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(11)

**EP 1 362 974 A2**

(12)

## EUROPEAN PATENT APPLICATION

(43) Date of publication:  
19.11.2003 Bulletin 2003/47

(51) Int Cl.7: **E06B 3/984**, E06B 3/98,  
E06B 3/96

(21) Application number: **03425307.0**

(22) Date of filing: **14.05.2003**

(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 PT RO SE SI SK TR**  
Designated Extension States:  
**AL LT LV MK**

(30) Priority: **15.05.2002 IT MC20020041**

(71) Applicants:  
• **Saletti, Lamberto**  
**60022 Castelfidardo (AN) (IT)**

• **Saletti, Maurizio**  
**60022 Castelfidardo (AN) (IT)**

(72) Inventors:  
• **Saletti, Lamberto**  
**60022 Castelfidardo (AN) (IT)**  
• **Saletti, Maurizio**  
**60022 Castelfidardo (AN) (IT)**

(74) Representative: **Baldi, Claudio**  
**Piazza Ghislieri, 3**  
**60035 Jesi (Ancona) (IT)**

(54) **Frame for wooden doors made of modular elements connected with a fast coupling and uncoupling joint**

(57) The present invention refers to a frame for wooden doors of modular type, obtained from wooden uprights (1) and crosspieces (2) with standard size and

final surface finish, designed to be assembled by means of a special innovative fast-coupling and uncoupling joint.

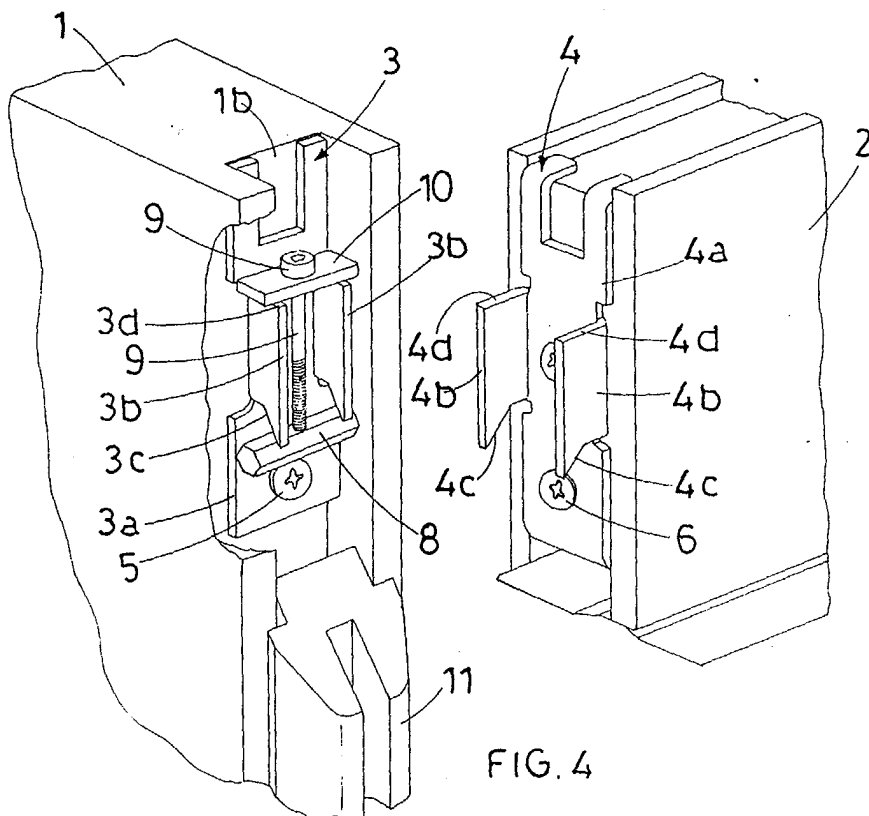


FIG. 4

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## Description

**[0001]** The present patent application for industrial invention refers to a frame for wooden doors obtained from modular elements that can be assembled without using specialised workers or special tools.

**[0002]** An additional characteristic of the frame of the invention is represented by its great versatility of use, meaning that, although they are produced with standard dimensions and final surface finish, the modular elements can be cut to size before assembly, providing an inexpensive and practical solution to the problem related to special-size doors.

**[0003]** For a better understanding of the advantages of the frame of the invention, the description continues with the technique that is currently used to produce wooden doors made of a bearing frame covered with one or more wooden panels or glass panes.

**[0004]** There are currently four standard door sizes with the same height and different width, normally ranging from minimum 60 cm to maximum 90 cm with 10-cm intervals.

**[0005]** For each standard size, the traditional technique provides for the construction of an unfinished bearing frame made of two wooden uprights that are firmly and irreversibly connected by means of one or more wooden crosspieces

**[0006]** The spaces limited by uprights and crosspieces are covered with unfinished wooden panels.

**[0007]** Once the construction of the door has been completed, the door is finished and painted.

**[0008]** Special-size doors are produced with the same technique, meaning that unfinished uprights, crosspieces and panels are cut to size before final assembly.

**[0009]** Special-size doors are significantly more expensive than standard-size doors, since they are produced in small lots and require the adjustments of machinery in production lines.

**[0010]** Moreover, delivery time of special-size doors is much longer than standard-size doors, since standard-size doors are produced in higher numbers and stocked in the warehouse to shorten delivery time, especially in case of high demand.

**[0011]** Warehouse stocks are not, of course, possible for special-size doors, which are produced upon request and in the ordered quantity.

**[0012]** The purpose of the present invention is to provide a solution to the problems that jeopardise the construction of special-size wooden doors, by realising a new modular wooden frame obtained from wooden uprights and crosspieces with standard size and final surface finish, designed to be assembled by means of a special innovative fast-coupling and uncoupling joint, and not with traditional glue.

**[0013]** In other words - in the case of special-size doors - the modular elements of the frame are cut to the desired size and assembled by means of the special joint.

**[0014]** This means that the production of the modular elements of the frame of the invention can be programmed in large lots having standard size and superficial finish, without considering the size of the frame obtained from the finished modular elements. This also allows for warehouse stocks of single finished modular elements, and not unfinished doors, which are cut to size, if necessary, before assembly, based on the size of doors to be made.

**[0015]** As a matter of fact, the aforementioned joint is applied onto the modular elements during the assembly of uprights and crosspieces, since - in the case of special-size doors - uprights and/or crosspieces are first cut and then joined with the special joint of the invention.

**[0016]** As mentioned above, assembly takes place without using specialised workers or special tools, thanks to the simple functional construction of the joint.

**[0017]** The assembly of the joint onto the modular elements requires simple fast operations, without any risk of damaging the final surface finish of the modular elements.

**[0018]** An additional purpose of the invention is to realise a frame for wooden doors capable of easy disassembly without using specialised workers or special tools, in order to replace damaged elements, if necessary.

**[0019]** As mentioned above, frames for wooden doors are currently made by gluing together uprights and crosspieces. This makes it impossible to repair doors on site without the intervention of specialised workers.

**[0020]** Today, damaged doors must be taken to a carpenter's shop where specialised workers disassemble the frame and assemble it again after repairing and painting it. The cost of such a repair is so high that it is preferable to replace damaged doors with new ones.

**[0021]** On the contrary, the frame of the invention can be disassembled with simple fast operations, since the coupling that joins crosspieces to uprights can be repeatedly tightened and loosened with a standard screwdriver or Allen wrench, to remove the damaged upright or crosspiece and replace it with a new one having the same size and surface finish.

**[0022]** For major clarity the description of the invention continues with reference to the enclosed drawings, which are intended for purposes of illustration and not in a limiting sense, whereby:

- Fig. 1 is a diagrammatic view of a frame for wooden doors made of two uprights and two crosspieces;
- Fig. 2 is an enlarged detailed axonometric view of Fig. 1;
- Fig. 3 is a lateral view of the fast-coupling and uncoupling joint, not assembled to the door frame;
- Fig. 4 is an axonometric view of the fast-coupling and uncoupling joint, in which the two elements are mounted to upright and crosspiece, respectively.

**[0023]** With reference to the aforementioned figures,

the frame of the invention is made of two lateral uprights (1) and two crosspieces (2) connected with special joints (G) using fast-coupling and uncoupling means.

**[0024]** With reference to Fig. 3 and 4, every joint (G) is made of two parts, the first part (3) designed to be fixed to the uprights (1), and the second part (4) designed to be fixed to the crosspieces (2).

**[0025]** The first part (3) is made of a plate (3a) having an opposite pair of identical lateral edges (3b) ending with a wedge-shaped profile (3c) at one side and with a flat profile (3d) at the other side.

**[0026]** On the internal edge (1a and 2a), every upright (1) and every crosspiece (2) have two identical longitudinal grooves (1b and 2b) going from one end to the other.

**[0027]** The longitudinal groove (1b) is dimensioned in such a way that the first part (3) of the joint (G) can be exactly housed in it; the plate (3a) is fixed to the bottom of the groove (1b) by means of screws (5).

**[0028]** The second part (4) of the joint (G) is made of a plate (4a) having an opposite pair of identical lateral edges (4b), same as the lateral edges (3b) of the plate (3a), meaning that the pair of edges (4b) ends with a wedge-shaped profile (4c) at one side, and with a flat profile (4d) at the other side.

**[0029]** The only difference between the two parts (3 and 4) of the joint (G) consists in the fact that the pair of edges (3b) is slightly closer than the pair of edges (4b), so that the pair of edges (3b) can be exactly inserted inside the pair of edges (4b), as shown in Fig. 3.

**[0030]** The plate (4a) is fixed at the ends of the crosspieces (2) by means of screws (6), as shown in Fig. 4.

**[0031]** The connection between the upright (1) and the crosspiece (2) is made by placing the crosspiece (2) close to the upright (1), and inserting the pair of edges (3b) inside the pair of edges (4b), whose wedge-shaped ends (3c and 4c) create a V-shaped notch (7) capable of housing a transversal dowel (8) in which the screw (9) is tightened, inserted into a transversal plate (10) placed against the flat profile (3d and 4d) of the pairs of edges (3b and 4b).

**[0032]** This means that the tightening of the screw (9) determines the gradual penetration of the dowel (8) inside the notch (7), resulting in the gradual fastening and tightening of the parts (3 and 4) of the joint (G) and consequently of the upright (1) and crosspiece (2), where the parts (3 and 4) are respectively screwed.

**[0033]** To reach the head of the screw (9), the tip of the screwdriver (C) is inserted inside the opening of the groove (1b) of the uprights (1), as shown in Fig. 2.

**[0034]** As mentioned above, before tightening the plates (3a and 4a) onto their housings, the crosspieces (2) or uprights (1) are cut to size to produce doors with special width or special height, respectively.

**[0035]** Attention is drawn to the fact that the cutting of uprights (1) or crosspieces (2) to size does not modify the width and depth of the longitudinal groove (1b), in which the plate (3a) can be placed in the same fixing

position.

**[0036]** Finally, it must be noted that the longitudinal grooves (1b and 2b) also house the covering panel of the door, either directly or with the interposition of union strips (11) in case of low-thickness panels or glass panes.

## Claims

1. Frame for wooden doors made of modular elements, of the type composed of two lateral uprights (1) and at least two crosspieces (2), having two identical longitudinal grooves (1b and 2b) going from one end to the other on the internal edge (1a and 2a), **characterised in that** it is made of uprights (1) and crosspieces (2) produced with standard size and cut to size, if necessary, connected by means of a removable joint (G) made of two parts (3 and 4), respectively screwed inside the groove (1b) of the uprights (1) and at the end of the crosspieces (2), equipped with fast-coupling and uncoupling fastening means.

2. Frame for wooden doors as defined in the foregoing claim **characterised in that** the joint (G) comprises:

- the first part (3) made of a plate (3a) screwed on the bottom of the groove (1b) of the uprights (1) and having an opposite pair of identical lateral edges (3b) ending with a wedge-shaped profile (3c) at one side and with a flat profile (3d) at the other side;
- the second part (4) made of a plate (4a) screwed at the end of the crosspieces (2) and having an opposite pair of identical lateral edges (4b), same as the lateral edges (3b) of the plate (3a), meaning that the pair of edges (4b) ends with a wedge-shaped profile (4c) at one side, and with a flat profile (4d) at the other side;
- a transversal dowel (8) in which the screw (9) is tightened, inserted inside a transversal plate (10) placed against the flat profile (3d and 4d) of the pairs of edges (3b and 4b);

it being provided that the pair of edges (3b) is slightly closer than the pair of edges (4b) so that the pair of edges (3b) can be exactly inserted inside the pair of edges (4b) in order to create a V-shaped notch (7) capable of housing the transversal dowel (8) by means of the parallel combination of the wedges (3c and 4c).

3. Frame for wooden doors as defined in the foregoing claims, **characterised in that** the uprights (1) and crosspieces (2) have a final surface finish before assembly.

4. Frame for wooden doors as defined in the foregoing claims, **characterised in that** the longitudinal grooves (1b and 2b) house strips (11) to support glass panes or covering panels having a thickness lower than the width of the grooves (1a and 1b).

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