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(54) **COVERING APPARATUS AND CORRESPONDING INSTALLATION METHOD**

(57) Covering apparatus (10) and corresponding method to assemble the covering apparatus (10) comprising at least one vertical upright (11) and at least two horizontal crosspieces (12) attached to said vertical upright (11). The method comprises a step of installing at least one of the horizontal crosspieces (12) on said vertical upright (11), said installation step providing to lower said horizontal crosspieces (12) in a parallel or sub-parallel manner, with respect to the longitudinal axis of the vertical upright (11).

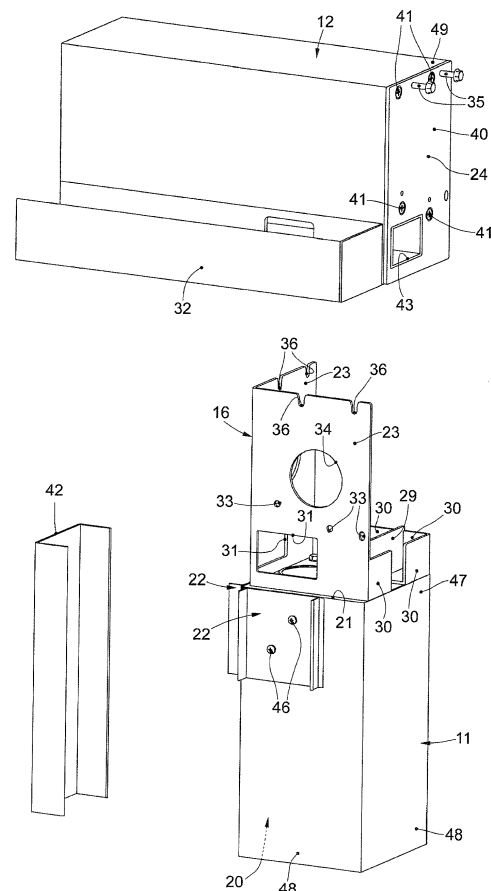


fig. 3

Description

FIELD OF THE INVENTION

[0001] The present invention concerns a covering apparatus and possible lateral protection, advantageously but not exclusively, for civil use, its conformation, and corresponding installation method. The covering apparatus is normally and generically referred to as a pergola.

[0002] A pergola is a structure that performs a function of coverage and protection, possibly also lateral, and that normally covers a maximum surface area of 35/40m² whose main civil use is to integrate residential areas.

[0003] If the pergola only provides cover, it can be provided, on the upper part, with adjustable sunshade blades that act as protection against the sun and/or rain, or with suitable sliding awnings configured for the same purpose.

[0004] As indicated, the pergola can also be provided with lateral covers, possibly sliding, such as blinds or glass windows, which allow a closure and therefore an insulation from the external environment.

[0005] In this case, the present invention concerns pergolas that have at least one vertical upright and at least two horizontal or sub-horizontal crosspieces. In the following description, we will refer only to horizontal crosspieces, since what refers to them can also be translated to sub-horizontal crosspieces.

[0006] The at least two horizontal crosspieces are connected to the upper part of the vertical upright, the horizontal crosspieces and the vertical uprights being equipped for the functions of the pergola itself.

BACKGROUND OF THE INVENTION

[0007] Covering apparatuses are known that comprise vertical uprights which support or position horizontal crosspieces equipped with covering elements, such as the sunshade blades as above, which have the function of protecting the underlying area from atmospheric agents.

[0008] The vertical uprights and the horizontal crosspieces can be made of boxed sheet metal usually made of aluminum or other material.

[0009] The vertical uprights and/or the horizontal crosspieces can be hollow internally in relation to possible components that can be positioned inside them.

[0010] Vertical uprights and horizontal crosspieces, if boxed or drawn, normally have plates at the ends for the containment and reciprocal connection of uprights and crosspieces.

[0011] The vertical uprights can be variously equipped according to customer needs. Therefore, sound systems, lighting means, rain sensors, anemometers, or surveillance devices, etc. can be provided.

[0012] Furthermore, the vertical uprights allow to house electric power cables and allow to contain the controls for the functions assigned to the horizontal cross-

pieces.

[0013] The horizontal crosspieces can have internal compartments to house horizontal and/or vertical blinds, as well as means to drive and control them, or other components of the pergola.

[0014] In addition, the horizontal crosspieces and the vertical uprights can comprise respectively longitudinal gutters to collect, and vertical gutters to drain rainwater coming from the upper roof.

[0015] The longitudinal gutters are put in communication with the vertical gutters by means of the apertures provided in the horizontal crosspieces and in the vertical uprights. Therefore, a precise and accurate assembly is essential to guarantee the correct positioning and to ensure the correct coupling of the apertures as above.

[0016] The horizontal crosspieces are therefore heavy, complex structures, which require precise and defined assembly, and which entail difficulties with testing, installation, as well as functioning.

[0017] It is also difficult, especially in the case of sophisticated pergolas, to correctly test the components once installed.

[0018] Generally, known covering apparatuses can have considerable plan sizes, with a base surface variable between about 20 m² and about 40 m² or more.

[0019] As a result, a suitable support structure has to be provided. In particular, the horizontal crosspieces have variable lengths from about 3.5 meters to about 7 meters with a weight that, including accessory components, varies between 200 kg and 300 kg or more.

[0020] The one or more vertical uprights are attached, during use, to a base surface.

[0021] It is known that the horizontal crosspieces are attached to the vertical uprights by means of a plurality of attachment means, for example threaded elements, configured to stably connect, when installed, the heads of the horizontal crosspieces as above to corresponding upper lateral walls of the vertical uprights.

[0022] One of the disadvantages of this installation method is that it is necessary to correctly support and position, with respect to the upright, the horizontal crosspiece during the entire installation step. In fact, the attachment is guaranteed only by the plurality of attachment means as above. This entails a long method and a greater number of operators and installation effort, with dangers for the operators.

[0023] Document AU 2017254931 B1 describes a pergola in which the horizontal crosspieces are connected to a respective vertical upright by means of an angular connection element, installed on the top of the one upright, and defined by a plurality of walls each provided with at least one recess to receive connection means suitable to stably connect the respective horizontal crosspiece.

[0024] However, since the horizontal crosspiece has, as mentioned, a rather significant weight, it exerts a static load on the connection means as above such as to subject them to rather significant shearing stresses. This,

over time, can cause one or more horizontal crosspieces to yield or even collapse, with consequences that can also be quite harmful.

[0025] The problems that arise when installing a pergola are mainly problems that concern the steps of completing the components present in the vertical uprights and in the horizontal crosspieces, as well as the corresponding assembly, refining and testing.

[0026] The assembly problems refer to the need to place the horizontal crosspieces at a precise height and suitably connect them to the upper part of the vertical uprights and/or to the lateral supports. This problem derives from the need to position the horizontal crosspieces exactly in the desired ratio in relation to the supports.

[0027] Everything is made even more difficult when the pergola has to be installed on the edge of a terrace or cliff, which requires being able to operate only from inside the structure.

[0028] Added to this is the need to install at least the horizontal crosspieces already pre-assembled in their components, since it is complicated and difficult to install, or complete the installation of, the multiple and complex components in the horizontal crosspieces already positioned at a certain height, or even only in the building site.

[0029] This means that it is in the interest of the manufacturer, due to warranty and functioning problems, to complete each crosspiece on his premises and to ship each complete, tested and verified crosspiece.

[0030] The testing problems refer, in fact, to the need to test every single component of each horizontal crosspiece in all the provided and/or possible functionings and to consider the possible corrective actions for completion or adjustment and refining, in order to avoid problems in the building site and subsequently.

[0031] The problems of production, storage and transport of the crosspieces and uprights can be added to the above, therefore the Applicant has evaluated the possibility that the horizontal crosspieces and the vertical uprights, complete with each component and tested, can be shipped completely packed and in a secure manner. This simplifies the problems of storage on company premises and transport, and allows for mass production, as well as avoiding damage to the various components during storage and transport.

[0032] To overcome this and other problems, the Applicant has studied, experimented, tested and perfected both a series of mechanical devices and expedients, and a pre-assembly and transport procedure, and also an assembly and installation procedure.

[0033] One purpose of the present invention is to provide at least the horizontal crosspieces which can be completely assembled and tested directly in the factory, so as to resolve all the problems, so that at the site of final assembly it is sufficient to perform only the final assembly and the associated electrical connections.

[0034] This means that the vertical uprights and crosspieces can be completely packed, protected and ready for assembly. These expedients mean that at the instal-

lation location it is sufficient to proceed simply with the unpacking and installation operations, allowing to reduce supply times and costs.

[0035] Another purpose of the present invention is to simplify and speed up the assembly operations, avoiding or reducing to a minimum the use of particular equipment such as, for example, cranes, lift trucks or other similar or comparable equipment.

[0036] It is also a purpose of the present invention to make the assembly operations safe, avoiding dangers and/or accidents to the fitters. Since the pergolas can also be installed on the edge of a terrace and/or cliff, it is necessary that the installation procedure guarantees a suitable level of safety and that it can also be performed from the inside of the pergola itself.

[0037] A further purpose of the present invention is to provide a covering apparatus which comprises components made so as to be simple to package, transport, assemble and fit rapidly, whatever the situation or condition a pergola has to be installed in. In this way, the transport step is optimized and the possibility of having parts that are different or damaged, or not present on the installation site, is reduced.

SUMMARY OF THE INVENTION

[0038] The present invention is set forth and characterized in the independent claims, while the dependent claims describe other characteristics of the invention or variants to the main inventive idea.

[0039] In accordance with the above purposes, a covering apparatus, according to the present invention, comprises at least one vertical upright and at least two horizontal crosspieces attached to the vertical upright.

[0040] According to one aspect of the invention, the vertical upright has, in itself and/or associated with it, at least one support surface on which at least one corresponding horizontal crosspiece is positioned, during use.

[0041] According to a possible aspect of the invention, it is provided that in the upper part of the vertical upright specific auxiliary elements are applied advantageously, but not restrictively, possibly provided with a bottom wall, to configure an L-shaped shape.

[0042] The bottom wall can comprise both holes for the means to connect it to the vertical upright, and at least one discharge hole for the possible vertical gutter provided in the vertical upright, and also a first auxiliary aperture for the passage of the drive and command cables.

[0043] The auxiliary element has useful and necessary holes and apertures in relation to the respective horizontal crosspiece.

[0044] According to a formulation of the invention, the bottom wall of the auxiliary element has a smaller size than the upper base of the vertical upright, so that once applied to the vertical upright, a support surface is configured on the base of the vertical upright with a size that varies between 2 and 10 mm.

[0045] According to a variant, the support surface is

defined by the edge of the upper base of the vertical upright, and by a support element that is additional to or integrated with the vertical upright.

[0046] Additionally, each auxiliary element has on the upper part recesses open upward, shaped with a bottom, positioned in a desired manner with respect to the base of the vertical upright.

[0047] The recesses, advantageously, have a development that is flared upward to facilitate their use.

[0048] Hereafter, since it is the most frequent case, we will refer only to the case in which the auxiliary element allows the connection of two horizontal crosspieces. However, it can also be the case that a vertical upright is located in an intermediate position, or in a central position. In the first case, the auxiliary element is configured to connect to three horizontal crosspieces, while in the second case it is configured to connect four of them.

[0049] According to the invention, advantageously the distance between the bottom of the recess and the free perimeter of the vertical upright is a specific and defined distance. This distance serves to ensure a correct pre-positioning of the horizontal crosspiece on that side of the auxiliary element and also serves to guarantee that, once the horizontal crosspiece is pre-positioned on the vertical upright, it cannot be displaced axially with its own motion without effecting the verticality of the vertical upright itself.

[0050] This is achieved by providing a coherent plurality of threaded holes having the same number and positioning of the recesses on the front surface of the horizontal crosspiece, so as to match when installed. Additionally, the threaded holes have a distance of the lower part of the threaded hole which is coherent with the distance of the lower part of the recess with respect to the perimeter support surface present on the vertical upright.

[0051] With this expedient, in the holes of the front surface of the horizontal crosspiece, axial retention means can be applied having a part with a larger section, such as for example screws having a head with a larger section, which are not completely tightened.

[0052] It is therefore evident that, since the vertical upright is already attached in a stable manner to the support plane, it is sufficient to lower the horizontal crosspiece from above with the axial retention means not completely tightened, which come to be located in the recesses and straddling the auxiliary element.

[0053] In this way, the screw heads act as axial retainers of the horizontal crosspiece while the weight of the horizontal crosspiece itself weighs on the edge of the vertical upright, that is, on the support surface, and possibly also on the screws present in the recesses.

[0054] It is sufficient, therefore, to fully tighten the axial retention means, if they are devices that allow tightening, to create a stable and safe connection for the operator who can then proceed with the other operations in safety.

[0055] As a further guarantee, if the retention means are screws, anti-unscrewing means can be provided. This assembly and reciprocal tightening operation can

be performed both from inside and also from outside of the pergola.

[0056] The axial retention means can be pre-assembled on the horizontal crosspiece already during the step of production and/or assembly thereof.

[0057] As indicated according to a variant, the support surface can also be defined by a support element associated with the vertical upright, which, for example, can extend to the lower base of the vertical upright or operate in determinate positions, or be located only in the upper part.

[0058] The support element, with its upper part, cooperates with the support surface of the vertical upright or replaces it in the step of assembly of the horizontal crosspieces.

[0059] According to a further variant, to integrate the support surface, a closing element can be provided, associable with the support element, which is simple or specialized for a specific function, for example to cooperate with the blind, or to abut with the sliding panels or other. The additional closing element can be autonomous or associated with the support element in order to support the horizontal crosspiece.

[0060] Therefore the present invention, by innovating the construction and assembly methods, provides to:

- obtain in the workshop at least the horizontal crosspieces finished in each of their components and tested so that they can already be packaged for their protection, storage and transport, as well as to reduce operations to unpacking and assembly only;
- provide on the upper bases of each vertical upright an auxiliary element suitable to attach a desired number of horizontal crosspieces that insist on the vertical upright itself;
- provide that axial retention means, for example screws, are applied, possibly on site, to the horizontal crosspieces, which cooperate, during the installation of the horizontal crosspieces, with a finalized upper edge of the respective specialized lateral wall;
- provide that the reciprocal ratios between the axial retention means, the finalized upper edge of the auxiliary element and the upper base of the vertical upright act as both axial retainers and also as support for the horizontal crosspieces.

BRIEF DESCRIPTION OF THE DRAWINGS

[0061] These and other characteristics of the present invention will become apparent from the following description of some embodiments, given as a non-restrictive example with reference to the attached drawings wherein:

- fig. 1 is a perspective view of a covering apparatus according to the present invention;
- fig. 2 is an exploded view of some components of the covering apparatus of fig. 1;

- fig. 3 is a further exploded view of some components of the covering apparatus of fig. 1;
- fig. 4 is an assembled perspective view of the components of the covering apparatus of fig. 1;
- fig. 5 is a view from above of a component of the covering apparatus.

DETAILED DESCRIPTION OF SOME EMBODIMENTS

[0062] We will now refer in detail to the various embodiments of the present invention, of which one or more examples are shown in the attached drawings. Each example is supplied by way of illustration of the invention and shall not be understood as a limitation thereof. For example, the characteristics shown or described insofar as they are part of one embodiment can be adopted on, or in association with, other embodiments to produce another embodiment.

[0063] It is understood that the present invention shall include all such modifications and variants.

[0064] With reference to fig. 1, a covering apparatus such as a pergola or a similar or comparable structure is indicated as a whole with the reference number 10.

[0065] In the case shown, it is a pergola with four vertical uprights 11 and four horizontal crosspieces 12.

[0066] Other embodiments are possible, therefore, one or more horizontal crosspieces 12 can be anchored to existing walls, or to support elements already provided for example for other functions.

[0067] Furthermore, one or more vertical uprights 11 can be associated with two or more pergolas combined together to form a single covering apparatus 10.

[0068] The covering apparatus 10 can comprise a support structure 13 defined by at least one of the vertical uprights 11 as above, and by at least two of the horizontal crosspieces 12 as above.

[0069] The covering apparatus 10 can also comprise a covering structure 14 associated with the support structure 13 and configured to provide cover for the area below the covering structure 14. According to possible solutions, the covering structure can comprise a plurality of fixed or adjustable covering elements 15, such as for example sunshade blades. According to variant embodiments, the covering structure 14 can comprise a protective canvas, possibly of the sliding type, to move to a first operating condition in which it protects the part below the covering structure 14, and to a second operating condition in which the underlying part is completely free, that is, not covered.

[0070] At least one of the horizontal crosspieces 12 is connected to the vertical upright 11 by means of one or more auxiliary elements 16.

[0071] In particular, it can be provided that each auxiliary element 16 is connected to an upper end 47 of the respective vertical upright 11 and is integrated with it, either in the factory or on site. The auxiliary element 16 defines a vertical extension of the vertical upright 11.

[0072] According to a variant embodiment of the

present invention, the auxiliary element 16 can be made in a single piece with the vertical upright 11.

[0073] If on site, the attachment occurs using precise and non-modifiable references.

[0074] According to possible solutions, the vertical uprights 11 and the horizontal crosspieces 12 can have an oblong development and can be hollow internally, that is, provided with a tubular cavity 20 variably configured to allow the housing of accessory components of the covering apparatus 10.

[0075] Specifically, it is possible to provide that the tubular cavity 20 of the horizontal crosspiece 12 is configured to house at least one of either a vertical blind, drive means for the covering structure 14, parts of discharge devices for rainwater, lighting devices, electrical connection devices, or other.

[0076] The tubular cavity 20 of the vertical uprights 11 can be configured to house devices to discharge water collected by the covering structure 14, such as a vertical gutter.

[0077] According to variant embodiments, the vertical uprights 11 and/or the horizontal crosspieces 12 can have a box-shaped cross-section for example, rectangular, circular, elliptical or other.

[0078] Preferably, the vertical uprights 11 and the horizontal crosspieces 12 have a square or rectangular shaped cross-section. This facilitates the installation operations of the covering apparatus 10.

[0079] According to possible solutions, the tubular cavity 20 can be provided with partitions, and/or stiffening ridges to define specialized through seatings for the passage and/or housing of predefined components.

[0080] Normally, the vertical uprights 11 and/or the horizontal crosspieces 12 can be obtained by bending or shaping a metal sheet.

[0081] In some solutions, the vertical uprights 11 and/or the horizontal crosspieces 12 can be obtained by drawing.

[0082] The vertical uprights 11 and/or the horizontal crosspieces 12 can be made of a metal material such as aluminum or other light alloy.

[0083] The vertical uprights 11 can be defined by a plurality of walls 48 connected together in a closed ring to define the cross-section of the vertical uprights 11.

[0084] Each vertical upright 11 normally comprises a lower base 17 provided in correspondence with the lower end and an upper base 18, opposite the lower base 17 and provided in correspondence with the upper end 47 as above.

[0085] The lower base 17 can be provided, or associated, with attachment means configured to attach the vertical upright to the support plane 19.

[0086] According to one aspect of the present invention, the vertical upright 11 has, in itself and/or associated with it, at least one support surface 21 on which at least one corresponding horizontal crosspiece 12 is positioned, during use.

[0087] According to a possible solution of the invention,

the support surface 21 as above can be made partly on the upper base 18 of the upper end 47 of the vertical upright 11.

[0088] According to possible solutions, not shown, the support surface 21 as above can be defined by a lateral extension of the vertical upright 11.

[0089] In particular, the support surface 21 is positioned, during use, substantially horizontal, or sub-horizontal, to perform the support function as above.

[0090] According to a possible solution, the support surface 21 as above can be defined, at least partly, by the thickness of at least some of the walls 48 of the vertical uprights 11, as shown with a lined pattern in fig. 5.

[0091] According to a possible variant embodiment, the vertical upright 11 can comprise, attached to it, for example with attachment elements 46, one or more support elements 22.

[0092] The support element 22 can be provided with a head end which defines at least part of the support surface 21 as above.

[0093] In particular, it can be provided that the head end of the support element 22 is positioned substantially coplanar with the upper base 18 of the vertical upright 11.

[0094] Each support element 22 can be attached to one of the walls 48 of the corresponding vertical upright 11 at least in correspondence with the upper end 47 of the latter.

[0095] According to a possible solution, the support element 22 can be defined by a section bar whose head end defines the support surface 21 as above.

[0096] The section bar can extend for the entire length of the vertical upright 11. In this case, the section bar can discharge the stresses weighing on it onto the support surface 19.

[0097] According to a variant, the section bar can extend only for a longitudinal portion of the vertical upright 11.

[0098] According to possible solutions, a closing element 42 can be coupled to the support element 22, defining with the support element 22 a through compartment to house possible components.

[0099] The closing element 42 can also define, with a head surface thereof, part of the support surface 21 as above.

[0100] The closing element 42 can be attached to the support element 22 by means of brackets, threaded elements or by means of same shape couplings, for example snap-in elements, or by interference.

[0101] The horizontal crosspiece 12 is connected to the vertical upright 11 with a head end 49 thereof.

[0102] In particular, it can be provided that the head end 49 is connected to the auxiliary element 16 as above.

[0103] The head end 49 is positioned resting on the support surface 21 defined above.

[0104] According to embodiments of the present invention, a head 40, such as an attachment plate, can be connected to the head end 49 of the horizontal crosspiece 12, for example by means of threaded elements 41

[0105] The head 40 can be provided with at least one aperture 43 to discharge water coming from longitudinal gutters 32 associated with the horizontal crosspieces 12.

[0106] According to a possible solution, also this head 40, for example with its thickness, can be positioned resting on at least part of the support surface 21 defined above.

[0107] According to a possible solution of the invention, the horizontal crosspiece 12 is provided with axial retention means 35 associable, during use, with the auxiliary element 16 and configured to contain axial movements of the horizontal crosspiece 12, that is, in a direction parallel to the longitudinal development of the latter.

[0108] According to a possible solution, the axial retention means 35 can be associated with the head 40.

[0109] According to one variant embodiment, not shown, the axial retention means 35 can be directly associated with the horizontal crosspiece 12. In particular, the axial retention means 35 can be pre-mounted on the horizontal crosspiece 12 already during the production or assembly step of the horizontal crosspiece 12.

[0110] According to some embodiments of the invention, the axial retention means 35 can be installed protruding cantilevered with respect to the head end 49 of the horizontal crosspiece 12.

[0111] According to a possible solution, the axial retention means 35 can comprise a screw, a pin, a hook, or similar or comparable elements suitable for the purpose.

[0112] According to possible solutions of the invention, the auxiliary element 16 can comprise at least one specialized lateral wall 23 to which one of the horizontal crosspieces 12 is attached, by means of attachment means 39.

[0113] According to a possible solution, the horizontal crosspiece 12 or possibly the head 40, if present, is provided with a front surface 24 positioned in contact with the specialized lateral wall 23 of the auxiliary element 16.

[0114] According to some solutions, the at least one specialized lateral wall 23 lies on a plane substantially parallel to the lying plane of one of the walls 48 of the respective vertical upright 11. The reciprocal distance between the two lying planes of the specialized lateral wall 23 and of one of the walls 48 defines part of the support surface 21 as above.

[0115] According to a possible solution, each auxiliary element 16 associated with a respective vertical upright 11 can be provided with at least two of the specialized lateral walls 23 as above, to each of which a respective horizontal crosspiece 12 is connected.

[0116] According to a possible solution, the specialized lateral walls 23 are connected to each other along respective longitudinal edges to define a connection bracket with an L-shaped conformation.

[0117] According to a possible solution, the at least two specialized lateral walls 23 can be reciprocally connected, in correspondence with a base edge thereof, with a bottom wall 25. The bottom wall 25 develops orthogonally

with respect to the specialized lateral walls 23.

[0118] According to a possible solution, the bottom wall 25 can define, with the specialized lateral walls 23 as above, the connection bracket as above.

[0119] The bottom wall 25 can be connected, by means of connection means 45, to the upper base 18 of the vertical upright 11 and has sizes suitable to allow the definition of the support surface 21 as above. By way of example only, it can be provided that the base wall 25 has smaller plan sizes than those of the upper base 18.

[0120] The bottom wall 25 can be provided with at least one discharge hole 27 for the connection to a possible vertical gutter provided in the vertical upright 11, and/or at least a further first auxiliary aperture 28 suitable to allow, for example, the transit of the drive and command cables.

[0121] If the discharge hole 27 for the connection to the vertical gutter is in the bottom wall 25, it is usual and advantageous to provide partitions 29 which section the bottom wall 25 so that the possible splashes of water do not affect the first auxiliary aperture 28 for the transit of the drive and command cables.

[0122] The auxiliary elements 16 can be provided with connection walls 30 configured to connect together two of the specialized lateral walls 23 as above, and increase the resistance of the auxiliary element 16.

[0123] According to possible solutions, the auxiliary elements 16 can be provided with at least one recess 36 suitable to cooperate with the axial retention means 35 associated with the horizontal crosspiece 12 in order to prevent significant axial displacements of the horizontal crosspiece 12, at least in the final step of the installation with respect to the vertical upright 11.

[0124] According to one embodiment of the invention, the at least one recess 36 can be made in correspondence with an edge of one of the specialized lateral surfaces 23, and be opened, during use, upward, in order to receive and subsequently retain the axial retention means 35.

[0125] The at least one recess 36 can have a flared shape diverging toward the outside to facilitate the insertion of the axial retention means 35.

[0126] When the axial retention means 35 are positioned on the bottom of the recess 36, the latter, together with the support surface 21, provides to support the entire horizontal crosspiece 12.

[0127] According to a further aspect of the present invention, the recesses 36 are positioned coherently with the position of the axial retention means 35 provided in the horizontal crosspieces 12.

[0128] The axial retention means 35 of the horizontal crosspiece 12 therefore have a first operative position in the assembly step, suitable to allow their insertion in the recess 36, and a second operative position, in which the axial retention means 35 are integrally fixed in the recess 36 for the stable connection between the vertical upright 11 and the horizontal crosspiece 12.

[0129] According to a variant, the axial retention means

35 consist of the same screws that clamp the vertical upright 11 and the horizontal crosspiece 12, screws which in the assembly step are partially screwed and in the stabilization step totally screwed.

[0130] If the axial retention means 35 are at least one screw, the screw provides a head with sizes larger than the sizes of at least the lower end part of the at least one recess 36 present in the upper edge of the specialized lateral wall 23.

[0131] Each auxiliary element 16 can be provided with apertures useful and necessary in relation to the respective horizontal crosspiece 12.

[0132] Therefore, on each occasion, the auxiliary element 16 can have a connection aperture 31 coherent with the possible longitudinal gutter 32 present in the horizontal crosspiece 12, holes 33 for the connection to the horizontal crosspieces 12, second auxiliary apertures 34 suitable for the passage of the power supply and control cables for the means associated with the horizontal crosspieces 12, etc.

[0133] Embodiments of the present invention also concern a method to assemble the covering apparatus 10 described above, which comprises a step of installing at least one of the horizontal crosspieces 12 on the vertical upright 11.

[0134] The installation step provides to lower the horizontal crosspiece 12 in a parallel or sub-parallel manner, with respect to the longitudinal axis of the vertical upright 11, and position the horizontal crosspiece 12 on the support surface 21 of the vertical upright 11.

[0135] Furthermore, during the installation step it is provided to insert the axial retention means 35 in the recesses 36 made in the auxiliary elements 16.

[0136] Following the insertion, the axial retention means 35 are tightened in the recess 36 in order to reciprocally constrain the horizontal crosspiece 12 to the vertical upright 11.

[0137] According to one implementation of the method, it is possible to provide to associate further attachment means 39 with the auxiliary element 16, configured to stabilize the reciprocal connection of the horizontal crosspiece 12.

[0138] It is clear that modifications and/or additions of parts may be made to the covering apparatus 10 and corresponding installation method as described heretofore, without departing from the field and scope of the present invention.

[0139] It is also clear that, although the present invention has been described with reference to some specific examples, a person of skill in the art shall certainly be able to achieve many other equivalent forms of the covering apparatus 10 and corresponding installation method, having the characteristics as set forth in the claims and hence all coming within the field of protection defined thereby.

[0140] In the following claims, the sole purpose of the references in brackets is to facilitate reading: they must not be considered as restrictive factors with regard to the

field of protection claimed in the specific claims.

Claims

1. Covering apparatus comprising at least one vertical upright (11), provided, in correspondence with an upper end (47) of said vertical upright (11), with an upper base (18), said apparatus also comprising at least two horizontal crosspieces (12) attached to said vertical upright (11) in correspondence with said upper end (47), **characterized in that** the vertical upright (11) has, in itself and/or associated with it, at least one support surface (21) defined, at least partly, by said upper base (18) and on which at least one corresponding horizontal crosspiece (12) is positioned resting.
2. Covering apparatus as in claim 1, **characterized in that** said at least one vertical upright (11) is defined by a plurality of walls (48), connected to each other in a closed ring, wherein said support surface (21) is defined, at least partly, by the thickness of at least some of said walls (48).
3. Covering apparatus as in claim 2, **characterized in that** at least one of the horizontal crosspieces (12) is connected to the vertical upright (11) by means of one or more auxiliary elements (16), connected to said upper end (47) of the vertical upright (11).
4. Covering apparatus as in claim 3, **characterized in that** the horizontal crosspiece (12) is provided with axial retention means (35) associated directly with said horizontal crosspiece (12), already in the production or assembly step of said horizontal crosspiece (12), and associated, during use, with the auxiliary element (16), said axial retention means (35) being configured to contain axial movements of the horizontal crosspiece (12).
5. Covering apparatus as in claim 4, **characterized in that** said auxiliary elements (16) are provided with at least one recess (36) suitable to cooperate with said axial retention means (35) to prevent significant axial displacements of the horizontal crosspiece (12).
6. Apparatus as in claim 5, **characterized in that** the axial retention means (35) associated with the horizontal crosspiece (12) have a first operating position, in the assembly step, suitable to allow their insertion into said recess (36), and a second operating position in which said axial retention means (35) are integrally fixed in said recess (36) for the stable connection of the vertical upright (11) and the horizontal crosspiece (12).
7. Covering apparatus as in any claim from 3 to 6, **characterized in that** said auxiliary element (16) comprises at least one specialized lateral wall (23) to which one of the horizontal crosspieces (12) is attached, wherein said at least one specialized lateral wall (23) lies on a plane substantially parallel to the lying plane of one of said walls (48) of said at least one vertical upright (11), wherein the reciprocal distance between the two lying planes of said specialized lateral wall (23) and one of said walls (48) allows to define on said upper base (18) at least a part of said support surface (21).
8. Covering apparatus as in claim 7, **characterized in that** said at least one specialized lateral wall (23) is connected, in correspondence with a base edge, to a bottom wall (25) of said auxiliary element (16), wherein said bottom wall (25) has smaller plan sizes than those of said upper base (18) allowing to define, on said upper base (18), at least a part of said support surface (21).
9. Apparatus as in any claim hereinbefore, **characterized in that** it comprises one or more support elements (22) attached to one or more of the walls (48) of said vertical upright (11) at least in correspondence with said upper end (47) in a position coplanar with said upper base (18) defining, at least partly, said support surface (21).
10. Vertical upright associable and associated with at least two horizontal crosspieces (12) to form a pergola, **characterized in that** the vertical upright (11) is provided, in correspondence with an upper end (47), with an upper base (18) on which is defined at least a part of a support surface (21) to support said horizontal crosspieces (12), an auxiliary element (16) being associated with said upper base (18) and configured to allow the connection of said horizontal crosspieces (12) to said vertical upright (11).
11. Vertical upright as in claim 10, **characterized in that** it comprises one or more support elements (22) attached to one or more walls (48) of said vertical upright (11) at least in correspondence with said upper end (47) in a position coplanar with said upper base (18) defining, at least partly, said support surface (21).
12. Vertical upright as in any claim from 10 to 11, **characterized in that** said auxiliary element (16) is provided with at least one recess (36) suitable to cooperate with axial retention means (35) of one of said horizontal crosspieces (12).
13. Horizontal crosspiece suitable to cooperate with at least one vertical upright (11) to form a pergola, **characterized in that** it comprises head ends (49), at

least one of which being provided with axial retention means (35) pre-assembled on said horizontal crosspiece (12) already in the production and/or assembly step of said horizontal crosspiece (12).

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14. Horizontal crosspiece as in claim 13, **characterized in that** said axial retention means (35) associated with the horizontal crosspiece (12) have a first operating position, in the assembly step, suitable to allow their insertion into at least one recess (36) of an auxiliary element (16) associated with said vertical upright (11), and a second operating position in which said axial retention means (35) are integrally fixed in said recess (36) for the stable connection of the vertical upright (11) and the horizontal crosspiece (12).
15. Method to assemble a pergola-type covering apparatus (10) as in any claim from 1 to 9, comprising at least one vertical upright (11) as in any claim from 10 to 12 and at least two horizontal crosspieces (12) as in any claim from 13 to 14, **characterized in that** it comprises a step of installing at least one of said horizontal crosspieces (12) on said vertical upright (11), said installation step providing to lower said horizontal crosspiece (12) in a parallel or sub-parallel manner with respect to the longitudinal axis of the vertical upright (11), and to position said horizontal crosspiece (12) on a support surface (21) of the vertical upright (11), wherein during the positioning of said horizontal crosspiece (12) on said support surface (21) it is provided to insert axial retention means (35) of said horizontal crosspiece (12) into recesses (36) of an auxiliary element (16) associated with said vertical upright (11).

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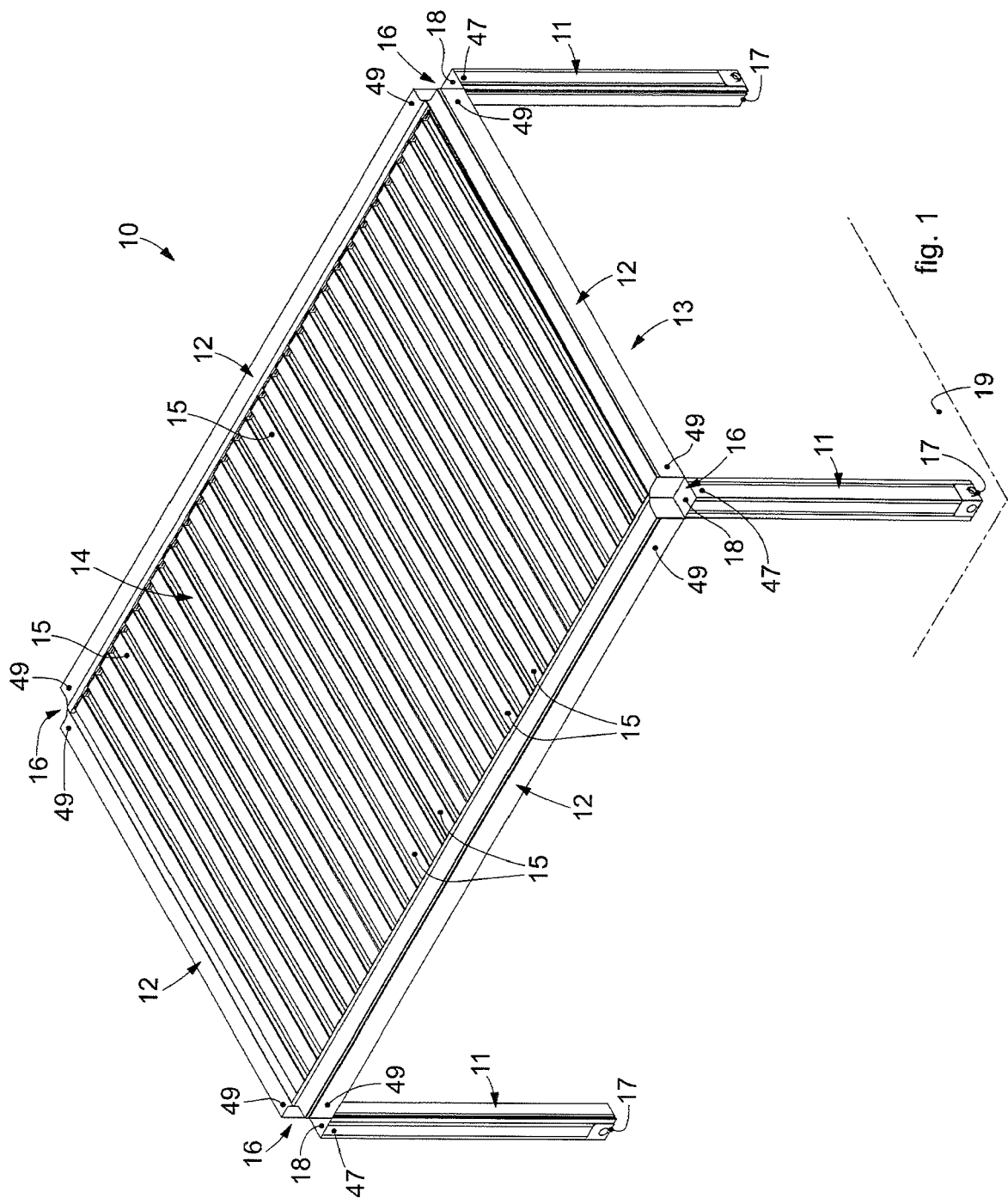
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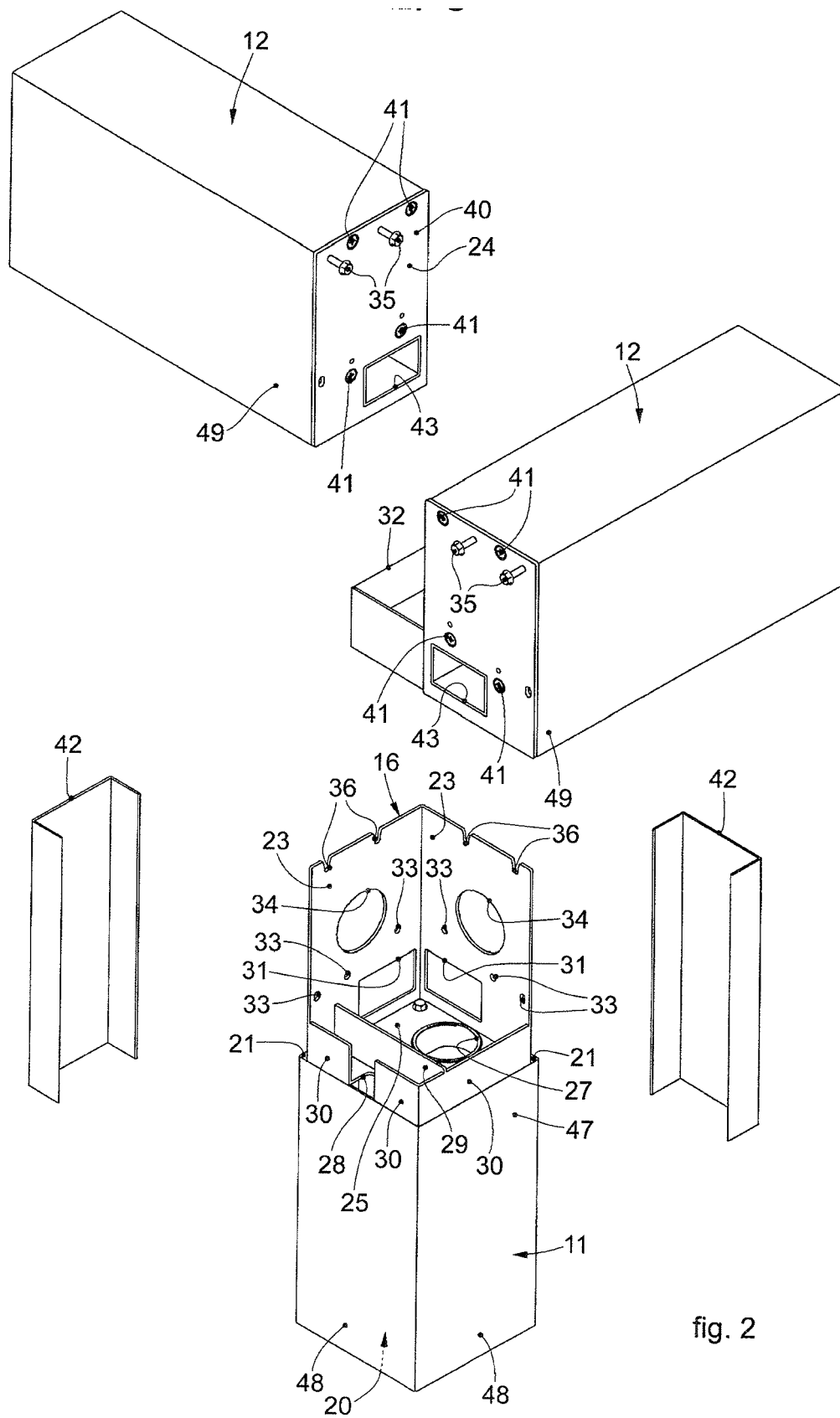


fig. 2

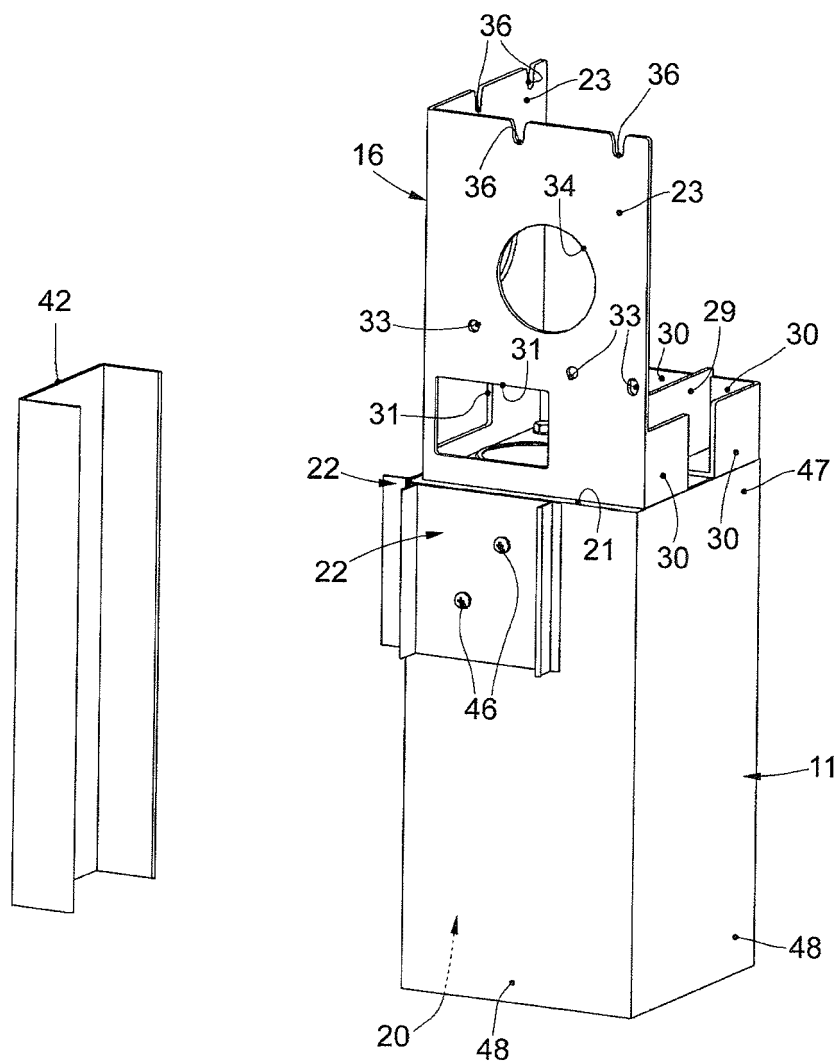
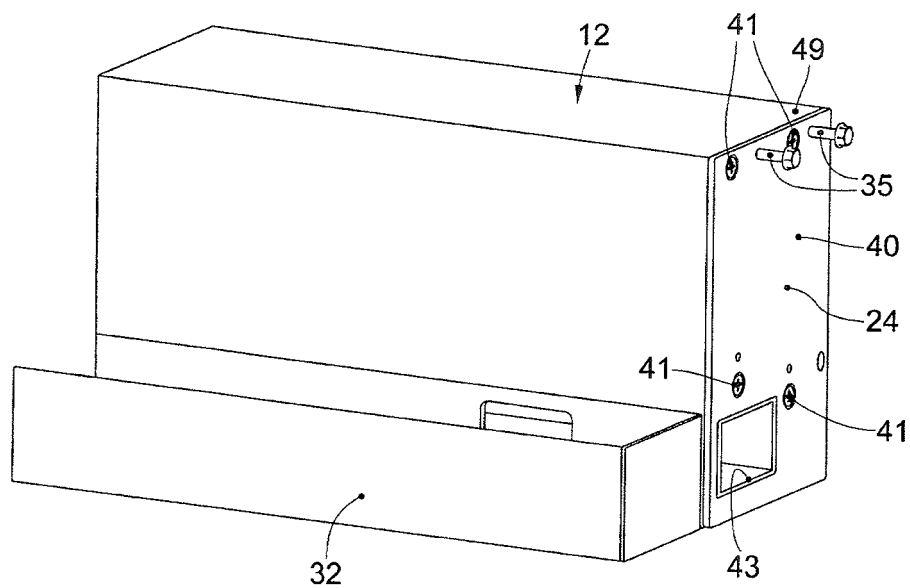


fig. 3

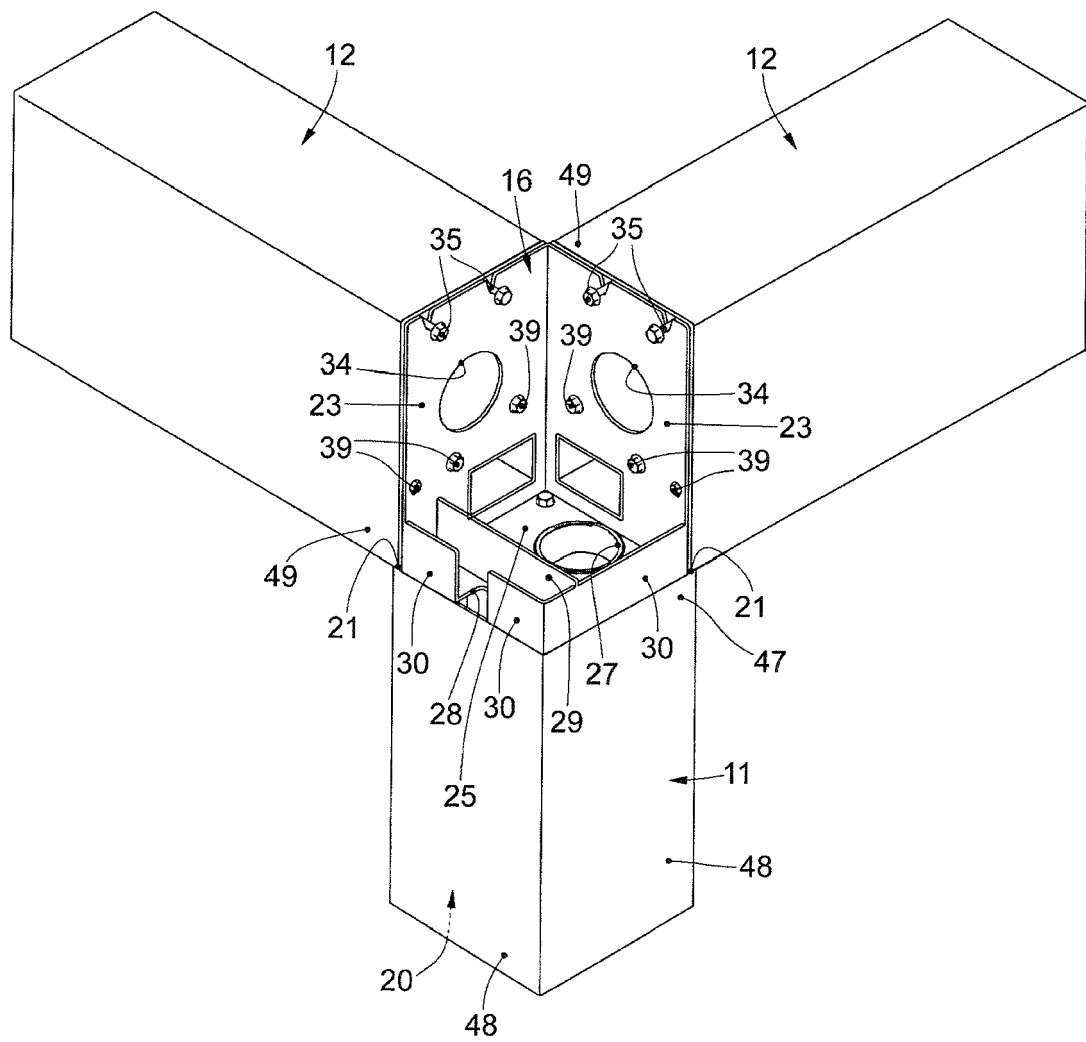


fig. 4

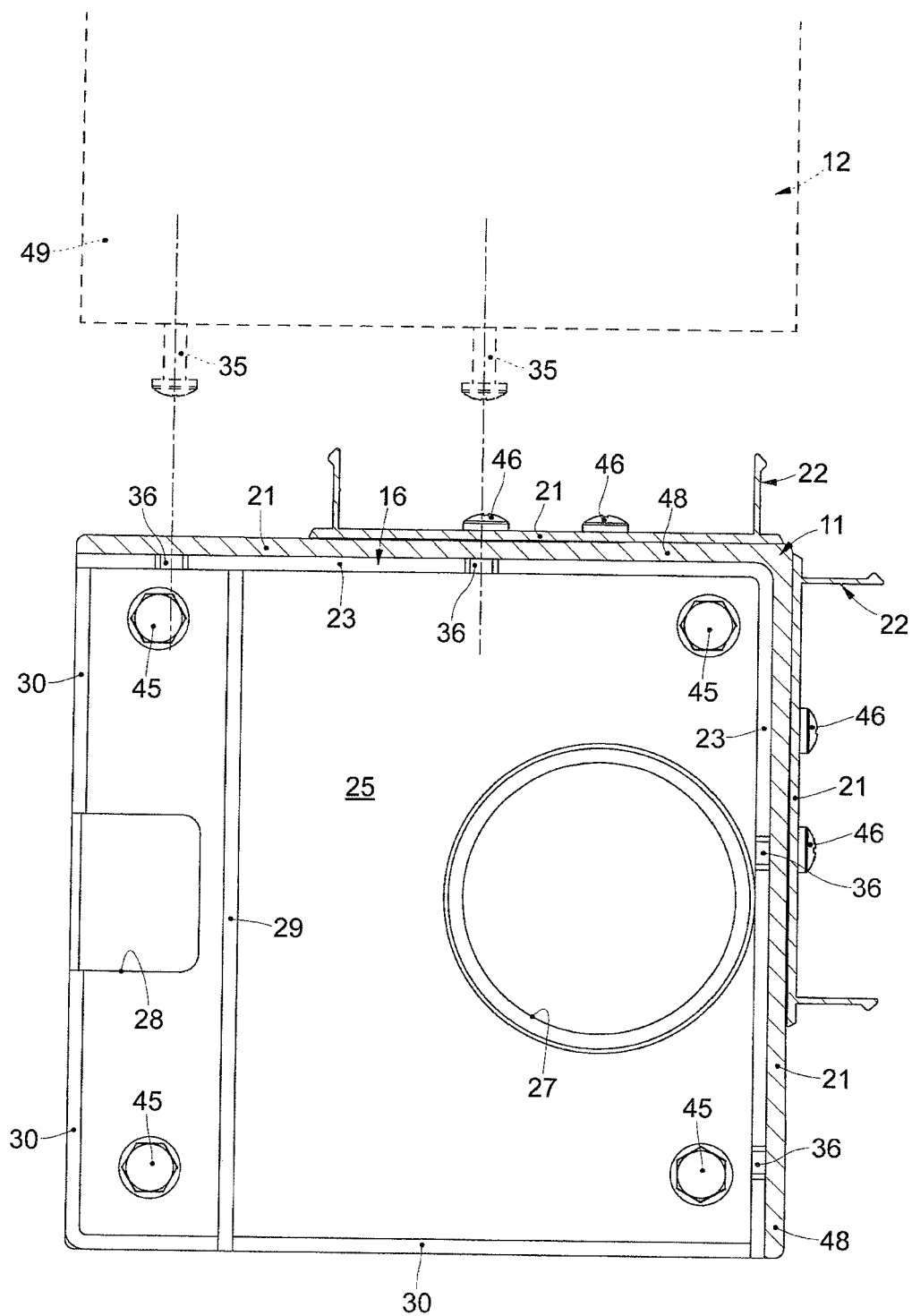


fig. 5



EUROPEAN SEARCH REPORT

Application Number
EP 19 18 1856

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X A	US 2017/335595 A1 (PAN LIANZHANG [CN]) 23 November 2017 (2017-11-23) * figures 19, 22 *	1,7,9-11 8	
			TECHNICAL FIELDS SEARCHED (IPC)
			E04F
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 8 November 2019	Examiner Cornu, Olivier
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			

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