



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
17.06.2015 Bulletin 2015/25

(51) Int Cl.:
E06B 9/52 (2006.01)

(21) Application number: **14020109.6**

(22) Date of filing: **10.12.2014**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

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(30) Priority: **16.12.2013 DK 201370777**

(54) **Slidable insect screen of a building aperture**

(57) The present invention relates to an insect screen (1) of a building aperture, comprising first and second side rails (2,3) with tracks extending substantially in parallel to each other in a first longitudinal direction defining, in a condition of use, a height direction, said first longitudinal direction being substantially perpendicular to a

second longitudinal direction defining a width direction, a screen (4) of wire mesh with opposing marginal areas (5,6) in said width direction adapted for being in a releasable sliding engagement with said first and second side rails (2,3).

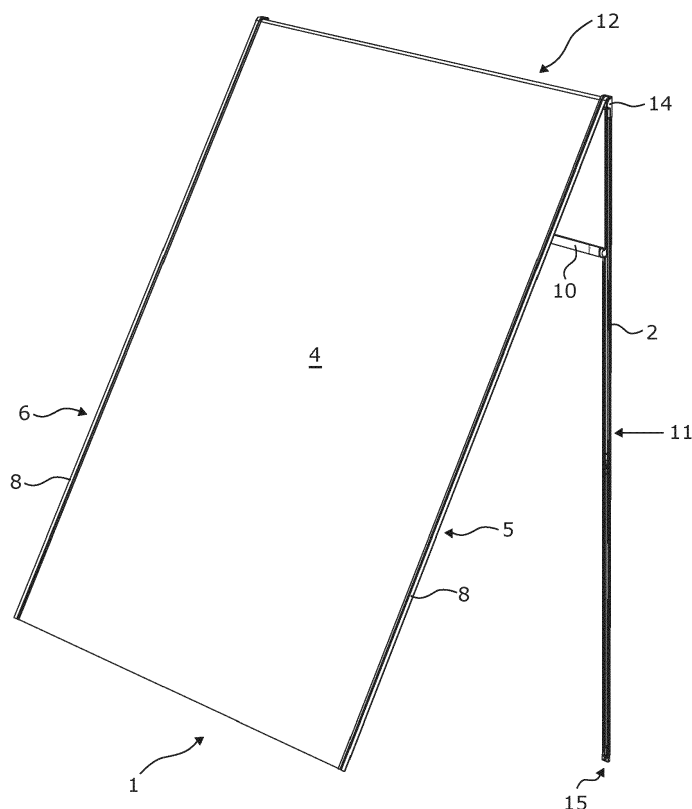


Fig. 4

Description

[0001] The present invention relates to an insect screen of a building aperture, having a supply condition and a condition of use, comprising first and second side rails extending substantially in parallel to each other in a first longitudinal direction defining, in the condition of use, a height direction, said first longitudinal direction being substantially perpendicular to a second longitudinal direction defining a width direction, a screen of wire mesh with opposing marginal areas in said width direction adapted for being in releasable engagement with said first and second side rails in the condition of use.

[0002] When casement windows are provided with an insect screen at the interior side of the window, the user's access to the operating handle of the window may be impaired. This is specially the case when the insect screen is an insect net used in the summertime where it is also desirable to open and close the window relatively often depending on the time of the day. As an insect net mounted in relation to a window must not leave any opening allowing the user to reach the operating handle of the window, as this would impair the function of the insect net, it is desirable to provide an insect net for a building aperture that is easily removed and repositioned in order to allow the user to operate the window as desired and still have the aperture screened between operation of the window.

[0003] DE 93 14 022 U1 discloses an insect screen having a screen of insect net adapted for mounting in relation to an aperture of a roof light. An upper rail of the insect screen is fastened with screws to an upper part of the aperture and sides of the apertures are provided with side rails of a magnetic band. Marginal areas of the screen of insect net are provided with a corresponding magnetic band in order to provide a releasable engagement between the side rails and screen of insect net. Hence the screen of insect net may be positioned in either an open or closed position.

[0004] US 4,825,921 discloses a screen assembly having a web of material and a pair of spaced opposed elongate strengthening elements as well as two opposed guide rails and a take-up roll. The strengthening elements are guided on the guide rails such as to enable retraction and withdrawal of the web of material to and from the take-up roll. The strengthening elements are adapted to form a tight roll when rolled up on the take-up roll and are thus resilient in substantially the same way as a coil spring.

[0005] It is the object of the present invention to provide an insect screen, which provides for a more flexible adjustment of the screen's position with respect to a building aperture.

[0006] With a view to this the insect screen according to the present invention is characterized in that each of the side rails comprises a track providing a sliding engagement with the opposing marginal areas in the width direction of screen of wire mesh, and the screen of wire

mesh is slidably movable in the height direction with respect to the side rails so that a portion of the screen of wire mesh may be released from the engagement with the side rails, the opposing marginal areas in the width direction being reinforced by respective bands extending in the height direction and engaging with respective tracks of the side rails, and particularly in that the screen of wire mesh is flexible in at least the height direction so that a freely hanging portion of the screen of wire mesh released from the engagement with the side rails may bend away from the plane defined by the height direction and the width direction, the screen of wire mesh is resilient in at least the width direction such as to enable a freely hanging portion of the screen of wire mesh released from the engagement with the side rails to remain substantially straight in at least the width direction, and the respective bands are flexible in their longitudinal direction and adapted for being rigid when the bands are located in the respective tracks.

[0007] The provision of tracks in the side rails allows the insect screen to be positioned in many different positions by adjusting the portion of the screen of wire mesh that is released from the engagement with the respective tracks of the side rails. This flexible positioning at any desirable position is achieved by the friction between the opposing marginal areas of the screen of wire mesh and the corresponding tracks of the side rails. Besides from being more flexible in use, the insect screen according to the invention may advantageously be mounted in relation to many different types of windows mounted in a building aperture. Due to the possible flexible positioning of the screen of mesh wire, the insect screen may be used in combination with windows of the type operated by a through-going operating handle in relation to the upper sash part of a roof window, but also with other kinds of casement windows of both the side-hung and top-hung type.

[0008] As the opposing marginal areas in the width direction are reinforced by respective bands extending in the height direction and engaging with respective tracks of the side rails, it becomes possible to provide a screen of wire mesh being of a thinner and more flexible material as the reinforced marginal areas is able to take-up forces during movement of the screen of wire mesh in the tracks of the side rails.

[0009] Besides from taking up forces during movement of the screen of wire mesh, the bands in respective opposing sides of the screens of wire mesh may engage with tracks or grooves of the side rails. Thereby, any tolerances from an imprecise installation of the side rails may be absorbed without impairing the screening of the aperture and the operation of the screen of wire mesh. Furthermore, the bands, which preferably are of a flexible material allowing the screen of wire mesh to be rolled up during transportation, protects the marginal areas both during transportation and during operation against wear and tear.

[0010] As the screen of wire mesh is flexible in at least

the height direction, yet resilient in at least the width direction, and as the respective bands are flexible in their longitudinal direction and adapted for being rigid when located in the respective tracks the screen of wire mesh may, when a portion of the wire mesh is hanging freely, be kept in a position not disturbing a user operating the window and simultaneously it becomes very easy for the user to move the freely hanging part of the wires mesh back into the tracks without any risk of jamming or tearing the screen of wire mesh.

[0011] In order to also protect the marginal areas in the height direction of the screen of wire mesh and to facilitate operation of the insect screen, a first marginal area in the height direction of the screen of wire mesh is provided with a first operating element being movable in the height direction. The operating element also entails a proper stretching of the screen of wire mesh between the side rail and that forces applied to the screen of wire mesh is transferred to the reinforced marginal areas engaging with the tracks of the side rails. One or more operating elements guided between the side rails, e.g. by a sliding engagement with tracks of each of the side rails, provides for an improved parallel motion of the marginal areas of the screen of wire mesh with respect to the side rails. As the screen of wire mesh is manually operated by pushing or pulling it in the height direction, the provision of operating elements may further facilitate such movement.

[0012] In a further development of this aspect, a second marginal area in the height direction of the screen of wire mesh is provided with a second operating element being movable in the height direction.

[0013] This further operating element may be of the same type as the first operating element or for instance be of a less prominent size such as a beading serving to protect the edge of the screen of wire mesh and to stretch the screen of wire mesh between the side rails. Evidently, both operating elements may be provided as beadings for protecting and stretching the screen of wire mesh between the side rails. Furthermore, the operating elements at both marginal areas in the height direction of the screen of wire mesh facilitates installation and operation of the insect screen as it's operation is more independent on how the insect screen is mounted.

[0014] In a further developed embodiment, the engagement between the screen of wire mesh and the side rails is releasable in two directions of the height direction. This feature is especially useful when using the insect screen according to the invention for screening apertures of roof windows mounted in an inclined roof, because the distance between the apertures and the floor from which the user is to operate the window and the insect screen varies from building to building. Hence in some installations it is desirable to move the screen of wire mesh upwards in the height direction to access the operating handle of the window, whereas in other installations it is more desirable to move the screen of wire mesh towards the floor in order to provide access to the operating handle.

Hence the insect screen according to the invention and its flexible use may be obtained in connection with many different types of apertures and even in very different types of building structures.

[0015] When the screen of wire mesh is moved downwards, the screen of wire mesh may unintentionally be released from the tracks of the side rails. In order to provide a more failsafe installation, the tracks of the side rails are provided with stop members engaging with the operating members when moved downwards with respect to the height direction. During operation of the insect screen normally only a portion of the screen of wire mesh is to be released from the sliding engagement with the side rails in order to provide the desired flexibility. However, the stop members may also be adapted to engage with the operating members when moved upwards in the height direction.

[0016] In a further embodiment the slidable insect screen further comprises stop members provided at an end of the side rails and at least one element adapted for frictionally engaging the stop members and provided at an end of the screen of wire mesh such that in the use condition of the screening device the stop members and the at least one element adapted for frictionally engaging the stop members are located at the same end of the insect screen.

[0017] The at least one element adapted for frictionally engaging the stop members may be provided on the screen of wire mesh and/or on one of the bands.

[0018] Thereby, the screen of wire mesh is prevented from being removed completely from the side rails during use, thus further simplifying the operation of the insect screen and preventing damage to the screen of wire mesh which might otherwise occur when reinserting it into the side rails.

[0019] In a further developed embodiment of the invention, a guide member extends between the side rails so as to guide the screen of wire mesh when released from the sliding engagement with the side rails.

[0020] The two above-mentioned embodiments provide a more smooth operation of the screen of wire mesh when it is moved with respect to the side rails as it allows the screen of wire mesh to be guided away from the aperture so that the part of screen of wire mesh released from the side rails does not prevent the user to access the operating handle of the window by partly screening the aperture without engaging the tracks of the side rails. Furthermore, the presence of a guide member prevents that the marginal areas are to be guided on any edges on the tracks of the side rails when being released from the sliding engagement. Additionally, the friction between the full width of the screen of wire mesh and the guide member ensures that the screen of wire mesh is kept in any desired position.

[0021] Since the use of an insect screen according to the invention, which serves to prevent insects to enter a building when a building through an open window, is very seasonal, it is desirable that the side rails are releasably

mounted on respective mounting rails adapted to receive the side rails. This allows for a dismounting at the end of the season and re-mounting at the beginning of the season in an easy manner without use of any tools.

[0022] In a further development of this embodiment, the guide member is releasably mounted on the side rails so that only the mounting rails are left outside the season when there is no need of an insect screen for keeping insects outside.

[0023] In a further embodiment the insect screen further comprises a stop mechanism, the stop mechanism comprising a first part provided at an end of the side rails and a second part provided at an end of the screen of wire mesh such that in the use condition of the screening device the first part and the second part of the stop mechanism are located at mutually opposite ends of the insect screen.

[0024] The second part of the stop mechanism may be provided on any one or more of the screen of wire mesh, one or both of the bands and the operating member.

[0025] In the following, illustrative examples and embodiments of the present invention are described in further detail with reference to preferred embodiment illustrated by the schematic drawings, on which

Fig. 1 is a perspective view of an insect screen according to the invention mounted on a sash of a roof window,

Fig. 2 is a perspective view of an insect screen according to the invention mounted in relation to an aperture in an inclined roof with a roof window,

Fig. 3 is a front view of an insect screen according to the invention wherein the screen of wire mesh have been removed,

Fig. 4 is a perspective view of an insect screen according to the invention in a partly open position,

Fig. 5 is a perspective view of an insect screen according to the invention in a closed position,

Fig. 6 is a detailed perspective view of the upper right corner of Fig. 3,

Fig. 7 is a detailed perspective bottom view of the insect screen of Fig. 5,

Fig. 8 is a perspective view of an embodiment of a side rail according to the invention,

Fig. 9 is a perspective view of an end stop member according to the invention,

Fig. 10 is perspective view of an end stop member mounted on a side rail of an insect screen according to the invention,

Fig. 11 is a perspective view of a stop member according to the invention,

Fig. 12 is a top view of a stop member mounted in a side rail of an insect screen according to the invention.

[0026] In Fig. 1 is shown an insect screen 1 according to the invention mounted on a sash 51 of a roof window. The insect screen 1 comprises a lightweight screen of

wire mesh 4 and side rails 2, 3 securing the screen of wire mesh 4 to the sash 51. The screen of wire mesh 4 is an insect net adapted to cover an aperture of a window in order to prevent insects, leaves, debris, birds and the like from entering the building while a flow of fresh air into the building is permitted. The screen of wire mesh 4 may be a wire net of metal, fibreglass and the like synthetic fibres in a mesh or a plastic mesh made from polypropylene, polyethylene, nylon, PVC or PTFE or the like materials. Preferably, the screen of wire mesh 4 is a PVC coated insect net of fibreglass. In order to facilitate handling of the insect screen in a storage condition, the screen of wire mesh 4 is preferably made so flexible that it may be rolled up for easier handling during storage outside the season or in a supply condition of the insect screen 1.

[0027] In a condition of use the side rails 2, 3 are mounted substantially in parallel to each other in a first longitudinal direction and defines, in a condition of use as illustrated in Fig. 1 and 2, a height direction h , which is substantially perpendicular to a second longitudinal direction defining a width direction w . Each of the side rails 2, 3 are provided with a through-going track 7 extending in the height direction h and being adapted to receive respective margin areas 5, 6 of the screen of wire mesh 4 in order to provide a sliding engagement between side rails 2, 3 mounted on the aperture and the screen of wire mesh 4. Hence the side rails 2, 3 serves as side rails mounting the screen of wire mesh 4 to the aperture to be screened. The friction between the marginal areas 5, 6 of the screen of wire mesh 4 and the respective tracks 7 of the side rails 2, 3 allows the screen of wire mesh 4 to be positioned in any desired position along the height direction h . Also, the screen of wire mesh 4 and the side rails 2, 3 have substantially the same length, size or extension measured in the height direction h .

[0028] The sliding engagement between the side rail 2, 3 and the screen of wire mesh 4 allows the screen of wire mesh 4 to be slidable movable in the height direction h with respect to the side rails 2, 3 so that a portion of the screen of wire mesh 4 may be released from the engagement with the respective tracks 7 of the side rail 2, 3. This is illustrated in Fig. 1 where the screen of wire mesh 4 has been moved downwards with respect to the window installation by pulling an operating member 10. Hence a portion of the screen of wire mesh 4 is freely hanging from the lower portion of the side rails 2, 3 and an upper portion of the aperture or the sash 51 is not covered by screen of wire mesh 4 so that a operating handle of the window (not shown) located in the upper portion of the sash may be accessed by a user of the window. The screen of wire mesh 4 is flexible in at least the height direction h so that a freely hanging portion of the screen of wire mesh 4 released from the engagement with the side rails 2, 3 may bend away from the plane defined by the height direction h and the width direction w . Preferably, the released portion bends away from said plane in a smooth curve so as to reduce friction between

the side rail 2, 3 on the screen of wire mesh. Furthermore, the screen of wire mesh 4 is sufficiently resilient in the width direction w to enable a freely hanging portion of the screen of wire mesh 4 released from the engagement with the side rails 2, 3 to remain substantially straight or unbend in the width direction w .

[0029] In order to return to a situation wherein the entire aperture is screened by the screen of wire mesh 4, the screen of wire mesh 4 may be pulled upwards by pulling a further operating handle 9. Evidently, for installations having a different structure or different type of casement and operating handles of the window 50, the screen of wire mesh 4 may be moved upwards in the height direction as shown in principle in Fig. 4, i.e. in the embodiment of Fig. 1 the tracks 7 of the side rails 2, 3 allows the screen of wire mesh 4 to be released from the sliding engagement in both directions both upwardly and downwardly in the height direction. Hence the insect screen is equally suitable for an aperture with a window 50 having the operating handle is positioned on a lower portion or on a side portion of the sash 51 and frame.

[0030] The operating handles 9, 10 extend between the side rails 2, 3 in the width direction w and are preferably guided in the tracks 7 of the side rails. Moreover, the provision of operating handles 9, 10 protect the marginal areas in the height direction of the screen of wire mesh 4 and ensure that the screen of wire mesh 4 is stretched between the side rails 2, 3.

[0031] In Fig. 2 an insect screen 1 according to the invention has been mounted in relation to an aperture of a roof window 50 in an inclined roof. The roof window 50 is shown in an open position and the screen of wire mesh 4 has been moved downwards with respect to the roof window 50. Due to the dept of the aperture, i.e. the distance between an inner wall of the inclined roof and the frame aperture of the roof window 50, the sash 51 may moved to a position where it is slightly open but which also allows the screen of wire mesh 4 to be moved upwards in order to screen the entire aperture. This allows a fresh air-flow while the desired screening of the aperture is maintained. In the embodiment of Fig. 2 the insect screen 1 is provided with a guide member 12 extending between the side rails 2, 3. The guide member 12 has a tubular or rounded shape and serves to guide the screen of wire mesh 4 away from the side rails 2, 3. This provides for a smoother operation and protects the screen of wire mesh 4 from being guided directly on edges of the side rails 2, 3 when a portion of the screen of wire mesh 4 is released from the tracks 7. In the particular installation of Fig. 2 the guide member 12 is positioned at a lower end with respect to the height direction h between the side rails 2, 3.

[0032] For the window installation of Fig. 2 it is most practical to move the screen of wire mesh 4 downwardly and therefore the insect screen 1 is mounted so that the guide member 12 is positioned at the lower end of the side rails 2, 3. When the insect screen 1 is to be used with another type of window installation having a different

structure or having a different type of operating handling on the window, the guide member 12 may be positioned at the upper end of the side rails 2, 3 in order to guide and protect the screen of wire mesh 4 when moved upwards to be at least partly released from the engagement with the tracks of the side rails 2, 3. Evidently, a guide member 12 may be provided at both ends of the side rail 2, 3 in cases operation in both the upward and the downward direction is desirable for the same installation.

[0033] Fig. 3 is a front view of an insect screen 1 with a guide member 12 where the screen of wire mesh 4 has been removed. The guide member 12 is connected to one end of the side rail 2, 3 by corner fittings 14 and at the opposite end, the side rails 2, 3 is provided with end stop members 15. Hence in this embodiment the screen of wire mesh 4 is only releasable from the engagement with the side rails 2, 3 at one end of the side rails 2, 3, namely at the end where the guide member 12 is positioned. Furthermore, each of the side rails 2, 3 is provided with stop members 11 which are to be explained in more detail in relation to Fig. 11 and 12.

[0034] Fig. 4 is a perspective view of the insect screen of Fig. 3 showing the screen of wire mesh 4 in an open position in an embodiment where only one operating element 10 is provided at the lower end of the screen of wire mesh 4. When the screen of wire mesh 4 is released from the upper end of the side rails 2, 3 it is guided away from the aperture by the guide member 12. In Fig. 5 the screen of wire mesh 4 has been moved to a closed position where the operating element 10 is moved as far as possible towards the end stop members 15.

[0035] Fig. 6 is a detailed perspective view of the upper right corner of the insect screen 1 shown in Fig. 3. The corner fitting 14 is mounted in tracks of the side rail 2 (cf. Fig. 7) and comprises a tubular protrusion (not shown) engaging into the tubular shaped guide member 12. During movement of the screen of wire mesh 4 it is guided between the guide member 12 and the main body portion of the corner fitting 14 extending in the height direction of the side rail 2. Evidently, the guide member may comprise two portions, e.g. two rounded members adapted so that the screen of wire mesh 4 is to be guided in between them. Preferably, the engagement between the guide member 12 and the corner fittings is provided as snap connection so that the guide member 12, the screen of wire mesh 4 and the operating elements 9, 10 may be released from the side rails 2, 3 without use of any tools.

[0036] Fig. 7 is a detailed perspective view of the lower left corner of the insect screen 1 of Fig. 5, wherein the operating element 10 and the end stop members 15 have been removed. A first track 40a and a second track 40b extending in the full length of the side rail 3 in the height direction h is used for mounting a corner fitting 14, stop members (cf. Fig. 12) and end stop members (cf. Fig. 10). At the distal end of the side rail 3 of Fig. 7, the corner fitting 14 is mounted in the tracks 40a and 40b and a guide member 12 is mounted to the corner fitting 14. Similar tracks are provided in the side rail 2 of the other side

of the insect screen 1.

[0037] In the embodiment of Fig. 7 the marginal area 6 of the screen of wire mesh 4 is guided in a first guide track 7 also extending the height direction h of the side rail 3. Furthermore, the marginal area 6 in the width direction w of the screen of wire mesh 4 is reinforced with a band 8 extending along the edge in the height direction h. The band 8 is flexible in its longitudinal direction so that the screen of wire mesh 4 may still be rolled up to provide a storage condition which is easy to handle, but when the bands 8 in each side of the screen of wire mesh 4 is located in guide tracks 7, 30 of the side rails 2, 3, they can take up forces when the user manually pulls or pushes e.g. the operating elements 9, 10 in the height direction h. Furthermore, the band 8 is flexible in its longitudinal direction and adapted for, in practice, being rigid or function as a bar-like element when it is located in guide tracks 7, 30 of the side rails 2, 3. Preferably, the band 8 is not resilient. A first portion 8a of the flexible band 8 is fastened to the screen of wire mesh 4 along the edge in the height direction h by gluing, adhering or welding and is disposed in the first guide track 7. A second portion 8b of the flexible band 8, which is not fastened to the screen of wire mesh 4, is in this particular embodiment disposed in a second guide track 30 opposing the first guide track 7. Preferably, the flexible band 8 is made of PVC. The provision of opposing guide tracks 7, 30 in each of the side rails 2, 3 for guiding the flexible band 8 fastened to marginal areas of the screen of wire mesh 4, ensure that tolerances due to an imprecise mounting of the side rails 2, 3 with respect to the aperture may be compensated for by providing a slack between the flexible band 8 and the guide tracks 7 and 30.

[0038] Alternatively, the screen of wire mesh 4 is reinforced in the marginal areas 5, 6 by an increase the thickness or use of another material for the marginal areas and only the first guide track 7 is used to provide the sliding engagement between the screen of wire mesh 4 and the side rails 2, 3. The reinforced portions of the screen of wire mesh 4 or the bands 8 are more rigid than the remaining portion of the screen of wire mesh 4, which allows a portion of the screen of wire mesh 4 released from the engagement with the side rails 2, 3 to bend away from the plane defined by the height direction h and the width direction w in a smooth curve. This allows for use of a very lightweight and even more flexible screen of wire mesh 4, while the operation of the screen of wire mesh 4 is improved due to the reinforced marginal areas 5, 6 being able to take up forces when the screen of wire mesh 4 is moved with respect to the side rails 2, 3. Hence, reinforced portions or the bands 8 are flexible when released from an engagement with the side rails 2, 3 but still able to take up forces in the height direction h when guided in a track of the side rail. Furthermore, the side rails 2, 3 may take many different shapes in order to provide the desired means for fixing corner fittings 14, end stop members 15, stop members 11, and to provide the sliding engagement with the screen of wire mesh 4.

[0039] Fig. 8 is a perspective view of a side rail 3 of an insect screen according to another embodiment of the invention. In this embodiment, the side rails 2, 3 are mounted to an aperture by use of mounting rails 13 adapted to engage with the back side of the side rails 2, 3 facing the aperture and being adapted to be mounted on a mounting rail 13 e.g. by a means of a snap connection that does not require any tools for mounting or dismounting. Instead of using mounting rails the side rails 2, 3 may be mounted directly to an aperture by means of screws or suitable fastening means.

[0040] Fig. 9 is a perspective view of an end stop member 15 to be mounted at an end of a side rail 2 of an insect screen 1 according to the invention. The end stop member 15 comprises a body portion 23 for closing off the end of a side rail 2, 3 and from which body portion 23 two flanged coupling members 20, 21 protrude. The coupling members 20, 21 is adapted for engaging the tracks 40a and 40b of a side rail 2 as shown in Fig. 10. Between the coupling members a resilient leaf spring 22 is positioned so that when the coupling members engages with the tracks 40a and 40b as shown in Fig. 10 the leaf spring extend in the in the spacing between the guiding tracks 7 and 30, i.e. in the plane in which the screen of wire mesh 4 is operated.

[0041] When the screen of wire mesh 4 is positioned in a closed position as shown in Fig. 5, the spring leaf 22 will be slightly depressed by an operating element 9, 10, which is then positioned above the spring leaf 22 and thereby the screen of wire mesh 4 is kept more secure in that position. This is especially the case when the insect screen 1 is mounted so that the screen of wire mesh 4 is to be moved downwards as shown in Fig. 1 and 2. If the friction between the tracks 7, 30 of the side rails 2, 3 and the margin areas 5, 6 of the screen of wire mesh 4 is reduced over time due to wear and tear, the provision of a end stop member 15 keeping the screen of wire mesh 4 in the closed position, will make sure that the overall functionality of the insect screen 1 is not impaired. Furthermore, the end stop member 15 will ensure that the screen of wire mesh 4 is kept in the closed position even in case of strong gusts of wind.

[0042] Fig. 11 shows a stop member 11 for mounting in a side rail 2, 3 as shown in Fig. 4 and Fig. 12. The stop member 11 comprises two flanges 26 and 27 adapted for engaging with tracks 40a and 40b, respectively, of a side rail 2, 3. A resilient spring leaf 25 extend from an upper surface 28 of the stop member 11 and when the stop member is mounted in a side rail 2, 3 as shown in Fig. 4, the leaf spring extends in the in the spacing between the guiding tracks 7 and 30 of the side rail 2, 3, i.e. into the plane in which the screen of wire mesh 4 is operated.

[0043] When the operating element 9, 10 of a screen of wire mesh 4 is positioned in an intermediate position as shown in Figs. 1 and 2, it may be kept in position by a stop member 11. If the operating member 9, 10 is positioned above the stop member 11, the spring leaf 22

will be depressed slightly and thereby the screen of wire mesh 4 is kept more secure in that position. This is in particular useful for installations where the insect screen 1 is mounted so that the screen of wire mesh 4 is to be moved downwards as shown in Fig. 1 and 2. If the friction between the tracks 7, 30 of the side rails 2, 3 and the margin areas 5, 6 of the screen of wire mesh 4 due to wear and tear is reduced over time, the provision of a stop members 11 at the side rails 2, 3, will make sure that screen of wire mesh 4 is not unintentionally fully released from the tracks 7, 30 of the side rails 2, 3 when it is slid downwards so that the window may be operated. Evidently, the additional force of the leaf spring 25 may be overcome so that the screen of wire mesh 4 and corresponding operating elements 9, 10 intentionally may be released when not to be used and re-mounted later on.

[0044] The various embodiments described above may be combined into other embodiments, and it is furthermore possible to design specific features in other manner within the scope of the claims. As an example the reinforced bands of the screen of wire mesh may be provided as rigid elements connected by joints so that the portion of the screen of wire mesh may still bend or be rolled up for storage when released from the tracks of the side rails.

Claims

1. An insect screen (1) of a building aperture, having a supply condition and a condition of use, comprising first and second side rails (2, 3) extending substantially in parallel to each other in a first longitudinal direction defining, in the condition of use, a height direction (h), said first longitudinal direction being substantially perpendicular to a second longitudinal direction defining a width direction (w), a screen of wire mesh (4) with opposing marginal areas (5, 6) in said width direction (w) adapted for being in releasable engagement with said first and second side rails (2, 3) in the condition of use, each of the side rails (2, 3) comprising a track (7) providing a sliding engagement with the opposing marginal areas (5, 6) in the width direction (w) of the screen of wire mesh (4), the screen of wire mesh (4) being slidably movable in the height direction (h) with respect to the side rails (2, 3) so that a portion of the screen of wire mesh (4) may be released from the engagement with the side rails (2, 3), the opposing marginal areas (5, 6) in the width direction (w) being reinforced by respective bands (8) extending in the height direction (h) and engaging with respective tracks (7) of the side rails (2, 3), **characterized in that** the screen of wire mesh (4) is flexible in at least the height direction (h) so that a freely hanging portion of the screen of wire mesh (4) released from the en-
- gagement with the side rails (2, 3) may bend away from the plane defined by the height direction (h), the width direction (w) and the screen of wire mesh (4) is resilient in at least the width direction (w) such as to enable a freely hanging portion of the screen of wire mesh (4) released from the engagement with the side rails (2, 3) to remain substantially straight in at least the width direction (w), and the respective bands (8) are flexible in their longitudinal direction and adapted for being rigid when the bands (8) are located in the respective tracks (7).
2. An insect screen (1) according to claim 1, wherein a first marginal area in the height direction (h) of the screen of wire mesh (4) is provided with a first operating element (9) being movable in the height direction (h).
3. An insect screen (1) according to claim 2, wherein a second marginal area in the height direction (h) of the screen of wire mesh (4) is provided with a second operating element (10) being movable in the height direction (h).
4. An insect screen (1) according to any one of claims 1 to 3, wherein the engagement between the screen of wire mesh (4) and the side rails (2, 3) is releasable in two directions of the height direction (h).
5. An insect screen (1) according to any previous claim, and further comprising stop members (11) provided at an end of the side rails (2, 3) and at least one element adapted for frictionally engaging the stop members (11) and provided at an end of the screen of wire mesh (4) such that in the use condition of the screening device the stop members (11) and the at least one element adapted for frictionally engaging the stop members (11) are located at the same end of the insect screen (1).
6. An insect screen (1) according to claim 5, wherein the tracks (7) of the side rails (2, 3) are provided with the stop members (11), and wherein the stop members (11) are frictionally engaging the operating elements (9, 10) when moved downwards with respect to the height direction (h).
7. An insect screen (1) according to any previous claim, wherein a guide member (12) extends between the side rails (2, 3) so as to guide the screen of wire mesh (4) when released from the sliding engagement with the side rails (2, 3).
8. An insect screen (1) according to any previous claim, wherein the side rails (2, 3) are releasably mounted on respective mounting rails (13) adapted to receive the side rails (2, 3).

9. An insect screen (1) according to claim 7 or 8, wherein the guide member (12) is releasably mounted on the side rails (2, 3).
10. An insect screen (1) according to any previous claim, and further comprising a stop mechanism, the stop mechanism comprising a first part provided at an end of the side rails (2, 3) and a second part provided at an end of the screen of wire mesh (4) such that in the use condition of the screening device the first part and the second part of the stop mechanism are located at mutually opposite ends of the insect screen (1).
11. An insect screen according to claim 10, wherein the first part of the stop mechanism is a guide member (12) and the second part of the stop mechanism is an operating element (9, 10).

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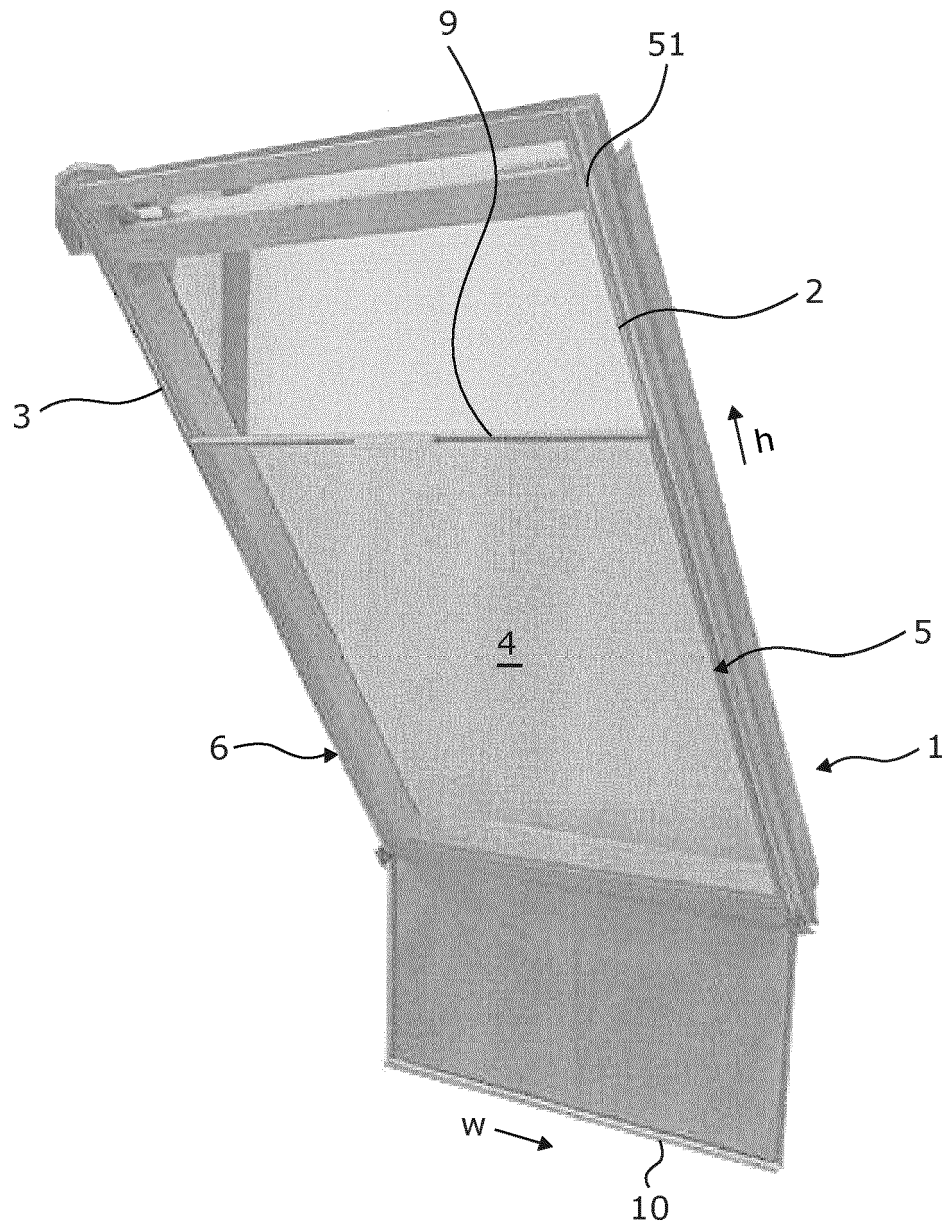


Fig. 1

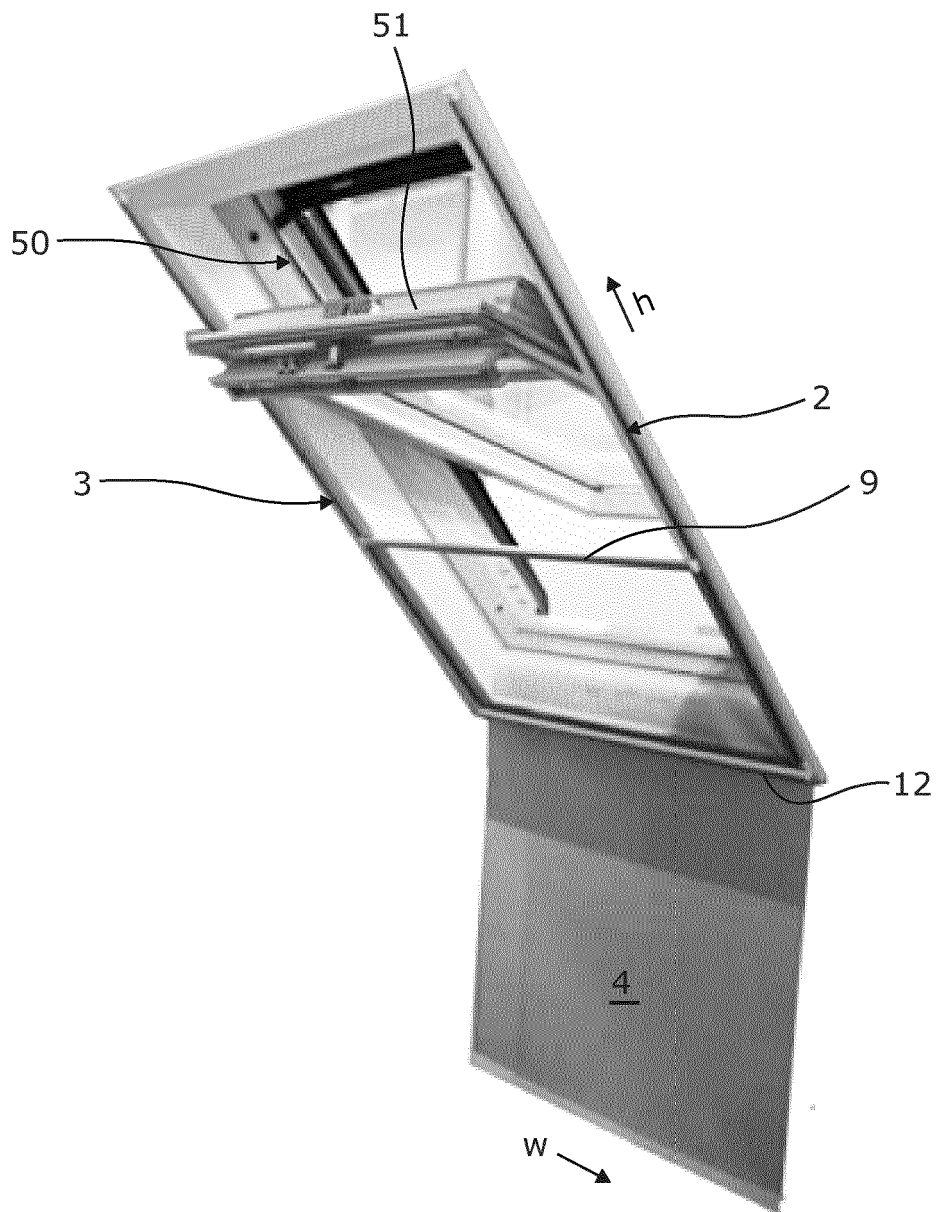


Fig. 2

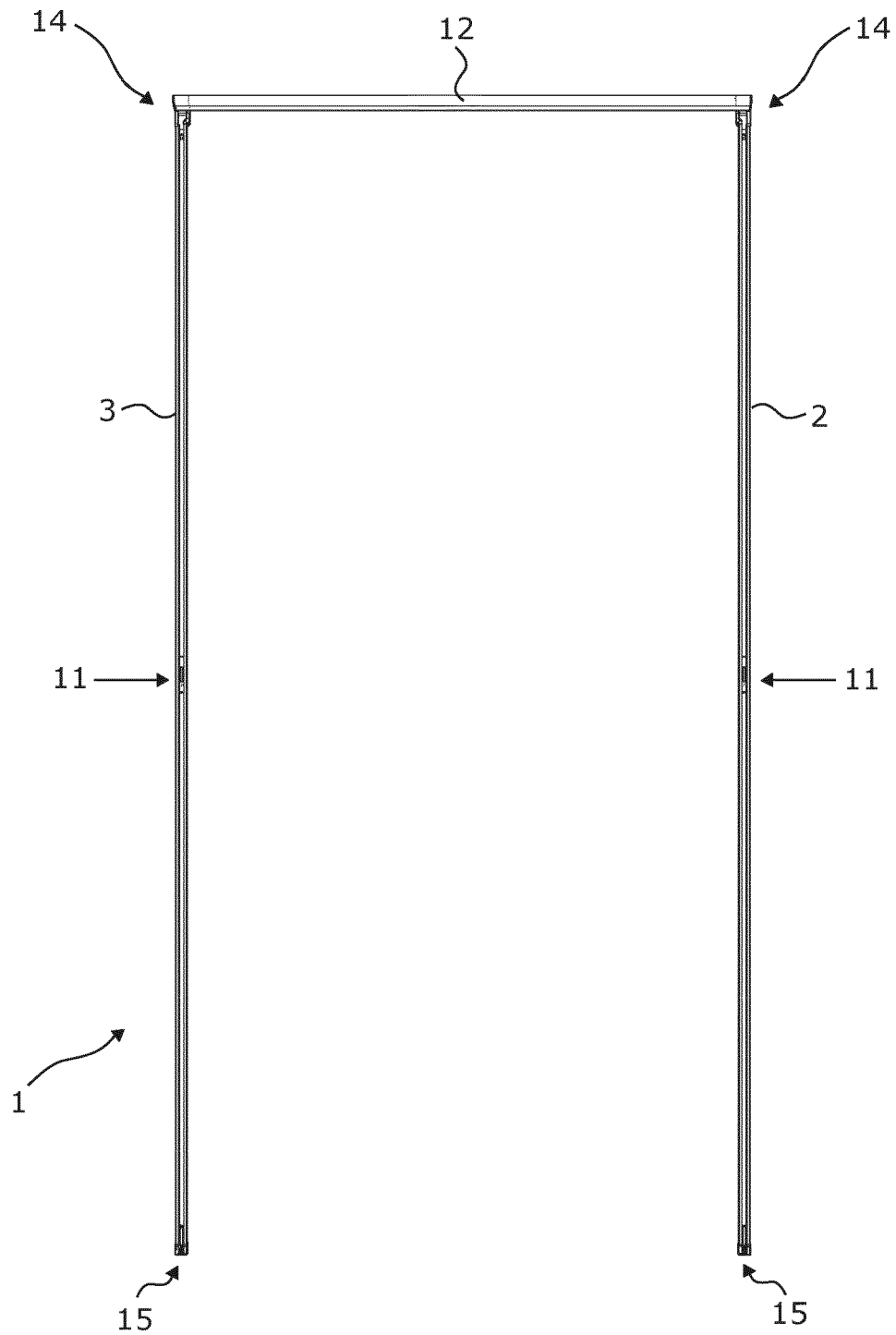


Fig. 3

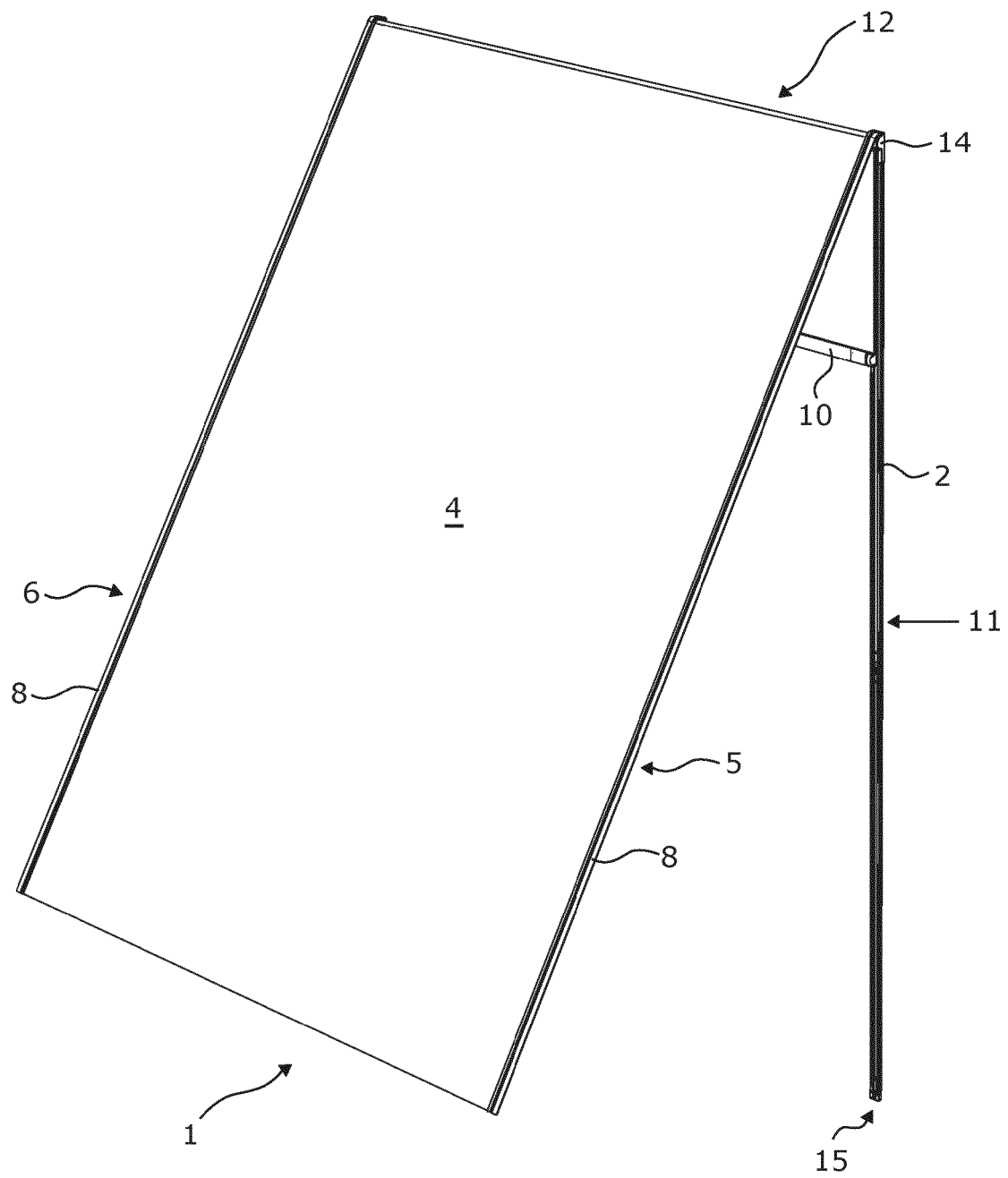


Fig. 4

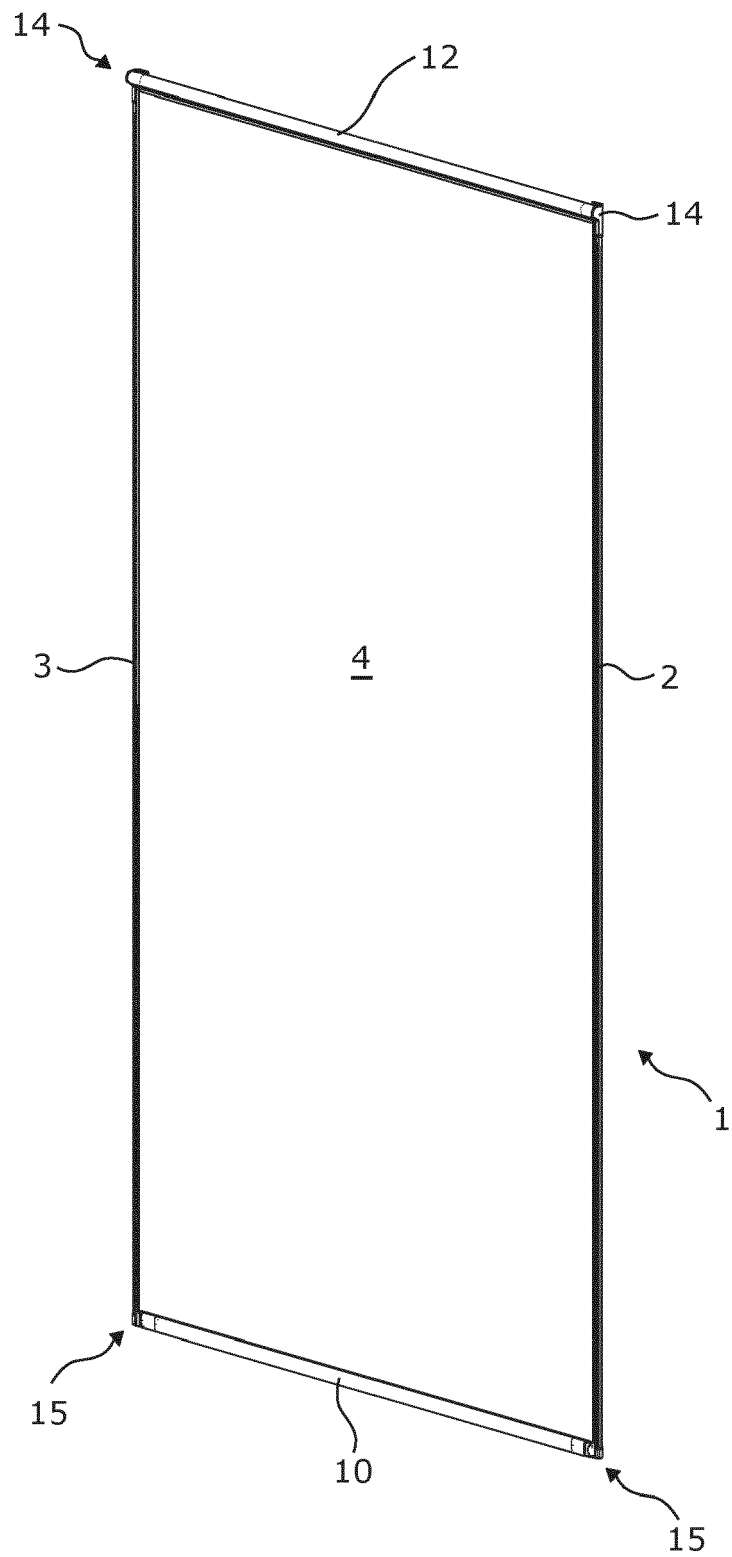


Fig. 5

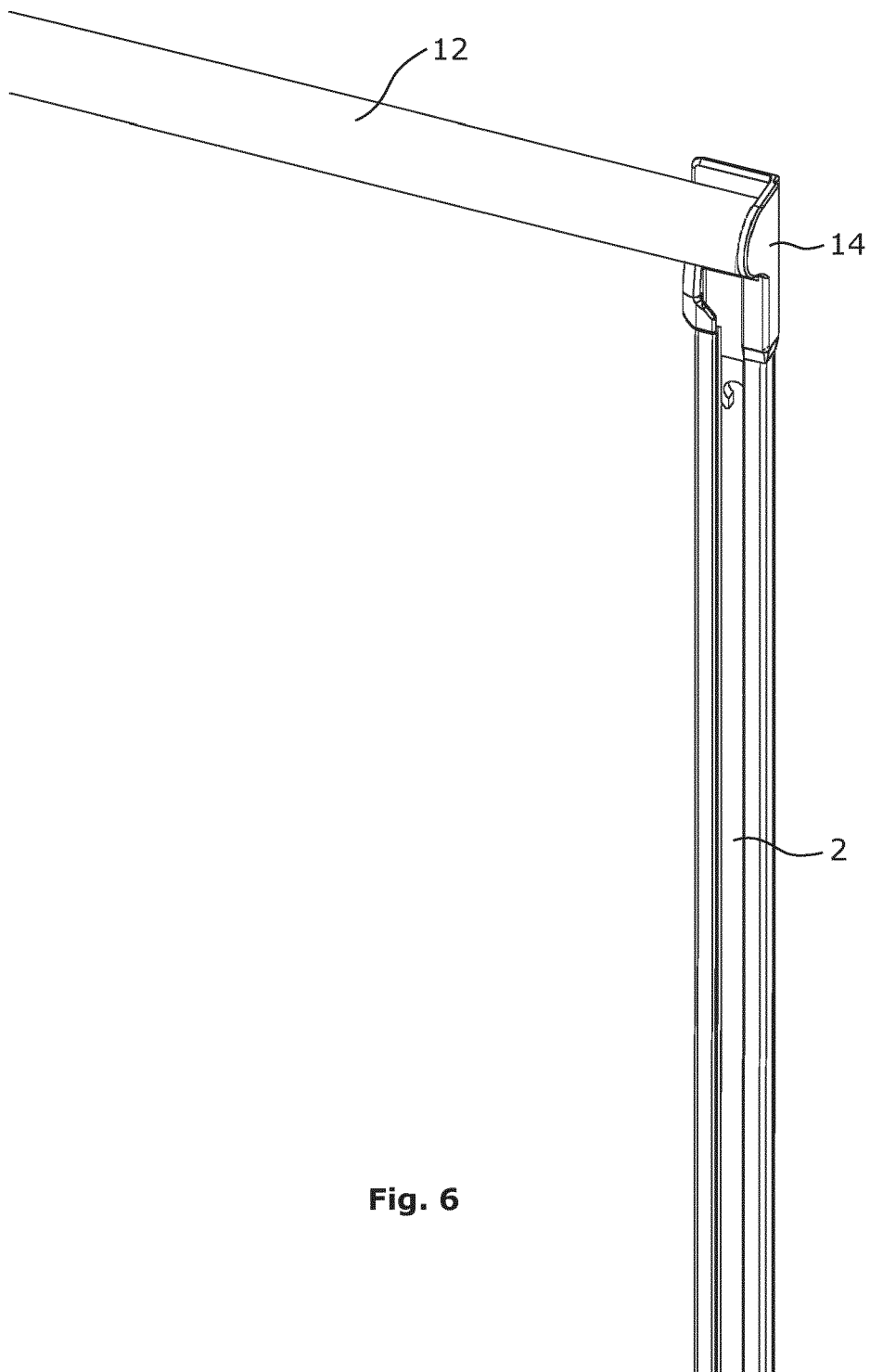


Fig. 6

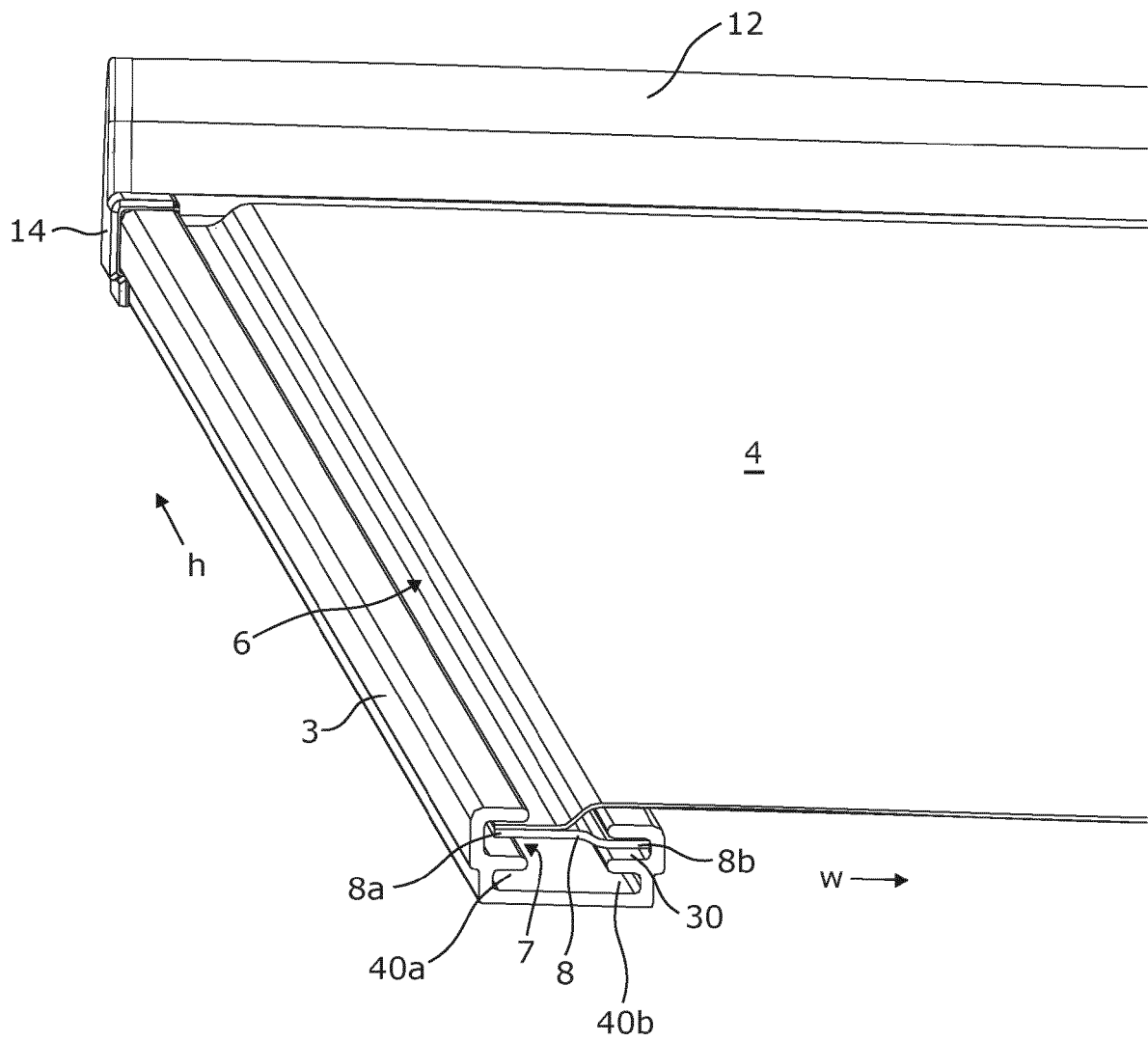


Fig. 7

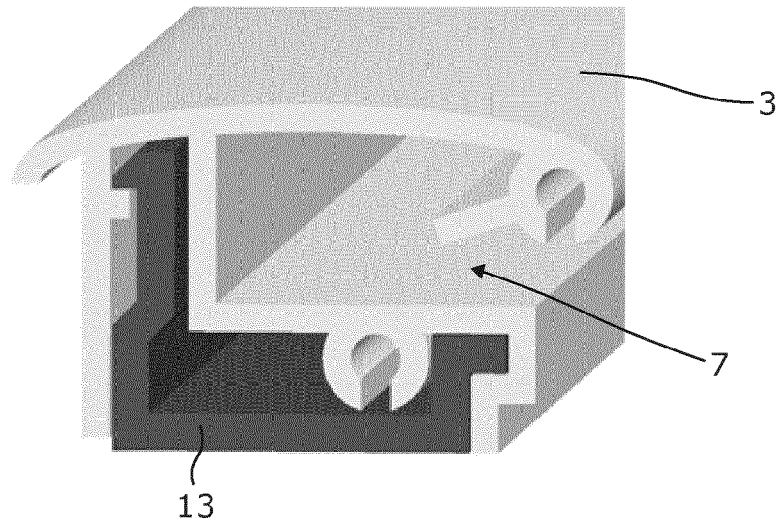


Fig. 8

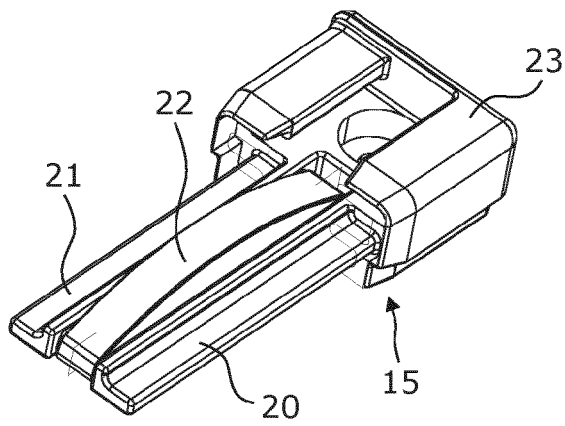


Fig. 9

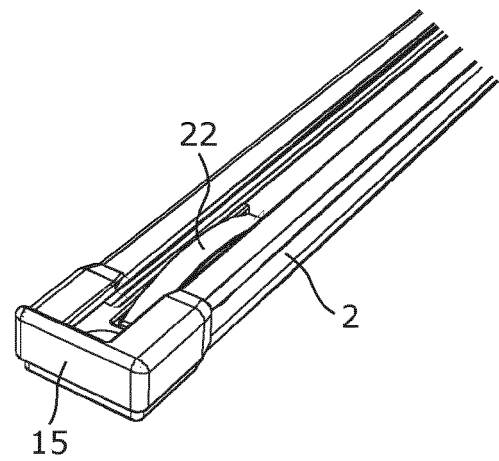
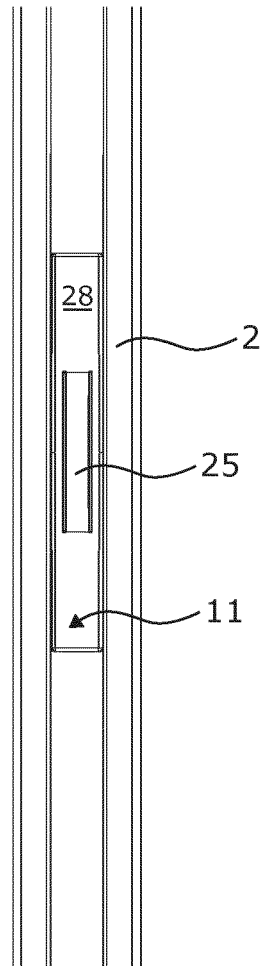
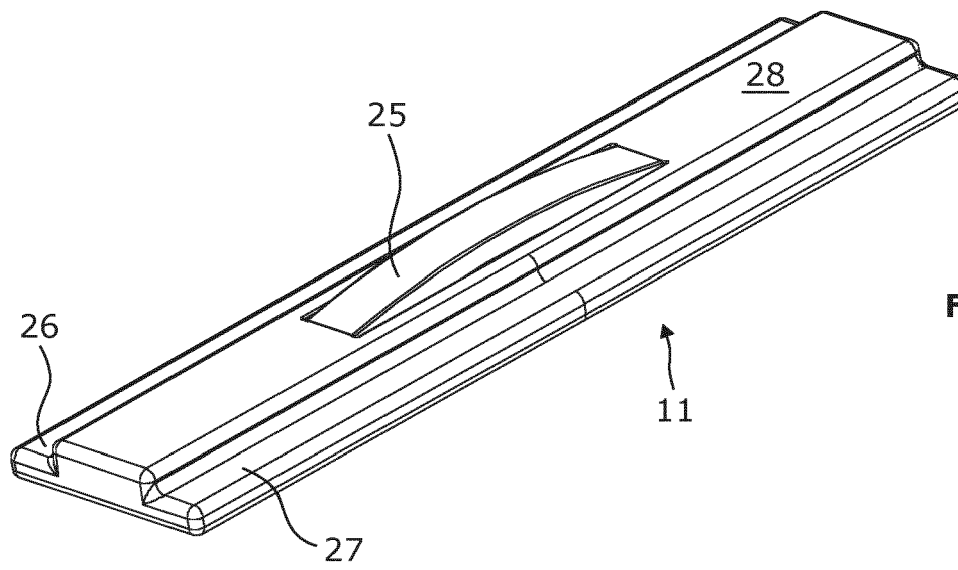


Fig. 10





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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	US 4 825 921 A (RIGTER STEVEN M [AU]) 2 May 1989 (1989-05-02) * column 4, line 28 - line 51; figure 1 * * column 5, line 63 - column 6, line 16; figures 8b, 9 *	1	INV. E06B9/52
Y	FR 751 308 A (EWALD SYLVESTER) 31 August 1933 (1933-08-31) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			E06B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 29 April 2015	Examiner Knerr, Gerhard
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EP 14 02 0109

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The members are as contained in the European Patent Office EDP file on
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29-04-2015

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