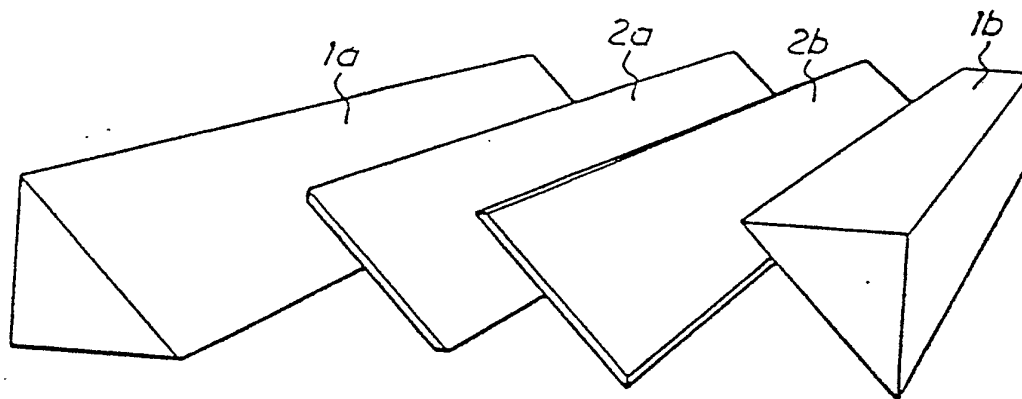




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(54) Title: A BUILDING ASSEMBLY



(57) Abstract

Building assembly which comprises two identical building units (1a, 1b) for house building, these units being each in the form of one half of a transport box of transport container size which is divided along a diagonal plane. The units can be assembled to form the above-mentioned transport box and, after transport to a building site, can be disassembled and used, when in a vertical upright position, as frameworks and sections of a housing body, and, when in a horizontal position, as housing sections with one or more rooms. Further, the building assembly preferably comprises two panel-like units (2a, 2b) which are each of a size corresponding to the diagonal plane of the transport box in order to be accommodated as diagonal walls in the transport box and are used as floor structure or wall elements in a housing complex constructed from several building assemblies according to the invention.

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A BUILDING ASSEMBLY

The present invention relates to a building assembly comprising components which are intended for use as building units.

It has long been known to prefabricate building units of various types and it is also known to prefabricate wholly or partly interiorly fitted housing sections and housing halves which, after transport to prepared building sites, may be assembled relatively rapidly and easily to more or less complete and more or less interiorly finished houses.

For the prefabrication of housing sections, the manufacturer as a rule must possess exact prior knowledge of the size and appearance of the finished house, which, in other words, means that freedom of selection for the contractor is restricted if he intends to build the house substantially only from prefabricated sections.

One exception to this rule is the prefabrication and use of housing sections which are to be mounted in on-site constructed house skeletons. In this case, the prefabricated housing sections, such as storeys, can be used for the erection of different building complexes but it is normally necessary first to raise a building framework on the site.

However, for rational housing production, use should be made, as far as is possible, of prefabricated units which are self-supporting. Proposals have also been made to prefabricate self-supporting modules which are easy to assemble according to a predetermined plan. Here, an obvious desire is to be able, with a sufficient number of modules of only a few different types, to construct large building complexes. This desire has given rise to many more or less ingenious solutions. Swedish printed application 7208696-0 (publication number 390,996) suggests, for example, that self-supporting modules which are to form parts of a framework for permanent buildings should be manufactured by joining together beams of particu-

lar profiles, normally box beams of sheet metal with projecting flanges. Thus, these modules consist of open frames, for example of hexagonal or rectangular shape, and, hence, are not complete modules but must first be
5 supplemented with walls, ceiling and floor structure, and, in addition, with interior fittings. French patent specification 1,269,321 describes a number of open box-like modules, i.e. frameworks, which can be inscribed in prismatic bodies whose cross-sections
10 are in the form of squares or other regular polygons. The purpose is that these framework modules should be covered by wall-forming units of several different types.

Further examples are illustrated in German Offenlegungsschrift 2,135,940 which illustrates prismatic
15 modules which may be described as having the form of a hollow triangular prism with one open side, i.e. the module is constructed from two rectangular walls which are joined together and make an angle of 90° with
20 respect to each other, as well as two triangular end walls which, together with the rectangular walls, form a hollow pentahedron open at one side. It should be possible to put these units together substantially in the same manner as one puts together hoods of different
25 types, i.e. nested in each other, for storage or transport. How many such nested units ("modules") are to be put together for transport is an open question on which German Offenlegungsschrift 2,135,940 is silent. However, this publication clearly shows that it is not,
30 here, a matter of prefabricated and substantially interiorly finished modules but of completely empty shells.

The size of prefabricated building units and sections is limited because of current regulations for road
35 transport and available transport means. As is well known, transport containers are built in standard sizes which, as a rule, satisfy current regulations for road transport. Consequently, it should be taken for granted that it is possible to transport prefabricated building

sections ("modules") of such a size and weight as do not exceed the maximum permissible size and weight for transport of loaded containers.

The object of the present invention is to provide
5 a building assembly which consists of an optional number of building units of only two different types which are intended for use for house construction purposes and which are so constructed that they may readily be assembled to form transport "boxes" which are of desired, for example
10 maximum container standard size, and themselves protect the interior of the "boxes".

This object has now been attained by means of the building assembly according to the present invention which has been given the features stated in claim 1 and,
15 in preferred embodiments, the features stated in claims 2 and 3.

The invention will be described in greater detail hereinbelow with reference to the accompanying drawings, in which:

20 Fig. 1 is a schematic perspective view of four building units according to the invention and, more precisely, two building units of a first, and two building units of a second major type;

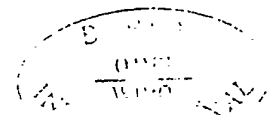
25 Fig. 2 is a perspective view of a transport "box" composed of the building units in Fig. 1;

Fig. 3 is a perspective view of a building complex composed of the units in Fig. 1;

30 Fig. 4, in horizontal section, shows a building or part of a house body composed of a number of building units of the type shown in Fig. 1; and

Fig. 5 shows a larger building complex which is also composed of building units of the type shown in Fig. 1.

35 Fig. 1 illustrates two building components or units 1a, 1b which are constructed according to the present invention and each of which is substantially in the form of one half of a parallelepipedal box which is divided along a diagonal plane. If each unit 1a, 1b is



covered along the diagonal side, the unit will thus have the form of a right-angled triangular prism. The other two building units 2a, 2b are in the form of rectangular panels of a length and width which correspond to the above-mentioned diagonal plane, i.e. the hypotenuse side of the prism 1a, 1b.

The two hollow "prismatic" building units 1a, 1b open at the longitudinal base can be assembled to form a parallelepipedal box. They can also be assembled together with the rectangular units 2a, 2b so that these cover the open sides of the "prismatic" units to form a box of the type illustrated in Fig. 2. According to the invention, the units 1a, 1b, 2a, 2b are preferably so dimensioned that, when assembled as shown in Fig. 2, they form a transport box of a size which corresponds to a container standard size.

Fig. 3 illustrates a housing body which consists of two "prismatic" building units 1a, 1b resting on bases 3, and two horizontal panel-like building units 2a, 2b extending therebetween. The upright "prismatic" units 1a, 1b in Fig. 3 form a load-bearing framework and angular house end wall sections for a two-storey building or for two storeys of a building, while the two panel-like sections 2a, 2b form a roof and a floor structure or two floor structures if the building unit of Fig. 1 is assumed to form part of a multi-storey building.

The housing body shown in horizontal section in Fig. 4 consists of at least two upright "prismatic" building units 1a, 1b which form house end wall sections and have inner walls consisting of panel-like units 2a, 2b which are provided with openings and doors 3, 4, 5 which cover these openings. It is further shown that these end wall sections 1a, 1b have interior fittings for toilet rooms which may be and preferably are installed in conjunction with the prefabrication stage and are protected during transport and handling as a result of the box arrangement in Fig. 2. Moreover, the housing

body of Fig. 4 includes a number of horizontal box-like storeys or storey sections extending between the "prismatic" units and consisting of "prismatic" units 1a, 1b assembled to box form, which may also have been provided with the desired equipment for the contemplated purpose in conjunction with the prefabrication stage.

Fig. 5 shows a complex erected and composed from the same type of building units as the units in Fig. 1. Schematic Fig. 5 shows, without the need for any further explanation, an example of how horizontal "boxes" of pairwise assembled "prismatic" units 1a, 1b, simple upright "prismatic" units 1 (i.e. 1a or 1b) as frameworks, and panel-like units 2 (i.e. 2a or 2b) as walls or floor structures can be combined.

According to the invention, fully equipped houses with a ready-installed framework can be transported in the form of boxes to building sites where the intention is, rapidly and by relatively simple assembly operations, to build for example hospitals, school houses, hotels, residential buildings etc.

As a result of the unique "transport box system" according to the invention, composed of building assemblies, each of which consists of two identical "prismatic" units 1a, 1b and, possibly, two identical "panel-like" units 2a and 2b and with the units "interiorly finished", for example wallpapered or painted interiorly and provided with the desired equipment, for example for W.C., shower cabinet, bathroom, kitchen or kitchenette, staircase, lift, heating, water and sanitation, electricity, water supply and sewerage etc., and which are adapted to be joined together to form room units for the above-mentioned or other functions and are prepared for connection to on-site service lines and conduits, such as electricity, water, sewage and district heating, prefabricated houses can be transported in the form of compact, protected units of an unusually small number (two) of different types, from which at least the major parts of houses can be rapidly erected with a floor structure width and, thus, room width larger than the height or width of the

transport boxes when being transported. Moreover, the size and the maximum height of the houses are not restricted by the limited dimensions of the transport boxes, as will be readily appreciated from the example in Fig. 5.

5 Naturally, to the extent that fixed installations and equipment leave room in the transport boxes, loose equipment parts and elements can also be consigned with the transport to the building site. Furthermore, the "prismatic" units which are built to form frames serving
10 as upright pillars, can be provided with inner transverse partitions which can form "cells" with floor structure etc. for room units and/or may serve as rigidifying members.

The invention is not restricted to the types of housing shown in the drawings. Building assemblies according
15 to the invention which may be combined to the form and function of transport boxes, in fact permit such extensive combination possibilities that it is practically impossible to show and describe them all.

CLAIMS

1. A building assembly consisting of prefabricated house building units, characterised in that the building assembly comprises at least two basically identical units (1a, 1b) which may be assembled to form a parallelepipedal transport box and each of which is substantially in the form of one half of the box divided along the diagonal plane between two diagonally opposed longitudinal corners and is of a sufficient size to form, when assembled, a transport box of at least approximately the same size as a transport container with a length corresponding to at least two storey heights for a normal residential building, and that each unit (1a, 1b) is adapted such that, when placed in a vertical upright position on a substrate, it can form a section of a house serving as a house framework and, alternatively, such that it can be assembled with the other unit in order, when placed in a horizontal position and supported by at least one framework of said type, to form a house section for one or more rooms.

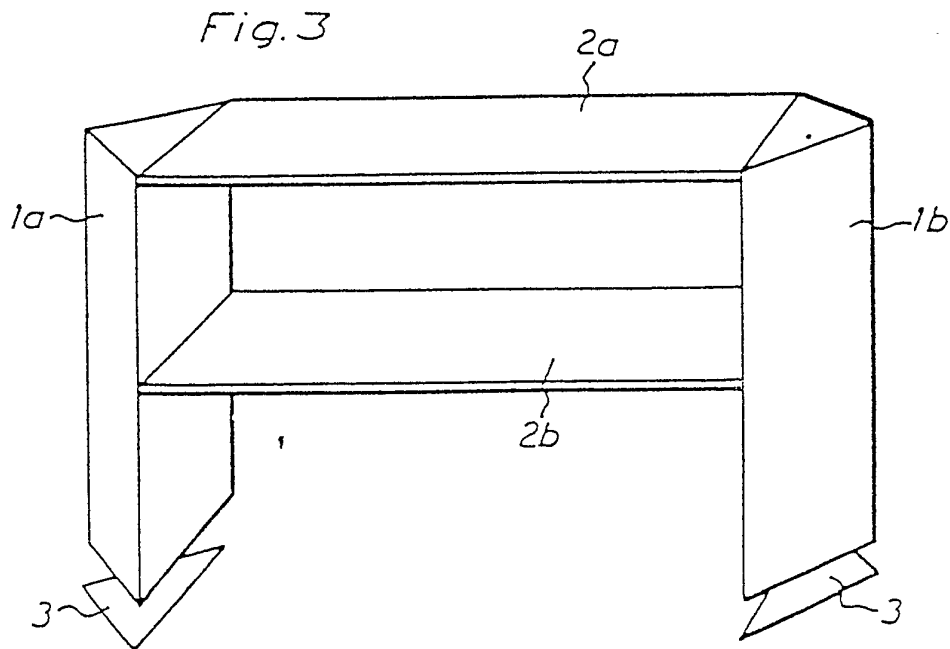
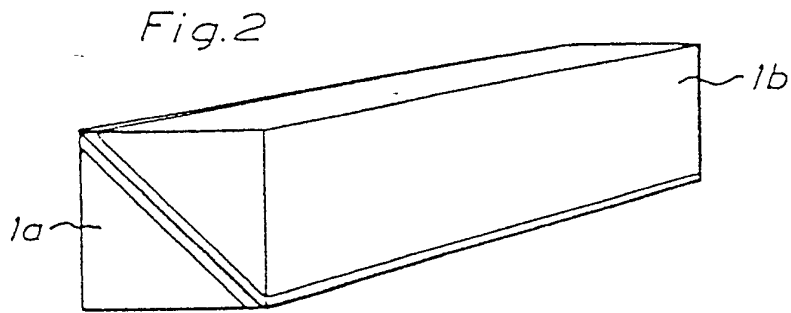
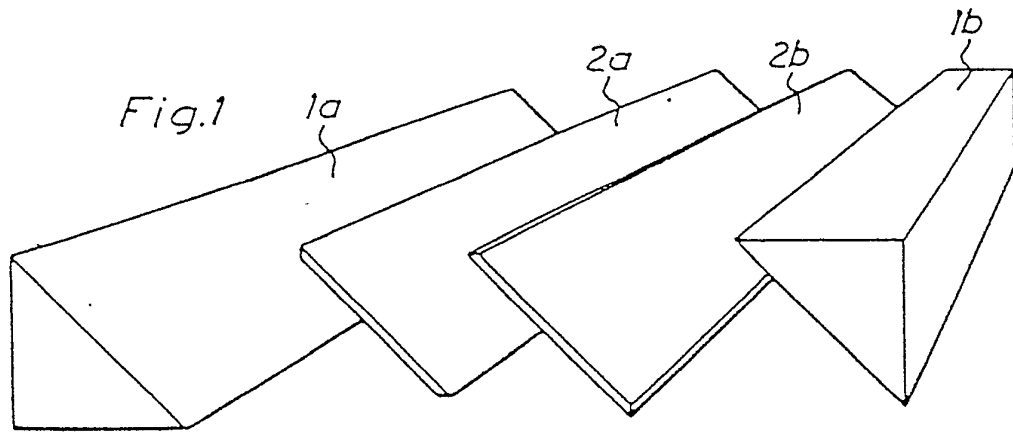
2. Building assembly as claimed in claim 1, characterised in that it further comprises one or more substantially identical panel-like building units (2a, 2b) which are of substantially the same size as the diagonal plane of the transport box and are adapted to be mounted as a diagonally placed, dismountable wall in the transport box, and are so constructed that they are usable as floor structure elements, walls or the like in a housing complex constructed of one building assembly or several identical building assemblies.

3. Building assembly as claimed in claim 1 or 2, characterised in that at least the units (1a, 1b) constructed as halves of a transport box are prefabricated house construction units which, in conjunction with the prefabrication stage, are provided with at least a certain equipment for the house sections which they are intended to form, for example, sanitary equipment.

8

kitchen equipment, equipment for heat supply or other service equipment, this equipment being disposed, when the building assembly is transported as a transport box composed thereof, to be accommodated and protected
5 in the transport box.

1/2



LEAU

2/2

Fig. 4

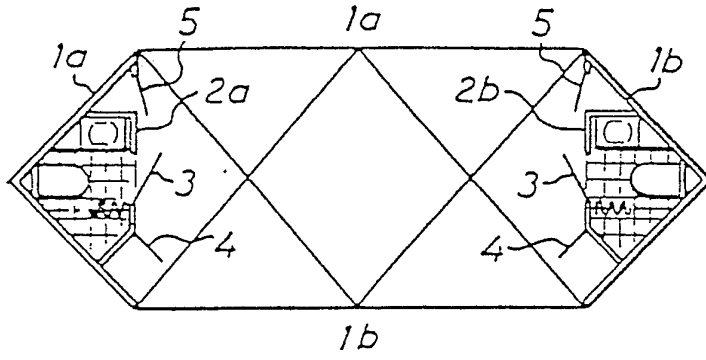
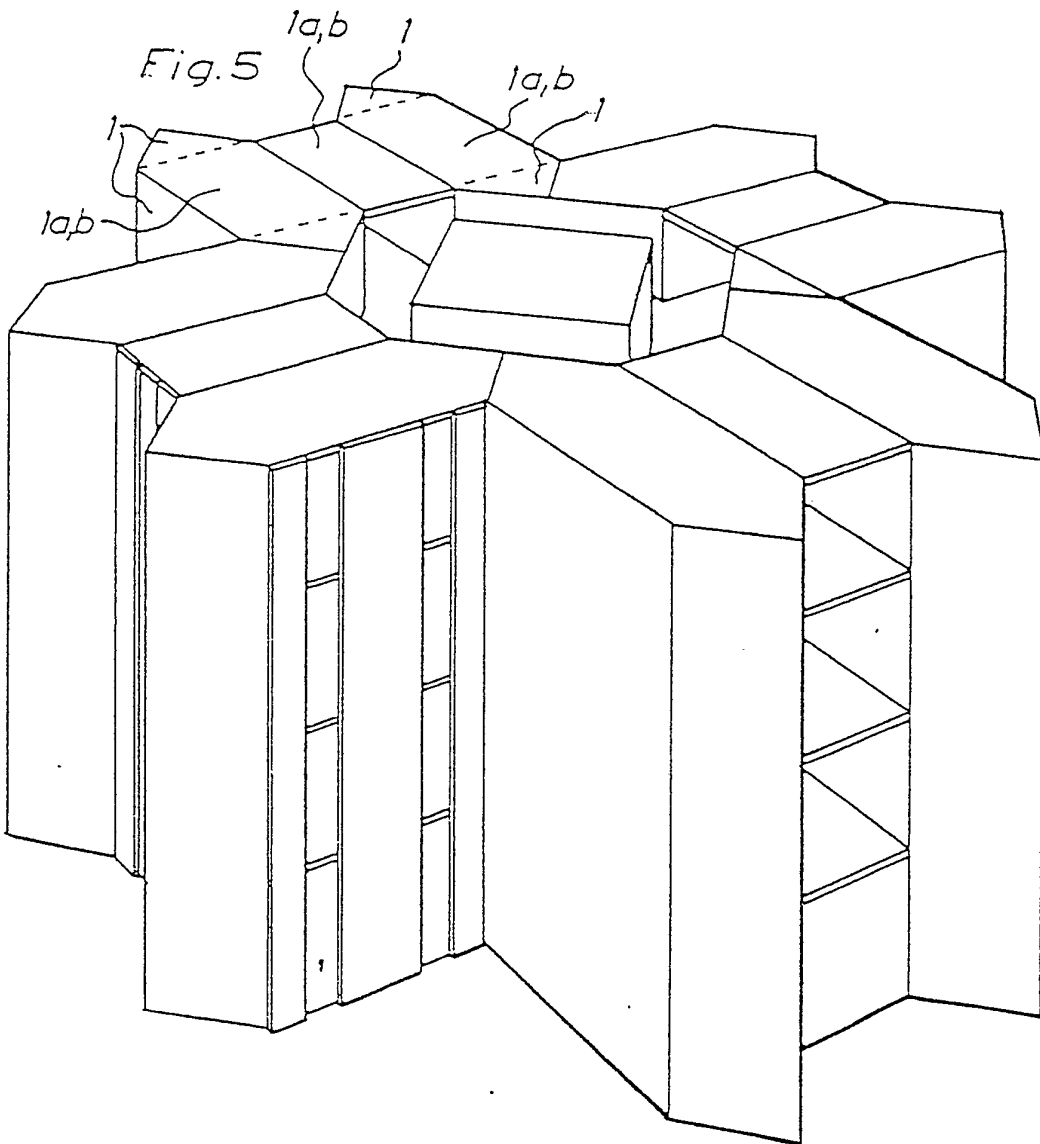
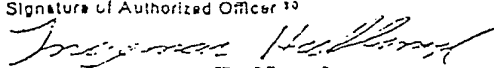


Fig. 5



INTERNATIONAL SEARCH REPORT

International Application No PCT/SE81/00133

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) * According to International Patent Classification (IPC) or to both National Classification and IPC 2 E 04 B 1/348		
II. FIELDS SEARCHED Minimum Documentation Searched 4 .		
Classification System	Classification Symbols	
IPC 2 US C1	E 04 B 1/343, 344, 348 52:1, 64, 69-72, 79, 79.1-17, 90, 143, 234, 237, 238, 745	
Documentation Searched other than Minimum Documentation to the extent that such Documents are Included in the Fields Searched 5		
SE, NO, DK, FI classes as above		
III. DOCUMENTS CONSIDERED TO BE RELEVANT 14		
Category *	Citation of Document, 15 with indication, where appropriate, of the relevant passages 17	Relevant to Claim No. 18
A	DE, A, 2 135 940 published 1973, February 8, J Colzani et al.	1
A	DE, A, 2 221 078 published 1972, November 30, Deutsche Semperit GmbH	
A	FR, A, 1 269 321 published 1961, December 15, M J L Rey	1
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IV. CERTIFICATION		
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