

Sun shade device

The invention relates to a sun shade device pursuant to the preamble of Claim 1.

A sun shade device of this sort is known from EP 2 607 602 A1. The sun shade device comprises a sun blocking curtain that can be wound up on a shaft. The sun blocking curtain consists of an arrangement of slats interconnected sequentially by means of joints in the winding direction, each slat being composed of a plurality of slat segments and having an inherently rigid design so that each retains its form when wound up on the shaft. The same applies accordingly to the unwinding of the sun blocking curtain from the shaft.

The individual slat segments are connected to one another by means of insertion so that the optical appearance from the exterior is highly homogeneous, i.e. the connections between the individual slat segments are not visible.

The sun blocking curtain is structured so that only the joint connections between the individual slats are mobile, which ensures that the sun blocking curtain exhibits the necessary form adjustment during the winding or unwinding process on the shaft. Conversely, the individual slats have an inherently rigid design and are therefore stable in their form, i.e. they do not bend during a winding or unwinding process. This stability of form means that the slats have a high degree of inherent stability.

To create a joint connection between two slats of such a sun blocking device, a first slat typically has a first joint element which is inserted into a complementary joint element of a second slat. The individual slat is designed in such a way that the curtain can be rolled up in the front and in the back.

After insertion of the joint elements, they must be positionally secured against further horizontal movements. In known sun shade devices, this positional se-

curing is performed by locking parts being laterally pressed or driven into the cavities on the longitudinal sides of the slats. This type of positional securing is relatively simple to implement and is customary practice.

Provision of such locking parts is problematic, however, when slats without cavities are used.

The invention is based on the task of providing a locking system for a sun shade device of the type mentioned initially, said locking system offering a high degree of added functionality combined with low design effort.

The features of Claim 1 are provided in order to solve this problem. Advantageous embodiments and practical further developments of the invention are described in the subclaims.

The sun shade device according to the invention comprises a sun blocking curtain that can be wound up on a shaft. The sun blocking curtain consists of an arrangement of slats which are interconnected sequentially in the winding direction by means of joints and each of which has a plurality of slat segments. Adjacent slats are positionally secured against lateral movements by means of locking parts which latch into recesses in the slats, said recesses being located on the top or bottom side of the slats.

A fundamental advantage of the invention is that the individual slats can be positionally secured very easily and quickly by latching the locking parts into the recesses of the slats. The sun blocking curtain can therefore be assembled and/or installed rapidly and easily. It is especially advantageous that the recesses are located on the top and bottom sides of the slats, because this enables especially easy and convenient latching of the locking parts into these recesses, in that these locking parts are latched into the slats from above or below.

Advantageously, locking parts are provided on both the longitudinal edges of the slats.

This completely protects the slats against reciprocal lateral displacement.

In contrast to the slats, which are made of metallic materials like aluminum or stainless steel, the locking parts used for this purpose are made of plastic.

The locking parts preferably each consist of a single plastic injection-molded part, which is cheap to manufacture. It is especially advantageous that all the locking parts of the sun shade device are identical in design, thus allowing these locking parts to be produced in a highly efficient manner since no differing variants are required.

A special advantage of the invention is that the locking parts serve not only to positionally secure in each case two slats connected by means of joints; instead, they also perform a protective function for the entire sun blocking curtain. This protective function is provided by the fact that the locking parts, which are made of relatively soft and therefore flexible material, protect the metallic slats from coming into contact with other metal bodies, thereby protecting the slats from damage.

It is especially advantageous that the segments of the locking parts project laterally beyond the longitudinal edges of the slats and thereby form contact surfaces.

This is a simple design measure that prevents the slats, during winding or unwinding on the shaft, from coming into contact laterally with a rail or other guide, which could result in damage to the slats. Instead, only the segments of the locking parts that project laterally beyond the slats come into contact with the rail, thereby protecting the slats from impacting the rails.

As a further advantage, segments of the locking parts project above the top or bottom sides of the slats, thereby forming elements that exert a protective function during winding or unwinding of the slats.

The segments that project upwards and/or above the slats prevent the slats from coming into close contact with one another during winding or unwinding, thereby preventing the slats from being damaged.

It is especially advantageous that all the locking parts are of identical design, so that only one type of locking part is needed for the entire sun shade device. On one hand, this enables efficient production of the locking parts, while additionally simplifying assembly of the sun shade device, since there is no need to install different locking parts in certain, different installation positions.

According to an especially advantageous design, each locking part has a headpiece arranged in the area of a joint connection between two slats and serving to positionally secure two adjacent slats.

In this regard, each locking part has a rib element adjoining the headpiece, said rib element being positioned in the recesses of only one slat, with the headpiece of the locking part being wider than the rib element.

The rib element inserted into the recesses of a slat ensures stable positioning of the locking part within the slat and allows correct positioning of the headpiece of the locking part between two slats, so that the headpiece can perform its function of positionally securing the slats against lateral movements.

In general, the recesses form linear arrangements in the winding or unwinding direction of the sun blocking curtain, so that the longitudinal axes of the rib elements of the locking parts, which are inserted into these recesses, also extend in this direction.

When the headpiece of a locking part is positioned with some play between two slats, the locking part, and in particular, the rib element, can move slightly in the longitudinal direction.

To avoid such undesired movement of the locking part, the locking element advantageously possesses a crosspiece whose longitudinal axis extends perpendicular to the longitudinal axis of the rib element.

In this configuration, the crosspiece projects beyond the rib element on both sides, and the contour of the crosspiece is adapted to the slat segments of the slats.

The crosspiece thus serves to secure the entire locking part against undesired movement within the respective slat, since it is positively connected with the structure of the slat segments.

Alternatively, knobs protrude on opposite lateral walls of the rib element of a locking element.

These knobs form a non-positive connection with the bordering edges of the recesses within a slat, and thereby also serve to positionally secure the locking part within the slat.

In general, for the purpose of positionally securing it within a slat, a locking part can be equipped with both a crosspiece and with knobs.

It is especially advantageous for the recesses in the slats, which recesses are intended to accommodate locking parts, to be created by means of milling or by being punched.

In this way, the recesses in the slats can be produced efficiently and with a high degree of precision.

According to an especially advantageous design of the invention, the recesses are created in a single process together with cutting the slats to length.

If slats are cut to length from a long piece of base material then, simultaneously with the sawing process used to cut the slats, the recesses can be created adja-

cently on both sides by milling or punching along the cutting line between the slats. This results in further rationalization of the slat manufacturing process.

Below, the invention is explained in reference to the drawings. The drawings indicate the following:

Figure 1: A schematic representation of an exemplary embodiment of the sun shade device according to the invention.

Figure 2: A section of the sun blocking curtain from the sun shade device according to Figure 1.

Figure 2a: An enlarged detail view of a slat segment from the arrangement according to Figure 2.

Figure 3: A top view of the slat edge areas of the sun blocking curtain according to Figures 1 and 2, with the locking parts inserted therein.

Figure 4a, b: A detail view of a locking part for the slats according to Figure 3, in two perspective views.

Figure 5: A top view according to Figure 2 of the edge areas of two slats, with recesses made therein.

Figure 6: A lateral view of an edge area of a slat.

Figure 1 shows the fundamental components of the sun shade device 1 according to the invention, which can be used, in particular, as a sun shade in windows of buildings and similar

The sun shade device 1 comprises a sun blocking curtain 2 capable of being wound and unwound on a shaft 3. Figure 1 shows the sun blocking curtain 2

unwound on the shaft 3. The sun blocking curtain 2 is oriented in a vertical plane and is positioned within the opening of a window, or similar.

The sun blocking curtain 2 is composed of an arrangement of multiple, individual slats 4. Figure 2 shows two slats 4 coupled to one another, which are oriented in the vertical plane of the sun blocking curtain 2 unwound on the shaft 3, as shown in Figure 1.

The slats 4 each have an inherently rigid design, i.e. their material strength is sufficiently great that they have a stable form and are not flexible.

The slats 4 are made of metallic materials such as aluminum or stainless steel.

In the present exemplary embodiment, the sun blocking curtain 2 consists of an arrangement of multiple slats 4 of identical design. Each slat 4 in turn consists of an arrangement of multiple slat segments 5 of identical design. Figure 2a shows a magnified detail view of such a slat segment 5.

Each slat segment 5 comprises a first sub-segment 6, which is arranged extending in a vertical plane (y-plane) in the arrangement according to Figure 2. Within this sub-segment 6, there is an arrangement of light slits 7 which essentially extend along the entire width of the slat 4. The individual light slits 7 can be separated by rib elements 15, which are components of the sub-segment 6.

Above the first sub-segment 6 with the light slit 7, there is a second sub-segment 8 which is designed to be completely opaque. As is evident from Figure 2a, in particular, the second sub-segment 8 consists of a section 8a that adjoins the upper edge of the first sub-segment 6 and extends in the x-direction, and said section 8a is adjoined by a terminal section 8b extending in the y-direction. In turn, this section 8b is adjoined by a section 8c extending in the x-direction. These three sections 8a-8c form a rectangular profile piece on the outer side of the slat 4, said profile piece facing towards the incoming light rays (denoted by S in Figure 2). From this rectangular profile piece a section

8d of the sub-segment 8 protrudes upwards at an angle to the lower edge of the first sub-segment 6 of the next slat segment 5.

This design of the slat segments 5 largely prevents rays of the sun from directly coming through the light slit 7. Instead, incident sunlight only comes through the light slit 7 in a narrow angular range after being reflected by the boundary faces of the slat segment 5, in particular of section 8d of the second sub-segment 8. In this way, the specific design of the structure of the slat segments 5 results in controlled incidence of light through the light slit 7.

As is evident from Figure 2, the individual slats 4 are arranged sequentially in the y-direction and are articulatedly interconnected by means of joints 9. In order to form the connecting joints 9, a first joint element 10 is provided on each lower edge of a slat 4, while a second joint element 11 that is complementary to the first joint element 10 is provided on the upper edge of the slat 4.

The joint elements 10, 11 are designed as a single piece with the respective slat 4 and preferably extend over the entire width of the slat 4, with the cross-sections of the joint elements 10, 11 remaining constant over the entire width.

The first joint element 10 has an essentially circular cross-section, and it encompasses a cavity that opens out at its lower side. Alternatively, the first joint element 10 can be designed in the shape of a hook.

The joint element 11, which is designed to be complementary to the first joint element 10, has at a free end a circular expansion of the cross-section.

To create the joint connection 9 the circular expansion of the cross-section of the second joint element 11 is inserted into the cavity of the first joint element 10. In this manner, the joint connection 9 is created so that the two slats 4 connected in this manner can be pivoted with respect to one another in the x-y plane.

When the joint elements 10, 11 of two adjacent slats 4 are inserted into one another, the slats 4 can still slide relative to one another in their longitudinal direction. To prevent this sliding movement and to positionally secure the slats 4, locking parts 12 are provided, as shown in Figure 3, which are inserted from the upper side of the sun blocking curtain 2 into corresponding recesses at the edge of the slats 4. Figures 4a and 4b show a detail view of one such locking part 12.

Figures 5 and 6 show the receptacles for the locking parts 12 which are provided in the form of recesses 13, 13a, 13b in an identical manner in the area of the two longitudinal sides of each slat 4.

The recesses 13, 13a, 13b are made in the individual slats 4 by means of milling or punching processes. The first recesses 13 are formed by the sub-segments 8 of the individual slat segments 5 of a slat 4 being completely removed so that these recesses extend to the plane of the sub-segments 6 in which the light slits 7 are provided. As is evident from Figure 6, in particular, the identically designed recesses 13 have a rectangular cross-section.

Furthermore, a recess 13a is provided at the upper edge of each slat 4 in the area of the joint element 11, in the form of a rectangular notch in a corner of the slat 4. A corresponding recess 13b is provided in the form of a notch in the opposite corner in the area of the joint element 10.

Figure 5 shows two slats 4 with longitudinal edges arranged opposite one another, wherein the longitudinal axes of these slats 4 extend along a straight line. This arrangement illustrates the process of producing the slats 4 by cutting them to the desired length, using a saw tool, from a long piece of bar-shaped base material. To separate the two slats 4 shown in Figure 5, the cut is made along a cutting line A. During this cutting or sawing process, the recesses 13 are simultaneously machined into the longitudinal edges of the slats 4 along the milling lines F_1 , F_2 .

To positionally secure the slats 4 against longitudinal movement, the identically designed locking parts are inserted from above into the recesses 13, 13a, 13b on the two longitudinal edges of the individual slats 4.

Figures 4a and 4b show a detail view of the locking part 12. The locking part 12 is made of plastic. This locking part 12 comprises a headpiece 14 and a rib element 15 adjoining the headpiece 14, said rib section being shaped essentially like a rectangular cuboid. The width of the headpiece 14 is greater than the width of the rib element 15 so that the headpiece 14 projects beyond the lateral walls 15a, 15b of the rib element 15. The bottom side of the headpiece 14 is beveled on the end that faces the rib element 15 (Figure 4a).

Moreover, the locking part 12 comprises a crosspiece 16 whose longitudinal axis extends perpendicular to the longitudinal axis of the rib element 15 and projects beyond the lateral walls 15a, 15b of the rib element 15. The contour of the crosspiece 16 is adapted to the contours of the slat segments 5 of the slats 4.

Finally the locking part 12 has knobs 17, which project from the lateral walls 15a, 15b of the rib element 15.

All aforementioned components of the locking part are components of a plastic injection-molded part. The locking part 12 designed in this manner has mirror symmetry with reference to a plane of symmetry that runs through the longitudinal axis of the locking part 12.

Figure 3 shows an arrangement of multiple articulatedly connected slats 4 of the sun shade device 1 which are secured by the locking parts 12 to prevent uncontrolled movements in their longitudinal direction.

The headpiece 14 of a locking part is therefore located in the area of the joint connection 9 of two slats 4. The headpiece 14 lies in the recess 13a of a first slat 4 and in the recess 13b of the adjacent slat 4. The rib element 15 of the locking part lies in the recesses 13, 13a, 13b within the slat segments 5 of each

slat 4 and therefore extends over virtually the entire width of a slat 4. The locking part 12 is placed onto the slat 4 from above, whereby the headpiece 14 and the rib element 15 are placed into the respective recesses 13, 13a, 13b. Movement of the locking part in its longitudinal direction is prevented by the crosspiece 16, which is latched with a positive fit in the area between two slat segments 5. Moreover, the knobs 17 on the rib element 15 of the locking part 12 prevent tolerance-related movements of the locking part in its longitudinal direction, as the knobs 17 rest with frictional engagement against the edges of the slat segments 5 which delimit the recesses 13, 13a, 13b. In principle, a locking part can also be equipped solely with knobs 17, or alternatively, solely with a crosspiece 16, in order to provide secure positioning at the recesses 13, 13a, 13b.

Each locking part 12 is dimensioned such that, when the locking part 12 is positioned within the recesses 13, 13a, 13b of the slats 4, the lateral edge of the headpiece 14 projects slightly beyond the lateral edges of the slats 4. In this manner the headpiece 14 fulfils its protective function by ensuring that the slats 4 do not impact against rails or other guides during winding and unwinding of the sun blocking curtain 2, whereby the slats 4 are protected against damage.

Furthermore the locking part, in particular, its headpiece 14, also projects slightly upwards above the slats 4. In this manner, the locking parts perform an additional protective function in that the slats 4 do not impact against one another during winding and unwinding of the sun blocking curtain 2, which could also lead to damage of the slats 4.

List of reference numbers

- (1) Sun shade device
- (2) Sun blocking curtain
- (3) Shaft
- (4) Slat
- (5) Slat segment
- (6) Sub-segment
- (7) Light slit
- (8) Sub-segment
- (8a) Section
- (8b) Section
- (8c) Section
- (8d) Section
- (9) Joint connection
- (10) Joint element
- (11) Joint element
- (12) Locking part
- (13) Recess
- (13a) Recess
- (13b) Recess
- (14) Headpiece
- (15) Rib element
- (15a) Lateral wall
- (15b) Lateral wall
- (16) Crosspiece
- (17) Knobs

Claims

1. Sun shade device (1) with a sun blocking curtain (2) capable of being wound and unwound on a shaft (3), and consisting of an arrangement of slats (4) interconnected sequentially in the winding or unwinding direction by means of joint connections (9), each slat being composed of a plurality of slat segments (5), characterized in that adjacent slats (4) are positionally secured against lateral movements by means of locking parts (12) which latch into recesses (13) located on the top or bottom sides of the slats (4).
2. Sun shade device according to Claim 1, characterized in that the slats (4) are made of metallic materials and that the locking parts (12) are made of plastic.
3. Sun shade device according to either of Claims 1 or 2, characterized in that locking parts (12) are provided on both longitudinal edges of the slats (4).
4. Sun shade device according to Claim 3, characterized in that segments of the locking parts (12) project laterally beyond the longitudinal edges of the slats (4) and thereby form contact surfaces.
5. Sun shade device according to either of Claims 3 or 4, characterized in that segments of the locking parts (12) project above the top or bottom sides of the slats (4) and thereby form protecting elements during winding or unwinding of the slats (4).
6. Sun shade device according to any of Claims 1 to 5, characterized in that all locking parts (12) are identical in design.
7. Sun shade device according to any of Claims 1 to 6, characterized in that each locking part (12) has a headpiece (14) which is arranged in the area of a joint connection (9) between two slats (4) and by means of which

two adjacent slats (4) are positionally secured, and further characterized in that each locking part (12) has a rib element (15) adjoining the headpiece (14), which rib element is located in recesses (13) of only one slat (4), wherein the headpiece (14) of the locking part (12) has a greater width than the rib element (15).

8. Sun shade device according to Claim 7, characterized in that the locking part (12) has a crosspiece (16) whose longitudinal axis extends perpendicular to the longitudinal axis of the rib element (15), wherein the crosspiece (16) projects beyond the rib element (15) on both sides.
9. Sun shade device according to Claim 8, characterized in that the contour of the crosspiece (16) is adapted to the slat segments (5) of the slats (4).
10. Sun shade device according to Claims 7 to 9, characterized in that knobs (17) protrude on opposite lateral walls (15a, 15b) of the rib element (15) of a locking part (12).
11. Sun shade device according to any of Claims 1 to 10, characterized in that the recesses (13) in the slats (4) intended to accommodate locking parts (12) are made by milling or punching.
12. Sun shade device according to any of Claims 1 to 11, characterized in that the recesses (13) are created in one step along with the cutting-to-length of slats (4).
13. Sun shade device according to any of Claims 1 to 12, characterized in that the recesses (13) form linear arrangements in the winding and/or unwinding direction of the sun blocking curtain (2).
14. Sun shade device according to Claim 1, characterized in that the slat segments (5) of a slat (4) are designed to be inherently rigid so that they retain their shape during winding or unwinding on the shaft (3).

15. Sun shade device according to Claim 17, characterized in that all the slats (4) are of identical design and/or that each slat (4) has a plurality of identical slat segments (5).