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(54) **Screen device**

(57) The present invention relates to a screen device (1) comprising a screen (2) with thickenings (4) on its lateral sides and a screen guide (3) with a cavity (5) for holding the corresponding thickening (4), and an access slot (6) to the cavity (5) through which the screen (2) extends. The screen guide (3) of said screen device (1) is less susceptible to wear because it has a lower wear factor in a zone which adjoins the access slot (6) and the cavity (5) than the rest of the screen guide (3).

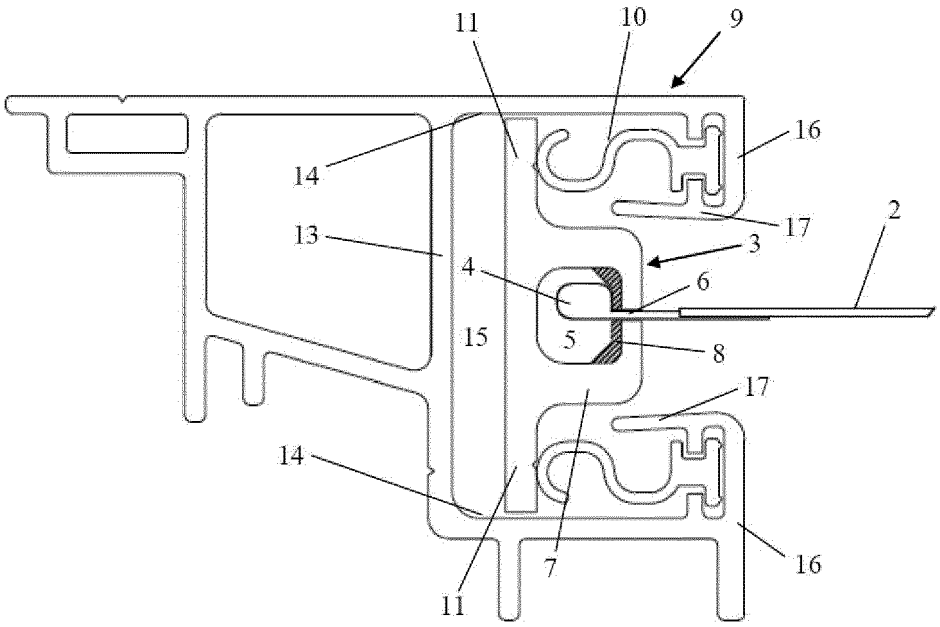

FIG. 8

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Description

[0001] The present invention relates to a screen device comprising a screen with thickenings on its lateral sides and, for each lateral side, a screen guide with a cavity which extends in the longitudinal direction of the screen guide for accommodating the corresponding thickening of the screen, and an access slot to said cavity through which the screen extends when the thickening is accommodated in the cavity.

[0002] Such a screen is usually used to cover a door or window opening or to cover a terrace. In this case, the screen of such a screen device may be arranged on a screen roller so that it can be unrolled and rolled up, but may also be arranged in a fixed manner. The lateral sides are held in such a screen guide in order to be able, for example, to withstand wind loads without the screen moving to and fro, flapping, etc. and is preferably tensioned therein in a resilient manner, so that the screen remains smooth and loads on the screen are absorbed without said screen starting to tear.

[0003] However, particularly when the screen can be rolled up and unrolled and is tensioned in a resilient manner, the screen guide will after some time show strong signs of wear at the location of the access slot as a result of the movement of the thickenings of the screen with respect to the screen guide. In this case, the thickenings gradually move more and more towards the access slot, instead of remaining in the cavity of the screen guide. As a result thereof, the movement of the thickenings with respect to the screen guide will be accompanied by a squeaking noise, in particular if the screen is regularly rolled up and unrolled. In the worst case, the thickenings will even slide out of the access slot and become detached from the screen guide.

[0004] It is an object of the present invention to remedy the abovementioned problems.

[0005] This object of the invention is achieved by providing a screen device comprising a screen with thickenings on its lateral sides and, for each lateral side, a screen guide with a cavity which extends in the longitudinal direction of the screen guide for accommodating the corresponding thickening of the screen, and an access slot to said cavity through which the screen extends when the thickening is accommodated in the cavity, wherein said screen guide comprises a first zone and a second zone, wherein the screen guide has a lower wear factor in the second zone than in the first zone, wherein the second zone extends in the longitudinal direction of the screen guide and at least partly adjoins both the access slot and said cavity.

[0006] By producing the screen guide in two zones, more expensive materials having a lower wear factor or more expensive surface treatments which result in a lower wear factor can be used locally where this lower wear factor is desired, without the complete screen guide having to be produced in this way.

[0007] Preferably, the wear factor of the screen guide in this second zone is at most 10.10^{-15} m^2/N.

[0008] Still more preferably, the coefficient of friction of the screen guide in the second zone is at most 0.3.

[0009] Very preferably, the coefficient of friction of the screen guide in the second zone will at most double in a temperature range between 20°C and 70°C.

[0010] In a particular embodiment of a screen device according to the present invention, the screen guide is at least partly made from a first material which forms the first zone and at least partly from a second material which forms the second zone and has a lower wear factor than the first material.

[0011] By constructing the screen guide from different materials, the different requirements placed on materials for the screen guide can simply be combined in one screen guide. In the areas where the susceptibility to wear is highest, the screen guide can be made more wear-resistant by using a different material which has greater wear-resistant properties.

[0012] In a first particular embodiment of such a screen device, the second material is a plastic. This second material then preferably comprises a percentage of polytetrafluoroethylene (PTFE). PTFE is for example also well known under the trade name Teflon ® by E.I. Du Pont de Nemours & company (Du Pont ®). Alternatively, this PTFE could also be reinforced with optical fibre.

[0013] The first material is also preferably a plastic. This first material of a screen device according to the invention is then preferably substantially made of polyvinylchloride (PVC). PVC is also well known as polychloroethylene.

[0014] PVC is cheaper and easier to process and therefore the largest part of the screen guide is preferably made of PVC and only that zone of the screen guide which suffers most wear is made of a more expensive and wear-resistant material, such as PTFE.

[0015] The screen guide is preferably made by means of co-extrusion, so that the screen guide forms one strong unit.

[0016] Alternatively, in cases where for example (but not in a limiting way) materials are preferred which are difficult to combine by means of co-extrusion, the screen guide may comprise a first profiled section which is made of the first material and a second profiled section which is made of the second material, wherein the first and the second profiled section are configured so as to be attachable to each other in order to form the screen guide.

[0017] Possible thickenings for a screen are known, for example, from FR 2 602 539 A, NL 1 029 104 C, EP 1 669 537 A2, NL 1 014 061 C, EP 1 491 712 A2 and EP 0 272 733 A1.

[0018] The thickening of a screen in a screen device according to the present invention is preferably configured to be flexible and is preferably made substantially of polyester or nylon.

Furthermore, in one particular embodiment, the thickening substantially extends on one side with respect to the surface of the screen. At the location of the access slot,

the second material is then preferably substantially arranged on one side with respect to the access slot, so that the flexible thickening and the second material at the location of the access slot extend substantially on the same side with respect to the surface of the screen when said flexible thickening is fitted in the cavity.
More specifically, this thickening may be configured as a half zip.

[0019] A particular embodiment of a screen device according to the present invention comprises a screen roller on which the screen can be rolled up and from which it can be unrolled and wherein the screen guide guides the lateral sides of the screen during the rolling-up and unrolling movement of the screen.

[0020] A particularly preferred screen device according to the present invention comprises a fastening profile for each lateral side, wherein the screen guide is accommodated in an elongate slot of said fastening profile and wherein the screen device comprises resilient elements which are fitted between the screen guide and the fastening profile in order to tension the screen in a direction transverse to the screen guide and in the plane of the screen.

[0021] The present invention will now be explained in more detail by means of the following detailed description of a preferred embodiment of a screen device according to the present invention. The sole aim of this description is to give illustrative examples and to indicate further advantages and features of this screen device, and can therefore 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.

[0022] In this detailed description, reference numerals are used to refer to the attached drawings, in which

- ***Figure 1*** shows a terrace covering according to the invention in bird's eye view;
- ***Figure 2*** shows a fastening profile, screen guide and screen of a screen device according to the prior art in cross section shortly after mounting;
- ***Figure 3*** shows a perspective view of the fastening profile, the screen guide and the screen from Figure 2 shortly after mounting;
- ***Figure 4*** shows the fastening profile, the screen guide and the screen from Figure 2 in cross section after repeated use;
- ***Figure 5*** shows a perspective view of the fastening profile, the screen guide and the screen from Figure 2 after repeated use;
- ***Figure 6*** shows a fastening profile, screen guide and screen of a first embodiment of a screen device according to the invention in cross section after mounting;
- ***Figure 7*** shows a perspective view of the fastening profile, the screen guide and the screen from Figure 6 after mounting;
- ***Figure 8*** shows a fastening profile, screen guide and screen of a second embodiment of a screen device according to the invention in cross section after mounting;
- ***Figure 9*** shows, in a graph, the average depth of wear of a screen guide according to the prior art from Figure 2 compared to a screen guide according to the invention from Figure 6 or Figure 8 as a function of time and at different temperatures.

[0023] A terrace covering (1) illustrated in Figure 1 as a screen device (1) has the problems which are solved by the invention. This terrace covering (1) is provided with two screens (2) on a substructure (19) which can be rolled up onto and unrolled from a screen roller. On the one hand, these screens (2) serve to adjust the incidence of light on the covered terrace (18) and, on the other hand, to protect the covered terrace (18) against limited precipitation and/or wind.

[0024] The construction of a screen device (1) according to the invention, possible embodiments of the lateral guides of which are illustrated in Figures 6 to 8, may be analogous to the construction of a screen device (1) according to the prior art, an embodiment of which that corresponds to the embodiment from Figures 6 and 7 is illustrated in Figures 2 to 5. Both are adapted to be accommodated in a terrace covering (1) as illustrated in Figure 1. The lateral guides from Figures 2 to 7 can also be accommodated in, for example, a screen device (1) for mounting in front of a vertical window.

[0025] As can be seen in Figures 2 to 8, the lateral sides of the screens (2) are in each case provided with half zips (4) which are guided in screen guides (3) during the upward and downward movement of the screens (2). These half zips (4) are made of polyester or nylon. Each half zip (4) is in this case accommodated in a cavity (5) of the corresponding screen guide (3). In this case, the screen (2) extends through an access opening (6) to this cavity (5).

[0026] Along the lateral sides of the screens (2), the screen guides (3) extend substantially parallel to each other and are to this end accommodated in elongate slots (15) in lateral guides (9) which, in turn, are arranged substantially parallel to each other on the lateral sides of the screens (2), as can be seen in Figure 1. These lateral guides (9) are fixedly attached to the substructure (19) of the terrace covering (1).

[0027] Each lateral guide (9) comprises a bottom (13) and two upright sides (14) which delimit said slot (15), as can be seen in Figures 2 to 8. At the ends of the upright sides (14), away from the bottom (13), each lateral guide (9) furthermore comprises a collar (16) which partly delimits the slot (15). This collar (16) is provided with guiding shoulders (17) which extend towards the bottom (13) substantially parallel to the upright sides (14). The screen guides (3) in turn comprise flanges (11) which partly extend behind these guiding shoulders (17) and behind the collar (16).

[0028] Such shoulders (17) not only form shoulders (17) for the screen guides (3), but also guide elements

for guiding the bottom slat (12) during the rolling-up and unrolling movement of the screen (2). Said bottom slat (12) is attached on the side of the screen (2), opposite the side by means of which the screen (2) is attached to the screen roller, as can be seen in Figure 1.

[0029] In such a terrace covering (1), it is desirable to keep the gradient at which the screens (2) are fitted as small as possible. With such smaller gradients, there is a greater need to apply tension to the screen (2). However, even with other screen devices (1), a screen (2) is often tensioned. Tensioning the screens (2) is effected, inter alia, by tensioning the screens (2) by means of resilient elements (10) in the direction indicated by the arrows in Figure 1. Said resilient elements (10) are in this case fitted between the flanges (11) of the screen guides (3) and the collar (16) of the lateral guides (9), as can be seen in Figures 1 to 8.

[0030] With a screen guide (3) according to the prior art, the half zip (4) of the screen (2) is situated in the cavity (5) of the screen guide (3) shortly after mounting, as is illustrated in Figures 2 and 3. However, after repeated use, the screen guide (3) starts to wear at the location of the through-opening (6), as can be seen in Figures 4 and 5, as a result of which the half zip (4) will extend at least partly into this through-opening (6) and, in the worst case, is pulled through this through-opening (6), so that the screen (2) becomes detached from the screen guide (3).

[0031] Now, according to the invention, such a screen guide (3) is made from two kinds of materials.

[0032] The body of the screen guide (3) of the first illustrated embodiment, as shown in Figures 6 and 7, is largely made from PVC (7) by means of co-extrusion and only locally, at the location of the through-opening (6), on either side of said through-opening (6), is the more wear-resistant PTFE (8) used. Due to such a construction of the screen guide (3), the service life of this screen guide (3) is greatly increased compared to the service life of the similar screen guide (3) from Figures 2 to 5 which is made completely from PVC, as can clearly be seen in Figure 9. Figure 9 shows the wear depth in the vertical direction in μm as a function of time which is given on the horizontal axis in hours, and this for both the screen guide (3) from Figure 2 (RT REF and 70°C REF) and the screen guide (3) from Figure 6 (RT NEW and 70°C NEW) and both at room temperature (RT REF and RT NEW) and at a temperature of 70°C (70°C REF and 70°C NEW).

[0033] The body of the screen guide (3) of the second illustrated embodiment, as shown in Figure 8, is also substantially made from PVC (7) by means of co-extrusion and only locally, at the location of the through-opening (6), towards the inner side of the cavity (5), on the side of said cavity (5), is the substantially more wear-resistant PTFE (8) used. In this way, the PTFE is protected by the PVC with respect to the environment and is thus less susceptible to any changes which take place in said environment.

The advantageous results, as illustrated in Figure 9 and described above with regard to the embodiment from Figures 6 and 7, also apply to the screen guide (3) according to the embodiment from Figure 8.

Claims

1. Screen device (1) comprising a screen (2) with thickenings (4) on its lateral sides and, for each lateral side, a screen guide (3) with a cavity (5) which extends in the longitudinal direction of the screen guide (3) for holding the corresponding thickening (4) of the screen (2), and an access slot (6) to said cavity (5) through which the screen (2) extends when the thickening (4) is held in the cavity (5), **characterized in that** the screen guide (3) comprises a first zone (7) and a second zone (8), wherein the screen guide (3) has a lower wear factor in the second zone (8) than in the first zone (7), wherein the second zone (8) extends in the longitudinal direction of the screen guide (3) and at least partly adjoins both the access slot (6) and said cavity (5).

2. Screen device (1) according to Claim 1, **characterized in that** the wear factor of the screen guide (3) in the second zone (8) is at most 10.10^{-15} m^2/N.

3. Screen device (1) according to one of the preceding claims, **characterized in that** the coefficient of friction of the screen guide (3) in the second zone (8) is at most 0.3.

4. Screen device (1) according to one of the preceding claims, **characterized in that** the coefficient of friction of the screen guide (3) in the second zone (8) will at most double in a temperature range between 20°C and 70°C over time.

5. Screen device (1) according to one of the preceding claims, **characterized in that** the screen guide (3) is partly made from a first material (7) which forms the first zone and partly from a second material (8) which forms the second zone and has a lower wear factor than the first material (7).

6. Screen device (1) according to Claim 5, **characterized in that** the second material (8) is a plastic.

7. Screen device (1) according to Claim 5 or 6, **characterized in that** the first material (7) is a plastic.

8. Screen device (1) according to Claim 7, **characterized in that** the first material (7) is substantially made of polyvinylchloride.

9. Screen device (1) according to one of Claims 5 to 8, **characterized in that** the screen guide (3) is made

by means of co-extrusion.

10. Screen device (1) according to one of Claims 5 to 8, **characterized in that** the screen guide (3) comprises a first profiled section which is made from the first material (7) and comprises a second profiled section which is made from the second material (7), wherein the first and the second profiled section are configured so as to be attachable to each other in order to form the screen guide (3).

11. Screen device (1) according to one of the preceding claims, **characterized in that** the flexible thickening (4) is made substantially of polyester.

12. Screen device (1) according to one of the preceding claims, **characterized in that** said screen device (1) comprises a screen roller on which the screen (2) can be rolled up and from which it can be unrolled and wherein the screen guide (3) guides the lateral sides of the screen (2) during the rolling-up and unrolling movement of the screen (2).

13. Screen device (1) according to one of the preceding claims, **characterized in that** the screen device (1) comprises a fastening profile (9) for each lateral side, **in that** the screen guide (3) is accommodated in an elongate slot (15) of said fastening profile (9), and **in that** the screen device (1) comprises resilient elements (10) which are fitted between the screen guide (3) and the fastening profile (9) in order to tension the screen (2) in a direction transverse to the screen guide (3) and in the plane of the screen (2).

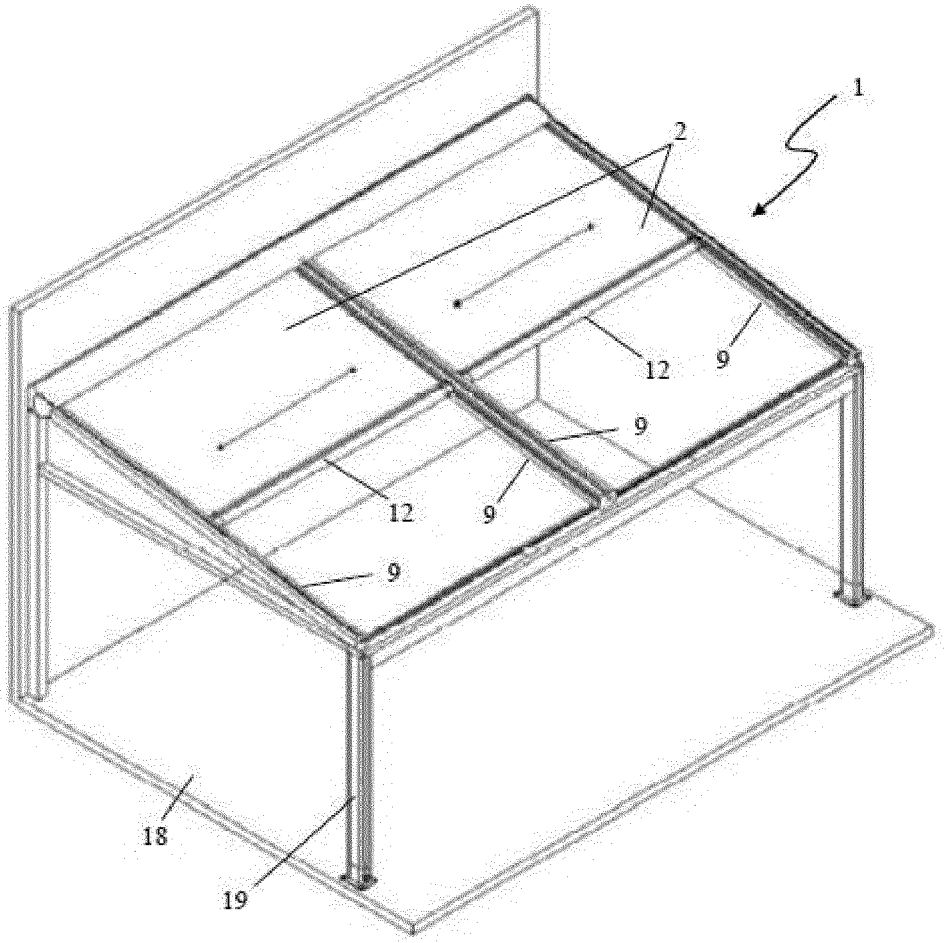

FIG. 1

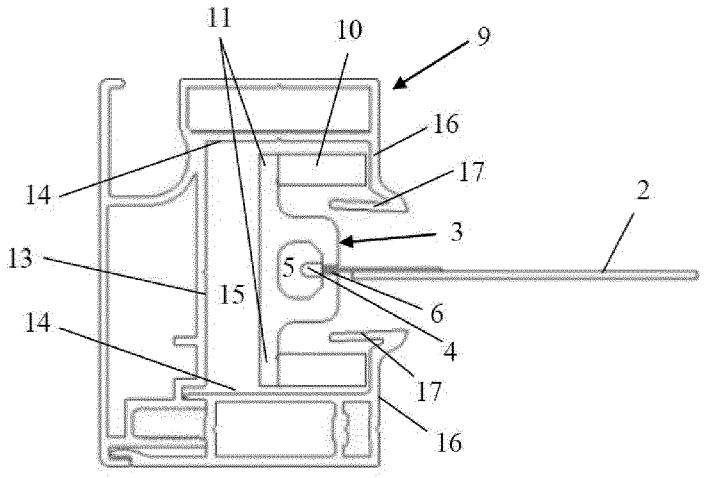

FIG. 2 Prior art

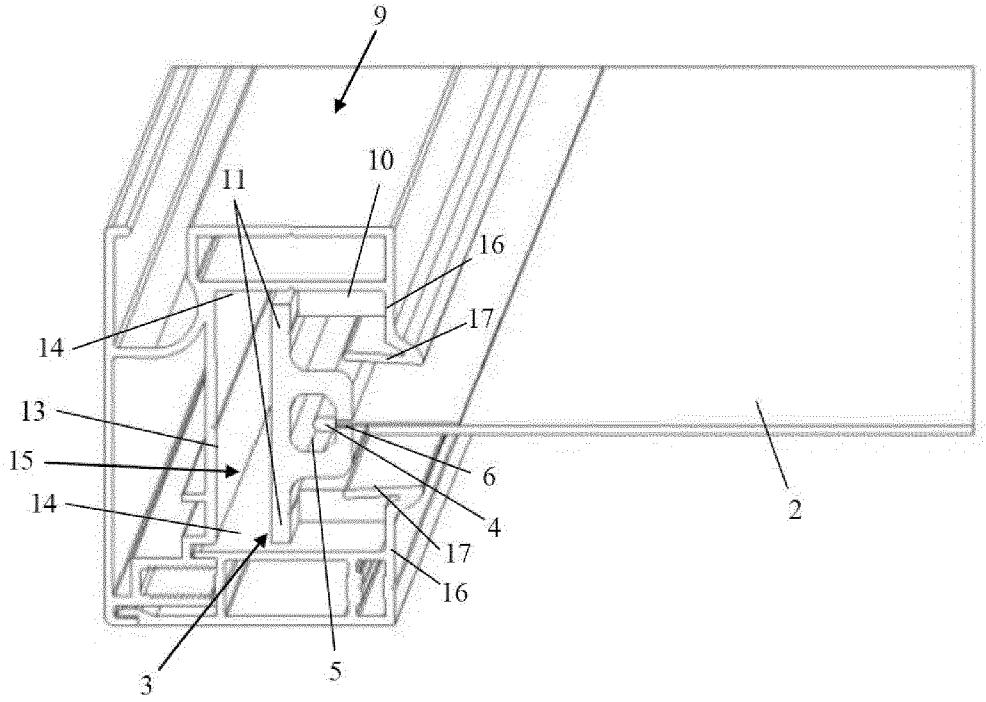

FIG. 3 Prior art

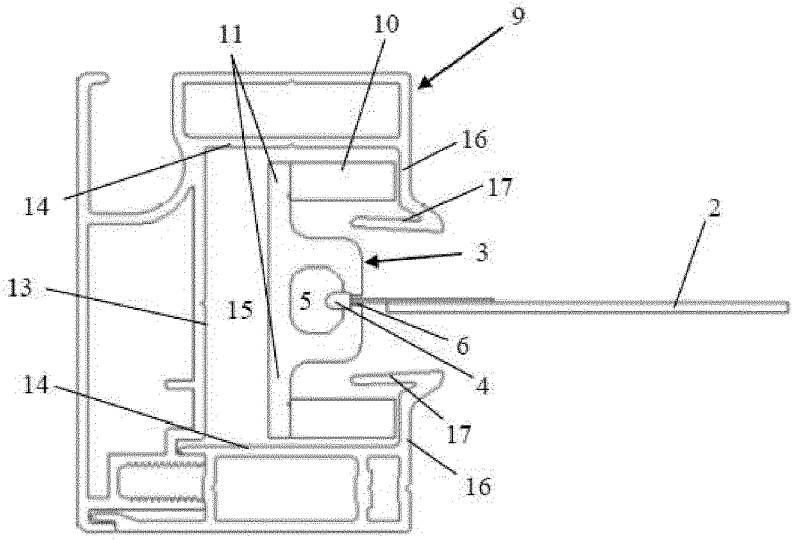

FIG. 4 Prior art

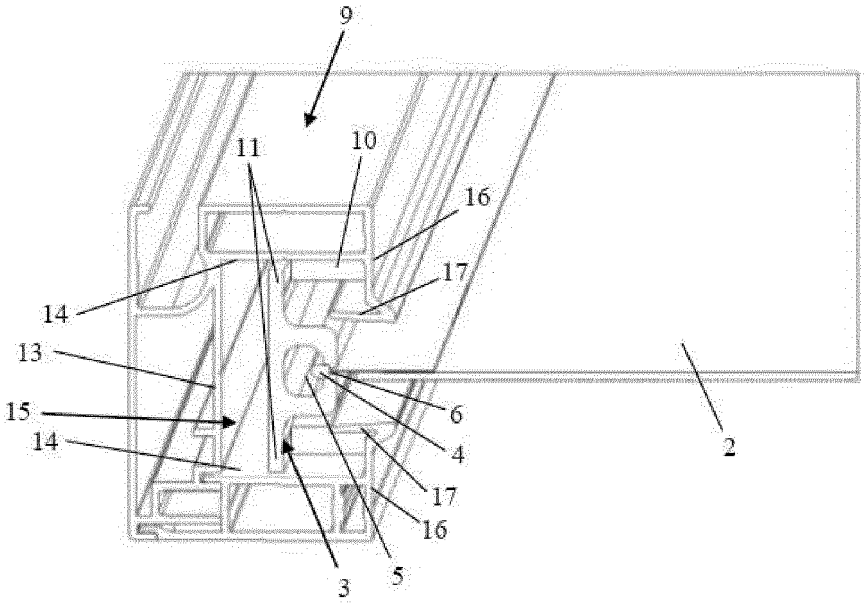

FIG. 5 Prior art

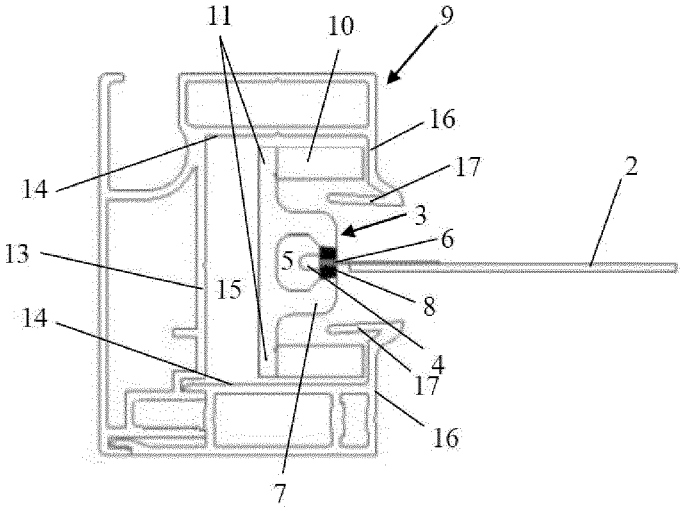
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FIG. 6

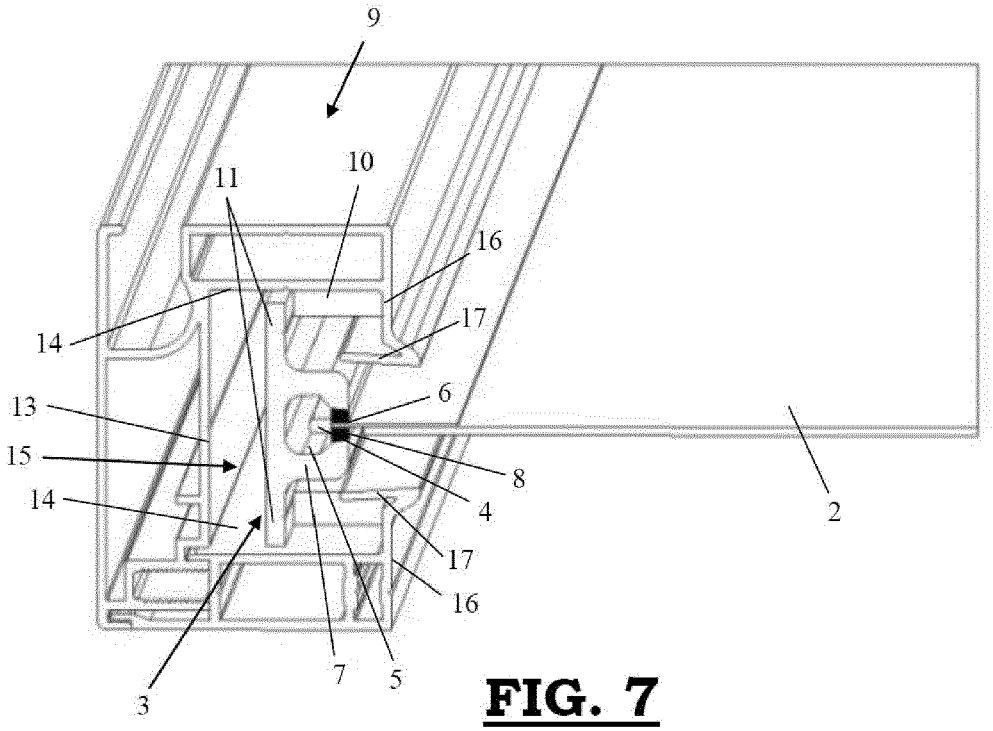
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FIG. 7

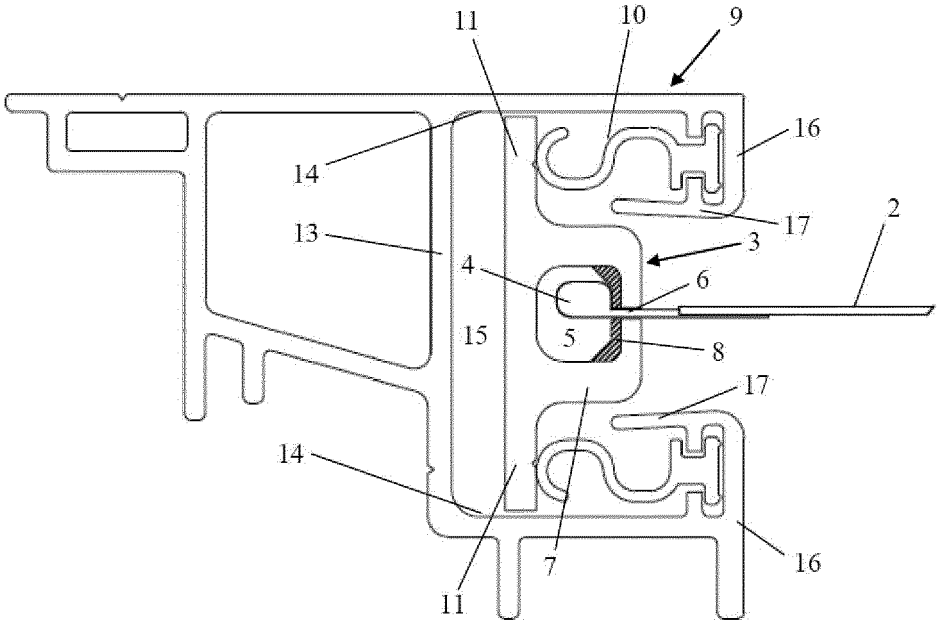
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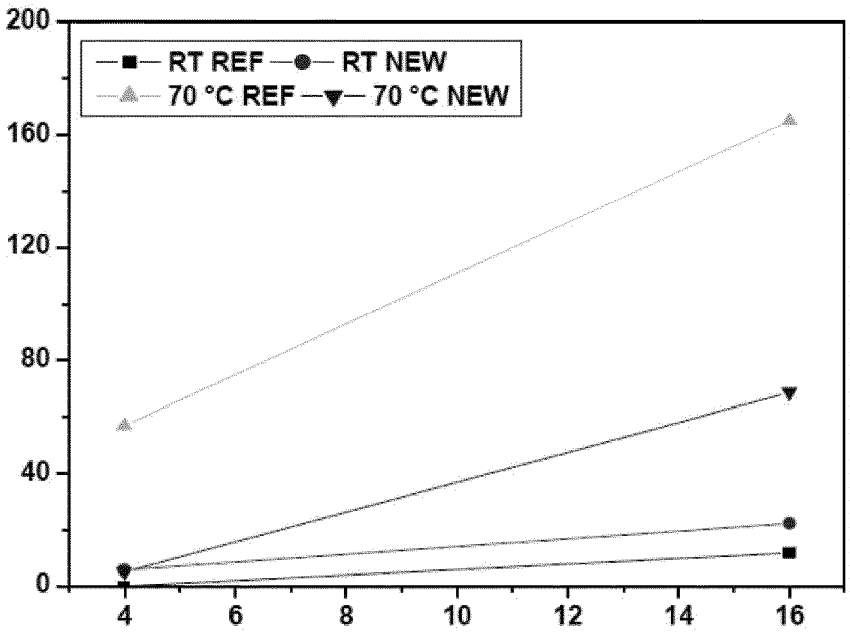
FIG. 8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70 °C NEW
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FIG. 9

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EUROPEAN SEARCH REPORT

Application Number
EP 13 19 3343

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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TECHNICAL FIELDS SEARCHED (IPC)

E06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	22 January 2014	Knerr, Gerhard

CATEGORY OF CITED DOCUMENTS

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22-01-2014

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