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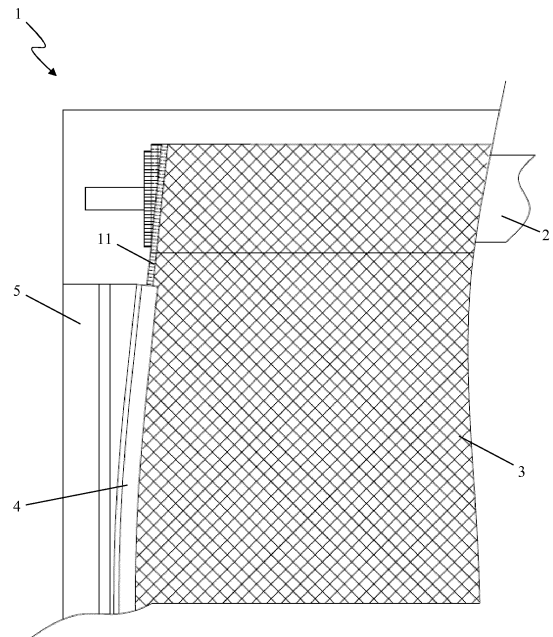
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(54) **Screen device**

(57) The present invention relates to a screen device (1) comprising a screen (3) which can be rolled up onto and unrolled from a screen roller (2), the lateral sides of which are guided in screen guide profiles (4) which are arranged in a slot (8) in a securing rail (5), in which the slot (8) is formed by a bottom (6) and two upright sides (7a, 7b). Said screen device (1) is less susceptible to wear due to the fact that, between the shoulders (9a, 9b) of the securing rail (5) and flanges (14a, 14b) of the screen guide profile (4) which partly extend behind the shoulders (9a, 9b), intermediate elements (16a, 16b) are fitted, the size of which, measured in the direction from the shoulders (9a, 9b) towards the flanges (14a, 14b), is smaller closer to the screen roller (2) than further away from the latter.



**FIG. 1**

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## Description

**[0001]** The present invention relates to a screen device comprising:

- a screen roller;
- a screen which can be rolled onto and unrolled from the screen roller;
- a screen guide profile on each lateral side of the screen into which the corresponding lateral side of the screen can be fitted in order to guide said lateral side during the rolling/unrolling movement;
- and a securing rail on each lateral side of the screen, comprising:
  - a bottom;
  - two upright sides which delimit a slot, in which the corresponding screen guide profile is fitted in the mounted position;
  - and a shoulder on both sides of the slot;

in which the screen guide profile comprises two flanges each of which, in the mounted position, extends at least partly behind a corresponding shoulder of the securing rail.

**[0002]** Such a screen is usually used to screen off a doorway or window opening or to cover a terrace. With such screen devices, it is found that the screen guide profiles wear more quickly closer to the screen roller than further away from the screen roller, as the screen is moved up and down more often in the section closer to the screen roller than the section further away from the screen roller. In any case, the screen will pass close to the screen roller more often than further away from it, as the screen is not lowered completely every time. If, in addition, the screen is tensioned laterally, this problem is further exacerbated. It is possible to consider tensioning the screen to a lesser degree in order to limit this type of wear, but this will lead to the drawbacks which are associated with a non-tensioned screen. The screen will flap in the wind and sag.

**[0003]** A solution could be sought in the form of a screen device as described in JP 2004-308170 A. In this case, the screen guide profiles are made up of two parts, after an incision has been made, and are connected by a back. The flanges of the upper part of the screen guide profiles narrow in a conical tapering manner. Thus, the screen guide profiles are provided in the securing rail with more play at their upper side in order to ensure that a rolled-up screen will slip out of these screen guide profiles less easily. However, due to this play, the tension acting on the screen is also slightly reduced locally, closer to the screen roller.

However, the flanges of the upper part of the screen guide profiles become so narrow, that they are at risk of breaking. The flanges breaking or being completely removed at the location of the upper part of the screen guide profiles leads to a risk of breakage at the location of the back,

in particular with changing temperatures and loads.

The additional play which is created in this manner is moreover very limited in view of the limited thickness of the flanges.

- 5 The upper part of the screen guide profiles, above the back, is only a few cm long, so that a notch or bend is required to make this part bend. However, a screen in such screen devices is usually provided with flexible thickenings on its lateral sides, such as, for example a half zip, in order to improve guidance thereof in the screen guide profile. However, these flexible thickenings cause the screen to become caught more easily in the screen guide profile at the location of this bend. A further drawback is the fact that the bend renders fitting of the screen guide profile in a securing rail (lateral guide) more difficult. In addition, the screen guide profile will also wear more quickly at the location of the bend.

**[0004]** It is therefore an object of the present invention to provide a better solution to the aforementioned problem of wear without encountering the drawbacks of the partial solution offered by the screen device from JP 2004-308170 A.

**[0005]** This object is achieved by providing a screen device, comprising:

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- a screen roller;
  - a screen which can be rolled onto and unrolled from the screen roller;
  - a screen guide profile on each lateral side of the screen into which the corresponding lateral side of the screen can be fitted in order to guide said lateral side during the rolling/unrolling movement; and
  - a securing rail on each lateral side of the screen, comprising:
    - a bottom;
    - two upright sides which delimit a slot, in which the corresponding screen guide profile is fitted in the mounted position;
    - and a shoulder on both sides of the slot;

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- in which the screen guide profile comprises two flanges each of which, in the mounted position, extends at least partly behind a corresponding shoulder of the securing rail and in which the screen device comprises intermediate elements which, in the mounted position, extend at least partly between the shoulders of at least one securing rail and the corresponding flanges of at least one screen guide profile which are configured such that their size, in the mounted position measured in the direction from the shoulders towards the flanges, is smaller closer to the screen roller and varies in such a manner that this size increases in the unrolling direction of the screen.

**[0006]** Due to the fact that the intermediate elements ensure that the screen guide profile nearer to the screen

roller comes closer to the shoulders, the screen guide profiles on either side of the screen will also be able to come closer together locally here, without said screen guide profiles having to be provided with a bend for this purpose. As a result, the tension on the screen is lower closer to the screen roller than further away from the screen roller. If the lateral sides of the screen are provided with flexible thickenings which are accommodated in the screen guide profiles in a guiding manner, the compressive stress between said flexible thickenings and the screen guide profile is lower on the side of the screen roller.

**[0007]** According to the invention, the tension on the screen is thus reduced locally where wear is greatest, without the known drawbacks of the screen device from JP 2004-308170 A. There is no risk of the flanges breaking, as these do not have to be narrowed. Likewise, there is no risk of breakage at the location of a back, as no incision has to be made in a screen guide profile. The distance across which the screen guide profile can bend can be much greater than the upper part of the screen guide profile of the screen device from JP 2004-308170A. The inward bending of the screen guide profile can also be much greater than the thickness of its flanges. The greatest abovementioned size of the intermediate elements can be selected to be a multiple of the thickness of the flanges. Optionally, the depth of the slot in the securing rail will have to be modified to this end.

If the screen is provided with flexible thickenings on its lateral side, these cannot become caught in the screen guide profile since no bend or notch in the screen guide profile is required.

**[0008]** In a first more specific embodiment, at least part of said intermediate elements is connected to the corresponding shoulders of the securing rail. In this case, these may be fixedly connected to the shoulders of the securing rail, for example, if this securing rail is produced by means of extrusion, by providing intermediate elements as upright edges on the securing rail having the greatest abovementioned size along the entire lateral side and to then partly mill these off. It is, for example, also possible to provide separate intermediate elements which can be attached to the securing rail. In this case, no finishing treatment of the securing rail (such as milling) is required, but the intermediate elements will have to be attached to the securing rail during installation.

**[0009]** In particular, the at least one securing rail of a screen device according to the invention may comprise a collar at the ends of its upright sides, away from the bottom, which collar partly delimits the slot, wherein the corresponding intermediate element forms part of an upright edge which extends towards the bottom along said collar.

**[0010]** In a second more specific embodiment, at least part of said intermediate elements is connected to the flanges of the corresponding screen guide profile. In this case as well, these intermediate elements may, for example, be fixedly connected to the flanges of the screen

guide profile, if the screen guide profile is produced by means of extrusion, by first providing intermediate elements, for example, as upright edges on the flanges having the greatest abovementioned size along the entire lateral side and to then partly mill these off. The flanges themselves are not milled off, as with the screen device from JP 2004-308170 A. It is also, for example, possible to provide separate intermediate elements on the screen guide profile in a detachable manner. In this case, no additional finishing treatment of the screen guide profile (such as milling thereof) is required, but the intermediate elements will have to be attached to the screen guide profile during installation. Preferably, the screen guide profile is always produced as a single piece, in which case it remains uninterrupted along its entire length. The flanges of such a screen guide profile are preferably also produced as a single piece and uninterrupted along the entire length of the screen guide profile. Only one single screen guide profile is preferably provided for each lateral side of the screen as well.

**[0011]** Alternatively, but less preferred, the intermediate elements may also be provided as separate elements which are not attached to the securing rail or to the screen guide profile. Such separate intermediate elements then each extend preferably along the entire length of the securing rail and/or the screen guide profile, so that said size thereof is always the desired size at every location. With separate intermediate elements, which are to be fitted at an intermediate space from one another between these profiles across the height of the securing rail and the screen guide profile in order to achieve the desired size at each height, these are preferably attached to the securing rail and/or to the screen guide profile in order to prevent that, during use, said size of the intermediate elements starts to deviate from the desired size at a certain height.

**[0012]** With a particular embodiment of a screen device according to the present invention, at least part of the intermediate elements is designed to be resilient. In this way, these intermediate elements can simultaneously also serve to suspend the screen guide profile with respect to the securing rail and/or to dampen, so that no separate elements have to be provided for this purpose. Sprung intermediate elements can, for example, also be provided in the screen guide profile and/or in the securing rail in a readily (detachably) attachable manner. To this end, the screen guide profile and/or the securing rail may, for example, be provided with fastening slots in which these intermediate elements can be fixed, due to their suspending properties.

**[0013]** Preferably, the at least one screen guide profile of a screen device according to the present invention is designed to be flexible, so that the shape of this screen guide profile can automatically adapt to the shape of the corresponding intermediate elements. Thus, this screen guide profile can adjoin these intermediate elements everywhere, without itself exhibiting a bend. Any stresses which occur can thus be transferred between these com-

ponents of the screen device in an optimum manner. At the locations where the intermediate elements exhibit a bend, the movement of the lateral side of the screen in the screen guide profile will still be carried out smoothly, due to the corresponding screen guide profile being designed to be flexible, thus preventing it from becoming stuck. The wear of the screen guide profile is also more limited than if the screen guide profile itself were to be provided completely with a bend. Preferably, the flexibility of the screen guide profile is selected as a compromise between sufficient flexibility, enabling it to adapt quickly in order to bear against the intermediate elements, and sufficient rigidity in cross section, preventing the lateral side of the screen from breaking free therefrom.

**[0014]** The size of the intermediate elements of a screen device according to the invention preferably varies in such a manner that, when the screen is unrolled, the at least one screen guide profile extends substantially according to a continuous and curved line. In this way, the guide of the screen has a continuous, gradual transition. The tension on the screen will also be built up gradually, so that the screen is not subjected to sudden changes in tension, provided there are no external loads during normal use.

**[0015]** In order to keep the screen under optimum tension, the size of the intermediate elements in the mounted position, viewed in the direction of the shoulders towards the flanges, preferably remains substantially the same over at least half the length of the corresponding securing rail, adjacent to the end which is arranged away from the screen roller in the mounted position.

**[0016]** A particularly preferred embodiment of a screen device according to the present invention comprises a bottom slat which is fitted on the side of the screen opposite the side where the screen is rolled up and unrolled, comprises one or more lath guide elements which are attached to the ends of the bottom slat and comprises a lath guide profile on each lateral side of the screen into which one or more corresponding lath guide elements can be fitted in order to guide the bottom slat during the rolling/unrolling movement of the screen, with the screen guide profile and the lath guide profile being arranged behind one another on the same side of the screen, viewed in a direction at right angles to the plane of the unrolled screen.

**[0017]** The object of the present invention is furthermore also achieved by providing a terrace covering which comprises a screen device according to the present invention.

**[0018]** The present invention will now be explained in more detail with reference to the following detailed description of a preferred embodiment of a screen device according to the present invention. This description is solely aimed at giving illustrative examples and to indicate further advantages and features of this screen device and can thus by no means be interpreted as a limitation of the area of application of the invention or of the patent rights defined in the claims.

**[0019]** In this detailed description, reference numerals are used to refer to the attached drawings, in which:

- **Figure 1** diagrammatically shows a front view of the top left-hand corner of a screen device according to the present invention with an open screen casing and a lateral guide in cross section;
- **Figure 2** shows a first embodiment of the right-hand lateral guide of the screen device from Figure 1 in perspective, in longitudinal section, to illustrate the screen guide profile which is fitted therein and which is not shown in cross section;
- **Figure 3** shows a front view of the first embodiment of the right-hand lateral guide of the screen device from Figure 1, in longitudinal section, to illustrate the screen guide profile which is fitted therein and which is not shown in cross section;
- **Figure 4** shows a front view of the first embodiment of the right-hand lateral guide of the screen device from Figure 1, in longitudinal section as shown in Figure 3, without the screen guide profile;
- **Figure 5** shows a separate front view of the right-hand screen guide profile of the screen device from Figure 1, in the position it is accommodated in the lateral guide from Figure 3;
- **Figure 6** shows a right-hand part of the screen device from Figure 1, in cross section through the first embodiment of the right-hand lateral guide along the axis AA', as indicated in Figure 3;
- **Figure 7** shows a right-hand part of the screen device from Figure 1, in cross section through the first embodiment of the right-hand lateral guide along the axis BB', as indicated in Figure 3;
- **Figure 8** shows a front view of a second embodiment of the right-hand lateral guide of the screen device from Figure 1, in longitudinal section, with intermediate elements arranged therein and without screen guide profile;
- **Figure 9** shows the second embodiment of the right-hand lateral guide of the screen guide from Figure 1, in cross section along the axis CC', as indicated in Figure 8, with the screen guide profile and the screen arranged in the screen guide profile;
- **Figure 10** shows the second embodiment of the right-hand lateral guide of the screen guide from Figure 1, in cross section along the axis DD', as indicated in Figure 8, with the screen guide profile and the screen arranged in the screen guide profile;
- **Figure 11** shows the second embodiment of the right-hand lateral guide of the screen guide from Figure 1, in cross section along the axis EE', as indicated in Figure 8, with the screen guide profile and the screen arranged in the screen guide profile;
- **Figure 12** shows the second embodiment of the right-hand lateral guide of the screen guide from Figure 1, in cross section along the axis FF', as indicated in Figure 8, with the screen guide profile and the screen arranged in the screen guide profile.

**[0020]** The screen device (1) illustrated in Figure 1 comprises a screen (3) which can be rolled up onto and unrolled from a screen roller (2). On one side, the screen (3) is attached to the screen roller (2) to this end. The screen (3) is provided on both its lateral sides with a half zip (11) which forms a flexible thickening (11) of said lateral sides. Numerous alternatives for such a half zip (11) are also known as a flexible thickening, such as, for example, a string which is provided in the lateral edge of the screen, etc.

**[0021]** During the rolling/unrolling movement of the screen (3), the flexible thickening (11) of each lateral side is guided in a cavity (12) (see Figure 2) in a screen guide profile (4), as can be seen in Figures 6, 7 and 9-12. In this case, the screen (3) extends through an access opening (13) to said cavity (12) (see Figure 2).

**[0022]** The screen guide profiles (4) of the screen device (1) are accommodated in turn in corresponding slots (8) in lateral guides (5) which also serve as securing rails (5), as can be seen in Figures 1-3, 6-7, 9-12. These securing rails (5) extend virtually at right angles to the screen roller (2), on both lateral sides of the screen (3). Each lateral guide (5) comprises a bottom (6) and two upright sides (7a, 7b) which delimit said slot (8). At the ends of the upright sides (7a, 7b), away from the bottom (6), each lateral guide (5) furthermore comprises a collar (10a, 10b) which partly delimits the slot (8).

**[0023]** Said collar (10a, 10b) is provided with upright edges (9a, 9b, 16a, 16b) which extend substantially parallel to the upright sides (7a, 7b) towards the bottom (6). Said upright edges (9a, 9b, 16a, 16b) comprise shoulders (9a, 9b) behind which the flanges (14a, 14b) of the screen guide profile (4) partly extend.

**[0024]** In the first embodiment of the lateral guide (5), as illustrated in Figures 2-3 and 6-7, the upright edges (9a, 9b, 16a, 16b) adjacent to the shoulders (9a, 9b) comprise intermediate elements (16a, 16b). Alternatively, it would, for example, also be possible to provide upright edges parallel to the collar (10a, 10b) and substantially at right angles to the upright sides (7a, 7b) as shoulders and/or intermediate elements. It is also possible, for example, to provide the ends of the upright sides (7a, 7b) with thickenings which simultaneously serve as collars and as shoulders.

The intermediate elements (16a, 16b) of this first embodiment may be formed integrally with the lateral guide (5) by, for example, producing said lateral guide (5) by means of extrusion, in which case the upright edges (9a, 9b, 16a, 16b) are designed to be of maximum height and are, for example, milled off in order to form the desired intermediate elements (16a, 16b).

As can clearly be seen in Figure 4, the intermediate elements (16a, 16b) in this embodiment have a length which is equal to the length of the lateral guide (5) and said intermediate elements (16a, 16b), for well over half their length, adjacent to the end which is arranged away from the screen roller (2) in the mounted position, extend substantially parallel to the bottom (6) and said interme-

mediate elements (16a, 16b), towards the screen roller (2), gradually extend further and further from the bottom (6).

**[0025]** The intermediate elements (16a, 16b) from the second embodiment, as illustrated in Figures 8-12, do not form an integral part of the lateral guide (5), but are fitted in a fastening slot of said lateral guide (5) as separate elements (16a, 16b). In this case, the intermediate elements (16a, 16b) are much shorter than the length of the lateral guide (5), with several intermediate elements (16a, 16b) in each case being arranged at an intermediate distance apart, distributed along the length of the lateral guide (5). Closer to the screen roller (2), their size, measured in the mounted position in the direction from the shoulders (9a, 9b) towards the flanges (14a, 14b), is smaller than further away from the screen roller (2) and it varies in such a manner that said size increases in the direction of unrolling of the screen (3). With the upper three intermediate elements (16a, 16b), this size varies with these intermediate elements (16a, 16b) themselves. With the lower four intermediate elements (16a, 16b), said size remains the same.

Where said size of the intermediate elements (16a, 16b) changes most significantly, the intermediate elements (16a, 16b) are arranged at a shorter distance from each other in order to be able to support the screen guide profile (4) as efficiently as possible, so that this profile (4) follows a curved line which, with an unrolled screen (3), is as continuous as possible. Where the size of the intermediate elements (16a, 16b) varies less, or remains the same, the intermediate elements (16a, 16b) can be arranged further apart. In this case, the lower four intermediate elements (16a, 16b) which are of equal size together extend along more than half of the length of the lateral guide (5).

**[0026]** The screen guide profiles (4) in turn are designed to be flexible, so that these are able to adjoin the shape of the intermediate elements (16a, 16b) of the lateral guides (5) in both embodiments as securely as possible, extend substantially according to a continuous and curved line when the screen (3) is unrolled, as can be seen in the figures.

**[0027]** In this way, the ends of the screen guide profiles (4) are closer to each other closer to the screen roller (2), so that the screen (3) is subjected less to tension closer to the screen roller (2) and is subjected less to wear. Due to the fact that the screen guide profiles (4) run parallel to each other along more than half of their length, the screen (3) can be kept under sufficient tension to prevent it from flapping or sagging, etc.

**[0028]** In the second embodiment, the intermediate elements (16a, 16b) are of flexible design, so that they can serve to dampen the movements of the screen guide profile (4) as damping elements (15a, 15b) at the same time. To this end, said intermediate elements (16a, 16b) are sufficiently elastic to be able to perform a damping action, yet sufficiently rigid to support screen guide profile (4) in a satisfactory manner.

In the first embodiment, separate damping elements

(15a, 15b) are fitted in a fastening slot of the lateral guide (5) and extend between the collar (10a, 10b) of the securing rail (5) and the flanges (14a, 14b) of the screen guide profile (4).

**[0029]** On the side of the screen (3) opposite the side where the screen (3) is being rolled up onto and unrolled from the screen roller (2), a bottom slat (17) is fitted, which has been shown in Figures 6 and 7. At the ends of the bottom slat (17), guide wheels (18) are attached which are fitted in a lath guide profile (19) in a guiding manner in order to guide the bottom slat (17) during the rolling/unrolling movement of the screen (3). The screen guide profile (4) and the lath guide profile (19) on the same side of the screen (3) are arranged one behind the other, viewed in a direction at right angles to the plane of the unrolled screen (3). The lath guide profile (19) is of rigid design and extends substantially along a straight line in its longitudinal direction. As a result thereof, the path travelled by the guide wheels (18) of the bottom slat (17) is substantially rectilinear, while the flexible lateral thickening (11) of the screen (3) is guided along a smooth curved line in the screen guide profile (4). If a tensioning system is fitted in such a screen device, in which the screen is kept under tension in the unrolling direction by means of a tensioning belt or tensioning string or tensioning cable which is attached to an end of the bottom slat at its one end, then this tensioning belt or tensioning string or tensioning cable can continue to run straight.

**[0030]** The illustrated screen device (1) may, for example, form part of a terrace covering used to cover a terrace.

## Claims

### 1. Screen device (1) comprising:

- a screen roller (2);
  - a screen (3) which can be rolled onto and unrolled from the screen roller (2);
  - a screen guide profile (4) on each lateral side of the screen (3) into which the corresponding lateral side of the screen (3) can be fitted in order to guide said lateral side during the rolling/unrolling movement; and
  - a securing rail (5) on each lateral side of the screen (3), comprising:
    - a bottom (6);
    - two upright sides (7a, 7b) which delimit a slot (8), in which the corresponding screen guide profile (4) is fitted in the mounted position; and
    - a shoulder (9a, 9b) on both sides of the slot (8); in which the screen guide profile (4) comprises two flanges (14a, 14b) each of which, in the mounted position, extends at least partly behind a corresponding shoulder (9a, 9b) of the securing rail (5);
- characterized in that** the screen device (1)

comprises intermediate elements (16a, 16b) which, in the mounted position, extend at least partly between the shoulders (9a, 9b) of at least one securing rail (5) and the corresponding flanges (14a, 14b) of at least one screen guide profile (4) which are configured such that their size, in the mounted position measured in the direction from the shoulders (9a, 9b) towards the flanges (14a, 14b), is smaller closer to the screen roller (2) than further away from the screen roller (2) and varies in such a manner that this size increases in the unrolling direction of the screen (3).

2. Screen device (1) according to Claim 1, **characterized in that** at least part of the intermediate elements (16a, 16b) is connected to the shoulders (9a, 9b).
3. Screen device (1) according to one of the preceding claims, **characterized in that** the at least one securing rail (5) comprises a collar (10a, 10b) at the ends of the upright sides (7a, 7b), away from the bottom (6), which collar partly delimits the slot (8), and **in that** the corresponding intermediate element (16a, 16b) forms part of an upright edge (9a, 9b, 16a, 16b) which extends towards the bottom (6) along said collar (10a, 10b).
4. Screen device (1) according to one of the preceding claims, **characterized in that** at least part of the intermediate elements (16a, 16b) is connected to the flanges (14a, 14b).
5. Screen device (1) according to one of the preceding claims, **characterized in that** at least part of the intermediate elements (16a, 16b) is designed to be resilient.
6. Screen device (1) according to one of the preceding claims, **characterized in that** the at least one screen guide profile (4) is designed to be flexible.
7. Screen device (1) according to one of the preceding claims, **characterized in that** said size of the intermediate elements (16a, 16b) varies in such a manner that, when the screen (3) is unrolled, the at least one screen guide profile (4) extends substantially according to a continuous and curved line.
8. Screen device (1) according to one of the preceding claims, **characterized in that** said size of the intermediate elements (16a, 16b) in the mounted position, viewed in the direction of the shoulders (9a, 9b) towards the flanges (14a, 14b), remains substantially the same over at least half the length of the corresponding securing rail (5), adjacent to the end which is arranged away from the screen roller (2) in the mounted position.

9. Screen device (1) according to one of the preceding claims, **characterized in that** the screen device (1) comprises a bottom slat (17) which is fitted on the side of the screen (3) opposite the side where the screen (3) is rolled up and unrolled, comprises one or more lath guide elements (18) which are attached to the ends of the bottom slat (17) and comprises a lath guide profile (19) on each lateral side of the screen (3) into which one or more corresponding lath guide elements (18) can be fitted in order to guide the bottom slat (17) during the rolling/unrolling movement of the screen (3), with the screen guide profile (4) and the lath guide profile (19) being arranged behind one another on the same side of the screen (3), viewed in a direction at right angles to the plane of the unrolled screen (3).
10. Terrace covering, comprising a screen device (1) according to one of the preceding claims.

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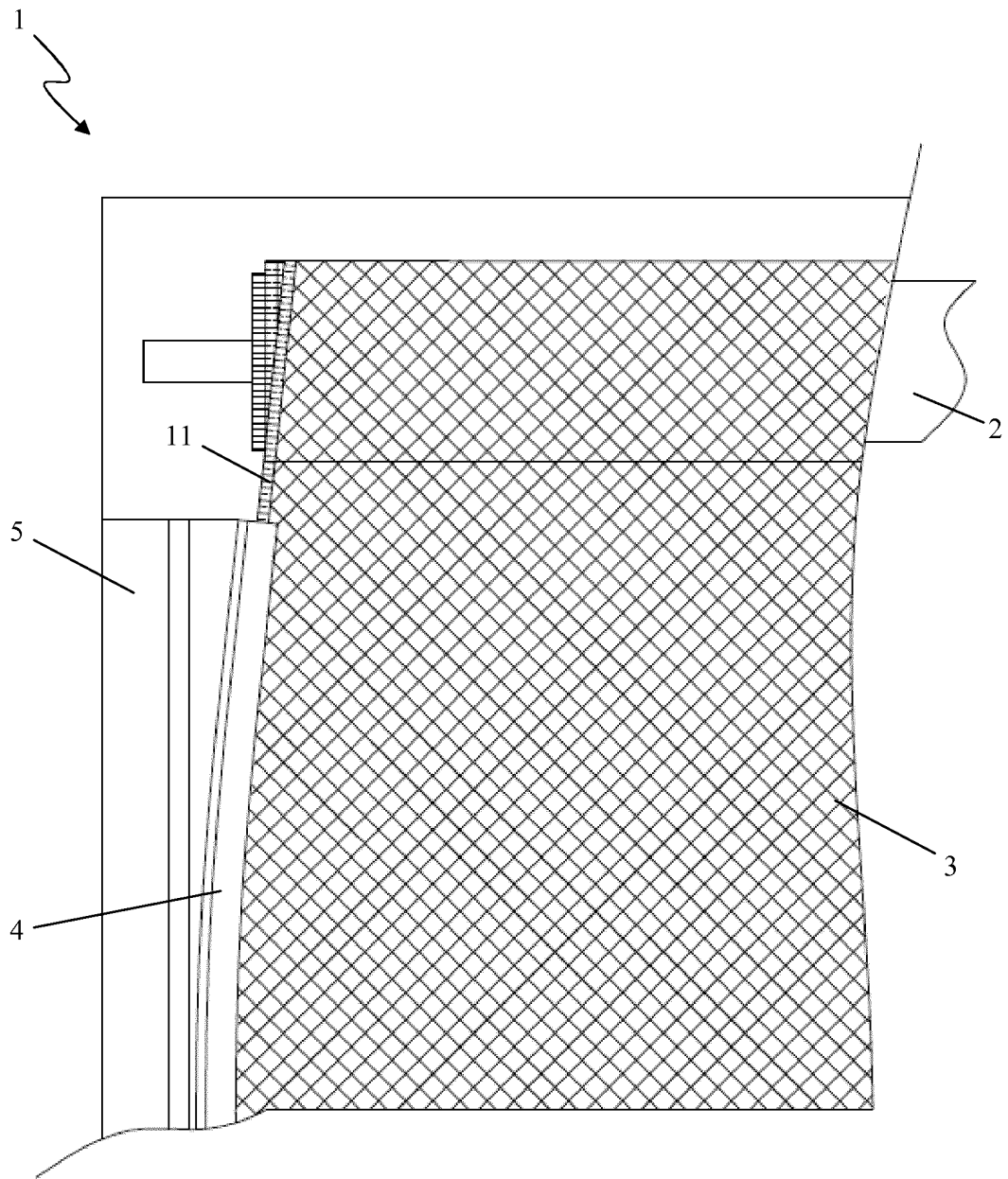
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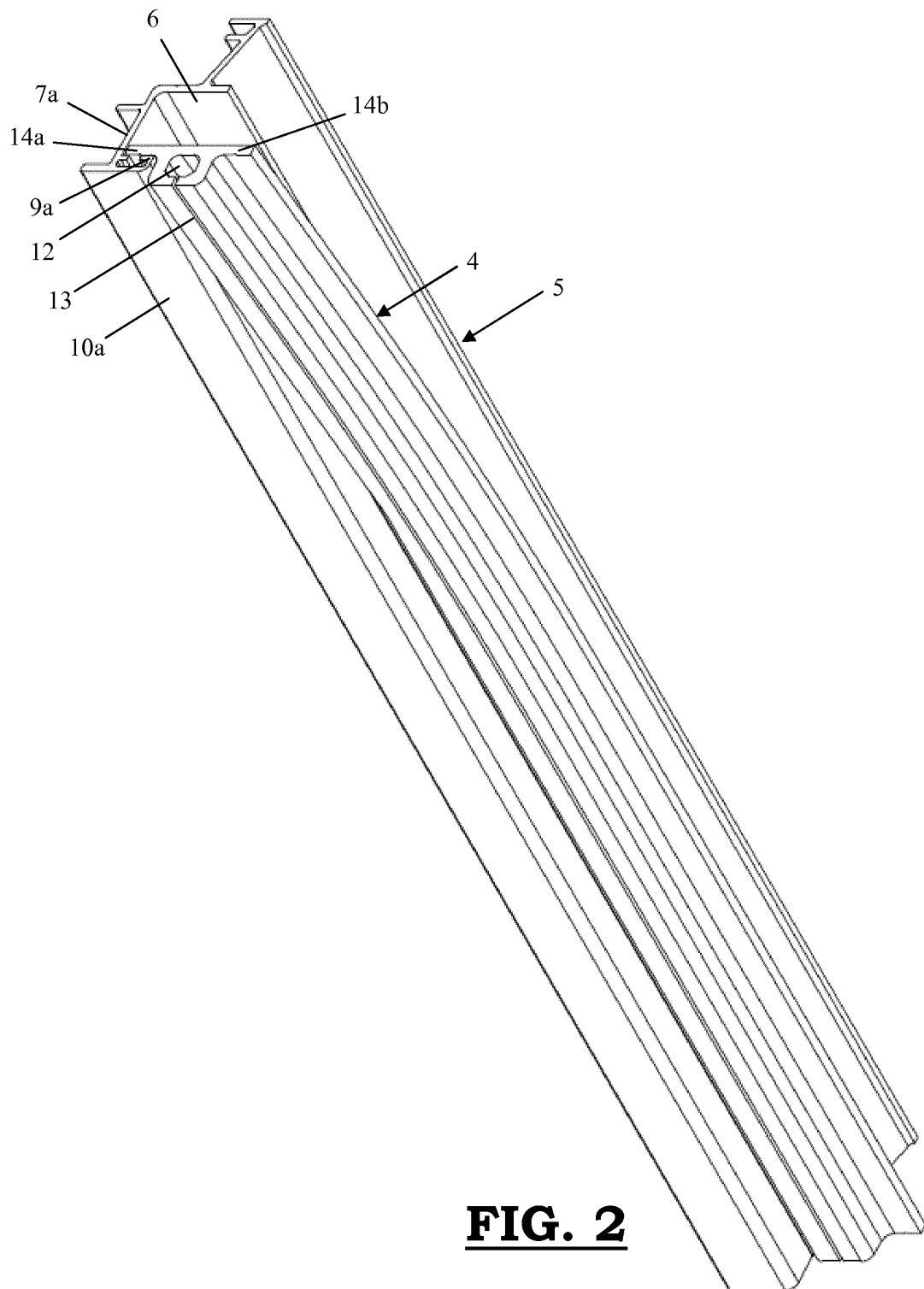
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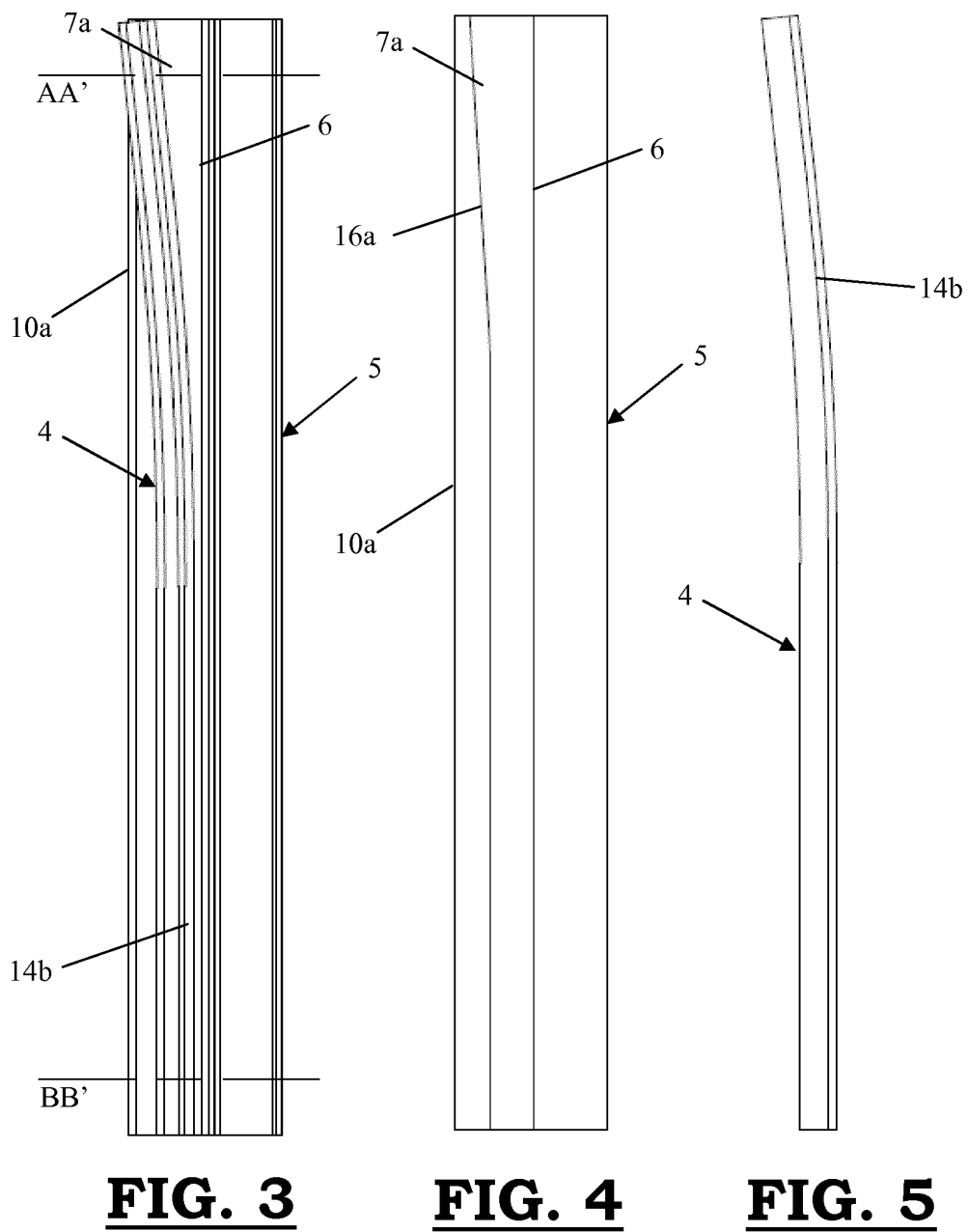
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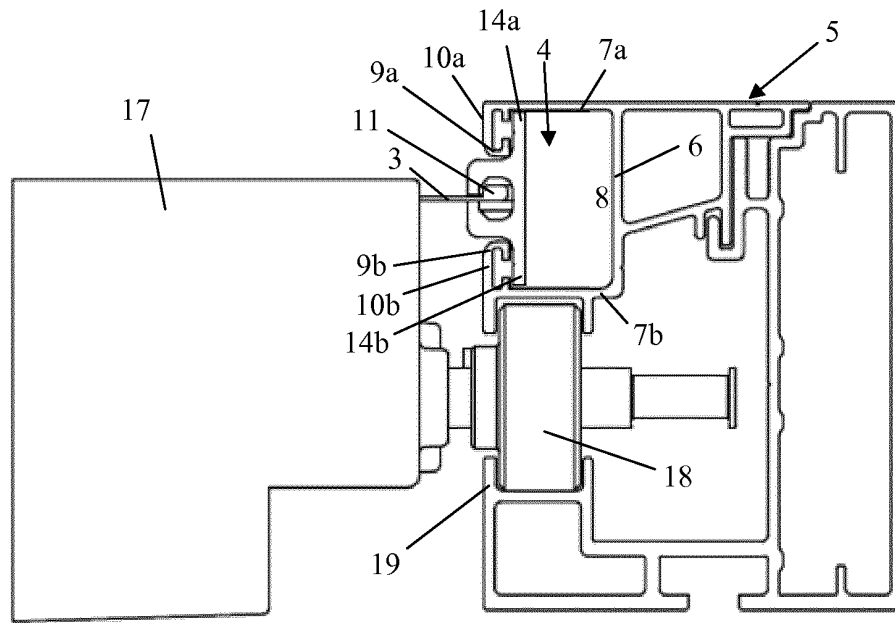


**FIG. 1**

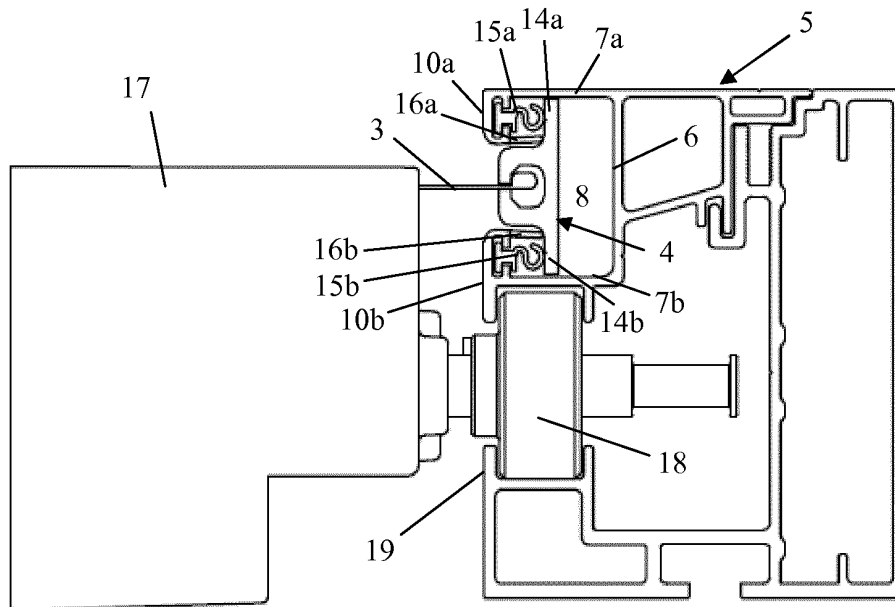


**FIG. 2**

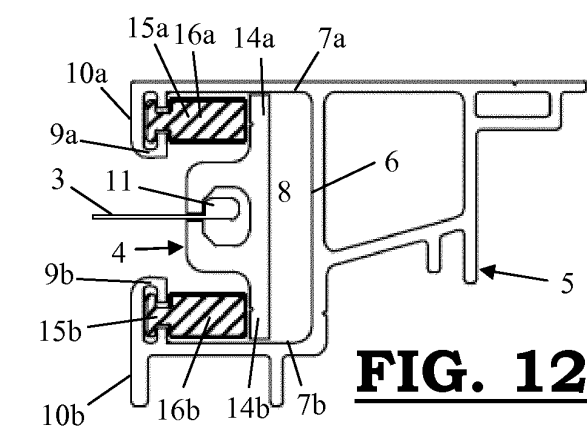
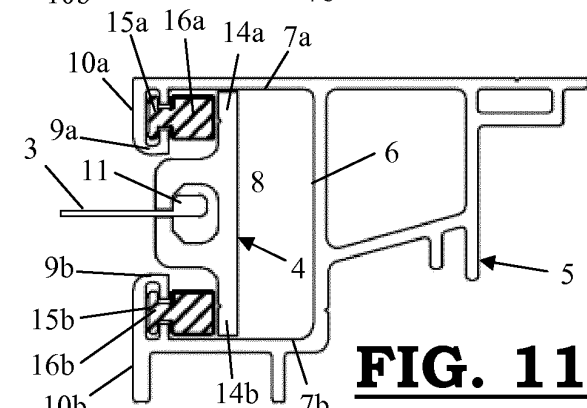
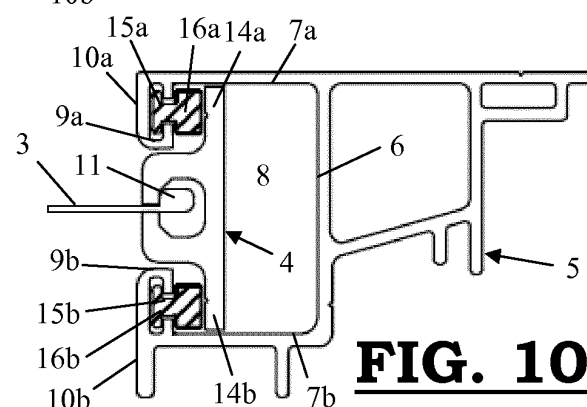
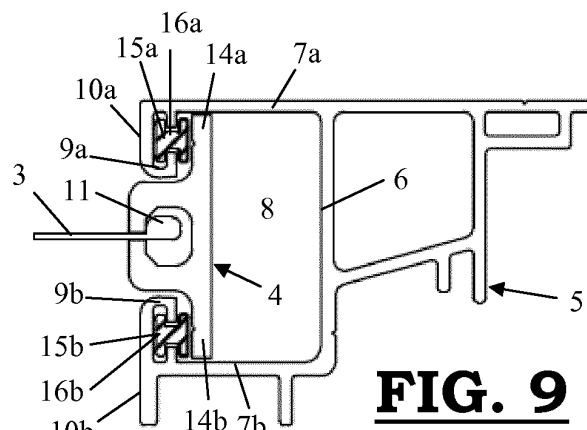
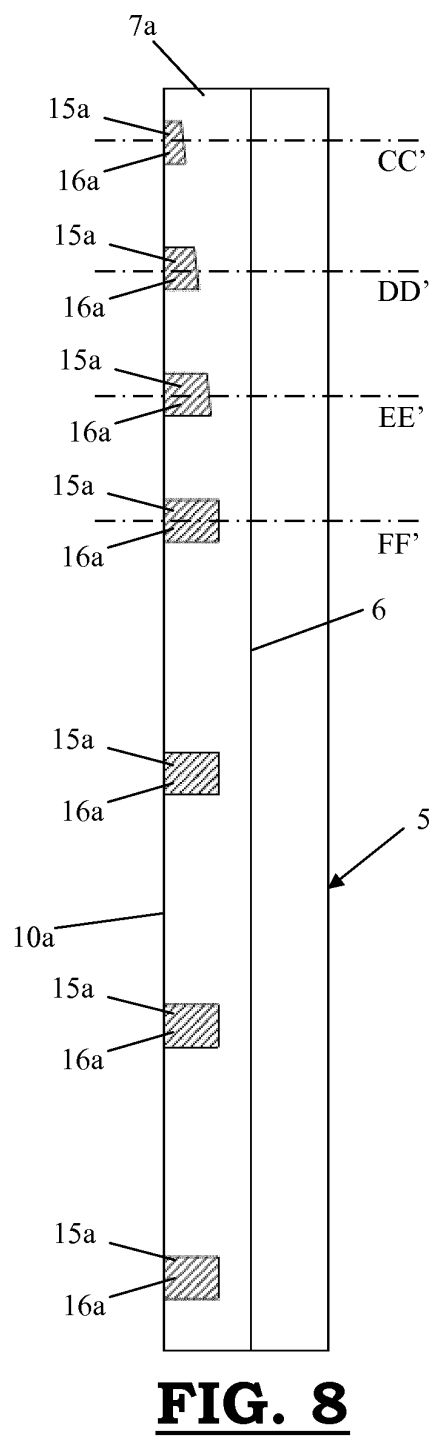




**FIG. 6**



**FIG. 7**





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