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(54) **Holding system**

(57) A holding system for holding an external unit of a fluid conditioning system (such as an air conditioning system), comprising an internal unit operatively connected via an elongate interconnector to the external unit in an roof opening of a sloping roof comprising an upper roof surface, said holding system comprising; a watertight base comprising a base circumference and an upper side, a watertight wall which extends upwardly from the upper side of the base, is connected to the base in a watertight manner and extends along part of the base circumference of the base to define a water outlet for the drainage of water, a unit support for supporting the external unit at a distance above the upper side of the base,

a securing device for securing the holding system to the sloping roof, said securing device being configured to position the base and the wall substantially under the upper roof surface and to position the upper side of the base substantially horizontal or under a small angle in relation to the horizontal to in use guide water out of the water outlet, wherein the base or the wall comprises a holder opening to provide a passage for the interconnector and a water shield is provided at the holder opening to in use prevent the passage of water through the holder opening.

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Description

[0001] The invention relates to a holding system for holding an external unit of a fluid conditioning system on a roof. The external unit is via an elongate interconnector operatively connected to an internal unit. The fluid conditioning system may be an air conditioning system and the external unit may be a heat exchanger.

[0002] External units of fluid conditioning systems are in general not placed on a sloping roof of a building due to the fact that in said situation the external units are positioned such that they are fully visible.

[0003] The holding system according the invention solves above mentioned problem. The invention relates to a holding system for holding an external unit of a fluid conditioning system (such as an air conditioning system), comprising an internal unit operatively connected via an elongate interconnector to the external unit, in a roof opening of a sloping roof comprising an upper roof surface, said holding system comprising;

- a watertight base comprising a base circumference and an upper side,
- a watertight wall which extends upwardly from the upper side of the base, is connected to the base in a watertight manner and extends along part of the base circumference of the base to define a water outlet for the drainage of water,
- a unit support for supporting the external unit at a distance above the upper side of the base,
- a securing device for securing the holding system to the sloping roof, said securing device being configured to position the base and the wall substantially under the upper roof surface and to position the upper side of the base substantially horizontal or under a small angle in relation to the horizontal to in use guide water out of the water outlet, wherein the base or the wall comprises a holder opening to provide a passage for the interconnector and a water shield is provided at the holder opening to in use prevent the passage of water through the holder opening.

[0004] The holder system according the invention ensures that the external unit will be at least partly received by the sloping roof. Due to this, the external unit is less visible. Furthermore, the holding system according the invention covers the roof opening such that in use no water will enter through the roof opening.

[0005] In an embodiment of the holding system according the invention, the holder opening is only located in the wall. The opening may only be located in the base.

[0006] In an embodiment of the holding system according the invention, the holder opening comprises an opening circumference and the water shield extends along at least part of the opening circumference. The water shield may form a shielding tube fully surrounding the opening circumference. The water shield may extend along part of the opening circumference, as long as in use a pas-

sage of water through the holder opening is prevented.

[0007] The shielding tube may comprise a tube opening for receiving the interconnector, which tube opening may be located at a distance from the holder opening and directed towards the upper side of the base.

[0008] The unit support may be provided on the upper side of the base. The external unit may be substantially fully supported by the base. The securing device may be configured to attach the wall to the roof. The wall may comprise an upper edge and the securing device may be configured to attach the upper edge to the roof. The securing device may comprise an adjuster to in use adjust the angle between the upper side of the base and the horizontal.

[0009] In an embodiment of the holding system according the invention, the base comprises an under side, the wall comprises an outer side and the holding system comprises an acoustic isolator extending along the under side of the base and the outer side of the wall.

[0010] The invention relates to a use of a holding system according to the invention.

[0011] The invention relates to a method for placing an external unit of a fluid conditioning system (such as an air conditioning system), comprising an internal unit connected via an elongate interconnector to the external unit, in a roof opening of a sloping roof comprising an upper roof surface, comprising the steps of;

- placing a holding system according to the invention in the roof opening of the sloping roof such that the holding system is located under the upper roof surface and the upper side of the base extends substantially horizontal or under a small angle in relation to the horizontal to in use guide water out of the water outlet,
- attaching the holding system to the roof with the securing device,
- placing the external unit on the unit support, and
- placing the interconnector through the holder opening.

[0012] The method may comprise the step of operatively connecting the external unit to the internal unit via the interconnector extending through the holder opening.

[0013] The method may comprise the step of adjusting the angle α between upper side of the base and the horizontal.

[0014] Embodiments of the holding system and the method according to the invention will be described in detail with reference to the figures 1-5, wherein;

Figure 1 schematically shows a view in perspective of a first embodiment of the holding system according the invention,

Figure 2 schematically shows an exploded view of the holding system of figure 1,

Figures 3 and 4 schematically show a view in cross section along line III-III of figure 2, and

Figure 5 schematically shows a side view of a second embodiment of the holding system according the invention.

[0015] The figures 1-4 show a first embodiment of a holding system 1 for holding an external unit 2 (heat exchanger) of an air conditioning system 3 in a roof opening 7 of a sloping roof 6. The sloping roof comprises an upper roof surface 8. The upper roof surface 8 is defined by the roof tiles 8. In use, the air conditioning system 3 comprises an internal unit (not shown) which is operatively connected via an elongate interconnector to the external unit 2.

[0016] It will be clear that the holder system 1 can be used for any other type of fluid conditioning system comprising an external unit, such as a heat exchanger, connected to an internal unit via an elongate interconnector.

[0017] The holding system 1 comprises a watertight base 9 comprising a base circumference 10 and an upper side 11. A watertight wall 12 extends upwardly from the upper side 11 of the base 9, is connected to the base 9 in watertight manner and extends along part of the base circumference 10 to define a water outlet 13 for the drainage of water. The holding system 1 comprises a unit support 14 for supporting the external unit 2 at a distance above the upper side 11 of the base 9.

[0018] A securing device 15 is provided for securing the holding system 1 to the sloping roof 6. The securing device 15 is connected to the roof 6 such that the securing device 15 is located below the upper roof surface 8. More specifically, the securing device 15 is connected to the roof 6 such that the securing device 15 is located below the roof tiles 17. The securing device 15 is configured to position the base 9 and the wall 12 substantially under the upper roof surface 8 and to position the upper side 11 of the base substantially horizontal 16 (fig. 3) or under a small angle α in relation to the horizontal 16 (fig. 4) to in use guide water out of the water outlet 13.

[0019] The wall 12 comprises a holder opening 18 to provide a passage for the interconnector 5. A water shield 19 is provided at the holder opening 18 to prevent the passage of water through the holder opening 18. The holder opening 18 comprises an opening circumference 20 and the water shield 19 extends along the whole opening circumference 20. The water shield 19 forms a shielding tube 21 fully surrounding the opening circumference 20. The shielding tube 21 comprises a tube opening 22 for receiving the interconnector 5. The tube opening 22 is located at the distance from the holder opening 18 and directed towards the upper side 11 of the base 9.

[0020] The external unit 2 is attached to the unit supports 14. The unit supports 14 are resilient to in use damp vibration movements of the external unit 2. The unit supports 14 comprise elastic material for in use damping vibration movement of the external unit 2. The external unit 2 is fully supported by the base 9 via the unit supports 14.

[0021] The securing device 15 is configured to attach

the wall 12 to the roof 6. The wall 12 comprises an upper edge 23 and the securing device 15 is configured to attach the upper edge 23 to the roof. The securing device 15 comprises a roof part 29 and a wall part 30. The roof part 29 is in use attached to the roof 6. The wall part 30 is in use connected to the wall 12. More specifically, the wall part 30 is in use connected to wall 12 near the upper edge 23 thereof.

[0022] A water guide 28 is provided at the water outlet 13. The water guide 28 is configured to guide the water after leaving the water outlet 13. The water guide 28 is positioned on the upper roof surface 8. More specifically, the water guide 28 is positioned on top of the roof tiles 17.

[0023] In fig. 3 the external unit 2 and the thereto connected interconnector 5 are indicated by discontinuous lines. The base 9 comprises an under side 25 and the wall 12 comprises an outer side 26. In fig. 3, an optional acoustic isolator 27 is added to the holding system 1. The acoustic isolator 27 extends along the under side 25 and outer side 26. More specifically, the acoustic isolator 27 is fully covering the under side 25 and outer side 26.

[0024] In fig. 3 and 4 the horizontal 16 is indicated. In fig. 3, the upper side 11 of the base 9 extends substantially horizontal 16 to guide water out of the water outlet 13. In fig. 4, the upper side 11 of the base 9 extends under a small angle α in relation to the horizontal 16 to guide water out of the water outlet 13. The angle α may be between larger than 0° and smaller than 15° . The angle α may be between larger than 0° and smaller than 10° . The angle α may be between larger than 0° and smaller than 5° . The base and the wall are made from plastics, but may be made from any other suitable material, such as metal. In a further embodiment, the upper side 11 extends under an angle α in relation to the horizontal 16 and the wall 12 extends substantially vertical.

[0025] Figure 5 shows a side view of a second embodiment of the holding system according the invention. The securing device 15 comprises an adjuster 35 to in use adjust the angle α between the upper side 11 of the base 9 and the horizontal 16. The two opposing parts of the wall part 30 of the securing device 15 are near the water outlet 13 connected to opposing parts of the wall 12 via a pivot connection 32. In this side view only one of these pivot connections 32 is shown. The securing device 15 is pivotable around the pivot connection 32 as indicated by movement arrow 37. This allows the adjusting of the indicated angle β between the upper edge 23 of the wall 12 and the roof part 29 of the securing device 15. Securing means 36 are provided to secure the securing device 15 to the wall 12 under a specific angle β . The securing means 36 comprise a slit 33 and a fastener 34. The fastener 34 is fixed to the wall part 30 of the securing device 15. By moving the securing device 15 as indicated by arrow 37, the fastener 34 is movable through the slit 33. The fastener 34 is configured to secure the securing device 15 in any position in the slit 33. By adjusting the angle β , the angle α under which the upper side 11 of the base 9 in use extends relative to the horizontal 16 is

adjusted.

[0026] The invention also relates to a method for placing an external unit 2 of an air-conditioning system 3 comprising an internal unit connected an elongate interconnection to the external unit 2, in roof opening 7 of a sloping roof 6 comprising an upper roof surface 8, comprising the steps of;

- placing a holding system 1 of the figures 1-4 or 5 in the roof opening 7 of the sloping roof 6 such that the holding system 1 is located under the upper roof surface 8 and the upper side 11 of the base 9 extends substantially horizontal 16 or under a small angle α in relation to the horizontal 16 to in use guide water out of the water outlet 13,
- attaching the holding system 1 to the roof 6 with the securing device 15,
- placing the external unit 2 on the unit support 14, and
- placing the interconnector 5 in the holder opening 18.

[0027] It will be clear that many modifications of the holding system 1 and method according to the invention are possible without departing from the scope of protection as disclosed in this document.

Claims

1. Holding system for holding an external unit of a fluid conditioning system (such as an air conditioning system), comprising an internal unit operatively connected via an elongate interconnector to the external unit, in an roof opening of a sloping roof comprising an upper roof surface, said holding system comprising;

- a watertight base comprising a base circumference and an upper side,
- a watertight wall which extends upwardly from the upper side of the base, is connected to the base in a watertight manner and extends along part of the base circumference of the base to define a water outlet for the drainage of water,
- a unit support for supporting the external unit at a distance above the upper side of the base,
- a securing device for securing the holding system to the sloping roof, said securing device being configured to position the base and the wall substantially under the upper roof surface and to position the upper side of the base substantially horizontal or under a small angle in relation to the horizontal to in use guide water out of the water outlet, wherein the base or the wall comprises a holder opening to provide a passage for the interconnector and a water shield is provided at the holder opening to in use prevent the passage of water through the holder opening.

2. Holding system according to claim 1, wherein the holder opening is only located in the wall.
3. Holding system according to claim 1 or 2, wherein the holder opening comprises an opening circumference and the water shield extends along at least part of the opening circumference.
4. Holding system according to claim 1, wherein the holder opening is only located in the base.
5. Holding system according to any of the preceding claims, wherein the water shield forms a shielding tube fully surrounding the opening circumference.
6. Holding system according to claim 5, wherein the shielding tube comprises a tube opening for receiving the interconnector, which tube opening is located at a distance from the holder opening and directed towards the base.
7. Holding system according to any of the preceding claims, wherein the unit support is provided on the upper side of the base.
8. Holding system according to any of the preceding claims, wherein the external unit is substantially fully supported by the base.
9. Holding system according to any of the preceding claims, wherein the securing device is configured to attach the wall to the roof.
10. Holding system according to any of the preceding claims, wherein the wall comprises an upper edge and the securing device is configured to attach the upper edge to the roof.
11. Holding system according to any of the preceding claims, wherein the securing device comprises an adjuster to in use adjust the angle between the upper side of the base and the horizontal.
12. Holding system according to any of the preceding claims, wherein the base comprises an under side, the wall comprises an outer side and the holding system comprises an acoustic isolator extending along the under side of the base and the outer side of the wall.
13. Use of a holding system according to any of the claims 1-12.
14. Method for placing an external unit of a fluid conditioning system (such as an air conditioning system), comprising an internal unit connected via an elongate interconnector to the external unit, in roof opening of a sloping roof comprising an upper roof sur-

face, comprising the steps of;

- placing a holding system according to any of the claims 1-12 in the roof opening of the sloping roof such that the holding system is located under the upper roof surface and the upper side of the base extends substantially horizontal or under a small angle in relation to the horizontal to in use guide water out of the water outlet, 5
- attaching the holding system to the roof with the securing device, 10
- placing the external unit on the unit support, and
- placing the interconnector through the holder opening. 15

15. Method according to claim 14, comprising the step of operatively connecting the external unit to the internal unit via the interconnector extending through the holder opening. 20

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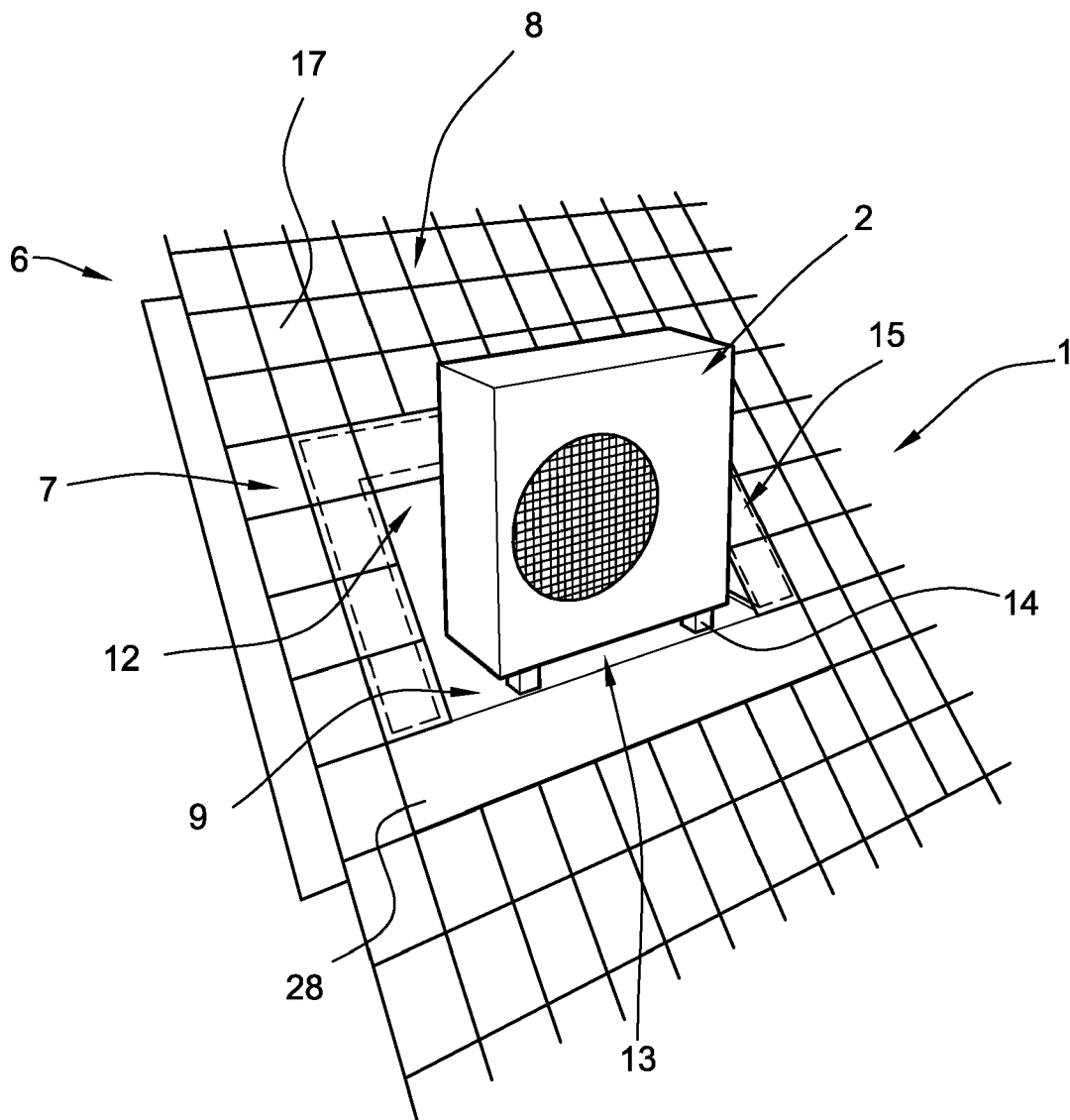


Fig. 1

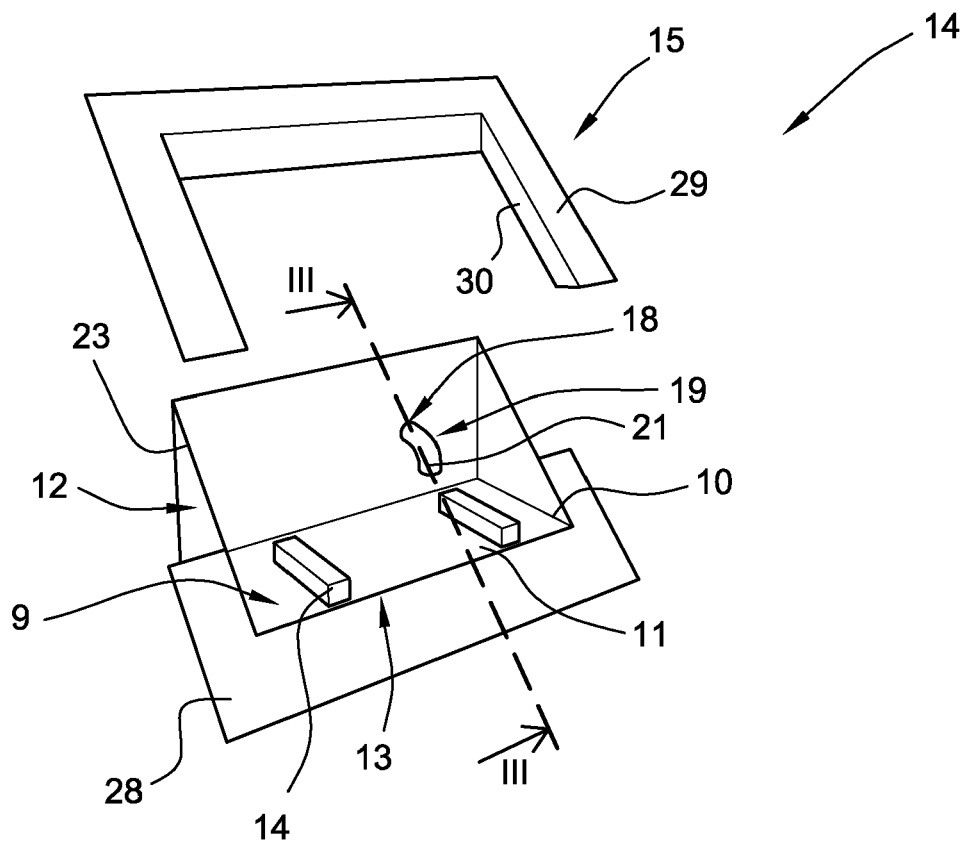


Fig. 2

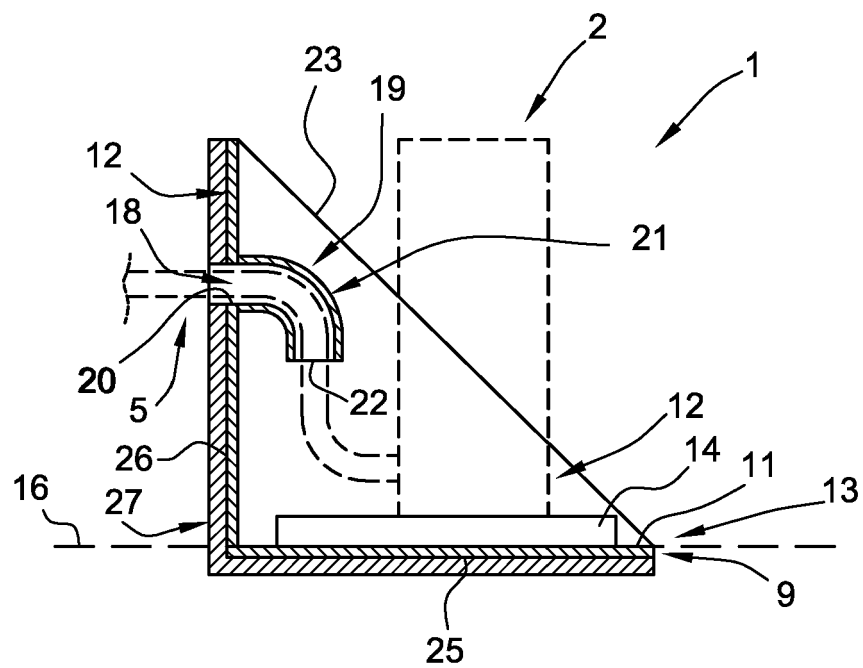


Fig. 3

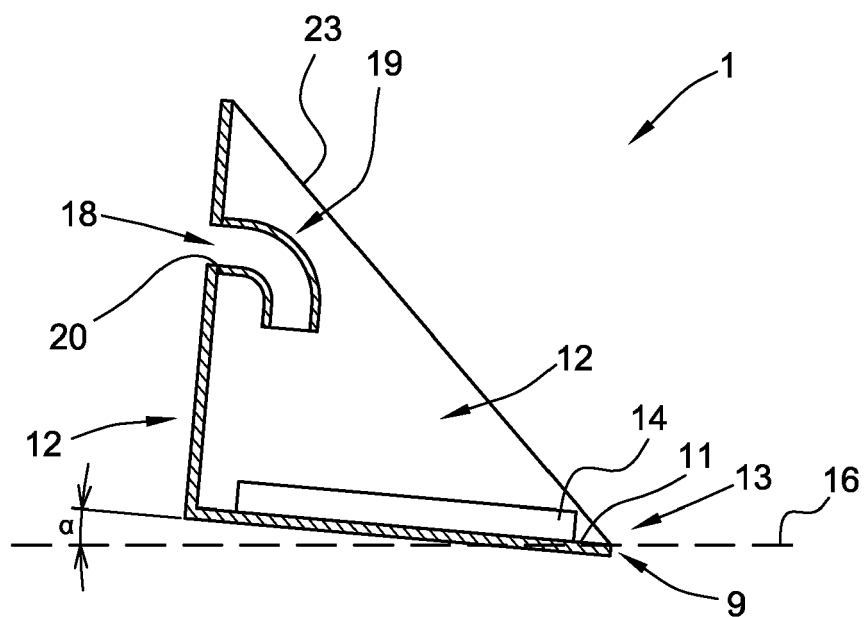


Fig. 4

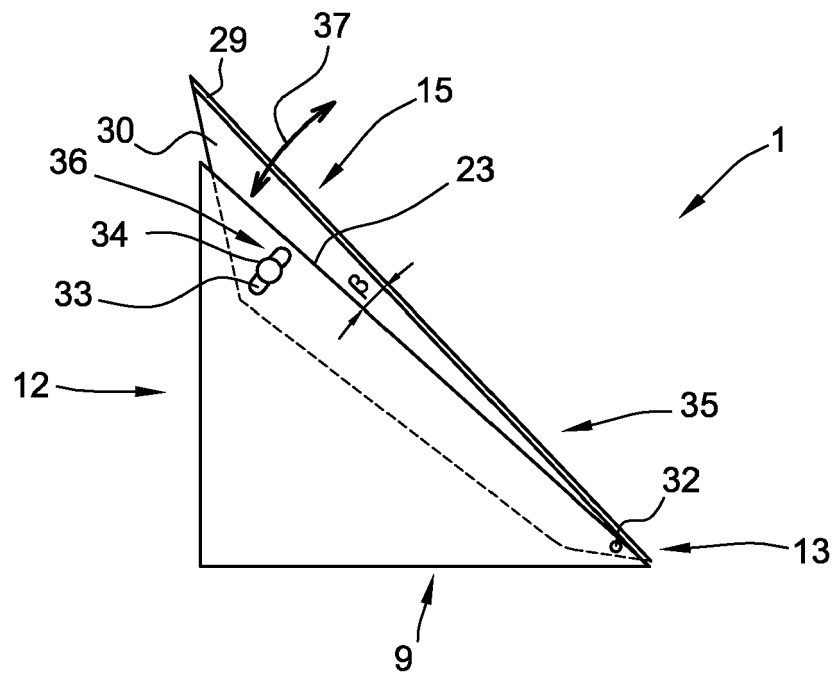


Fig. 5