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(54) **Link chain for retractable screens**

(57) Link chain for retractable screens for easy assembly which has limited the direction of the rotation thanks to a first flange (2), located on the rear top of the links (1) and a second flange (6), located on the front top of the links (1) such that when both flanges come into contact they avoid the link chain to rotate in that direction. Also the links (1) incorporate a vertical step (5) on its inner side by which a inclined vertical side (7) of an adjacent link slides in such a way that the chain can only be rotated a certain angle marked by the contact of the inclined vertical side (7) of a link and the vertical step (5) of the adjacent link. Links (1) include a front limit surface (10) and a rear limit surface (11), which are flexible in order to facilitate the assembly of the chain.

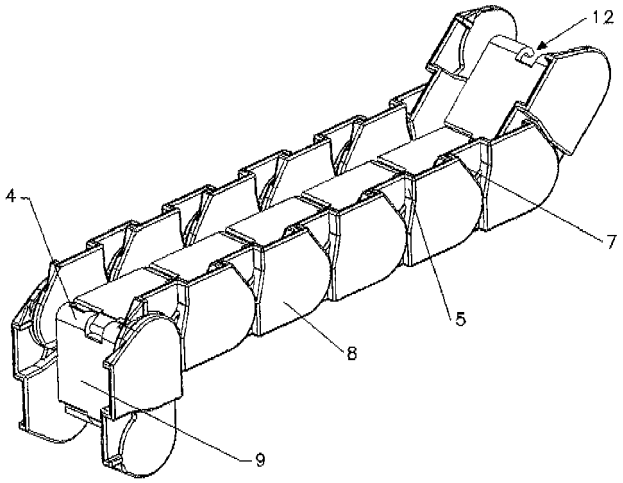

FIG. 1

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Description

[0001] The present invention is part of the devices that allow the guiding of a fabric like a retractable screen mode.

State oF the prior art

[0002] From the state of the art there are known devices that allow the guiding of fabrics like retractable screens comprising chains or rigid elements articulated as those described for example in the patents EP1903175, EP1905944, EP2312113. The problem in the rigid elements or chain for retractable screens from state of the art is that have surfaces with nooks which allow the accumulation of dirt.

[0003] In addition, another major problem that have is the way in which is performed the binding among the different links in the chain that has a delicate security system so that the links do not loose among themselves during the operation of the retractable screen motion system.

Explanation of the invention

[0004] Retractable screens include for example the pleated anti-mosquito nets. These screens are devices characterized by extending a fabric closing a gap, and then being able to pick it again, remaining in the initial state. The fabric is arranged between two vertical rigid elements, joined together by two flexible or rigid articulated elements or chains that slide to the inside of the vertical rigid elements, while its outer span remains horizontal.

[0005] The main objective of the present invention is to propose a link chain which exceeds the limitations of the previous ones, introducing a new principle of assembly, a minimization of nooks where dirt can accumulate, and a novel anti-rotation and anti-disassembly security system.

[0006] The links in the chain have a structure formed by two side walls parallel each other and joined by a perpendicular surface to them which has a hook at the front with an opening and has attached to its rear a cylindrical axis. When the links join together to form a chain two adjacent links join each other in an articulated way with the cylindrical axis of one of them being introduced through the hook opening of the adjacent link.

[0007] In addition the links of the present invention has a geometric shape that allows only the rotation of the chain in a direction and limiting the angle of rotation of the chain in the permitted direction. The links incorporate flanges at the top, both the front and the rear in such a way that when the chain is mounted the front top flange of a link is placed in contact with the rear top flange of an adjacent link in such a way that they allow the rotation only in a direction.

[0008] The limitation of the angle of rotation is achieved due to a vertical step that is inside of the links and which has curved shape. When this vertical step from a link comes into contact with a vertical side of an adjacent link allows the rotation of both of them, but only to an extent in which the curvature of the vertical step changes and the inclined vertical side of a link can not continue sliding by said step.

[0009] In addition the links have on its top a front limit surface and a rear limit surface that when the links are mounted, allow the separation of the top part so that the rear part of a link is introduced inside of the front of a second link.

[0010] Throughout the description and claims the word "comprises" and its variants are not intended to exclude other technical features, additives, components or steps. For those skills in the art, other objects, advantages and features of the invention will be understood partly of the description and partly of the practice of the invention. The following examples and drawings are provided by way of illustration, and are not intended to be limiting of the present invention. In addition, the present invention covers all possible combinations of particular and preferred embodiments here indicated.

Brief description of the drawings

[0011]

FIG. 1 shows a perspective view of a link chain object of the invention in which the limitation of the rotation is appreciated (in the right area of figure it can be seen how the chain can only rotate upwardly) and it can be seen how the links are placed in the chain (in the left area of the figure it can be seen a link placed perpendicularly to the chain for its placement in this chain).

FIG. 2 shows a view in perspective of a link in the chain.

FIG. 3 shows a section of a link in the chain for its plane of symmetry.

FIG. 4 shows a profile view of a link in the chain.

FIG. 5 shows a perspective view of a link in the chain of the invention in perpendicular position to the chain for its assembly.

References

[0012] 1: Link; 2: First flange; 3: Cylindrical axis; 4: Hook; 5: Vertical step; 6: Second flange; 7: Tilted vertical sides; 8: Lateral walls; 9: Perpendicular surface; 10: Front limit surface; 11: Rear limit surface; 12: Opening

Detailed exposition of embodiments

[0013] The link chain for retractable screens of the invention consists of (1) links that are rigid elements, being these links articulated to each other.

[0014] Each link is composed by two lateral walls (8) parallel to each other and joined by a perpendicular surface (9) to them. This perpendicular surface (9) has in his front end a hook (4) with a cylindrical shape and an opening (12). In the area of the rear end of the perpendicular surface (9) there is a cylindrical axis (3) placed in parallel with the perpendicular surface (9) and joined in a fixed way to the perpendicular surface (9). When mounting the chain, the links are connected to each other by placing the hook (4) of a second link around the cylindrical axis (3) of a first link that is adjacent to it in the chain. In this way the links are joined in an articulated way because this type of join allows the rotation of the links one with regarding to the other.

[0015] The lateral walls (8) comprise in the side that is inward of the links (1) a vertical step (5) so that the rear area, which is the area in which is the cylindrical axis (3), it is narrower than the front area, which is the area in which it is the hook (4). This allows that when the chain is mounted, the rear area of a first link remains inside of a second link adjacent to it, remaining the front area of the second link outside of the rear area of the first link.

[0016] The vertical step (5) is curve-shaped to ensure that the rotation of a link to its adjacent link occurs only in one direction. Thus the vertical step (5) is curve-shaped in the top part and is straight on the bottom so that the link adjacent to it can rotate in respect of the top, and in relation to the bottom is, at most, perpendicular. The vertical step (5) has a different shape in the inner surface of the lateral walls (8) than on the outer face to properly limit the rotation to only a direction.

[0017] Links (1) also comprise other limitative surfaces of rotation of the links. Specifically, they comprise a first flange (2) which is located at the rear top of each of the side walls (8). Each side wall (8) has two inclined vertical sides (7) and has its bottom end curve-shaped to allow the rotation in relation to the adjacent steps and has straight horizontal sides. The inclined vertical sides (7) limit the rotation of the links when coming into contact with the vertical step (5) of the adjacent link. Thus, when the inclined vertical side (7) of a second link slides by the vertical step (5) because of the movement of rotation of the chain, there is a moment in which the vertical step (5) of the first link, due to the above described geometry, avoids that the rotation of the second continues.

[0018] The first flange (2) is vertical and is located in the outer face of the lateral walls, in the rear part. The links also comprise a second flange (6), also vertical, and located in the inner side of the front top of each of the side walls (8). When the chain has been mounted, the rotation of the links is limited since when it is intended to turn the chain in a direction in which has limited, the first flange (2) in a first link comes into contact with the second flange (6) of the second link thus avoiding the rotation of the chain in this direction.

[0019] The first flange (2) and the second flange (6) come to contact during the assembly of the chain so that the top of the links (1) separates to allow the assembly and subsequently restores its initial position which is the final position in the chain.

[0020] The assembly of the link chain will be carried out placing a second link in perpendicular with respect to a first link so that the hook (4) is placed under pressure around the cylindrical axis (3) allowing an articulated join. Then the second link is rotated about a quarter until the bottom of the second link is left to the height of the bottom of the first link.

[0021] The lateral walls (8) have a front limit surface (10) which is located at the upper front part of the link (1) where the second flange is located (6). They also have a rear limit surface (11) which is located in the upper back part of the link where it is the first flange (2). When the chain is mounted, when turning the second link with respect to the first link to leave both links to the same height, the front limit surface (10) of the second link comes into contact with the rear limit surface (11) of the first link in such a way that the front top part of the second link is separated. In this way the rear part of the first link is introduced into the inside of the front part of the second link. Hence the limit surfaces (10, 11) open elastically the lateral walls of the link at the top.

[0022] Once mounted the chain, the first flange (2) and the second flange (6) limit the rotation of the chain in such a way that they allow this rotation only in a direction since in attempting to rotate the chain in the contrary direction the first flange (2) and the second flange (6) come into contact. The inclined vertical surfaces (7) together with the vertical step (5) limit the angle of rotation of the chain in the direction in which the rotation is allowed. The limit surfaces (10, 11) allow assembly of the chain since the limit surfaces of two links adjacent to each other come into contact separating the front top part of one of the links so as the rear top part of the other one is left inside.

Claims

1. Link chain for retractable screens which allows the rotation only in a direction, and in this direction the rotation is limited at an angle determined, link chain being formed by links joined in an articulated way each other and **characterized in that** each link (1) comprises two lateral walls (8) attached by a perpendicular surface (9) to them which has a hook (4) in its front end with an opening (12) and there is a cylindrical axis (3) attached to its rear end, placed in parallel with the perpendicular surface (9) in such a way that in the chain the hook (4) of a second link is around the cylindrical axis (3) of a first link, and the rotation of the chain is limited by the contact with a vertical step (5) which is in the inner part of the lateral

walls (8) of a link and a inclined vertical side (7) of the side walls (8) of an adjacent link and by the contact of a first flange (2) located on the rear top of the side walls (8) with a second flange (6) located in the front top of the side walls (8).

2. Link chain according to the claim 1 wherein the vertical step (5) of the links is on the inside of the side walls (8) such that the back area of the links (1), which is the area in which it is the cylindrical axis (3), is narrower than the front area, which is the area which is the hook (4) such that in the position of the links in the chain, the back area of a first link is inside of the front area of a second link, and the vertical step (5) has a curve shape to ensure that the rotation of a link in relation to its adjacent rotation occurs only in one direction.

3. Link chain according to the claim 1 wherein each link has a front limit surface (10) which is located in the upper front of the link (1) where the second flanges (6) is located, and has a rear limit surface (11) which is located on the upper back of the link where it is the first flange (2) being both limit surfaces flexible such that when they come into contact to join a link (1) to its adjacent link, they detach the front top of a second link, and the rear top of a first link is inserted into the front of the above-mentioned second link.

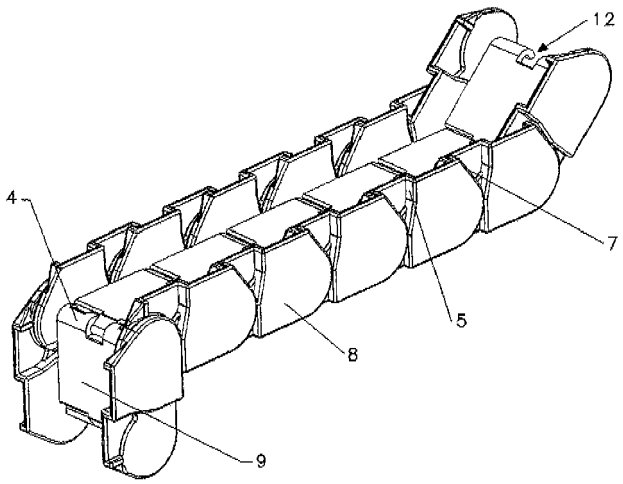

FIG. 1

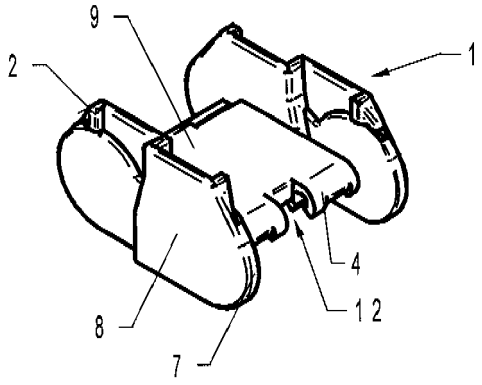

FIG. 2

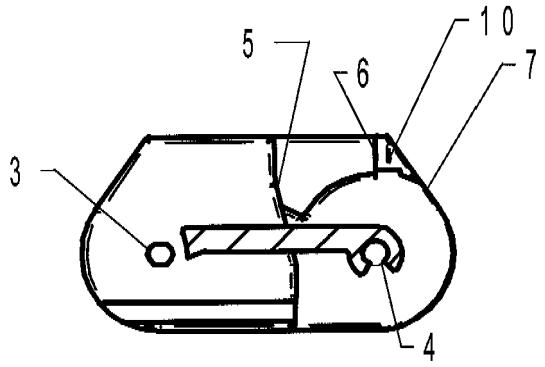

FIG. 3

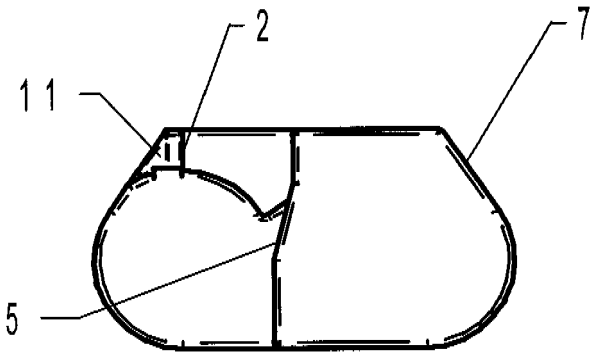

FIG. 4

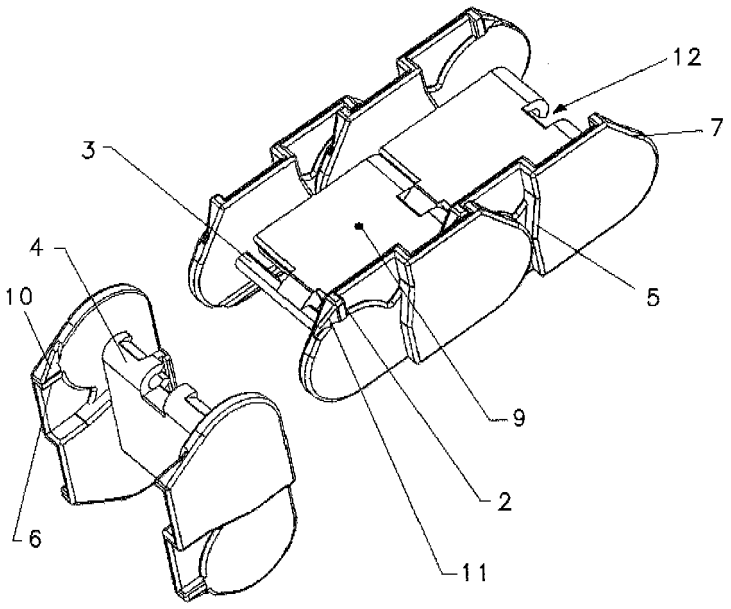

FIG. 5

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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