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(11) **EP 1 505 219 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
09.02.2005 Bulletin 2005/06

(51) Int Cl.7: **E04B 2/86, E04H 4/00**

(21) Application number: **04077243.6**

(22) Date of filing: **05.08.2004**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PL PT RO SE SI SK TR**
Designated Extension States:
AL HR LT LV MK

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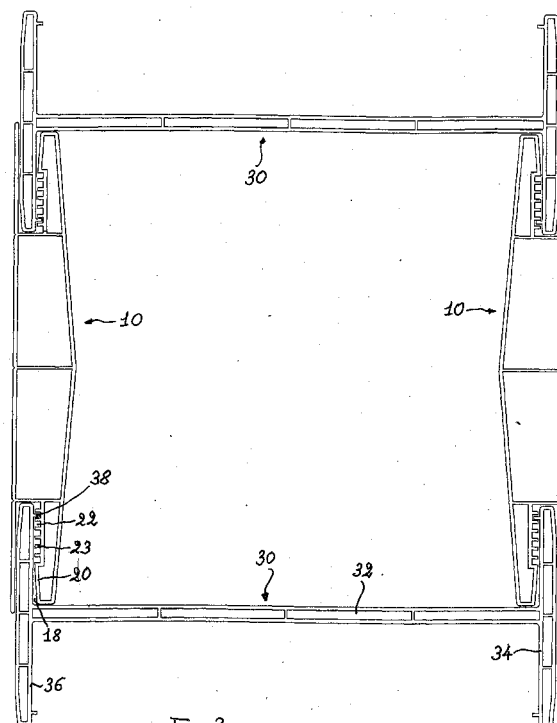
(30) Priority: **07.08.2003 IT MI20031628**

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(54) **Wall modular structure, particularly for swimming pools**

(57) A modular structure for walls is described, comprising two modular elements only, a wall element and a joining element, characterized in that it comprises a wall modular element provided with the female part of the joint on both sides and able to form both sides of the wall, and an H crosspiece shaped modular joining element, whose two flanges are provided on both sides of the male part of the joint. This structure allows to build walls of any height with a joining between the different wall modules which allows a considerable degree of freedom, in order to build angles and curves even of a certain entity and thus to practically obtain structures of any planimetry and dimensions.



Description

[0001] The present invention is about a wall modular structure which allows, using two kinds of elements only, to build walls for any purpose, more particularly adapted for constructions which do not have to support considerable vertical loads, i.e. constructions without covering, like outdoor swimming pools, or constructions with a single floor, like garages, sheds, or terraced or one-family houses.

[0002] The problem of the prefabricated modular structures is that of providing for a system which uses the lowest possible number of kinds of modules, for evident cost advantages, in particular for manufacturing the moulds, of easy and quick assembly, and which reduces the stocks. However, this necessity of reducing to the minimum the kinds of modules is in conflict with the likewise indispensable necessity of adapting the modules to the planimetry of the structure to be built and to its dimensions, which are rarely identical to a multiple of the module to be used. Therefore, there are always problems connected with angles, curves and/or the length of the walls, so it is always necessary to provide for special modules for this requirement, or to resort to complicate systems for joining the modules.

[0003] The present invention derives from an opposite and to say the least revolutionary concept in the modular systems field, i.e. it is based on the principle of using a single wall module and a single joining module of so reduced size as to have the greatest possible flexibility, thus allowing to practically build, simply using these two elements, structures of any planimetry and dimension.

[0004] The constructive principle on which the present invention is based is substantially that of the sheet piling or palisade, that is placing side by side a plurality of poles or planks of very limited width but even considerable height, to form walls like for instance the palisades of far west forts, fences or foundation pilings of structures built on the water, such as harbour structures, lagoon buildings (see Venice) and so on.

[0005] The problem to solve for adapting this kind of structure to civil buildings is to provide for a joining between the modular elements which allows a high degree of freedom between the two joined elements, in order to obtain angles of fair entity and even curves with rather narrow radius.

[0006] This problem is brilliantly solved by providing for a wall modular element having the female part of the joint on both sides and an H crosspiece shaped joining modular element, whose two flanges are provided on both sides of the male part of the joint.

[0007] These and other objects, characteristics and advantages of the structure according to the present invention will be better highlighted in the appended claims, as well as in the following detailed description of a preferred embodiment of the same invention, given in an explanatory but not limiting way, with reference to the

figures of the annexed drawings wherein:

Figure 1 is a plan view of a wall element of the structure;

Figure 2 is a plan view of a joining element or cross-piece;

Figure 3 is a plan view of a wall module made with two wall elements for both faces of the wall and two crosspieces for the joining with the same number of wall elements on both sides;

Figure 4 is a plan view of a portion of arc-shaped wall to build for example the so called roman stairs of a swimming pool; and

Figure 5 is an enlarged detail of Figure 4, to evidence the joining of modules forming an angle together.

[0008] With reference to the different Figures of the annexed drawings, in which the same reference numbers are used to indicate the same components, the description starts with the wall modular element 10, preferably but not exclusively made of plastic material like polyvinyl chloride (PVC), comprising an outer surface 12 and an inner surface 14, being provided on both its ends with the female part of the joint or opening 16, consisting of a large opening 18 on whose inner surface 20 a series of grooves 22 similar to a portion of teeth 23 of a rack is provided. The size of such a wall element 10, whose height is variable, is of about 15-20 cm in length, preferably between 16 and 18 cm.

[0009] The joining crosspiece, made of the same material and of about the same length, is H shaped and comprises a central core 32 and two head flanges 34, 36, each having a hooking tooth 38 at its end. The outer terminal portion of the flanges 34, 36 forms the male part of the joint and the tooth 38 forms the male member by which the crosspiece can be joined to the rack 22 of the female member, to obtain the joining of the two kinds of modular elements.

[0010] It is evident that the position of a wall element 10 with respect to its contiguous one will be determined by the position in which the tooth 38 of the crosspiece 30 is hooked in the grooves 22 of the wall element 10. Therefore, if the tooth 38 is hooked on both faces of the wall at the same groove 22 (see Figures 3 and 5), a rectilinear joining between the wall modular elements will take place, also allowing to set the length of the wall according to the groove in which the hooking tooth is inserted. On the contrary, if the tooth 38 is hooked in a groove A of the outer modular element which is different from the groove B of the inner modular element, a curve or a concave or convex angle (see Figure 5) will be obtained, thus creating for instance an arc of circumference like that shown in Figure 5.

[0011] If a wall head or an approximately right angle edge has to be built, it will be sufficient to cut the two outer flanges of the crosspiece 30, as it is shown in the detail C of Figure 5.

[0012] Clearly, the two modular elements of the structure according to the present invention are suitable for being manufactured also as a continuous extrusion, which is then cut according to the desired sizes (i.e. heights), and it is therefore evident that such a system allows a considerable saving of production, warehouse storage and transportation costs.

[0013] Obviously these structures, once assembled and joined to form the designed walls, will be completed by a vertical reinforcement inserted in the inner spaces of the modular elements, a horizontal reinforcement also passing through holes easily obtained in the diaphragms of the elements and a subsequent cement flow according to the usual constructive techniques, thus obtaining structures which perfectly resist to lateral loads, as well as able to support vertical loads of a certain entity without requiring pillars, which could be obtained anyway by inserting a proper grid reinforcement in the almost square cavity of a module like that shown in Figure 3.

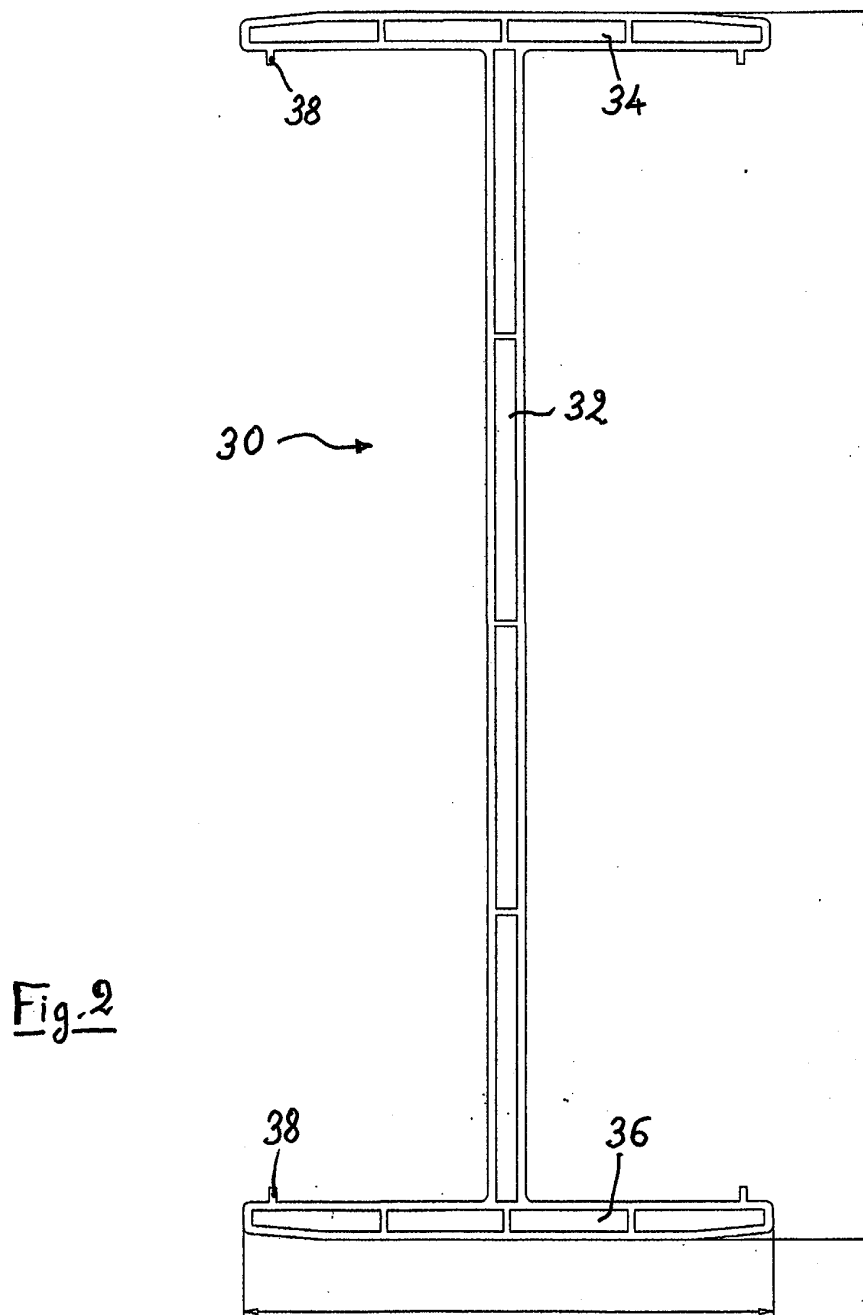
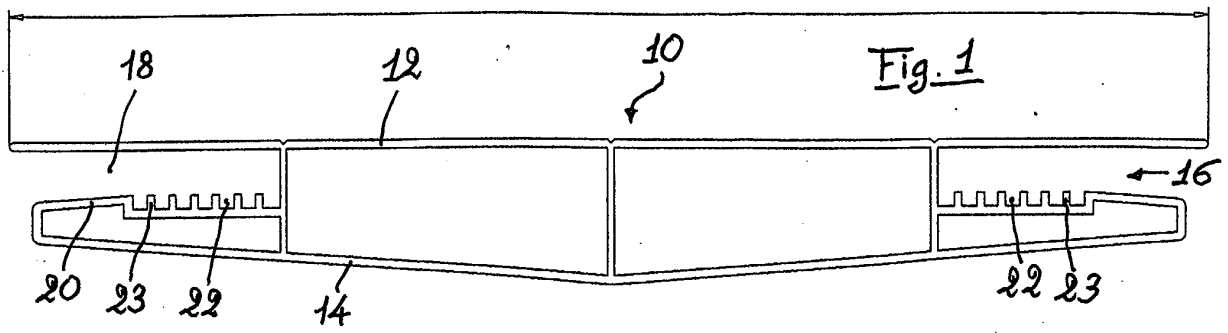
[0014] It is therefore evident from the foregoing description that the modular structure of the present invention fully achieves the intended objects, but it should be pointed out that numerous alterations, modifications, additions and/or replacements of elements could be made without falling outside the object of the invention and without departing from its scope of protection, as it is also defined in the appended claims.

Claims

1. A modular structure for walls, comprising two modular elements only, a wall element and a joining element, **characterized in that** it comprises a wall modular element provided with the female part of the joint on both sides and able to form both sides of the wall, and an H crosspiece shaped modular joining element, whose two flanges are provided on both sides of the male part of the joint.
2. A modular structure according to claim 1, **characterized in that** the female part of the joint comprises an opening whose outer surface consists of the outer end of the wall element while the inner surface is provided with a series of grooves forming a portion of rack, by which both the distance from the adjacent wall modular element and the inclination or angulation with respect to said adjacent wall modular element can be set, varying the groove in which the male part of the joint is inserted.
3. A modular structure according to claims 1 and 2, **characterized in that** the H shaped crosspiece comprises at both ends a terminal portion to be inserted in the correspondent opening of the wall element, provided at its edge with a hooking tooth to be inserted in one of the rack grooves of said female

part of the joint.

4. A modular structure according to the preceding claims, **characterized in that** the two flanges of one of the crosspiece's sides may be cut to form a head or an edge of the modular wall.
5. A modular structure according to the preceding claims, **characterized in that** the modular elements are manufactured as a continuous bar to be cut according to the desired measurements.
6. A modular structure according to the preceding claims, **characterized in that** both the length of the wall modular element and the width of the crosspiece are comprised between 15 and 20 cm, preferably between 16 and 18 cm.
7. A modular structure according to the preceding claims, **characterized in that** the modular elements are made of plastic material, preferably PVC.



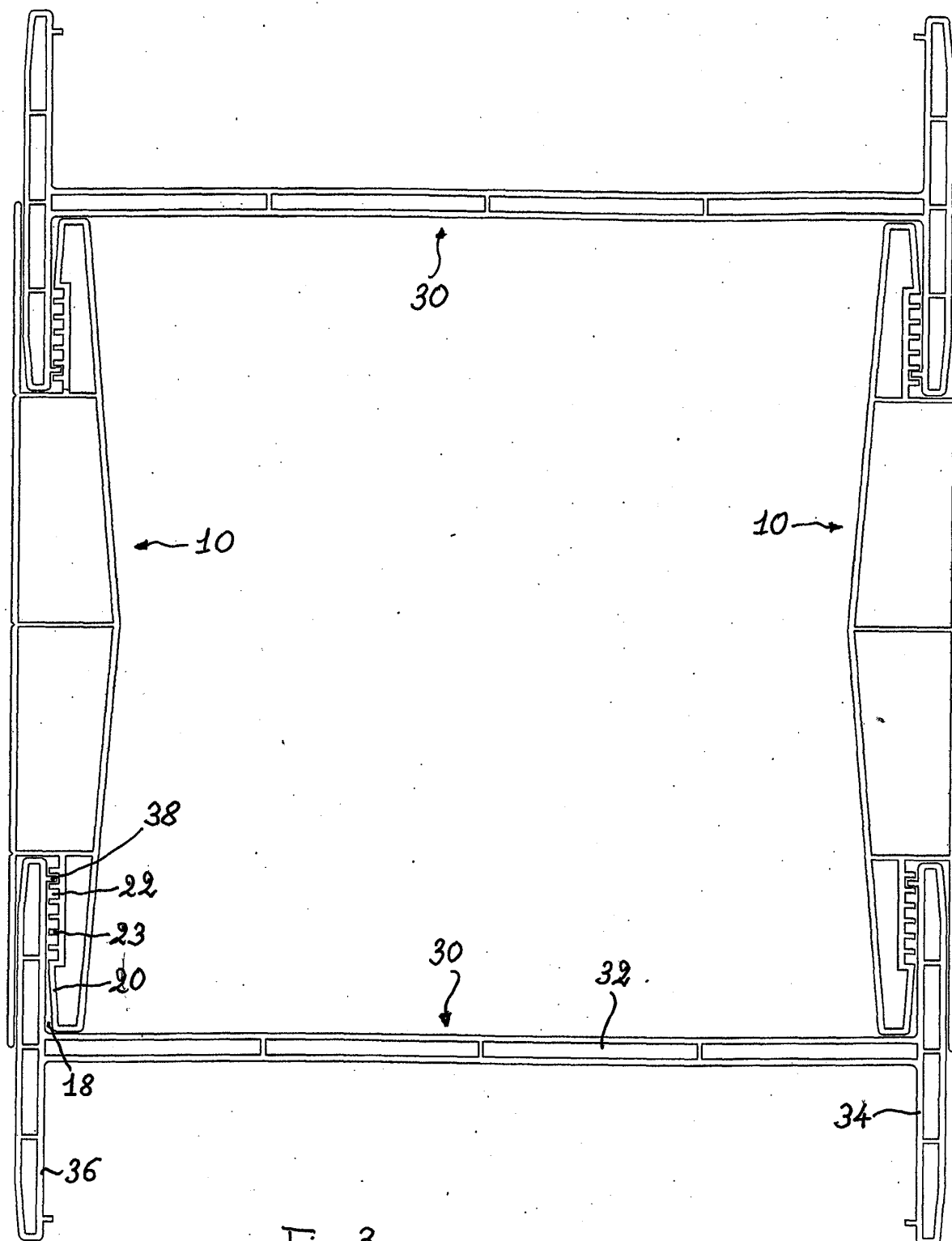


Fig. 3

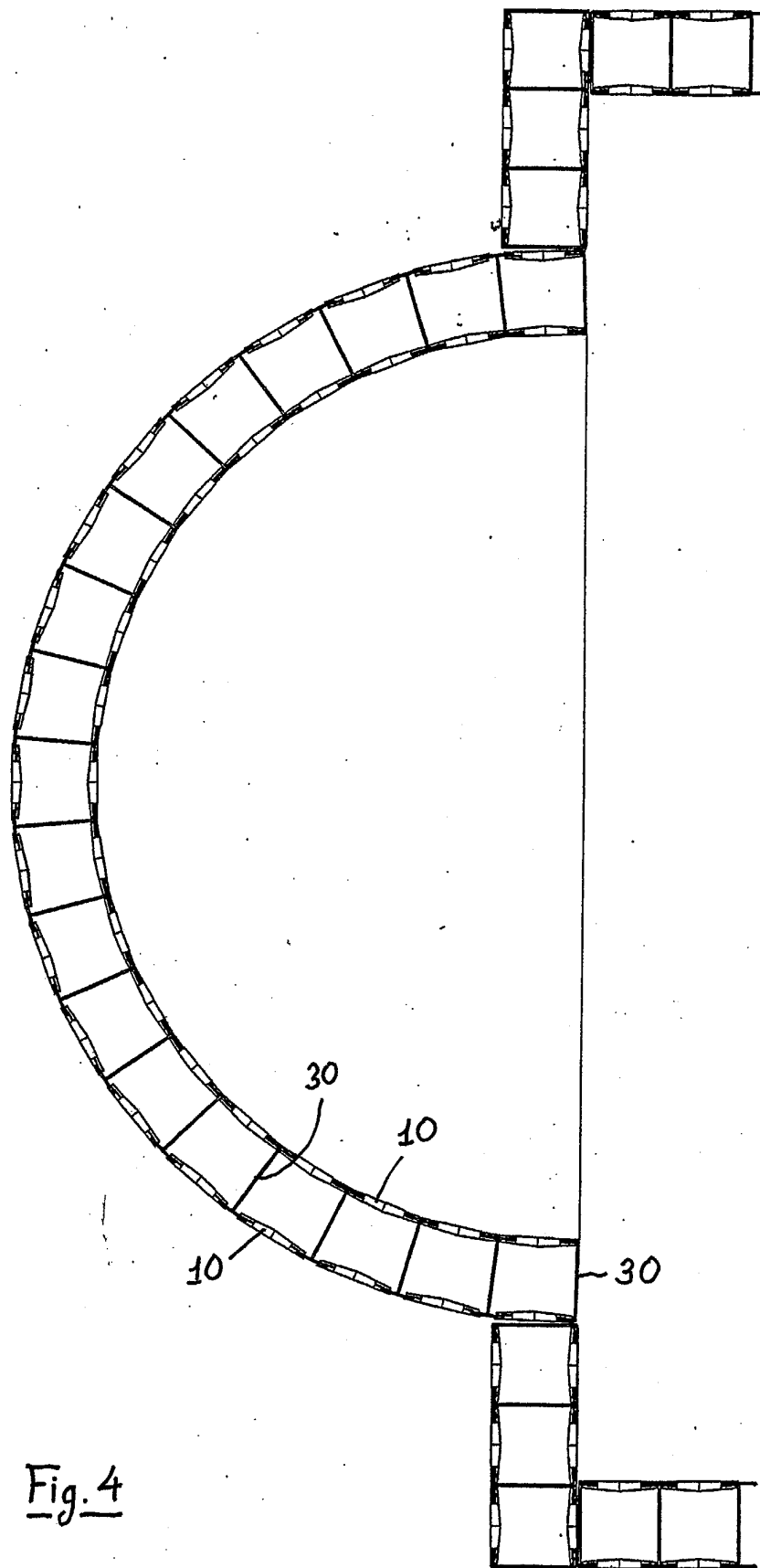


Fig. 4

Fig. 5

