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Anti-mosquito net rope movement system

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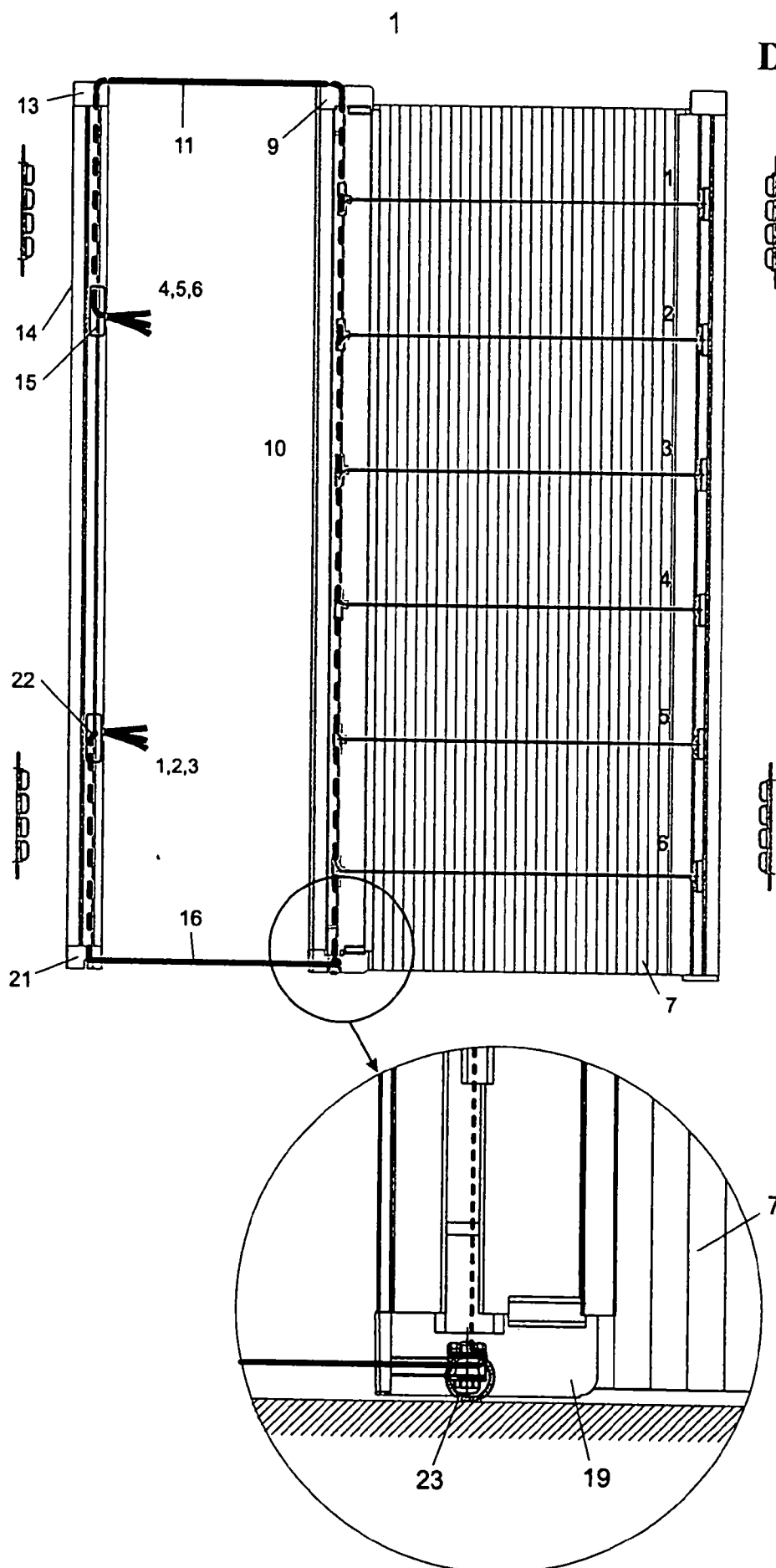
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(56) Related Art
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EP 2157274

ABSTRACT**Anti-mosquito net rope movement system**

- 5 The invention is a rope movement system for anti-mosquito pleated net (7), moving horizontally. It consists of a terminal accessory (19) at the lower end of the sliding guide (10), carrying a transit pulley (17), a direction pulley (18) and a sliding pulley (23), as well as a terminal accessory (21) at the lower end of the fixed lateral guide (14), carrying a
- 10 lateral entrance socket (25) of the unified bundle (16) formed by the short ropes crossing over the net (7). The invention applies to the existent anti-mosquito systems by replacing the accessory located at the lower end of the sliding guide (10) and the accessory located at the lower end of the lateral fixed guide (14).

Drawing 1



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COMPLETE SPECIFICATION

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Anti-mosquito net rope movement system

The invention belongs to the field of mechanics with regard to anti-mosquito net systems that are used for horizontal door sliding.

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According to the current state of the art, those systems use two examples of mosquito net. The stretched net that is rolled and unrolled and the pleated (plisse) net that is folded and unfolded.

The present invention refers to anti-mosquito systems with a plisse (pleated) net.

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In these anti-mosquito systems the pleated net is folded in its pleats (plisse), in between two vertical boxes, the restraint and the sliding one. The entire system is like a frame that has the restraint and the sliding boxes as its vertical sides. The restraint box is screwed on one of the two vertical door frames, while one lateral fixed rail is screwed on the opposite vertical door frame. The sliding box moves between the restraint box and the lateral fixed rail, in a position parallel to them. The frame has two screwed and fixed guides, as its horizontal sides at the upper and the lower door opening, respectively. The sliding box slides into the two horizontal guides, the upper and the lower made from aluminum, shape Π and lateral walls height 4mm.

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In that way the net is folded and unfolded. As the user pulls the sliding box, in order to unfold the anti-mosquito net, the pleated net is unfolded simultaneously. By doing the opposite move, bringing the sliding box back to its folded position, the pleated net is folded too.

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During the above-mentioned action, the pleated net is folded and unfolded in its pleats, supported by short ropes which cross it over horizontally, longwise. The short ropes, placed horizontally and in equal distances from each other, when unfolded are stretched and then they are useful in keeping the pleated net straight in its position. They are also useful for its refolding in its pleats. One of the ends of each rope is fixed on the restraint box, which is screwed on the door frame, whereas

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the other end of the ropes passes through the moving sliding box. From this point on, the short ropes unify to rope groups of equal number, the upper and the lower group:

- 5 The short ropes passing through the middle of the upper part of the net, form the upper group. The ends of the ropes passing through the sliding box and then unify in one bundle, which passes through the lower horizontal fixed guide and ends up fixed on the lower end of the box of the lateral fixed guide.

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The short ropes passing through the middle of the lower part of the net, form the lower group. The ends of the ropes passing through the sliding box and then unify in one bundle, which passes through the upper horizontal fixed guide and ends up fixed on the upper end of the box of

- 15 the lateral fixed guide.

At this point occurs the following technical problem, regarding the upper group ropes, which form unified bundle of ropes, passing through the lower horizontal guide. This bundle passes through the lower horizontal
20 guide, coming in touch with the floor of the guide and the straight way passing inside it, which means, in equal distance between its two lateral walls. This causes the following problem: the rainwater could enter the guide and as a consequence the short rope would rot. Furthermore, the short rope could get cut by the users' steps, while another problem is the
25 accumulation of dust and garbage inside the guide, which, due to fact that the short rope gets in and out of the net, by unfolding the net the garbage could get into its internal part. The final result of the above mentioned problems is that the net blocks, the sliding guide cannot move and unfold it, which consequently requires the replacement of the
30 entire anti-mosquito system, since the replacement of the net alone is not an available option.

Such technical problems exist, for example, in the EP 0549209 A1 and the EP 2157274 A2 products.

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2012204143 10 Apr 2013

Both documents reveal anti-mosquito net rope movement systems, with a pleated net being foldable in between a vertical fixed restraint box and a vertical sliding box, whereby the sliding box is slideable between a folded position of the net close to the restraint box and an unfolded position close to a vertical lateral fixed rail along a horizontal upper/lower fixed guide of a net frame assembly, whereby a plurality of short ropes are provided for stiffing the net in an unfolded position and are fixed at the restraint box, are passing through the net, are guided vertically through the sliding box in an unified upper/lower bundle, are guided along the upper/lower horizontal fixed guide and are fixed at the upper/lower end of the vertical lateral fixed rail.

Similar anti mosquito net robe systems are described in JP 9 105284 A and JP 2001 152765 A

The lower group of ropes which passes through the upper fixed horizontal guide as a unified bundle, does not present the above mentioned problems of the lower part, since the rainwater cannot enter the upper fixed horizontal guide, neither exists the danger of garbage accumulation in the upper fixed horizontal guide, either the danger of the cut of the upper unified bundle by the user's steps.

The present invention is an anti-mosquito net rope movement system. It solves the above technical problems, since the lower bundle does not pass contiguously through the middle part of the lower horizontal guide longwise, like in the case of the current state of the art. In the present invention the lower bundle of ropes borders the internal lateral wall of the lower horizontal guide, longwise, and uses pulleys, which alter the course of the rope from the current state of the art. In that way, the bundle borders the lateral wall of the lower horizontal guide and the user cannot see it. As a consequence, the present invention solves the above technical problems, since the bundle of ropes is not exposed to the movement of the users' feet, and if rainwater enters the lower guide, the bundle is not in danger of rotting, since it doesn't border the floor of the guide, where the water enters. Furthermore, even if garbage and dust accumulate in the guide, the bundle does not get in touch with the

2012204143 10 Apr 2013

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garbage, and consequently does not transfer them inside the net. The result of the above mentioned and the main advantage of the present invention is that it solves the problem of the destruction of the anti-mosquito system by the reasons mentioned above.

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The Drawings that accompany the invention illustrate, in brief, the following:

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Drawing 1 pictures the anti-mosquito system with a pleated net in oblique view, with the net partially unfolded, and in detail, the lower point of the sliding guide and its movement pulley.

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Drawing 2 pictures the pleated net, with the bundle of ropes at the lateral wall of the lower fixed horizontal guide. In detail, it presents the movement system of the bundles and in particular the lower end of the sliding guide with the two pulleys, the transit pulley and the direction pulley, and the lower part of the fixed lateral guide with the bundle of ropes entering it.

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Drawing 3 pictures the anti-mosquito system with a pleated net, with the bundle at the lateral wall of the lower fixed horizontal guide entering and being fixed on inside the lower part of the fixed lateral guide. In detail, it presents one part of the rope movement system and of the anti-mosquito net and in particular, the lower end of the sliding guide with the

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direction pulley.

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Drawing 4 pictures in detail one part of the rope movement system of the anti-mosquito net and the four transit phases of the transit of the bundle: towards the transit pulley (figure 4a), around the transit pulley (figure 4b), towards the direction pulley (figure 4c) and around the direction pulley (figure 4d) towards the lower point of the lateral guide.

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Drawing 5 pictures the rope movement system of the anti-mosquito net with the position occupied by the bundle inside the lateral wall of the lower fixed horizontal guide, longwise.

An example implementing the present invention follows with a detailed description and reference to the attached drawings.

5 As depicted in drawings 1, 2, 3, 5 short ropes traverse the pleated net (7) horizontally and in equal distances from each other, which are useful for the folding and the unfolding of the net. These ropes are divided in two groups: the upper group with three short ropes (1, 2, 3) and the lower group with equal in number ropes (4, 5, 6). In the present
10 example the two groups have ropes equal in number. In another implementation of the present inventive idea, it is possible that the two groups of rope may not be equal in number, but all of them will always be horizontal.

15 The ropes are fixed vice versa:

The three ropes of the lower group (4, 5, 6) traverse the net (7) horizontally and then unify in a bundle (11) which heads vertically towards the upper ones and comes through the pulley (8). The pulley (8)
20 lies inside the terminal accessory (9) of the upper end, of the sliding guide (10). Hereupon, the bundle (11) enters the opening (12) located inside the terminal accessory (13) at the upper end of the fixed vertical lateral guide (14) and is fixed on a point (15) inside the lateral guide (14).

25 The axis A-B of the pulley (8) is perpendicular to the movement direction of the net (7) (drawing 5).

Similarly, as depicted in drawings 1 to 5, the three short ropes from the upper group (1, 2, 3) traverse the net (7) horizontally and then unify in
30 a bundle (16) which goes down vertically and comes around the transit pulley (17) (drawing 4, figures 4a and 4b) forming a 90 degree angle. Afterwards, the bundle (16) moves horizontally and rotates around the direction pulley (18) forming again a 90 degree angle (drawing 4, figures 4c and 4d). Both the transit (17) and the direction (18) pulleys are
35 located in the terminal accessory (19) at the lower point of the sliding

guide (10).

5 The A-B axis of the transit pulley (17) is parallel to the movement direction of the net (7), while the E-F axis of the direction pulley is perpendicular to the movement direction of the net (7) (drawing 2). In that way, the A-B axis of the transit pulley (17) is perpendicular to the E-F axis of the direction pulley (18). The terminal accessory (19) at the lower point of the sliding guide (10) (drawing 1), also carries a sliding roller (23).

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As depicted in drawings 2, 4 and 5, due to the direction pulley (18), the bundle (16) coming through it, is far from the floor of the lower fixed horizontal guide (24) and comes, longwise, through the entire lower fixed horizontal guide (24), contiguous to the internal lateral wall of the guide (24), and without touching the internal floor of the fixed horizontal
15 guide at any point, contrary to the current state of art, where the bundle touches constantly the internal floor of the lower fixed horizontal guide. This distance between the bundle (16) and the floor of the guide (24) exists due to the existence of the transit pulley (17) in combination with
20 the direction pulley (18) and thanks to them the technical problem of the wear of the bundle (16) and consequently of the net (7) is solved.

The same course of the bundle can also come through with the existence of two openings, transit and direction, instead of pulleys, or with the
25 existence of two fixed accessories, around which shall move the bundle (16). However, in this implementation example is depicted the use of pulleys, direction (18) and transit (17), because due to their shape and function they prevent the bundle of ropes (16) from wearing off and cutting.

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Moreover, the bundle (16) after passing through the entire lower fixed horizontal guide (24) longwise, contiguous to its internal lateral wall, it reaches the terminal accessory (21), located at the lower point of the fixed lateral guide (14). There, the bundle (16) enters the internal part
35 of the lateral wall, via specified lateral entrance socket (25) for the

bundle (drawings 2, 3 and 5), included in the terminal accessory (21) at the lower end of the fixed vertical lateral guide (14), and fixes on a point (22) in the internal part of the lateral guide (14), located in the middle of the width of the lateral guide.

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The invention applies to the existing anti-mosquito systems, by replacing two of the following accessories: the accessory located at the lower point of the sliding guide, according to the current state of art, is being replaced by the lower point accessory (19) of the present invention, which carries a transit pulley (17), a direction pulley (18) and a sliding roller (23), when in the same time, at the fixed lateral guide (14) the lower point, used in the current state of art, is respectively replaced by the terminal accessory (21) carrying the specified lateral entrance socket (25) for the transit of the bundle (16).

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The present invention applies to the anti-mosquito system with pleated net, moving horizontally.

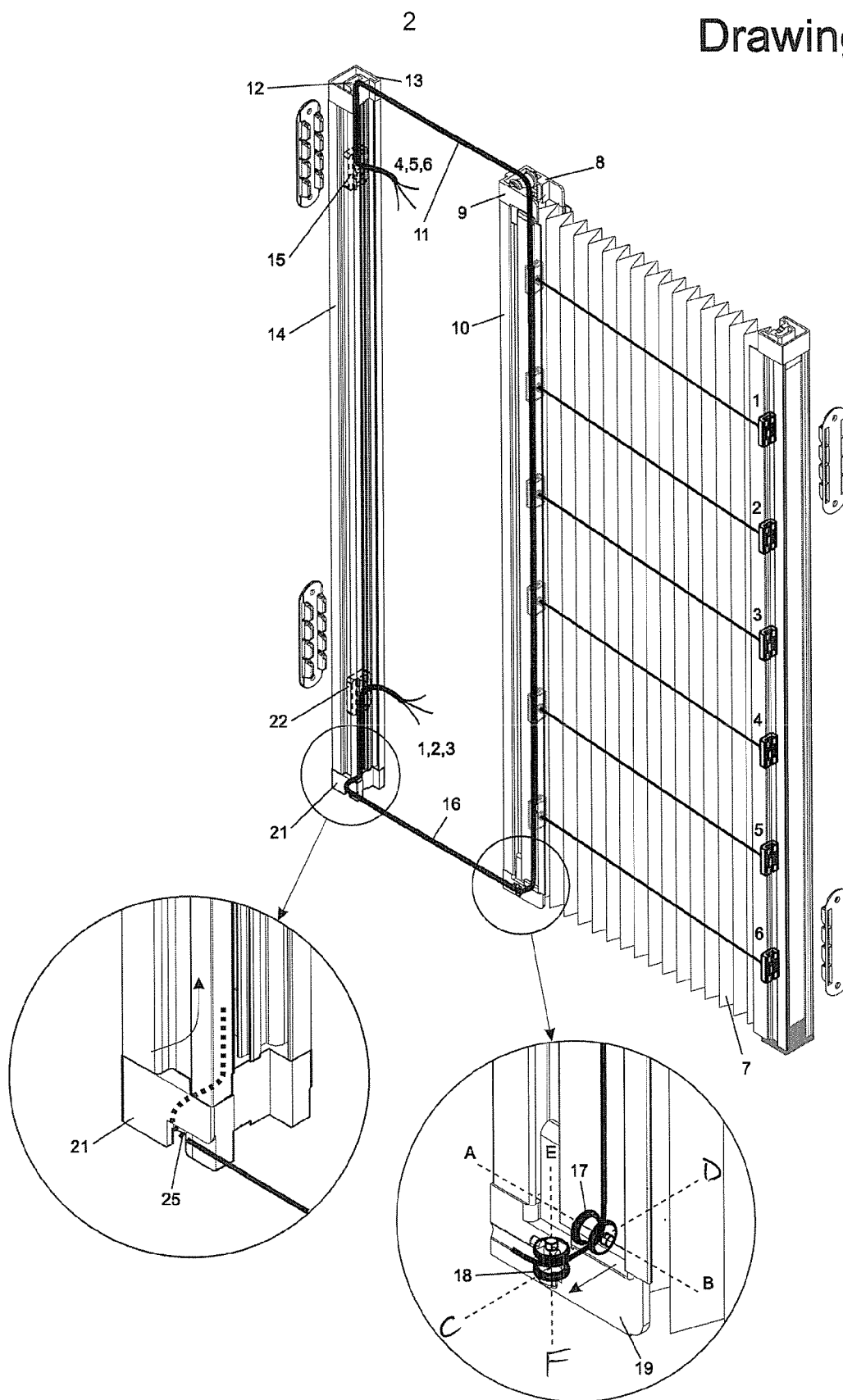
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CLAIMS

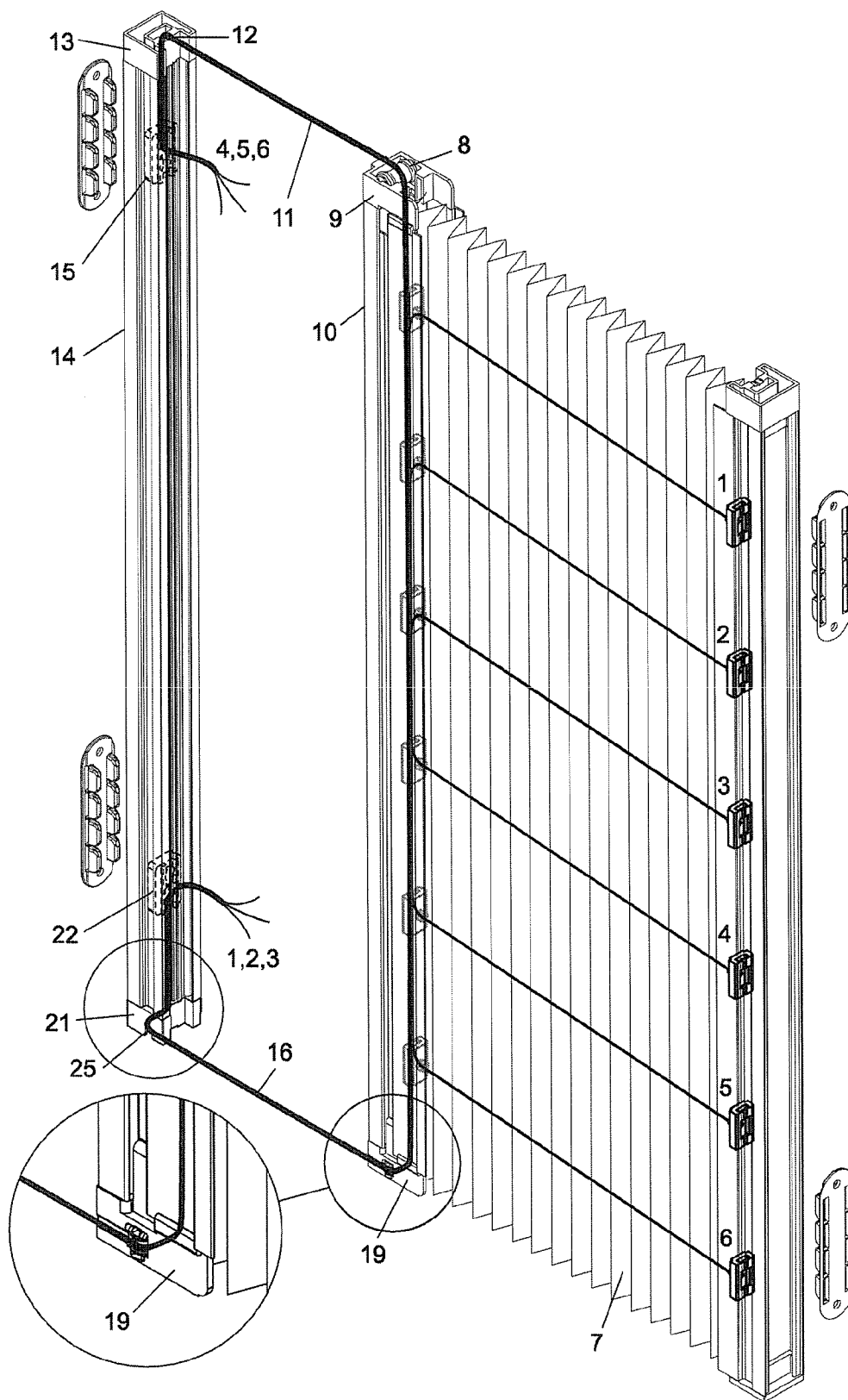
1. Anti-mosquito net rope movement system, with a pleated net being foldable in between a vertical fixed restraint box and a vertical sliding box, whereby the sliding box is slideable between a folded position of the net close to the restraint box and an unfolded position close to a vertical lateral fixed rail along a horizontal upper/lower fixed guide of a net frame assembly, whereby a plurality of short ropes are provided for stiffening the net in an unfolded position and are being fixed at the restraint box, are passing through the net, are being guided vertically through the sliding box in an unified upper/lower bundle, are being guided along the upper/lower horizontal fixed guide and are being fixed at the upper/lower end of the vertical lateral fixed rail, characterized by a terminal accessory at a lower point of the sliding box carrying a transit pulley and, a direction pulley for guiding the lower unified bundle formed by the short ropes coming through the net, and a sliding roller for supporting a sliding movement of the vertical sliding box along the lower horizontal fixed guide, and a terminal accessory at a lower end of the fixed lateral guide carrying a lateral entrance socket of the lower unified bundle whereby the transit pulley and the direction pulley are arranged in a way to guide the unified bundle of short ropes not in the middle part of the lower horizontal guide but along an internal lateral wall of the lower horizontal guide.
2. Anti-mosquito net rope movement system according to claim 1, characterised by the fact that the unified bundle:
- A) heads down vertically and comes around the transit pulley forming a 90 degree angle;
 - B) then moves horizontally and rotates around the direction pulley forming a second 90 degree angle;
 - C) comes over the entire lower fixed horizontal guide, longwise, contiguous to its internal lateral wall in equal distance from the internal floor of the guide; and
 - D) from the entrance socket, enters the terminal accessory of the lower end of the fixed lateral guide and fixes on a point in the internal part of the guide in the middle of its width.

3. Anti-mosquito net rope movement system according to claims 1 and 2, characterised by the fact that the axis A-B of the transit pulley is parallel to the movement direction of the net, while the axis E-F of the direction pulley is perpendicular to the movement direction of the net, and consequently to the axis A-B of the transit pulley.
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4. Anti-mosquito net rope movement system according to claims 1 and 2, characterised by the fact that instead of the pulleys, the bundle can rotate around fixed accessories or enter openings.
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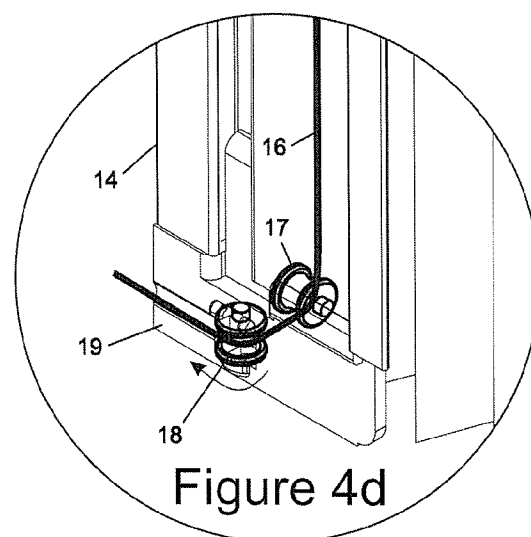
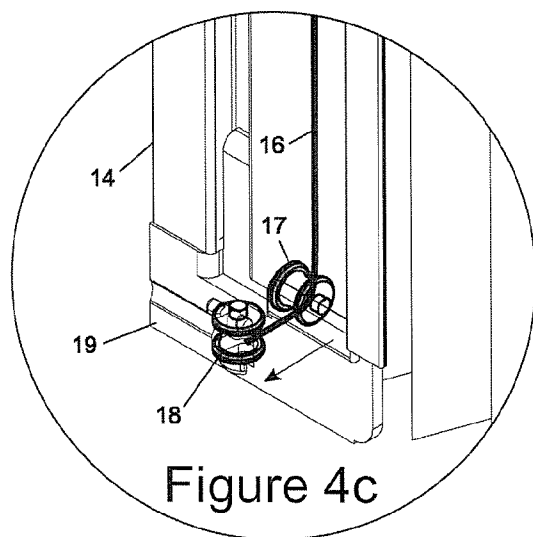
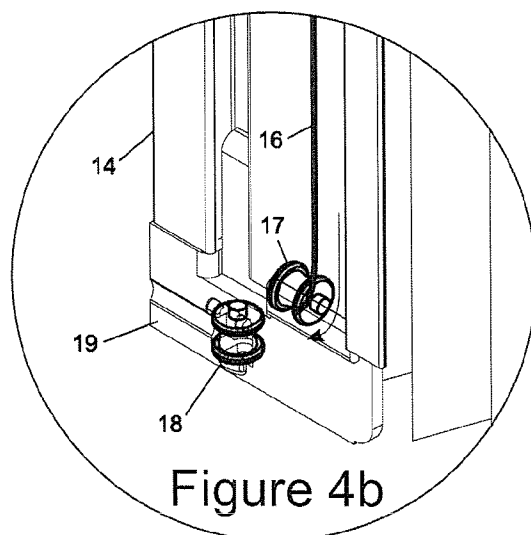
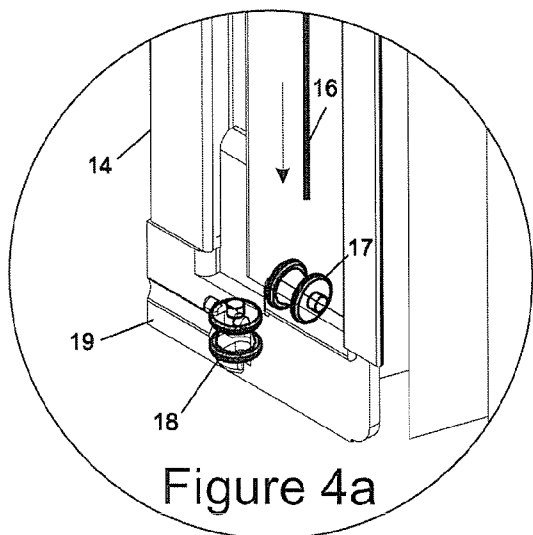
Drawing 2



Drawing 3



Drawing 4



Drawing 5

