A screening arrangement and a method for fastening a screening body to a bottom element

Fig. 5
A screening arrangement and a method for fastening a screening body to a bottom element

The present invention relates in a first aspect to a screening arrangement for screening an aperture of a frame according to the introductory part of claim 1.

Such screening arrangements are typically applied to the screening of windows such as roof windows. The end portion of the screening body can be attached to a bottom element such as a bottom element in numerous ways. In a common example of a prior art screening arrangement of the above type the end portion of the screening body is attached to a longitudinal element such as a thin slat or the like, e.g. made from extruded aluminium. The cross-sectional shape of the slat is oblong such as ellipsoidal or shaped as a plate. The end portion is typically glued or clipped onto the thin slat and subsequently rolled one or one half revolution about the slat. The thin slat is then inserted with a thinner end of its oblong cross section into a slot of the bottom element formed by two projections, the tips of which are more or less facing each other. The slat is then rotated in the slot such that a thicker end of the cross-sectional shape of the slat faces the opening between the projections, said thicker end being of such dimensions that the projections keep the slat within the slot. One example of this prior art screening arrangement type is disclosed in EP 1384849.

One disadvantage of this type of prior art screening arrangement is that it requires a relatively high degree of accuracy to fit the slat in between the projections and rotate it such that it is held in place. Assembly of the slat and bottom element on a machine of a production line is thus difficult, which makes production more expensive. Further, a somewhat large risk exists that the slat in use leaves the bottom element resulting in the bottom element being released from the screening body. This would appear to a user as though the screening arrangement has been broken. Also, in this type of prior art arrangements the bottom element needs somewhat large dimensions to be able to take up the oblong slat, this making the bottom element appear unhandy and aestheti-
cally less appealing.

Another prior art screening arrangement is disclosed in GB 1443845, in which an end portion of a screening body is attached to a bottom element by means of a projection of the bottom element. The projection is deformed such that it is biased against and projects with a sharp point into a recess of a wall of the bottom element with the end portion of the screening body being fastened between the projection and the recess. In contrast to the above-described prior art screening arrangement, this arrangement does not comprise a longitudinal element or slat.

Although this solution provides a more secure fastening of the screening body to the bottom element, the screening body can easily be ripped apart and destroyed between the point of the projection and the recess of the wall. Manufacturing a pointed projection and corresponding recess is relatively expensive, as is providing an accurate and secure positioning of the projection into the recess. If the contact faces are not sufficiently clearly defined, strong local forces may result, which may destroy the screening body or may crease or fold the screening body.

In view of the above-described disadvantages of the prior art screening arrangements, it is the object of the present invention to provide a screening arrangement according to the introductory part of claim 1, which screening arrangement provides an aesthetically appealing and secure fastening of a screening body to a bottom element, which is furthermore easy and cheap in manufacture.

To meet this object the screening arrangement according to the first aspect of the present invention is characterized by the features of the characterizing part of claim 1.

With the screening arrangement according to the invention the longitudinal element can be made smaller and does not have to be ob-long in cross section; it may for example be circular. Thus, the overall dimensions of the bottom element can be made smaller, making the bottom element cheaper to produce and the screening arrangement more aesthetically appealing.

Moreover, a more secure fastening of the screening body to the
bottom element is provided since the longitudinal element is not able to move within the slot, more clearly defined contact faces between the slot and the end portion of the screening body and the longitudinal element may be achieved, and thus the screening body is less likely to be destroyed because large local forces on the screening body may be avoided.

The screening body may be easily and cheaply manufactured since it is very straightforward to position the longitudinal element in the slot and since deforming the first projection to assume the inclined position towards the second projection need not be carried out with as high degree of accuracy as the prior art attachment processes. Further, the longitudinal element need not be secured to the end portion of the screening body before attaching the screening body to the bottom element.

In a preferred embodiment of the invention said end portion of said screening body surrounds at least about 185° and preferably about 230-240° of the circumference of said longitudinal element. About 185° of the circumference of the longitudinal element is enough to provide a reliable fastening of the longitudinal element and/or the end portion of the screening body in the slot of the bottom element; about 230-240° provides for a more optimal fastening.

In another preferred embodiment said projections extend radially outwards from said bottom element, preferably both said projections and preferably said longitudinal element extend continuously substantially in the entire length of said bottom element.

In another preferred embodiment said first projection extends longer radially outwards than said second projection, which provides for an easier and more efficient deformation of the first projection towards the second projection. Preferably said first projection extends over a tip portion of said second projection such as to position said screening body to be substantially flush with an outer, i.e. inwards facing surface of said second projection. This makes the screening arrangement more aesthetically appealing since the transition between the bottom element and the screening body is less distinct.
In another preferred embodiment said longitudinal element has a substantially circular cross section. This makes it easier to position the longitudinal element in the slot, and a strong fastening is provided. Preferably said longitudinal element is in the form of a cord, more preferably a metal cord, which provides a cheap and efficient circular longitudinal element, which is durable and easy to position in the slot.

In another embodiment said slot comprises at least one inwards facing projection abutting said longitudinal element and/or said end portion of said screening body. This provides for a more secure and easier-to-control fastening of the longitudinal element and end portion of the screening body in the slot.

In a second aspect of the invention a method for fastening an end of a screening body of a screening arrangement, which screening arrangement is suitable for screening an aperture of a frame, to a bottom element is provided. The method steps of the method according to the second aspect of the invention are defined in claim 6.

The method according to the second aspect of the invention provides advantages similar to the advantages described in connection with the above explanation of the first aspect of the invention.

A preferred embodiment of the method according to the second aspect of the invention further comprises the steps of winding said screening body off of a screening body roll, cutting said screening body off at a suitable length, and positioning of said longitudinal element and said end portion of said screening body in said slot by means of first positioning said longitudinal element in contact with said end portion of said screening body and then positioning said end portion and said longitudinal element in said slot such that said end portion of said screening body surrounds at least a major part of the circumference of said longitudinal element. These steps provide an extremely easy and cheap attachment of the screening body to the bottom element, which embodiment may easily be implemented in an automated machine process for the assembly of the screening arrangement.

Like advantages are achieved in another preferred embodiment, which further comprises the step of guiding a slide or the like from one
end of said bottom element to the other, said slide thus carrying out said
deformation of said first projection towards said second projection.

In another preferred embodiment said first projection is de-
formed about a weakening portion, such as a narrower portion, of said
first projection, thereby making it easier to deform the first projection
and ensuring that the deformation of the first projection occurs at the
correct position.

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 screen-
ing arrangement in an embodiment of the invention;

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

Fig. 3 shows an end view of a detail of the screening arrange-
ment according to Figs 1 and 2; and

Fig. 4 shows an end view similar to that of Fig. 3 with some
parts removed for the purpose of clarity.

Figs 1 and 2 show an exemplary embodiment of the screening
arrangement according to the first aspect of the invention and 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 win-
dow. 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 under-
stood as incorporating any substantially rectangular structure positioned
in any opening in a building, whether in a wall or the roof, and surround-
ing 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 in-
vention 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.

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 Figs 3 and 4) and a bottom element 7 extending substantially in the entire width of the screening body 6. At its upper end edge, the screening body 6 is accommodated in the top element 4 and its opposed, lower end edge or end portion is fastened to the bottom element 7 in a manner to be described in further detail below. 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. The bottom element 7 is preferably made from a material of relatively high strength and low weight, such as aluminium.

Furthermore, the screening arrangement 1 comprises two side rails 8 and 9 connected with a respective side piece 23 and 24, opposite ends of the bottom element 7 and opposite side edges of the screening body 6 being 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.

In this specification the terms "front" and "back" are utilized to denote the sides of the screening arrangement, "front" being the side intended to face inwards into the room of the building (visible in Figs 1 and 2 and to the left in Figs 3 and 4), and "back" the opposite, outwards facing side.

Turning now to Fig. 3, a housing comprising a cover 43 accommodates a guide bar 44 and a roller bar 45. The cover 43 extends throughout the entire length of the top element 4. The screening body 6 is fastened to the roller bar 45 along its upper end edge in any suitable manner known per se. The guide bar 44 guides the screening body 6 onto the roller bar 45, 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 6 contains surplus material. As shown, the screening body 6 is wound in mutually opposite directions on the roller bar 45 and the guide bar 44. Furthermore, the roller bar 45 is spring-biased and, hence, provides the preload toward the non-screening position required to roll up the screening body 6. The preload acting on the roller bar 45 is provided by a spring device in a manner known per se.

Referring again to Figs 1 and 2 the screening arrangement 1 comprises a conventional parallel guidance cord system comprising two cords not shown. The cords are hidden behind the side rails 8, 9, which are connected with the top element 4.

Fig. 4 is a view similar to that of Fig. 3 with only the guide bar 44, the roller bar 45, the screening body 6 and the bottom element 7 shown.

As can be seen from Fig. 4 an end portion 62 of the screening body 6 is fastened to the bottom element 7. The end portion 62 of the screening body 6 surrounds part of a circumference of a longitudinal element in the form of a cord 63 with substantially circular cross section, preferably a metal cord, e.g. an aluminium cord, extending over substantially the complete width of the screening body 6 and the complete length of the bottom element 7. The diameter of the cord 63 is 2-3 mm. The longitudinal element may take other suitable forms such as a non-circular rod, and it may be made from other suitable materials such as plastic materials. In the embodiment shown the end portion 62 surrounds a major part of, more specifically about 230-240° of the circumference of, the cord 63 in order to secure it to the cord 63. In other embodiments the end portion 62 may be wound more or less and may even be wound more than one whole revolution about the cord 63.

The cord 63 and the end portion 62 are positioned in a slot 73 of the upper part of the bottom element 7, the slot 73 being formed by a first projection 74 and a second projection 7a of the bottom element 7. The bottom element 7 has a general U-shape, the U-shape forming a handle for a user to grab when operating the screening arrangement.
The legs of the U-shape extend integrally into the first and second projections 74, 7a, respectively. In alternative embodiments the projections 74, 7a are formed separately from and attached to the bottom element 7.

The bottom element 7 further comprises an integrally formed bar 75 projecting in the direction facing backwards, i.e. outwards in a mounted position of the screening arrangement 1, said bar 75 abutting the guide bar 44 in the non-screening position. As is conventional, the bar 75 comprises, at its lowermost part, a retainer in the form of a slot 76 for retaining a flexible edge or seal 77 preferably made from rubber or the like. The flexible edge 77 ensures a more complete screening of the aperture when the screening body is in the fully screened position.

In the embodiment shown the first projection 74 and the second projection 7a take the form of rails extending continuously over substantially the entire length of the cord 63; they may however extend over only some part of the cord 63 or even be split up into two or more separate projections. The projections 74, 7a extend substantially radially outwards from the bottom element 7, thus forming a U-shaped slot 73.

The first projection 74 of the bottom element 7 is inclined towards the second projection 7a such as to jam the longitudinal element 63 and the end portion 62 of the screening body 6 in between the first and second projections 74, 7a and thus fasten them to the bottom element 7. For clarity reasons in Figs 3 and 4 the first projection is not shown in contact with the end portion 62 and the cord 63; in practice the first projection will of course be inclined such as to contact the end portion 62.

The first projection 74 abuts the end portion 62 and thus the cord 63 on a line-shaped contact face having a small width and extending in the entire length of the bottom element 7. The first projection 74 is inclined to provide a force on the end portion 62 and the cord 63 towards the second projection 7a. Preferably, the second projection 7a and/or the bottom part of the slot 7 have a contact face corresponding to that of the first projection 74 with the end portion 62 and thus the cord 63 such as to provide clearly defined, strong forces on the screen-
ing body 6, this minimizing the risk that the screening body 6 is pulled out of the slot 73 and that creases or folds arise on the screening body 6. The invention, however, is not limited to this embodiment; the projections may for example contact the end portion of the screening body and the cord in two or more points or they may more or less surround the circumference of the cord. The cross section of the slot may be substantially polygonal in order to provide three or more clearly defined contact lines. Preferably, the cord 63 has a rough or uneven surface in order to provide an even stronger and more clearly defined frictional contact between this and the screening body 6. In an alternative embodiment of the bottom element 7 shown in Fig 5 the slot 73 comprises at the bottom of its U-shape at least one inwards facing projection 80 abutting the end portion 62 of the screening body 6. This provides for a more reliable and easier-to-control fastening of the cord 63 and end portion 62.

In the following an exemplary embodiment of the method according to the second aspect of the invention will be described in detail with reference to the screening arrangement 1 of the drawings. The exemplary method is for fastening an end of the screening body 6 to a bottom element 7, thus resulting in a screening arrangement 1 according to the above-described exemplary embodiment of the first aspect of the invention and shown in the drawings.

The screening arrangement 1 is assembled in a completely automated machine process.

First, the screening body 6 is wound off of a screening body roll containing a large length of screening body material, such as cloth or textile, of a suitable width. Having reached the desired length (substantially corresponding to the height of the aperture to be screened), the screening body material is cut along a straight transverse line perpendicular to the length direction of the screening body material to form the screening body 6. At this point the end portions of the screening body 6 are temporarily secured to a table or the like. One end portion of the screening body 6 is then attached to the roller bar 45. The opposite end portion 62 of the screening body 6 is simultaneously attached to the bottom element 7, this simultaneous operation ensuring that the roller bar
45 and the bottom element 7 are as parallel as possible.

Subsequently, the cord 63 is cut off from a longer cord at a length corresponding to the width of the screening body 6 and then positioned in contact with the end portion 62 of the screening body 6 at a short distance from and in a straight line parallel to the end of the screening body 6. In this specific embodiment it is not necessary to provide separate means to secure or attach the cord 63 to the screening body. In alternative embodiments the screening body may, however, at this point be secured to the cord (or an alternative longitudinal element) by means of for example clips, glue and/or a slot in the cord. Then the cord 63 is guided into the slot 73 by means of a slide or the like from one end of the slot 73 to the other such that the end portion of the screening body 6 at the end of the operation is positioned in the slot 73 surrounding part of the circumference of the cord 63. The end portion 62 thus follows the second projection 7a into the bottom part of the slot 73 and then turns to follow the bottom part of the slot 73 until it reaches the second projection 74 to follow this in the direction out of the slot 73, terminating at the tip of the first projection 74. The cord 63 is positioned in the slot abutting the bottom part of the slot via the screening body 6, about 230-240° of the circumference of the cord 63 thus being surrounded, in the embodiment shown, by the end portion 62 of the screening body 6. The end portion 62 of the screening body 6 enters the surrounding position without needing to be manipulated further when being pushed from a certain direction straight into the slot 73, making the positioning of the cord 63 and end portion 62 into the slot 73 a very simple and easily carried out operation.

The above-mentioned slide or the like guiding the cord 63 into the slot 73 simultaneously carries out deformation of the first projection 74 from one end of the slot 73 to the other until the entire projection 74 has been deformed. The first projection 74 is deformed towards the second projection 7a until it abuts the end portion 62 of the screening body 6, and via this the cord 63, with a force. If the first projection 74 is deformed properly, the cord 63 and the section of the screening body surrounding part of the circumference of the cord 63 are exposed to forces
applied from the projections 74, 7a and the bottom of the slot 73 in clearly defined contact lines of the circumference extending in the entire length of the cord 63 and working in a radial direction of and towards the centre of the cord 63. In order to ensure proper deformation, the first projection 74 is deformed to the inclined position about a predefined weakening portion 78 in the form of a narrower portion of the first projection 74. The applied forces are large enough to jam the cord 63 and the end portion 62 in between the first and second projections 74, 7a and prevent the cord 63 and the end portion 62 of the screening body 6 from leaving the slot 73 during normal use of the screening arrangement. The clearly defined forces or stresses applied to the screening body 6 in the concerned area lowers the risk of the screening body 6 being torn apart or forming creases or folds. Further, the cord 63 and the screening body 6 are not able to move within the slot and thus will seem more durable to a user operating the screening arrangement 1.

The material of the bottom element or at least the first projection 74 to be deformed is manufactured from deformable, non-elastic material, such as extruded aluminium, to ensure that a suitable deformation or bending of the projection 74 is easily carried out and that the resulting deformed projection is strong enough to serve its purpose.

Finally, the screening body is wound up on the roller bar 45, and the roller bar 45 and the guide bar 44 are positioned in the housing formed among others by the cover 43 and in the positions shown in Fig. 3. This produces the screening arrangement end product.

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.

For example, in a not shown alternative embodiment of the screening arrangement according to the first aspect of the invention the first projection extends longer radially outwards than the second projection. Also, in such alternative embodiment the first projection may extend with its tip over a tip of the second projection, the tip of the first projection more or less abutting the tip of the second projection with the end portion of the screening body positioned between the projections. In
this embodiment the first projection has a length such that it and thereby the screening body flush with an outer, i.e. inwards facing surface of the second projection. This makes the screening arrangement more aesthetically appealing since the transition between the bottom element and the screening body is less distinct.

In another not shown embodiment of the screening arrangement according to the first aspect of the invention the second projection 7a of the embodiment according to the drawings is removed, the second projection instead being formed by part of the upper leg of the U-shape of the bottom element. In this case, preferably, the first projection extends so far from the remaining part of the bottom element that it is able to substantially enclose the longitudinal element. In yet another embodiment, the first and second projections are reversed such that it is the inwards facing projection (reference sign 7a in the embodiment of the drawings), which is inclined towards the outwards facing other projection (reference sign 74 in the embodiment of the drawings).

As an example of the alternatives available for the skilled person relating to the second aspect of the present invention and falling within the scope of the attached claims the longitudinal element or cord need not be positioned in contact with the screening body before positioning these in the slot of the bottom element; the end portion of the screening body may be positioned in the slot after which the cord or longitudinal element is positioned in the slot.
CLAIMS

1. A screening arrangement (1) for screening an aperture of a frame, comprising a screening body (6) and a bottom element (7),
   said screening body (6) including an end portion (62) attached to said bottom element (7),
   said bottom element (7) being movable between a first position for said screening body (6) to not screen said aperture and a second position for said screening body (6) to screen at least part of said aperture,
   said end portion (62) of said screening body (6) and a longitudinal element (63) with a circumference, said longitudinal element being positioned in a slot (73) formed by a first and a second projection (74, 7a) of said bottom element (7),
   characterized in that said end portion (62) of said screening body (6) surrounds at least a major part of said circumference of said longitudinal element (63), and
   said first projection (74) of said bottom element (7) is inclined towards said second projection (7a) such as to jam said longitudinal element (63) and said end portion (62) of said screening body (6) in between said first and second projections (74, 7a) and thus fasten them to said bottom element (7).

2. A screening arrangement (1) according to claim 1, wherein said end portion (62) of said screening body (6) surrounds at least about 185° and preferably about 230-240° of the circumference of said longitudinal element (63).

3. A screening arrangement (1) according to claim 1 or 2, wherein said projections (74, 7a) extend radially outwards from said bottom element (7), preferably both said projections (74, 7a) and preferably said longitudinal element (63) extend continuously substantially in the entire length of said bottom element (7).

4. A screening arrangement (1) according to claim 3, wherein said first projection (74) extends longer radially outwards than said second projection (7a), preferably said first projection (74) extends over a tip portion of said second projection (7a) such as to position said screen-
ing body (6) to be substantially flush with an outer, i.e. inwards facing
surface of said second projection (7a).

5. A screening arrangement (1) according to any previous
claim, wherein said longitudinal element (63) has a substantially circular
cross section, preferably said longitudinal element (63) is in the form of
a cord, more preferably said cord is made from metal.

6. A screening arrangement (1) according to any previous
claim, wherein said slot (73) comprises at least one inwards facing pro-
jection (80) abutting said longitudinal element (63) and/or said end por-
tion (62) of said screening body (6).

7. A method for fastening an end of a screening body (6) of a
screening arrangement (1), which screening arrangement (1) is suitable
for screening an aperture of a frame, to a bottom element (7) such that
said bottom element (7) is movable between a first position for the
screening body (6) to not screen said aperture and a second position for
the screening body (6) to screen at least part of said aperture, said
method comprising the steps of:

positioning an end portion (62) of said screening body (6) and a
longitudinal element (63) in a slot (73) formed by a first projection (74)
and a second projection (7a) of said bottom element (7) such that said
end portion (62) of said screening body (6) surrounds at least a major
part of the circumference of said longitudinal element (63), and
deforming said first projection (74) towards said second projec-
tion (7a) such as to jam said longitudinal element (63) and said end por-
tion (62) of said screening body (6) in between said first and second
projections (74, 7a) and thus fasten them to said bottom element (7).

8. A method according to claim 7, further comprising the steps
of winding said screening body (6) off of a screening body roll, cutting
said screening body (6) off at a suitable length, and positioning of said
longitudinal element (63) and said end portion (62) of said screening
body (6) in said slot (73) by means of first positioning said longitudinal
element (63) in contact with said end portion (62) of said screening
body (6) and then positioning said end portion (62) and said longitudinal
element (63) in said slot (73) such that said end portion (62) of said
screening body (6) surrounds at least a major part of the circumference of said longitudinal element (63).

9. A method according to claim 7 or 8, further comprising the step of guiding a slide from one end of said bottom element (7) to the other, said slide thus carrying out said deformation of said first projection (74) towards said second projection (7a).

10. A method according to any one of claims 6 to 8, wherein said first projection (74) is deformed about a weakening portion (78), such as a narrower portion, of said first projection (74).
A. CLASSIFICATION OF SUBJECT MATTER

According to International Patent Classification (IPC) or both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F16B E06B E04F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Further documents are listed in the continuation of Box C

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* Special categories of cited documents

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Date of the actual completion of the international search

18 January 2008

Date of mailing of the international search report

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Geivaerts, Dirk
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