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(54) **Energy windows**

(57) This invention relates to an energy window for mounting in a building, wherein said window comprises a frame part and a sash part with a glass part, said frame part being adapted for connecting to said building, said sash part and said frame part being interconnected by hinges making it possible to open and close said energy window by opening and closing said sash part relative to said frame part. The frame part is a substantially flat plate wherein said sash part also comprises a flat plate and two flanges resulting in a U shape with an opening between said two flanges for receiving said glass part and wherein said sash part further comprises a third flange pointing in the opposite direction compared to said two flanges overlapping the front of the frame part. This configuration reduces the area taken up by the sash and frame part and results in the glass part of the window taking up a larger part of the total area of the entire window (sash + glass). The effective area of glass in the window frame is increased. This increases the effective amount of sunlight entering into the building through windows. The third flange pointing in the opposite direction compared to said two flanges overlapping the front of the frame part ensures that the frame part can be at least partly and even completely hidden behind the third flange and it is possible to position a gasket between the third flange and the front of the frame part. Having gaskets positioned both in the front between the third flange and the frame and in the back of the window creates a cavity between the two gaskets resulting in a very low heat loss between frame and sash and removes thermal bridges.

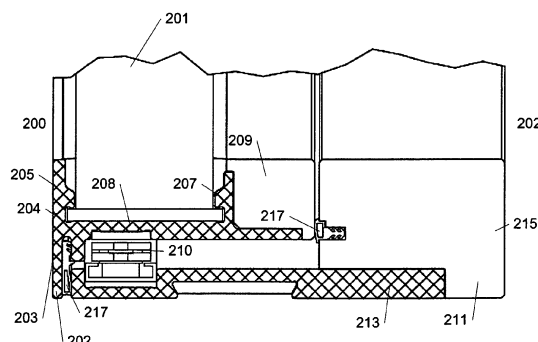


Fig. 2

Description

FIELD OF THE INVENTION

[0001] The invention concerns an energy window comprising a sash part with glass and a frame part. The invention further concerns, respectively, a sash part with glass and a frame part to be used as part of an energy window.

BACKGROUND OF THE INVENTION

[0002] The focus on energy usage reduction has increased significantly over the last years and this also includes focus on buildings and the isolation of buildings.

[0003] In connection with buildings, a lot of focus and research effort has been given to windows and this has resulted in energy windows typically comprising multiple layers of glass spaced apart from each other.

[0004] Research has resulted in glass for windows that isolates extremely well, and therefore it has become possible that a large area of the building is constituted by glass with the result that more daylight will enter the interior of the building. However, the sash and frame surrounding and holding the glass still take up a relatively large part of the entire area taken up by the window, since they have to be strong enough to hold the glass.

[0005] The governments keep increasing the demand to energy windows, and in order to produce energy windows fulfilling future demands it is required that a special gas, e.g. kryptonite, is added between the glass layers. A problem is that these special gasses, e.g. kryptonite, are quite expensive thereby resulting in expensive energy windows. Further, the adding of kryptonite can be a quite troublesome process.

[0006] EP 1,353,035B1, DE 100 36 265 and FR 2 881 784 describe a window or door having a sash and a frame. In these solutions both the sash and the frame parts are quite thick and complex resulting in that quite a large area of the window opening is filled by the sash and frame leaving less space for the glass part.

[0007] Further, solutions being less complex also exist, but then a compromise has been made resulting in thermal bridges which significantly decrease isolation properties of the window.

OBJECT AND SUMMARY OF THE INVENTION

[0008] The object of the invention is to solve the above-mentioned problems.

[0009] This is obtained by an energy window for mounting in a building, wherein said window comprises a frame part and a sash part with a glass part, said frame part being adapted for connecting to said building, said sash part and said frame part being interconnected by hinges making it possible to open and close said energy window by opening and closing said sash part relative to said frame part. The frame part is a substantially flat plate

wherein said sash part also comprises a flat plate and two flanges resulting in a U shape with an opening between said two flanges for receiving said glass part and wherein said sash part further comprises a third flange pointing in the opposite direction compared to said two flanges overlapping the front of the frame part.

[0010] This configuration reduces the area taken up by the sash and frame part and results in the glass part of the window taking up a larger part of the total area of the entire window (sash + glass).

[0011] The effective area of glass in the window frame is increased. This increases the effective amount of sunlight entering into the building through windows. The third flange pointing in the opposite direction compared to said two flanges overlapping the front of the frame part ensures that the frame part can be at least partly and even completely hidden behind the third flange and it is possible to position a gasket between the third flange and the front of the frame part. Having gaskets positioned both in the front between the third flange and the frame and in the back of the window creates a cavity between the two gaskets resulting in a very low heat loss between frame and sash and removes thermal bridges.

[0012] In an embodiment said sash part is glued to said glass part, resulting in a sash part where the glass part is the bearing part. Thereby, since the glass part becomes the bearing part, fewer requirements to the stability of the sash are necessary. Quite simple sash solutions even in weak materials are possible.

[0013] In an embodiment said sash part comprises four side pieces, each side piece having been separately connected to the glass part. This is a very simple method of mounting the sash to the glass part.

[0014] In an embodiment said sash part and said frame part are made from fiber composite. This is a very light material with quite strong properties. Further, by using composite material the sash and frame are less sensitive to moisture or dryness as a result of the humidity of the air.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] In the following, preferred embodiments of the invention will be described referring to the figures, where;

figure 1 a and 1 b illustrate the principle behind the sash of an energy window according to the present invention, in an unassembled state and in an assembled state, respectively,

figure 2 illustrates the parts of the energy window according to an embodiment of the present invention,

figure 3a, 3b and 3c illustrate an embodiment of an energy window described in figure 2, seen from different angles,

figure 4a and 4b illustrate the window in an opened

position seen from different angles.

DESCRIPTION OF EMBODIMENTS

[0016] Figure 1 a and 1b illustrate the principle behind the sash part of an energy window according to the present invention, in an unassembled state and in an assembled state, respectively.

[0017] In figure 1 a the glass part 101 of a window and the profile of the sash part 103 are illustrated. The sash profile comprises a U shape with two flanges 105, 107 ensuring that the sash part 103 can be positioned around the edges of the glass part 101. The glass part 101 is thereby positioned between the flanges 105, 107, and the distance between the flanges 105, 107 corresponds to the thickness of the glass part 101 in such a way that the flanges can be mounted around the glass part. In figure 1b the sash part 103 has been connected to the glass part by mounting the sash part 103 on the glass part, and further glue 109 has been used to secure the sash part to the glass part 101. In this example the glue is positioned between the flanges 105, 107 and the edge of the glass part. Alternatively, the glue 109 could be positioned differently; the important thing is that a sufficiently strong connection between the glass part 101 and the sash part 103 is obtained. The glue 109 could e.g. be fast drying hot melt glue or any other glue being useable for creating a strong connection between the material of the sash part 103 and the glass part 101. The sash part further comprises a third flange 108 pointing in the opposite direction compared to the two flanges 105, 107 overlapping at least part of said frame part. This third flange can be used for covering at least part of the frame part of the energy window (described later) and also for generating a first isolating barrier between the sash part and the frame part to avoid a thermal bridge.

[0018] In figure 2 the parts of the energy window according to an embodiment of the present invention are illustrated as a cut seen from the side. Here the side 200 is outside and the side 202 is inside. The basic elements of the energy windows according to the present invention are the sash part 203 with a glass part 201 and the frame part 213. As illustrated, the frame part 213 is a substantially flat plate which can be mounted to a surface of a window opening, and the sash part 203 comprises a flat plate 208 with two flanges 205, 207 resulting in a U-shape with an opening between the flanges wherein the glass part 201 is positioned. Further, this embodiment of the sash part comprises a third flange 202 pointing in the opposite direction compared to the two flanges 205, 207 and overlapping the front 214 of the frame part 213. In an alternative embodiment the third flange could be dimensioned differently relative to the frame and thereby only partly overlapping the frame.

[0019] The window comprises the glass part 201 and the sash part 203 with flanges 205, 207 mounted around the edge of the glass part 201. In this embodiment the sash part 203 has been designed having a composite

sash part 204 - and on the inside a wooden sash part 209. The window is mounted to a frame part 211 via hinges 210, where hinge elements are mounted on the sash part 203 of the window and the frame part 211, respectively, enabling opening of the window. The frame part 211 has been designed having a composite frame part 213 and a wooden frame part 215. In the embodiment in figure 2 the window has been mounted to the composite frame part 213 of the frame part 211. Further, gaskets 217 are mounted between the frame and the third flange 202 of the sash part enabling a sealing barrier, whereby the frame and the sash are closely sealed, which further helps reducing the heat migrating from the inside to the outside of the window in the building. By placing the two gaskets 217 respectively in the front part of the energy window between the third flange and the frame and at the back part of the energy windows a cavity is generated between the two gaskets resulting in a very low heat loss between frame and sash. In the embodiment illustrated in figure 2 a fourth flange is positioned behind the third flange, whereby a small gap is generated wherein a gasket can be mounted. This gap results in a better grip on the gasket, whereby the position of the gap is maintained.

[0020] Figure 3a, 3b and 3c illustrate an embodiment of an energy window described in figure 2, seen from different angles. In figure 3a the window is seen from the front. Figure 3b shows the window along the axis A-A where 301 is the glass part and 303 is part of the frame. Here the side 300 is outside and the side 302 is inside. The encircled area D is enlarged and identical to figure 2. Figure 3c shows the window along the axis B-B where 301 is the glass part and 303 is part of the frame. Again, here the side 300 is outside and the side 302 is inside and 304 is the top and 306 is the bottom of the window.

[0021] Figure 4a and 4b illustrate the window in an opened position seen from different angles. On the figures it can be seen that the sash part 301 with the glass part in one embodiment opens up in a way where the sash is hinged 305 to the sides of the frame 303, and where the bottom of the sash part opens up away from the frame. Figure 4b is seen from the same angle as figure 3c, but with the window opened instead of closed. Again, here the side 300 is outside and the side 302 is inside and 304 is the top and 306 is the bottom of the window.

[0022] In an embodiment, the sash is hinged to the bottom or the top of the frame so that the sash part can open up in any way the user wants it to. In another embodiment the sash is fixed to the frame rendering it impossible to open the window.

Claims

1. An energy window for mounting in a building, wherein said window comprises a frame part (213) and a sash part (203) with a glass part (201), said frame part (213) being adapted for connecting to said build-

- ing, said sash part (203) and said frame part (213) being interconnected by hinges (210) making it possible to open and close said energy window by opening and closing said sash part (203) relative to said frame part (213) **characterized in that** said frame part (213) is a substantially flat plate and wherein said sash part also comprises a flat plate (208) and two flanges (205, 207) resulting in a U shape with an opening between said two flanges (205, 207) for receiving said glass part (201), and wherein said sash part (203) further comprises a third flange (202) pointing in the opposite direction compared to said two flanges (205, 207) overlapping the front (214) of the frame part (213).
2. An energy window according to claim 1, wherein said sash part (203) is glued to said glass part (201), resulting in a sash part (203) where the glass part (201) is the bearing part.
3. An energy window according to claims 1-2, wherein said sash part (203) comprises four side pieces, each side piece having been separately connected to the glass part.
4. An energy window according to claim 1-3, wherein said sash part (203) and said frame part (213) are made from fiber composite.
5. A frame part (213) to be used as part of an energy window for mounting in a building, wherein said energy window further comprises a sash part (203) with a glass part (201), said frame part (213) being adapted for connecting to said building, said sash part (203) and said frame part (213) adapted for being interconnected by hinges (210) making it possible to open and close said energy window by opening and closing said sash part (203) relative to said frame part (213) **characterized in that** said frame part (213) is a substantially flat plate.
6. A sash part (203) with a glass part (201) to be used as part of an energy window for mounting in a building, wherein said energy window further comprises a frame part (213), said frame part (213) being adapted for connecting to said building, said sash part (203) and said frame part (213) being adapted to be interconnected by hinges (210) making it possible to open and close said energy window by opening and closing said sash part (203) relative to said frame part **characterized in that** said sash part (203) comprises a flat plate (208) and two flanges (205, 207) resulting in a U shape with an opening between said flanges for receiving said glass part (201), and wherein said sash part (203) further comprises a third flange (202) pointing in the opposite direction compared said two flanges (205, 207) adapted for overlapping the front (214) of the frame part (213).
7. A sash part according to claim 6, wherein said sash part is glued to said glass part, resulting in a sash part with glass part the glass part is the bearing part.
8. A sash part according to claims 6-7, wherein said sash part comprises four side pieces, each side piece having been separately connected to the glass part.

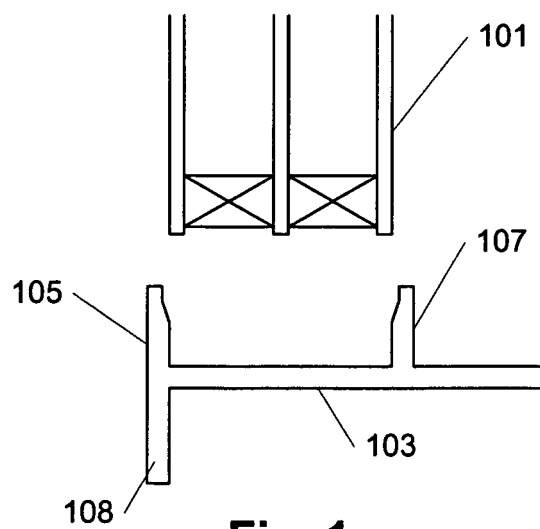


Fig. 1a

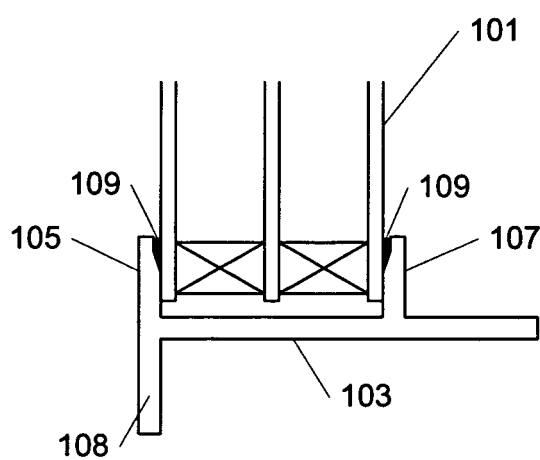


Fig. 1b

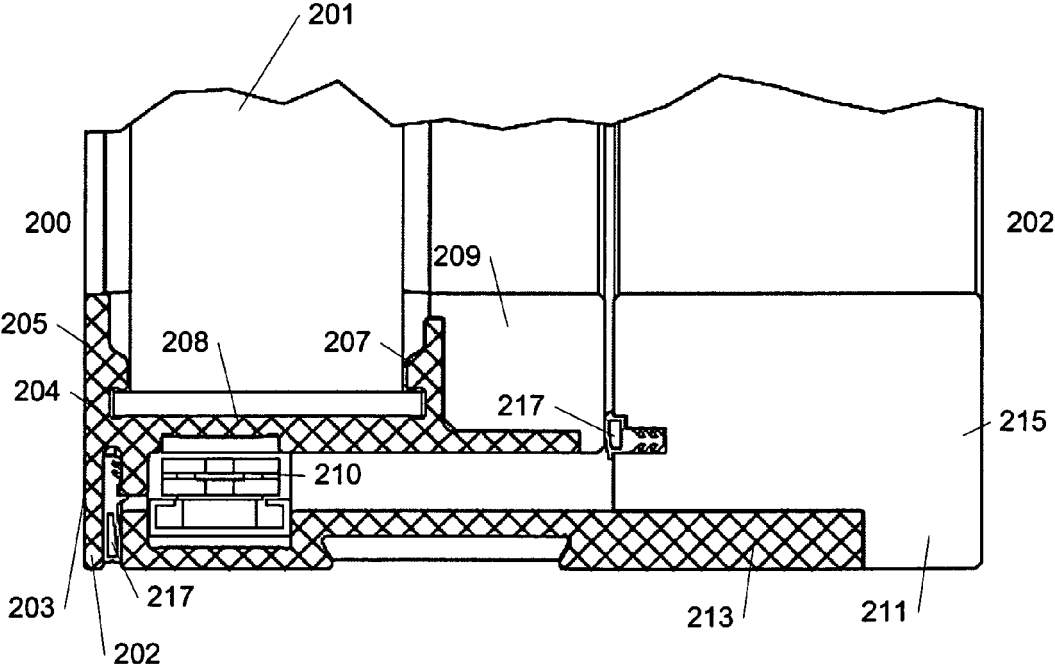


Fig. 2

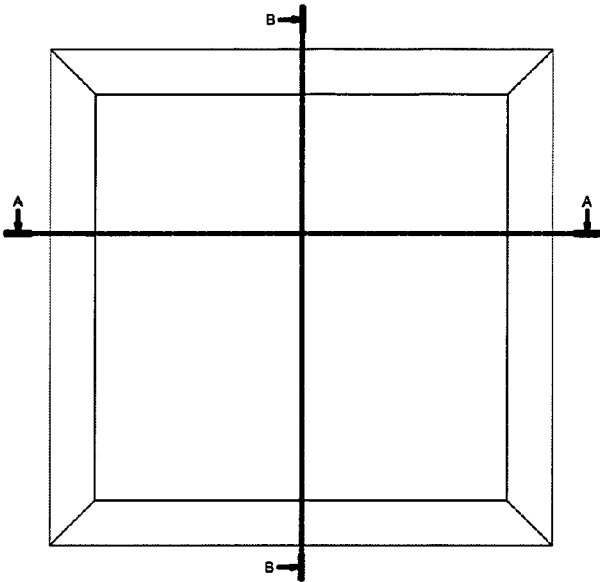


Fig. 3a

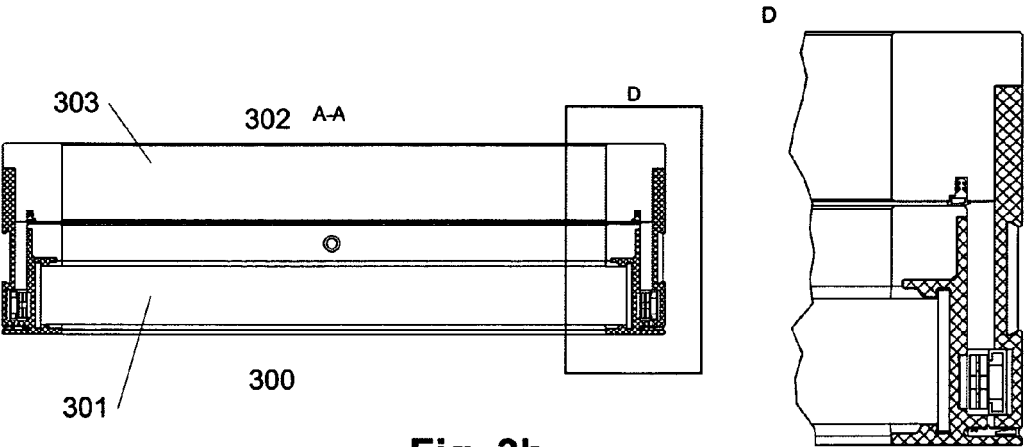


Fig. 3b

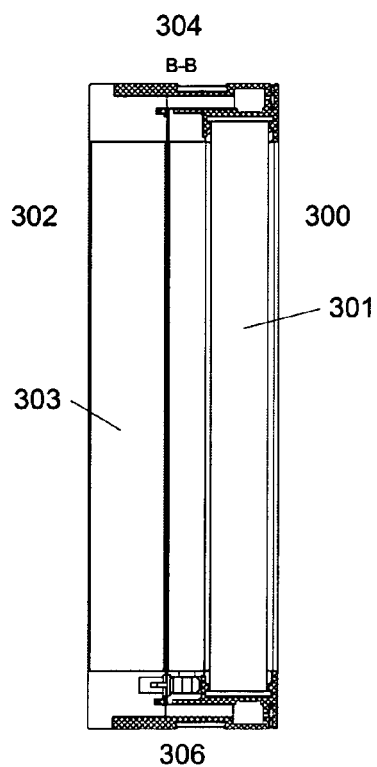


Fig. 3c

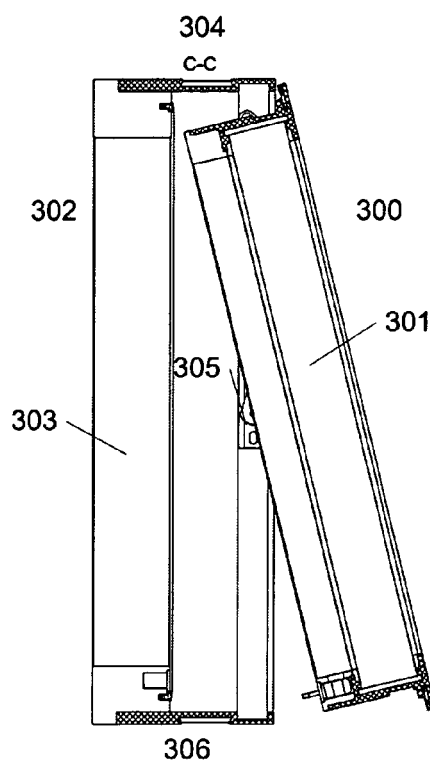


Fig. 4b

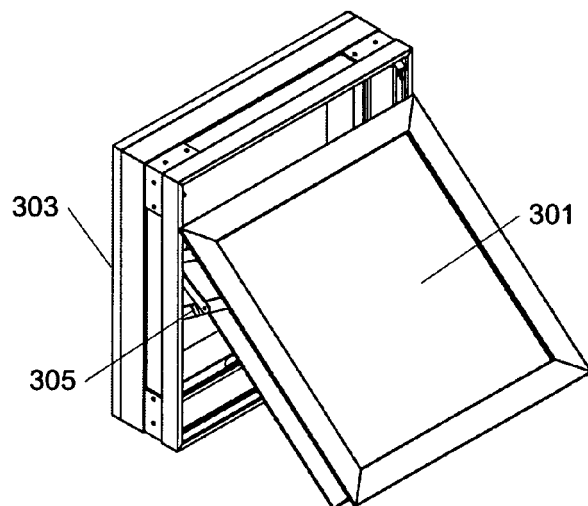


Fig. 4a



EUROPEAN SEARCH REPORT

Application Number
EP 10 00 8274

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 3 March 2011	Examiner Kofoed, Peter
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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**ANNEX TO THE EUROPEAN SEARCH REPORT
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