detailed description of a preferred embodiment thereof, given herein by way of example and not of limitation with

reference to the accompanying drawings, where:

Figure 1 is an isometric view of this element;

Figure 2 is a cross-sectional view of two such elements laid side-by-side;

5 Figure 3 illustrates a complementary corner element;

Figure 4 is a schematical isometric view of the element casting form;

10 Figure 5 shows a section taken through the form in the open condition thereof;

Figure 6 is a perspective view of a building constructed with prefabricated elements according to the invention; and

15 Figure 7 is a sectional view taken through the building of Figure 6.

With reference to the drawing figures, the modular element of this invention comprises a frame 1 having an angle or L-like cross-sectional configuration which includes a first raised flange or rib 2 and second flange or rib 3 extending in the same plane as the panel infilling to be obtained, for example, directly by means of a slab 4 cast concurrently with said frame.

25 The element configuration provides in practice a self-supporting frame or relatively light weight and small modular dimensions, which can be installed in combination with other similar elements without requiring the availability of any special construction equipment.

Thus, the erection of a building, and construction work, may proceed even in the absence of cranes or hoists, and can be carried out by comparatively unskilled labor, since the connection of any one
5 element to adjacent ones is effected by means of throughgoing bolts 5 with the possible interposition at the resulting joint 6 of a sealant 7.

The bolts 5 are led through holes 8 provided in the rib 2.

10 To accomplish corner joints, a complementary corner element 9 is provided which comprises a straight molding whose L-like cross-section shape matches the cross-sectional shape of the frame 1 and has a set of holes 10 along both its cross-section pieces
15 or flanges.

The cited modular elements are prepared in a form 11 having a middle diaphragm 12 made rigid to a base 13 and two movable half-forms 14 and 15 for shakeout purposes.

20 The form 11 has a considerable length dimension, and enables the formation of two rows of elements, indicated at 16 and 17 in Figure 4, which are separated from each other by intervening partition diaphragms 18.

By inserting in the form temporary filling
25 elements, apertures may be obtained in the plate 4 to provide apertured modular elements.

By removing the diaphragms 18, multiple elements may be obtained which would be particularly suitable for roof and floor applications.

30 Figures 6 and 7 illustrate an exemplary building

incorporating the modular elements of this invention, wherein the walls are formed with filled elements 19 and apertured elements 20, corner elements 21, and roof plates 22.

5 The assembling procedure is quite straightforward and readily carried out, thereby the resulting building and its installation procedure lend themselves well for erection in such emergencies as are encountered in disaster situations.

10 In fact, in this particular case, the availability is highly appreciated of light weight prefabricates which can be easily transported and installed without involving the use of constructional equipment and machinery.

15 It should be further noted that this reinforced concrete prefabricate can also be disassembled after use and recovered for further installations.

From the latter standpoint, it would be specially advantageous for use at temporarily set up job sites,
20 it combining the features of a concrete construction with the versatility of a readily assembled and disassembled structure.

This element may also be utilized to produce light and thin sheds so arranged spatially as to be
25 self-supporting.

Furthermore, reservoirs, either fully or in part embedded in the ground, may be constructed to produce swimming pools.

It will be appreciated from the foregoing
30 description that the invention achieves its objects,

by providing a simple assembly-type prefabricated element of either standard or prestressed reinforced concrete construction with which different structures can be erected to suit a variety of application requirements.

Of course, this same inventive concept may be variously embodied without departing from the scope of the invention.

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C L A I M S

1 1. A modular reinforced concrete element for build-
2 ing prefabrication, characterized in that it comprises
3 a self-supporting frame (1) of reinforced concrete hav-
4 ing a substantially L-like cross-sectional configura-
5 tion, said frame (1) means adapted for association
6 with other like frames (1) by means of mechanical fas-
7 tening and sealing devices.

1 2. A modular element according to Claim 1, char-
2 acterized in that said L-like cross-section includes
3 two substantially identical flanges (3,2), one (3)
4 extending parallel and one normal (2) to the plane of
5 lay of said frame.

1 3. A modular element according to one or both of
2 the preceding claims, characterized in that said flange
3 extending normal (2) to said frame plane of lay has through-
4 going holes (8) for the insertion of mechanical
5 means of connection to similar contiguous elements.

1 4. A modular element according to one or more of
2 the preceding claims, characterized in that said me-
3 chanical means (5) of connection are removable and in
4 particular comprise through bolts (5)..

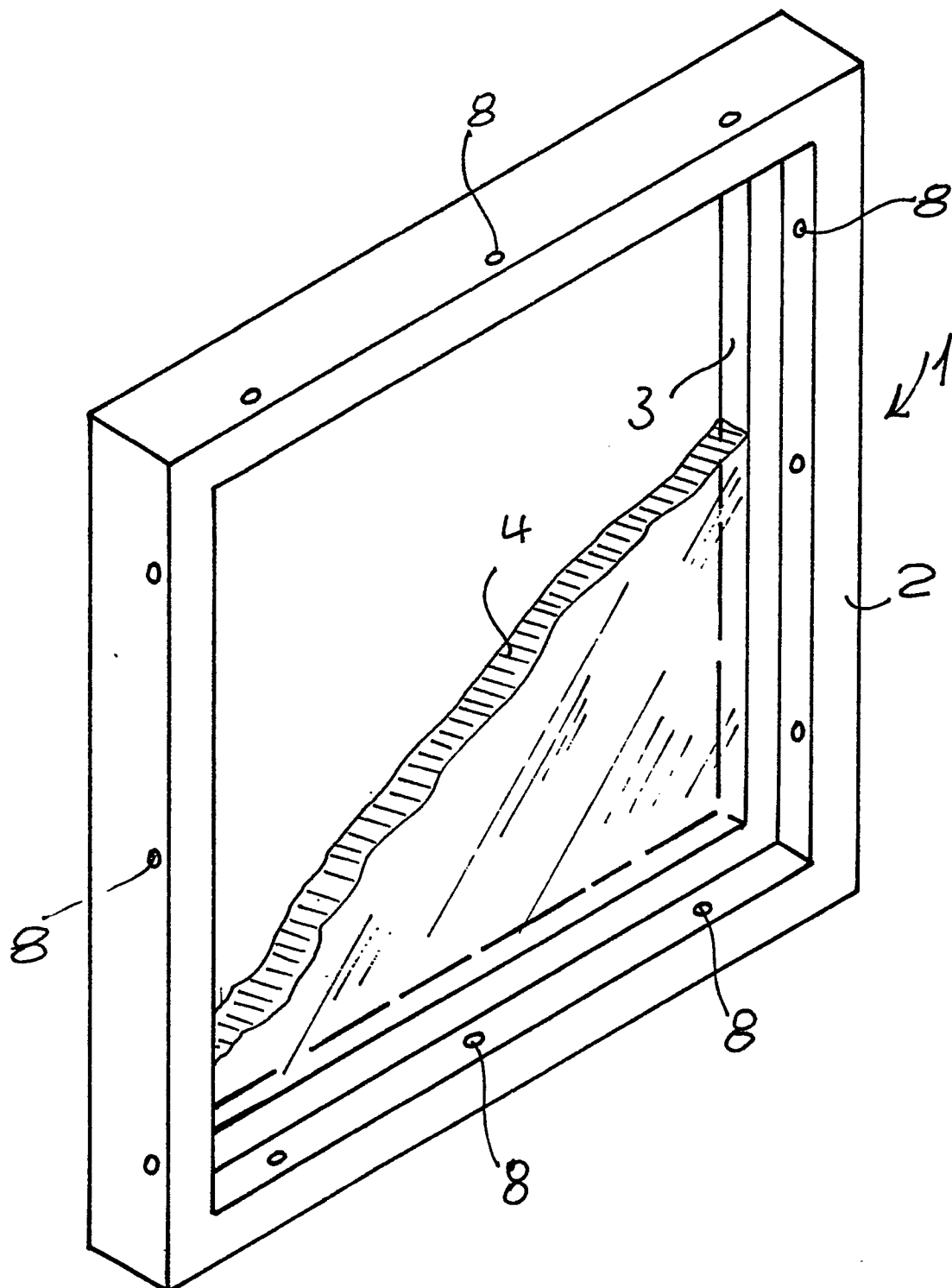
1 5. A modular element according to one or more of
2 the preceding claims, characterized in that said flanges
3 (3) extending parallel to said frame plane of lay are
4 preferably extended into a curtain wall plate (4)
5 formed integrally with the casting of said frame (1).

1 6. A modular element according to one or more of
2 the preceding claims, characterized in that any two
3 contiguous such frames or elements (1) can be associ-

4 ated together to a corner arrangement with the inter-
5 position of a straight L-like cross-section molding
6 (9) having holes (10) for accomodating connection
7 bolts therethrough.

1 7. A modular element according to one or more of
2 the preceding claims, characterized in that the dimen-
3 sions and weight of any such elements (1) are selected
4 to enable said element to be installed without the as-
5 sistance of heavy-duty construction equipment.

1 8. A modular reinforced concrete element for
2 building prefabrication, substantially as herein de-
3 scribed and illustrated.

Fig 1

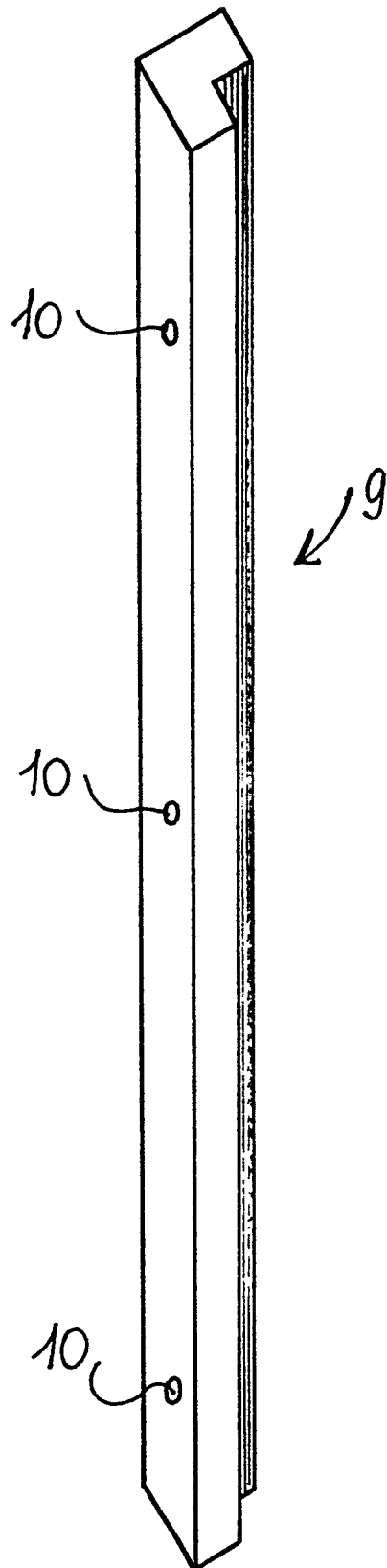
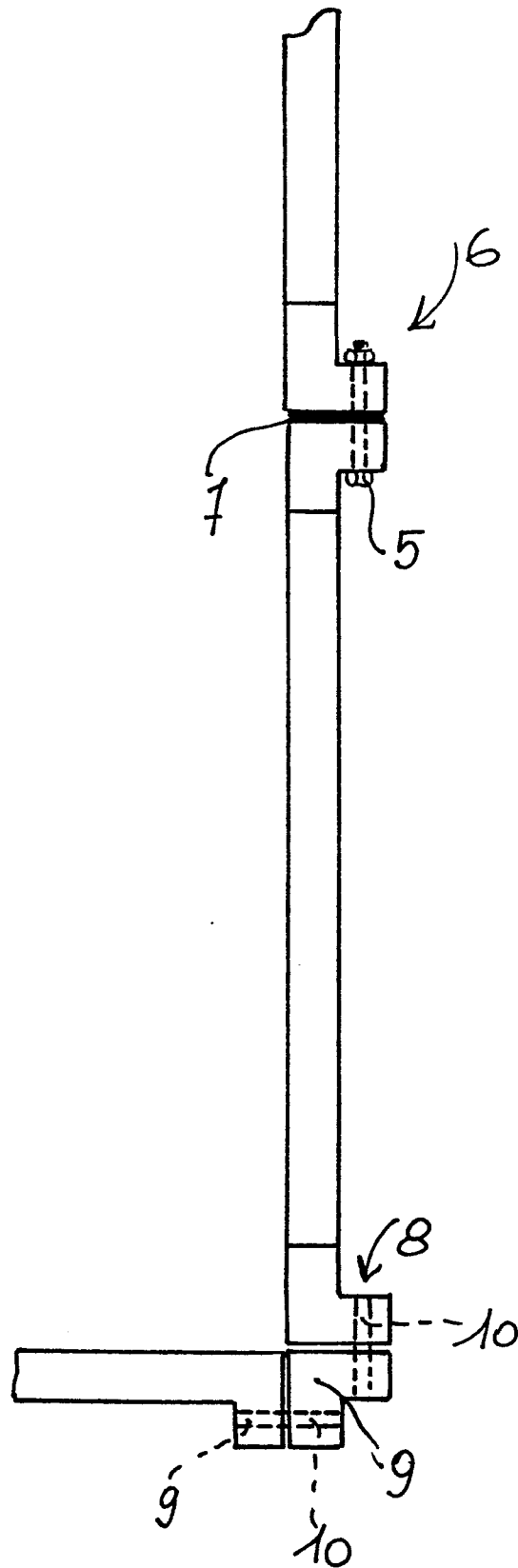
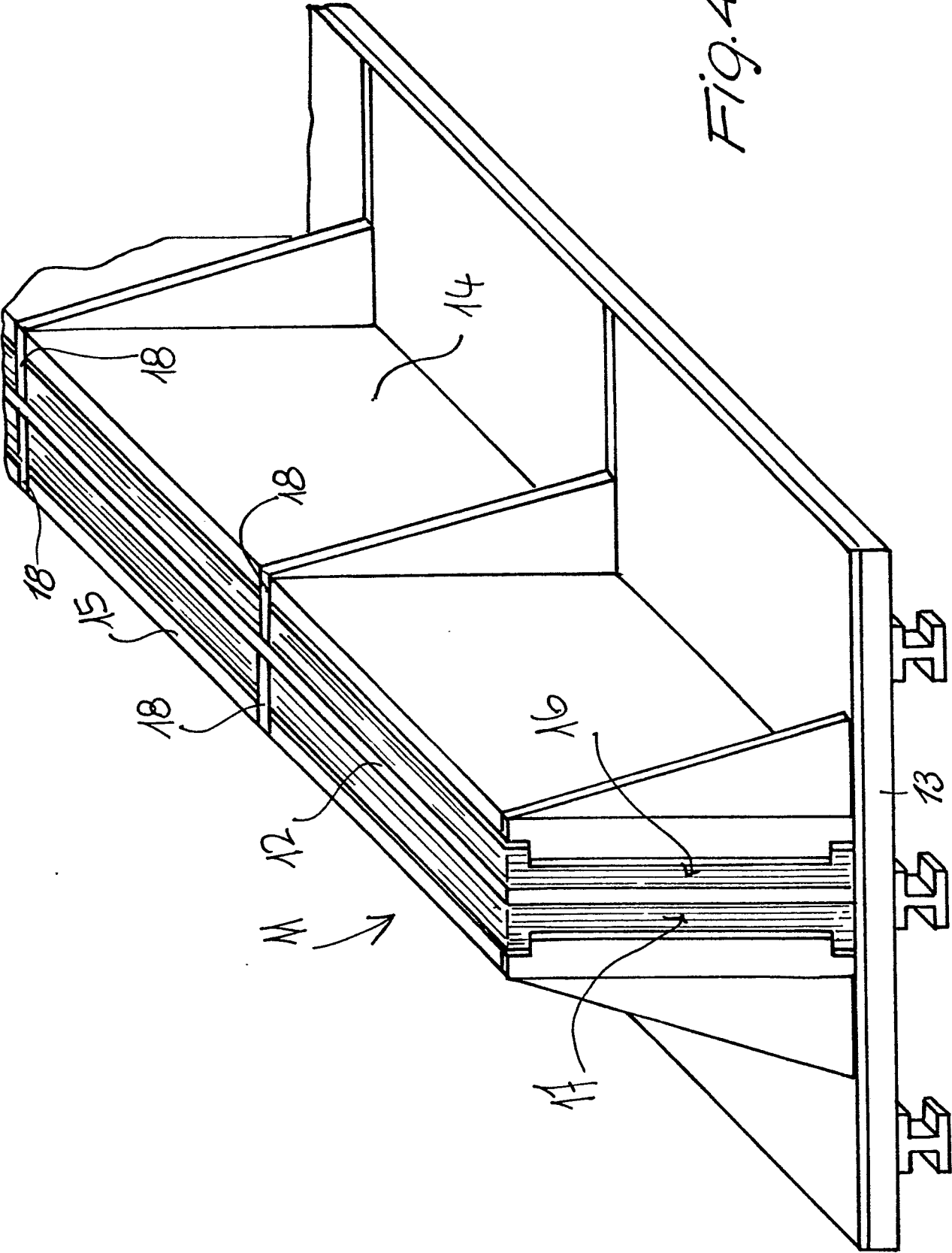
Fig 3Fig 2

Fig. 4



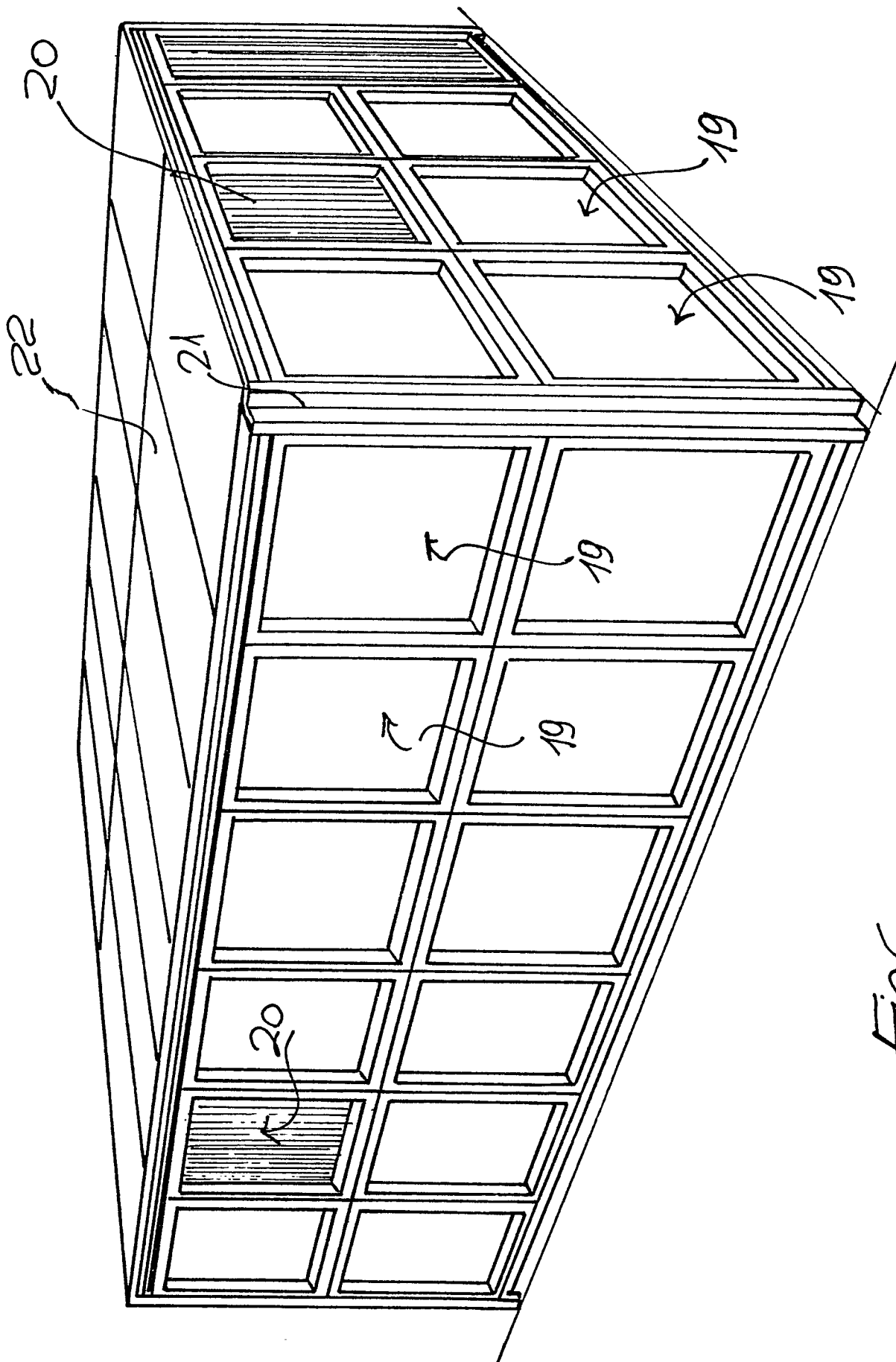


Fig. 6

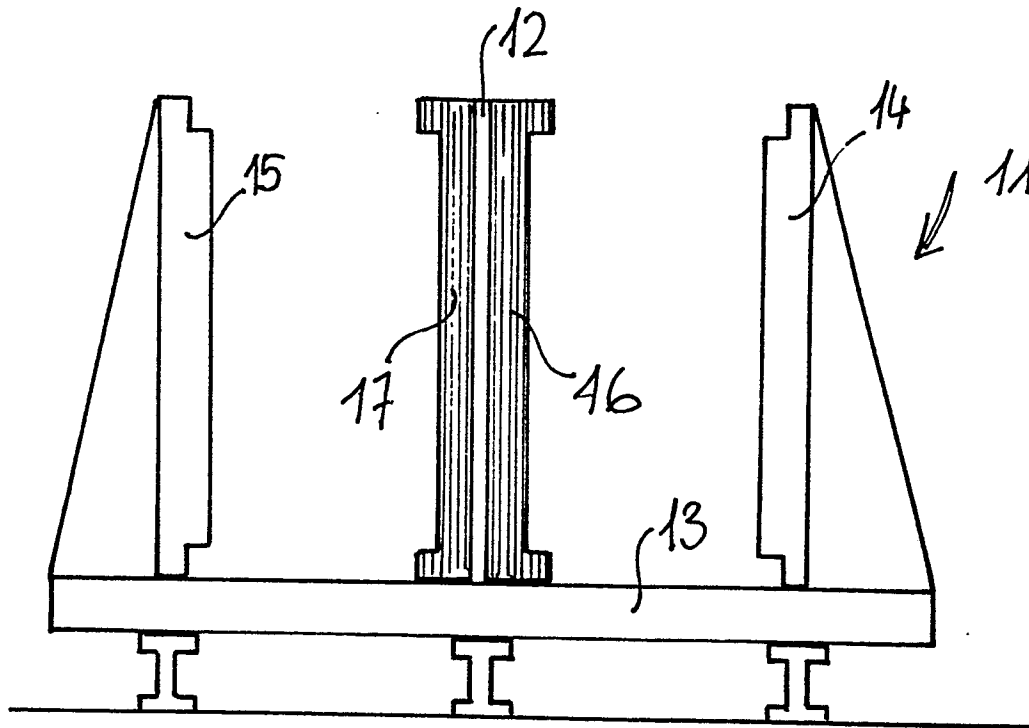


Fig 5

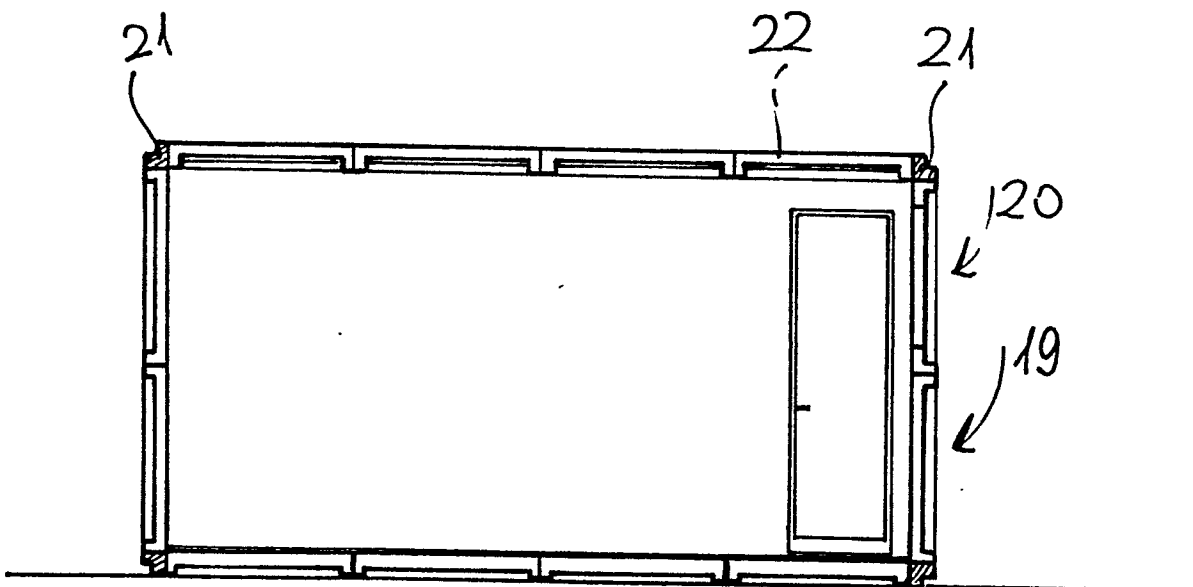


Fig 7



European Patent
Office

EUROPEAN SEARCH REPORT

0066138

Application number

EP 82 10 4172

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
A	FR-A-1 125 570 (VARIN) * Page 1, column 2, lines 1-24; figures 1,2,5 *	1,3-5	E 04 C 2/04

A	US-A-3 979 863 (HURLEY) * Column 2, lines 60-68; column 3, lines 1-34; figures 5-8,9 *	1,3-5	

A	FR-A-2 147 011 (TRUANT) * Whole document *	1,3-5, 7	

A	FR-E- 60 716 (PITROIS) * Page 2, column 1, lines 30-39; figure 5 *	6	

			TECHNICAL FIELDS SEARCHED (Int. Cl. 3)
			E 04 C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 31-08-1982	Examiner DALL' ANESE D.D.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	