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(54) A SCREENING ARRANGEMENT INCLUDING A TOP ELEMENT HAVING A COMPACT CONFIGURATION

ABSCHIRMUNGSANORDNUNG MIT EINEM KOPFTEIL IN EINER KOMPAKTEN AUSFÜHRUNG

DISPOSITIF DE BLINDAGE COMPRENANT UN ÉLÉMENT SUPÉRIEUR DE CONFIGURATION COMPACTE

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Description

[0001] The present invention relates to a screening arrangement for screening an aperture of a frame, comprising a top element having a front side, a bottom element having a top edge and a bottom edge, a finger grip being defined on the bottom element, and a screening body, said screening body including a first end edge and a second end edge, said first end edge being accommodated in the top element and the second end edge fastened to the top edge of the bottom element, said bottom element being movable manually by operation of said finger grip between a non-screening position close to the top element and a screening position at a distance from the top element, said screening body defining a screening plane, said top element accommodating a roller bar and a guide bar. Such a screening arrangement is known from US 6 873 461 B1.

[0002] Traditionally, such screening arrangements contain a number of parts that should be concealed from the surroundings. This is primarily due to the fact that impurities in the surrounding air, such as dust and pollution, and daylight, should be prevented from reaching these parts, as they are normally sensitive to such external influences. As a second consideration, these parts may be of a less aesthetically pleasing design due to their technical character. Consequently, many attempts are made at concealing these parts in the top element of the screening arrangement. However, as the top element and some other parts, such as side rails, are exposed to the surroundings at all times, i.e. both in the screening position and in the non-screening position, it is a fundamental requirement to make the top element as functional and inconspicuous as possible. In practically all fields of application of the screening arrangement, there is focus on reducing in particular the height dimension of the top element as much as possible. This requirement is mostly relevant in cases, in which the screening arrangement is mounted in the frame aperture itself, and in which the top element actually covers a part of the aperture to be screened. However, also in screening arrangements arranged outside the aperture to be screened, i.e. in most cases above the aperture, it is an aim to affect the building façade as little as possible. Evidently, the height of the top element is even more crucial in case the screening arrangement comprises a guide bar in addition to the roller bar, thus requiring extra space.

[0003] In other kinds of screening arrangements, which may furthermore involve different installation situations, complete enclosure of the screening arrangement may be advantageous. This is for instance the case in screening arrangements positioned on the outside of a building. Traditionally, such screening arrangements are intended for automatic operation by means of e.g. an electrical motor, operating means in the form of cords being fastened to the bottom element.

[0004] However, in screening arrangements to be installed in the aperture to be screened itself, focus is not

only on reducing the height dimension as much as possible. Due to spatial restrictions, also the depth dimension perpendicular to the screening plane must be reduced as much as possible. Furthermore, as the screening arrangement is operated manually, it must be possible to allow access to the finger grip on the bottom element, i.e. the bottom element must protrude from the top element at least partially in the non-screening position.

[0005] With this background it is an object of the invention to provide a screening arrangement, which provides for adequate protection of parts inside the top element, but which at the same time has an inconspicuous appearance.

[0006] This and further objects are achieved by means of a screening arrangement of the kind mentioned in the introduction, which is furthermore characterized by the features according to the characterising portion of claim 1. In the non-screening position, the bottom element assumes such a position that the entire screening body is accommodated in the top element, thus preventing exposure of the screening body. Simultaneously, the inner parts of the top element are hidden behind the combined inwards facing surfaces of the front side and the bottom element. The invention is thus based on the recognition that the bottom member may form part of the shield protecting the inner parts of the top element from exposure. This provides for a particularly compact design of the top element as such and of the screening arrangement as a whole. According to the invention, said top element is provided with a top rail forming the front side of the top element and being connected to a cover of the top element, said cover including a top cover portion and a back cover portion, the roller bar being positioned closer to the back cover portion and farther from the top cover portion than the guide bar. This configuration provides for optimum utilization of the space available in the top element.

[0007] In an advantageous further development of this embodiment, the bottom element is positioned at substantially the same level of height as the roller bar in the non-screening position, the bottom edge of the bottom element being positioned at the same level as or slightly above the lowermost portion of the screening body stored on the roller bar. Consequently, the roller bar including the stored screening body is hidden behind the bottom element. Even in case the bottom edge is situated slightly above the lowermost portion, this configuration provides for the possibility of hiding the roller bar including the stored screening body in the following installation situation: when the screening arrangement according to the invention is utilized to screen a window built-into an inclined roof surface, and the top of the window is positioned at a height corresponding to the line of sight of a person standing in the room, the line of sight extends at an angle other than perpendicular to the screening plane.

[0008] According to the invention, the bottom element is positioned below the guide bar in the non-screening position.

[0009] In order to improve the operability of the screen-

ing arrangement even further, the bottom element has a general U-shape between the top and bottom edges comprising an integrally formed bar projecting in the direction facing the back cover portion, the finger grip being provided by said U-shape. The side of the U-shape facing inwards provides a grip that is easily manageable. The U-shape has the further advantage that it blocks the view into the guide bar from below the screening arrangement.

[0010] In a further development of this embodiment, the top portion of said bar in the non-screening position is situated immediately below the guide bar and the back portion of the bar is situated immediately in front of the front portion of the screening body stored on the roller bar.

[0011] The degree of overlap lies in the interval 1-10 mm, preferably 2-8 mm, most preferably 4-6 mm.

[0012] In an embodiment, the roller bar and the guide bar have substantially the same length, diameter and material thickness. In addition to providing for a very rationalized manufacture of the screening arrangement, this embodiment is particularly advantageous as the dimensions of the roller bar and guide bar makes it possible to optimize the utilization of the space available in the top element.

[0013] In a further embodiment, the screening arrangement further comprises a guide bar, and the screening body is wound in mutually opposite directions on the roller bar and the guide bar, and that the front side of the screening body faces inwards on the roller bar in the non-screening position.

[0014] A particularly compact design is provided for by an embodiment in which the top element includes two end pieces, wherein the roller bar is spring-biased and mounted on a roller shaft, and wherein said roller shaft and one of the end pieces constitute an integral unit provided as a one-piece moulded unit. With the integration of the roller shaft and the end piece in a one-piece unit, the need for complicated connections at this point is rendered superfluous. The reduction of the number of parts entails that the simplified assembly aimed at is obtained and, simultaneously, a very strong transition between the roller shaft and the end piece is provided. In turn, the integral transition makes it possible to make the roller shaft slimmer. Consequently, the roller bar may be made with a smaller diameter, and hence the entire top element may be formed with smaller overall dimensions. As a supplementary advantage, the spatial requirements at the ends of the top element at the end piece/roller shaft transition are reduced. The additional space thus obtained may for instance be utilized to make the screening body wider. This is an advantage from an aesthetical point of view in any screening arrangement.

[0015] However, in case of screening arrangements functioning as blackout blinds, it is a requirement that the gap between the side edges of the screening body and the frame pieces be covered. This is, most often, achieved by means of side rails. When using the screening arrangement according to the invention as a blackout blind, the width of these side rails may be reduced, which

in addition to providing a more pleasant appearance provides for a reduced material consumption. In one embodiment of such a screening arrangement, the top rail extends in said first longitudinal direction between a first mitred end and a second mitred end, and wherein the screening arrangement further comprises two side rails, each of said side rails having a first end and second mitred end, the second mitred end of each side rail being adapted to be joined to the first and second mitred end, respectively, of said top rail, and that the screening arrangement furthermore includes a set of angular brackets, each angular bracket being adapted to cooperate with reception means in the back side of the top rail and in the back side of the respective side rail.

[0016] Preferably, the top rail has a predetermined height and each side rail has a predetermined width, and wherein said predetermined height is substantially the same as said predetermined width, the mitre joint thus being a 45° mitre joint. This provides for a particularly harmonic overall appearance of the screening arrangement. As the top rail may be formed with a small predetermined height due to the compact design and optimum utilization of the space available in the top element, the three elements visible from inside the room render the screening arrangement slender, elegant and inconspicuous.

[0017] In the following the invention will be described in further detail by means of examples of embodiments with reference to the schematic drawings, in which

Fig. 1 is a perspective view of a window provided with a screening arrangement in an embodiment of the invention;

Fig. 2 is a perspective view of the screening arrangement shown in Fig. 1;

Fig. 3 shows, on a larger scale, a partial perspective view of a detail of the screening arrangement in an embodiment of the invention;

Fig. 4 shows, on a still larger scale, a perspective view of a part of the detail of the screening arrangement shown in Fig. 3;

Fig. 5 shows, on a still larger scale, a partial perspective view of a detail of the screening arrangement in an embodiment of the invention;

Fig. 6 shows, on a larger scale, a perspective view of a detail of the screening arrangement in an embodiment of the invention;

Fig. 7 shows a view of the screening arrangement detail of Fig. 6 seen from the above;

Figs 8, 9 and 10 show perspective views of details of the screening arrangement of Figs 6 and 7;

Figs 11 and 12 show, on a larger scale, partial perspective views of details of the screening arrangement of Figs 6 and 7; and

Fig. 13 shows, on a still larger scale, an end view of details of the screening arrangement in one embodiment.

[0018] Figs 1 and 2 show an embodiment of a screening arrangement generally designated 1. As shown in Fig. 1, the screening arrangement is adapted to be mounted on a frame constituted by a sash 2 representing a window. The sash 2, in turn, is adapted to be connected with a stationary frame (not shown), which in a mounted position of the window lines an opening in a building. It is noted that the term "frame" is to be understood as incorporating any substantially rectangular structure positioned in any opening in a building, whether in a wall or the roof, and surrounding an aperture to be screened. Although the sash shown in Fig. 1 is the sash of a roof window and the screening arrangement 1 is mounted on the sash 2 of the window, a screening arrangement according to the invention may just as well be mounted on the stationary frame instead of the sash and may also be utilized in connection with e.g. windows having a frame only, or in doors.

[0019] The sash 2 has a top piece 21, a bottom piece 22 and two side pieces 23 and 24 surrounding an aperture, which is covered by a suitable panel element such as a glazing in the form of an insulating pane (not shown). In the embodiment shown, the screening arrangement 1 comprises a top element 4 positioned at the sash top piece 21, a screening body 6 (not shown in Figs 1 or 2, cf. however Fig. 13) and a bottom element 7. At its upper end edge, the screening body 6 is accommodated in the top element 4 and its opposed, lower end edge is fastened to the bottom element 7. In the embodiment shown, the bottom element 7 is adapted to act as a handle during operation of the screening arrangement 1, i.e. when moving the bottom element 7 and hence the screening body 6 between the non-screening position shown in Figs 1 and 2 and a screening position, in which the screening body 6 covers the sash aperture partly or fully. However, instead of being manually operated, the screening arrangement may be operated by other means, e.g. by electrical operating means.

[0020] Furthermore, the screening arrangement 1 comprises two side rails 8 and 9 adapted to be connected to a respective side piece 23 and 24 and to the top element 4, in a manner to be described in further detail below. In the mounted position of the screening arrangement 1, opposite ends of the bottom element 7 and opposite side edges of the screening body 6 are guided in these side rails 8 and 9. In the embodiment shown, the screening arrangement comprises a roller blind having as its screening body 6 a cloth or fabric, and of which the top element 4 includes a spring-biased roller bar. However, other screening arrangements having other kinds of screening bodies and other configurations of the top element are conceivable as well.

[0021] Turning now to Figs 3 and 4 depicting the top element 4 in one embodiment of the screening arrangement, it may be seen that the top element 4 has a left-hand end piece 410 and a right-hand end piece 420 (not shown in these Figures, cf., however, Fig. 6). The terms "left-hand" and "right-hand" refer to the orientation shown

in for instance Figs 1 to 3 and are utilized for reasons of convenience only. Similarly, the terms "front" and "black" are utilized to denote the sides of the screening arrangement, "front" being the side intended to face inwards into the room of the building, and "black" the outwards facing side.

[0022] The top element 4 comprises a cover 430 extending almost throughout the entire length of the top element 4 from the left-hand end piece 410 to the right-hand end piece 420, the end pieces thus constituting the end faces of the top element 4. At the side intended to face inwards into the room, i.e. the front side, the cover 430 is connected to a top rail 440. In the embodiment shown, the connection between the top rail 440 and the remaining portion of the top element, i.e. the cover 430 is made integral, e.g. by extruding the top element as a profile including the cover 430 as well as the top rail 440. The end piece 410 is adapted to be fastened to the cover 430 by means of e.g. a screw inserted in screw hole 416 (cf. Fig. 6) to be received in threaded track 449 in the cover 430. The top rail 440 has a slightly longer extension in the longitudinal direction than the cover portion 430.

[0023] In the mounted position of the screening arrangement the top rail 440 is joined to side rails 8, 9 in mitre joints by means of angular brackets 85. To that end the top rail 440 has two mitred ends, of which one mitred end 445 is shown in Figs 3 and 4 to be joined to a respective mitred end of the side rails. In Fig. 5, the left-hand side rail 8 is shown with its mitred end 819. The side rail 8 furthermore has a flange 823 ending at a distance from the mitred end 819. This difference, in combination with the difference in length between the top rail 440 and the cover portion 430, leaves room for the end piece 410.

[0024] Just as the top rail 440 has a predetermined height, each side rail 8, 9 has a predetermined width, and in the embodiment shown the predetermined height is substantially the same as said predetermined width, the mitre joint thus being a 45° mitre joint. Other angles are conceivable, however, this entails that a similar configuration of the front sides of the three elements, i.e. top rail and two side rails, is not achievable.

[0025] The side edges of the screening body 6 are guided in the side rails 8, 9 in a manner known *per se*, for instance by means of a number of guide beads mounted at a distance from each other along each side edge. Hence, the side rails 8, 9 serve the purpose of improving the light-proofing properties of the screening arrangement, as they overlap the side edges of the screening body in the mounted position of the screening arrangement. Eventually, depending on the type of screening body and the installation situation, the side rails may contribute to holding the screening body in position. The bottom edge of the screening body 6 is connected with the bottom element 7 in any suitable manner, and the ends of the bottom element 7 are advantageously guided in the side rails as well. In order to improve the lightproof qualities even further the bottom element 7 may be pro-

vided with a sealing profile 76 (cf. Fig. 13) to abut against the bottom side piece of the frame.

[0026] Eventually, the screening arrangement comprises a parallel guidance cord system comprising two cords (not shown), one cord being adapted to extend from the left-hand lower corner of the sash, up through or along the bottom element 7 and further up to the top element 4. The other cord is routed in a mirror-inverted manner. At the top element 4, each cord is connected with a respective pre-tensioning device adapted to be connected with the top element 4 in a track and/or to press against the top cover portion 431 of the cover 430. The pre-tensioning devices entail that the cords are held at a suitable tension all of the time, thereby ensuring that the bottom element 7 is at all times kept substantially in parallel with the top and bottom pieces 21, 22 of the sash 2 during operation of the screening arrangement. In the mounted position, the cords are hidden behind the side rails.

[0027] As may be seen most clearly from the partial perspective view of Fig. 6 and the plane view of Fig. 7, in which the screening body 6 and the bottom element 7 are not shown for clarity reasons, the top element 4 accommodates a guide bar 470 and a roller bar 460. The screening body 6 is fastened to the roller bar 460 along its upper end edge in any suitable manner known *per se*. The guide bar 470 guides the screening body 6 onto the roller bar 460, which serves to collect and store the screening body 6 in the non-screening and partially screened positions of the screening arrangement, or even in the fully screened position, in case the screening body contains surplus material. As shown in Fig. 13, the screening body is wound in mutually opposite directions on the roller bar and the guide bar. Furthermore, the roller bar 460 is spring-biased and, hence, provides the preload toward the non-screening position required to roll up the screening body 6. Although not visible in Figs 6 and 7, it is noted that the screening body 6 extends almost up to the inner side of the end pieces 410, 420, thus providing for an optimum usage of the space available also in the longitudinal direction of the top element 4. The preload acting on the roller bar 460 is provided by a spring device that will be described in further detail below during the description of Figs 8 to 12. The roller bar 460 and the guide bar 470 are formed as hollow cylindrical bodies. For instance, the roller bar 460 and the guide bar 470 may be more or less identical, both as regards length, diameter and material thickness. For instance, the diameter of the roller bar 460, and of the guide bar 470, may be approximately 12-20 mm, e.g. 16 mm. However, different configurations between the two bars are conceivable.

[0028] The guide bar 470 serves three primary purposes: Firstly, it ensures that the screening body 6 is guided in substantially the same screening plane along the height of the sash aperture. On the roller bar 460, the total external diameter of the roller bar 460 and the stored portion of the screening body 6 varies with the length of

screening body unrolled. In screening arrangements not provided with a guide bar or other guide means, this entails that the screening body unrolled from the roller bar in a fully or almost fully screened position is positioned close to the roller bar and hence a distance from the side rails. The provision of the guide bar 470 eliminates the effects of this diameter variation. Secondly, the guide bar 470 makes it possible to obtain a suitable tension of the screening body 6 to avoid wrinkles of the screening body and prevents that the screening body is rolled up askew. This effect is even more pronounced in one embodiment, in which the guide bar 470 has a configuration tapering towards each end. The tapering might for instance lie in the interval 2-5 mm per m length of the guide bar 470. Third, the side of the screening body 6 facing inwards in the screening positions, i.e. the front side facing towards the room in the position of use of the screening arrangement, faces inwards when stored on the roller bar 460 and, consequently, the back side faces outwards on the roller bar. In this manner, the front side of the screening body is protected from light when rolled up on the roller bar. Hence, deterioration of the appearance of the front side is avoided or at least reduced to a considerable extent. In the embodiment shown, in which the top element 4 has a top side and a back side constituted by the cover 430, the roller bar 460 is positioned closer to the back cover portion 432 than the guide bar 470, whereas the guide bar 470 is positioned closer to the top cover portion 431 than the roller bar 460. This reduces the portion of the screening body exposed to light in the non-screening position to a minimum. In fact, it is an important feature of the spring device according to the invention that the top element 4 is of a compact design. This will be described in further detail following the below description of the remaining parts of the screening arrangement.

[0029] Referring now to the detailed description of Figs 8 to 12, it emerges that in the embodiment shown, a roller shaft 461 is integral with the left-hand end piece 410. Alternatively, the roller shaft 461 could be formed as an integral unit with the other, right-hand end piece 420. The integral connection is obtained by moulding the end piece 410 and the roller shaft 461 in one piece, i.e. without subsequent joining of any parts, to form the one piece unit comprising the end piece and the roller shaft. Preferably, the moulding is carried out by any appropriate method on the basis of a suitable plastic material, such as polyamide, for instance PA6, or polyethylene, which has a good durability against wear and tear, and sufficient resistance towards torsion and bending. The roller shaft 461 extends between a left hand end 462 joined to the end piece 410 by stub portion 463, and a right hand end 465. Preferably, the roller shaft 461 is formed as a solid body part.

[0030] In the embodiment shown, a plurality of further functions is integrated into the end pieces. In addition to the above-described roller shaft 461 being integral with the left-hand end piece 410, it may be seen that the end piece 410 has a stub 471 acting as means for receiving

bearings for one end (the left-hand end) of the guide bar 470, said bearings being constituted by end plug 472 having a bearing ring 473. The right-hand end piece 420 is provided with a stub (not shown) similar to stub 471 for receiving the bearings for the right-hand end of the guide bar 470 in the form of end plug 474 and a bearing ring corresponding to bearing ring 473. Furthermore, the right-hand end piece 420 is provided with a second stub (not shown) intended for receiving end plug 464 for supporting the right-hand end of roller bar 460. The left-hand end of roller bar 460 is supported on stub portion 463 by an end plug 482 of the spring device. The connection with the roller bar 460 may be carried out in any suitable manner, e.g. by means of a stepped portion of the end plug 482. Whereas the roller shaft 461 is, as mentioned in the above, preferably formed as a solid body part, stub 471 of left-hand end piece 410 and the not-shown stubs on right-hand end piece 420 may be hollow. The retention of the roller bar and the guide bar on the respective end plugs may be carried out by friction alone, or by means of mechanical fastening means such as protruding portions of the end plugs interacting with apertures in the roller and guide bars, or vice versa. The roller shaft, stubs, bearings and spring device form part of the suspension arrangement of the roller bar and guide bar of the screening arrangement. The diameter of the roller shaft 461 may for instance lie in the interval 4-8 mm, e.g. 6 mm.

[0031] In the embodiment shown, the spring device generally designated 480 comprises a torsion spring extending between a left-hand end 481 securely fastened to end plug 482 and a right-hand end 483. As may be seen in the enlarged views of Figs 11 and 12, torsion spring end 483 is secured in a slit 466 in the right-hand end 465 of roller shaft 461. In the embodiment shown the slit 466 opens towards the top of the roller shaft 461 and extends towards the bottom thereof, ending at a certain distance from the bottom such that a bridge of material is still present at the bottom. The slit 466 could open in any direction and have other extensions in the radial direction, e.g. extend to the centre of the roller shaft 461. The retention of the torsion spring in the slit 466 is carried out by a bent portion (not shown) of the torsion spring end 483. Furthermore, retention is secured by means of support element 490, which has the additional function of preventing the roller shaft 461 from splitting open. The support element 490 is, in turn, retained on the roller shaft 461 by means of a groove 467 at the end 465 of roller shaft 461. The support means 490 has a maximum external diameter adapted to fit into the roller bar 460 in order to support the roller bar 460. It is to be understood that other kinds of spring devices may be utilized as well, e.g. spring devices making use of springs of other kinds than the shown torsion spring.

[0032] Returning now to Fig. 3, a number of further functions built into the end pieces will be described in further detail. On the outer side, the end piece 410 comprises portions constituting coupling means for cooperation with bracket members positioned on the side piece

23 of the window sash 2. The opposite, right-hand end piece has an outer side configured in a substantially mirror-inverted manner. The bracket members may, in principle, have any suitable form as long as they permit swift and secure connection with the screening arrangement. One example of such bracket members is shown in Applicant's published international applications Nos WO 2005/008013 and WO 2006/048014. Such a coupling member is traditionally formed as a separate part connected with the remaining parts of the screening arrangement, one example being described in detail in Applicant's published international application No. WO 00/47858.

[0033] In the embodiment shown, the portions serving the function of coupling means corresponding to the coupling members of the prior art are made integral with the respective end pieces. These coupling portions are substantially identical, however mirror-inverted, on the left-hand end piece 410 and the right-hand end piece 420, and only the coupling portions of the left hand piece 410 will be described. Thus, the outer side of end piece 410 comprises an upper guide surface 411 and a lower guide surface 412 formed on a respective upstanding rib on the end piece 410 itself. In addition to providing the guide surface, the rib acts as reinforcement of the end piece 410. The screening arrangement 1 has a general direction of mounting, as described in further detail in the above-mentioned Nos WO 2005/008013 and WO 2006/048014. The guide surfaces 411, 412 extend in parallel with that general direction of mounting. At one end, the lower guide surface 412 is formed with an inclined portion forming a ramp 412a. The ramp 412a is formed at the end intended to be positioned at the back when mounted, and is thus the end which is first brought into contact with the bracket member. The ramp 412a thus serves to facilitate correct positioning of the top element 4 of the screening arrangement. At the upper guide surface 412 resilient engagement means are provided. These means comprise a tongue 413 extending from a point at the back of end piece 410 in the direction towards the front such that one portion, back portion 413a, of the tongue has a direction substantially parallel with that of the ramp 412a on the lower guide surface and one portion is substantially parallel with the guide surfaces 411 and 412. This configuration facilitates the mounting even further. The resilient tongue 413 has the effect of allowing temporary positioning of the top element 4 on the bracket member. However, the tongue 413 furthermore includes snap engagement means in the form of upstanding retaining pawl 414 to allow for a more permanent retention of the top element in the frame. In this manner, the top element 4 is easily connected with the bracket members: Initially, the top element is moved generally in the mounting direction from inside the room towards the outside, i.e. towards the pane of the frame, however slightly from below. Each end piece is guided onto the bracket member via the ramp 412a and the back portion 413a of tongue 413 during increased impression of the tongue

413. The tongue 413 thus exerts a corresponding resilient pressure on the bracket member resulting in a slightly clamping action on the top element. The top element is moved further on in the mounting direction with the guide surfaces 411, 412 in sliding engagement with the corresponding sides of the bracket member. When the top element 4 is almost at its final position, the retaining pawl 414 snaps out into engagement with an edge of the bracket member. The thickness of the end piece 410 itself, i.e. of the plane portion from which the roller shaft and the guide surfaces etc. mentioned in the above emanate, is relatively small, for instance 1-2 mm, e.g. 1.5 mm.

[0034] Furthermore, the end piece 410 has spring means 415 (cf. Fig. 6) for cooperation with a cord system of a further screening arrangement (not shown).

[0035] Returning now to Figs 6 to 7, and referring in particular to Fig. 13, the compact design of the top element 4 will be described: In the embodiment shown the top element 4 has a front side, a top side and a back side. The front side is constituted by top rail 440, and the top and back sides by cover 430, i.e. by the top cover portion 431 and the back cover portion 432, respectively. It is conceivable to have a bottom side as well. Of course, such a bottom side could only cover a part of the distance from the back cover portion towards the screening plane in order not to come into conflict with the screening body 6.

[0036] The top element 4 is designed with such a height measured from the bottom of the back cover portion 432 to the top cover portion side 431 that it encloses a major part of the roller bar 460 including the screening body 6 stored on the roller bar 460 in the non-screening position.

[0037] Furthermore, the top element 4 is designed with such a depth measured from the top rail 440 to the back cover portion 431 that the bottom element 7 may be positioned at the same level of height as the roller bar 460 in the non-screening position. The bottom element 7 has a general U-shape, the legs of the U extending integrally into the top and bottom edges 71 and 72, respectively. As shown in Fig. 13, the top edge 71 of the bottom element 7 is positioned above bottom edge 444 of the top rail 440 of the top element 4 in the non-screening position. The bottom edge 72 is positioned at the same level as or slightly above the lowermost portion of the screening body 6 stored on the roller bar 460. In case the screening arrangement according to the invention is utilized to screen a window built into an inclined roof surface, and the top of the window is positioned at a height corresponding to the line of sight S of a person standing in the room, the line of sight S extends at an angle other than perpendicular to the screening plane. Consequently, the roller bar 460 including the stored screening body 6 is hidden behind the bottom element 7. As is apparent from Fig. 13, the bottom element 7 has a general U-shape between the top and bottom edges 71, 72 comprising an integrally formed bar 74, 75 projecting in the direction facing the back cover portion 432, the finger grip 73 being provided by said U-shape. In the non-screening position,

the top portion 74 of said bar is situated immediately below the guide bar 470 and the back portion 75 of the bar is situated immediately in front of the front portion of the screening body 6 stored on the roller bar 460. The slight overlap should not exceed the distance between the top edge 71 and the lower end of the U-shape and may for instance lie in the interval 1-10 mm, preferably 2-8 mm, most preferably 4-6 mm.

[0038] In combination, the height and depth dimensions and the particular positioning of the roller bar 460 and the guide bar 470 provide for an extremely compact design of the top element 4.

[0039] Installation of the entire screening arrangement 1 in a frame, for instance the sash 2 of Fig. 1, is carried out in the following manner:

The screening arrangement 1 may e.g. be delivered in a supply condition carried out at the manufacturer. In the supply condition, the angular brackets 85 are connected to the top rail 440 of the top element 4. At the installation site, the top element 4 is connected to the frame 2. In the embodiment shown, this is carried out in the manner described in the above by guiding the coupling members on the outer side of each end piece over the bracket members positioned at the upper ends of each side piece of the frame 2. Finally, the side rails 8, 9 are joined to the top rail 440 at the mitred ends by means of the angular brackets. During the final step of joining the side rails to the top rail, each side rail is brought from a position, in which the side rail is out of alignment with the second longitudinal direction, to a position, in which the side rail is in alignment with the second longitudinal direction, during the step of connecting the side rails to the top rail. Subsequently, or simultaneously, each side rail is connected to the respective side piece of the sash or frame by means of suitable fastening means, e.g. screws inserted through aperture 825 and further similar apertures in the side rail.

[0040] The invention should not be regarded as being limited to the described embodiments. Several modifications and combinations of the different embodiments will be apparent to the person skilled in the art.

[0041] For instance, in screening arrangements having a large longitudinal extension there may be two spring devices. In this case, each end piece may be formed as an integral unit with a roller shaft. Obviously, the configuration of the two sides is mirror-inverted and the screening arrangement may e.g. comprise two torsion springs wound in opposite directions, or comprise springs of two different kinds.

List of reference numerals

[0042]

1 screening arrangement

2	sash
21	top piece
22	bottom piece
23	side piece
24	side piece
4	top element
410	left-hand end piece
411	guide surface
412	guide surface
412a	ramp
413	tongue
413a	back portion
414	retaining pawl
415	spring means
416	screw hole
420	right-hand end piece
430	cover
431	top cover portion
432	back cover portion
440	top rail
444	bottom edge
445	first mitred end
449	track
460	roller bar
461	roller shaft
462	left-hand end of roller shaft
463	stub portion
464	end plug for roller bar, right-hand side
465	right-hand end of roller shaft
466	slit
467	groove
470	guide bar
471	stub
472	end plug for guide bar, left-hand side
473	bearing ring
474	end plug for guide bar, right-hand side
480	spring device
481	left-hand end of torsion spring
482	end plug of spring device
483	right-hand end of torsion spring
490	support element
6	screening body
7	bottom element
71	top edge
72	bottom edge
73	finger grip
74	top bar portion
75	back bar portion
76	sealing profile

8	side rail
819	mitred end
823	flange
825	aperture
5	
85	angular bracket
9	side rail
10	
S	line of sight
Claims	
15	1. A screening arrangement (1) for screening an aperture of a frame, comprising:
20	a top element (4) having a front side (440), a bottom element (7) having a top edge (71) and a bottom edge (72), a finger grip being defined on the bottom element, and a screening body (6), said screening body (6) including a first end edge and a second end edge, said first end edge being accommodated in the top element (4) and the second end edge fastened to the top edge of the bottom element (7), said bottom element being movable manually by operation of said finger grip between a non-screening position close to the top element and a screening position at a distance from the top element, said screening body defining a screening plane, said top element (4) accommodating a roller bar (460) and a guide bar (470),
25	characterized in that the top element (4) is provided with a top rail (440) forming the front side of the top element and being connected to a cover (430) of the top element (4), said cover (430) including a top cover portion (431) and a back cover portion (432), the roller bar (460) being positioned closer to the back cover portion (432) and farther from the top cover portion (431) than the guide bar (470), that the top element (4) is provided with such dimensions that the top edge (71) of the bottom element (7) is adapted to overlap, in the non-screening position, the bottom edge (444) of the top rail (440) of the top element (4) slightly, wherein the slight overlap lies in the interval 1-10 mm, preferably 2-8 mm, most preferably 4-6 mm, that the bottom element (7) is positioned below the guide bar (470) in the non-screening position, and that the bottom element (7) has a general U-shape between the top and bottom edges (71, 72) com-
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- prising an integrally formed bar (74, 75) projecting in the direction facing the back cover portion (432), the finger grip (73) being provided by said U-shape.
2. A screening arrangement according to claim 1, wherein the bottom element (7) is positioned at substantially the same level of height as the roller bar (460) in the non-screening position, the bottom edge (72) of the bottom element (7) being positioned at the same level as or slightly above the lowermost portion of the screening body (6) stored on the roller bar (460).
 3. A screening arrangement according to claim 1, wherein the top portion (74) of said bar in the non-screening position is situated immediately below the guide bar (470) and the back portion (75) of the bar is situated immediately in front of the front portion of the screening body (6) stored on the roller bar (460).
 4. A screening arrangement according to any one of the preceding claims, wherein the roller bar (460) and the guide bar (470) have substantially the same length, diameter and material thickness.
 5. A screening arrangement according to any one of the preceding claims, wherein the top element (4) includes two end pieces (410, 420), wherein the roller bar (460) is spring-biased (480) and mounted on a rollershaft (461), and wherein said rollershaft (461) and one of the end pieces (410) constitute an integral unit (410, 461) provided as a one-piece moulded unit, the integral unit (410, 461) and the other end piece (420) preferably each including coupling means (411-414) adapted to be connected with a bracket member provided in the frame aperture, the coupling member preferably including resilient engagement means (413) and snap engagement means (414).
 6. A screening arrangement according to claim 5, wherein the integral unit (410, 461) and the other end piece (420) each includes means (471) for receiving the bearings of the guide roller (470).
 7. A screening arrangement according to any one of the preceding claims, wherein a spring device (480) providing the spring bias includes a torsion spring securely fastened, in one end (482), to an end plug having a bearing ring freely rotatable on said roller shaft, and, in the other end (483), secured in a slit (466) in the roller shaft, the retention of the torsion spring in the slit being preferably secured by means of a support element (490).
 8. A screening arrangement according to any one of claims 5 to 7, wherein said integral unit (410, 461) is moulded from a plastic material, such as polyamide or polyethylene.
 9. A screening arrangement according to any one of claims 5 to 8, wherein the other end piece (420) is provided as a moulded piece, preferably from a plastic material, such as polyamide or polyethylene.
 10. A screening arrangement according to any one of the preceding claims, wherein the screening arrangement further comprises a guide bar (470), and wherein the screening body (6) is wound in mutually opposite directions on the roller bar (460) and the guide bar (470), and wherein the front side of the screening body (6) faces inwards on the roller bar (470) in the non-screening position.
 11. A screening arrangement according to any one of claims 1 to 10, wherein said top rail (440) extends in said first longitudinal direction between a first mitred end and a second mitred end, and wherein the screening arrangement further comprises two side rails (8, 9), each of said side rails (8, 9) having a first end and second mitred end, the second mitred end of each side rail (8, 9) being adapted to be joined to the first and second mitred end, respectively, of said top rail (440), and that the screening arrangement furthermore includes a set of angular brackets (85), each angular bracket being adapted to cooperate with reception means in the back side of the top rail (440) and in the back side of the respective side rail (8, 9), the top rail (440) preferably having a predetermined height and each side rail (8, 9) has a predetermined width, and wherein said predetermined height is substantially the same as said predetermined width, the mitre joint thus being a 45° mitre joint.

Patentansprüche

1. Abschirmungsanordnung (1) zur Abschirmung einer Öffnung eines Rahmens, mit:
 - einem oberen Bauteil (4) mit einer Vorderseite (440),
 - einem unteren Bauteil (7) mit einer oberen Kante (71) und einer unteren Kante (72), einem Fingergriff auf dem unteren Bauteil, und
 - einem Abschirmkörper (6) mit einer ersten Endkante und einer zweiten Endkante, wobei die erste Endkante in dem oberen Bauteil (4) aufgenommen ist und die zweite Endkante an der oberen Kante des unteren Bauteils (7) befestigt ist, wobei das untere Bauteil durch Bedienung des Fingergriffs zwischen einer nicht-abschir-

- menden Position nahe des oberen Bauteils und einer abschirmenden Position, beabstandet von dem oberen Bauteil, manuell bewegbar ist, wobei das obere Bauteil (4) eine Rollstange (460) und eine Führungsstange (470) aufnimmt, **dadurch gekennzeichnet, dass** das obere Bauteil (4) eine obere Schiene (440) aufweist, die die Vorderseite des oberen Bauteils bildet und mit einer Abdeckung (430) des oberen Bauteils (4) verbunden ist, wobei die Abdeckung (430) einen oberen Abdeckungsabschnitt (431) und einen rückwärtigen Abdeckungsabschnitt (432) aufweist, wobei die Rollstange (460) näher an dem rückwärtigen Abdeckungsabschnitt (432) und weiter entfernt von dem oberen Abdeckungsabschnitt (431) positioniert ist als die Führungsstange (470), dass das obere Bauteil (4) derartige Abmessungen aufweist, dass die obere Kante (71) des unteren Bauteils (7) dazu eingerichtet ist, in der nicht-abschirmenden Position die untere Kante (444) der oberen Schiene (440) des oberen Bauteils (4) leicht zu überdecken, wobei die leichte Überdeckung in dem Intervall 1-10 mm, vorzugsweise 2-8 mm, besonders bevorzugt 4-6 mm, liegt, dass das untere Bauteil (7) in der nicht-abschirmenden Position unter der Führungsstange (470) positioniert ist, und dass das untere Bauteil (7) eine allgemeine U-Form zwischen den oberen und den unteren Kanten (71, 72) aufweist, mit einer integral ausgebildete Stange (74, 75), die sich in der Richtung erstreckt, die dem rückwärtigen Abdeckungsabschnitt (432) zugewandt ist, wobei der Fingergriff (73) durch die U-Form bereitgestellt wird.
2. Abschirmungsanordnung nach Anspruch 1, wobei das untere Bauteil (7) im Wesentlichen auf der gleichen Höhe wie die Rollstange (460) in der nicht-abschirmenden Position positioniert ist, wobei die untere Kante (72) des unteren Bauteils (7) auf der gleichen Höhe oder leicht über dem untersten Abschnitt des auf der Rollstange (460) gelagerten Abschirmkörpers (6) positioniert ist.
 3. Abschirmungsanordnung nach Anspruch 1, wobei der obere Abschnitt (74) der Stange in der nicht-abschirmenden Position unmittelbar unter der Führungsstange (470) liegt und der rückwärtige Abschnitt (75) der Stange unmittelbar vor dem vorderen Abschnitt des auf der Rollstange (460) gelagerten Abschirmkörpers (6) liegt.
 4. Abschirmungsanordnung nach einem der vorhergehenden Ansprüche, wobei die Rollstange (460) und die Führungsstange (470) im Wesentlichen die gleiche Länge, den gleichen Durchmesser und die gleiche Materialdicke aufweisen.
 5. Abschirmungsanordnung nach einem der vorhergehenden Ansprüche, wobei das obere Bauteil (4) zwei Endstücke (410, 420) aufweist, wobei die Rollstange (460) federvorgespannt (480) und auf einer Rollenwelle (461) montiert ist, und wobei die Rollenwelle (461) und eines der Endstücke (410) eine integrale Einheit (410, 461) bilden, die als einstückig geformte Einheit vorgesehen ist, wobei die integrale Einheit (410, 461) und das andere Endstück (420) vorzugsweise jeweils Kopplungsmittel (411-414) aufweisen, die dazu ausgebildet sind, mit einem Klammerelement in der Rahmenöffnung verbunden zu werden, wobei die Kopplungselemente vorzugsweise elastische Eingriffsmittel (413) und Schnappeingriffsmittel (414) aufweisen.
 6. Abschirmungsanordnung nach Anspruch 5, wobei die integrale Einheit (410, 461) und das andere Endstück (420) jeweils Mittel (471) zum Aufnehmen der Lager für die Führungsrolle (470) aufweisen.
 7. Abschirmungsanordnung nach einem der vorhergehenden Ansprüche, wobei eine die Feder-Vorspannkraft bereitstellende Federvorrichtung (480) eine Torsionsfeder beinhaltet, die an einem Ende (482) fest mit einem Endstopfen verbunden ist, der einen auf der Rollenwelle frei rotierbaren Lagerring aufweist, und die an dem anderen Ende (483) in einem Schlitz (466) in der Rollenwelle gesichert ist, wobei die Torsionsfeder vorzugsweise durch ein Trägerelement (490) in dem Schlitz gesichert ist.
 8. Abschirmungsanordnung nach einem der Ansprüche 5 bis 7, wobei die integrale Einheit (410, 461) aus einem Kunststoffmaterial wie Polyamid oder Polyethylen geformt ist.
 9. Abschirmungsanordnung nach einem der Ansprüche 5 bis 8, wobei das andere Endstück (420) als ein geformtes Stück, vorzugsweise aus einem Kunststoffmaterial, wie Polyamid oder Polyethylen, vorgesehen ist.
 10. Abschirmungsanordnung nach einem der vorhergehenden Ansprüche, wobei die Abschirmungsanordnung weiter eine Führungsstange (470) aufweist, und wobei der Abschirmkörper (6) in zueinander entgegengesetzten Richtungen auf die Rollstange (460) und die Führungsstange (470) gewickelt ist, und wobei die Vorderseite des Abschirmkörpers (6) auf der Rollstange (470) in der nichtabschirmenden Position nach innen gerichtet ist.
 11. Abschirmungsanordnung nach einem der Ansprüche 1 bis 10, wobei die obere Schiene (440) sich in

der ersten Längsrichtung zwischen einem ersten Gehrungsende und einem zweiten Gehrungsende erstreckt, und wobei die Abschirmungsanordnung weiter zwei Seitenschienen (8, 9) aufweist, wobei jede der Seitenschienen (8, 9) ein erstes Ende und zweites Gehrungsende aufweist, wobei das zweite Gehrungsende jeder der Schienen (8, 9) dazu angepasst ist, mit dem ersten bzw. mit dem zweiten Gehrungsende der oberen Schiene (440) verbunden zu werden, und wobei die Abschirmungsanordnung weiterhin einen Satz von Winkelklammern (85) aufweist, wobei jede Winkelklammer dazu angepasst ist, mit Aufnahmemitteln in der rückwärtigen Seite der oberen Schiene (440) und in der rückwärtigen Seite der jeweiligen Seitenschiene (8, 9) zusammenzuwirken, wobei die obere Schiene (440) vorzugsweise eine vorbestimmte Höhe und jede der Seitenschienen (8, 9) eine vorbestimmte Breite aufweist, und wobei die vorbestimmte Höhe im Wesentlichen mit der vorbestimmten Breite übereinstimmt, so dass die Gehrungsverbindung eine 45°-Gehrungsverbindung ist.

Revendications

1. Dispositif de protection (1) pour protéger une ouverture d'un cadre, comprenant :

un élément supérieur (4) pourvu d'un côté avant (440),
un élément inférieur (7) pourvu d'un bord supérieur (71) et d'un bord inférieur (72), un accroche-doigts étant défini sur l'élément inférieur, et un corps de protection (6),
ledit corps de protection (6) comprenant un premier bord d'extrémité et un second bord d'extrémité, ledit premier bord d'extrémité étant logé dans l'élément supérieur (4) et le second bord d'extrémité étant fixé au bord supérieur de l'élément inférieur (7), ledit élément inférieur pouvant être déplacé manuellement par actionnement dudit accroche-doigts entre une position de non-protection proche de l'élément supérieur et une position de protection à distance de l'élément supérieur, ledit corps de protection définissant un plan de protection, ledit élément supérieur (4) logeant une barre à rouleaux (460) et une barre de guidage (470),

caractérisé en ce que

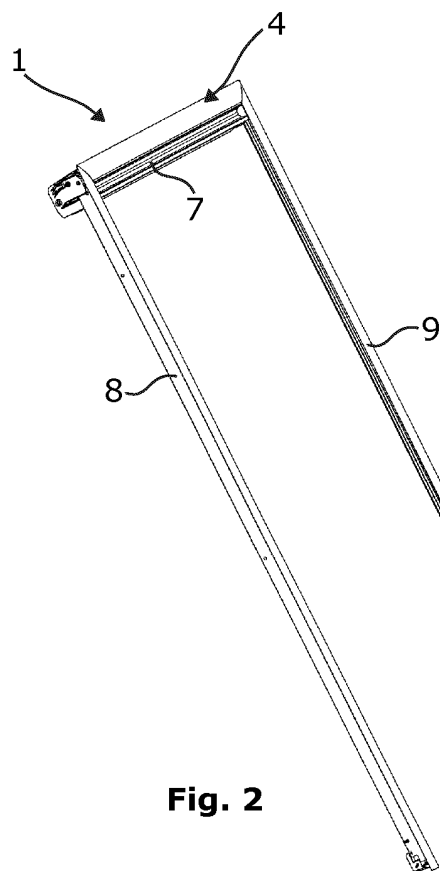
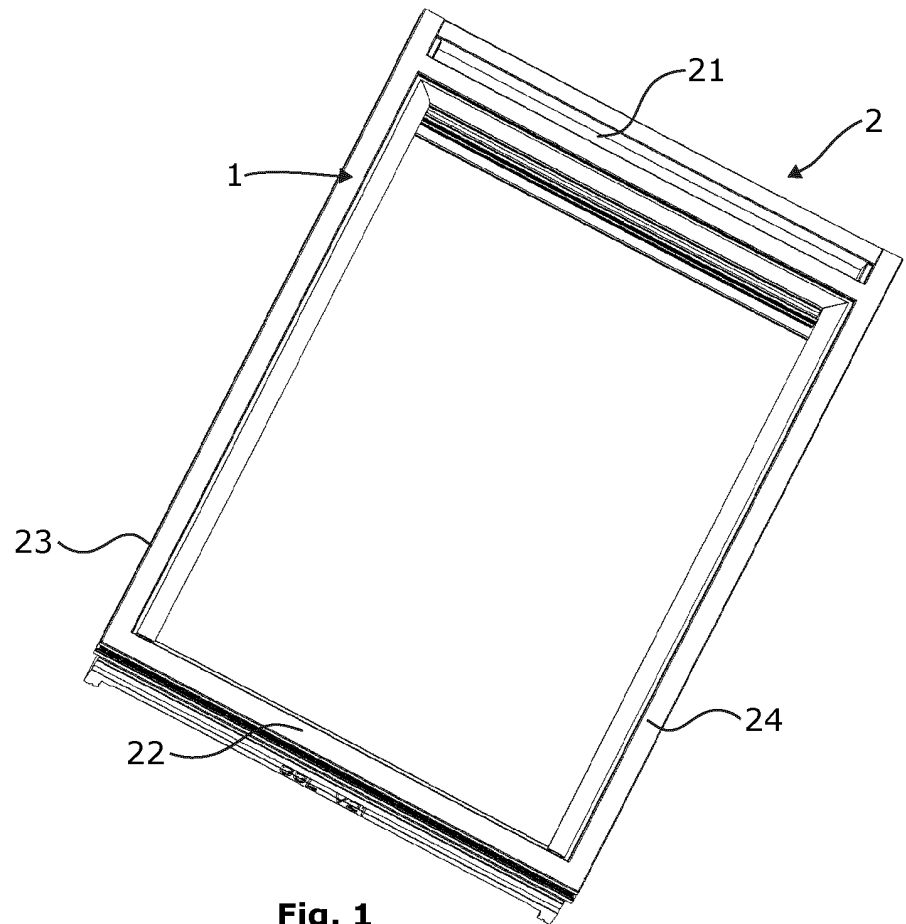
l'élément supérieur (4) est pourvu d'un rail supérieur (440) formant le côté avant de l'élément supérieur et étant relié à un couvercle (430) de l'élément supérieur (4), ledit couvercle (430) comprenant une partie de couvercle supérieure (431) et une partie de couvercle arrière (432),

la barre à rouleaux (460) étant positionnée plus près de la partie de couvercle arrière (432) et plus loin de la partie de couvercle supérieure (431) que la barre de guidage (470),
l'élément supérieur (4) est pourvu de dimensions telles que le bord supérieur (71) de l'élément inférieur (7) est adapté pour chevaucher légèrement, dans la position de non-protection, le bord inférieur (444) du rail supérieur (440) de l'élément supérieur (4), le léger chevauchement se situe dans l'intervalle de 1 à 10 mm, de préférence de 2 à 8 mm, plus préférablement de 4 à 6 mm,
l'élément inférieur (7) est positionné au-dessous de la barre de guidage (470) dans la position de non-protection, et
l'élément inférieur (7) a la forme générale d'un U entre les bords supérieur et inférieur (71, 72) qui comprend une barre (74, 75) d'un seul tenant en saillie dans la direction de la partie de couvercle arrière (432), l'accroche-doigts (73) étant réalisé par ladite forme en U.

2. Dispositif de protection selon la revendication 1, dans lequel l'élément inférieur (7) est positionné sensiblement à la même hauteur que la barre à rouleaux (460) dans la position de non-protection, le bord inférieur (72) de l'élément inférieur (7) étant positionné au même niveau, ou légèrement plus haut, que la partie la plus basse du corps de protection (6) stocké sur la barre à rouleaux (460).
3. Dispositif de protection selon la revendication 1, dans lequel la partie supérieure (74) de ladite barre en position de non-protection est située immédiatement au-dessous de la barre de guidage (470) et la partie arrière (75) de la barre est située immédiatement devant la partie avant du corps de protection (6) stocké sur la barre à rouleaux (460).
4. Dispositif de protection selon l'une quelconque des revendications précédentes, dans lequel la barre à rouleaux (460) et la barre de guidage (470) ont sensiblement la même longueur, le même diamètre et la même épaisseur de matière.
5. Dispositif de protection selon l'une quelconque des revendications précédentes, dans lequel l'élément supérieur (4) comprend deux pièces d'extrémité (410, 420), dans lequel la barre à rouleaux (460) étant poussée par ressort (480) et montée sur un axe de rouleau (461), et dans lequel ledit axe de rouleau (461) et l'une des pièces d'extrémité (410) constituent une unité monobloc (410, 461) prévue sous la forme d'une unité moulée d'une pièce, l'unité monobloc (410, 461) et l'autre pièce d'extrémité (420) comprenant de préférence chacune des moyens de couplage (411 à 414) adaptés pour être

- reliés à un élément de support prévu dans l'ouverture du cadre,
l'élément de couplage comprenant de préférence des moyens d'engagement élastiques (413) et des moyens d'engagement par encliquetage (414). 5
6. Dispositif de protection selon la revendication 5, dans lequel l'unité monobloc (410, 461) et l'autre pièce d'extrémité (420) comprennent chacune des moyens (471) destinés à recevoir les roulements du rouleau de guidage (470). 10
7. Dispositif de protection selon l'une quelconque des revendications précédentes, dans lequel un dispositif à ressort (480) fournissant la poussée par ressort, comprend un ressort de torsion qui est fixé solidement, dans une extrémité (482), à un bouchon d'extrémité comportant une bague de roulement pouvant tourner librement sur ledit axe de rouleau, et, qui est immobilisé, dans l'autre extrémité (483), dans une fente (466) dans l'axe de rouleau, le maintien du ressort de torsion dans la fente étant de préférence assuré au moyen d'un élément de support (490). 20 25
8. Dispositif de protection selon l'une quelconque des revendications 5 à 7, dans lequel ladite unité monobloc (410, 461) est moulée à partir d'une matière plastique, telle que du polyamide ou du polyéthylène. 30
9. Dispositif de protection selon l'une quelconque des revendications 5 à 8, dans lequel l'autre pièce d'extrémité (420) est prévue sous la forme d'une pièce moulée, de préférence à partir d'une matière plastique, telle que du polyamide ou du polyéthylène. 35
10. Dispositif de protection selon l'une quelconque des revendications précédentes, dans lequel le dispositif de protection comprend en outre une barre de guidage (470), et dans lequel le corps de protection (6) est enroulé dans des directions mutuellement opposées sur la barre à rouleaux (460) et la barre de guidage (470), et dans lequel le côté avant du corps de protection (6) est dirigé vers l'intérieur sur la barre à rouleaux (470) dans la position de non-protection. 40 45
11. Dispositif de protection selon l'une quelconque des revendications 1 à 10, dans lequel ledit rail supérieur (440) s'étend dans ladite première direction longitudinale entre une première extrémité en onglet et une seconde extrémité en onglet, et dans lequel le dispositif de protection comprend en outre deux rails latéraux (8, 9), chacun desdits rails latéraux (8, 9) comportant une première extrémité et une seconde extrémité en onglet, la seconde extrémité en onglet de chaque rail latéral (8, 9) étant adaptée pour être jointe à la première et à la seconde extrémité en onglet, respectivement, dudit rail supérieur (440), et 50 55

que le dispositif de protection comprend en outre un ensemble d'attaches angulaires (85), chaque attache angulaire étant adaptée pour coopérer avec des moyens de réception dans le côté arrière du rail supérieur (440) et dans le côté arrière du rail latéral respectif (8, 9),
le rail supérieur (440) ayant de préférence une hauteur prédéterminée et chaque rail latéral (8, 9) ayant une largeur prédéterminée, et dans lequel ladite hauteur prédéterminée étant sensiblement la même que ladite largeur prédéterminée, le joint en onglet étant ainsi un joint à onglet de 45°C.



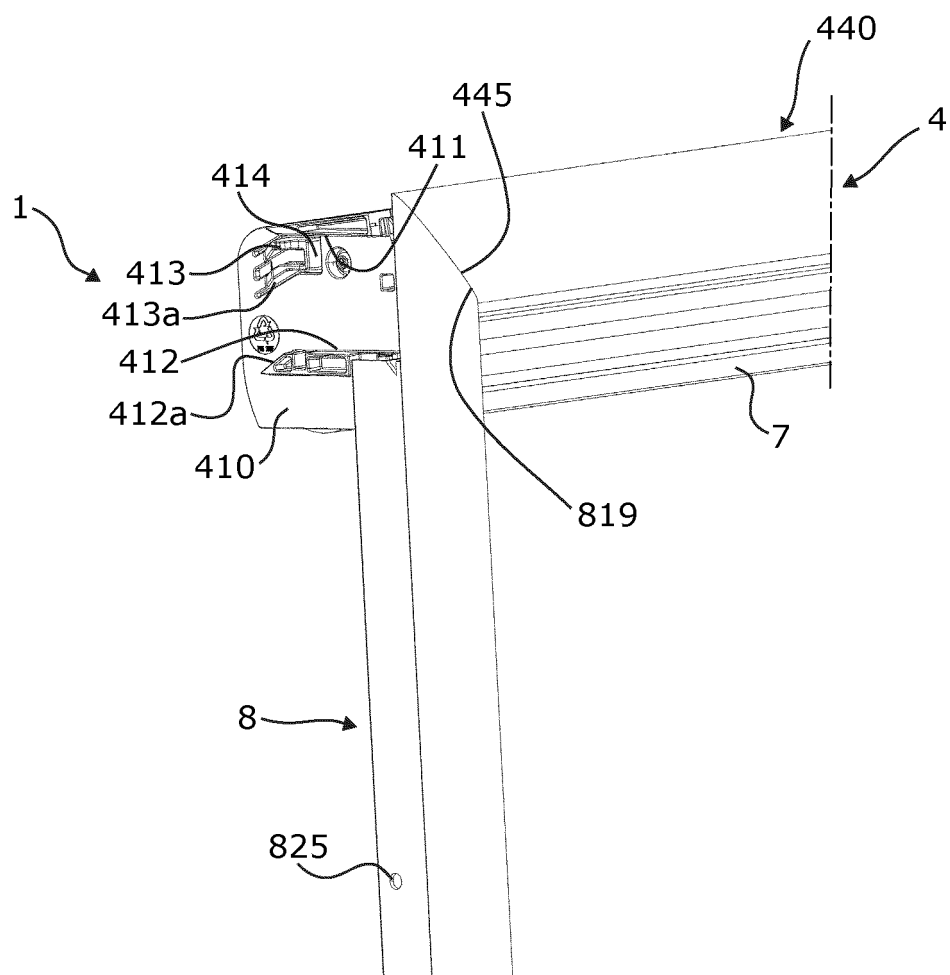


Fig. 3

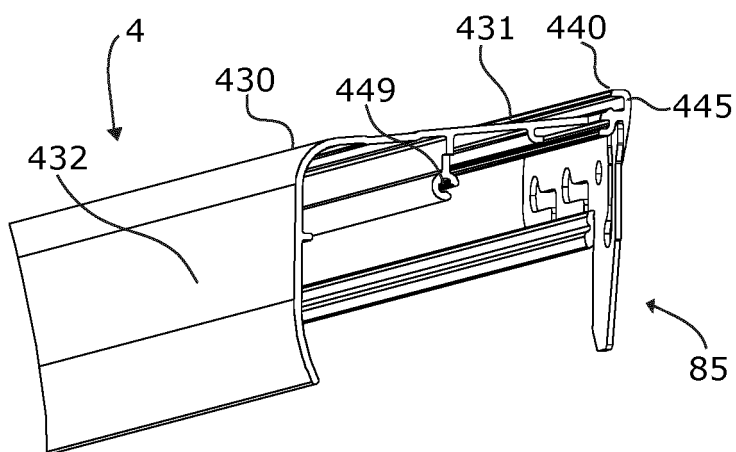


Fig. 4

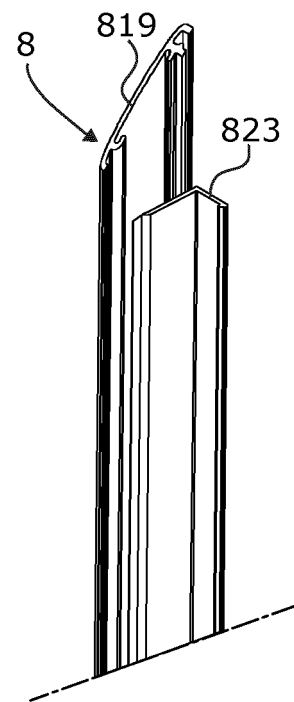


Fig. 5

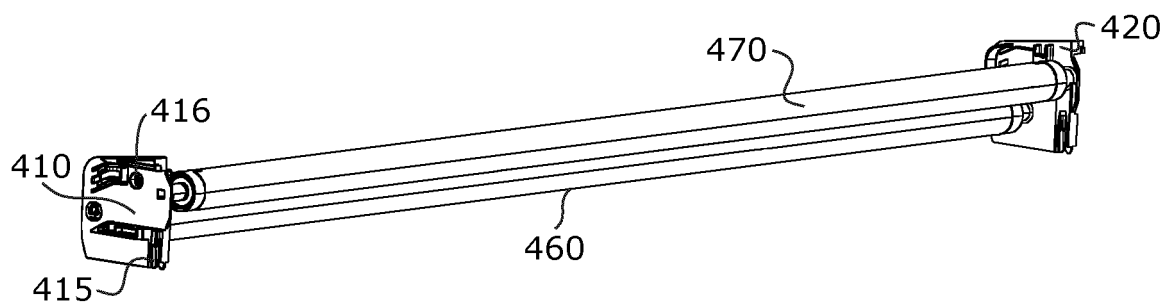


Fig. 6

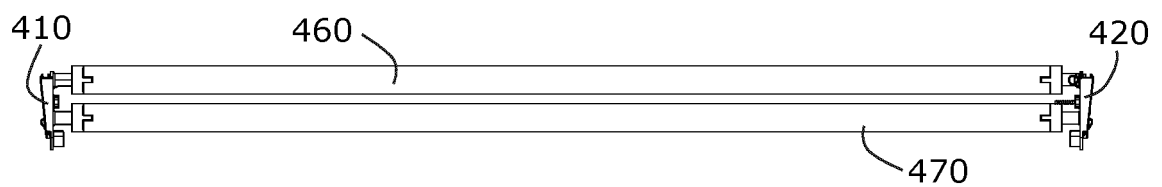


Fig. 7

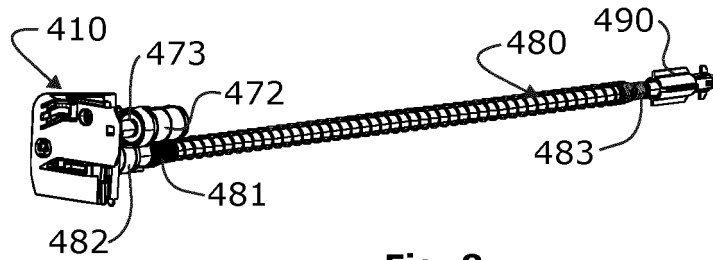


Fig. 8

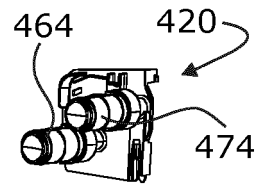


Fig. 9

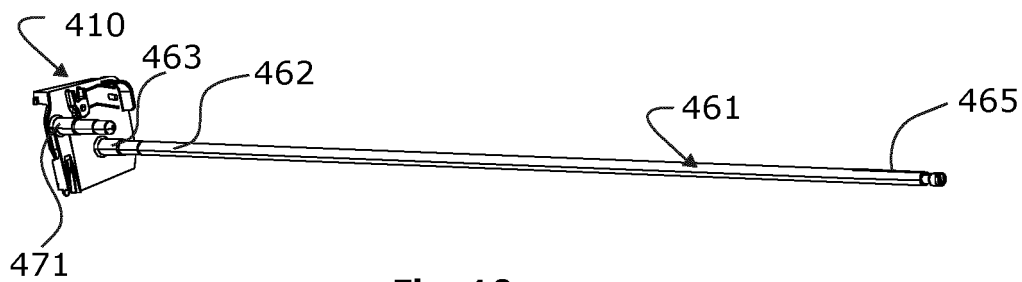


Fig. 10

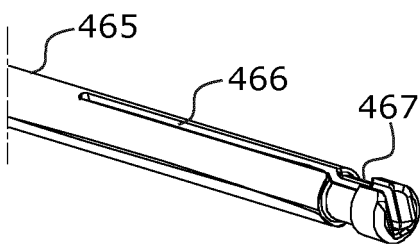


Fig. 11

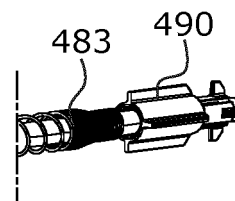


Fig. 12

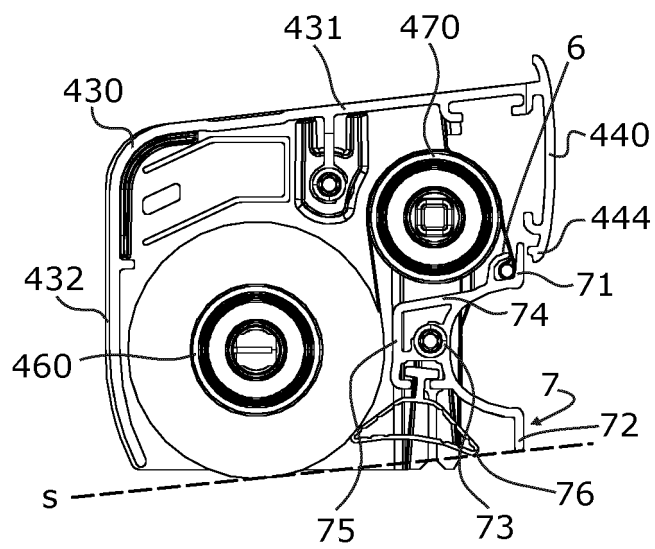


Fig. 13

REFERENCES CITED IN THE DESCRIPTION

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