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(54) **A sliding device, a window having such a sliding device and a method for mounting a sash in such a window**

(57) The sliding device (1) comprises a slide member (2) having a slide shoe (3), said slide shoe (3) being adapted to engage a substantially U-shaped rail (4) comprising a bottom wall (5), a side wall (6) and a front wall (7). The sliding device (1) further comprises a safety member (8) adapted to releasably engage the slide

member (2), said safety member (8) being in the mounted condition of the sliding device in engagement with a backside (6a) of the side wall (6) of the rail, such that the slide shoe (3) is prevented from being removed from the rail (4). At the same time a possibility for a varied frictional engagement between the sliding device (1) and the rail is provided.

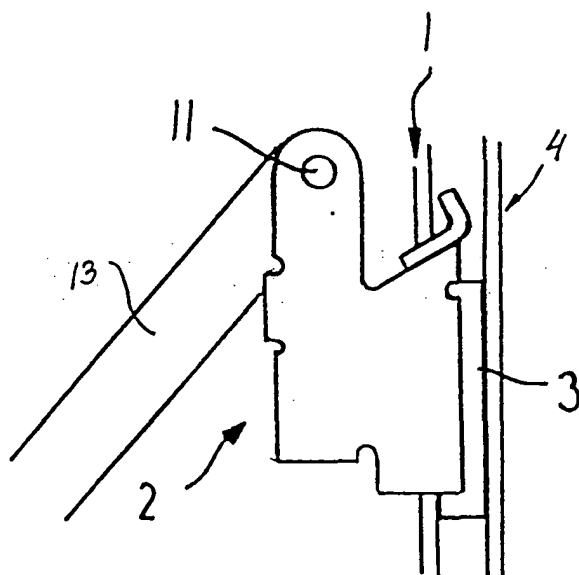


FIG. 4

Description

[0001] The present invention relates to a sliding device comprising a slide member having a slide shoe, said slide shoe being adapted to engage a substantially U-shaped rail comprising a bottom wall, a side wall and a front wall. The invention further comprises a window having such a sliding device and a method for mounting a sash in such a window.

[0002] Such sliding devices are known i.a. from reversible windows. The known sliding devices have a rail with a comparatively deep U-shape and correspondingly a comparatively big slide shoe, as there would otherwise be a risk that the slide shoe during use might fall out from the rail, which under unlucky circumstances may damage the window and at all events cause trouble for the user, which is to bring the slide shoe back into the rail to enable the window to function correctly. Such known sliding devices are therefore comparatively big, which makes them less suited for new window types, where the space for the fittings of the window is limited.

[0003] Another kind of sliding device uses partially closed rails, i.e. with C-shaped cross section, such that the slide shoe is retained against removal. This kind of sliding device ensures a good securing of the slide shoe in the rail, but it is on the other hand difficult to get the slide shoe in and out of engagement with the rail as required during mounting and dismounting of the window. The slide shoe is thus to be introduced into the rail from one end thereof, or a recess should be provided in the rail, such that the slide shoe can be taken out of the rail at a certain place, which, however, increases the risk of the slide shoe unintentionally disengaging the rail, and at the same time it is difficult to take out the block, as it is to be positioned on precisely the right place to be removed from the rail.

[0004] It is an object of the present invention to provide a sliding device, which is easy to mount, takes up little room and in which the slide shoe cannot unintentionally disengage the rail.

[0005] It is a further object to provide a window, in which the mounting and the operation of the sash relative to the frame is simple and flexible and which ensures the engagement between sash and frame.

[0006] With a view to meeting the above objects the sliding device according to the invention further comprises a safety member adapted to releasably engage the slide member, said safety member being in the mounted condition of the sliding device in engagement with a backside of the side wall of the rail. In this manner it has in a simple way been ensured that the slide shoe will not unintentionally disengage the rail, as this is prevented thereby that the safety member in the mounted position abuts against the backside of the sidewall.

[0007] The safety member may be a loose member adapted to be connected with the sliding member after mounting of the slide shoe in the rail, for instance with securing means, like a screw, a bolt or a snap connector,

but according to a preferred embodiment the safety member is displaceably connected to the slide member to be displaced from a first position at a distance from the slide shoe to a second position, in which the safety member at least partially overlaps the slide shoe.

[0008] With a view to getting a desired retaining function, such that a certain amount of force is to be exerted to move the sliding device, the sliding device comprises means for a varied frictional engagement between the sliding device and the rail.

[0009] In a second aspect, a window with a frame and a sash is provided, said window comprising a tension bar, a compression bar, a rail and a sliding device. The window is characterized in that the sash is connected to the frame by means of a sliding device according to the invention.

[0010] An embodiment is characterized in that the rail is provided with means for the attainment of a varied frictional engagement with the sliding device on one or more of its sides over the whole or over a part of its length. This embodiment makes it possible to attain a varying friction over the opening angle of the window, for instance in such a manner that the window has a holding function in chosen angle positions or has a child proofing by means of a point, where the window slides tightly, such that a child cannot open the window fully. Furthermore, the friction coating may be adapted to compensate for the fact that the slide shoe does not move equally much in all the angle areas, such that in spite of this, a fairly uniform resistance against opening and closing is attained.

[0011] In other cases it is desirable that the sliding device is easy to move, for which reason the slide shoe, the rail and the safety member may be adapted to a low mutual friction over the major part of the length of the rail, whereas at predetermined places a high friction is established.

[0012] A third aspect of the invention relates to a method for mounting a sash for a reversible window, comprising the following steps: provision of a frame, provision of a sash, provision of a set of rails of substantially U-shaped cross section at a front side of the frame, said rails opening towards the opening of the window, provision of two sliding devices comprising a set of slide shoes at the sash and insertion of the slide shoes in the rails by tilting the sash relative to the frame.

[0013] The method is characterized by the further step of actuating a safety member provided at the sliding device, such that the safety member is brought into abutment against the rail at its backside, whereby removal of the slide shoe from the rail is prevented.

[0014] Other features and advantages of the invention will appear from the remaining dependent claims and from the following description.

[0015] The invention will be explained in detail in the following by means of an example of an embodiment with reference to the accompanying drawings, in which

Fig. 1 is a lateral view of a slide member,
 Fig. 2 is an end view of the slide member and a rail,
 Fig. 3 is a lateral view of a reversible window,
 Fig. 4 is an enlarged part view of a sash corner of the reversible window,
 Fig. 5 is a lateral view of a safety member,
 Fig. 6 is an end view of the safety member,
 Fig. 7 is a sectional view through a slide shoe inserted in a rail, in which a safety member is in its passive position,
 Fig. 8 is a sectional view through a slide shoe inserted in a rail, in which the safety member is in its active position, and
 Fig. 9 is a schematic view of a sash for a reversible window during mounting.

[0016] A slide member 2, which constitutes a part of a sliding device 1, is shown in a lateral view in Fig. 1. The slide member 2 comprises a slide shoe 3 extending along a side edge. The slide member 2 may, as shown, be a comparatively small fitting adapted to be connected to a further member, like a sash of a reversible window, for instance by means of an eye 11. The slide member 2 has, moreover, a leg 16, the function of which will be explained in the following.

[0017] Fig. 2 is an end view of the slide member 2 and a rail 4, said rail comprising a bottom wall 5, a sidewall 6 and a front wall 7. The slide shoe 3 may be a bent metal leg, which is appropriately provided with an outer layer of plastic, whereby a slide shoe 3 is established, said slide shoe being easily displaceable in the rail 4 without any noise. If a particularly small resistance against displacement of the slide shoe 3 in the rail 4 is required, the slide shoe 3 may be provided with an exterior coating of a friction-dampening material, such as Teflon. Alternatively or supplementary the rail 4 may be provided with friction-dampening material on the surfaces, where the slide shoe 3 slides. In other cases a considerable friction between the slide shoe 3 and the rail 4 is desirable, for instance in order to obtain a holding function, such that the window may be open in a ventilating position, and in that case the slide shoe 3 and/or the rail 4 may be provided with a friction-increasing surface, for instance at selected places along the length of the rail. Alternatively, the rail 4 may be dimensioned in such a manner that the slide shoe 3 slides comparatively tight-fittingly in the rail 4 over the whole length thereof or solely at selected places.

[0018] A suitable use for such a sliding device 1 is as a guide for a sash 13 relative to a frame 23 of a reversible window 12 known per se, as illustrated in a slightly open position in Fig. 3. The design of such a reversible window will be described in consideration of principles only. The sash 13 of the reversible window 12 is mounted in a guide member comprising a tension bar 33, the upper end of which is rotatably connected to the frame 23, and the lower end of which is connected to a compression bar 43. One end of the compression bar 43 is connected

to the sash substantially at its central body and the other end is displaceably connected to the frame 23. The sash 13 is at its upper edge displaceably connected to the frame 23 by means of the sliding device 1 according to the invention, which is more clearly seen in Fig. 4, which is an enlarged part view of a sash corner of the reversible window. It will be seen here, how the slide member 2 is connected to the sash 13 at the eye 11, whereas the slide shoe 3 of the sliding device is inserted in the rail 4. In this manner the upper edge of the sash 13 is displaceable along the front side of the window frame, such that the sash 13 can be turned completely over, whereby for instance cleaning of the window is facilitated.

[0019] Figs 5 and 6 show a lateral view and an end view, respectively, of a safety member 8. It will be seen that the safety member 8 comprises an arm 14 functioning as a pre-stressing member and a locking member, which will be explained in detail below. The safety member may preferably be manufactured from a suitable plastic material. In cases, where it is desirable that the sliding device 1 has a particularly high friction, the safety member 8 may be manufactured from a material comprising hard particles, if at all, solely at the abutment surfaces against the rail in the mounted position of the safety member. In other cases, in which it is required that the sliding device has a particularly low friction, the safety member 8 may have a surface of a friction-dampening material, for instance Teflon.

[0020] Fig. 7 is a cross section through the sliding device 1 in a position during mounting or dismounting of the sash relative to the frame. In this position the safety member 8 is positioned somewhat at a distance from the rail 4, the end 14a being brought out of engagement with the leg 16. In this position it is thus possible to insert the slide shoe 3 in the rail 4 during mounting or to remove the slide shoe 3 from the rail during dismounting. In case of dismounting the safety member 8 can be further displaced relative to the slide shoe 3, such that the edge 15 (shown more clearly in Fig. 6) goes completely clear of the slide shoe.

[0021] Fig. 8 is a cross section through the sliding device 1 in its mounted position, in which the slide shoe 3 is inserted in the rail 4, and in which the safety member 8 is in abutment against the front wall 7 of the rail 4. At the same time the edge 15 of the safety member 8 is positioned at a backside 6a of the back wall 6, such that the slide shoe 3 is prevented from being removed from the rail 4. Furthermore, the end 14a of the arm 14 is in this mounted position of the sliding device in engagement with the leg 16 on the slide member 2, such that the safety member 8 is prevented from being removed from the rail 4. At the same time the leg 16 prevents the safety member 8 from being displaced relative to the slide member 2 in the direction of the rail 4.

[0022] The safety member 8 may, moreover, be adapted, in a manner not shown in detail, to be retained at differing distances from the rail 4, whereby is

achieved that the friction of the sliding device against the rail 4 is adjustable. This may for instance take place in a stepless manner by fastening the safety member 8 with screws in the desired position, or stepwise for instance by engagement between a leg of the safety member 8 and a hole in the slide member 2, or for instance thereby that the arm 14 is provided with a row of notches for engagement with the leg 16, alternatively thereby that the end 14a of the arm 14 may engage the underside of the leg 16. In a very simple embodiment (not shown) the sliding device may be provided with a pressure member in the form of for instance a leaf spring, which increases the friction against the rail. Other ways of varying the friction are conceivable, in this connection devices like cam mechanisms or the like, which makes it possible to shift manually or automatically between a condition, in which the friction is very low, and a condition, in which the friction is very high. The actuation thereof may for instance take place at predetermined places along the rail by means of actuating means provided on or in the rail itself.

[0023] Mounting of a sash of a reversible window in the rail is illustrated in Fig. 9, which is a schematic view of a sash 13 for a reversible window 12 during the mounting of the sash 13 on the frame 23. It will be seen that the sash 13 is positioned slightly askew, such that the horizontal distance between the slide shoes gets smaller, following which the slide shoes 3 may be introduced in the rail at the respective sides of the frame.

[0024] The window is preferably designed in such a manner that the sash 13 has substantially the same circumference as the frame 23 and in such a manner that the tension bar 33 is situated at or close to the exterior edge of the frame 23, for instance 1-2 mm from the frame. This means that the tension bar will be only slightly visible, when the window is closed. When the window is turned over, for instance to attain a cleaning position, the tension bar 33 will slightly touch the edge of the sash 13.

[0025] The rail 4 may preferably be manufactured by extrusion from aluminium, whereby a comparatively strong and low-cost rail is attained. The rail 4 may furthermore preferably be provided with a mounting means 17, for instance in the form of one or more protruding flanges or a longitudinal wall part adapted to be secured to the frame.

[0026] The invention is not to be considered as being limited to the embodiments described above and shown in the drawings, but different variations and combinations are conceivable.

Claims

1. A sliding device (1) comprising a slide member (2) having a slide shoe (3), said slide shoe (3) being adapted to engage a substantially U-shaped rail (4) comprising a bottom wall (5), a side wall (6) and a

front wall (7), **characterized in that** the sliding device (1) further comprises a safety member (8) adapted to releasably engage the slide member (2), said safety member (5) being in the mounted condition of the sliding device in engagement with a backside (6a) of the side wall (6) of the rail (4).

2. A sliding device (1) according to claim 1, in which the safety member (8) is displaceably connected to the slide member (2) for displacement from a first position at a distance from the slide shoe (3) to a second position, in which the safety member (8) at least partially overlaps the slide shoe (3).

3. A sliding device (1) according to one of the claims 1 and 2, said sliding device (1) comprising means for a varied frictional engagement between the sliding device (1) and the rail (4).

4. A sliding device (1) according to claim 3, in which the safety member (8) comprises means for frictional engagement with the rail (4).

5. A sliding device (1) according to claim 3 or 4, in which the slide shoe (3) comprises a friction material.

6. A sliding device (1) according to one of the claims 3-5, in which the sliding device comprises a prestressing member.

7. A sliding device (1) according to one of the preceding claims, in which the releasable connection between the slide member and the safety member in the mounted condition is locked by an arm (14).

8. A window with a frame (23) and a sash (13) comprising a tension bar (33), a compression bar (43), a rail (4) and a sliding device (1), **characterized in that** the sash (13) is connected to the frame (23) by means of a sliding device (1) according to one of the claims 1-7.

9. A window according to claim 8, in which the rail (4) is provided with means for the attainment of a varied frictional engagement with the sliding device on one or more of its sides over the whole or over a part of its length.

10. A window according to claim 8 or 9, in which the slide shoe (3), the rail (4) and the safety member (8) are adapted to display a low mutual friction over the major part of the length of the rail, whereas at predetermined places a high friction is established.

11. A window according to one of the claims 8-10, in which the circumference of the sash (13) substantially corresponds to that of the frame (23), and in

which the tension bar (33) is positioned by or close to the exterior edge of the frame (23).

12. A method for mounting a sash (13) for a reversible window (12), comprising the following steps: 5

provision of a frame (23),
provision of a sash (13),
provision of a set of rails of substantially U-
shaped cross section at a front side of the 10
frame, said rails (4) opening towards the open-
ing of the window,
provision of two sliding devices (1) comprising
a set of slide shoes (3) at the sash (13),
insertion of the slide shoes (3) in the rails (4) by 15
tilting the sash (13) relative to the frame (23),

characterized by the further step of actuating
a safety member (8) provided at the sliding device
(1), such that the safety member (8) is brought into 20
abutment against the rail (4) at its backside (6a),
whereby removal of the slide shoe (3) from the rail
(4) is prevented.

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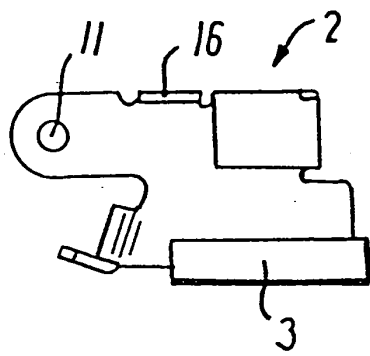


FIG. 1

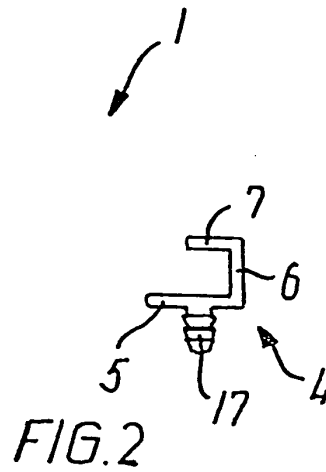
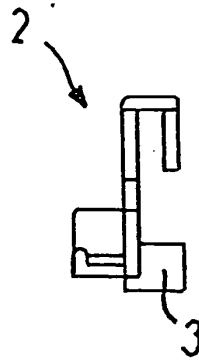


FIG. 2

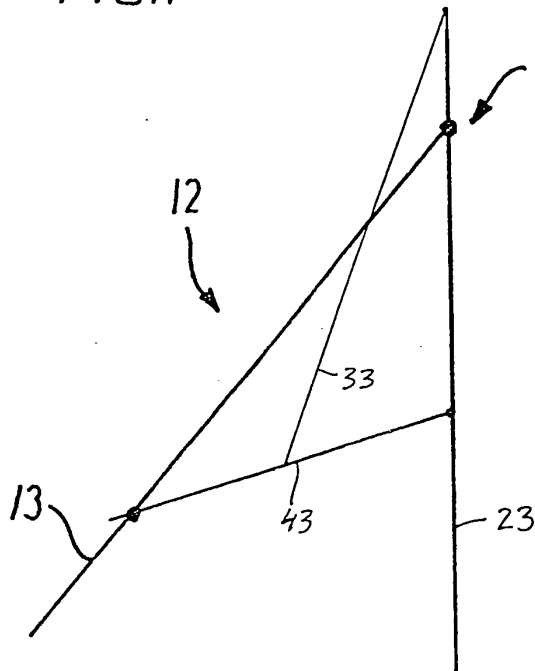


FIG. 3

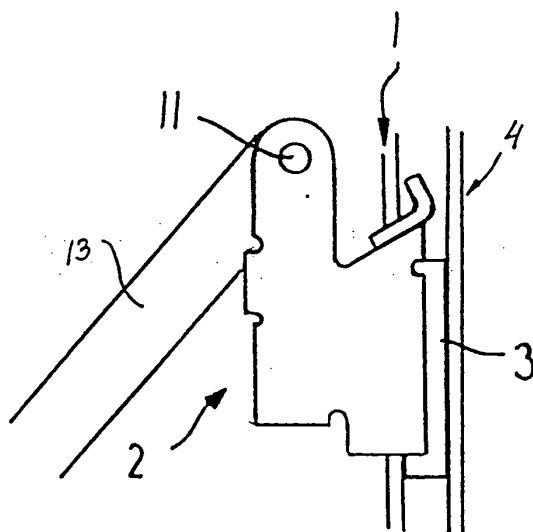


FIG. 4

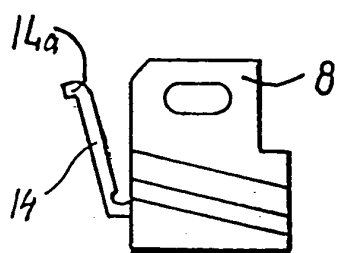


FIG. 5

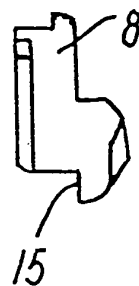


FIG. 6

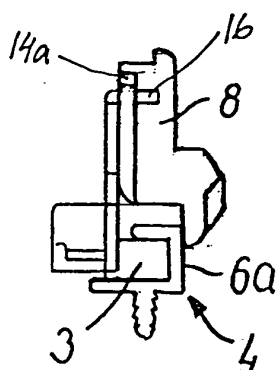


FIG. 7

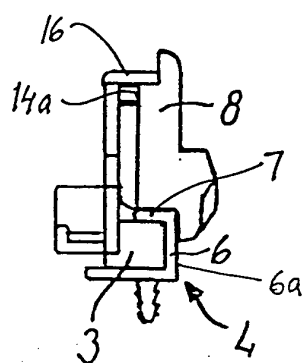


FIG. 8

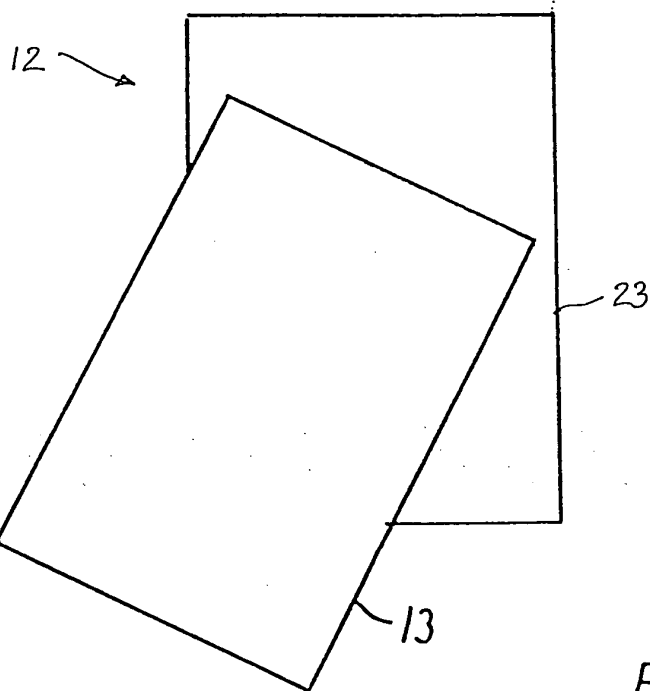


FIG. 9