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(54) Structure with modular elements for the technical-functional furnishing of interiors, particularly a shelving

(57) Modular shelving structure, comprising at least four elements:

- a rectangular shelf in which the angles obtain an oblique side, each having a downward opened seat;
- an upright, with square section, in which two diametrically opposed sharp edges, have longitudinally some specular and equidistant punching;
- a means for supporting a shelf, consisting of a quadrangular conic element, in which at least one side is provided with a male connector for the reciprocal fixing along a seat provided on the shelf;
- a core positioned annularly to the upright, subdivided in two elements, provided along the internal walls of bodies protruding for being inserted inside of the punching obtained along the tubular upright;
- an accessory for the orthogonal connection of an analogue shelf, on one side provided with means for the engagement along the edge of a first shelf, on the other one, providing a side provided with male means for the coupling with a corresponding female seat obtained perimetrally to the adjoining shelf.

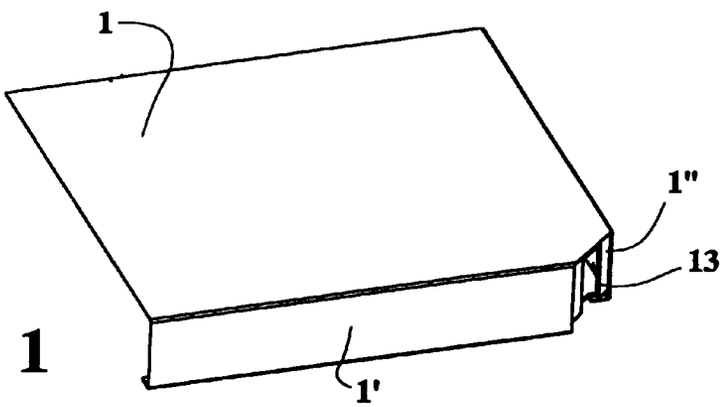

Fig. 1

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Description

This invention has for object a structure with modular elements for the technical-functional furnishing of interiors, particularly a shelving.

The innovation, finds particular even if not exclusive application in the field of food industry and in collective refreshment.

It is known to everybody the need for using shelvings for the stocking of many products. These, have different characteristics according to their specific use, so that on one side it is possible having some traditional shelvings for the support of any kind of objects, which are not subjected to any structural constraint, and on the other side some other special shelvings for the support of determined products, such as the food products for the refrigeration industry, which on the contrary must answer to precise demands, mainly required by the regulations concerning their special use. In prior art, reference is made to this last type of shelvings, and in particular to the shelving for food. A first condition which must be satisfied by said structure, consists of the material of which it must be made of, in particular the steel used for food. This for at least two reasons: on one side it is possible to subject it to hygienizing treatments, such as by autoclave, for the elimination of bacteria, on the other because the characteristics of the material make it difficult for the bacteria to proliferate on it. Now, if on one side steel has these and other positive aspects which favour its use in such field, on the other side, because of the difficulty in working the material, it is extremely difficult to obtain some structures which can result functional also and because of their modularity and quickness in assembling, and at the same time economical and highly hygienizable, of course without disregarding the last requirement, the aesthetical look.

For example, a first typology of modular structure for special uses, derives from the common shelvings, where, to a series of uprights, provided with feet also adjustable, are connected some shelves by screw means. More in detail, the section of each upright is made of a square tube, unlike the most common section bars having an "L" like section, in which at least along two of the adjoining sides, on four, are provided some through holes, equidistant and symmetrical, through which are introduced the screws for fixing the corresponding shelf, having generally a rectangular plan. In some cases, the shelf appears as provided with a perimetral frame for the support of a wide surface grate, also obtained in polyurethane. The section of said frame is made of a square tube, perimetrically providing in correspondence of the four corners, some spaces, so that in their inside can be housed a part of the upright on two adjoining surfaces. The drawbacks regarding this solution are to be associated to the difficulty of installation, caused by using screws as means the mechanical fixing of the shelves. Practically the operation, especially for very large surfaces, needs a considerable time and a lot of labor. Such a system, besides, would have some unsteady points, such as, for example, the case of orthogonal junction of one shelf with another, in absence of a corresponding supporting upright on the internal side. Finally, another drawback, is the shape of the materials used, for example the square tube, which being holed, is not suitable to be hygienized, because of the many recesses (for example the hollow inside of the tube), which not being suitably cleaned, are a receptacle for the proliferation of bacteria. For obviating these problems, the firms working in this field are aiming at other proposals for shelvings, which first of all would take into account a substantial reduction of the possible bacteria receptacles. Therefore, are more and more becoming popular the elements having more rounded shapes, for allowing a more careful cleaning, but mostly are being searched new types for the fastening of the shelves to the respective uprights, avoiding using the usual screws. To this last category belongs a first solution, also widely used, consisting of two symmetrical sides, each side comprising two parallel uprights held together by a series of transversal elements, whose ends passing through said uprights are in conjunction with them. The shelf, in this case, is just laid with its ends on the corresponding crosspieces, and possibly fixed, providing a reciprocal housing seat. If on one side, the assembling results simplified and also fast, on the other the structure results to be very unsteady. For obviating this problem, on the back of the shelving is provided the use of suitable tie-rods, at least two, which placed one on the other and crossed, allow a minimum structural stiffness.

Therefore, the structure, besides being not excessively strong, is penalized by the use of transversal means whose ends passing through the uprights, are in conjunction with them. This may cause infiltrations of any kind of dirt, along the concerned upright, becoming therefore a suitable place for the proliferation of bacteria, and hardly accessible. Finally, because of its complexity, the structure has some rather high manufacturing costs of the various components, which are not compatible with the present needs of the users, who instead demand a good compromise between quality and purchase cost.

A third and last generation of shelvings, aimed substantially to avoiding the drilling of uprights or of shelves. More in particular, the most simple of these, consists of a classic structure with four uprights with tubular and round section, provided at the bottom with pivoting small wheels, and of a series of corresponding shelves.

These latter, are provided, in correspondence of the respective angles, with a kind of bushings, perfectly cylindrical, in whose inside there seems to be a sheath in plastic material, and which would cause the annular clamping of the upright, thus allowing the adjustment of the height of said shelves. This solution, though, is subjected to other kinds of drawbacks. First of all, the struc-

ture is not yet sufficiently steady, mainly for what concerns the means for blocking the shelves along the uprights, and secondly it is not flexible because it does not allow the connection with an analogue structure both placed longitudinally and orthogonally and frontal respect to the same. This, obviously, limits its use to just some fields, finding a minimum success on the market.

A final and more complete structure, not having a national origin, to which reference is made, comprises some tubular uprights in this case square ones, whose sharp edges are caulked, deforming the material for obtaining some equidistant and symmetric punching.

Said punching, have the purpose of being the reference for the fastening in predetermined positions of the respective shelves.

These latter, are characterized by a rectangular frame obtained by the union of four rectilinear staves, two by two parallel and symmetrical, which hold a grate-like surface. In correspondence of the corners, each shelf has a piece of square tube, in this case, having a conic shape, on whose lateral adjoining surfaces end, forming a single group, the ends of said staves. Substantially, thus, the result is that each shelf is integrally provided with four through receptacles, one for each corner, in whose inside are coaxially insertable the respective uprights, provided with punchings. A third element, consists of an insert of plastic material, obtained in one single piece, also conical and with a quadrilateral section. Said ring appears with no material along the surfaces, and besides provides on the internal surface, some protrusions. Said insert, during the installation of the shelving, is placed close to the desired height, and the same is done for the other uprights, then, always proceeding from the top downwards the first shelf is lowered, up to enclose the respective rings, having care of pushing the same furtherly downwards clamping the uprights. The solution presented, besides, provides some fittings, which have the purpose of allowing the continuity of the structure with some analogue adjoining ones, for obtaining some both longitudinally and orthogonally developed shapes. One of these, for example, consists in that it provides a hook, essentially "L" like seen from the side and in section consisting of a turned "U", which on the top provides a re-folded portion which on a side is hooked along the transversal stave of a first profile, while on the other, placed lower, are obtained two teeth suitable to rest on the lower edge of the facing stave of an adjoining shelf to be connected.

But also this solution has some drawbacks. In the first place, it appears as non-flexible, because once it is installed, it is very difficult to modify the position because of the different needs of the user. In fact, it is not uncommon the need for removing a shelf for leaving a larger space among the same ones, in this case for the upper one there is no problem, but there would be some difficulties if the shelf is placed under the first one. In this case, then, it is necessary to remove all the overlaying shelves, after having freed all shelves from the objects placed on them. Definitely, the structure does not appear as flexible, also and because of the system used in the making of modular structures. It is the case of the fitting, whose use does not give the structure a sufficient stability. Besides, it is noticed that such an application, does not allow to the shelves thus united, a solution of logical continuity, instead it is noticed among these same a point of interruption.

Purpose of this invention is also that of allowing to obviate the mentioned drawbacks.

This and other purposes, are reached with this invention according to the characteristics mentioned in the enclosed claims solving the mentioned problems by a structure with modular elements for the technical-functional furnishing of interiors, particularly a shelving, comprising at least five elements, among which:

- an essentially rectangular shelf with the closed edge, in which the corners are beveled obtaining a side whose width is at least equal to one of the sides of a supporting accessory means providing in correspondence of each corner the making of a female seat opened downwards;
- an upright, with square section, in which two diametrically opposed angles have longitudinally some specular and equidistant punchings;
- a supporting means, for the fastening of one end of a shelf, said means consisting of a quadrangular conic element, in which at least one side is provided with a male means for the reciprocal fixing along a female seat provided on the shelf;
- a core positioned annularly to said upright subdivided in two elements, provided along the internal walls of protruding bodies for being inserted inside of the punchings obtained along the tubular upright;
- and finally, providing an accessory for the orthogonal connection and the support of an analogue shelf said accessory consisting of a clip-like means on one side provided with means for the engagement along the edge of a first shelf, on the other side providing a side provided with male means for the coupling with a corresponding female seat obtained perimetrically to the adjoining shelf. In such a way through the considerable creative contribution whose effect is an immediate technical progress are obtained many advantages. In the first place the structure is definitely more flexible and complete and along the sides it offers with a better comfort, the possibility of adjusting the single shelves. More in particular, mainly depending on the amount of reference points provided along the single uprights the `optimal operational heights can be quickly reached. Nevertheless one of the most interesting aspects concerns the possibility of removing each shelf without having to interfere with the already existing structures. In such a way as the user's needs change, the structure is made more flexible, being possible to intervene fastly on it, and

without removing the shelves positioned one the removed one. The same advantage is found in the opposite operation that is when it is necessary adding another shelf, also if in this last hypothesis it is necessary to place along the uprights the respective engagement means since the installation of the structure.

Some advantages are also referred to an increase of the stability and higher steadiness of the structure, not excluded the possibility of obtaining some articulated shapes of continuity of the shelves, both longitudinally and perpendicularly to a first base one by using extremely functional and fast to be installed accessories. Finally advantages are found in the absence of non reachable or difficult to be reached recesses, with some extremely rounded shapes of the components allowing in case of use in special fields, the activation of hygienizing processes which answer to very high quality standards, being able to suitably combine quality and price. These and other advantages will appear in the following detailed description of a preferential embodiment solution with the aid of the schematic enclosed drawings, whose manufacturing details are not to be considered as limitative but only as examples.

Figure 1., represents an exploded particular and group of the components which make up the shelving.

Figure 2., is a plan view of a component in particular of a core to be axially inserted into an external jacket for the clamping of an upright.

Figures from 3. to 6., represent respectively some plan side and section views of one of the two universal parts which make up the core of Figure 2.

Figure 7 is a plan view of a shelving structure, to which is orthogonally connected a shelf.

Figure 8., is a front view of a base shelving structure particularly to be used for food.

Figure 9., is a plan view of an accessory for the connection in continuity of the shelves in a shelving.

Finally, Figure 10., is a side and section view of the accessory of the previous Figure.

Referring also to the mentioned figures, a shelving structure (A) of the type with modular elements particularly in steel to be used for food for the furnishing of interiors consists of a series of shelves (1) preferably having rectangular plan, supported one on another, by means of at least four corresponding uprights (2). In the first place each upright (2), is a tube, at least on one side, the lower one, provided with an adjustable foot for resting on the ground, having a square section, with the corners rounded, and along two of which (3), diametrically opposed are obtained some equidistant punchings (4, 4^n). Each punching (4), locally deforms the angle portion concerned obtaining a kind of recess with the material exceeding in positive on the internal side of the upright (2). For proceeding with the installation of said shelving structure, once positioned the single uprights (2), is identified the desired height and therefore the reference punching (4), then is connected to the upright the same core (5), which is sub-divided into two perfectly symmetrical inserts (5'). More in detail, each insert (5') is obtained in plastic material, and has a substantially "C" like shape perpendicularly developed, consisting of two short sections or lateral sides (6,6') connected by a section or intermediate wall (6"). The intermediate wall, provides two openings (7), one opposite and parallel to the other each one ending respectively in correspondence of the lower or upper edge of said wall (6"). For what concerns the sides (6, 6') these are not perpendicular but on the contrary tending to converge towards the inside of the wall (6"). Practically this allows, during the structure assembling (A), to said portion (5') to clamp the sides (2') of an upright (2) and to remain in such suspension condition easing the installation. The same is for the opposed insert (5') , which put close to the upright (2) is pushed, widening the sides or walls (6,6') which therefore clamp it, up to interfere with the ends of said sides or walls (6, 6') with the opposite and specular insert (5'). Furtherly, each side (6, 6'), provides along the main profile, and alternatively made on one and the other, some reciprocal means for the engagement. More in particular a first side (6), provides a protruding tooth (8), while the side (6') obtains, on the front side, always along the edge, a suitable seat (9) obtained by removing a part of the side, and intended for reciprocally housing the tooth (8) of an opposite and symmetric part (5'). With the purpose of giving a certain conic shape to the assembling (5), the sides (6', 6") are cut with the sloping profile, so to provide a lower height on one side and the contrary on the other one. Thus, by connecting specularly the two inserts, is obtained a conic core (5), which surrounds annularly the concerned upright (2) portion. With the purpose of obtaining the stabilizing of the core (5) along the upright (2) in a determined point, each insert (5'), in an intermediate position, concerning the internal surfaces of the side (6') and of the wall (7), provides an indentation (10) with a size not bigger than the punching (4) found along the upright (2) profile.

Once positioned along the corresponding upright (2), and at the desired height, a first core (5) being careful that the respective diametrically opposite indentations (10) are in the seats (4), a collar is inserted from the top downwards, particularly in metal (11).

Said collar (11), having conic shape, is a quadrilateral similar to the shape of the upright (2), having along the perimetrical surfaces some suitable means for the engagement and support of the shelf (1). Said means, consist of a slide (12), steadily and in vertical associated in correspondence of at least one side (11') of each collar (11). Furtherly, always said slide (12), has on its side some guides (12') which engage locally the edge suitably pre-arranged of a corresponding shelf (1).

The tendency of said guides (12') is that of restraining their seat getting close to the lower part of the collar (11), thus allowing to diminish the slack, during the

assembling, of the shelf (1) to the uprights (2). According to the shape of the shelving structure (A), may be made available collars (11) with more ways, as for example two-ways, that is providing two similar slides (12), obtained on two adjoining sides, in the case of a structure to which may be necessary to add, in axis with a first shelf, a second shelf. While occasionally it may be also provided the use of a three or four-ways collar, therefore provided with three or four slides (12) for the engagement on the corresponding shelves. Once the collars (11) have been suitably positioned, particularly along the four uprights (2) enclosing the cores (5), it is possible applying the shelf (1). This in the case in point, is obtained with a flat sheet, rectangularly shaped suitably folded along the edges with a section orthogonal to a bigger and flat surface (1), followed by an inwardly folding perpendicular to the first one and shorter. The four corners (1") of the shelf (1), result bevelled, providing a short diagonal section which develops a surface (1") with dimensions similar enough to those of one side (11') of a collar (11). Each side (1") in the shelf (1), provides a recess (13), opened from the bottom towards the top, in whose inside for reciprocal coupling is fixed the slide (12) associated with the collar (11).

in a further preferred solution of possible configuration, with one she]f (1) is possible to associate a shelf (1a), orthogonal and coplanar to said first one (1). In this case, to the above described components, is added an angular accessory (14) whose use is provided for replacing an upright (2). More in detail, because the top of the coplanar shelf (1a) is in abutment along a side of the shelf (1), the structure, on the opposite side with respect to an upright (2a) and respective to-way connection collar, provides an angle (14) whose only purpose is that of fastening and keeping together on that side, integrally, the two adjoining shelves (1, la). Said accessory (14) is characterized in having a body, in plan view seen essentially at 45°, to which is lowerly associated a movable clip (15), said clip consisting of a section in metal sheet (15'), provided on its end with an hook (15"), which, once applied, engages the lower edge (1') of the shelf (1).

Upperly, and integral with the remaining structure is provided a protruding wing (16) obtained on the same side of the hook (15") and that partially overlaps the surface of the shelf (1). Finally, for allowing the engagement of the adjoining shelf (la), the angle (14) along the closed side (14') provides associated an analogue slide (12), suitable]e to being reciprocally engaged inside of a recess (13) obtained similarly on the concerned side of said shelf (1a).

Claims

1. Structure with modular elements for the technical-functional furnishing of interiors, particularly a shelving, characterized in that it comprises at least four elements, respectively:
   - a shelf (1), in which the ends, along the edge provide some diagonal surfaces in each of which is obtained a seat (13) opened upwards;
   - an upright (2), in which two diametrically opposed sharp edges, have longitudinal]y some specular and equidistant punchings (4);
   - a supporting means (11) , for the fastening of one end of a shelf (1), said means consisting of a quadrangular conic element, in which at least one side (11') is provided with a male means (12) for the reciprocal fixing of a female seat (13) provided on the shelf to be supported (1);
   - a core (5), disposed annularly respect to said upright (2) and insertable inside of said supporting means (11), subdivided in two elements (5'), provided along the internal walls of protruding bodies (10) for being inserted inside of the punchings (4) obtained along the tubular upright (2).

2. Structure with modular elements, according to claim 1., characterized in that it comprises a fifth element, consisting of an accessory (14) for the orthogonal connection and the support of an analogue shelf (1-1a), said accessory (14) associating a clip-means (15), on one side, provided with means for the engagement along the edge of a first shelf (1), on the other side, providing a side provided with male means (12) for the coupling with a corresponding female seat (13) obtained perimetrally to the adjoining shelf (la).

3. Structure with modular elements, according to claims I. and 2., characterized in that each upright (2), is made of a tube, at least on one side, the lower one, provided with a foot also adjustable for the resting on the ground, having a square section, with rounded sharp edges, and along two of which (3), diametrically opposed, are obtained some equidistant punchings (4, 4^n).

4. Structure with modular elements, according to previous claims, characterized in that the core (5) is subdivided in two symmetrical inserts (5'), each insert (5') being obtained with a substantially "C" like shape, given by the two lateral sides (6, 6') connected by an intermediate wall (6") in which:
   - the intermediate wall (6"), provides two openings (7), one opposite and parallel to the other, each ending respectively in correspondence of the lower or upper edge of said wall (6");
   - the sides (6,6'), tending to converge towards the inside of the wall (6"), provide along the front profile, and alternatively made on both of them, some engagement reciprocal means.

5. Structure with modular elements, according to pre-

vious claims, characterized in that the reciprocal engagement means, provided along the end of the sides (6, 6'), consist, in correspondence of a first side (6), of a protruding tooth (8), while the side (6') makes frontally, always along the edge, a suitable seat (9), for reciprocally housing a tooth (8) of an opposite and symmetric part (5').

6. Structure with modular elements, according to previous claims, characterized in that the sides (6-6') are cut with a sloping profile, providing a minor height on one side and a higher one on the other, giving the group (5) a conic shape.

7. Structure with modular elements, according to previous claims, characterized in that by specularly joining the two inserts (5'), is obtained a conic core (5), which surrounds annularly the portion of the upright (2) concerned.

8. Structure with modular elements, according to previous claims, characterized in that each insert (5'), in an intermediate position, concerning the internal surfaces of the side (6') and of the wall (7), provides obtained an indentation (10) having a size not exceeding the punchings (4) found along the profile of the upright (2).

9. Structure with modular elements, according to previous claims, characterized in that on the core (5) is inserted downwards a collar (11) having a conical shape, said collar being a quadrilateral like the shape of the upright (2), having along the perimetral surfaces suitable means (12) for the engagement and support of the shelf (1).

10. Structure with modular elements, according to previous claims, characterized in that the means provided on the collar (11) for the engagement of a shelf (1), consist of a slide (12) steadily and in vertical associated in correspondence of at least one side (11 ') of each collar (11).

11. Structure with modular elements, according to previous claims, characterized in that said slide (12), has laterally some guides (12') able to engage locally the edge (1") suitably endowed with a corresponding shelf (1), and in which said guides (12') constrain their seat getting close to the lower part of the collar (11).

12. Structure with modular elements, according to previous claims, characterized in that a collar (11) is a more-ways type, providing two analogue slides (12), obtained on two adjoining sides.

13. Structure with modular elements, according to previous claims, characterized in that the shelf (1) is obtained out of a flat sheet, having rectangular plan, folded along the edges with a section (1') orthogonal to the larger and flat surface (1), followed by an inward folding perpendicular to the first one and shorter; and in which said shelf (1), provides each of the corresponding four corners with a diagonal side (1").

14. Structure with modular elements, according to previous claims, characterized in that the four corners (1 ") of the shelf (1) each consisting of a surface in diagonal, have some dimensions rather corresponding to those of one side (11') of a collar (11), and in which each side (1"), provides a recess (13), open upwardly, inside of which by reciprocal coupling is fixed a corresponding slide (12) associated with the collar (11).

15. Structure with modular elements, according to previous claims, characterized in that with a shelf (1) it is possible to associate a shelf (la), orthogonal and coplanar to said first one (1), providing an angular accessory (14) whose use is provided for replacing an upright (2).

16. Structure with modular elements, according to previous claims, characterized in that said accessory (14) is characterized by a body, in a plan view essentially at 45°, with which is lowerly associated a clip (15), movable, said clip consisting of a section of metal sheet (15'), provided on the end of a hook (15"), which engages the lower edge (1') of the shelf (1), and in which upperly, and integral with the remaining structure is provided a protruding wing (16) obtained on the same side of the hook (15") and which partially overlaps the surface of the shelf (1), while for allowing the engagement of the adjacent shelf (1a), the angle(14) along the non visible side (14') provides as associated an analogue slide (12), suitable]e to be reciprocally engaged inside of a recess (13) of said shelf (la).

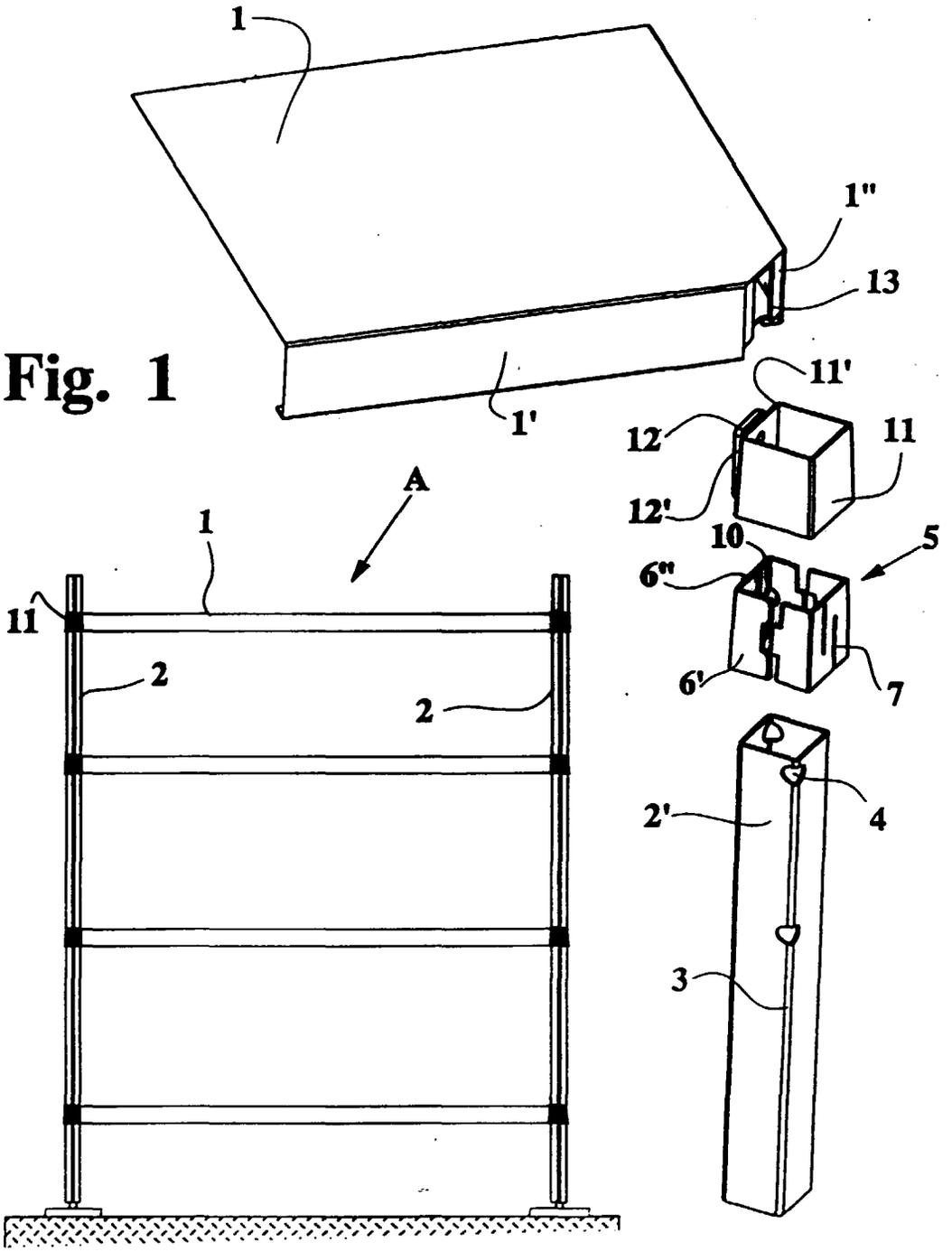

Fig. 1

Fig. 8

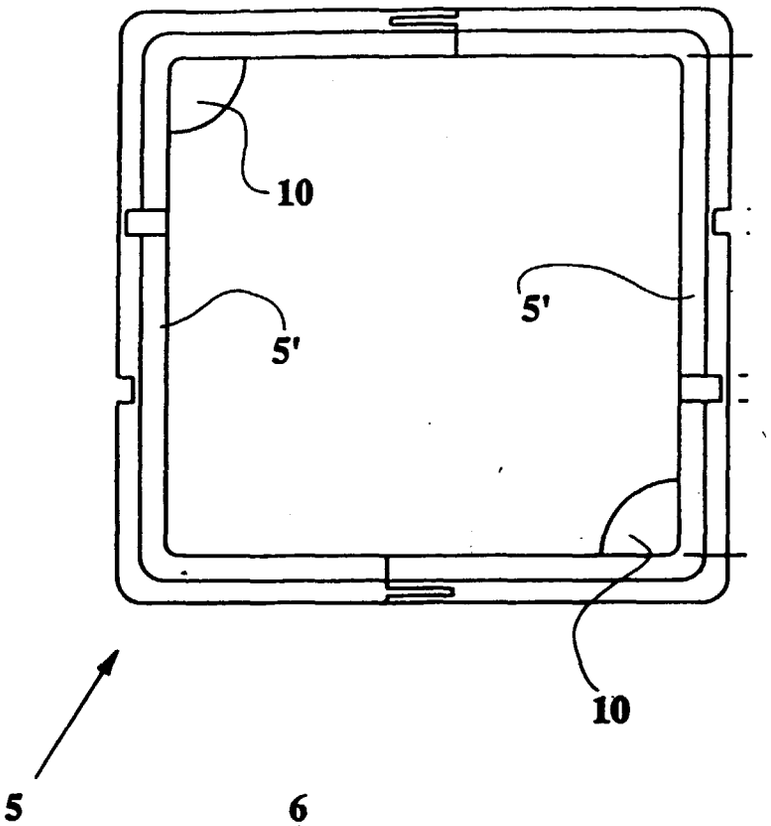

Fig. 2

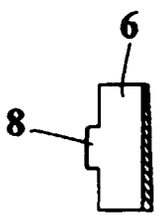

Fig. 6

Fig. 4

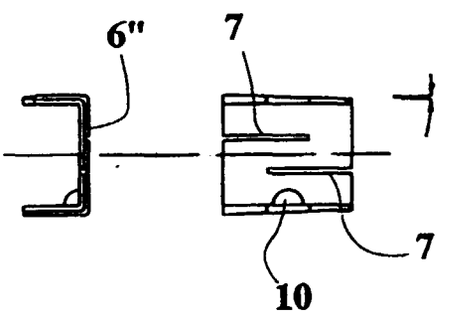

Fig. 3

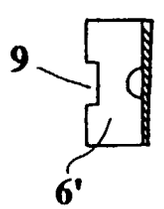

Fig. 5

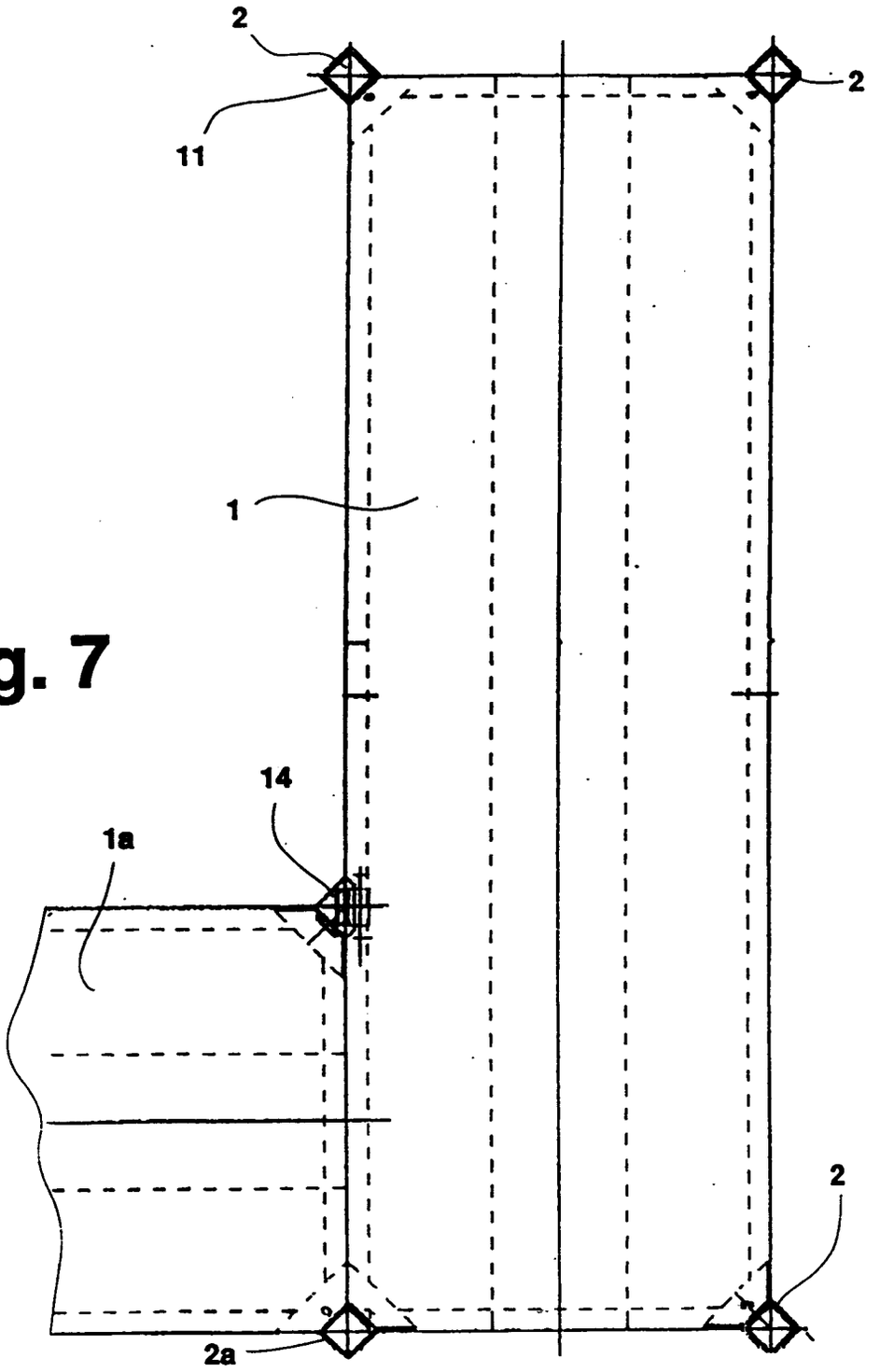

Fig. 7

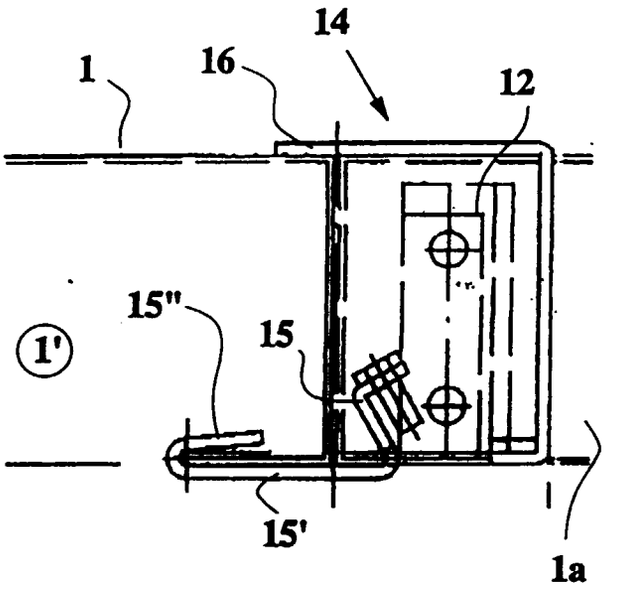

Fig. 10

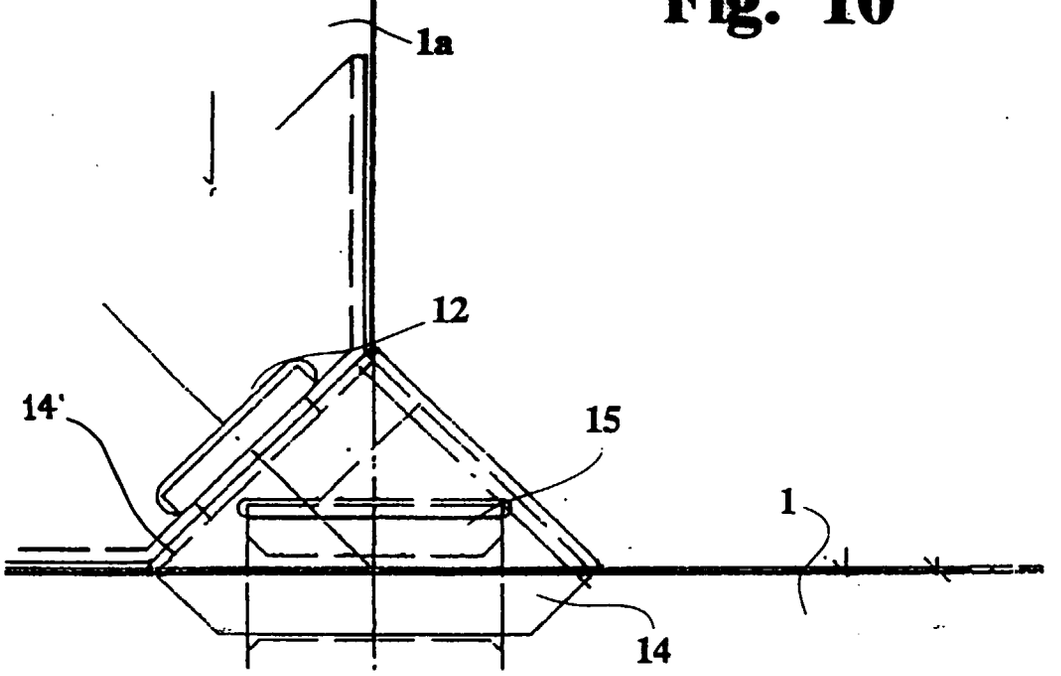

Fig. 9