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(54) **Drying rack**

(57) Drying rack (1) comprising a supporting frame (3) and at least one pair of, mounted to the supporting frame (3), clamping elements (5) with opposite ends (6), where at least one end (6) is tilted upwards with respect to the gravity force at that spot and this end (6) is movable

in a direction perpendicular to the tilted upwards direction of this end (6). The at least one movable end (6) can also be elastic in the direction of motion. The clamp elements (5) can at their upper ends be abut, possibly under preloaded tension. A corresponding method for hanging out to dry an object (7,8) is also disclosed.

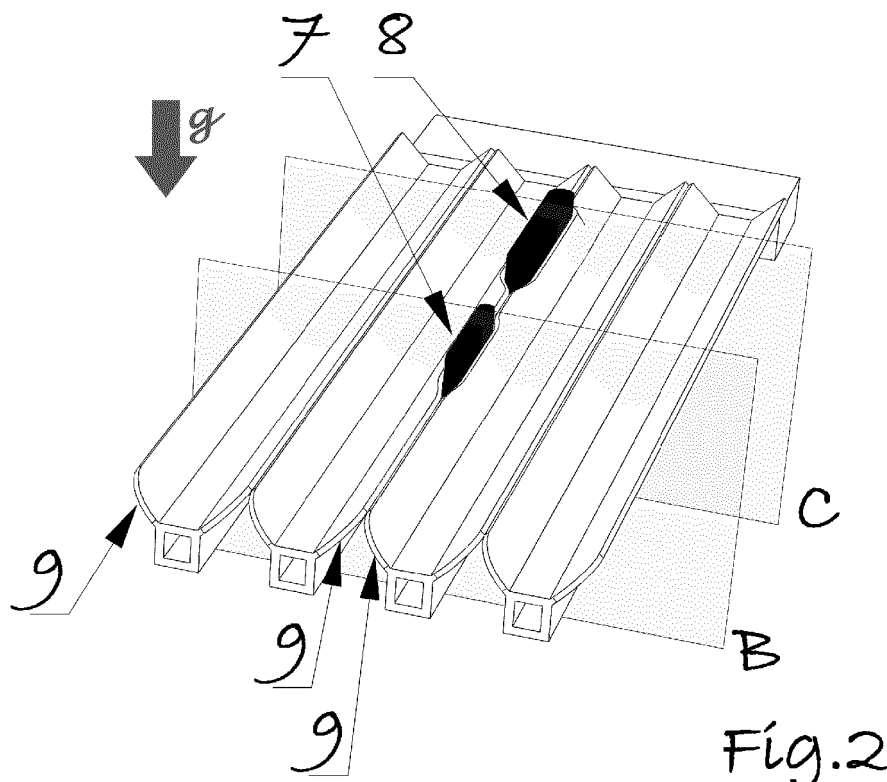


Fig. 2

Description

[0001] The present invention relates to a drying rack comprising a supporting frame and at least one pair of clamping elements with opposite ends mounted to the supporting frame. The drying rack is used to hang objects to dry. The invention also relates to a method to dry objects.

[0002] Such a drying rack is known, like from U.S. patent application U.S. 2007/0012638 A1, in which a rack for the hanging of laundry to be dried, like clothing, is disclosed, including at least one pair of mainly parallel, elongated clamping elements close to each other, of which one end is attached to a supporting frame thereof, where the associated clamping elements define a narrow, slit-like space, where the laundry is clamped.

[0003] Also from EP 2 220 284 A1 (family of WO 2009059374 A1) a holding means is known, comprising an elongated support means, a gripping means, a first and second gripping portion, of which at least one partially is formed from a flexible elastic material, where each gripping portion is attached to the support means, and where the first gripping portion has an outer edge positioned near an outer edge of a second gripping portion so that an object can be held down between the outer edges of the first and second gripping portions.

[0004] Both known drying racks offer the opportunity to hang laundry, or other objects to be dried, out to dry without using pegs. However these have the disadvantage that it is cumbersome to fix the laundry correctly and that there is also a significant chance that it will not stick. Moreover, the construction of EP 2 220 284 A1 is complex.

[0005] The aim of the invention is to provide an improved drying rack of the type described. In particular, the aim of the invention is to provide an improved drying of the type described where at least partially these disadvantages are circumvented.

[0006] To this end, the invention provides a drying rack according to claim 1.

[0007] In a drying rack according to the invention, washed garments and other objects to be dried will hang out with a significantly reduced risk of falling out off the drying rack. The reason for this lies in the location and orientation of the at their ends oppositely located clamping elements: at least one of them is tilted upwards and movably arranged in a direction perpendicular to said direction angled upwards. Because of this, a garment that hangs between the ends will pull the at least one movable element, as a result of gravity, down and thus pull the ends of the elements slightly towards each other because the elements more or less rotate and clamp the laundry like a wedge (unless it's a perfectly smooth and frictionless object, which in practice will never occur, not even approximately). If the clamping elements would run horizontally, as in the above mentioned application EP 2 220 284 A1 and U.S. 2007/0012638 A1, or even downward, then the clothing would relatively easy slip from

from it.

[0008] In EP 2 220 284 A1, this is partly counteracted by an additional measure, namely an auxiliary edge where clothing also will be laid over. This auxiliary edge has however the disadvantage that laundry is hung in a U-shape, which results in unnecessary wrinkles in the laundry. This auxiliary edge is not required in the drying rack according to the invention.

[0009] In U.S. 2007/0012638 A1 garments hanging side by side influence each other; if one garment is thicker, then the other will be less well clamped. This can also be easily circumvented in the drying rack according to the invention, which is not possible with the drying rack from said publication, since the clamping action of a whole clamping element would then be lost. In U.S. 2007/0012638 A1 the clamping force required to hold the laundry, is obtained by the elasticity of the clamping elements. The clamping elements should therefore be constructed fairly rigid, which is a disadvantage when hanging laundry of varying thickness. In a drying rack according to the invention, the clamping force is obtained by the wedging action caused by the vertically directed force due to gravity on the objects to dry. Because of this the clamping element do not have to be stiff and differences in thickness of items the dry are no longer a problem for a well functioning clamping.

[0010] Another advantage of a drying rack according to the invention, in addition to the objects that are stuck in reliably, is that it is easy to fix them, by entering these from the side or from below. Yet another advantage is that a drying rack according to the invention practically leaves no wet spots behind, because the interface to the object to be dried can be very small in size (compared to a drying rack as described in the aforementioned patent application U.S. 2007/0012638 A1). Moreover, a compact design is possible, which is also easy to clean.

[0011] In one embodiment, the at least one movable end is also elastic in the movement direction. This further promotes more reliable suspension.

[0012] In another embodiment, the clamping elements are at their upper ends abut, possibly under preloaded tension. This leads to an even more reliable suspension.

[0013] In yet another embodiment, at least one of the clamping elements is partially or entirely made of elastic material. This measure makes it possible to achieve the elastic properties in a structurally simple way. A soft material such as a soft PVC is a good choice for the elastic material because of the desired stiffness as well as the absence of corrosion that could sully the clean laundry and even damage it irreparably. It is also a relatively safe material for human hands, in comparison to for instance a metal.

[0014] Another embodiment has elongated clamping elements, where the adjoining ends each form one of the long edges of the clamping elements. Thus, the laundry can be suspended without the need to pay much attention to the positioning relative to the clamping elements, which is easily correct.

[0015] In an embodiment wherein the clamping elements are relatively thin, and at least one of the adjoining ends has a bulge, the laundry is protected better and the gripping elements have a longer lifecycle because it is more difficult to damage them accidentally. Also the reliability of the suspension of the laundry can be increased by it.

[0016] If any of the short ends of at least one of the elongated clamping elements includes a chamfer or rounding, it is easier to insert laundry from the side of the clamping elements, which is very comfortable for the person who is hanging the laundry.

[0017] In yet another embodiment, at least one of the gripping elements is elastic and becomes, from the point of attachment to the support frame to the abutting end progressively thinner. This increases the elastic action towards the narrow end, and the insertion of laundry gets easier when a good combination of rigidity on the thicker side and flexibility on the thinner side is chosen. Moreover, the reliability of the clamping of laundry is even less influenced by laundry hanging beside it, which is possibly thicker.

[0018] In one embodiment, the support frame comprises elongated extrusion profiles, in which the clamping elements are fixed at a distance from the adjacent elements. This embodiment is advantageous as well from a constructive point of view as regarding to costs, also this embodiment makes it possible to obtain an aesthetically pleasing appearance.

[0019] In a further embodiment, the support frame contains at least one plastic extrusion profile, on which one or two clamping elements are formed. Thus, an easy to manufacture drying rack is obtained, which also shows no corrosion. Also, a metal profile can be attached to or inside the plastic profile extrusion, this gives extra strength.

[0020] Yet another embodiment is obtained when the clamping elements have, except their position with the ends close to each other also have a position where the ends are spaced from each other. Thus, the latter position can be used to insert the objects to be dried very easily.

[0021] A final embodiment has clamping elements with openings. This allows flow of air past the objects to be dried in a vertical direction more easily, both natural and forced convection.

[0022] The invention will now be further explained by reference to the following figures in which corresponding parts have the same reference numbers. Moreover, in the figures an arrow with the caption "g" indicates the direction of the gravitational field of the earth, hereafter referred to as "gravity direction".

[0023] It shows:

Figure 1 is a schematic perspective view of a portion of a part of a drying rack in a first embodiment according to the invention in perspective view, without laundry in it,

Figure 2 a similar view of the drying rack in Figure 1, now with laundry inserted,

Figure 3 is a different perspective view of the drying rack with laundry from Figure 2,

Figure 4A shows a schematic cross-section along the dotted plane A in Figure 1,

Figure 4B shows a schematic cross-section along the dotted plane B in Figure 2,

Figure 4C shows a schematic cross-section along the dotted plane C in Figure 2,

Figure 5 shows a perspective view of a possible embodiment of the entire drying rack from Figures 1 to 4,

Figure 6A to 6J show cross-sections through various embodiments of drying racks according to the invention,

Figure 7 shows a detail of two cooperating clamping elements from yet another embodiment of a drying rack according to the invention,

Figure 8 shows an embodiment of a drying rack according to the invention which can be hung over an object like a door, a balcony or a railing,

Figure 9 shows an embodiment of a drying rack according to the invention which can be attached to a wall, and

Figure 10 shows an embodiment in which the clamping elements 5 are provided with a series of holes 25 of any shape to make air flow past the object to be dried possible.

[0024] Figure 1 shows in schematic form a portion of a drying rack 1 displayed as a whole in Figure 5, having a crossbar 2 of a supporting frame 3, on which crossbar 2 a number of elongated supports 4 are fitted mutually parallel. On each support 4, two elongated clamping element 5 are formed or applied. The clamping elements 5 are made of a soft and slightly elastic material, while the supports 4 are of a rigid material and are stiff. From each pair of adjacent supports 4 two clamping elements 5 reach obliquely upwards towards each other, one from each of the two adjacent supports 4. The ends 6 of clamping elements 5, facing away from supports 4, are in this example against each other, with or without preloaded tension. As the material of the clamping element is elastic, the ends 6 of the clamping elements 5 can be pushed apart, after which they will spring back to the state in which they press against each other. Although in this example the clamping elements, at their extremities, are against each other but may also be on a small mutual

distance, provided they are opposite each other, which is important for the wedge effect, and the space between them is small enough to clamp the objects to be dried between them.

[0025] The clamping elements 5 are elongated in the illustrated embodiment, where one of the long sides of each clamping element 6 is also the end of the respective clamping element 5 that presses against a coupled clamping element 5.

[0026] In Figures 2 and 3, the same components as shown as in Figure 1, but now with two very schematically represented garments 7 and 8 inserted, each between two clamping elements 5. As seen in Figure 3, the clamping elements 5 are slightly opened up at the location of the garments 7 and 8, so that these fit in between and are clamped because of the elasticity of the clamping elements 5. The elasticity of the clamping elements 5 in this embodiment is selected so that each clamping element 5 can deform locally, without leading to further distortion in the longitudinal direction of the respective clamping element 5. Figure 3 also shows that the clamping elements 5 have rounded ends 9 at their extremities, which make it easier to insert laundry sideways without damaging them. Subsequently the laundry can be removed upwardly or sideways.

[0027] Figures 4A to 4C schematically show the cross sections of the drying rack in Figures 1-3, in plane A, B and C.

[0028] Figure 5 shows a possible embodiment of the drying rack comprising a supporting framework suitable to place on a surface.

[0029] Figure 6 shows embodiments of the invention in which the support 4 and the clamping elements 5 are implemented differently than in Figures 1-5.

[0030] In Figure 6A a support 4 consists of an oblong hollow profile 10 made of a strong and stiff material such as steel, with a square or rectangular cross-section, surrounded by a plastic profile 11 with two thin elongated clamping elements 5 attached. The clamping elements 5 are, like the surrounding plastic profile made of a relatively rigid material. The clamping elements 5 derive flexibility in the gradient of their thickness, which is such that the clamping element at the end 6 has a small thickness.

[0031] The embodiment of Figure 6B is similar to that in Figure 6A, but has an internal profile 10 made of a strong and stiff material with a rounded shape.

[0032] Figure 6C shows an embodiment as shown in Figure 6B, but now with the clamping elements 5 from a stiffer material and attached by a flexible material 12 to the plastic profile 11. This could for example be made by a coextrusion process.

[0033] In Figure 6D the support 4 is formed in aluminium, and two flexible plastic clamping elements 5 are wedged into the support 4.

[0034] In Figure 6E the support 4 is, like in Figure 6D, formed in aluminium. There are short clamping elements 5 of a rigid material included that can swivel slightly.

[0035] Figure 6F shows another variant with metal sup-

port 4 where clamping elements 5 made of spring steel are clamped in channels inside support 4.

[0036] Figure 6G shows a metal support 4 where at the top a combination of two clamping elements 5 in the form of a flexible plastic element is clamped in support 4.

[0037] In Figure 6H the support 4 is made of metal, and the two clamping elements are produced integrally from a strip of spring steel 13, and this strip 13 is attached to the support 4 by means of fastening means 14. These fasteners may be screws, bolts, rivets or the like.

[0038] In Figure 6I an elongated, curved strip 15 of flexible plastic is secured to the bottom of a tubular metal support 4 with a pressure strip 16 and a fastener 17. These fasteners may be screws, bolts, rivets or the like. The clamping elements 5 of the strip 15 extend upwards.

[0039] In Figure 6J a square tubular support 4 is fitted with an elongated L-shaped profile 18 of spring steel or a flexible plastic, with fastener 19. Again the clamping elements extend upwards, this time formed by edges of the L-shaped profile 18.

[0040] Finally Figure 7 shows a detail in cross section of two cooperating elongated clamping elements 5, according to another embodiment of the invention. In this embodiment, ribs 20 are provided in the longitudinal direction of the clamping elements 5 which, when the ends 6 of the clamping elements are abut, are adjacent, at both clamping elements 5 at least one, in this example two respectively one, and thus provide a better clamping of laundry between the clamping elements 5.

[0041] Figure 8 shows an embodiment of a drying rack according to the invention that can be hung over an object, like a door, a balcony, a railing or similar. For this, the supporting frame is fitted with two hooks 23 that can hook over the object.

[0042] Figure 9 shows an embodiment of a drying rack according to the invention, where the drying rack can be attached to a wall. For this the support frame is fitted with a wall mounting plate 24. If the transition between supporting frame and wall mounting plate is provided with a hinge, the drying rack can be folded against the wall and because of that take up less space.

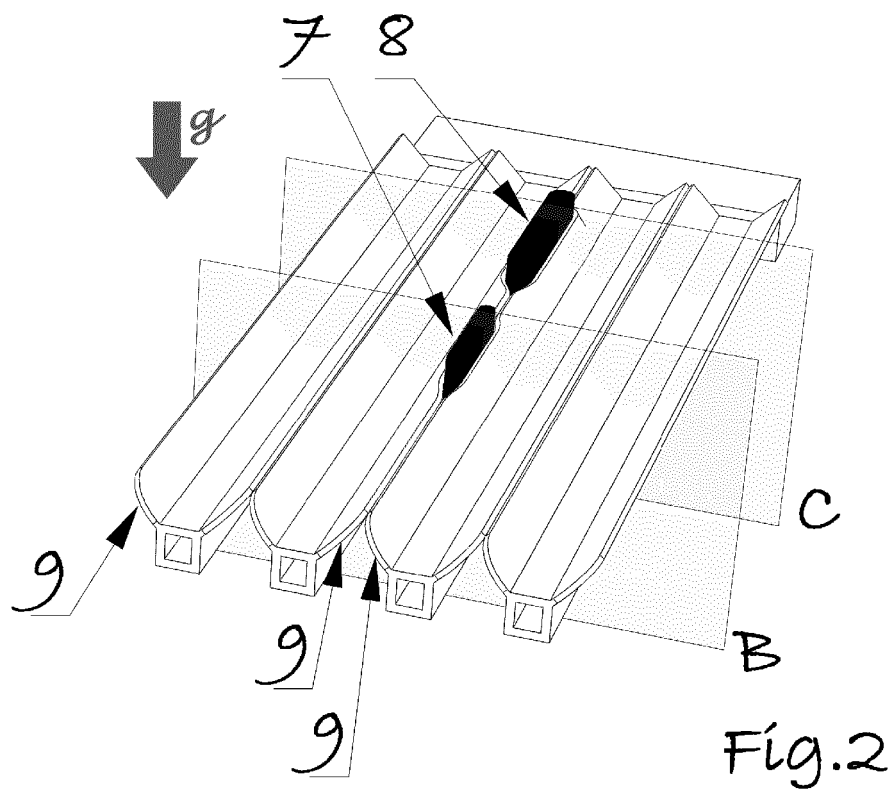
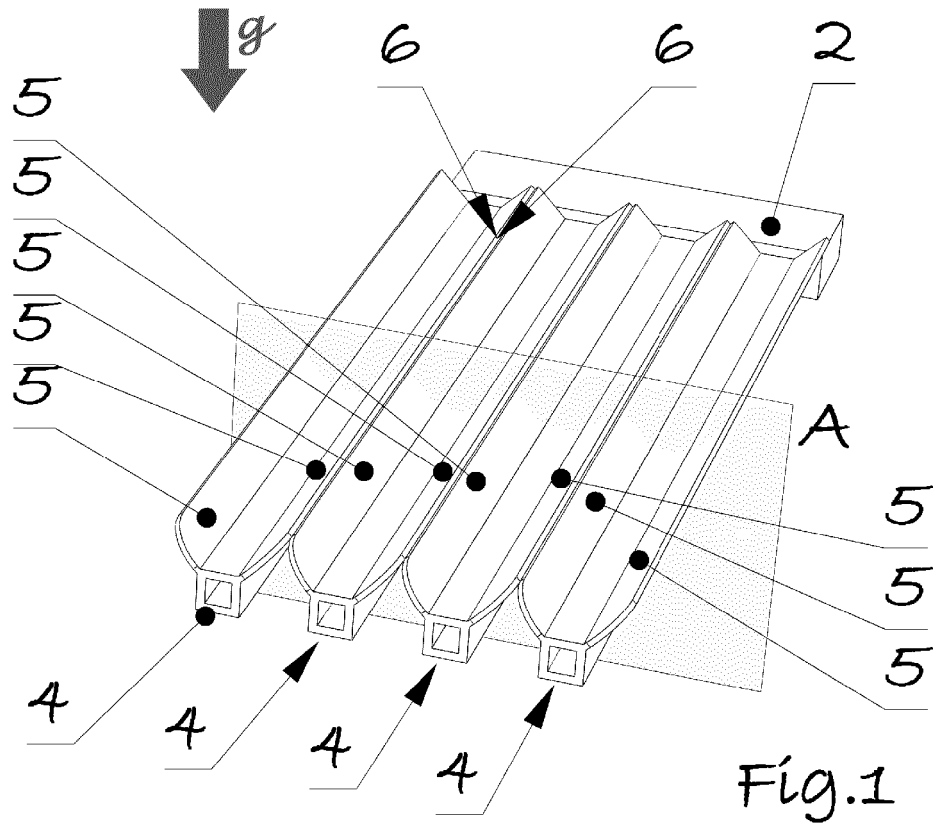
[0043] In the embodiment shown in Figure 10, the clamping elements 5 are provided with circular openings 25. These openings 25 allow a flow of air through the drying garments as indicated in Figure 10 by the arrows. The openings 25 make the clamping elements 5 more flexible at the side of support 4, while the ends 6 of the clamping elements 5 remain stiff because the material is not weakened there.

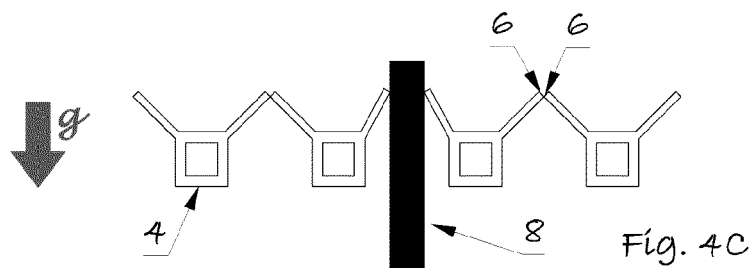
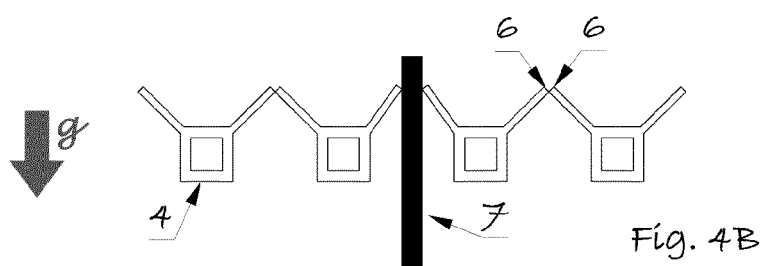
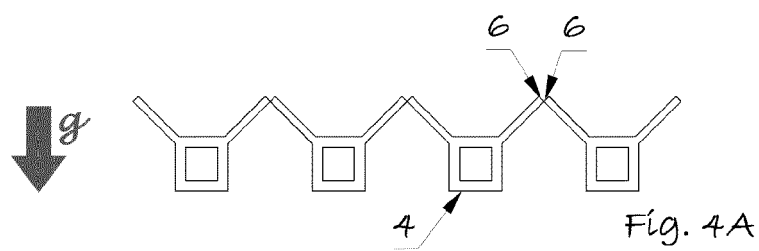
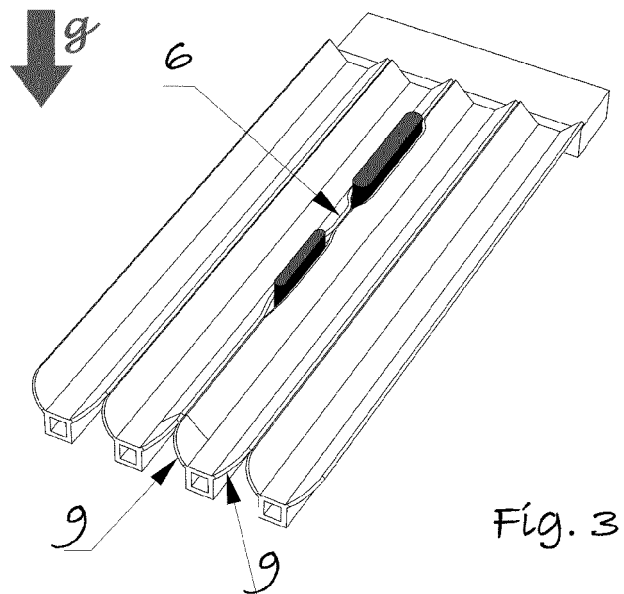
[0044] Variations on the above embodiments are possible. For example, two horizontal planes can be filled with clamping elements, instead of just one horizontal plane, and the openings 25 may have a different shape.

Claims

1. Drying rack comprising a supporting frame and at

- least one pair of clamping elements attached to the supporting frame fitted with opposite ends, **characterized in that** at least one end is positioned tilted upwards with respect to the gravity force at that spot and this end is movable in a direction perpendicular to the tilted upwards direction of this end.
2. Drying rack according to claim 1, **characterized in that** at least one movable end is also elastic in the direction of movement.
 3. Drying rack according to claim 1 or 2, **characterized in that** the clamping elements abut at their upper ends.
 4. Drying rack according to any of claims 1-3, **characterized in that** the clamping elements at their upper ends abut under preloaded tension.
 5. Drying rack according to any of claims 1-4, **characterized in that** at least one of the clamping elements is at least partially made of an elastic material.
 6. Drying rack according to claim 5, **characterized in that** the elastic material is an elastic soft PVC or another elastic plastic.
 7. Drying rack according to any of the preceding claims, **characterized in that** the clamping elements are elongated, while the ends opposite each other each form one of the long sides of the clamping elements.
 8. Drying rack according to any of the preceding claims, **characterized in that** the clamping elements are relatively thin, and at least one of the opposed ends has a bulge.
 9. Drying rack according to claim 7 or 8, **characterized in that** at least one of the elongated clamping elements at least one of the short ends thereof is provided with a chamfer or rounding.
 10. Drying rack according to any of claims 7-9, **characterized in that** at least one of the clamping elements is elastic and from the point of attachment to the support frame becomes progressively thinner towards the adjacent tip.
 11. Drying rack according to any of claims 7-10, **characterized in that** the support frame contains longitudinal extrusions, wherein the clamping elements are fixed at a distance from the adjacent elements.
 12. Drying rack according to any of the preceding claims, **characterized in that** the support frame includes at least one plastic extrusion profile, whereat one or two clamping elements are formed.
 13. Drying rack according to any of the preceding claims, wherein the clamping elements except their position with the ends close to each other also have a position where the ends are spaced from each other.
 14. Drying rack according to any of the preceding claims, wherein the clamping elements are provided with openings.
 15. Method to dry an object, comprising the steps:
 - the erecting of a support frame, that incorporates at least one pair of, at the ends opposite, clamping elements of which at least one of the clamping elements is tilted obliquely upwards with respect to the gravitational direction and movable in a direction perpendicular to the tilted obliquely upwards direction and
 - clamping between the opposite ends of at least one pair of clamping elements, by means of wedging action, an edge of the object to be dried.





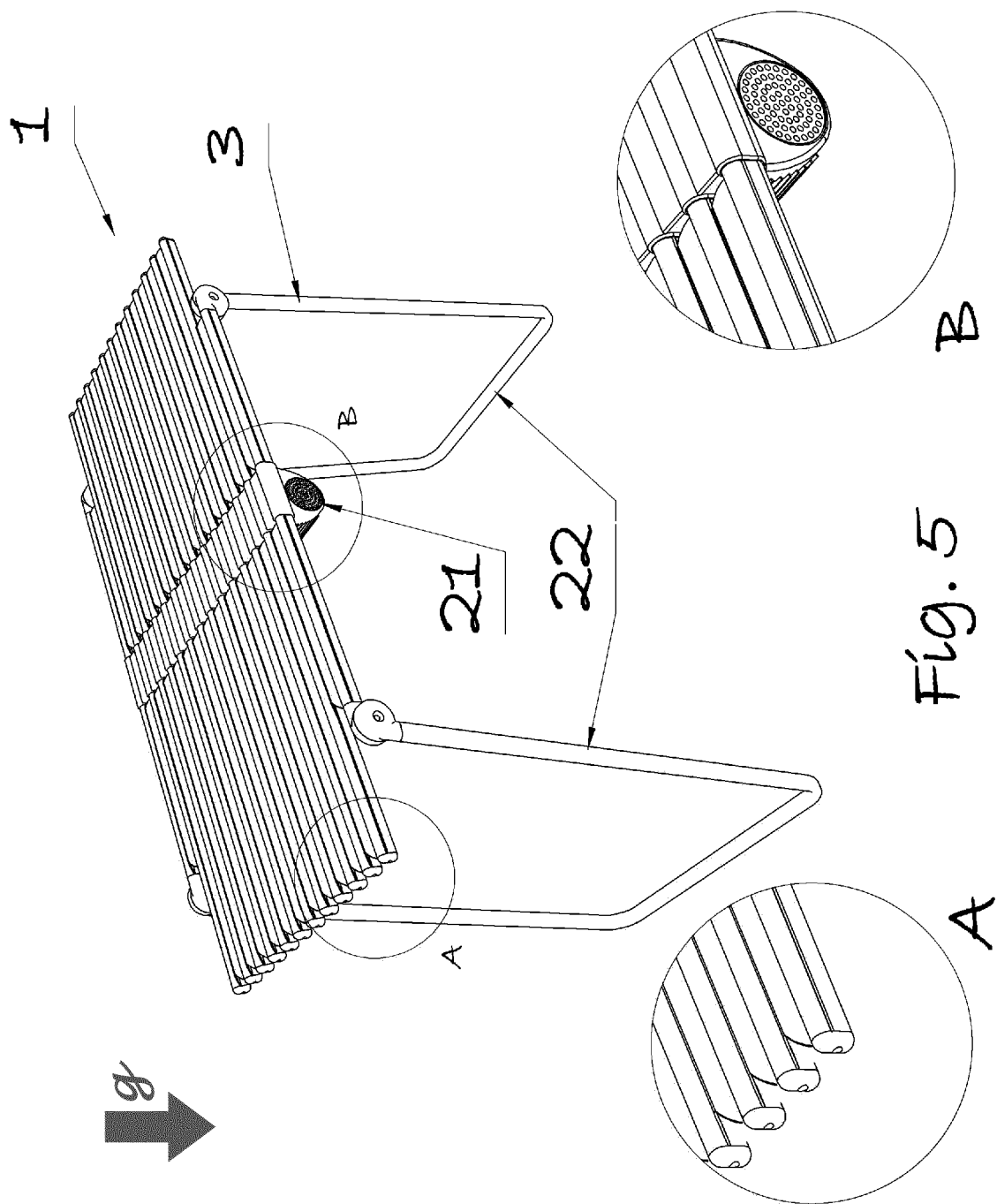
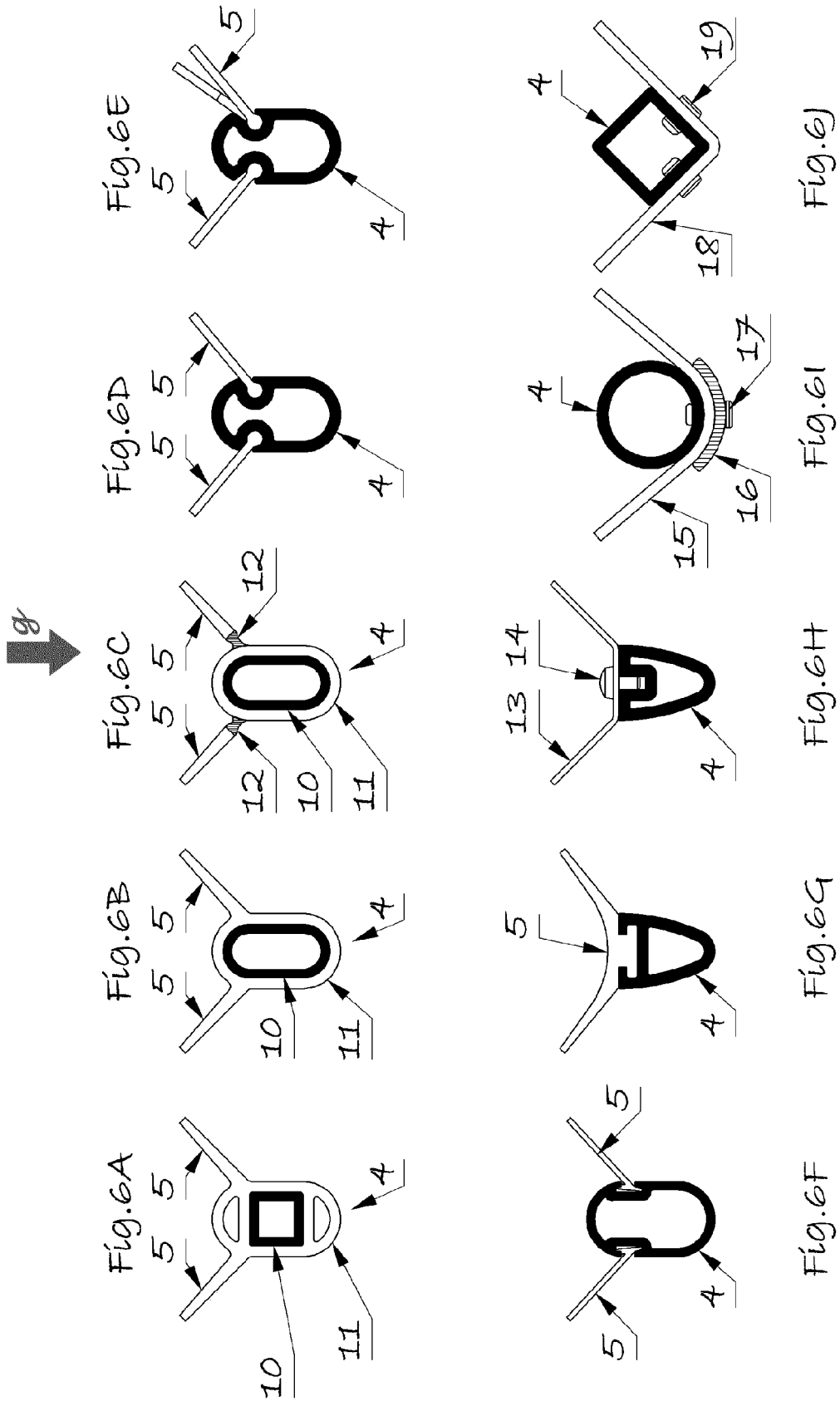


Fig. 5



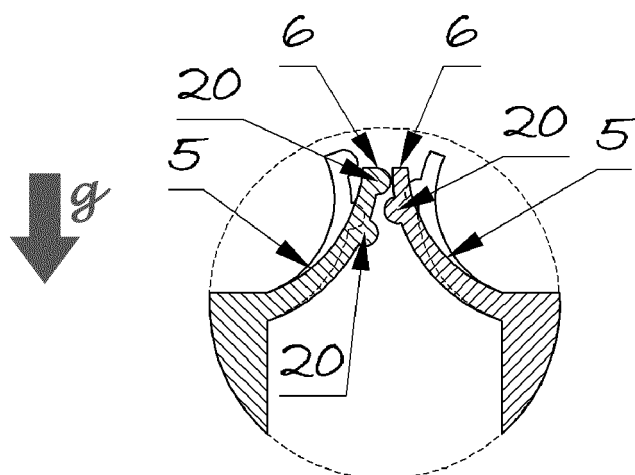


Fig. 7

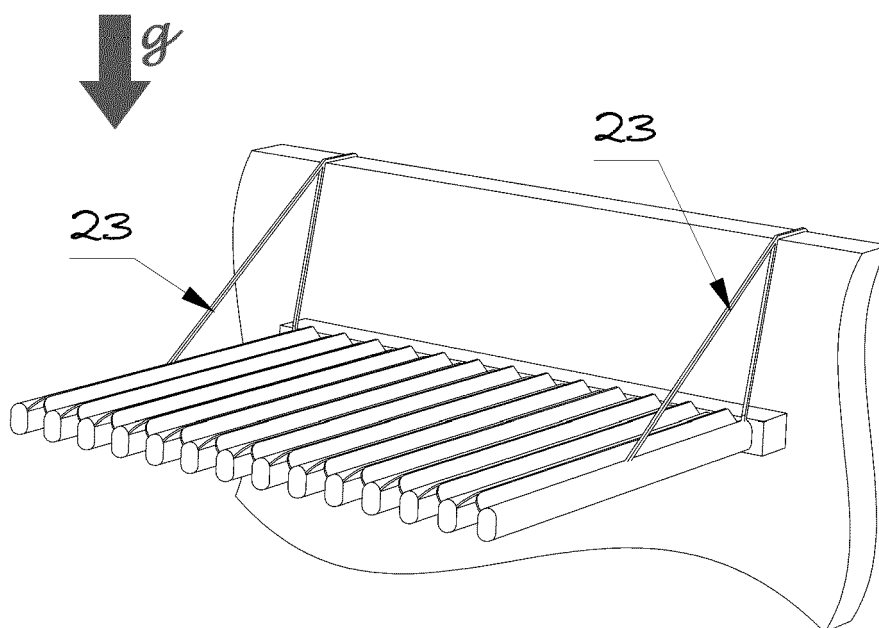


Fig. 8

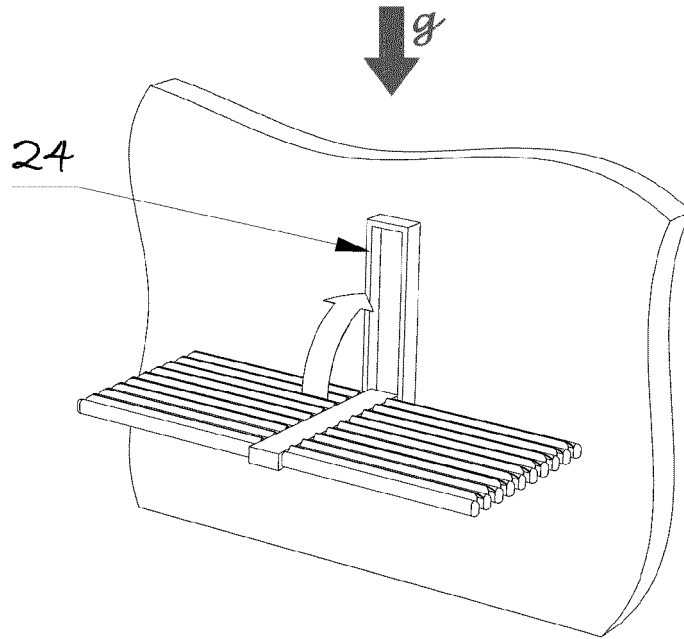


Fig. 9

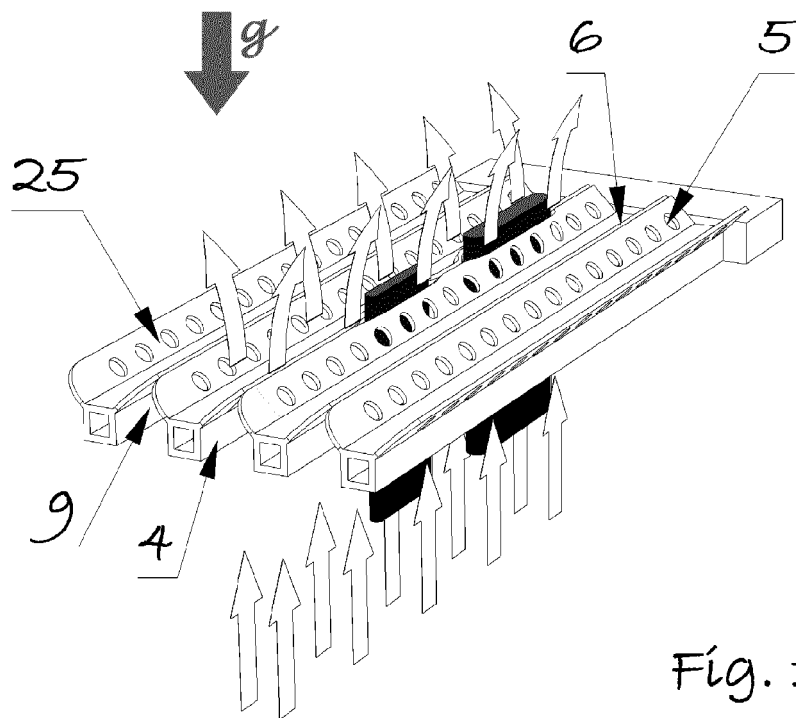


Fig. 10



EUROPEAN SEARCH REPORT

Application Number
EP 11 18 8426

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 24 February 2012	Examiner Uhlig, Robert
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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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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