(19) DANMARK

(10) DK 178574 B1

(12) PATENTSKRIFT

Patent- og Varemærkestyrelsen

(51) Int.Cl.: *E 06 B 3/46 (2006.01)* *E 05 D 15/10 (2006.01)* *E 05 D 15/30 (2006.01)* *E 05 D 15/34 (2006.01)* *E 05 D 15/58 (2006.01)* *E 06 B 7/215 (2006.01)*

(21) Ansøgningsnummer: **PA 2014 70766**

(22) Indleveringsdato: **2014-12-05**

(24) Løbedag: **2014-12-05**

(41) Alm. tilgængelig: **2016-06-06**

(45) Patentets meddelelse bkg. den: **2016-07-04**

(73) Patenthaver: **VKR Holding A/S, Breeltevej 18, 2970 Hørsholm, Danmark**

(72) Opfinder: **Kaj Smedegaard, Agersbækvej 23, 6950 Ringkøbing, Danmark**

(74) Fuldmægtig: **GUARDIAN IP CONSULTING I/S, Diplomvej , Bygning 381, 2800 Kongens Lyngby, Danmark**

(54) Benævnelse: **Sliding door or window assembly with a low bottom sill height**

(56) Fremdragne publikationer:
EP 0090956 B1
EP 0619410 B1
EP 1688573 A1
US 2010/064590 A1

(57) Sammendrag:
A sliding door or window assembly (1) comprising: a frame (2) having a bottom sill (20), said bottom sill having a sealing surface (23), a sliding panel (4) moveable between an open position and a closed position, said sliding panel having a bottom sealing surface (31) which is sealed against the sealing surface (23) of the bottom sill (20) of the frame (2) in the closed position of the sliding panel (4) to provide a sealing interface between the bottom sill and the sliding panel, a track (3), a wagon (10) arranged to be displaceable along the track, and a displacement mechanism (12) connecting the sliding panel (4) and the wagon (10), said displacement mechanism arranged such that the sliding panel is displaceable with respect to the wagon in a direction having a vector component which is perpendicular to the plane of the sliding panel. The assembly further comprises a sealing plate (40) which in the closed position of the sliding panel is arranged between the wagon (10) and the sealing surface (23) of the bottom sill (20), is provided with an upper sealing surface (42) which establishes an upper sealing interface between the sealing plate (40) and the sliding panel (4) and which comprises a portion which is located above the uppermost edge (14) of the wagon (10) and is provided with a lower sealing surface (42) which establishes a lower sealing interface between the sealing plate (40) and the sealing surface (23) of the bottom sill (20) and which comprises a portion which is located below the uppermost edge (14) of the wagon (10). In this way, an assembly is provided with a much lower bottom sill height than prior

Fortsættes ...

art assemblies.

Fortsættes ...

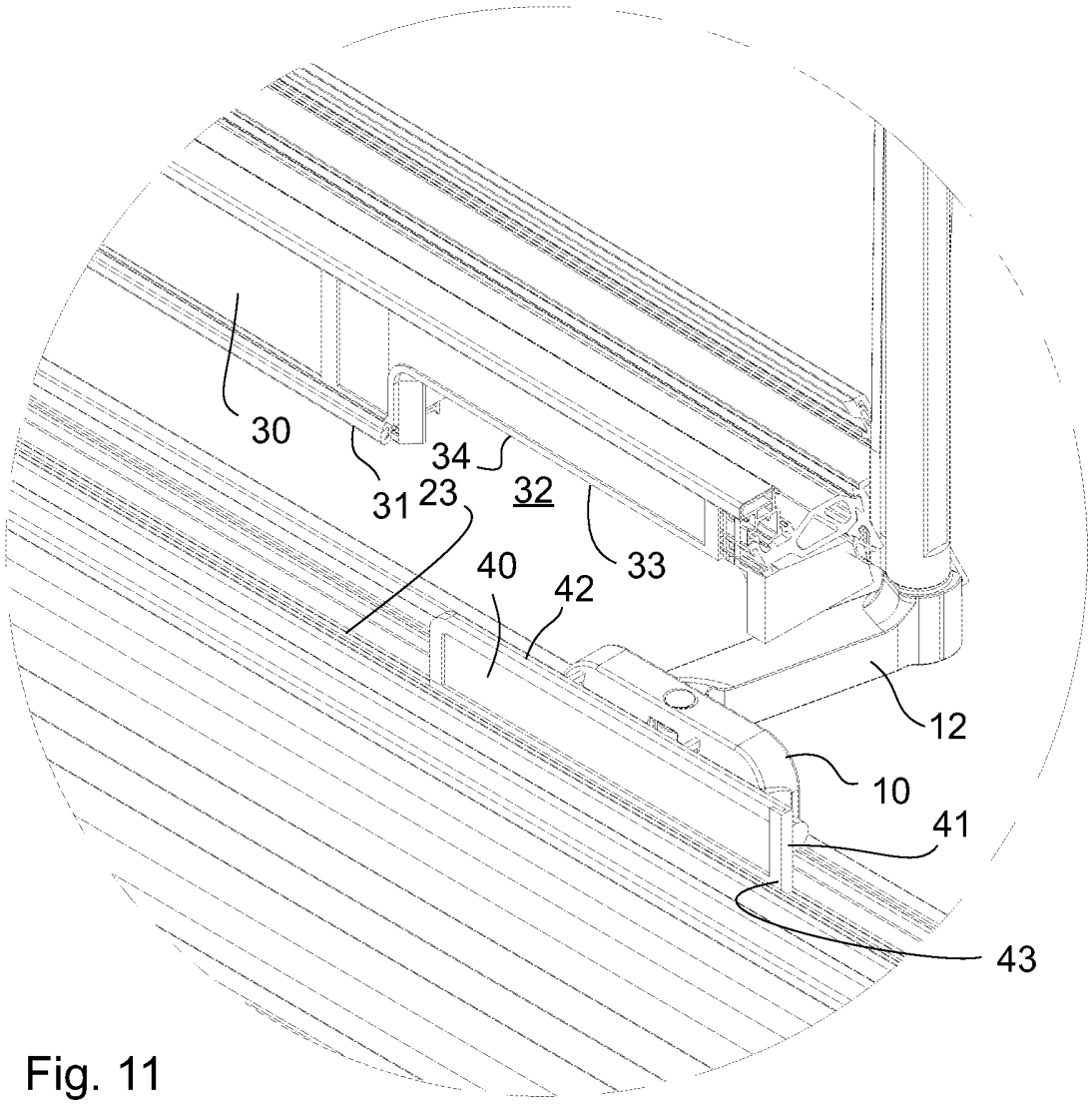

Fig. 11

Sliding door or window assembly with a low bottom sill height

The current invention relates to a sliding door or window assembly with a low bottom sill height.

In particular the current invention relates to a sliding door or window assembly comprising: a frame having a bottom sill, said bottom sill having a sealing surface, a sliding panel moveable between an open position and a closed position, said sliding panel having a bottom sealing surface which is sealed against the sealing surface of the bottom sill of the frame in the closed position of the sliding panel to provide a sealing interface between the bottom sill and the sliding panel, a track, a wagon arranged to be displaceable along the track, and a displacement mechanism connecting the sliding panel and the wagon, said displacement mechanism arranged such that the sliding panel is displaceable with respect to the wagon in a direction having a vector component which is perpendicular to the plane of the sliding panel.

For the sake of the current application, the term "sealing interface" should be understood as the interface or connection between two individual and with respect to each other displaceable elements which creates a weatherproof seal between the two elements. The term "sealing surface" should be understood as a surface of an element which forms one part of a "sealing interface". In other words, when two elements come into contact with each other to form a sealing interface, the surfaces on the parts which are in contact with each other will be termed "sealing surfaces".

It should also be noted that for the current specification, the terms inner and outer refer to the two sides of a wall in which the door or window assembly is mounted. In most cases the door/window assembly will be mounted in an exterior wall where the term inner side refers to the interior side of the wall and the term outer side refers to the exterior side of the wall. However, in a

situation where the door/window assembly is mounted in an interior wall, the terms inner and outer can be interpreted as the first and second major surface of the assembly. An object which is on the inner side of the assembly will be located closer to the inner side of the wall and an object which is on the outer side of the assembly will be located closer to the outer side of the wall.

Furthermore, the terms upper and lower should be understood as referring to the position in which the door or window assembly is to be mounted. If in doubt, the orientation shown in the figures should be used.

Description of related art

Sliding doors/windows are typically comprised of two panels, a fixed panel which is fixed in position and a sliding panel which slides relative to the fixed panel. This is typical for assemblies which comprise glass panes as the panels. However, in certain cases, sliding door or window assemblies are provided without a "fixed panel" as such. One could imagine a case where the assembly comprises a sliding panel which is placed adjacent a fixed wall section. Or the sliding panel could be arranged to slide past a fixed post element instead of a fixed panel element.

In most cases, the sliding panel is connected to a wagon which slides on a track. Typically, the track will be arranged parallel with the plane of the sliding panel in the closed position of the door. Typically, the track will be arranged underneath the fixed panel such that the track is hidden underneath the fixed panel. Typically, the sliding panel will be connected to two wagons, one arranged at each side of the sliding panel. The displacement mechanism used to displace the sliding panel perpendicularly to the plane of the sliding panel is typically a pivotable arm assembly where one end of the arm is

pivotably connected to the wagon and the other end of the arm is pivotably connected to the sliding panel.

Sliding doors can furthermore be classified into one of two main kinds. In a first kind of sliding door, when the door is in its closed position, the fixed and sliding panels are arranged parallel but offset from each other in a direction perpendicular to the plane of the panels. In one typical example, the inner surface of the sliding panel is arranged outside the outer surface of the fixed panel. In another typical example, the outer surface of the sliding panel is arranged inside the inner surface of the fixed panel. In this way the sliding panel can slide past the fixed panel in an easy manner without requiring any large displacements of the sliding panel perpendicular to the panel. Typically a small perpendicular displacement is provided when opening/closing the assembly in order to protect the seal between the frame and the sliding panel when sliding the sliding panel relative to the frame.

A disadvantage of this type of sliding door/window assembly is that in the closed position, the outer surfaces of the fixed and sliding panels are in separate planes. The same is true for the inner surfaces. This means that the outer and inner visual impression made by the door is less harmonious. This disharmonious visual appearance will be more apparent as the sliding panel gets thicker. With current developments in door/window assemblies where very thick multiple glazed window pane assemblies of are becoming standard, the disharmonious visual impression is very significant.

In a second type of sliding door, when the door is closed, the fixed panel and the sliding panel are arranged in line with each other. In general, it is usually desired that the outer surface of the sliding panel is in the same plane as the outer surface of the fixed panel when the door is closed. Other times, it is desired that the inner surface of the sliding panel is in the same plane as the inner surface of the fixed panel. In this way, a more harmonious outer and/or

inner visual appearance is provided. If the thickness of the fixed panel and the sliding panel are the same, then both the outer and inner surfaces of the fixed and sliding panels can be arranged co-planar when the door is closed. This gives a very harmonious outer and inner visual impression. This harmonious visual appearance is provided no matter how thick the panel construction is.

A disadvantage of this type of construction is that in order to allow the sliding panel to slide past the fixed panel, it is first necessary to displace the sliding panel a distance perpendicular to the plane of the sliding panel at the start of the opening process. The distance which needs to be displaces should be greater than the thickness of the sliding panel perpendicularly to the plane of the sliding panel. In an inwardly opening sliding door assembly, the sliding panel needs to be displaced inwardly until the outer surface of the sliding panel is inside the inner surface of the fixed panel. In an outwardly opening sliding door assembly, the sliding panel needs to be displaced outwardly until the inner surface of the sliding panel is outside the outer surface of the fixed panel. Due to the thickness and weight of modern sliding panels made from multiple glazed glass panes, the mechanisms used for displacing the sliding panel need to be quite strong.

The current invention relates to the second type of sliding door where the fixed and sliding panels are arranged inline when the door is closed. Some examples of this type of sliding door are provided in DE2700598C2, DE3725617A1, DE3810944A1, DE8435367U1, EP90956B1, EP222091B1, EP619410B1, EP1645707A1, EP2216472B1, EP2685040A2 and EP2690241A1.

A schematic example of a prior art mechanism used to displace a sliding panel of an outwardly opening sliding door assembly is shown in figure 1 in a closed position. The mechanism 1 comprises a wagon 2 which rolls on a

track 3 and a pivotable arm 4 which connects the wagon and the sliding panel 5. The wagon is typically arranged such that it is located underneath the sliding panel 5 when the door is closed. In this way, the wagon is hidden from view when the door is closed. The inner most sealing interface 6 between the sliding panel 5 and the bottom sill 7 is located above the uppermost edge of the wagon. When the door is to be opened, the sliding panel has to slide out and over the wagon. As such the portions of the sliding panel which are located on the inner side of the wagon when the door is closed need to be above the uppermost edge of the wagon. This is shown by the dimension "d" in figure 1. The dimension "d" has to be positive for all points of the sliding panel arranged inside the wagon when the door is closed, otherwise the portion of the sliding panel which is lower than the uppermost edge of the wagon could not pass the wagon and the door could not open.

Due to this fact, the overall height "h" of the bottom sill of prior art mechanisms is quite large. In situations where one would like easier access over the door sill, for example in wheelchair friendly constructions, the significant height of the bottom sill is a problem.

Summary of the invention

A first aspect of the current invention is therefore to provide a sliding door or window assembly of the above described kind which has a low bottom sill height.

This is provided by an assembly as specified in the introductory paragraph which further comprises a sealing plate which in the closed position of the sliding panel is arranged between the wagon and the sealing surface of the bottom sill, is provided with an upper sealing surface which establishes an

upper sealing interface between the sealing plate and the sliding panel and which comprises a portion which is located above the uppermost edge of the wagon and is provided with a lower sealing surface which establishes a lower sealing interface between the sealing plate and the sealing surface of the bottom sill and which comprises a portion which is located below the uppermost edge of the wagon. By providing a sealing plate between the wagon and the bottom sill, the sill height can be reduced significantly.

In one embodiment, the sealing plate is arranged such that the plane of the major surface of the sealing plate is parallel to the plane of the sliding panel in the closed position of the assembly. The sealing plate can be arranged as a plate element which has a thickness which is smaller than the length and height of the plate. The major surface of the plate is the surface which is defined by the length and height of the plate.

In one embodiment of an outwardly opening assembly, the upper sealing surface of the sealing plate is located on the outer side of the sealing plate and the lower sealing surface is located on the inner side of the sealing plate. In one embodiment of an inwardly opening assembly, the upper sealing surface of the sealing plate is located on the inner side of the sealing plate and the lower sealing surface is located on the outer side of the sealing plate.

In another embodiment, in the open position of the sliding panel, the assembly is arranged such that the upper sealing surface of the sealing plate is not in sealing contact with the sliding panel and/or in that the lower sealing surface of the sealing plate is not in sealing contact with the sealing surface of the bottom sill. In other words, the sealing interface between the sealing plate and the sliding panel and/or the sealing interface between the sealing plate and the bottom sill are/is broken. In the embodiments shown in the figures both sealing interfaces are broken when the sliding panel is moved into its open position. However, other embodiments could be provided where

at least one of the sealing interfaces remains intact in the open position of the sliding panel.

In one embodiment, the wagon is arranged underneath the sliding panel when the assembly is closed. In this way, the wagon can be hidden underneath the sliding panel in the closed position of the assembly. This provides a cleaner visual impression. In another embodiment, a second wagon is provided which is also connected to the sliding panel. In one such embodiment, the second wagon is hidden underneath the fixed panel in the closed position of the sliding panel.

In one embodiment, the sealing plate is arranged to displace as the sliding panel moves from its closed position to its open position. In one embodiment, for example the embodiment shown in the figures, the sealing plate is connected to the wagon and displaces together with the wagon when the wagon displaces along the track. In one embodiment, the sealing plate displaces along a direction which is parallel to the sliding panel.

However, in another embodiment (not shown) the sealing plate could remain fixed in place in the frame opening. In this embodiment, the sealing interface between the sealing plate and the bottom sill would remain intact when opening the door.

In one embodiment, the assembly further comprises a sealing plate displacement mechanism which allows the sealing plate to be displaceable with respect to the wagon in a direction having a vector component which is parallel to the axis of the track and/or in a direction having a vector component which is perpendicular to the plane of the sliding panel. In the embodiments shown in the figures, the sealing plate is connected directly to the wagon. As the wagon moves, the sealing plate also moves. However, the sealing plate in the embodiments from the figures is also provided with a

displacement mechanism between the wagon and the sealing plate. This displacement mechanism is arranged to allow displacement along both directions mentioned above. In another embodiment (not shown), the sealing plate could however be arranged such that it is not directly connected to the wagon. However, as the sliding door is opened, the sealing plate could be displaced in another manner to remove the sealing plate from the door opening. For example, in one embodiment, the sealing plate could be arranged to slide downwardly into the bottom sill. In another embodiment, the sealing plate could be arranged to slide opposite to the wagon and slide out into the frame of the assembly. In another embodiment, the sealing plate could displace both outwardly and rotate such that it is laid down when the assembly is opened.

In one embodiment, the sealing plate extends across essentially the entire width of the sliding panel. It should be noted that it is not necessary that the sealing plate is exactly the same length as the width of the sliding panel. Rather it is important that the sealing plate covers the entire width of the sliding panel which is visible between the frame members. Using another wording, one could say that in one embodiment the length of the sealing plate is at least 80%, at least 90% or at least 95% of the width of the sliding panel. In this case, during the opening of the sliding panel, it is necessary to displace the sealing plate since otherwise, the sealing plate would just add to the height of the bottom sill. In another embodiment, similar to the one shown in the figures, the sealing plate extends across only a portion of the width of the sliding panel. For example, the length of the sealing plate in the horizontal direction parallel to the plane of the sliding panel could be less than 50% of the width of the sliding panel. In another embodiment, the length of the sealing plate could be less than 30% or less than 20% of the width of the sliding panel. In one embodiment, the length of the sealing plate is slightly larger than the length of the wagon. By reducing the length of the sealing plate, a smaller plate needs to be displaced. If the sealing plate is

small enough, one could also imagine an embodiment where the sealing plate remains fixed in place on the bottom sill when opening the assembly.

In one embodiment with a reduced length sealing plate, the sliding panel further comprises an elongated sealing profile which is fixedly connected to or otherwise incorporated into the sliding panel along a bottom edge of the sliding panel and which is provided with the bottom sealing surface which establishes the sealing interface between the sliding panel and the bottom sill when the sliding panel is in its closed position, at least a portion of said bottom sealing interface being located between the wagon and the sealing surface of the bottom sill and at least a portion of said bottom sealing interface being located below the uppermost edge of the wagon, and said sealing profile being provided with an opening, said opening defining an area in a plane which is parallel to the plane of the sliding panel and being arranged in the vicinity of the wagon in the closed position of the sliding panel whereby the wagon can pass through said opening in the sealing profile when moving the sliding panel from its closed position to its open position and in that said sealing plate is arranged to seal the opening when the sliding panel is in its closed position. By providing such an opening in the sealing profile of the sliding panel, the wagon can pass through the opening while still allowing a low sill height. By providing the sealing plate in the correct position, the opening can be fully sealed in the closed position of the sliding panel.

It should be emphasized that the term "comprises/comprising/comprised of" when used in this specification is taken to specify the presence of stated features, integers, steps or components but does not preclude the presence or addition of one or more other features, integers, steps, components or groups thereof.

Brief description of the drawings

In the following, the invention will be described in greater detail with reference to embodiments shown by the enclosed figures. It should be emphasized that the embodiments shown are used for example purposes only and should not be used to limit the scope of the invention.

Figure 1 schematically shows a cross section view of a prior art type opening mechanism for a sliding door assembly.

Figure 2 shows a top front side perspective view of a first embodiment of an outwardly opening sliding door assembly according to the current invention in a closed position.

Figure 3 shows a top front side perspective view of the embodiment of figure 2, but in a halfway open position.

Figure 4 shows a bottom front side perspective view of the embodiment of figure 2 in a closed position.

Figure 5 shows a bottom front side perspective detail view as defined by the circle marked with V in figure 4.

Figure 6 shows a more detailed bottom front side perspective view of the opening mechanism as defined by the circle marked with VI in figure 5.

Figure 7 shows a more detailed bottom front side perspective view of the opening mechanism as defined by the circle marked with VII in figure 5.

Figure 8 shows a bottom front side perspective view of the assembly of figure 2 in an open position.

Figure 9 shows a more detailed bottom side perspective view of the bottom section of the door construction as defined by the circle marked with IX in figure 8.

Figure 10 shows a top front side perspective view of the sliding door assembly of figure 2 in a halfway open position where many elements of the assembly have been removed to make the figure easier to understand.

Figure 11 shows a top front side perspective detail view as defined by the circle marked with XI in figure 10.

Figure 12 shows a schematic cross section through the assembly as defined by the line XII-XII in figure 10.

Figure 13 shows a schematic cross section through the assembly as defined by the line XIII-XIII in figure 10.

It should be noted that for both figures 12 and 13, many details have been removed from the drawings in order to improve the clarity of the figures. Furthermore, some elements, for example the wagons 10,11, the arms 12,13 and the displacement mechanisms 50, 51 described with respect to figures 14 and 15, are shown schematically for the sake of simplicity.

Figures 14 and 15 show two different perspective detail views of the outside wagon and the arm of the opening mechanism.

Figure 16 shows a schematic cross section view of another embodiment of a bottom portion of a fixed panel and bottom sill of a frame.

Detailed description of the embodiments

Figures 2-15 show different views of the same embodiment of an outwardly opening sliding door assembly according to the invention.

The sliding door assembly 1 comprises a frame 2, a fixed panel 3 arranged in a first opening in the frame and a sliding panel 4 arranged in a second opening in the frame. The frame is mounted in a wall opening (not shown) as is of the kind which is well known in the art. The frame comprises four outer frame elements forming the periphery of the frame and a post arranged in the middle of the frame to define two openings in the frame. In the embodiment shown, the fixed panel and the sliding panel are assembled from similar extruded sash elements and therefore have similar cross sections. However, the fixed panel is fixed in the first frame opening via fixed fittings while the sliding panel is mounted in the second frame opening via sliding door fittings. The person skilled in the art will be familiar with this type of construction and more details will not be provided here.

In the figures, only the bottom fittings of the sliding panel are shown. The upper fittings and the fixed fittings used can be of the kind known in the art. The current invention is related mainly to the bottom sliding fitting and as such the description below will focus on the bottom sliding fitting.

As shown in figure 2, when the door is closed, the outer surface (the surface which can be seen in the figures) of the fixed panel 3 is in the same plane as the outer surface of the sliding panel 4. This provides a harmonious outer visual impression. In the current embodiment, the thickness of the sliding panel and the thickness of the fixed panel are the same, and as such, the inner surfaces (the surfaces facing into the paper in the figures) of the fixed and sliding panels are also arranged in the same plane. This also gives a harmonious visual impression on the inside of the door assembly.

As shown in figure 3, when the door is opened, the sliding panel 4 is first displaced outwardly in a direction which is perpendicular to the plane of the sliding panel until the inner surface of the sliding panel is outside the outer surface of the fixed panel 3. The sliding panel can then be displaced sideways in order to slide the sliding panel past the fixed panel so that the panels are at least partly overlapping or superposed. Figures 2 and 3 show in general a known construction and known fittings and as such will not be described in more details here.

Figures 4-7 show different views of the bottom of the door assembly in the closed position of the door assembly. In order to show the details of the opening mechanism, the track on which the wagons roll has been removed.

The opening mechanism comprises two wagons, a side wagon 10 placed at one side of the door assembly and a centre wagon 11 placed near the centre of the door assembly. It should be noted that the centre wagon 11 is placed near the side edge of the sliding panel which is closest to a side edge of the fixed panel, which places it near the centre of the door assembly, hence the name "center" wagon. Each wagon has a pivotable arm 12,13. Each arm is pivotably connected to a wagon and one side edge of the sliding door panel near the bottom of the sliding door panel. It should be noted that in the current embodiment, the arm is connected to the ide edge of the sliding panel at the corner between the side edge and the bottom edge. However, in another embodiment, the arm could also be connected to the bottom edge of the sliding panel. The arm 12 of the side wagon 10 is connected to the side edge of the sliding panel which is closest to the side edge of the door assembly on the side of the sliding panel and the arm 13 of the centre wagon 11 is connected to the side edge of the sliding panel which is closest the centre of the door assembly. As can be seen from figure 6, in the closed position of the door assembly, the centre wagon 11 and the centre wagon's

arm 13 is located underneath the fixed panel 3. As can be seen from figure 7, in the closed position of the door assembly the side wagon 10 and the side wagon's arm 12 are located underneath the sliding panel 4.

Figures 8-15 show different views of the door assembly in an open position. As can be seen by comparing figures 5 and 9, as the door is opened, the sliding panel is first displaced outwardly by rotating the arms 12,13. In order to achieve a more perpendicular outward motion at the start of the opening procedure, in contrast to a combined sideways and outward motion, the wagons are both displaced a small amount towards the side edge of the door assembly closest to the sliding panel. In this way, it is possible to move the door almost perpendicularly outwards at the start of the opening procedure. In the current embodiment, it is furthermore arranged such that the centre wagon and centre arm are displaced a small amount more than the side wagon and side arm are displaced at the start of the procedure. In this way, the door is angled slightly. In general, this form of opening procedure and opening mechanism is known in the prior art. More details of such mechanisms can be found in the previously cited patent documents.

As mentioned previously in this specification, a problem with prior art type sliding doors is that the bottom sill height is quite high. It is therefore an objective of the current invention to reduce the height of the bottom sill with respect to the prior art. As such, as can best be seen from figures 11 and 13, the height "h" of the bottom sill 20 has been reduced. A prior art sill 21 is shown with dotted lines in figure 13. The sill height of the prior art assembly is shown by "H". In the prior art type assembly, the seal between the prior art sill and the sliding panel is located as shown schematically by the dotted line circle 22. In the prior art type assembly, the seal 22 is located high in order for it to be able to pass by the uppermost edge of the wagon when the sliding panel is moved outwards.

However, in the current invention, a sealing profile 30 has been attached to the inside lowermost edge of the fixed and sliding panels 3,4. This can best be seen in figures 12 and 13. In the current embodiment, the sealing profile is an extruded elongated profile having an essentially constant cross section perpendicular to the longitudinal axis of the profile. The sealing profile 30 is arranged to move the seal 31 between the panel and the sill downwards in comparison to prior art so that the sill height can be reduced. It can be noted that the seal 31 can be described as a lower sealing surface which forms a sealing interface between the panel and the sealing surface 23 of the bottom sill 20.

However, due to this, the seal 31 and a large portion of the sealing profile 30 are arranged inside and underneath the uppermost edge 14 of the wagon 10. As such, the wagon would have to go through the sealing profile 30 when displacing the sliding panel from its closed position perpendicularly outwards to its open position. This is illustrated in figure 12 where the seal 31' and sealing profile 30' connected to the sliding panel are shown in dotted lines. Figure 12 shows that in the open position of the sliding panel 4, the panel has moved outwardly whereby the seal 31' and the sealing profile 30' have displaced from a position inside the wagon to a position outside the wagon. In order to solve this problem, as can best be seen in figure 11, an opening 32 is formed in the sealing profile 30, to allow the wagon to pass through the sealing profile when the sliding panel is to be displaced outwardly. The opening is formed such that an open area having a cross sectional area in a plane parallel to the plane of the sliding panel is large enough for the wagon to slide through the opening.

In order to seal the opening 32 in the sealing profile, a sealing plate 40 has been attached to the wagon between the wagon and the sealing surface 23 of the bottom sill 20. The sealing plate 40 is arranged to fill the opening 32 in

the sealing profile 30 when the sliding panel 4 is put into the closed position of the door assembly.

The opening 32 in the sealing profile 30 is provided with a sealing edge 33 which is arranged around the periphery of the opening 32. The sealing edge is arranged in a plane which is parallel to the plane of the sliding panel. The sealing edge 33 is furthermore arranged to correspond to the outer edge 41 of the sealing plate 40. When the sliding panel is closed, the outer edge 41 of the sealing plate 40 is arranged to press up against the sealing edge 33 of the opening 32 in the sealing profile 30.

It can be seen that the upper outer horizontal edge 42 of the sealing plate forms a vertically arranged sealing surface which engages with the inner upper horizontal edge 34 of the opening of the sliding panel to form an upper sealing interface in the closed position of the assembly. Likewise, the lower inner horizontal edge 43 of the sealing plate forms a vertically arranged sealing surface which engages with the vertically arranged and outwardly facing sealing surface 23 of the bottom sill 20 to form a lower sealing interface in the closed position of the assembly. In the current embodiment, the sealing surfaces are arranged as vertical surfaces which engage with each other by pressing one surface against another. Deformable seals, for example rubber gaskets, are attached to the sealing surfaces to further improve the sealing effect. However it should be clear to the person skilled in the art that other arrangements of sealing interfaces could be imagined. For example, the sealing plate could be arranged slightly smaller than the opening and be provided with a perimeter seal, for example a wiper seal or an o-ring, which engages with an inner surface of the opening when the sealing plate is inserted into the opening.

In figures 14 and 15, it can be seen that the sealing plate 40 is attached to the wagon in a displaceable manner via two displacement mechanisms. A

first displacement mechanism 50 is provided to allow the sealing plate 40 to displace in a direction perpendicular to the plane of the sliding panel and a second displacement mechanism 51 is provided to allow the sealing plate 40 to displace in a direction parallel to the plane of the sliding panel.

The first displacement mechanism 50 allows the sealing plate 40 to retract from the sill 20 when the sliding panel is opened. The first displacement mechanism comprises a horizontal slot 52 connected to the wagon and square horizontal rod 53 connected to the outer side of the sealing plate 40. The rod 53 is arranged inside the slot 52. The rod can displace in the slot but cannot rotate in the slot. In this way, the sealing plate can slide in an out in a direction parallel to the axis of the slot. The axis of the slot in the current embodiment is arranged perpendicular to the plane of the sliding panel. In one embodiment (not shown) a spring is provided to bias the sealing plate towards the wagon. In this way, as the sliding panel is moved outwardly, the sealing plate will also move outwards, thereby releasing the sealing interface between the sealing plate and the bottom sill. However, when the sliding panel is closed, the closing of the sliding panel will press the sealing plate back in towards the bottom sill thereby re-establishing the sealing interface.

The second displacement mechanism 51 allows the side wagon 10 to displace slightly sideways before the sliding panel starts to move outwardly. In this way, the wagon can move without requiring that the sealing plate 40 displaces with the wagon at the start of the motion. The sideways motion is provided by the same slot 52 and rod 53 arrangement as the first displacement mechanism in the current embodiment. The rod is arranged to slide in the opening of the slot in a direction which is parallel to the longitudinal axis of the rod 53. A spring 54 is provided to move the sealing plate into a predetermined bias position. In the current embodiment, the spring is arranged to force the sealing plate to one side of the wagon. However, in another embodiment (not shown) another spring arrangement

could be provided to bias the sealing plate in a position where motion to both sides was permitted.

As mentioned above, the sealing profile 30 is provided with an opening for the side wagon 10 to pass through the sealing profile. This is because the side wagon is placed underneath the sliding panel 4 in the closed position of the sliding panel. In contrast, since the centre wagon 11 is placed underneath the fixed panel 3 in the closed position of the sliding panel, see for example figure 6, it is not necessary for the centre wagon 11 to pass through the sealing profile 30. As such only one opening 32 is required in the sealing profile 30 of the sliding panel. Furthermore, as can be roughly seen in figure 9, the arm 13 of the centre wagon 11 is connected to the side edge of the sliding panel. In this way, the arm does not interfere with the sealing profile since the sealing profile does not extend into the corner region of the sliding panel. This explains why the arm 13 in figure 13 is higher than the sealing profile 30.

As mentioned previously in this specification, the description above has only shown an example embodiment of a sliding door assembly according to the invention. However, it should be clear to the person skilled in the art, that the invention could also be applied to a sliding window assembly with the same benefits.

Furthermore, the invention could also be practiced in other ways than the exact one shown here. In one example embodiment, the sealing element, is arranged to have the same length as the width of the sliding door panel and in this way, extend all the way across the door opening. In order to make this work, the bottom sash profile of the fixed panel is provided with space to allow the sealing element to slide into when the sliding panel is opened. A schematic example is shown in figure 16. By comparing figure 12 and figure 16, one could imagine that the sealing profile 60 attached to the fixed panel 3

were provided with a slot 61 which was the same size as the sealing plate (not shown in figure 16, but arranged as in figure 12 but extending across the entire width of the door). As the door is opened, the sealing plate would displace slightly outwardly to be able to pass by the inside surface 62 of the sealing profile 60 of the fixed panel, and then the sealing plate would slide in under the fixed panel while the sliding panel slides outside of the fixed panel. In one example embodiment, the sealing plate displaces slightly outwardly and downwardly to give more room in the fixed profile.

It is to be noted that the figures and the above description have shown the example embodiments in a schematic manner where certain details have been hidden since the person skilled in the art should be familiar with these details and they would just unnecessarily complicate the figures and description.

It should also be noted that the invention can be used for both sliding door assemblies and sliding window assemblies. In the description provided above and in the figures the focus was on sliding doors. However the person skilled in the art will be able to use the teaching of the current invention and apply it to windows as well. It should furthermore be noted that in the description above, an outwardly opening door assembly has been described. The terms used in the description will therefore refer to an outwardly opening assembly. However, the person skilled in the art will be able to understand that when designing an inwardly opening door or window assembly based on the teachings of the current specification, the terms inside and outside will be reversed.

Krav

1. Skydedørs- eller vindueskonstruktion (1) som omfatter:
    a. en karm (2) med en bundkarm (20), hvor bundkarmen har en tætningsflade (23),
    b. et glidende panel (4) som kan bevæges mellem en åben stilling og en lukket stilling, hvor det glidende panel har en bundtætningsflade (31), som er tætnet mod tætningsfladen (23) af bundkarmen (20) af karmen (2) i den lukkede stilling af det glidende panel (4) for at tilvejebringe en tætningsgrænseflade mellem bundkarmen og det glidende panel,
    c. et spor (3),
    d. en vogn (10) som er indrettet til at kunne forskydes langs sporet, og
    e. en forskydningsmekanisme (12), der forbinder det glidende panel (4) og vognen (10), hvilken forskydningsmekanisme er indrettet således, at det glidende panel er forskydeligt i forhold til vognen i en retning, der har en vektorkomposant, der er vinkelret på planet af det glidende panel (4),

    kendetegnet ved, at konstruktionen yderligere omfatter

    f. en tætningsplade (40), som i den lukkede stilling af det glidende panel:
        i. er placeret mellem vognen (10) og tætningsfladen (23) af bundkarmen (20),
        ii. er forsynet med en øvre tætningsflade (42), som fastlægger en øvre tætningsgrænseflade mellem tætningspladen (40) og det glidende panel (4), og som omfatter en del, der er placeret over den øverste kant (14) af vognen (10) og
        iii. er forsynet med en nedre tætningsflade (43), som fastlægger en nedre tætningsgrænseflade mellem

tætningspladen (40) og tætningsfladen (23) af bundkarmen (20), og som omfatter en del, som er placeret under den øverste kant (14) af vognen (10).

2. Skydedørs- eller vindueskonstruktion (1) ifølge krav 1, **kendetegnet ved**, at tætningspladen (40) er anbragt således, at planet af tætningspladen er parallel med planet af det glidende panel (4) i den lukkede position af konstruktionen.

3. Skydedørs- eller vindueskonstruktion (1) ifølge krav 1 eller 2, **kendetegnet ved**, at konstruktionen er således indrettet, at den øvre tætningsflade (42) af tætningspladen (40) ikke er i tætnende kontakt med det glidende panel (4) og / eller, at den nedre tætningsflade (43) af tætningspladen (40) ikke er i tætnende kontakt med tætningsfladen (23) af bundkarmen (20) i den åbne stilling af det glidende panel (4).

4. Skydedørs- eller vindueskonstruktion (1) ifølge et hvilket som helst af kravene 1 til 3, **kendetegnet ved**, at vognen (10) er anbragt under det glidende panel (4), når konstruktionen er lukket.

5. Skydedørs- eller vindueskonstruktion (1) ifølge et hvilket som helst af kravene 1 til 4, **kendetegnet ved**, at tætningspladen (40) er indrettet til at forskyde sig, når det glidende panel (4) bevæger sig fra sin lukkede stilling til sin åbne stilling.

6. Skydedørs- eller vindueskonstruktion (1) ifølge krav 5, **kendetegnet ved**, at tætningspladen (40) er forbundet med vognen (10) og forskyder sig sammen med vognen, når vognen forskyder sig langs sporet (3).

7. Skydedørs- eller vindueskonstruktion (1) ifølge et hvilket som helst af kravene 1 til 6, **kendetegnet ved,** at konstruktionen endvidere omfatter en tætningsplade forskydningsmekanisme (50,51), som gør det muligt at forskyde tætningspladen (40) i forhold til vognen (10) i en retning, der har en vektorkomposant, der er parallel med sporets akse (3) og / eller i en retning, der har en vektorkomposant, der er vinkelret på planet af det glidende panel (4).

8. Skydedørs- eller vindueskonstruktion (1) ifølge et hvilket som helst af kravene 1 til 7, **kendetegnet ved**, at tætningspladen (40) strækker sig over mere end 90% af bredden af det glidende panel (4).

9. Skydedørs- eller vindueskonstruktion (1) ifølge et hvilket som helst af kravene 1 til 7, **kendetegnet ved**, at tætningspladen (40) strækker sig på tværs af blot en del af bredden af glidepladen (4).

10. Skydedørs- eller vindueskonstruktion (1) ifølge krav 9, **kendetegnet ved**, at det glidende panel yderligere omfatter en aflang tætningsprofil (30), som er fast forbundet med eller på anden måde indarbejdet i det glidende panel (4) langs en bundkant af det glidende panel og som er forsynet med bundtætningsfladen (31), som fastlægger tætningsgrænsefladen mellem bundkanten af det glidende panel (4) og bundkarmen (20), når det glidende panel er i sin lukkede stilling, hvor mindst en del af nævnte tætningsgrænseflade er placeret mellem vognen (10) og tætningsfladen (23) af bundkarmen (20) og mindst en del af nævnte tætningsgrænseflade er placeret under den øverste kant (14) af vognen (10), og hvor nævnte tætningsprofil (30) er forsynet med en åbning (32), hvilken åbning definerer et areal i et plan, som er parallelt med planet af det glidende panel og er anbragt i nærheden af vognen (10) i den lukkede stilling af det glidende panel hvorved vognen kan passere igennem åbningen (32) i tætningsprofilet

(30) ved flytning af det glidende panel (4) fra sin lukkede stilling til sin åbne stilling, og ved, at tætningspladen (40) er indrettet til at tætne åbningen (32), når det glidende panel (4) er i sin lukkede stilling.

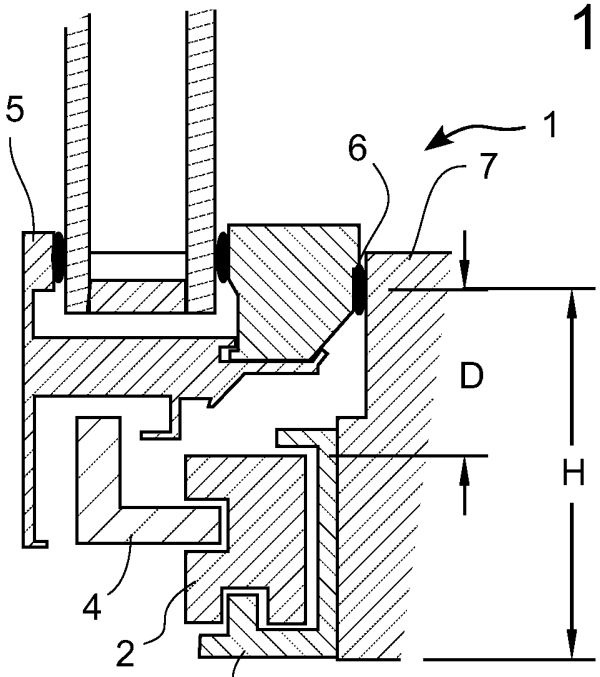

Fig. 1

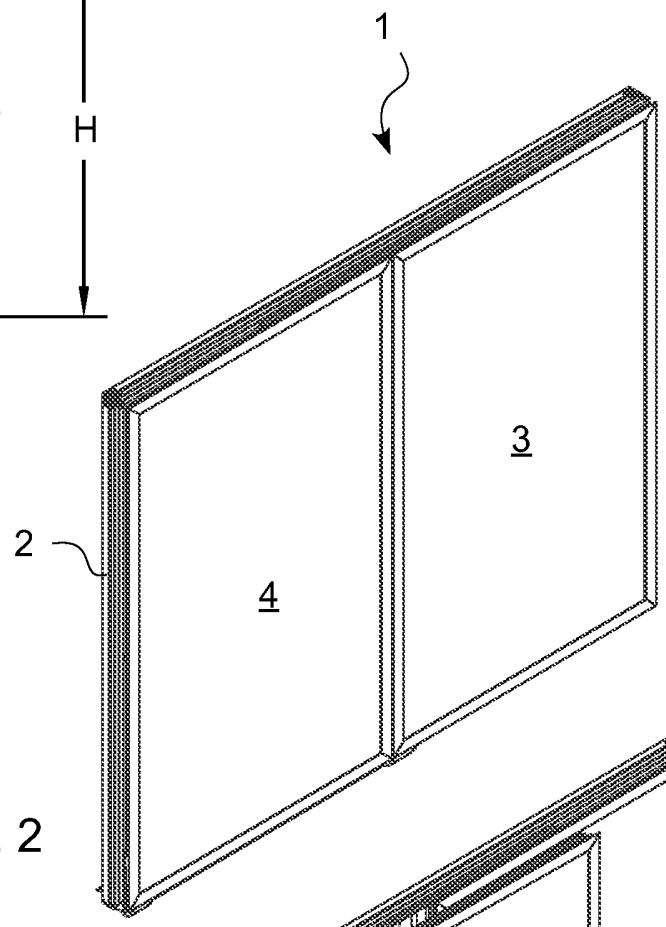

Fig. 2

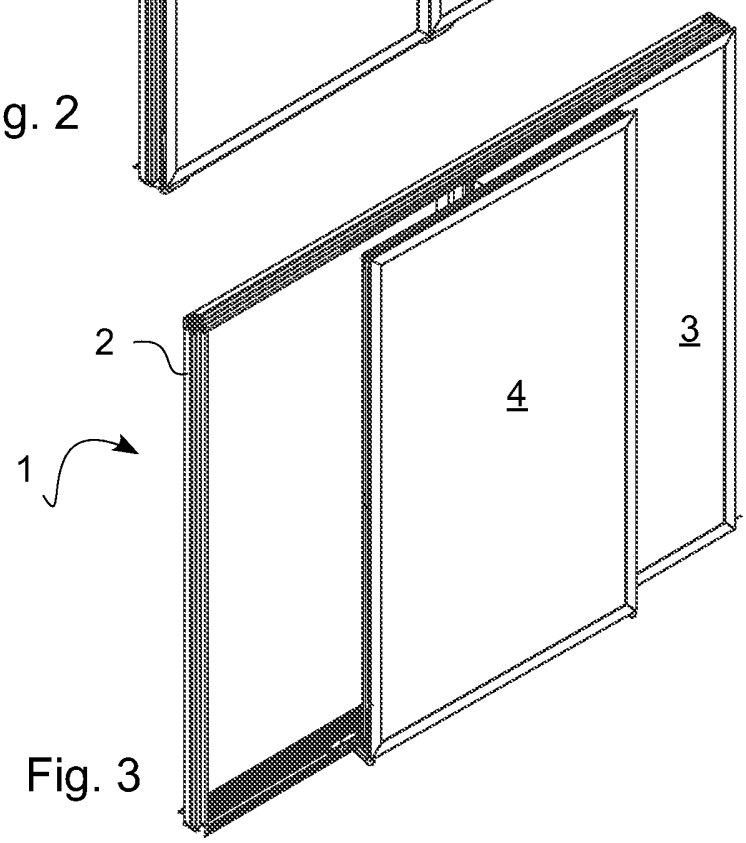

Fig. 3

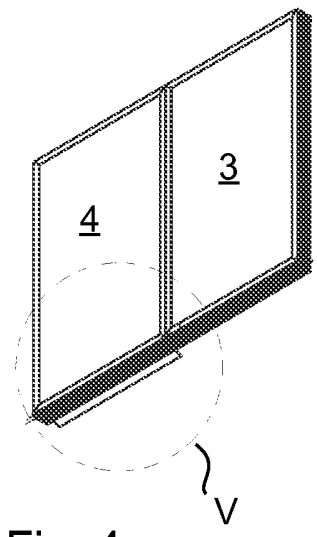

Fig. 4

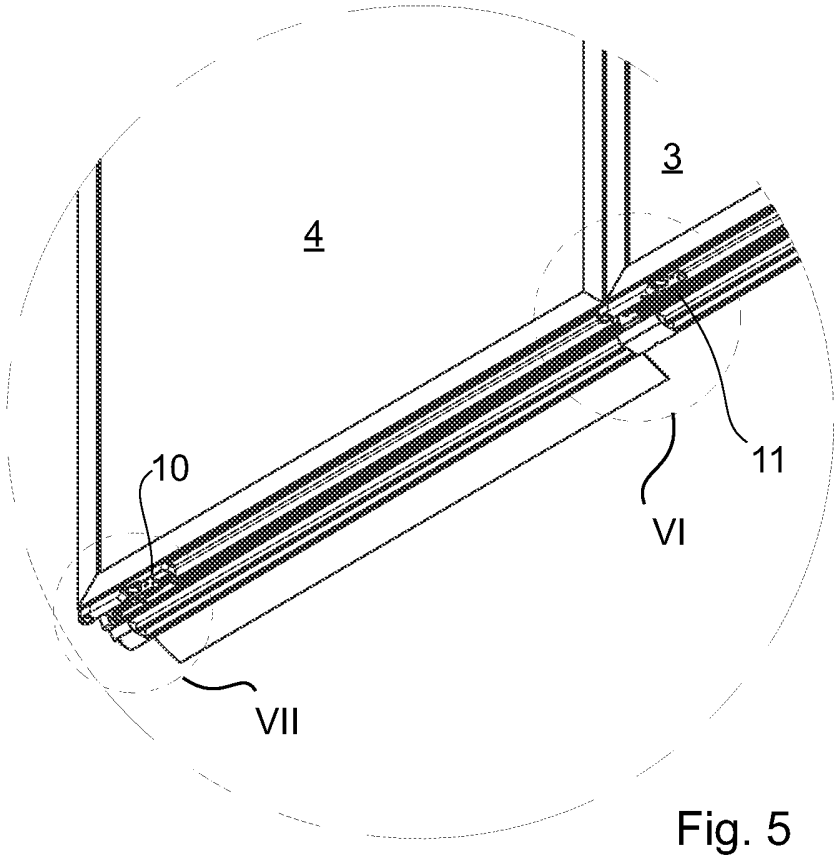

Fig. 5

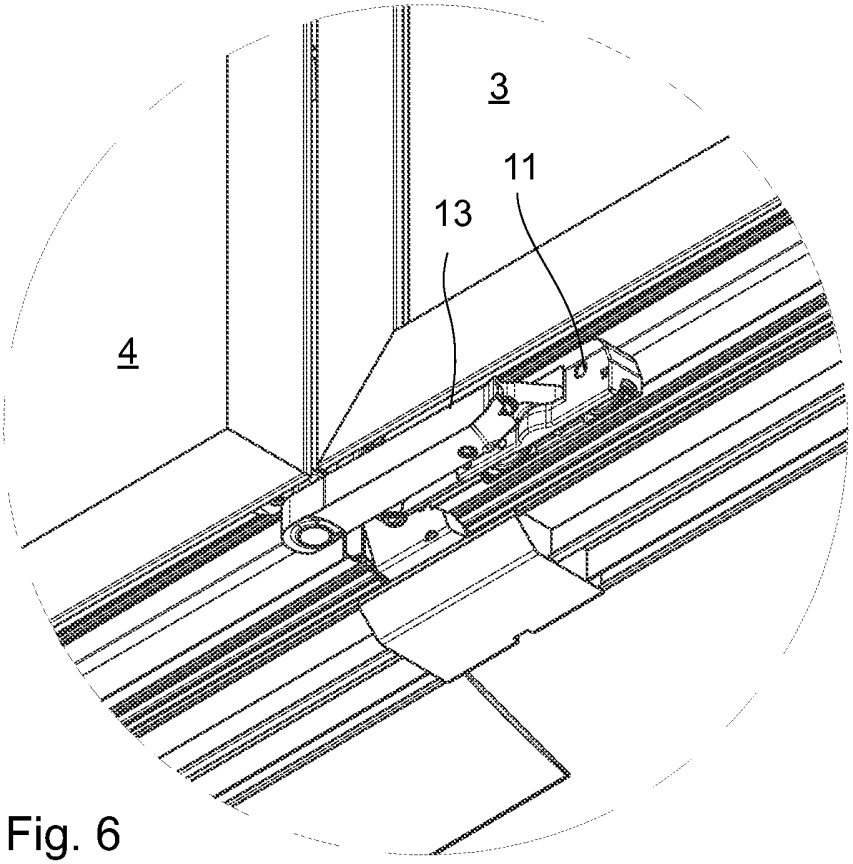

Fig. 6

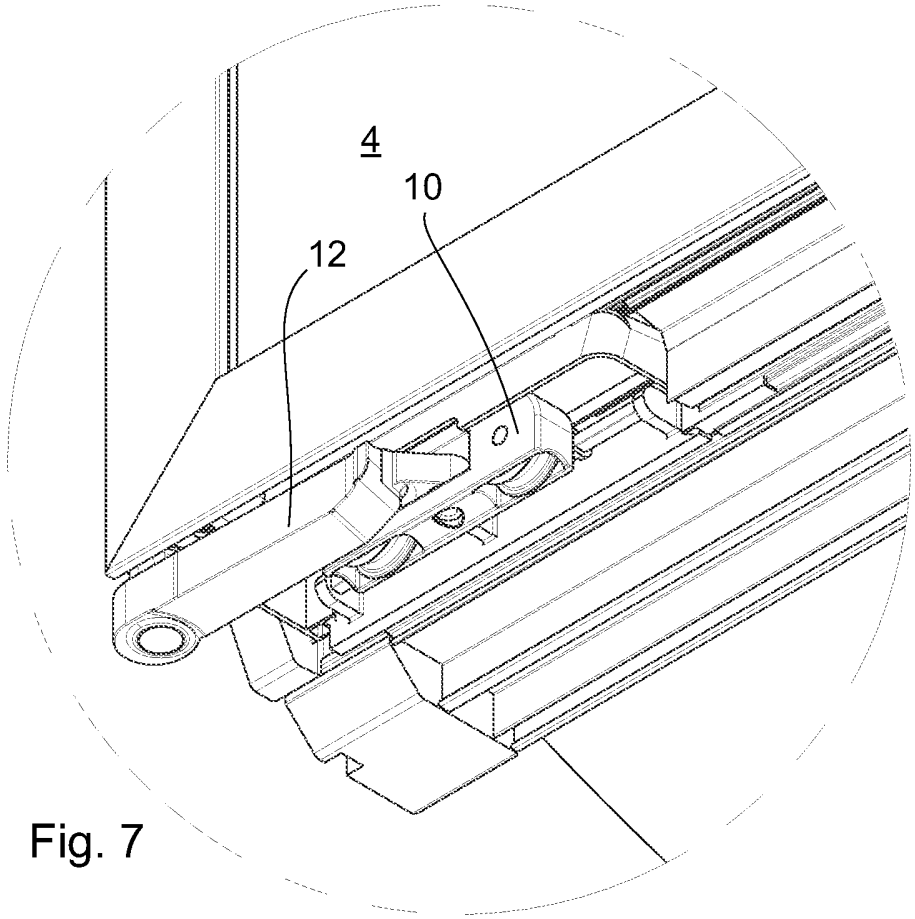

Fig. 7

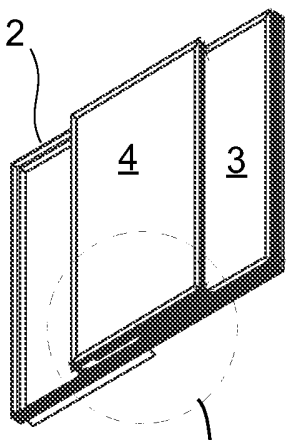

Fig. 8

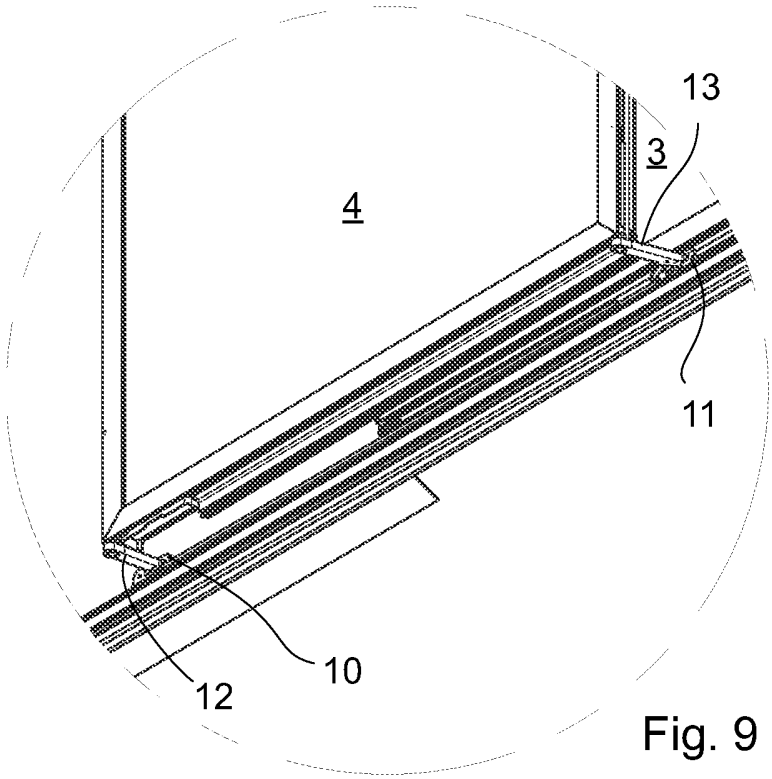

Fig. 9

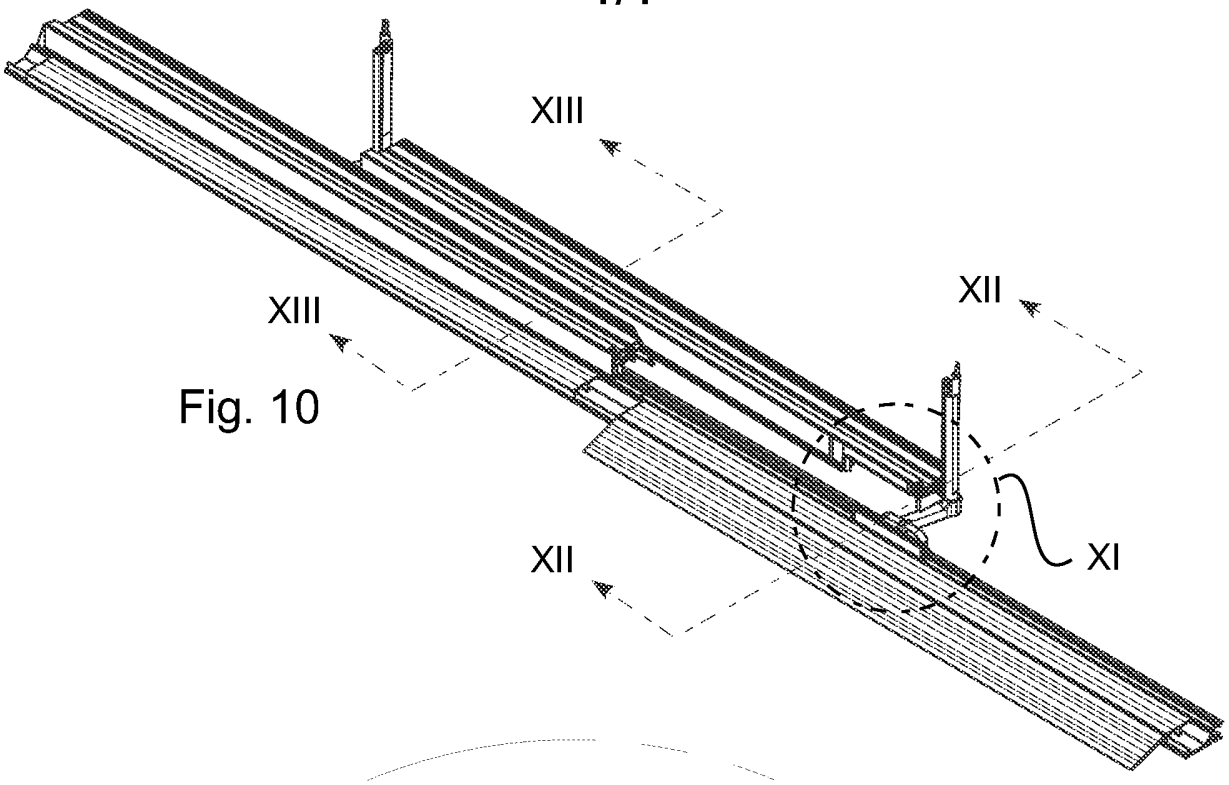

Fig. 10

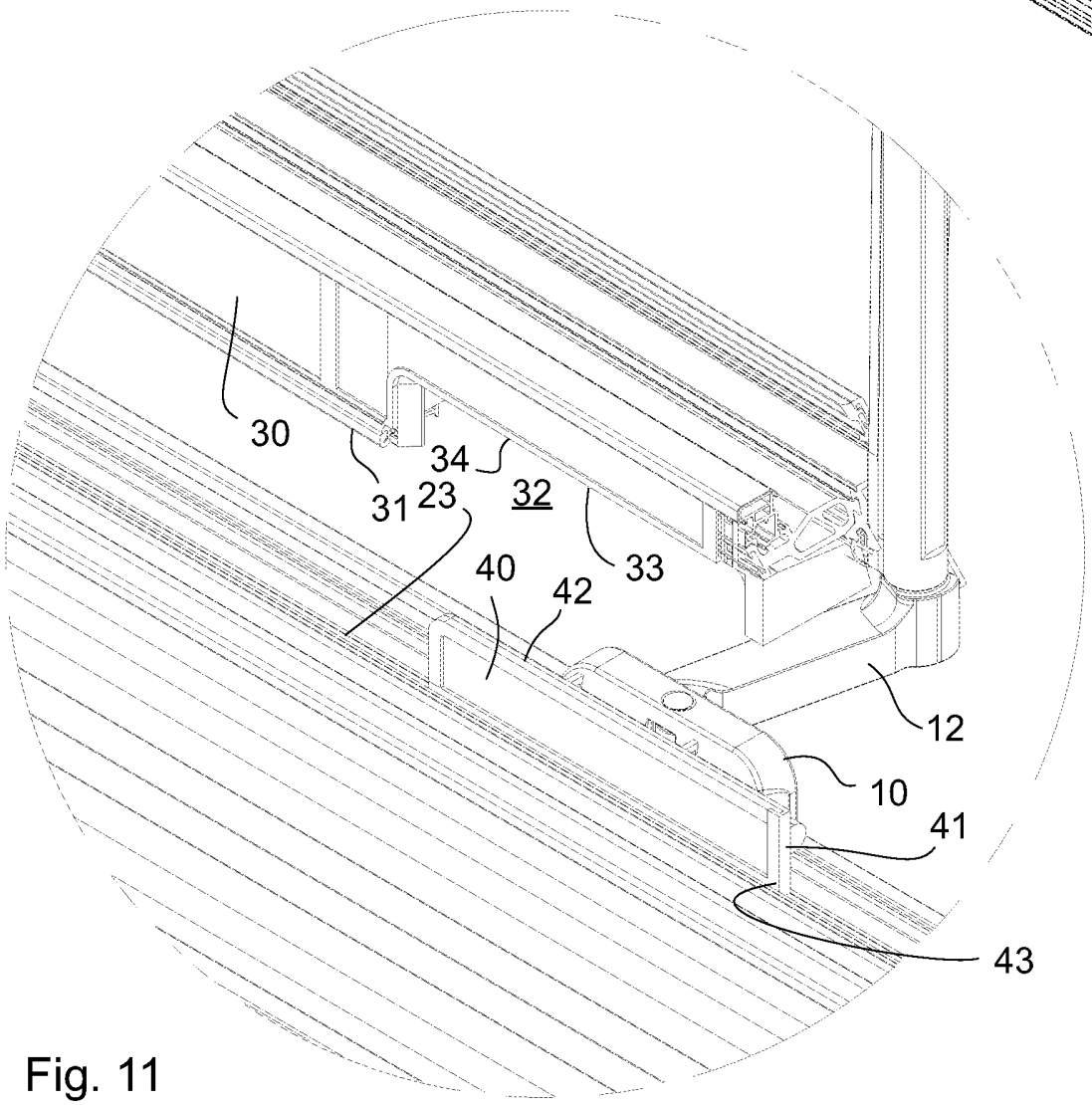

Fig. 11

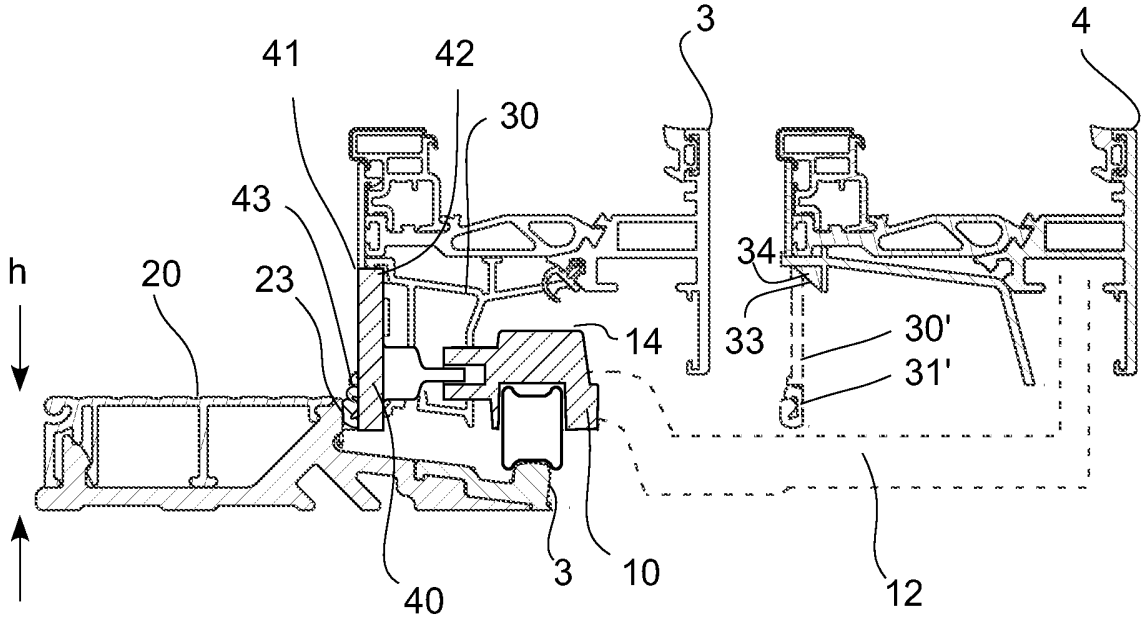
41
42
3
4
30
43
h
20
23
34
33
14
30'
31'
3
10
40
12

Fig. 12

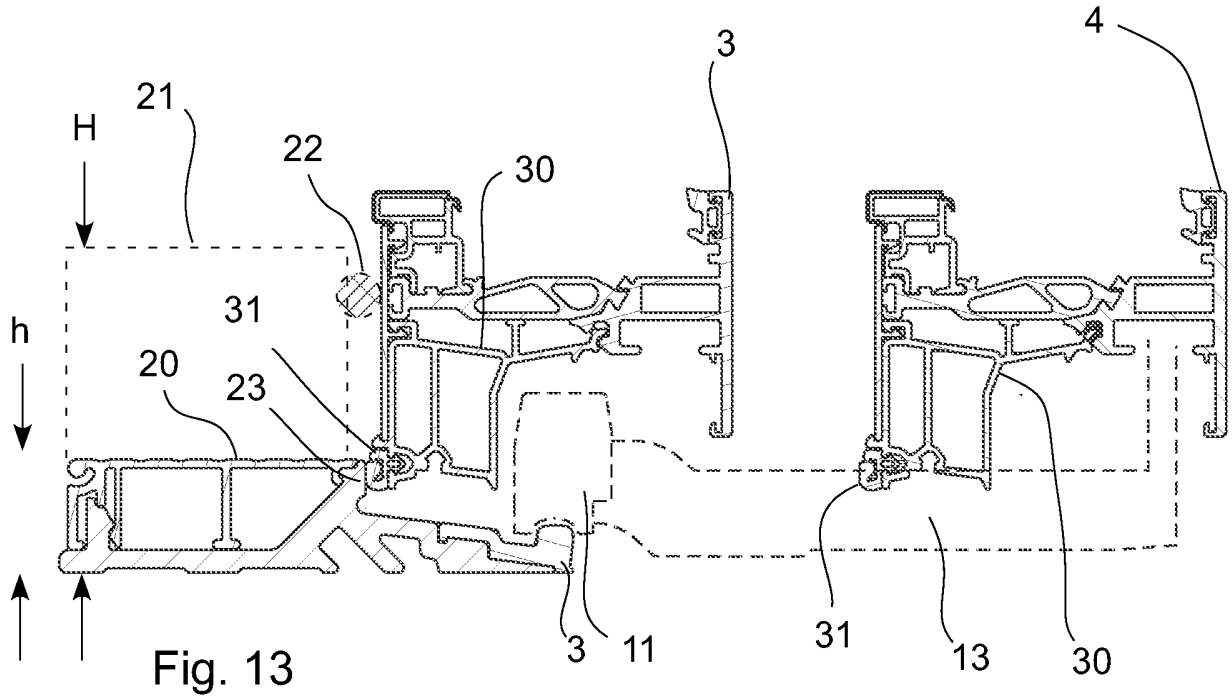
4
3
21
H
22
30
h
31
20
23
3
11
31
13
30

Fig. 13

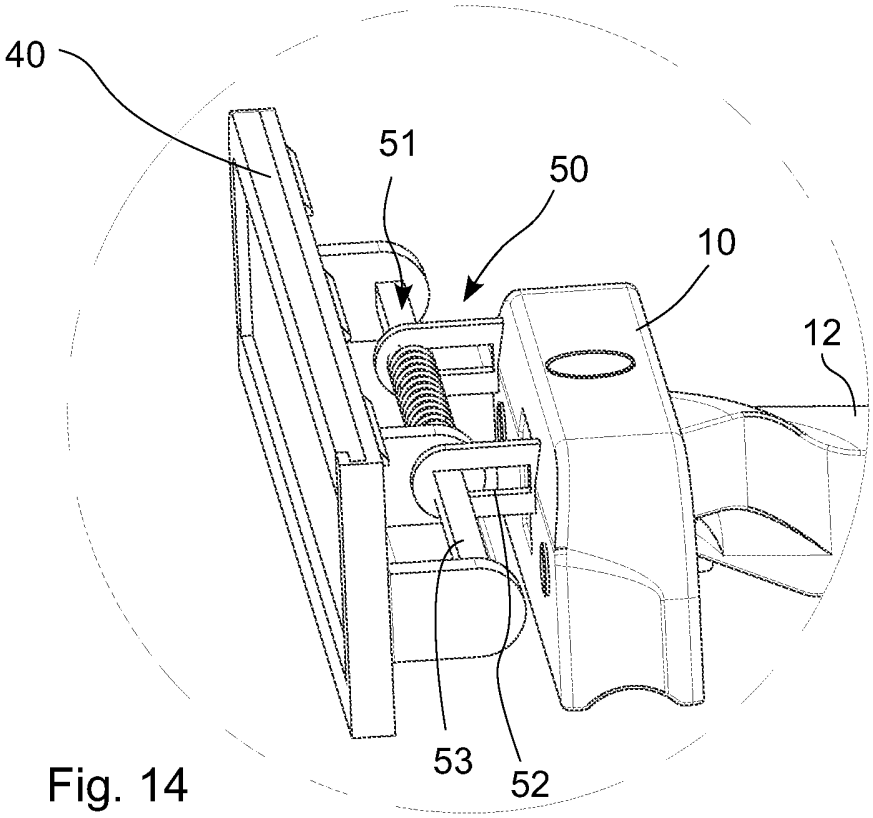

Fig. 14

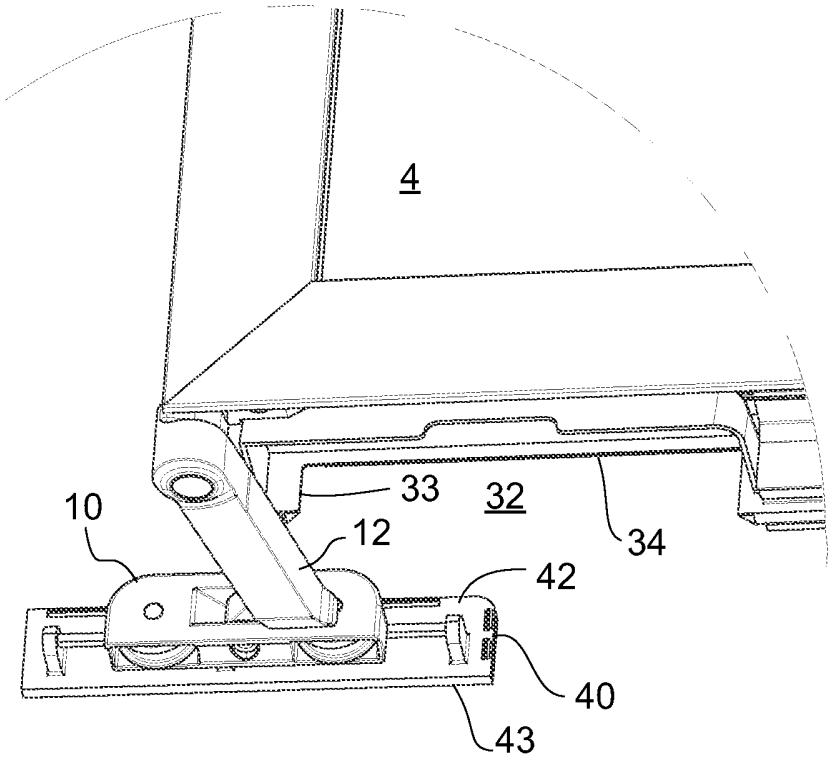

Fig. 15

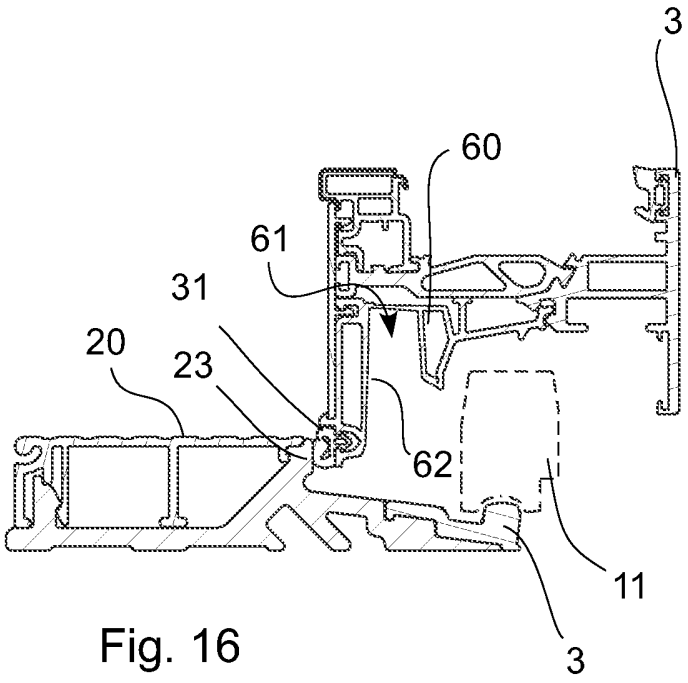

Fig. 16