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(54) Benævnelse: **WINDOW VENTILATION SYSTEM AND WINDOW**

(56) Fremdragne publikationer:
EP-A1- 2 578 764
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EP-A2- 2 565 355
WO-A1-03/060387
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DESCRIPTION

Description

[0001] The present invention is directed towards windows incorporating ventilation passages and in particular roof windows having a ventilation passage that can be opened/closed.

[0002] Known windows and roof windows comprise a frame with a sash pivotally or fixedly mounted therein. The sash has a top member, bottom member, and two side members defining an opening for receiving a window pane. The sash is commonly provided with a ventilation passage extending between the exterior and interior to provide a route for ventilation even if the window is closed. For example, in the roof window disclosed in the prior art, the ventilation passage is incorporated into the window sash and closable with a ventilation flap. A problem with this arrangement is that the location of the ventilation passage in the sash restricts the space available for the window pane. As a result, the total light admitting area for the window is reduced.

[0003] Patent document EP2578764 A1 shows a roof window according to the preamble of claim 1.

[0004] There have been attempts to overcome this problem by replacing the ventilation passage in the sash with a separate module that provides the ventilation passage. In this system, a top sash module with a generally rectangular construction connects or abuts with the outer surface of the sash. A ventilation flap for closing the ventilation passage in the top sash module is provided in pivot connection with the sash. It has been found that the top sash module increases the space available for the window pane, and therefore increases the amount of light admitting area. However, the pivot connection between the ventilation flap and the sash complicates the manufacturing process as it requires extra work on the sash to provide the pivot connection. In particular, the typical arrangement will require the routering out of one or more cavities in the top member of the sash for receiving the pivot joints attached to the ventilation flap. This routering operation will have to be performed as a step during the window manufacturing process. The pivot connection of the ventilation flap to the sash can also decrease the visual attractiveness of the roof window as the pivot connection can be visible on the interior side of the sash from the room.

[0005] It is an object of the present invention to obviate or mitigate the problems associated with the pivot connection between the ventilation flap and sash in existing windows.

[0006] Accordingly, the present invention provides a roof window according to claim 1.

[0007] According to the invention, the ventilation flap is in pivot connection with the ventilation

module rather than the sash. In this way modification to the sash is avoided and the manufacturing process is simplified. The pivot connection between the ventilation flap and the ventilation module is also less visible than one between the ventilation flap and sash, increasing the aesthetic appeal of the window.

[0008] Preferably, the window ventilation system being adaptable to be attached to or abutting with one or more of a top outer peripheral surface of the window sash, a bottom outer peripheral surface of the window sash, and a side outer peripheral surface of the window sash. By outer peripheral surface of the window sash we me that surface of the sash which is opposed to an interior surface of the frame when the sash is closed. The outer peripheral surface of the window sash is the surface opposite the surface housing the glass window panes.

[0009] Ideally, the ventilation flap is an elongate component.

[0010] Preferably, the ventilation module is an elongate component.

[0011] Ideally, the ventilation flap being adaptable to move between an open and a closed position about the pivotal coupling, the closed position closing the ventilation passage.

[0012] Preferably, the window ventilation system has a hinge for pivotally coupling the ventilation module and the ventilation flap together.

[0013] Ideally, the window ventilation system has a hinge for directly pivotally coupling the ventilation module and the ventilation flap together.

[0014] Preferably, the ventilation module being provided with at least one coupling member adaptable to pivotally engage with at least one complementary coupling member provided on a corresponding location of the ventilation flap.

[0015] Ideally, the cooperating coupling members, most preferably are male and female cooperating coupling members.

[0016] Ideally, the hinge comprising the cooperating coupling members.

[0017] Preferably, the at least one coupling member comprising a part cylindrical formation that projects outwardly from the ventilation module via a connecting member.

[0018] Ideally, the at least one complementary coupling member is in the form of a substantially elongate channel section.

[0019] Preferably, the at least one complementary coupling member is in the form of a substantially elongate channel section recessed into the ventilation flap.

[0020] Alternatively in another embodiment, the at least one coupling member comprises a part cylindrical formation that projects outwardly from the ventilation flap via a connecting member, and the at least one complimentary coupling member is in the form of an elongate channel section in or on the ventilation module.

[0021] Ideally, the at least one complementary coupling member is in the form of a substantially C-shaped elongate channel section.

[0022] Preferably, the at least one complementary coupling member is in the form of a substantially cylindrical shaped elongate channel section.

[0023] Preferably, the at least one complementary coupling member is in the form of a substantially cylindrically shaped elongate channel section recessed into the ventilation flap.

[0024] Alternatively in the other embodiment, the at least one coupling member comprises a part cylindrical formation that projects outwardly from the ventilation flap via a connecting member, and the at least one complimentary coupling member is in the form of a substantially cylindrically shaped elongate channel section in or on the ventilation module.

[0025] Ideally in the first or second embodiment, the at least one coupling member and/or complementary coupling member extend continuously or discontinuously along a length of the window ventilation system.

[0026] Preferably in the first or second embodiment, the at least one coupling member and/or complementary coupling member extend continuously or discontinuously along the entire length of the window ventilation system.

[0027] Ideally in this first or second embodiment, the at least one coupling member being integral with the ventilation module or ventilation flap.

[0028] Preferably in the first or second embodiment, the at least one coupling member and the ventilation module or ventilation flap are a unitary structure.

[0029] Ideally in this first or second embodiment, the at least one complementary coupling member being integral with the ventilation module or ventilation flap.

[0030] Preferably in the first or second embodiment, the at least one complementary coupling member and the ventilation module or ventilation flap are a unitary structure.

[0031] Advantageously, having a unitary structure simplifies the manufacturing process as the coupling member and the ventilation module or ventilation flap can be formed in a manufacturing process such as casting or moulding as a single unitary component. This means no post manufacturing assembly of these parts is required. The window ventilation system can be assembled by pressing the part cylindrical formation into the cylindrical shaped

elongate channel section.

[0032] Preferably, the ventilation module and/or the ventilation flap being of a moulded construction.

[0033] Ideally, the ventilation module and/or the ventilation flap being injection moulded from a plastic material.

[0034] Preferably, the ventilation flap being adaptable to move about the pivot joint between an open and a closed position, the closed position closing the ventilation passage.

[0035] Ideally, the ventilation module comprises a downwardly depending skirt extending below the outer peripheral surface of the sash and resting against the room facing surface of the sash of the roof window. Advantageously, this securely locates the module in position on the sash top member.

[0036] Ideally, the ventilation module comprises a hollow body with a frame support for supporting a front panel and a canopy shaped skirt depending backwards and downwards from the front panel.

[0037] Ideally, the ventilation module comprises a substantially open bottom.

[0038] Preferably, the support frame comprises a plurality of feet spaced apart longitudinally along the length of the ventilation module for supporting the ventilation module on the outer peripheral surface of the window sash.

[0039] Ideally, the base of the feet define a virtual plane for mounting the ventilation module on the outer peripheral surface of the window sash.

[0040] Ideally, the feet extend rearwards from the front panel and downwards from the canopy shaped skirt.

[0041] Preferably, the feet define a depth dimension for the ventilation module.

[0042] Ideally, the front panel extends beyond the base of the feet creating a downwardly depending skirt part of the front panel.

[0043] Ideally, the downwardly depending skirt of the ventilation module/front panel carries at least one coupling member of the pivotal coupling.

[0044] Preferably the downwardly depending skirt carries a part cylindrical formation that projects outwardly from the ventilation module via a connecting member.

[0045] Preferably, the intersection between the base of the feet and the front panel define a

locating corner which is locatable on the edge portion of the sash between the outer peripheral surface of the sash and room facing surface of the sash of the roof window.

[0046] Preferably, the support frame comprises a plurality of quadrant shaped feet.

[0047] Ideally, the quadrant shaped feet comprise a pair of spaced apart quadrant plates extending rearwards from the front panel and downwards from the canopy shaped skirt.

[0048] Preferably, the quadrant shaped feet define a depth dimension for the ventilation module.

[0049] Ideally, the ventilation module has means/through bores for receiving fastening means for fastening the module to the sash.

[0050] Preferably, the means/through bores extend through the feet, most preferably centrally.

[0051] Ideally, the ventilation module comprising the front panel for facing the ventilation flap when the ventilation flap is in the closed position.

[0052] Ideally, the front panel being generally planar.

[0053] Preferably, the front panel having at least one vent hole defining the at least one ventilation passage

[0054] Ideally, the front panel having a plurality of vent holes.

[0055] Preferably, the plurality of vent holes being differently sized.

[0056] Ideally, the ventilation module comprising the feet adaptable to be attached to or abutting with the outer peripheral surface of the window sash.

[0057] Ideally, the feet having a base with a generally circular or U-shaped cross-section.

[0058] Preferably, the ventilation module comprising a pair of side panels.

[0059] Ideally, the pair of side panels being connected to the front panel and the canopy.

[0060] Preferably, the pair of side panels having a generally planar or undulating profile.

[0061] Preferably, the ventilation flap is constructed from metal, preferably aluminium, wood, plastic or polyurethane, or a combination thereof.

[0062] Preferably, the base section having a ventilation module facing front face and a back face.

[0063] Ideally, the front face being generally planar.

[0064] Preferably, the back face being generally arcuate.

[0065] Ideally, the base section comprising at least one strut extending from the front face to the back face.

[0066] Preferably, the base section having a hollow construction.

[0067] Ideally, the handle section being connected to the base section by at least one fin extending from the back face of the base section.

[0068] Preferably, the handle section having a hollow construction.

[0069] Ideally, the ventilation flap further comprising a sealing section attached to the front face, the sealing section adaptable to seal the at least one ventilation passage when the ventilation flap is in the closed position.

[0070] Preferably, the ventilation flap being pivotally connected to a locking mechanism on the window sash.

[0071] Ideally, the ventilation flap being pivotally connected to the locking mechanism at a connection member extending outwardly from the ventilation flap.

[0072] Not part of the invention is accordingly a method for constructing a window with a ventilation system adaptable to be attached to or abutting with an outer peripheral surface of a window sash, the method comprising: forming a ventilation module defining at least one ventilation passage; and pivotally connecting a ventilation flap to the ventilation module.

[0073] Preferably, forming the ventilation module comprises forming the ventilation module with at least one coupling member adaptable to engage with at least one complementary coupling member provided on the ventilation flap.

[0074] Ideally, the at least one joint member and the ventilation module form a unitary structure.

[0075] Ideally, forming the ventilation module comprises moulding a plastic material to form the ventilation module.

[0076] Preferably, forming the ventilation module comprises injection moulding a plastic material to form the ventilation module.

[0077] Ideally, connecting the ventilation flap to the ventilation module comprises connecting

the at least one complementary joint member provided on the ventilation flap to the at least one joint member of the ventilation module.

[0078] Preferably, the method further comprises attaching or abutting the window ventilation system with the outer peripheral surface of the window sash.

[0079] Ideally, the method further comprises pivotally connecting the ventilation flap to a locking mechanism on the window sash.

[0080] The skilled man will appreciate that all preferred or optional features of the invention described with reference to only some aspects or embodiments of the invention may be applied to all aspects of the invention.

[0081] The invention will now be described with reference to the accompanying drawings which shows by way of example only one embodiment of an apparatus in accordance with the invention.

Figure 1 is a cut-a-way perspective view of a window ventilation system according to an embodiment of the present invention.

Figure 2 is a perspective view of the window ventilation system in Figure 1.

Figure 3 is an underside view of a ventilation module according to the present invention.

Figure 4 is a perspective view of a window ventilation system attached to or abutting with a window sash with the ventilation flap closed.

Figure 5 is the same view as Figure 4 but with the ventilation flap open.

Figure 6 is a detailed view of a window ventilation system according to the present invention.

Figure 7 is a underside perspective view of the window ventilation system in Figure 6.

Figure 8 is an end view of the ventilation module;

Figure 9 is a perspective view of the ventilation module;

Figure 10 is a perspective view of the ventilation flap;

Figure1 1 is an end view of the ventilation flap.

[0082] In the drawings, there is shown a window ventilation system indicated generally by the reference numeral 1 for providing ventilation to a building in which a window is mounted. The window ventilation system 1 has a ventilation module 20 defining nine ventilation passages in Figures 1 to 7 and seven ventilation passages in Figures 8 and 9, and a ventilation flap 30 pivotally connected to the window ventilation module 20. The ventilation flap 30 is directly

pivotally connected to the window ventilation module 20 via a hinge. The ventilation flap 30 moves between a closed position (Figure 4) and an open position (Figure 5) where in the closed position, the ventilation passages 21 are closed. The window ventilation system 1 attaches to or abuts with an outer peripheral surface of a window sash 2. As shown in Figures 4 and 5, the window ventilation system 1 can be attached to or abutting with a top peripheral surface 2a of the window sash 2. Equally, the window ventilation system 1 could be attached to an outer side peripheral surface 2b, 2c, a bottom peripheral surface (not shown), or a combination thereof. The window sash 2 is fixed or pivotally mounted in a window frame (not shown) in a known manner. For pivotally mounted sashes, the pivot connection can be at the top, middle or bottom of the window frame.

[0083] Advantageously, the ventilation flap 30 is in pivot connection with the ventilation module 20 rather than in pivot connection with the sash 2. In this way modification to the sash 2 is avoided and the manufacturing process is simplified. The direct pivot connection between the ventilation flap 30 and the ventilation module 20 is also less visible than one between the ventilation flap and sash, increasing the aesthetic appeal of the window.

[0084] The window ventilation system 1 has a hinge for pivotally coupling the ventilation module 20 and the ventilation flap 30 together. The ventilation module 20 has a joint member 22 which engages with a complementary joint member 31 provided on the ventilation flap 30, see especially Figures 10 and 11. The joint member 22 comprises a substantially cylindrical elongate formation that projects outwardly from a downwardly depending skirt 51 of the ventilation module 20 via a connecting member 41 see Figure 8, and the complementary joint member 31 is in the form of a substantially cylindrical shaped channel section 42 see Figure 10 and 11. The joint member 22 is integral with the ventilation module 20 and forms a unitary structure. In the arrangement shown in the Figures, one joint member 22 is provided which extends continuously along the length of the ventilation module 20. In another arrangement, two joint members 22 are provided spaced apart and at opposite ends of the ventilation module 20. Of course, any other number, arrangement, size and/or shape of joint member 22 and complementary joint member 31 are envisioned. For example, it can be appreciated that the complementary joint member 31 can have a substantially cylindrical elongate formation and the joint member 22 can have a substantially cylindrical shaped channel section. In this arrangement, the complementary joint member 31 can be integral with the ventilation flap 30 to form a unitary structure. In addition, it can be appreciated that the joint member 22 and/or complementary joint member 31 can extend continuously or discontinuously along a part of the length or the majority of the length of the window ventilation system 1.

[0085] The ventilation module 20 has a front panel 23 having seven or nine vent holes 21 of differing sizes which define the ventilation passages, a pair of side panels 26 connected to and extending backwards from the front panel 23, a top panel 24 connected to and extending backwards from the front panel 23, and six feet 25. The front panel 23 faces the ventilation flap 30 when the ventilation flap 30 is in the closed position and has a generally planar profile. The top panel 24 and pair of side panels 26 have a generally undulating profile. The feet 25 extends downwardly from the top panel 24 and attaches or abuts with the outer peripheral

surface of the window sash. As shown in Figure 3, the window ventilation module 20 has six feet/stands 25 spaced apart along the length of the ventilation module 20. The stands 25 have a base with a generally U-shaped cross-section and curve outwards from the top panel 24 to the base. Of course, other numbers, arrangements and/or shapes of stands 25 are envisioned. For example, the stands 25 can have a base with a circular cross-section and taper outwards from the top panel 24.

[0086] As shown in Figures 1, 10 and 11 at least the ventilation flap 30 has a base section 32 with a ventilation module facing front face 33 and a back face 34, and a handle section 36 connected to the base section 32 by three fins 37. The front face 33 is generally planar and the back face 34 is generally arcuate, although other arrangements are envisioned. The base section 32 is generally hollow with at least one strut 35 extending from the front face 33 to the back face 34 to provide structural support. A sealing section 38 is attached to the front face 34 for sealing the at least one ventilation passage (by covering the vent holes 21) when the ventilation flap 30 is in the closed position. The ventilation flap 30 further comprises a pivotal coupling joint 39 extending outwardly and adaptable to pivotally connect with a locking mechanism 3 (Figure 5) of the window sash 2.

[0087] The ventilation module 20 is constructed from plastic or polyurethane, and is of a moulded construction. In one exemplary arrangement, the ventilation module 20 is injection moulded from a plastic material. The ventilation flap 30 is constructed from metal, such as aluminium, wood, plastic or polyurethane, or a combination thereof.

[0088] As shown in Figures 4 and 5, the window sash 2 has a top sash member 2a, side sash members 2b, 2c and bottom sash member (not shown). The top sash member 2a, side sash members 2b, 2c and bottom sash member define an opening O adapted to receive a window pane. The window sash 2 is mounted in a frame installed in a building. The window sash 2 can be moveable relative to the frame such as by a pivot connection in the conventional manner. The pivot location can be located at the top, middle, or bottom of the frame. Alternatively, the sash 2 can be fixed relative to the frame. The window sash 2 comprises a locking mechanism 3. The ventilation flap 30 is pivotally connected to the locking mechanism 3 at a pivotal coupling joint 39 extending outwardly from the ventilation flap 30. The sash 2 and frame are constructed from one of wood, plastic, or polyurethane, or a combination thereof. As shown in Figure 8 the perimeter of the ventilation passages 21 have a protruding rim 43 protruding slightly out from the main planar surface of the front panel 23.

[0089] An exemplary method for constructing the window ventilation system 1 will now be described.

[0090] The window ventilation system 1 is constructed by forming the ventilation module 20, and pivotally connecting the ventilation flap 30 to the ventilation module 20.

[0091] The step of forming the ventilation module 20 involves forming the ventilation module 20 with at least one joint member 22 adaptable to engage with at least one complementary

joint member 31 provided on the ventilation flap 30. The ventilation module 20 and the joint member 21 can form a unitary structure, and can be formed by moulding/injection moulding a plastic material.

[0092] The step of connecting the ventilation flap 30 to the ventilation module 20 involves connecting the at least one complementary joint member 31 provided on the ventilation flap 30 to the at least one joint member 22 of the ventilation module 20.

[0093] A further step in the construction process is to pivotally connect the ventilation flap 30 to a locking mechanism 3 on the window sash 2.

[0094] Yet another further step in the construction process is to attach or abut the window ventilation system 1 to the outer peripheral surface of the window sash 2.

[0095] In the preceding discussion of the invention, unless stated to the contrary, the disclosure of alternative values for the upper or lower limit of the permitted range of a parameter, coupled with an indication that one of the said values is more highly preferred than the other, is to be construed as an implied statement that each intermediate value of said parameter, lying between the more preferred and the less preferred of said alternatives, is itself preferred to said less preferred value and also to each value lying between said less preferred value and said intermediate value.

REFERENCES CITED IN THE DESCRIPTION

Cited references

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Patent documents cited in the description

- EP2578764A1 [0003]

PATENTKRAV

1. Tagvindue omfattende en karm, en ramme (2) monteret i karmen og et vinduesventilationssystem (1), der er fastgjort til eller støder op til en ydre omkransende flade af vinduesrammen (2), hvor vinduesventilationssystemet omfatter: et ventilationsmodul (20), der definerer mindst én ventilationspassage gennem vinduet; og en ventilationsklap (30) omfattende en basissektion (32) og en håndtagssektion (36), kendetegnet ved, at ventilationsklappen (30) er drejeligt koblet til ventilationsmodulet (20).

2. Tagvindue ifølge krav 1, hvor vinduesventilationssystemet har et hængsel (22, 31) til direkte drejelig sammenkobling af ventilationsmodulet (20) og ventilationsklappen (30).

3. Tagvindue ifølge krav 1 eller krav 2, hvor ventilationsmodulet er forsynet med mindst et koblingselement (22, 31), der kan tilpasses til drejeligt at gå i indgreb med mindst et andet koblingselement (22, 31) tilvejebragt på et tilsvarende sted af ventilationsklappen.

4. Tagvindue ifølge krav 3, hvor de samvirkende koblingselementer (22, 31) er han- og hunsamvirkende koblingselementer.

5. Tagvindue ifølge krav 3 eller krav 4, hvor mindst et koblingselement, der omfatter en del-cylindrisk formdel (22), rager udad fra ventilationsmodulet via et forbindelseselement (41).

6. Tagvindue ifølge et hvilket som helst af kravene 3 til 5, hvor det mindst ene andet koblingselement er i form af en aflang i det væsentlige cylindrisk-formet kanalsektion (42), der er forsænket i ventilationsklappen (30).

7. Tagvindue ifølge krav 3 eller krav 4, hvor det mindst ene koblingselement omfatter en del-cylindrisk formdel (22), der rager udad fra ventilationsklappen (30) via et forbindelseselement (41), og den mindst ene andet koblingselement er i form af en i det væsentlige cylindrisk-formet aflang kanalsektion (42) i eller på ventilationsmodulet.

8. Tagvindue ifølge et hvilket som helst af kravene 3 til 7, hvor det mindst ene koblingselement (22, 31) og/eller mindst et andet koblingselement (22, 31) strækker sig kontinuerligt eller diskontinuerligt langs hele eller en del af længden af vinduesventilationssystemet.

9. Tagvindue ifølge et hvilket som helst af kravene 3 til 8, hvor det mindst ene koblingselement (22, 31) er integreret med ventilationsmodulet (20) eller ventilationsklappen (30), således det mindst ene koblingselement og ventilationsmodulet eller ventilationsklappen er en enhedsstruktur.

10. Tagvindue ifølge et hvilket som helst af kravene 3 til 9, hvor det mindst ene andet koblingselement (22, 31) er integreret med ventilationsmodulet eller ventilationsklappen, således det mindst ene andet koblingselement (22, 31) og ventilationsmodulet eller ventilationsklappen er en enhedsstruktur.

11. Tagvindue ifølge et hvilket som helst af de foregående krav, hvor ventilationsmodulet omfatter en nedadhængende kant (51), der kan forlænges under den ydre omkransende flade af rammen og kan hvile mod en mod rummet vendende flade af tagvinduets ramme.

12. Tagvindue ifølge krav 11, hvor den nedadhængende kant (51) af ventilationsmodulet bærer mindst et koblingselement (22, 31) af den drejelige kobling.

13. Tagvindue ifølge et hvilket som helst af de foregående krav, hvor ventilationsmodulet (20) omfatter et hult legeme med en rammestøtte til støtte af et frontpanel (23) og en baldakinformet kant, der hænger bagud og nedad fra frontpanelet (23), hvor støtterammen omfatter en flerhed af fødder (25) adskilt i længderetningen langs længden af ventilationsmodulet til støtte af ventilationsmodulet på den ydre omkransende flade af vinduesrammen, hvor føddernes base definerer et virtuelt plan til montering ventilationsmodulet på den ydre omkransende flade af vinduesrammen, hvor frontpanelet (23) strækker sig ud over føddernes base og danner en nedadhængende kantdel (51) af frontpanelet, hvor skæringen mellem føddernes base og en nedadrettet kantdel af frontpanelet definerer et positioneringshjørne, som kan placeres på kanten af rammen mellem den ydre omkransende flade af rammen og en mod rummet vendende flade af tagvinduets ramme.

14. Tagvindue ifølge et hvilket som helst af de foregående krav, hvor ventilationsklappen omfatter basissektionen (32) og håndtagssektionen (36), hvor basissektionen har et ventilationsmodul, der vender mod forsiden og en bagside, hvor ventilationsklappen yderligere omfattende en tætningssektion (38) fastgjort til forsiden, hvilken tætningssektion (38) kan tilpasses til at tætne den mindst ene ventilationspassage, når ventilationsklappen er i den lukkede stilling.

15. Tagvindue ifølge et hvilket som helst af de foregående krav, hvor ventilationsklappen (30) omfatter et drejeligt koblingsled (39), der strækker sig udad og kan tilpasses til drejeligt at forbindes med en låsemekanisme (3) af vinduesrammen (5).

DRAWINGS

Drawing

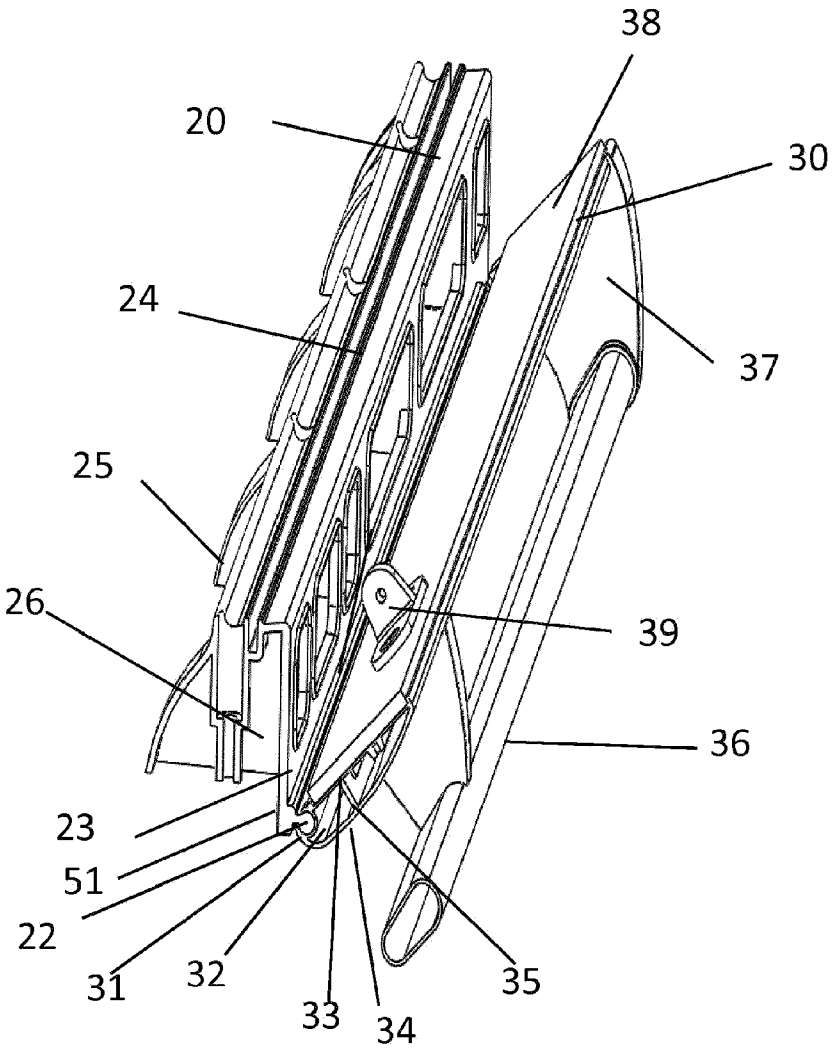


Figure 1

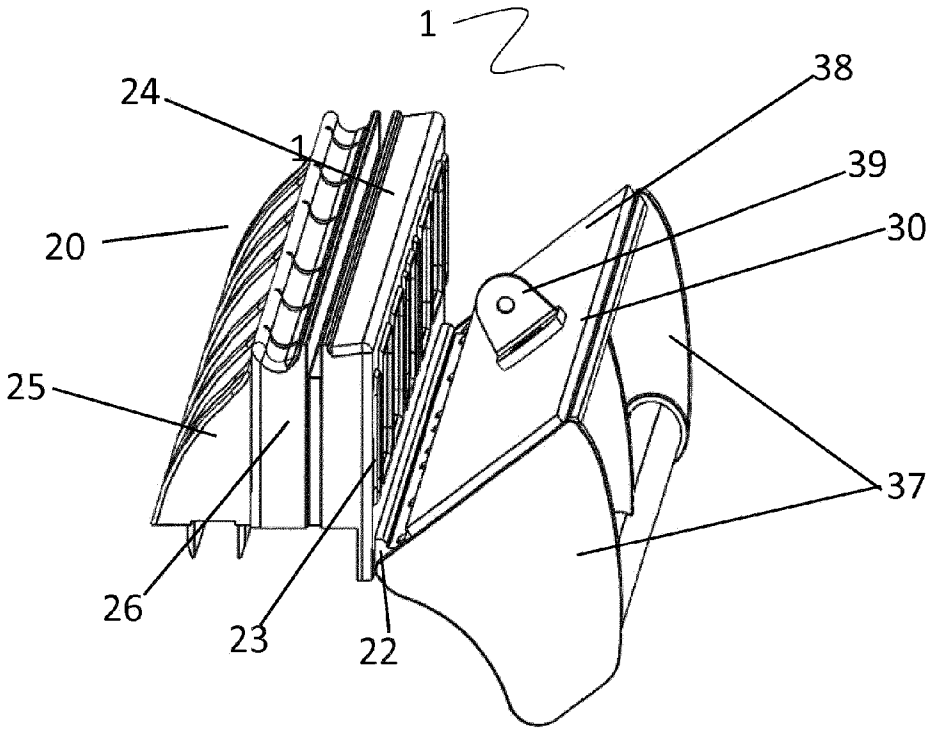


Figure 2

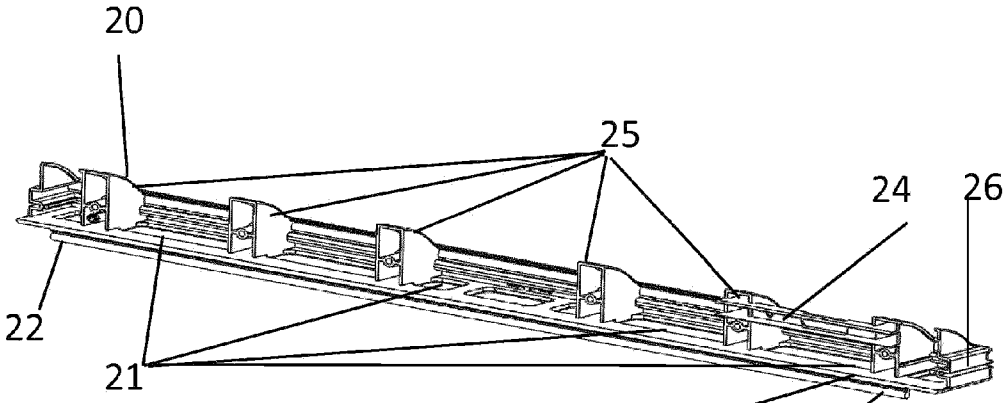


Figure 3

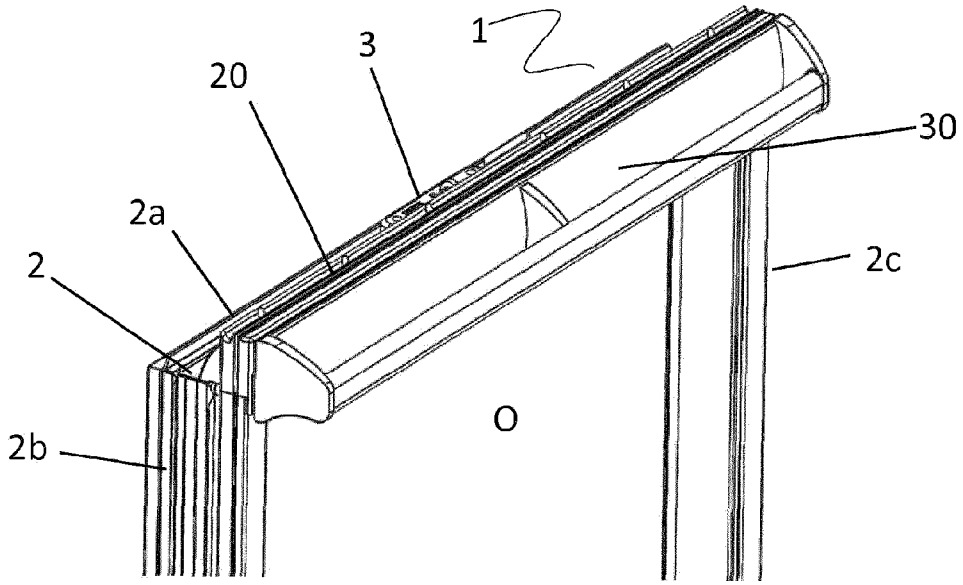


Figure 4

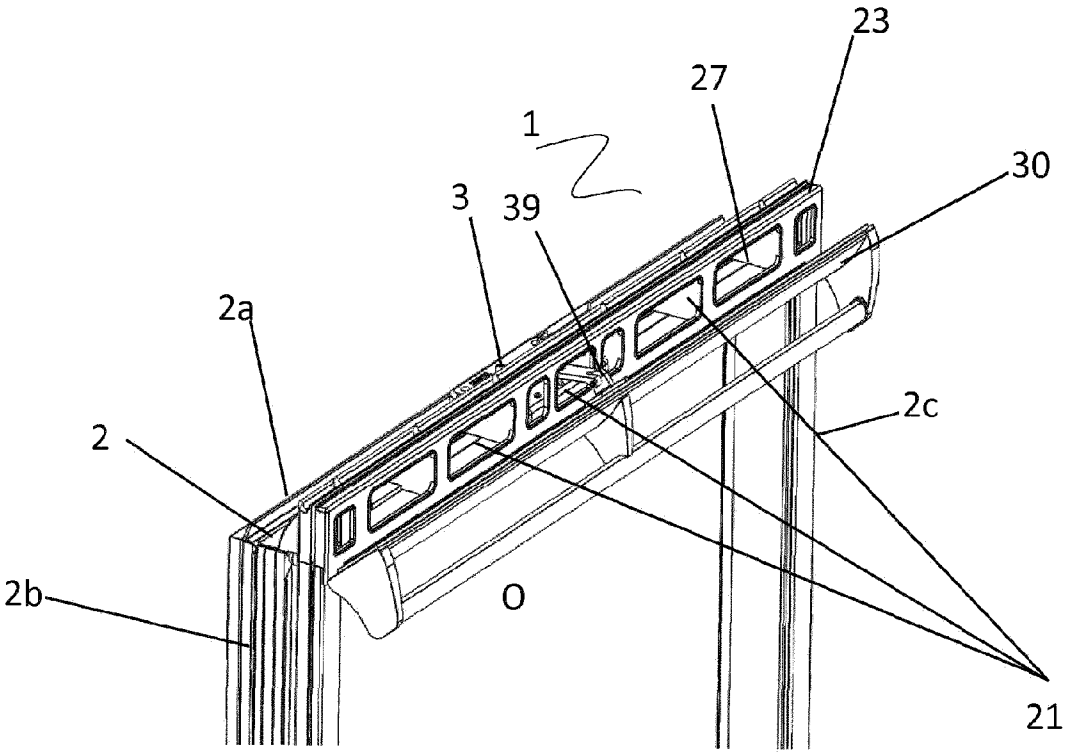


Figure 5

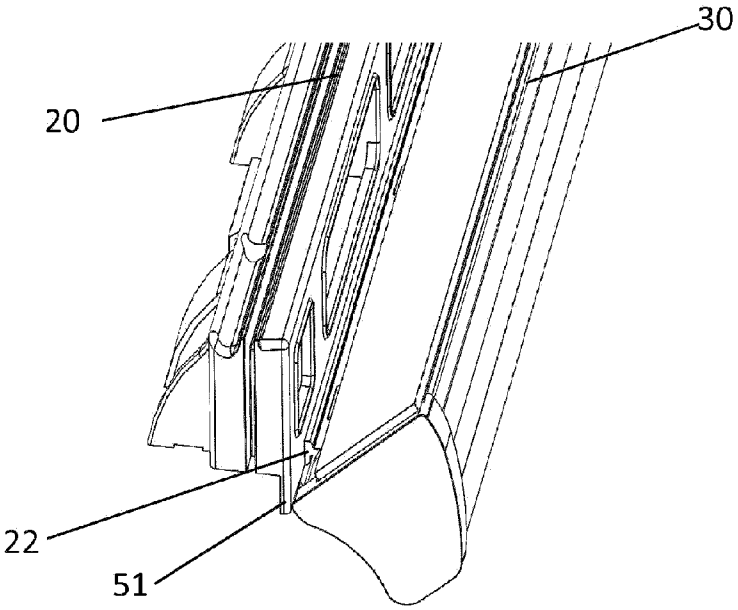


Figure 6

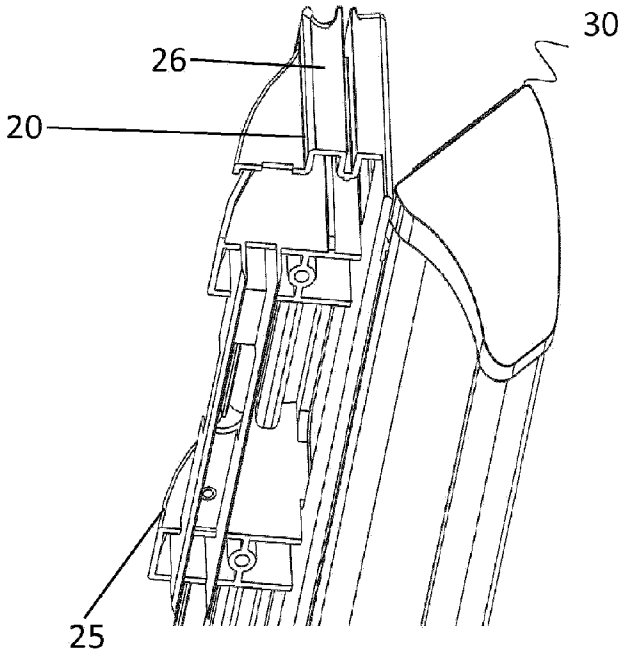


Figure 7

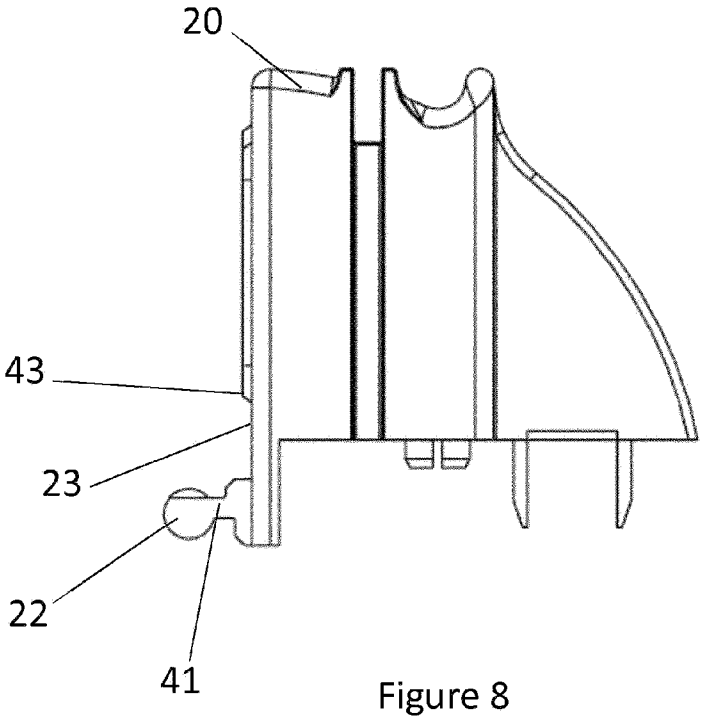


Figure 8

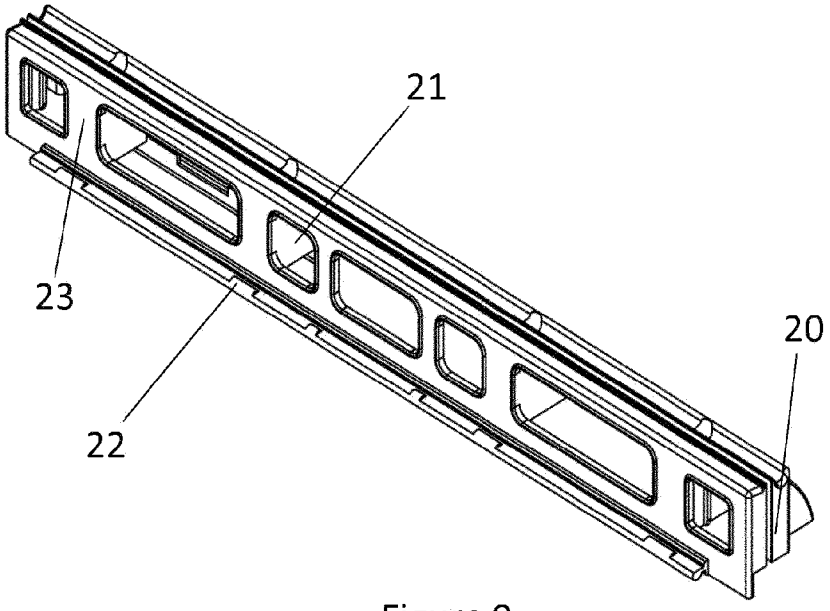


Figure 9

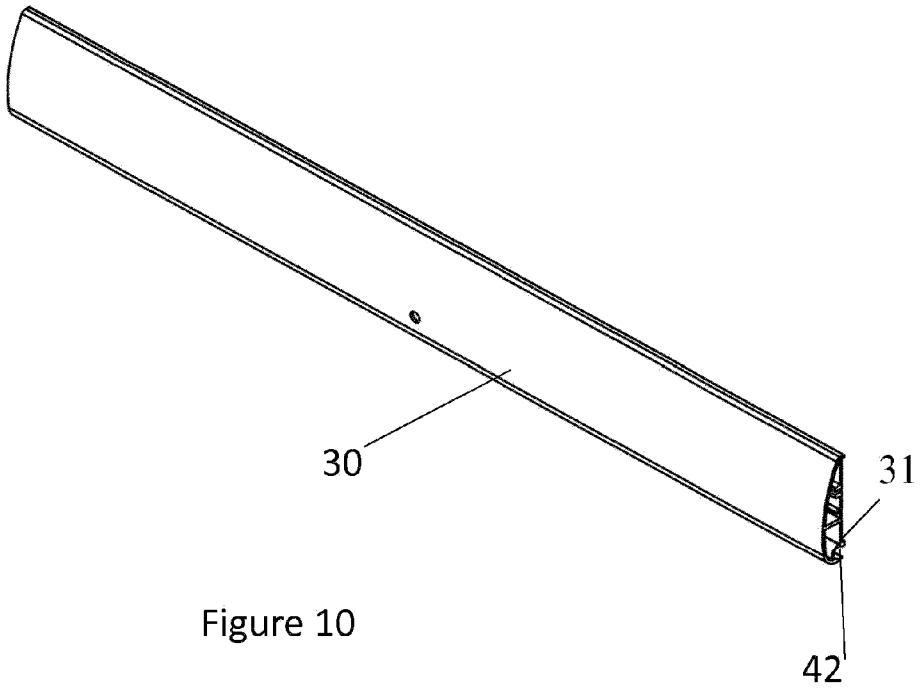


Figure 10

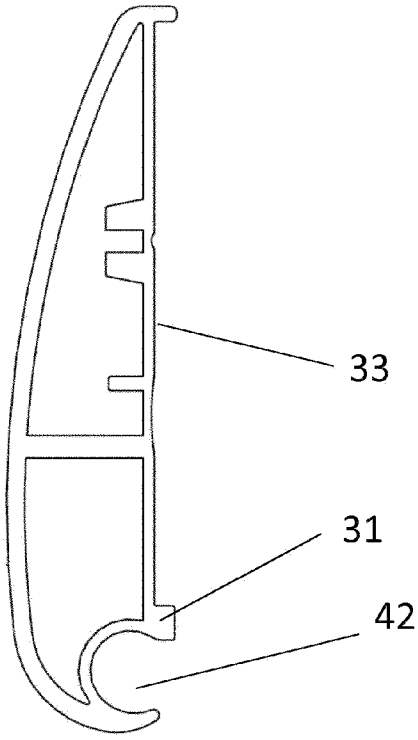


Figure 11