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(54) **Roller sun screen, with incorporated, extendable and self-winding mosquito nets**

(57) A roller sun screen comprising a plurality of rigid horizontal bars (1), all identical to each other, hollow on the inside according to three longitudinal C, pivoting

around axial bolts (3), at both external ends, being further flexible, extendable, self-winding mosquito nets (10) inserted inside said bars (1).

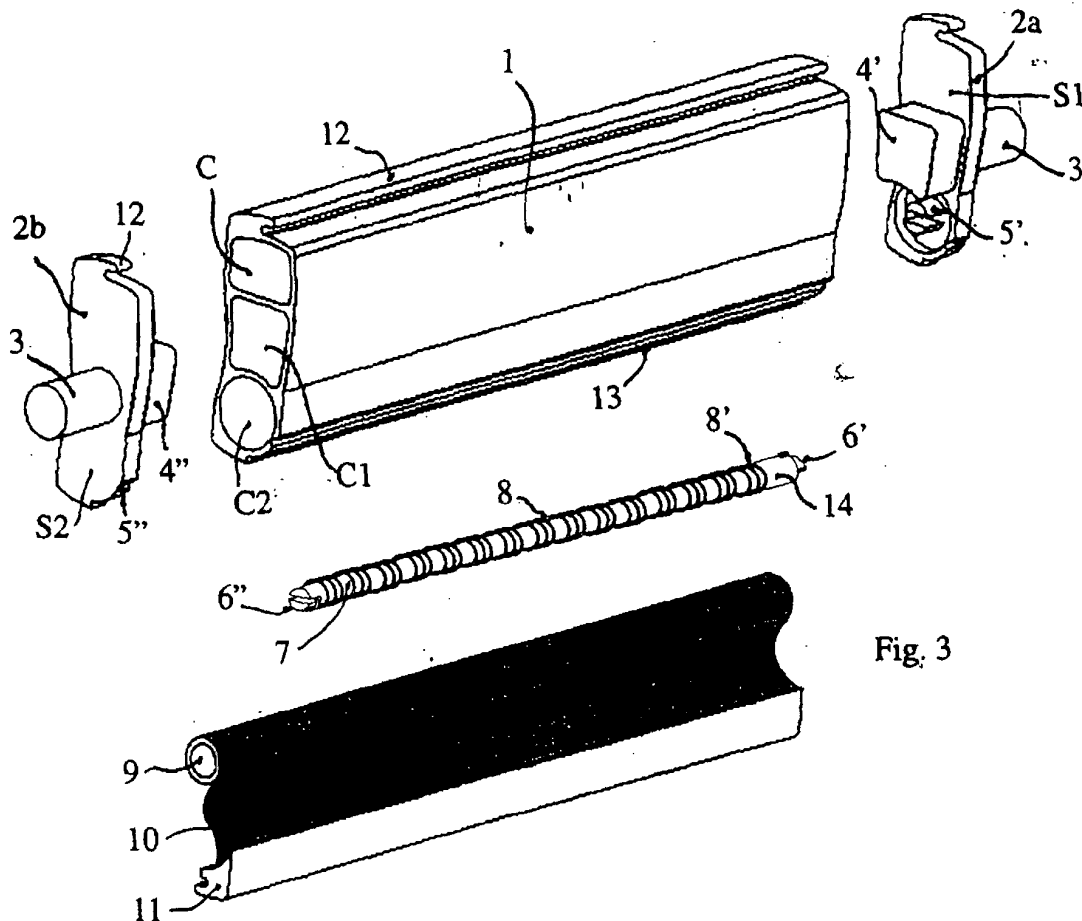


Fig. 3

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Description

[0001] The invention relates to a roller sun screen made up of horizontal bars that are hollow on the inside, pivoting around axial bolts located at both external ends; being further extendable, self-winding mosquito nets inserted inside said bars, according to claim 1.

[0002] The production of the roller sun screen is well known within the state of art, also referred to as "roll up shutters", made up of a series of horizontal bars, connected together with edge joints that allow for said bars to swing, with respect to the vertical level of the window or door, from a vertical position of total closure to a fully open horizontal position. The opening that is created between one bar and the next, immediately above or below, allows for light and air to flow in with an open window in proportion to the rotation of the bars themselves.

[0003] It is also well known that it is essential to attach very fine netting to the windows and/or doors to stop insects getting into the house, in areas that are particularly infested with mosquitoes and/or other insects.

[0004] These nets are applied to fixed or removable frames, as well as to roller supports that are fitted on the inside or outside of the screen. These nets, also known as "mosquito nets", aim to stop not only night time insects getting in when the roller sun screens are wound up, but also those during the day, when the roller sun screens are lowered to screen the sunlight and their bars are rotated into a horizontal position to allow air to circulate. In fact, the insects can get into the house via the opening left between one bar and another.

[0005] The main disadvantage with the known solutions is that on many windows or doors, the thickness of the post does not allow for the screen and mosquito net to be mounted simultaneously. In fact, the sum of the thicknesses of the two supporting frames is greater than the space available. In all of these cases, one or other of the screens has to be sacrificed, with the subsequent negative consequences.

[0006] The object of the present invention is to provide a sun screen with the additional advantage of a built-in insect net, while keeping all the dimensional and functional characteristics of this kind of device.

[0007] This way, the overall thickness is reduced to the thickness of a single screen.

[0008] A further advantage is the fact that the insect net, located inside the bars which make up the sun screen can, where necessary, be at will extracted. In fact, in many places, the insects are only found in certain months of the year and are absent in all the other months. This avoids the inconvenience of keeping the nets up unnecessarily.

[0009] The object is accomplished by inserting a small self-winding roller inside the bars that are hollow also in order to reduce weight. The self-winding roller has the same length as the bar itself and onto which a very fine net curtain is attached that is both highly flexible and prevents insects from getting in.

[0010] The net is attached firmly to the roller along one of the two free longitudinal edges, while, on the free edge opposite, it is attached to a rigid strip with its external part showing a hook shaped section along the whole length.

[0011] Said net comes out of the lower part of the bar, along the longitudinal slot, so that it forms a curtain. Said slot runs the whole length of the bar and its transversal width is less than the thickness of the hooked strip.

[0012] Therefore, the flexible net curtain can come out of the bar by applying a traction to the edge of the strip, and can be rewound with the return spring attached to the roller, until the strip itself stops against the edges of the slot.

[0013] On the opposite upper side of the hollow bar is a protrusion that is an integral part of the bar itself, with a hook shaped section that runs the whole length of the bar itself.

[0014] This hook shape plays a double role.

[0015] Firstly: when the bars, that make up the sun screen are in a vertical position, the hook profiles of the two adjacent bars, fit one inside the other, in order to create a joint that seals the contact between a bar and the one next to it.

[0016] Secondly: by rotating the bars anti-clockwise around their axial bolts, the profiles come unhooked, leaving the space between the bars free. If, however, the bars are rotated clockwise, one fixed profile (bar) hooks onto the corresponding mobile profile (strip at the end of the mosquito net) ensuring the extraction of the mosquito net.

[0017] This way the screen effect is always guaranteed, while the insect net protection is only guaranteed when necessary.

[0018] All the rotating movements of the bars, both clockwise and anti-clockwise, are achieved with well known mechanical or electromechanical transmissions that do not need to be described.

[0019] The object of this invention is, therefore, mainly to provide a winding screen that meets the needs for which it was installed, is easy to produce and assemble and can easily be used by everyone.

[0020] Other aims and advantages will become apparent from the description that follows and the drawings attached that illustrate in schematic and exemplary form, an embodiment of the invention though by no means limiting.

[0021] The sizes and shapes of the bars, as well as the materials of the bars themselves and the insect net curtains, can also be highly varied while still falling within the scope of the invention.

[0022] In reference to said drawings

- fig. 1 shows the sun screen completely unrolled and closed;
- fig. 2/a shows a side view of the same sun screen with the bars rotated anti-clockwise;
- fig. 2/b shows a side view of the same sun screen with the bars rotated clockwise

- fig. 3 shows the parts that make up the sun screen bar and the insect net curtain;
- fig. 4 is a view of one axial section of a sun screen bar;
- fig. 5 is a view of one cross section of a sun screen bar;
- fig. 6 shows, from a perspective point of view, two rotated sun screen bars, with insect net curtain extracted in order to close the opening in the middle.

[0023] In its essential elements, the sun screen is made up of a plurality of bars 1, obtained from extruded profiles with suitable shape and section.

[0024] The internal part of these profiles preferably has three longitudinal hollows C, closed in by walls that have a constant and homogeneous thickness, in order to simultaneously guarantee that the whole bar is both light and rigid.

[0025] At the two ends of bar 1, two plugs 2a and 2b are attached in order to close the bar.

[0026] The two plugs have specular shapes, one right and the other left, and each one has a cylindrical bolt 3 sticking out of the external surface S2 positioned in line with the median axis of the bar 1. The external profile also has the same shape for both plugs; said shape has the same profile found on the bars, so that there is no discontinuity in shape along the whole length of the bars themselves.

[0027] Both plugs 2a and 2b also have, sticking out of the internal surface S1, a plug respectively 4' and 4" while only the plug S1 has a fork pin 5. The 4' and 4" plugs are shaped according to the external profile corresponding with the internal profile of the central hollow C1 of the bar 1. This way they can be inserted into the hollow C1 itself. The fork pin 5 acts as a support, engaging at the prismatic end 6 of the cylindrical spindle 7, fitted inside the hollow C2, as described below.

[0028] The mosquito net curtain unit is fitted inside the hollow C2, comprising a spindle 7, a spiral spring 8, coaxial to spindle 7, a sleeve 14, a curtain holder hollow shaft 9 and a net curtain 10.

[0029] The spiral spring 8 is integrally fixed with one of its terminal parts 8", to the cylindrical end 6" of the spindle 7, while it is fixed with the other terminal part 8' to a sleeve 14, coaxial to the same spindle 7; said sleeve 14 also keeps the spindle 7 centred inside the tube 9, cooperating with the outside of the spring 8.

[0030] The net curtain 10 comes out of the hollow C2 of the bar 1, through the slot 13 carved out in the lower wall of the hollow C2 itself. It is extracted when the upper hook 12 integrally attached to the bar 1 engages the corresponding mobile hook 11 fitted to the net curtain 10 by rotating the bars 1 clockwise; rotation is made by acting on the bolts 3 using well known transmissions that are therefore not shown. As the bars rotate and move away from each other, the net curtain unwinds itself around the roller 9, extracted by the action of the fixed hook 12 on the corresponding mobile hook 11, contemporarily creating tension on the spring 8.

[0031] Similarly, by rotating the bars 1 anticlockwise, the net curtain 10 goes back inside the bar 1 due to the action of the spring 8, that this way releases its previously accumulated tension. The rewinding of the net curtain 10 inside the bar 1 stops when the rod 11 comes into contact with the external surface of the bar 1 because the rod 11 is bigger than the slot 13.

[0032] Continuing with the anticlockwise rotation of the bars 1, after all the bars have passed the vertical position, a position in which the curtain is completely rewound, the hooks 11 and 12 disengage from each other and the bars 1 move away from each other and leave the spaces in between free of any curtain. The bars that make up the winding screen can be made of ferrous or non ferrous metal as well as synthetic material, as required.

[0033] Similarly, the net curtains can be made of synthetic or natural material as long as it is flexible, like cotton, nylon and similar materials, without departing from the scope of the following claims.

Claims

1. A roller sun screen comprising a plurality of rigid horizontal bars (1), all identical to each other, hollow on the inside according to three longitudinal C, pivoting around axial bolts (3), at both external ends; being further flexible, extendable, self-winding mosquito nets (10) inserted inside said bars (1),
2. The roller, as set forth in claim 1 **characterised by** the fact that said internal hollows are superimposed and preferably three in number, with longitudinal extension, parallel to each other, located according to a vertical median axis and divided by continuous diaphragms along their whole length.
3. The roller, as set forth in claim 1 **characterised by** the fact that the above mentioned horizontal rigid bars are sealed at both ends by fitted joint plugs on the bars themselves.
4. The roller, as set forth in claims 1 or 2, **characterised by** the fact that said fitted joint plugs have each a bolt on their external surface positioned on the median longitudinal axis of the bars themselves.
5. The roller, as set forth in claim 1 **characterised by** the fact that said horizontal rigid bars have, on their upper external edge, a protrusion with hook shaped section.
6. The roller, as set forth in claim 1 **characterised by** the fact that said horizontal rigid bars have, on their lower external edge, a longitudinal slot that runs the whole length of the bars themselves.
7. The roller, as set forth in claims 1 or 2 **characterised**

by the fact that inside the lower hollow is located a flexible curtain screen made up of a very fine net.

8. The roller, as set forth in claim 7 **characterised by** the fact that the flexible curtain screen comes out through said longitudinal slot. 5
9. The roller, as set forth in claims 1, 2 or 7 **characterised by** the fact that the flexible curtain screen is linked at one end to a self-winding spring roller. 10
10. The roller, as set forth in claims 8 or 9 **characterised by** the fact that the flexible curtain screen is linked, with its second end, to a rigid rod that extends longitudinally and ends with a hooked section profile. 15
11. The roller, as set forth in claims 5 or 10 **characterised by** the fact that the upper and lower profiles with hooked section engage each other, forming a closed link between the adjacent bars. 20

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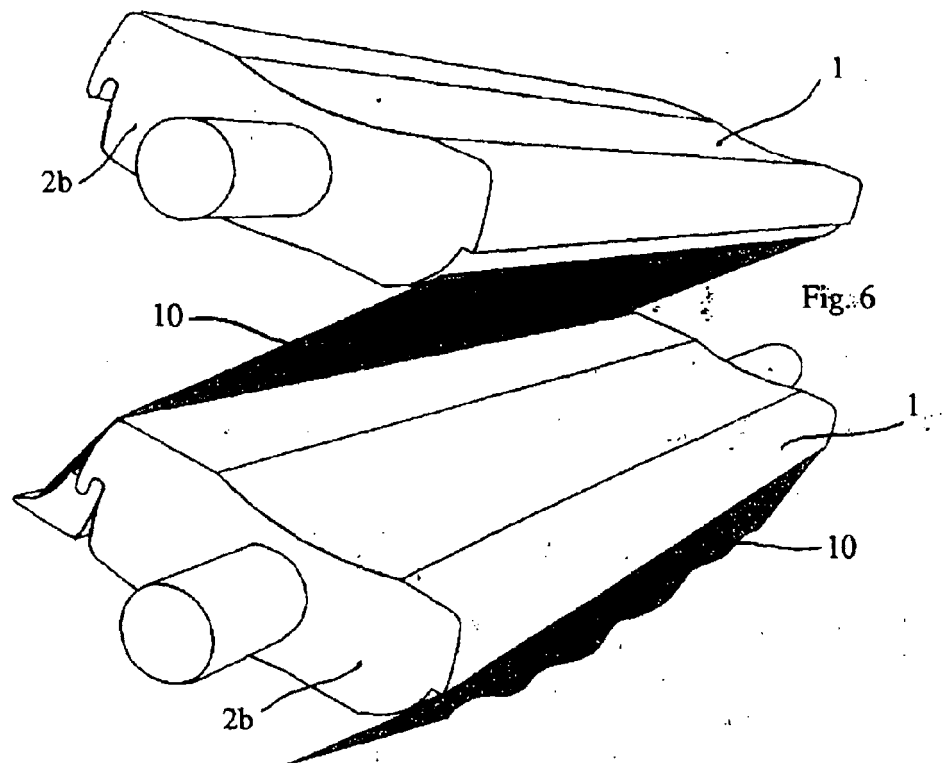
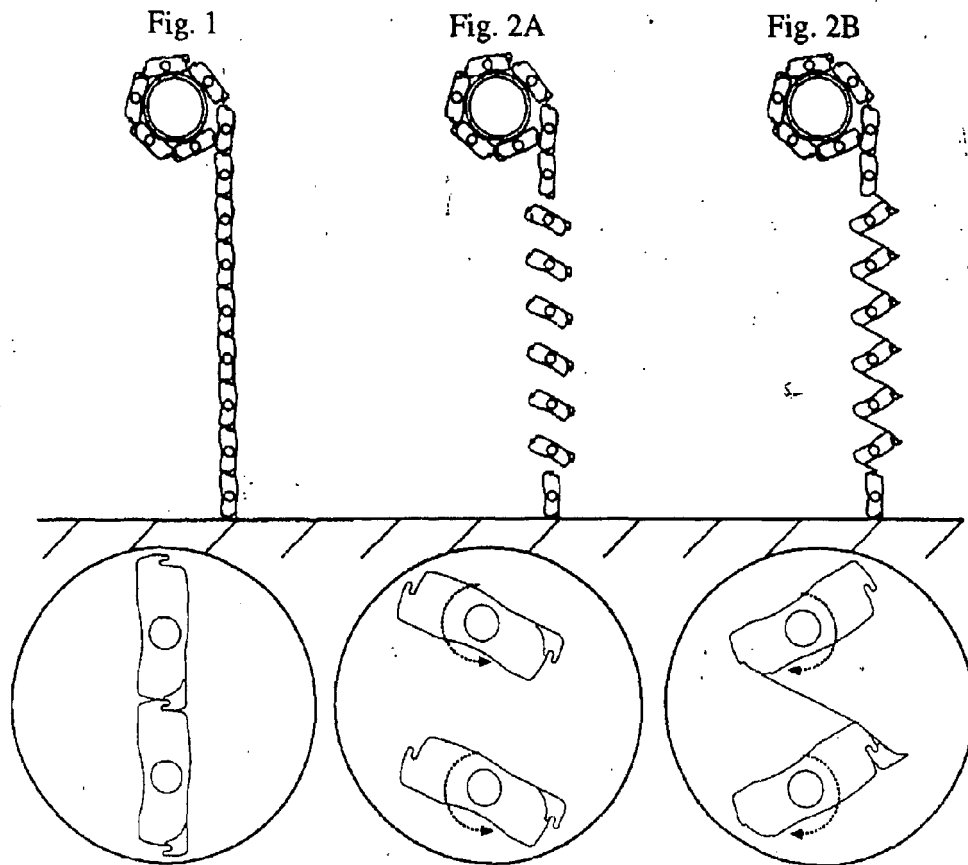
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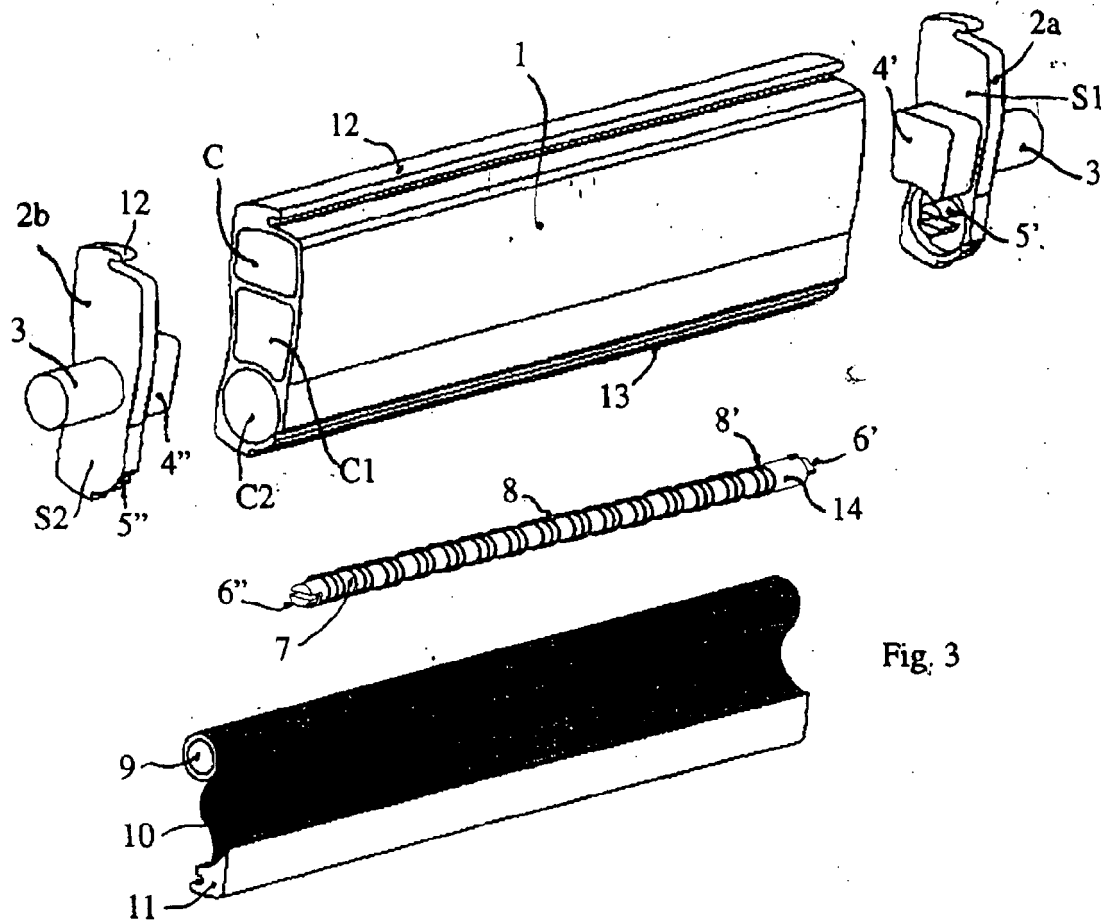


Fig. 3

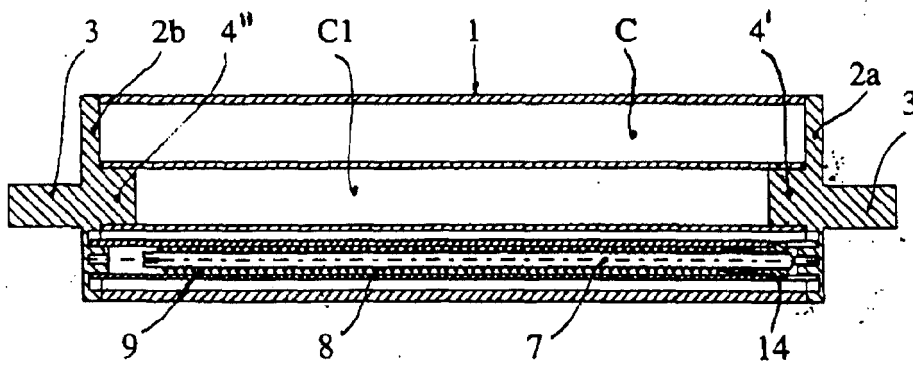


Fig. 4

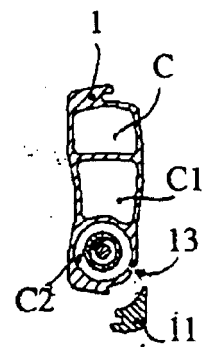
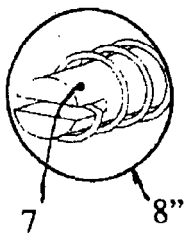


Fig. 5





DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 4 715 421 A (ERBER ET AL) 29 December 1987 (1987-12-29) * the whole document *	1	INV. E06B9/54 E06B9/15 E06B9/40 E06B9/34
A	DE 27 22 005 A1 (HELSHOEJ, EGON) 24 November 1977 (1977-11-24) * the whole document *	1	ADD. E06B9/60
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			TECHNICAL FIELDS SEARCHED (IPC)
			E06B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 15 March 2006	Examiner Geivaerts, D
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ON EUROPEAN PATENT APPLICATION NO.**

EP 05 02 8687

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15-03-2006

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