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(71) Applicant: **Favero Health Projects Spa**
31044 Montebelluna (TV) (IT)

(72) Inventor: **Favero, Giordano**
31044 Montebelluna (TV) (IT)

(74) Representative: **Osti, Biancamaria**
D'Agostini Group Srl
Contrà Santa Barbara, 33
36100 Vicenza (IT)

(54) Process for making a door for furniture elements of composite material, and related assembled door

(57) Manufacturing process in which from plates of a Corian material one obtains some pre-defined strips, wherein each strip has at least one of the two dimensions, length and width, which is a submultiple of the corresponding height or width of the plate, thus optimizing the cutting of said plate of Corian material and minimizing material wastes. Said strips of Corian material are then joined using techniques of welding by gluing with joints between the upright and the crosspiece, if necessary using pins or connection elements. In this way a frame is obtained, which is then completed with a central panel of a material which is different from the frame, and wherein said frame is then machined to make the shapings, the seats for the internal panel, the roundings, to eliminate the sharp edges, as well as the seat for fixing the hinges and the seats for a handle of Corian, if present.

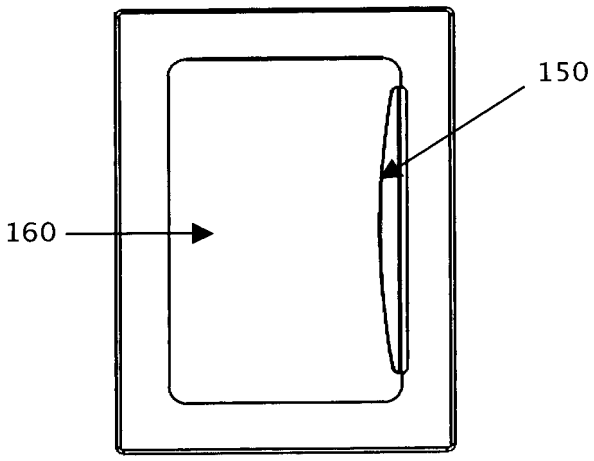

Fig. 6

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Description

[0001] The present invention relates to a process for making a door, even sanitizable, heat-resistant and scratch-resistant, to make a door, for example of a cabinet or a bedside table or of a trolley, but also for other modular components such as the panel fronts of drawers.

Field of the invention

[0002] The object of the present invention has a particular although not exclusive destination in hospitals, clinics and nursing homes also for long-term hospitalization, rest homes and in all the cases in which it is necessary to have an equipped and comfortable component in a convalescence room, to arrange in a safe way clothes, footwear, materials, accessories, consumables and goods of everyday use and so on in such a way as to provide assistance and facilitate the stay of patients, also being of possible support to the medical and paramedical staff.

[0003] The trolleys, as well as the cabinets or the bedside tables for hospital use are part of widespread conventional interior furnishing, which in its widest range offers bedside tables and cabinets of the most varied kinds, for instance of the type in which the frame is supported by floor supporting feet, or with swivelling wheels and other furniture elements intended to contain goods and things that are suspended such as the hanging units or wall structures.

[0004] In particular, said doors in the furniture elements are usually made using thermoplastic materials by moulding of the chosen shape or alternatively using materials which may be less valuable, such as MDF or other wood substitutes. In the first case, the processing is extremely easy, managing to obtain the element that completes the furniture, by means of a moulding or blow-moulding operation, while in the second case, the processing includes the use of a chipboard, for instance of MDF, preliminarily coated or faced, along which to make the frame-moulding applying a profile, and then to carry out the necessary machining to apply the further elements that complete the door, such as the seats for housing the hinges and the handle, if present. The so made door will be then be mounted on the respective component, in particular the frame of the piece of furniture, made up mainly of a parallelepiped structure, deriving from the assembly of a bottom, a top, two sides perpendicular with respect to the bottom, a back, wherein at least one door is frontal and openable, of the type hinged for example laterally in vertical. Generally, in the case of the bedside tables, these can also be provided with one or more drawers, externally, such as above the space openable from the underlying shutter and in other solutions also inside said space. The space accessible through the opening of the shutter can also be provided with one or more shelves, according to requirements, laterally supported by some guides or supports of various configuration protruding along the sides of the frame. Finally, both the drawer and the shutter can be provided with a conventional security key lock.

[0005] In the same way as the just described bedside table, the cabinet is configured with a frame provided with a bottom, a top, two sides, a back, and at least one front door hinged laterally and vertically. The support of the cabinet on the floor can include conventional feet adjustable according to requirements or swivelling wheels.

[0006] Therefore, it has been observed that the materials, which are usually used in the building of bedside tables and of cabinets, can be various materials, also metallic, in the past pseudoplastic laminated materials in combination with wooden blanks, and more recently mainly of moulded plastic material, with elements assembled to each other to form the frame or to constitute only some parts such as the top or also the shelves inside the space of the frame. One can generally agree that the choice of the thermoplastic material rather than the metal material or other materials used so far derives, in addition to clearly lower production costs, to the fact that it lends itself to an easy sanitization, as it is a component, being part of hospital furniture, which must be periodically treated in this way. The plastic material is particularly suitable for the purpose because it is easy to obtain shapes with geometries, which reduce if not even allow to eliminate the formation of receptacles inside which dirt may collect, otherwise hardly removable and as such having the possibility to facilitate bacterial proliferation.

Prior art

[0007] In the field of conventional furniture it has therefore been observed that some elements that make up said bedside tables and cabinets have been known for some time and also known are the structures that integrate into one single piece of furniture both the cabinet function and the bedside table function, as well as the materials that are used for the making.

[0008] In this field also known is the realization of elements for furniture components made of a material known as Corian®. Corian is a Du Pont registered trademark material, which consists of a composite material consisting of 2/3 of aluminium hydroxide (trihydrate) and 1/3 of acrylic resin (polymethylmethacrylate) with the possible addition of coloured pigments. It is a material that by definition is resistant to direct sunlight and its colour remains almost unchanged in time, with a good duration. It resists to normal stresses, to heat even if in direct contact, as long as only for a few instants. It is a translucent material, that is to say, a part of light can cross the material, it is scratch-resistant and it is sanitizable. The use of this material in the furniture sector is not completely new, for example it was broadly used to make valuable tops and kitchen tops in general, starting from a semi-finished product of a suitable thickness in the form of a flat plate, then cutting it to size and successively bordering it to mount it on some kitchen modules. In pat-

ent literature some priority documents can be found, and for example in NL1001066 (Fasting) also other components of Corian are described, such as some handles for assembly on flat surfaces, for example a door or a drawer, starting from a strip of material cut out of a sheet, heated and placed in a moulding cavity in such a way as to give the desired shape. After bending, the handle is left to cool in the mould before being removed. The strip of Corian is preferably heated for 30'/60' to 170 degrees C° before bending and is left to cool in the mould according to a time-temperature curve that is generally a mirror image of the heating curve. Then the surfaces are drilled in correspondence of the fastening to the door and are polished after shaping. US2006000538 (Cassels) proposes a method of modular construction for realizing a kitchen, bathroom or other false ceilings from pieces, which can be composed into one single laminated piece. The method allows to pre-arrange prefabricated and modular pieces for example for a false ceiling obtained from material like Corian or another similar material. By using the method, the customer selects a desired configuration and by the composition of modular pieces one can provide a working top, kitchen top or bathroom unit which is one single piece, including the rolling of a personalized sink basin to be integrated into any selected working top. The described method allows for a personalized and modular production using standardized pieces, thus reducing construction costs and speeding delivery times.

Drawbacks

[0009] The above-mentioned solutions certainly solve in an effective way the problem of facilitating cleaning in the hospital wards for hospital stay, however, they do not provide proper advantages, which can be objectively found in the products made of a material such as Corian or equivalent materials. In particular, one can reasonably agree that, also wishing to take inspiration from such teachings wanting to transfer the use of said material for example to the realization of furniture components, such as a solid door, the high purchase cost of the raw material, and the high number of scraps, in the conventional working, would make the realization of said component practically non-economical, resulting at the end of the works in a non-competitive product. About this, it is also known that in the past there was the attempt to make doors of Corian, however the working technology consisted in starting from a flat plate and by means of tools to perform a working operation in such a way as to obtain a rectangle of the desired size. This working thus turned out to be just as non-economical, making the product non-competitive, this being mainly due to the considerable waste material.

[0010] Another drawback can be noticeable in the high specific weight of the Corian material, almost comparable to other materials, which have been used in other solutions for a long time, for example the substitutes of wood commonly used in the making of doors. Then, however, there is the fact that the solutions already described are of not easy and fast assembly in the versatile and modular form, and they also do not reasonably allow for a rationalisation of the costs of production and management of the storage codes.

Short introduction to the object of the present invention

[0011] This and other aims are achieved by the present invention according to the characteristics as in the appended claims, solving the above-mentioned problems by means of a manufacturing process that consists in starting from plates of Corian material, of market sizes, in order to obtain predefined strips of material where each strip is provided at least with one of the two dimensions, length and width, which is a submultiple of the corresponding height or width of the plate, optimizing the cutting of said plate of Corian material and minimizing material wastes. These strips of Corian material are then joined using techniques of welding by gluing with joints between the upright and the crosspiece, if necessary using pins or connection elements. In this way a frame is obtained which then is completed with a central panel of a material that is different from the frame, and wherein said frame is then machined to make the shapings, the seats for the internal panel, the roundings, to eliminate the sharp edges, as well as the seats for fixing the hinges and the seats for a handle of Corian, if present.

Aims

[0012] By the considerable creative contribution the effect of which constitutes an immediate technical progress various aims are achieved.

[0013] First of all, the manufacturing process allows to make economical and therefore competitive the realization of doors for cabinets, hanging units, bases or in general other elements for applications mainly in the health sector, also enabling an easier and fast assembly of the element of the cabinet unit, hanging unit or of the base, without the connection point being noticed. At the same time one obtains a structure with a limited weight, easily and properly sanitizable, modular and versatile in its final configuration, suiting the various customer requirements.

[0014] These and other advantages will appear from the following detailed description of some preferred embodiments with the aid of the schematic drawings enclosed whose details are not to be considered as limitative but only as illustrative.

Content of the drawings

[0015]

Figure 1 is a plan view of an example of cutting into strips of Corian material starting from a flat plate.
Figure 2 is a plan view of the assembled frame.

Figure 3 is a view of the detail A of the various techniques of connection between the upright and the crosspiece.

Figure 4, 5 and 6 are other views of the assembled frame of Figure 2 in correspondence of which further working operations are performed.

Practical realization of the invention

[0016] The process of the present invention provides the start from semi-finished plates of Corian or also materials that are defined equivalent due to their technical characteristics. In the prior art the prevailing formats of Corian material available in various standard thicknesses and easily workable by specialized firms in the desired sizes and shapes are currently the following:

- 4 mm plates: 930 x 2490 mm
- 6 mm plates: 760 x 2490 mm or 930 x 2490 mm
- 12 mm plates: 760 x 3658 mm or 930 x 3658 mm
- 19 mm plates: 760 x 3658 mm

[0017] The most common format is the plate (10) having a thickness of 12 mm and a size of 760 x 3658 mm. In the case under examination the manufacturing process object of the present invention consists in starting from said plates (10) having the above-mentioned dimensions and obtain from each of them some parallel strips (20) so that at least one of the two dimensions, length and width, of each strip (20) constitutes a submultiple of at least one of the two length and width dimensions of the plate (10) in such a way as to optimize the cutting of said plate (10) thus minimizing material wastes (Figure 1). Said strips of Corian material (20) are joined to each other in a coplanar way and at the head, constituting the uprights and the crosspieces of the frame (100) using techniques of welding by gluing with joints between said upright and crosspiece, as those shown in Figure 3, and in more detail with an angle of connection (200) of 90° or 45° or alternatively with a connection in a continuous and linear way. Furthermore, it is observed that, although affecting the economical aspect one may use at the head some connection pins (210) or other connection elements, always made of Corian, or other metal or non-metal hardware in general.

[0018] In doing so one obtains an assembled frame (100). Said frame (100) is then machined by means of numerical control machines to make the appropriate shapings, for example the seats for the internal panel (110), the roundings (120) to eliminate the sharp edges, to make the seats (130) for hinges and to obtain the seats (140) for a handle of Corian (150), if present (see for example Figures 4, 5 and 6).

[0019] Afterwards one carries out the polishing and complete finishing of the door. Where present, one glues the handle and carries out the following polishing and finishing around the gluing zone. Finally, the door is completed by gluing an internal panel (160) made of glass or another material (Figure 6). The role of the central cover panel (160) of glass or another material is essential for the purpose of obtaining a finished door which is cost-effective for the market as a whole realizing a solid structure. The central panel (160) of glass can have any type of finishing from transparent to various degrees of opacity, from smooth to sandblasted or other finishes which have not been represented yet.

Reference:

[0020]

(10) plate of Corian
(20) strip
(200) angle of connection
(210) pins
(100) frame
(110) seats for the internal panel
(120) roundings
(130) seats for the hinges
(140) seats for the handle
(150) handle of Corian
(160) glass panel

Claims

1. Process for making a door for furniture elements of composite material of the Corian type, wherein,

a) one pre-arranges a plate of material (10) of at least one of the following sizes:

- 4 mm plates: 930 x 2490 mm
- 6 mm plates: 760 x 2490 mm or 930 x 2490 mm
- 12 mm plates: 760 x 3658 mm or 930 x 3658 mm
- 19 mm plates: 760 x 3658 mm

b) from said plate of material (10) some parallel strips (20) are obtained so that at least one of the two dimensions, length and width, of each strip (20) constitutes a submultiple of at least one of the two length and width dimensions of said plate (10) in such a way as to optimize the cutting of said plate (10);

c) said strips (20) are joined in a coplanar way constituting the uprights and crosspieces of the frame (100), with an angle connection (200) of 90° or 45°, alternatively in a continuous and linear way;

d) one makes the seats (110) for the peripheral fixing of the internal cover panel (160), the seats for the roundings (120) to eliminate the sharp edges, the seats (130) for the hinges and the seats (140) for a handle of Corian (150), if

present;
e) one glues the handle (150) and carries out the following polishing and finishing around the gluing zone;
f) finally, the door is completed by gluing a cover panel (160) which is internal with respect to the frame (100) and which is of a material different from said frame (100).

2. Door for furniture elements, **characterised in that** it is made up of uprights and crosspieces of Corian (20) in such a way as to obtain a frame of a quadrangular geometric shape (100), to which frame (100) a cover panel (160) is joined, which is enclosed by said uprights and crosspieces of Corian (20), and to which a handle (150) is joined in correspondence of one of said uprights or crosspieces.

3. Door for furniture elements according to claim 2, **characterised in that** the cover panel (160) supported by the frame (100) is of a glass material.

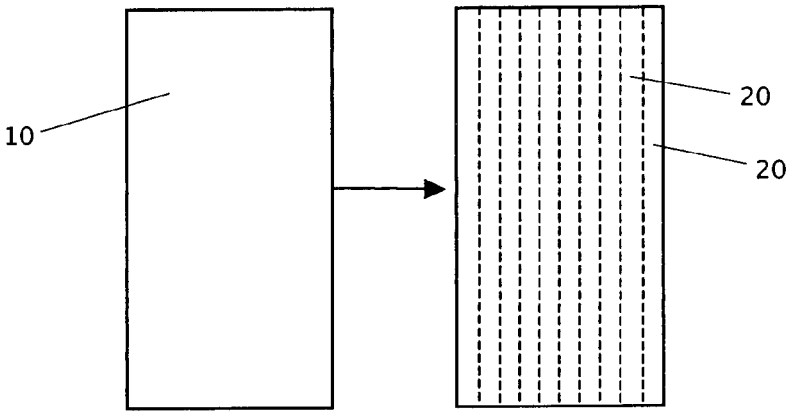


Fig. 1

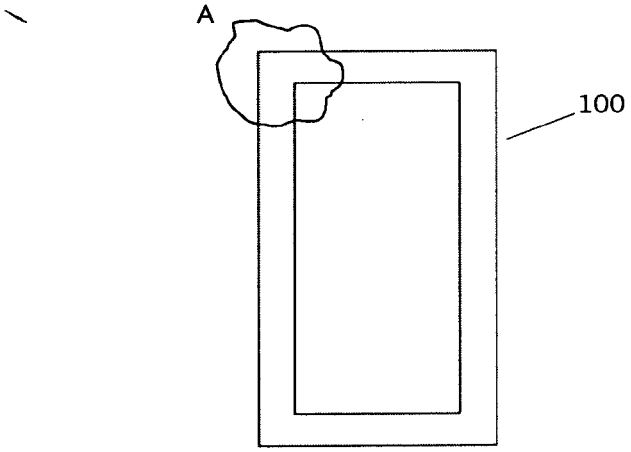


Fig. 2

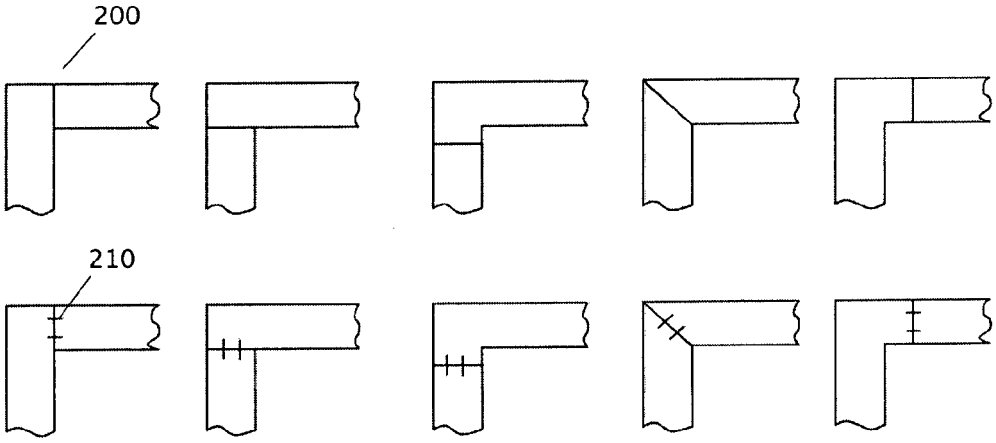


Fig. 3

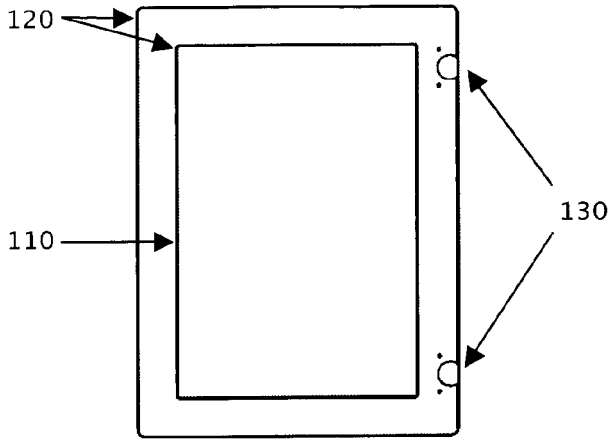
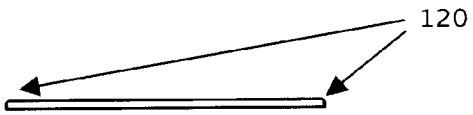


Fig. 4



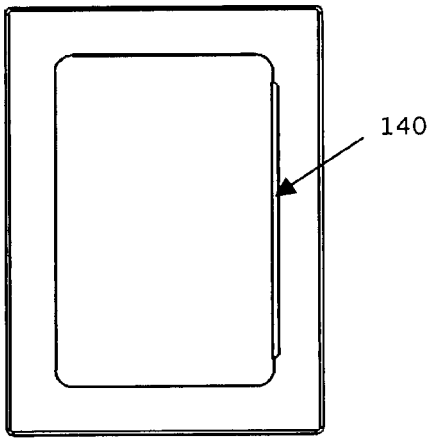


Fig. 5

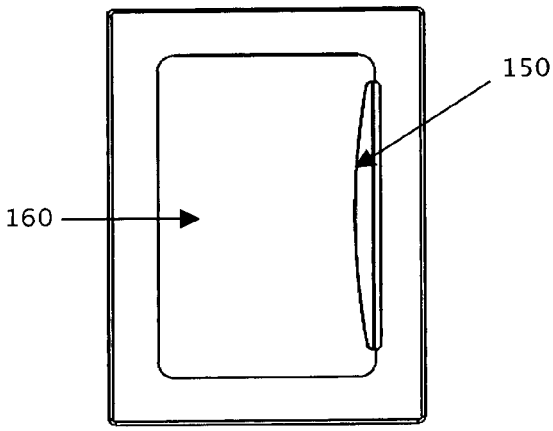


Fig. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 14 00 3276

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	29 October 2014	Blancquaert, Katleen

CATEGORY OF CITED DOCUMENTS

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