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(54) **SCREENING ARRANGEMENT COMPRISING A LIGHT-PROOFING ELEMENT**

(57) In a screening arrangement (10) for a roof window (1), a top casing (11) is configured to extend longitudinally substantially in parallel with a top member (2) of a frame structure. A screening body (12) has a screening position in which the screening body (12) substantially covers a window opening (6) of the roof window (1). A roller assembly (20) is accommodated in the top casing (11) and comprises a roller bar (21) and a guide bar (22). A first outer tangent line (T1) is defined to extend between the roller bar (21) and the guide bar (22) and substantially intersecting a periphery of the roller bar (21) and a periphery of the guide bar (22), the first outer tangent line (T1) extending on a side of the roller assembly (20) closer to a top of the top casing (11). The screening arrangement (10) further comprises a lightproofing element (30) extending within the top casing (11) and at least contacting the first outer tangent line (T1) so as to prevent reflection of light along the first outer tangent line (T1).

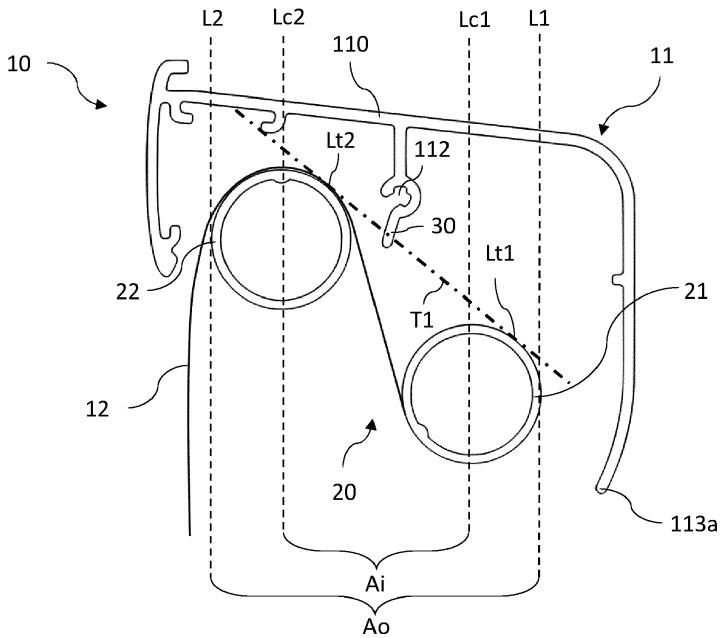


Fig. 9

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## Description

### Technical Field

**[0001]** The present invention relates to a screening arrangement for a roof window, the roof window having a window opening defined in a frame structure comprising a top member, a bottom member and two mutually parallel side members, the screening arrangement comprising: a top casing configured to extend longitudinally substantially in parallel with the top member of the frame structure and having a top portion, a back portion, and a front portion, a screening body having two side edges and a predefined length between a first end portion and a second end portion, said screening body being movable in a height direction between a non-screening position and a screening position in which the screening body substantially covers the window opening, a roller assembly accommodated in the top casing, the roller assembly comprising a roller bar and a guide bar, of which at least the roller bar is rotatable, the first end portion of the screening body being connected to the roller bar such that the screening body is wound on the roller bar in the non-screening position, the guide bar being configured for guiding the screening body when moving from the non-screening position towards the screening position, a first outer tangent line being defined to extend between the roller bar and the guide bar and substantially intersecting a periphery of the roller bar and a periphery of the guide bar, the first outer tangent line extending on a side of the roller assembly closer to the top portion of the top casing.

### Background Art

**[0002]** Screening arrangements positioned in front of a window to cover the window opening in the screening position such that incoming light is dimmed or blocked are common. Usually such a screening arrangement comprises a screen in the form of a blind or shade, such as a roller blind or a pleated blind. An interior screening arrangement comprising a roller blind is typically comprised of a flexible screen of fabric, arranged on a roller shaft within the top casing. The fabric used can be of varying quality depending on the purpose. For instance, the fabric may be a light fabric, which allows a generous amount of light into the room, or the fabric can be a thick fabric with heat-protecting properties and/or a light impermeable coating to darken the room of the building in which the roof window is installed.

**[0003]** In interior screening arrangements comprising a blackout roller blind, great effort is put into ensuring that as much light as possible from the exterior is blocked from entering the room. Prior art examples of such screening arrangements are found in Applicant's WO 2008/131757 A1 and WO 2008/131761 A1. Measures applied to improve the darkening properties include providing the roller assembly in the top casing with two separate bars, namely a roller bar on which the screening body is wound up in the non-screening position and a guide bar to guide the screening body in a well-defined plane close to the exit from the top casing when moving from the non-screening position towards the screening position. Despite these efforts, there is still room for improvement since reflected light may nevertheless pass between the top casing and the guide bar and enter the interior room.

### Summary of Invention

**[0004]** With this background, it is therefore an object of the invention to provide a screening arrangement for a roof window, in which the light-proofing properties are improved. In particular, it is an object of the invention to provide a roof window screening arrangement to accommodate the less favourable conditions for light-proofing prevalent in screening arrangements of roof windows built into an inclined roof surface as compared to screening arrangements installed in façade windows.

**[0005]** This and further objects are met by a screening arrangement of the kind mentioned in the introduction, which is furthermore characterised in that the screening arrangement further comprises a light-proofing element extending within the top casing and at least contacting the first outer tangent line so as to prevent reflection of light along or above the first outer tangent line.

**[0006]** Consequently, an improved screening arrangement is achieved. The light-proofing element acts to obstruct any incoming light directed at the top casing from passing through the top casing with as many reflection surfaces, or contact surfaces, as possible. Thus, the light-proofing properties of the top casing are improved. Having the light-proofing element extend within the top casing and either pass or at least contact the first outer tangent line ensures that no direct path for light to pass through the top casing is available when the screening body is in the screening position. Thereby, the source of light that could otherwise enter the interior room via the slit or gap between the top casing and the screening body has been blocked at its origin. It is noted that the term "light-proofing element" should be conceived as encompassing any elements providing light-darkening or light-reducing properties.

**[0007]** In one presently preferred embodiment, the light-proofing element is connected to, or connectable to, the top casing. This provides for an easily mountable and mechanically reliable solution, since the position of the light-proofing element is well-defined.

**[0008]** In an embodiment in which the casing comprises a track, the light-proofing element extends from the track towards the first outer tangent line. This embodiment requires only a minimum of adaptation of the top casing. In a further development of this embodiment, in which end covers for covering opposing longitudinal ends of the top casing are provided, the track may still be utilized for connection of such end covers.

**[0009]** In a further development of the presently preferred embodiment, the light-proofing element is integrally connected to the top casing. This provides advantages during manufacture, since the light-proofing element is able to be formed at the same time as the top casing, which is particularly advantageous when the top casing is manufactured as an extruded profile.

**[0010]** In principle, the light-proofing element could have any geometrical shape and extension. In a presently preferred embodiment, the light-proofing element extends from the top casing and has such a geometrical extension in a height direction perpendicular to a length direction parallel to a length direction of the top casing that it at least contacts or passes the first outer tangent line. In an advantageous further development of this embodiment, the light-proofing element does not contact the screening body in any screening position. In this way, an efficient path barrier has been provided in that a tortuous path for light is formed within the top casing.

**[0011]** To ensure optimum freedom of choice, the light-proofing element may be provided as a flexible or rigid element. The properties of the light-proofing element may for instance be chosen in accordance with the configuration of the light-proofing element within the top casing and whether this connection is integral, or the light-proofing element is provided as a separate element which is connectable to the top casing. A flexible element is thus able to flex, or yield, for instance to follow the movement of the screening body. The flexibility is obtained by a combination of choice of material and dimensions. A rigid element substantially maintains its geometrical configuration throughout.

**[0012]** In another embodiment, the light-proofing element is movable between a first position and a second position. This makes it possible for the light-proofing element to assume its blocking position only in the screening position of the screening body, whereas it may assume a non-active position in which the light-proofing element does not touch the screening body. This may be advantageous from a wear perspective. In developments of this embodiment, the light-proofing element may be movably connected to the top casing and/or the light-proofing element may be biased towards the first position, which ensures reliable functionality.

**[0013]** In another embodiment, the light-proofing element is configured to contact the screening body when the screening body is in the screening position. While this embodiment may provide for improved light-blocking, it has the disadvantage that there is a risk of damaging the screening body.

**[0014]** The light-proofing element itself may be configured to absorb incident light on the light-proofing element, preferably by providing the light-proofing element with a dark colour, such as black. By this embodiment, the overall light-proofing properties are improved.

**[0015]** In another embodiment, the light-proofing element extends longitudinally in parallel with the longitudinal extension of the top casing, the light-proofing element preferably having a length at least corresponding to a width of the screening body between the side edges thereof. This ensures sufficient light-proofing over the entire extension of the screening body.

**[0016]** Additional components of the screening arrangement that improve the light-proofing properties even further may include a bottom profile extending substantially in parallel with the top casing and connected to the second end portion of the screening body, and side rails extending substantially in parallel with a respective side member of the frame structure and configured to guide side edges of the screening body and optionally the bottom profile.

**[0017]** While the guide bar is typically located such that the gap between the top casing and the screening body is minimized, the guide bar is located closer to the top portion and the front portion of the top casing than the roller bar, preferably such that the guide bar is located entirely above the roller bar, in an advantageous embodiment. This provides for optimum utilization of the space within the top casing.

**[0018]** The screening body is advantageously wound in mutually opposite directions on the guide bar and the roller bar, which serves to protect the surface of the screening body, which is visible from the interior room in the screening position, in the non-screening position, i. e. when the screening body is wound up on the roller bar. However, the invention is operative also for an oppositely wound screening body.

**[0019]** In embodiments comprising an end cover at opposing longitudinal ends of the top casing, it is preferred that the roller bar and the guide bar are formed as substantially cylindrical elements mounted on a roller shaft and a stub shaft, respectively, connected to the end cover. In addition to providing easy operability, this configuration also ensures that components within the top casing assume well-defined positions which allows the light-proofing element to perform its light-blocking function in a reliable manner.

**[0020]** Other presently preferred embodiments and further advantages will be apparent from the subsequent detailed description and drawings.

**[0021]** A feature described in relation to one of the aspect may also be incorporated in the other aspect, and the advantage of the feature is applicable to all aspects in which it is incorporated.

## Brief Description of Drawings

**[0022]** In the following description embodiments of the invention will be described with reference to the drawings, in which

Fig. 1 is a plan view of a screening arrangement in an embodiment of the invention, shown in a mounted condition in a window opening of a roof window;

Fig. 2 is a plan view of the screening arrangement of Fig. 1;

Fig. 3 is a cross-sectional view of details of a prior art screening arrangement;
Fig. 4 is an exploded, partial perspective view of details a prior art screening arrangement;
Fig. 5 is an exploded, partial perspective view of details of a prior art screening arrangement;
Fig. 6 is a perspective view of a detail of a prior art screening arrangement;
Fig. 7 is an exploded perspective view of the detail of Fig. 6;
Fig. 8 is a cross-sectional view of details of a screening arrangement including a light-proofing element in a top casing in an embodiment of the invention, in a non-screening position;
Fig. 9 is a view corresponding to Fig. 8, with the screening arrangement in a screening position;
Fig. 10 is a cross-sectional view of details of a screening arrangement including a light-proofing element in another embodiment of the invention;
Fig. 11 is a cross-sectional view of details of a screening arrangement including a light-proofing element in a further embodiment of the invention;
Fig. 12 is a cross-sectional view of details of a screening arrangement including a light-proofing element in a still further embodiment of the invention;
Fig. 13 is a cross-sectional view of details of a screening arrangement including a light-proofing element in yet another embodiment of the invention;
Fig. 14 is a cross-sectional view of details of a screening arrangement including a light-proofing element in a still yet another embodiment of the invention;
Figs 15 and 16 are cross-sectional views of details of a screening arrangement including the light-proofing element of the embodiment of Figs 8 and 9, in further alternative embodiments with different configurations of components within the top casing of the screening arrangement; and
Figs 17 and 18 are cross-sectional views of details of a screening arrangement including a light-proofing element and components within the top casing of the screening arrangement in yet further alternative embodiments.

## Description of Embodiments

**[0023]** In the following detailed description, preferred embodiments of the present invention will be described. However, it is to be understood that features of the different embodiments are exchangeable between the embodiments and may be combined in different ways, unless anything else is specifically indicated. It may also be noted that, for the sake of clarity, the dimensions of certain components illustrated in the drawings may differ from the corresponding dimensions in real-life implementations.

**[0024]** It is noted that terms such as "up", "down", "left-hand", "right-hand", "exterior", "interior", "outer", "inner" are relative and refers to the viewpoint in question.

**[0025]** Referring initially to Figs 1 and 2, a roof window screening arrangement generally designated 10 is shown in a mounted condition in a window opening 6 of a roof window 1. In a manner known per se, the roof window 1 comprises one or more frame structures, typically one stationary frame (not shown) extending in parallel to the roof surface in the mounted condition of the roof window 1 and a sash carrying a glazing element such as a transparent pane. The sash may be openable or fixed.

**[0026]** The screening arrangement 10 is configured to be mounted on the interior side of a pane 7 of a sash constituting the frame structure of the roof window 1 and defining the window opening 6. The frame structure comprises a top member 2, a bottom member 5 and two mutually parallel side members 3, 4. The screening arrangement 10 comprises a top casing 11 configured to extend longitudinally substantially in parallel with the top member 2 of the frame structure. In Figs 1 and 2, the screening arrangement 10 is shown in its non-screening position.

**[0027]** Referring now to Figs 3 to 7 showing a prior art screening arrangement and to Figs 8 to 18 showing embodiments of the invention, the screening arrangement 10 comprises a screening body 12 having two side edges and a predefined length between a first end portion and a second end portion. The screening body 12 is movable in a height direction between the non-screening position and a screening position in which the screening body 12 substantially covers the window opening 6. It is noted that the screening body 12 may be moved also to intermediate screening positions, covering the window opening 6 partially; however, within the context of the present invention "the screening position" referred to is the fully screened position. It is furthermore noted that elements of the prior art screening arrangement and elements of embodiments of the invention having the same or analogous function carry the same reference numerals. In the configuration shown, the height direction of the screening arrangement 10 as a whole is substantially perpendicular to a length direction of the top casing 11. It is noted that the drawings show the screening arrangement 10 and its components positioned vertically. However, since the screening arrangement 10 is configured to be mounted in a roof window, the position of the screening arrangement 10 in the mounted condition will typically be inclined or even horizontal. The height direction is related to the screening arrangement 10 and is thus in most fields of use located at an angle with the vertical.

**[0028]** In order to operate the screening arrangement 10, a bottom profile 15 is provided to extend substantially in parallel with the top casing 11 and is connected to the second end portion of the screening body 12. Two side rails 13, 14 are provided to extend substantially in parallel with a respective side member 3, 4 of the frame structure in the mounted condition of the screening arrangement 10, i.e. in parallel with the height direction of the screening arrangement 10. The side rails 13, 14 are configured to

guide side edges of the screening body 12 and optionally the bottom profile 15. To this end, the side edges of the screening body 12 is provided with a plurality of retention elements 16, cf. Figs 5 to 7, each comprising a first piece 16a and a second piece 16b clamped onto the material of the screening body 12. In this way, the side edges of the screening body 12 are safely guided in the respective side rail 13, 14. Typically, a cord system ensuring that the bottom profile 15 is kept parallel may be provided as well.

**[0029]** A roller assembly 20 is accommodated in the top casing 11. The roller assembly 20 comprises a roller bar 21 and a guide bar 22. The roller bar 21 is rotatable and the guide bar 22 may be rotatable or non-rotatable. The first end portion of the screening body 12 is connected to the roller bar 21 such that the screening body 12 is wound on the roller bar 21 in the non-screening position, while the guide bar 22 is configured for guiding the screening body 12 when moving from the non-screening position towards the screening position. In the embodiments shown, the roller bar 21 and the guide bar 22 are formed as substantially cylindrical elements mounted on a roller shaft 23 and a stub shaft 24, respectively, connected to an end cover 25. A counterpart end cover is provided at the opposite end of the top casing 11. The roller shaft 23 is typically provided with a biasing device such as a spring and may be present only in connection with the shown end cover 25, a stub shaft corresponding to stub shaft 24 being provided in place of the roller shaft 23 on the counterpart end cover at the opposite end. While the guide bar 22 in the embodiment shown is in fact rotatable, it could also be a non-rotatable, fixed element since its purpose merely is to re-direct the screening body 12 as will be described below.

**[0030]** In the embodiments shown, the top casing 11 comprises a top portion 110 and a front portion 114. The front portion 114 is provided as a rail-like element with a surface facing the interior corresponding in substance to the surface of the side rails 13, 14 and is provided with two mitred ends to cooperate with counterpart mitred ends of the respective side rails 13, 14 to render the screening arrangement 10 with a picture frame-like appearance. The top casing 11 and the side rails 13, 14 are typically made from extruded profiles of an appropriate material such as aluminium.

**[0031]** The top casing 11 may comprise further details as well, including a flange portion 111 facing the interior of the top casing 11 and extending essentially throughout the length of the top casing 11. The flange portion 111 is at its free end edge provided with a track 112 having a slightly smaller extension than the flange portion 111 such that the track 112 ends slightly retracted from the end of the top casing 11. The track 112 serves to receive a screw 26 for fastening an end cover 25 provided with a hole 27 to allow passage of the screw 26. In some of the embodiments of the invention, the track 112 also has a function in the light-proofing element 30 of the invention as will be described in further detail below. Further details of the top casing 11 include a back portion 113 adjacent the top portion 110. The back portion 113 is provided with a ridge 115. Finally, a groove 116 associated with the top portion 110 is present. All in all, the top casing 11 is formed as a cassette with a substantially C-shaped form created by a front, a top and a back wall.

**[0032]** Common to the prior art screening arrangement and the screening arrangements of the embodiments of the invention is that the guide bar 22 is positioned closer to the front portion 114 than the roller bar 21. In this way, the screening body 12 is guided in a well-defined plane close to the exit from the top casing 11, i.e. near the lower-most edge of the front portion 114 when moving from the non-screening position towards the screening position (and vice versa). Referring in particular to Figs 8 and 9, it is seen that the roller package formed by the roller bar 21 and the portion of the screening body 12 wound up on the roller bar 12 has a variable diameter depending on whether the screening body 12 is in its non-screening position shown in Fig. 8 or its screening position shown in Fig. 9, or in any intermediate screening position in which the screening body 12 covers a part of the window opening 6. In contrast, the guide bar 22 has only a single layer of screening body 12 extending over an arc length of the guide bar 22, the length of the arc depending on the winding of the screening body 12 and the positions of the roller bar 21 and the guide bar 22.

**[0033]** By definition, a first outer tangent line T1 extends between the roller bar 21 and the guide bar 22 and substantially intersects a periphery of the roller bar 21 and a periphery of the guide bar 22. While in principle, two such tangent lines may be defined between the roller bar 21 and the guide bar 22, namely an upper and a lower tangent line, it is only the upper tangent line, facing the top portion 110 of the top casing 11, that is of relevance to the present invention. Hence, the first outer tangent line T1 is defined as the upper tangent line which extends on a side of the roller assembly 20 closer to the top portion 110 of the top casing 11. In this way, the first outer tangent line T1 provides a divide between a top portion of the top casing 11, facing away from the window opening 6 in the mounted condition of the screening arrangement 10, and a bottom portion which faces the window opening 6 in the mounted condition. It is noted that while the first outer tangent line T1 is defined relative to the peripheries of the roller bar 21 and the guide bar 22, it is to be understood that the extension of the first outer tangent line T1 accommodates the thickness of a portion of the screening body 12 wound on the guide bar 22 and a portion, if any, of the screening body 12 wound on the roller bar 21 in the screening position. The thickness of the screening body 12 does not include any retention elements 16. The invention encompasses predefined lengths of the screening body 12 such that it is conceivable that a portion of the screening body 12 is still wound up on the roller bar 21 in the screening position, and in which the screening body 12 has been deployed to its end position and is completely unwound from the roller bar 21. For

completeness, a second outer tangent line T2 is defined as well, extending to intersect a periphery of the roller bar 21, including a portion of the screening body 12 in the wound arc length, and a periphery of the roller package formed by the roller bar 21 itself and the portion of the screening body 12 wound up on the roller bar 21 in the non-screening position.

**[0034]** As will be described in further detail with reference to the embodiments of the invention shown in Figs 8 to 18, the screening arrangement 10 further comprises means to provide light-proofing of the top casing 11 to block incident light rays from the exterior to the interior. Thus, a light-proofing element 30 extends within the top casing 11 and at least contacts the first outer tangent line T1 so as to prevent reflection of light along or above the first outer tangent line T1. This will be described in further detail below. The term "along or above" is meant to encompass such embodiments in which reflection of light within the top casing is hindered above a level coinciding with the first outer tangent line. In this regard, "above" is seen in a direction perpendicular to the first outer tangent line T1. The term "along" should thus be construed as a dividing line, below which the light-proofing element extends; while it may happen that reflected light could cross the line, such light will then either be reflected backwards in the top casing by the light-proofing element itself, or contact the screening body, which if not entirely absorbing the light, reflects only a very limited amount of light.

**[0035]** In the embodiment of Figs 8 and 9, the light-proofing element 30 is connected to the top casing 11 in that the light-proofing element 30 extends from the track 112 towards and passing the first outer tangent line T1. Here, the light-proofing element 30 is thus provided as a part which is integrally connected to the top casing 11 and forms a protruding flange running in parallel to the track 112 and to the flange 111 formed on the top portion 110. The light-proofing element 30 will typically be chosen to have a length at least corresponding to a width of the screening body 12 between the side edges thereof. The light-proofing element 30 does not interfere with the track 112 itself, which may still serve as the connection point for the end covers 25 positioned at opposing longitudinal ends of the top casing 11. In the screening position shown in Fig. 9, any incident light passing through the gap present between a bottom edge 113a of the back portion 113 and the roller bar 21 may be able to reflect on the inner sides of the back portion 113 and top portion 111, but only as far as the light-proofing element 30, since the first outer tangent line T1 is passed by the light-proofing element 30.

**[0036]** Referring specifically to the details indicated in Fig. 9, the following is noted:

The first outer tangent line T1 has a point of contact Lt1 with the roller bar 21 and a point of contact Lt2 with the guide bar 22. The light-proofing element 30 extends from a position above the first outer tangent line T1 and protrudes downwards, i.e. away from the top of the top casing 11, passing the first outer tangent line T1 in the line segment defined by the two points of contact Lt1 and Lt2. This position of the light-proofing element 30 is particularly advantageous in that a tortuous path is provided in an efficient way, for any incident light entering the top casing 11 via the gap between the bottom edge 113a of the back portion 113 and a back periphery line L1 of the roller bar 21. As mentioned in the above, incident light will be able to reflect on the inner sides at the back of the top casing 11, but will be absorbed by, or only reflected to a very limited extent on, the screening body 12 itself.

**[0037]** Even if not necessarily positioned such as it extends to or passes the first outer tangent line T1 within the line segment defined by the two points of contact Lt1 and Lt2, the light-proofing element 30 is preferably located within an outer area Ao as defined by the back periphery line L1 of the roller bar 21 and a front periphery line L2 of the guide bar 22.

**[0038]** By way of an alternative definition, the light-proofing element 30 may be said to be positioned between the roller bar 21 and the guide bar 22, either as described in the above for the outer area Ao as defined by periphery lines L1, L2, or within the more narrow inner area Ai as defined by centre lines Lc1 and Lc2 of the roller bar 21 and the guide bar 22, respectively.

**[0039]** Finally, it is noted that in the embodiment of Figs 9 and 10, the light-proofing element 30 has such a height that it passes the first outer tangent line T1, but does not touch the screening body 12 when the screening body 12 is in the screening position.

**[0040]** In the embodiment of Fig. 10, the light-proofing element 30 is connected to the top casing 11 in that the light-proofing element 30 extends directly from the top casing 11 at its top portion 110 towards and passing the first outer tangent line T1. The light-proofing element 30 is thus provided as a part which is integrally connected to the top casing 11 and forms a protruding flange in itself.

**[0041]** In embodiments, in which the light-proofing element 30 is formed integrally with the top casing 11, manufacture is conveniently carried out by extrusion, thus including the light-proofing element 30 as an integral part of the extruded profile.

**[0042]** The light-proofing element 30 may also be provided as a separate element, which is connectable to the top casing 11. One example of such a separate light-proofing element 30 is shown in the embodiment of Fig. 11. Here, the light-proofing element 30 is formed as an element which may be flexible or rigid and has an anchoring portion accommodated in the track 112.

**[0043]** Common to all of the embodiments of the invention is that the light-proofing element 30 has such a height, i.e. geometrical extension in a direction perpendicular to the length direction which is parallel to the length direction of the top casing 11, that it at least contacts or passes the first outer tangent line T1. The height may be chosen such that the light-proofing element 30 only just contacts the first outer tangent line T1 or passes the first outer tangent line T1, possibly to such an extent that it is configured to contact the screening body 12 when

the screening body 12 is in the screening position. This is shown in the embodiment of Fig. 12, but also in the embodiments of Figs 13 and 14. One further detail which is noticeable from the embodiment of Fig. 13 is that the light-proofing element 30 is positioned such that it contacts the screening body 12 on the guide bar 22 at a point substantially coinciding with the point of contact Lt2 of the first outer tangent line T1.

**[0044]** In the embodiment of Fig. 14, the light-proofing element 30 is movably connected to the top casing 11 such as to be movable between a first position and a second position. In Fig. 14, the light-proofing element 30 is shown in its second position, corresponding to the screening position of the screening arrangement 10. In the not-shown first position, corresponding to the non-screening position of the screening arrangement 10, the light-proofing element 30 has followed the screening body 12 in that the free end of the light-proofing element 30 has moved to the left, seen in the direction of the drawing, to follow the varying diameter of the roller package. In this regard, it is advantageous if the light-proofing element 30 is biased towards the first position.

**[0045]** The light-proofing element 30 may be configured to not only block but also to absorb incident light on the light-proofing element 30. One way of achieving absorption of light is by providing the light-proofing element 30 with a dark colour, such as black.

**[0046]** The light-proofing element 30 may be provided by any suitable material allowing sufficient blocking of the path of light. In case the light-proofing element 30 is formed as an integral part with the top casing 11, the material should be suitable to allow extrusion or co-extrusion. Typically, the material of the light-proofing element 30 is then the same as that of the top casing 11. In case of a separate element, a large degree of freedom in the choice of material is achievable. For instance, a durable, flexible and resilient plastic material may be used.

**[0047]** In all of the above embodiments, the guide bar 22 is located closer to the top portion 110 and the front portion 114 of the top casing 11 than the roller bar 21. In the concrete configuration, the guide bar 22 is located entirely above the roller bar 21. This allows for an optimum utilization of the available space in the top casing 11.

**[0048]** It is also conceivable, however, to place the roller bar 21 only slightly below the guide bar 22 or at substantially the same level as shown in the embodiments of Figs 15 and 16, respectively.

**[0049]** One further common denominator to the embodiments described in the above is that the screening body 12 is wound in mutually opposite directions on the guide bar 22 and the roller bar 21. In this way, it is ensured that the front side of the screening body 12 which faces the interior of the room is wound inwards relative to the roller bar 21 to protect the front side from exposure to sunlight in its wound-up position.

**[0050]** It is however also conceivable to allow a different configuration of the winding of the screening body 12, which is shown in the embodiments of Figs 17 and 18. The difference between these embodiments is the position of the roller bar 21 relative to the guide bar 22.

**[0051]** Specific embodiments of the invention have now been described. However, several alternatives are possible, as would be apparent for someone skilled in the art.

**[0052]** Such and other obvious modifications must be considered to be within the scope of the present invention, as it is defined by the appended claims.

**List of reference numerals**

**[0053]**

| | |
|---|---|
| 1 | roof window |
| 2 | top member of frame |
| 3 | side member of frame |
| 4 | side member of frame |
| 5 | bottom member of frame |
| 6 | window opening |
| 7 | pane |
| 10 | screening arrangement |
| 11 | top casing |
| | 110 top portion |
| | 111 flange portion |
| | 112 track |
| | 113 back portion |
| | 113a bottom edge of back portion |
| | 114 front portion |
| | 115 ridge |
| | 116 groove |
| 12 | screening body |
| 13 | side rail |
| 14 | side rail |
| 15 | bottom profile |
| 16 | retention element |
| | 16a first piece |
| | 16b second piece |
| 20 | roller assembly |
| 21 | roller bar |
| 22 | guide bar |
| 23 | roller shaft for roller bar 21 |
| 24 | stub shaft for guide bar 22 |
| 25 | end cover |
| 26 | screw |
| 27 | hole |
| 30 | light-proofing element |
| T1 | first outer tangent line |
| T2 | second outer tangent line |
| Lt1 | point of contact with roller bar |
| Lt2 | point of contact with guide bar |
| L1 | back periphery line of roller bar |
| L2 | front periphery line of guide bar |

Lc1 centre line of roller bar
Lc2 centre line of guide bar
Ao outer area between periphery lines
Ai inner area between centre lines

## Claims

**1.** A screening arrangement (10) for a roof window (1), the roof window (1) having a window opening (6) defined in a frame structure comprising a top member (2), a bottom member (5) and two mutually parallel side members (3, 4), the screening arrangement (10) comprising:

a top casing (11) configured to extend longitudinally substantially in parallel with the top member (2) of the frame structure and having a top portion (110), a back portion (113), and a front portion (114),
a screening body (12) having two side edges and a predefined length between a first end portion and a second end portion, said screening body (12) being movable in a height direction between a non-screening position and a screening position in which the screening body (12) substantially covers the window opening (6),
a roller assembly (20) accommodated in the top casing (11), the roller assembly (20) comprising a roller bar (21) and a guide bar (22), of which at least the roller bar (21) is rotatable, the first end portion of the screening body (12) being connected to the roller bar (21) such that the screening body (12) is wound on the roller bar (21) in the non-screening position, the guide bar (22) being configured for guiding the screening body (12) when moving from the non-screening position towards the screening position, a first outer tangent line (T1) being defined to extend between the roller bar (21) and the guide bar (22) and substantially intersecting a periphery of the roller bar (21) and a periphery of the guide bar (22), the first outer tangent line (T1) extending on a side of the roller assembly (20) closer to the top portion (110) of the top casing (11),
**characterised in that**
the screening arrangement (10) further comprises a light-proofing element (30) extending within the top casing (11) and at least contacting the first outer tangent line (T1) so as to prevent reflection of light along or above the first outer tangent line (T1).

**2.** A screening arrangement (10) according to claim 1, wherein the light-proofing element (30) is connected to, or connectable to, the top casing (11).

**3.** A screening arrangement (10) according to claim 1 or 2, wherein the top casing (11) comprises a track (112), and wherein the light-proofing element (30) extends from the track (112) towards the first outer tangent line (T1).

**4.** A screening arrangement (10) according to claim 3, wherein the screening arrangement (10) further comprises end covers (25) for covering opposing longitudinal ends of the top casing (11), and wherein the end covers (25) are connectable to the track (112) of the top casing (11).

**5.** A screening arrangement (10) according to any one of the preceding claims, wherein the light-proofing element (30) is integrally connected to the top casing (11).

**6.** A screening arrangement (10) according to any one of the preceding claims, wherein the light-proofing element (30) extends from the top casing (11) and has such a geometrical extension in a height direction perpendicular to a length direction parallel to a length direction of the top casing that it at least contacts or passes the first outer tangent line (T1), preferably such that it does not contact the screening body (12) in any screening position.

**7.** A screening arrangement (10) according to any of the preceding claims, wherein the light-proofing element (30) is a flexible element or a rigid element.

**8.** A screening arrangement (10) according to any of the preceding claims, wherein the light-proofing element (30) is movable between a first position and a second position, the light-proofing element (30) being preferably biased towards the first position.

**9.** A screening arrangement (10) according to claim 8, wherein the light-proofing element (30) is movably connected to the top casing (11).

**10.** A screening arrangement (10) according to any of the preceding claims, wherein the light-proofing element (30) is configured to contact the screening body (12) when the screening body (12) is in the screening position.

**11.** A screening arrangement (10) according to any of the preceding claims, wherein the light-proofing element (30) is configured to absorb incident light on the light-proofing element (30), preferably by providing the light-proofing element (30) with a dark colour, such as black.

**12.** A screening arrangement (10) according to any of the preceding claims, wherein the light-proofing element (30) extends longitudinally in parallel with the longitudinal extension of the top casing (11), the

light-proofing element (30) preferably having a length at least corresponding to a width of the screening body (12) between the side edges thereof.

**13.** A screening arrangement (10) according to any of the preceding claims, wherein the screening arrangement (10) further comprises:

a bottom profile (15) extending substantially in parallel with the top casing (11) and connected to the second end portion of the screening body (12), and
side rails (13, 14) configured to extend substantially in parallel with a respective side member (3, 4) of the frame structure of the roof window (1) and configured to guide side edges of the screening body (12) and optionally the bottom profile (15).

**14.** A screening arrangement (10) according to any of the preceding claims, wherein said guide bar (22) is located closer to the top portion (110) and the front portion (114) of the top casing (11) than the roller bar (21), preferably such that the guide bar (22) is located entirely above the roller bar (21), and wherein the screening body (12) is wound in mutually opposite directions on the guide bar (22) and the roller bar (21), the .

**15.** A screening arrangement (10) according to any one of claims 4 to 14, wherein the roller bar (21) and the guide bar (22) are formed as substantially cylindrical elements mounted on a roller shaft (23) and a stub shaft (24), respectively, connected to the end cover (25).

**16.** A screening arrangement (10) according to any one of the preceding claims, wherein the light-proofing element (30) extends from the top casing (11) between the roller bar (21) and the guide bar (22), the light-proofing element (30) being preferably positioned within an outer area (Ao) as defined by a back periphery line (L1) of the roller bar (21) and a front periphery line (L2) of the guide bar (22), preferably within an inner area (Ai) as defined by a centre line (Lc1) of the roller bar (21) and a centre line (Lc2) of the guide bar (22), the light-proofing element (30) more preferably extending from a position above the first outer tangent line (T1) and downwards until it touches or passes the first outer tangent line (T1) in the line segment defined by a point of contact (Lt1) with the roller bar (21) and a point of contact (Lt2) with the guide bar (22).

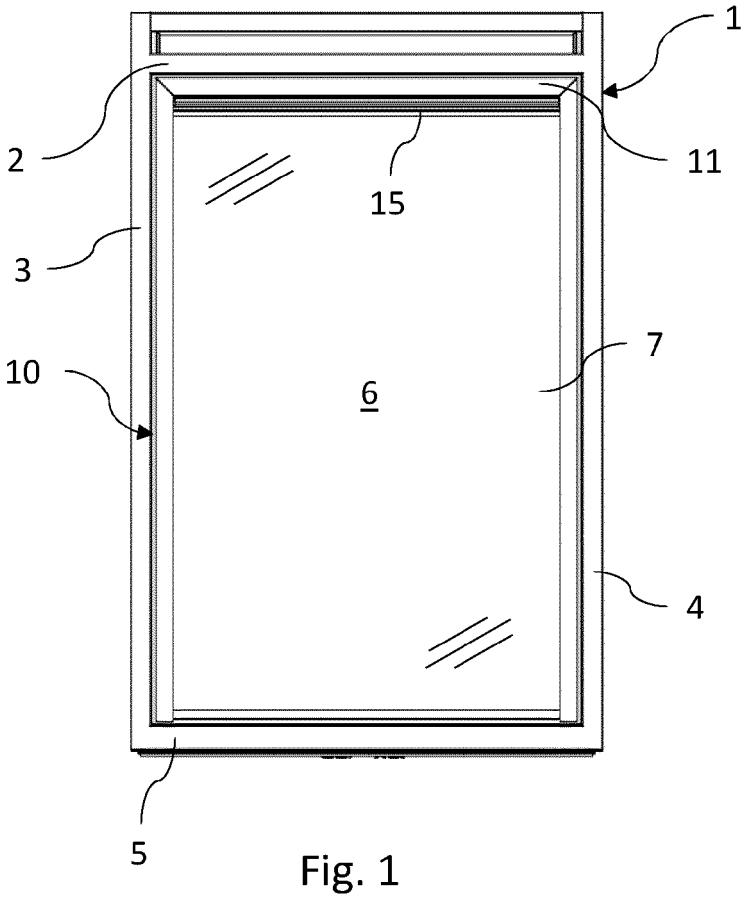


Fig. 1

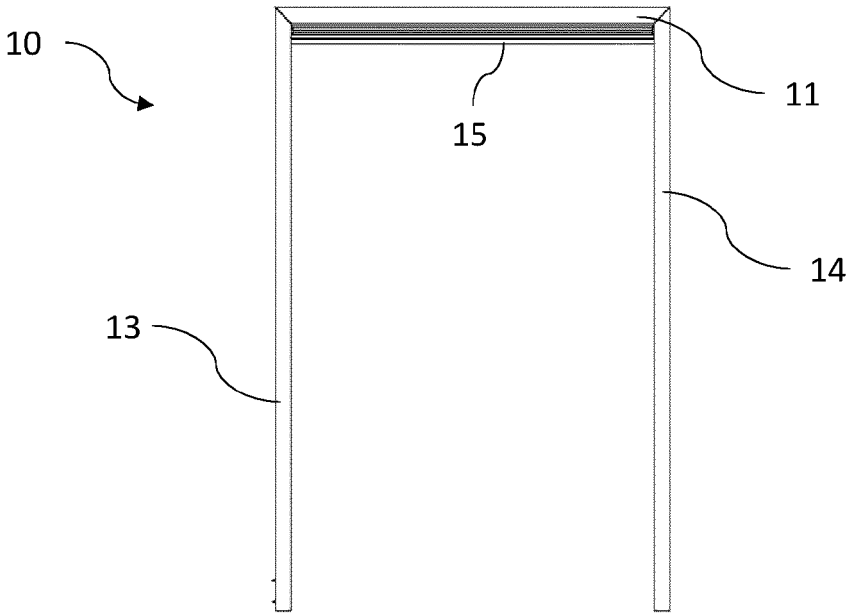


Fig. 2

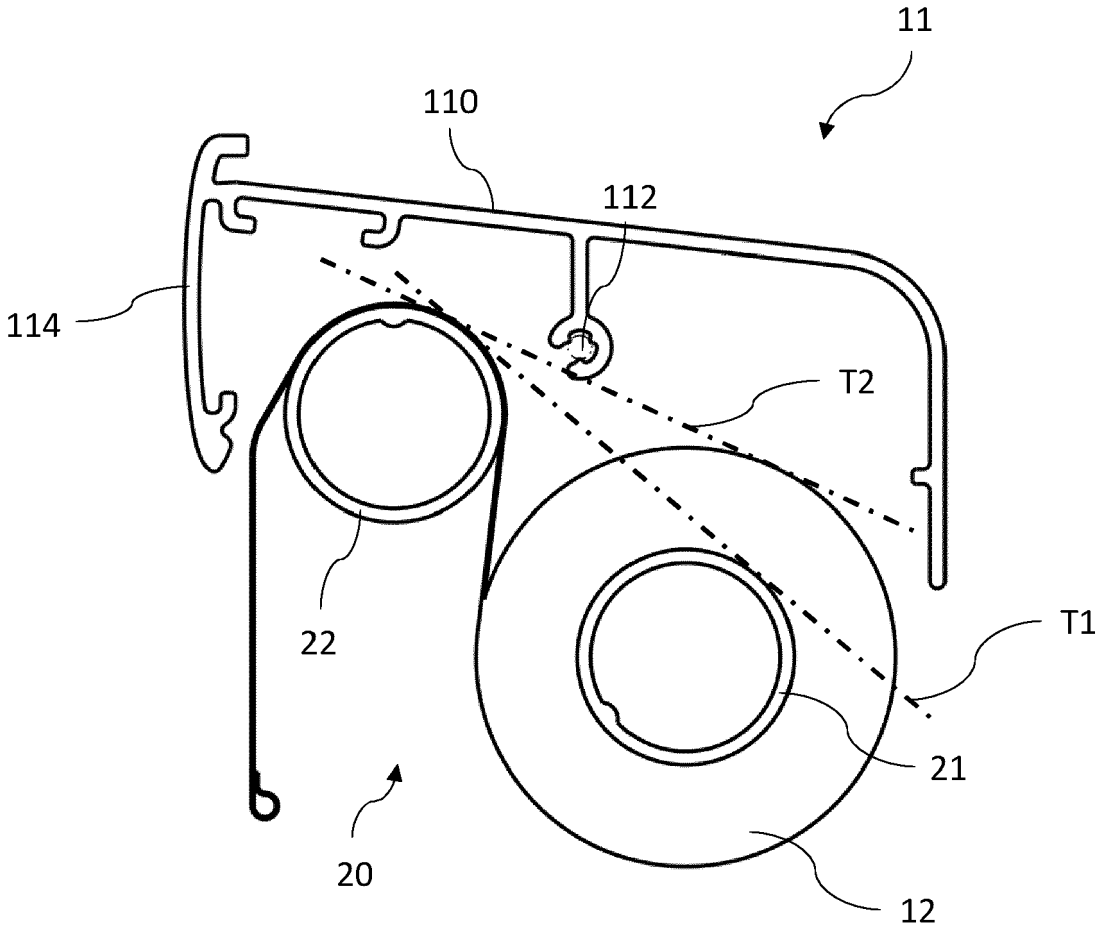


Fig. 3 (PRIOR ART)

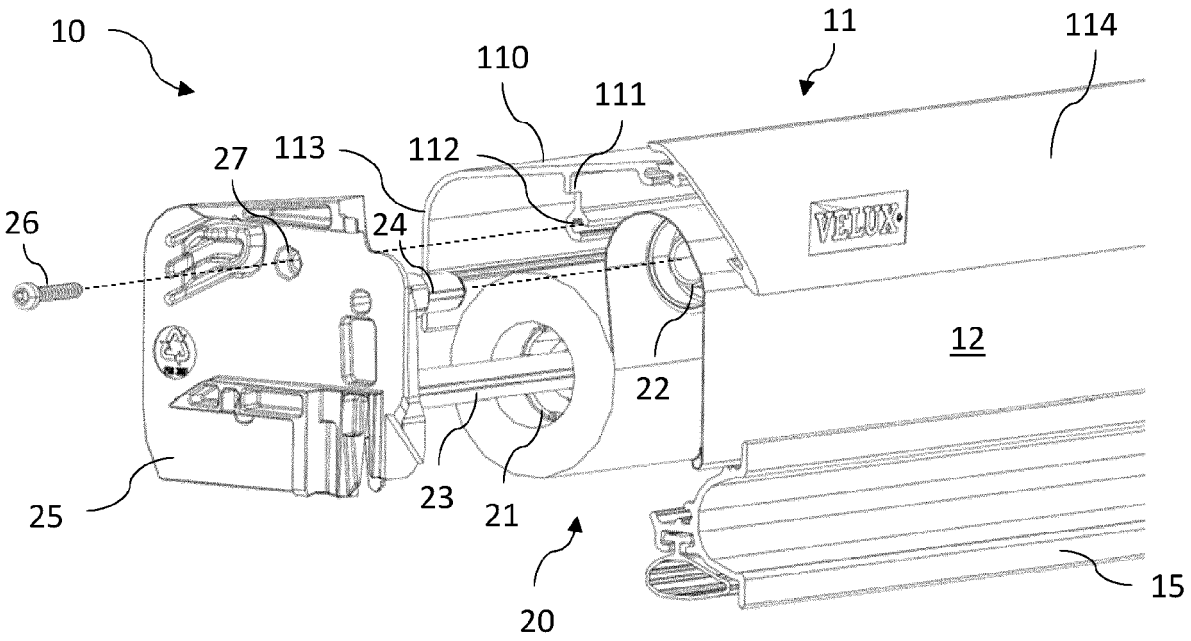


Fig. 4 (PRIOR ART)

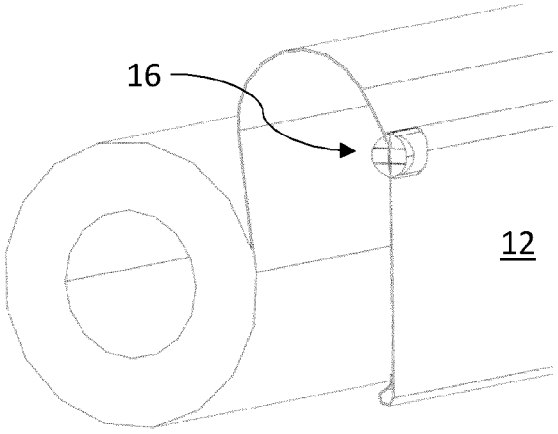


Fig. 5 (PRIOR ART)

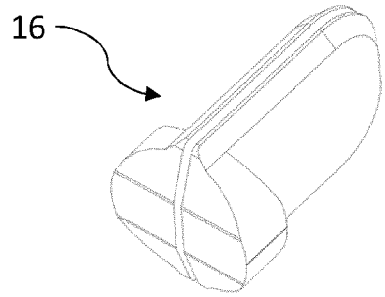


Fig. 6 (PRIOR ART)

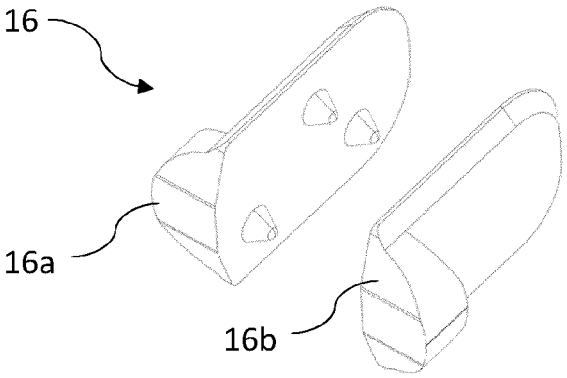


Fig. 7 (PRIOR ART)

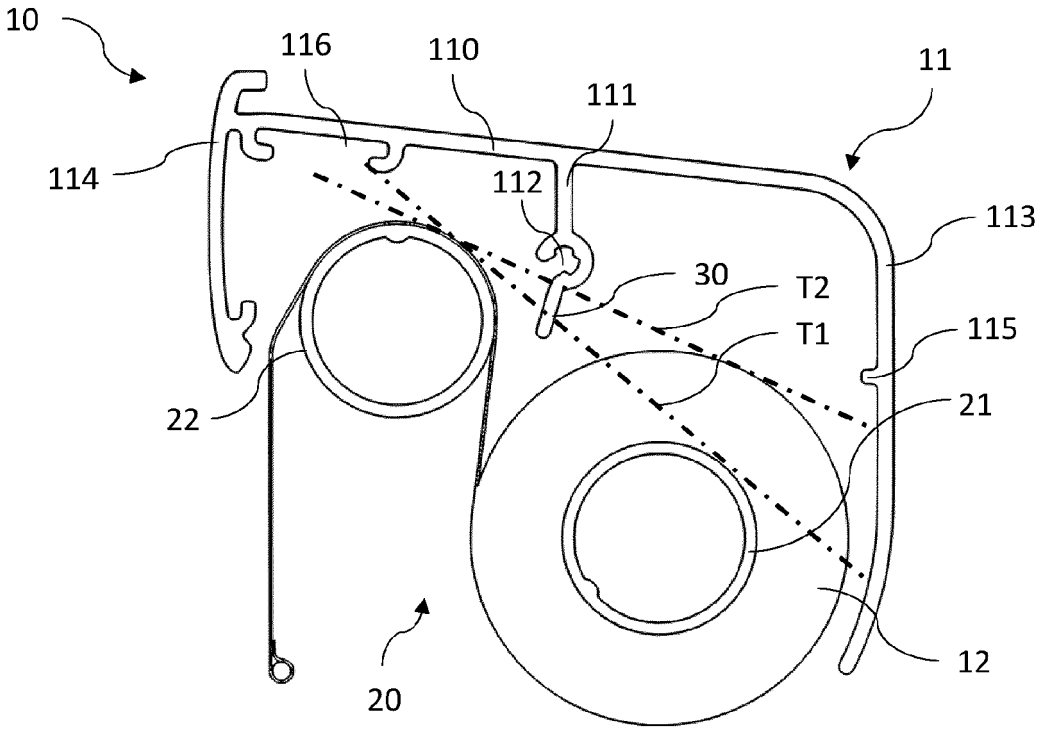
10
116
110
111
11
114
112
113
30
T2
T1
115
22
21
12
20

Fig. 8

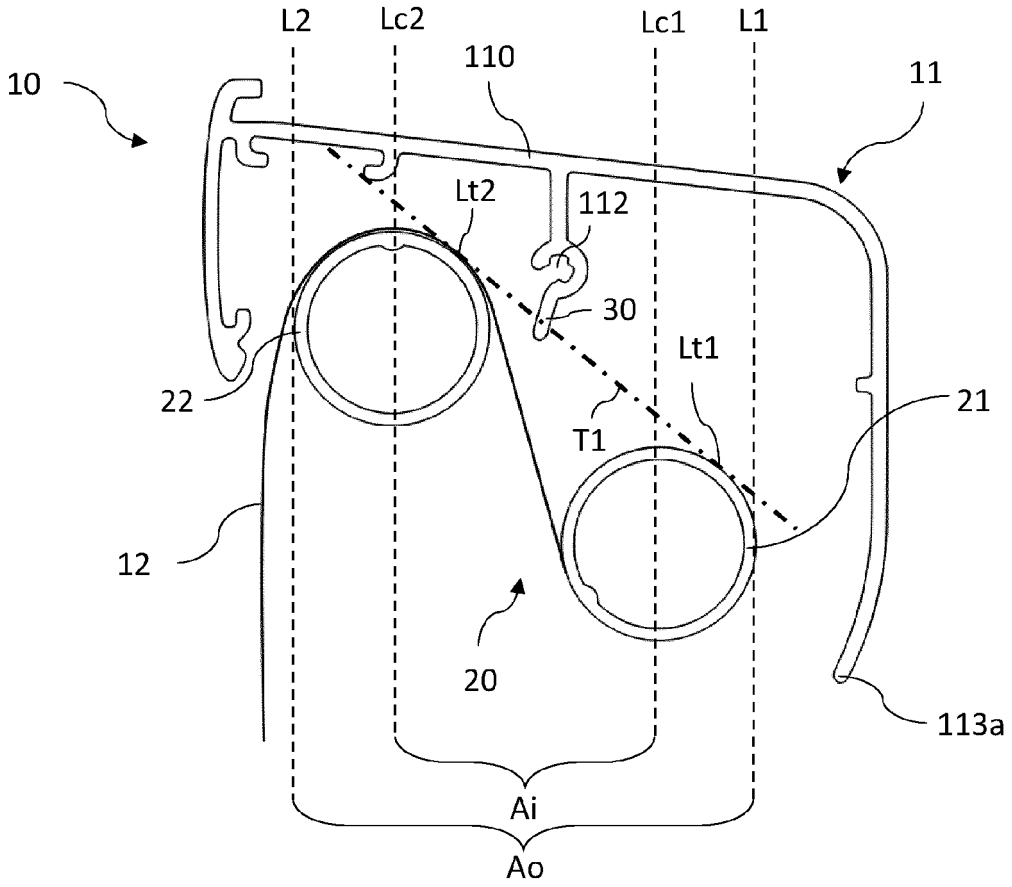
L2
Lc2
Lc1
L1
10
110
11
Lt2
112
30
Lt1
22
T1
21
12
20
113a
Ai
Ao

Fig. 9

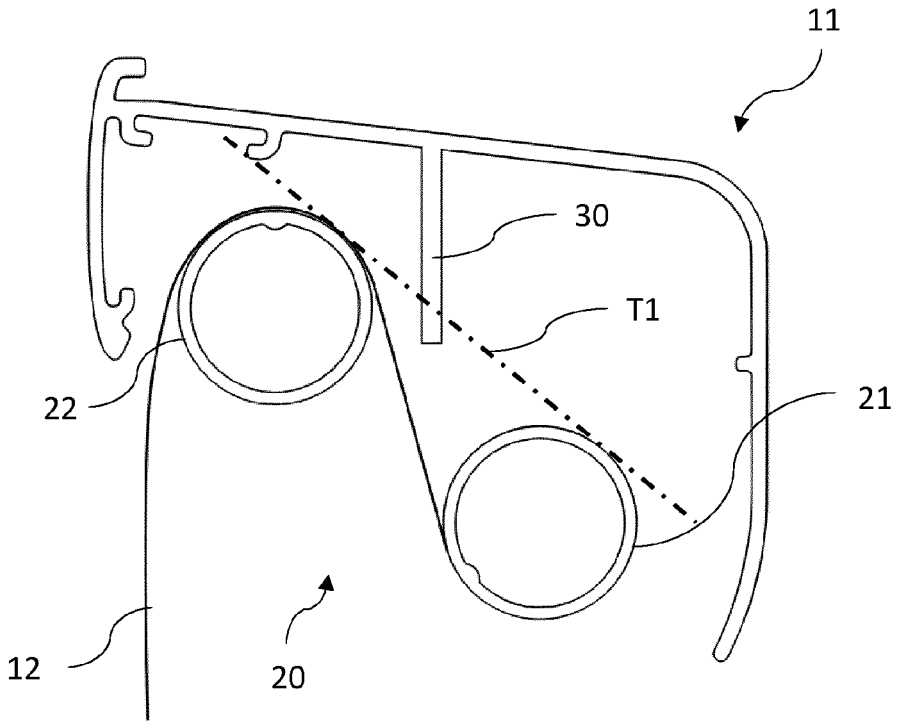


Fig. 10

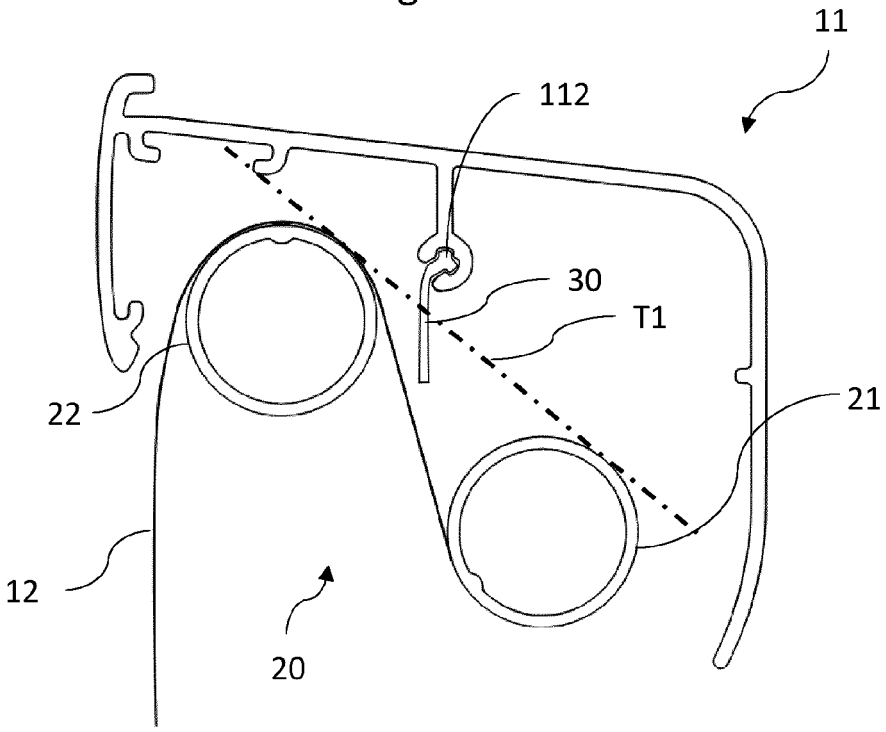


Fig. 11

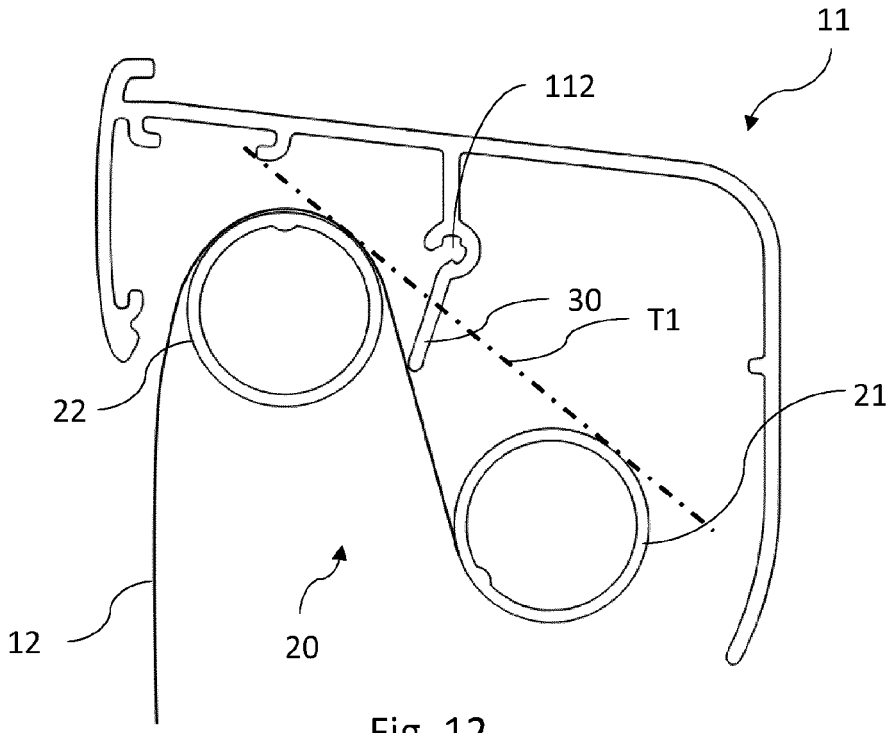


Fig. 12

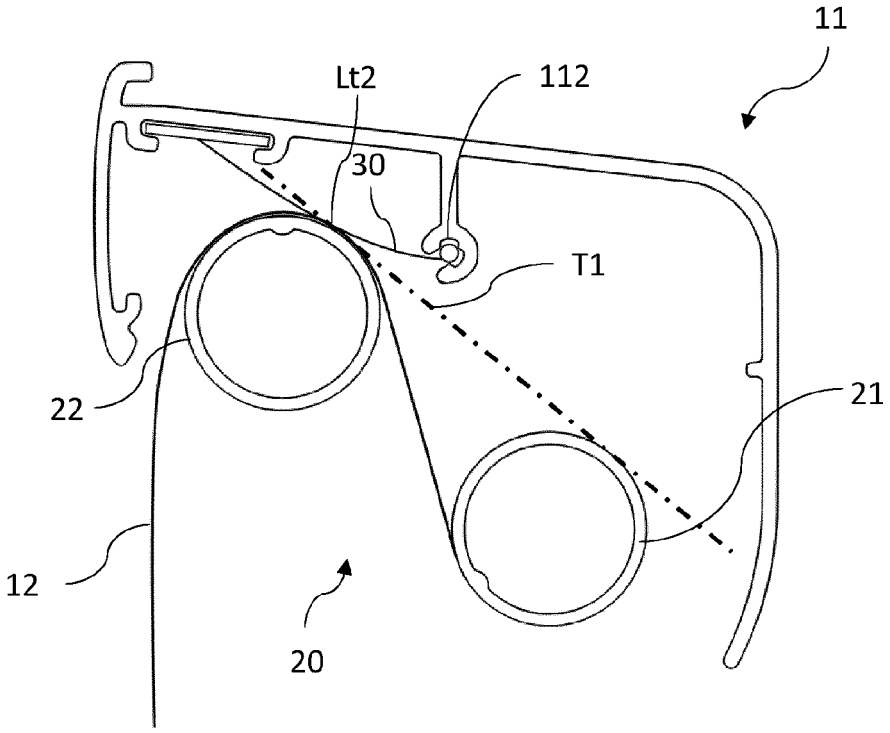


Fig. 13

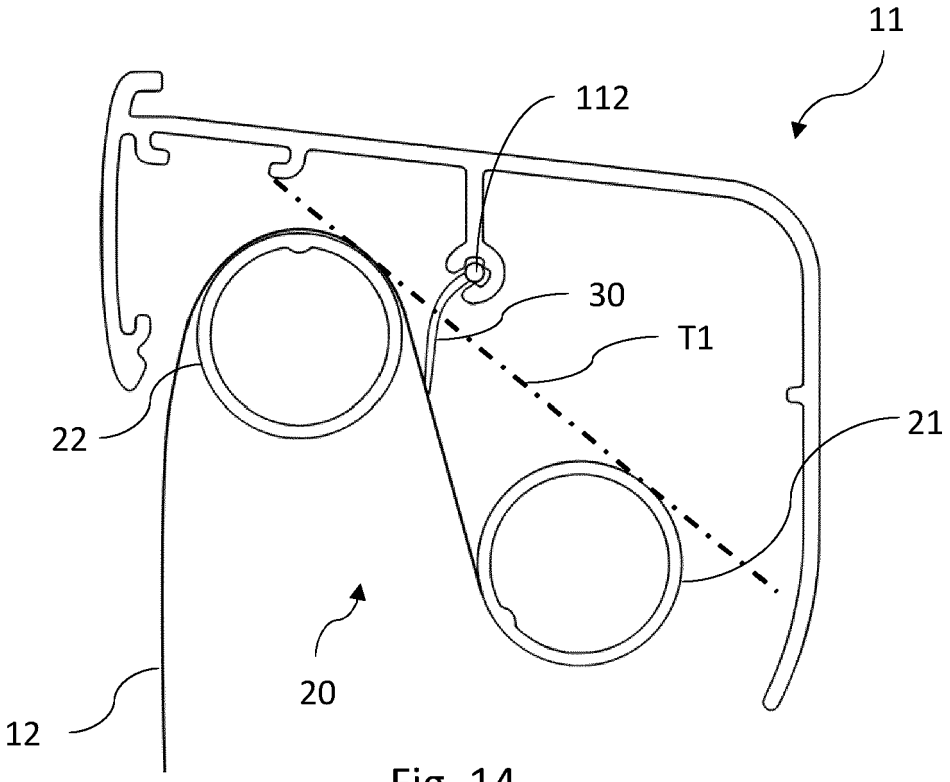


Fig. 14

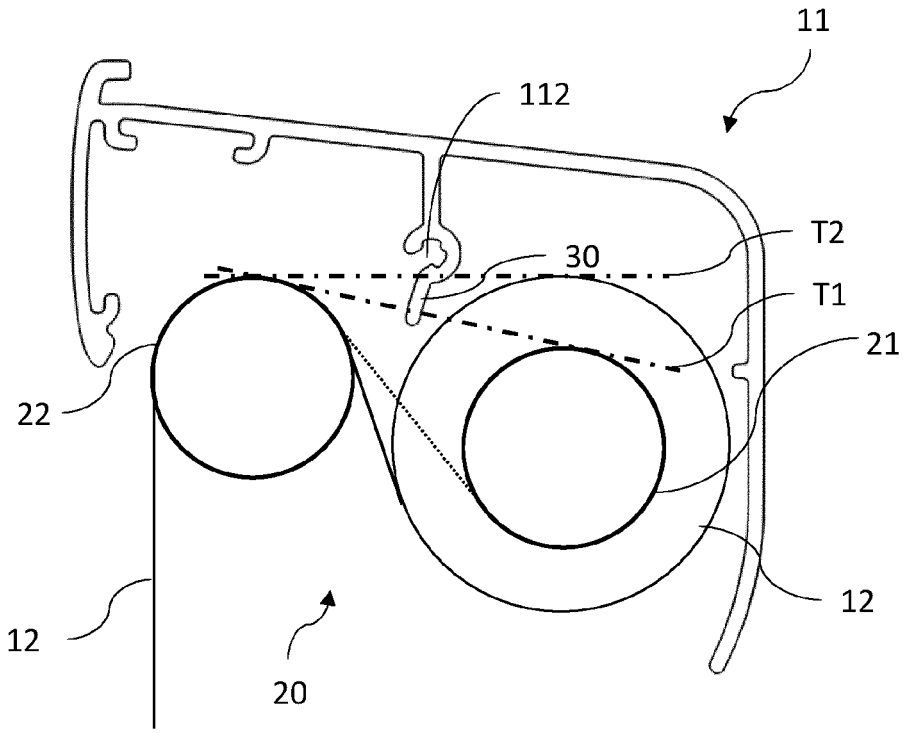


Fig. 15

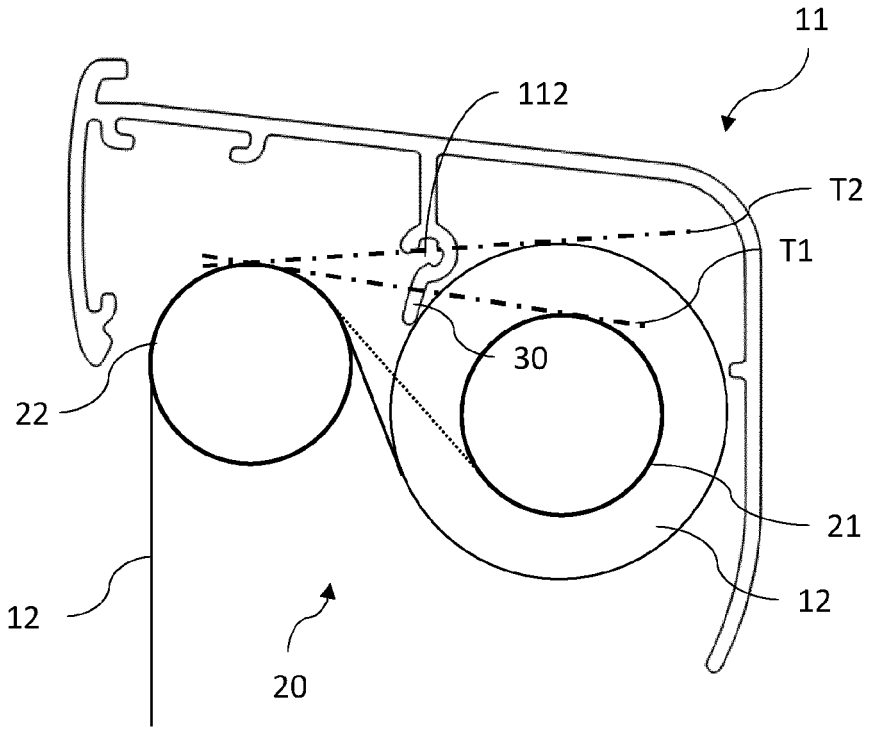


Fig. 16

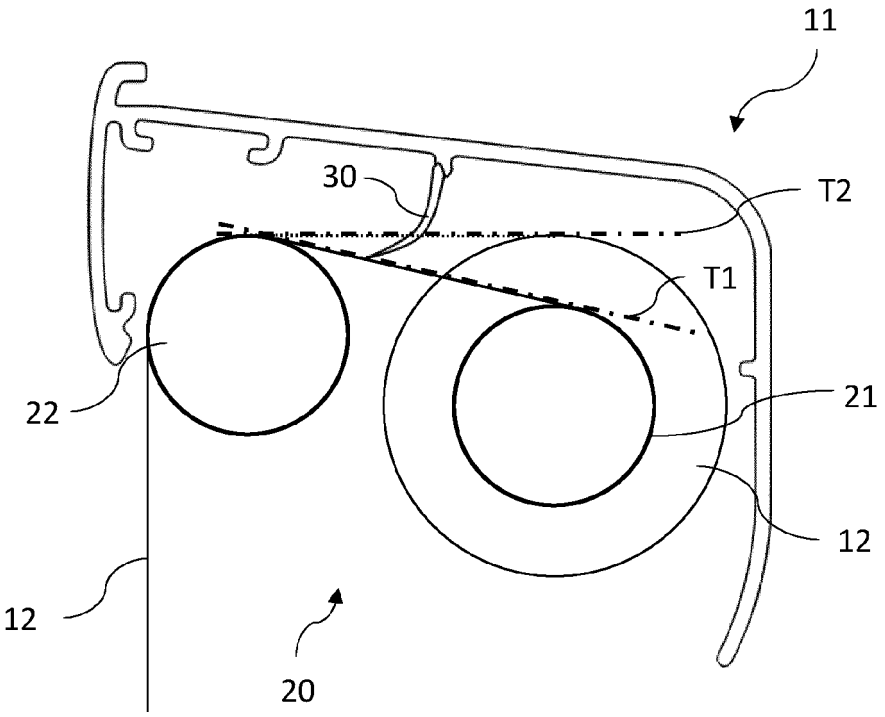


Fig. 17

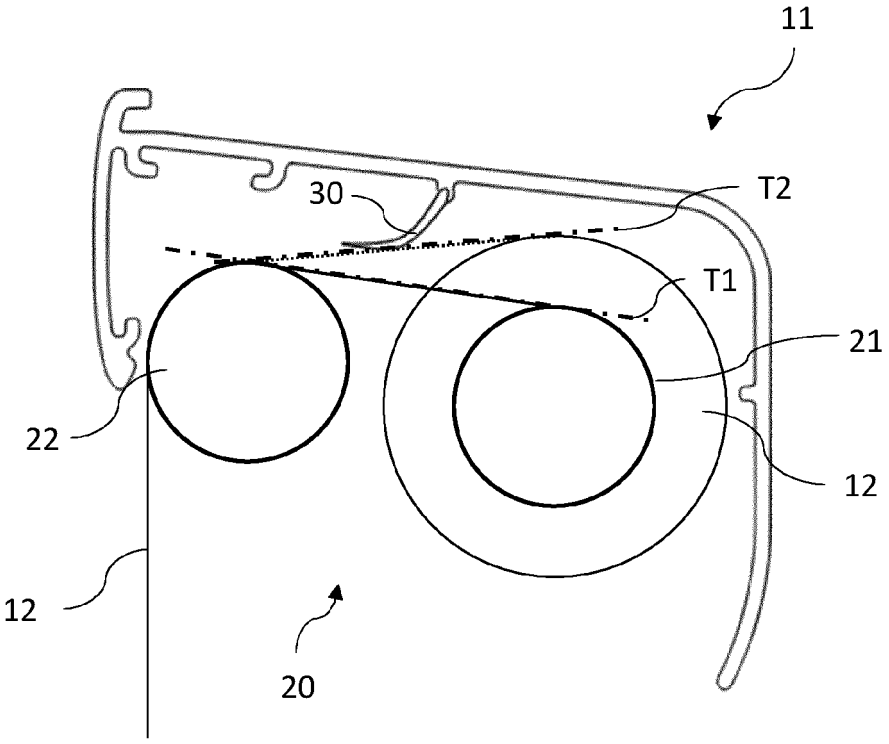


Fig. 18

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# EUROPEAN SEARCH REPORT

Application Number
EP 22 20 5285

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
|---|---|---|---|
| X | WO 2008/131761 A1 (VKR HOLDING AS [DK]; OLESEN BENT EKFELDT [DK] ET AL.) 6 November 2008 (2008-11-06) | 1,2,4-7, 14-16 | INV. E06B9/42 E06B9/58 |
| A | * paragraphs [0006], [0018], [0027]; figures 1,2,4 * | 3,8-13 | |
| | ----- | | |

TECHNICAL FIELDS SEARCHED (IPC)

E06B

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| Munich | 15 March 2023 | Bourgoin, J |

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 22 20 5285

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15-03-2023

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|---|---|---|---|
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EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

## REFERENCES CITED IN THE DESCRIPTION

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- WO 2008131761 A1 **[0003]**