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(54) Ventilation device

(57) The invention relates to a ventilation device (1), comprising a ventilation housing that is provided with one or more profiles (4) that are contiguous to an indoor environment (2) and one or more profiles (5) that are contiguous to an outdoor environment (3), comprising an air through-flow channel (6), and comprising a rebate (7) of a window, the ventilation housing being provided for installation in said rebate (7), the rebate (7) comprising a stop and/or a glazing bead (8), the window being provided so as to screen off the abovementioned indoor environment (2) from the abovementioned outdoor environment (3), and the abovementioned one or more profiles (4) of the ventilation housing that are contiguous to the indoor environment (2) running on in their longitudinal direction until behind the corresponding glazing bead or stop (8) of the rebate (7). With such a ventilation device (1), water penetration from the outdoor environment (3) to the indoor environment (2) is prevented at various degrees of inclination of the ventilation device (1).

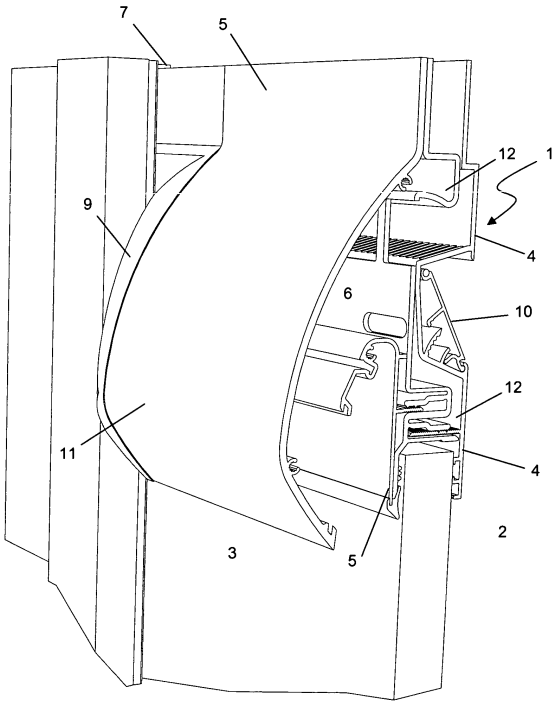

FIG. 1

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Description

[0001] The invention relates to a ventilation device, comprising a ventilation housing that is provided with one or more profiles that are contiguous to an indoor environment and one or more profiles that are contiguous to an outdoor environment, comprising an air through-flow channel, and comprising a rebate of a window, the ventilation housing being provided for installation in said rebate, the rebate comprising a stop and/or a glazing bead, and the window being provided so as to screen off the abovementioned indoor environment from the abovementioned outdoor environment.

[0002] A known problem in the case of ventilation devices in dwellings is that when it rains and when the air pressure of the indoor environment is lower than that of the outdoor environment, for example as a result of a wind force upon the ventilation device, water enters by way of the ventilation device, either going into the ventilation device itself, or going into the building. This water penetration is undesirable. Similarly, water penetration is also a problem also in the case of, for example, ventilation devices in vehicles.

[0003] For that reason, a ventilation device usually comprises a provision (a valve, slide etc.) making it possible for the air through-flow channel to be closed off in order to prevent water penetration.

[0004] NL 1 025 600, for example, discloses a ventilation device provided with a pivoting valve equipped to regulate the maximum airflow rate at a given pressure difference over the ventilation unit, or to shut off the airflow completely. In order to ensure that the ventilation device is watertight, a sealing element is provided here, which sealing element ensures that the air through-flow channel is airtight and watertight when the pivoting valve is closed.

[0005] However, closing the ventilation device prevents the achievement of the initial aim of the ventilation device, namely the permanent supply of fresh air. Consequently, a solution is needed to avoid water penetration in any open position of the ventilation device.

[0006] According to the Flemish Energy Performance Regulation (EPR), a controllable ventilation device for natural air supply must be watertight in the fully open position up to a pressure difference of 20 Pa and in the closed position up to 150 Pa. The term controllable ventilation device is meant to convey a ventilation device in the case of which the flow of fresh air being supplied by means of the ventilation device at a given pressure difference can be adjusted. The provision on the watertightness of a ventilation device is made in accordance with European standard EN 13141-1, which in turn refers to one of the methods described in European standard EN 1027. In such an experimental method the pressure difference over the ventilation device is raised in stages to the pressure difference at which water goes through the grille. This final pressure difference determines the pressure difference up to which the ventilation device is watertight.

[0007] Various ways of increasing the watertightness of ventilation devices in any open position are already known.

[0008] A known way of increasing the watertightness of ventilation devices is to screen off the inlet opening of the ventilation device sufficiently.

[0009] Such a screen can be in the form of an external cap. Embodiments of such an external cap can be found in, for example, NL 1 018 166, WO 03/060387 A1, EP 0 730 126 A2, EP 0 327 186 and EP 1 050 659. Here a screen is provided in each case on the outside of the ventilation device, in both WO 03/060387 A1 and EP 0 730 126 A2 it being stated in the description of the figures that said screen serves as a weather screen. It is stated in EP 0 327 186 that water penetration into the ventilation device is limited by the fact that the inlet opening is directed downwards. In EP 1 050 659 it is also explained how in the case of a ventilation device with controllable, but not self-regulating valve water penetration into the ventilation device is limited by the fact that the controllable valve is provided on the outside of the glazing panel above which the ventilation device is installed. Water penetration is limited well from a semi-open position of the controllable valve to a closed position of the controllable valve.

[0010] The disadvantage of such an external cap is, however, that this system cannot be used in all cases, for example in the case of sash windows, because in these cases the window knocks against the external cap of the ventilation device. The external cap also makes the ventilation device more noticeable from the outside, which many people find not very aesthetic.

[0011] Another screen is in the form of an external grille, comprising a set of horizontal slats that are downwardly inclined towards the outside. Such a grille is described in, for example, GB 2 276 235 A and GB 2 285 860. In GB 2 276 235 A this grille is furthermore provided on the bottom with downwardly directed teeth to drain off the rainwater easily. To this end, the grille of GB 2 285 860 is provided with grooves for each slat, with openings connected to respective drainage channels and a common vertical drainage pipe. Such external grilles are, however, an expensive solution for increasing the watertightness of ventilation devices.

[0012] Another way of increasing the watertightness of ventilation devices is to increase the internal flow resistance of the ventilation device. When the resistance is increased for the airflow, it stands to reason that the resistance to water penetration is also increased.

[0013] On the one hand, the internal flow resistance of ventilation devices in the case of known solutions is increased by increasing the length of the air through-flow channel. On the other hand, the internal flow resistance of ventilation devices in the case of known solutions can be increased by making the air through-flow channel less streamlined, for example by providing projecting edges or lips, or by providing rising parts.

[0014] The Z-shaped cross section of the slats of GB 1 045 132 provides, for example, not only an extension of the air through-flow channel, but also a less streamlined through-flow channel, since with the Z-shape the streamlining is disrupted abruptly a number of times. Similarly, with the zigzag path of the ventilation device of GB 1 557 534 the air through-flow channel is not only extended, but is also less streamlined. Furthermore, the zigzag path formed by slats in DE 103 52 113 also combines these two solutions.

[0015] GB 1 202 450, BE 1012000 and JP 11336442 disclose ventilation devices in which the internal flow resistance is increased solely by making the air through-flow channel less streamlined. For this purpose, in GB 1 202 450 and BE 1012000 projecting edges are provided on the slats that together form an air through-flow channel. In JP 11336442 a less streamlined air through-flow channel is obtained by providing said air through-flow channel with rising parts.

[0016] However, none of these known ways of increasing the watertightness of ventilation devices in any open position provides a satisfactory solution for increasing watertightness in the case of ventilation devices that are connected to the glazing of a sandwich panel of a sloping window. In the case of ventilation devices that are connected to vertically placed glazing or sandwich panels also, with the known solutions an accumulation of water is still often obtained in the ventilation device, and attempts are made to drain off this accumulation of water through drainage grooves and bores in the ventilation housing, as disclosed in, for example, JP10115156. However, as soon as ventilation devices are installed at very slight angles of inclination, it is not always possible to drain off the water through these drainage grooves and bores, or the water can penetrate to the indoor environment by way of the connections to said indoor environment. In the case of the existing systems attempts are made to seal these connections sufficiently by means of silicone or sealing foam. Such seals are not, however, durable and do not provide a satisfactory solution to the problem.

[0017] The object of this invention is therefore to provide a ventilation device comprising a ventilation housing that is provided with one or more profiles that are contiguous to an indoor environment and one or more profiles that are contiguous to an outdoor environment, comprising an air through-flow channel, and comprising a rebate of a window, the ventilation housing being provided for installation in said rebate, the rebate comprising a stop and/or a glazing bead, and the window being provided so as to screen off the abovementioned indoor environment from the abovementioned outdoor environment, which ventilation device can satisfactorily prevent water penetration from the outdoor environment to the indoor environment at various degrees of inclination of the ventilation device.

[0018] This object of the invention is achieved by providing a ventilation device comprising a ventilation housing that is provided with one or more profiles that are contiguous to an indoor environment and one or more profiles that are contiguous to an outdoor environment, comprising an air through-flow channel, and comprising a rebate of a window, the ventilation housing being provided for installation in said rebate, the rebate comprising a stop and/or a glazing bead, the window being provided so as to screen off the abovementioned indoor environment from the abovementioned outdoor environment, and the abovementioned one or more profiles of the ventilation housing that are contiguous to the indoor environment running on in their longitudinal direction until behind the corresponding glazing bead or stop of the rebate.

[0019] In a particular embodiment of a ventilation device according to this invention, said ventilation device is provided with end pieces, which are provided so as to at least partially screen off the ventilation housing at the level of the rebate, said end pieces screening off the ends of the ventilation housing at the level of the one or more profiles that are contiguous to the outdoor environment, and said end pieces running on into the respective rebate in which the ventilation housing is installed.

[0020] In this way water can no longer penetrate through the connection of profiles of the ventilation housing situated in the indoor environment and on an end piece, since this connection is now behind the stop or the glazing bead, or even no longer exists if as a result of this invention end pieces are only partially fitted. The partial fitting of end pieces has the additional advantage that said partial end pieces do not have to be provided over the full width of the ventilation housing, so that said end pieces can be produced and provided independently of the thickness of the glazing or the sandwich panel.

[0021] In a more specific embodiment of such a ventilation device the end pieces at least partially screen off the ends of the ventilation housing in the rebate. In this case the part of the end pieces that at least partially screens off the ends of the ventilation housing in the respective rebate is preferably made narrower than the width of the stop or the glazing bead that is contiguous to the indoor environment.

[0022] In a further embodiment of a ventilation device according to this invention said ventilation device comprises a rotating or sliding valve, by means of which the air through-flow channel can be closed off. Such a rotating or sliding valve, apart from its function of regulating the airflow through the air through-flow channel, has the additional function of preventing water penetration.

[0023] The air through-flow channel of yet a further embodiment of a ventilation device according to this invention is provided with obstructions that disrupt the airflow through the air through-flow channel. Yet another embodiment of a ventilation device according to this invention comprises an external cap, which screens off the air through-flow channel on the side of the outdoor environment. Furthermore, a ventilation device according to this invention is preferably provided with one or more drainage grooves.

[0024] According to this invention, the rebate of a ventilation device of the type described above preferably forms part of a vertical or sloping window. Said sloping window can in this case be provided specifically for fitting in a veranda roof.

[0025] This invention will now be explained in greater detail with reference to the detailed description that follows of a preferred embodiment of a ventilation device according to this invention. The purpose of this description is purely to give clarifying examples and to indicate further advantages and details of this embodiment, so that it can in no way be interpreted as a limitation of the field of application of the invention or of the patent rights applied for in the claims.

[0026] In this detailed description reference numerals are used to refer to the appended drawings, in which

- ***Figure 1*** shows a preferred embodiment of a ventilation device according to this invention in perspective and in cross section, looking from the outdoor environment towards the ventilation device;
- ***Figure 2*** shows the preferred embodiment of Figure 1 in perspective and in cross section, looking from the indoor environment towards the ventilation device;
- ***Figure 3*** shows the preferred embodiment of Figures 1 and 2 in cross section.

[0027] The embodiment of a ventilation device (1) according to this invention, as illustrated in Figures 1, 2 and 3, comprises the rebate (7) of a window that screens off an indoor environment (2) from an outdoor environment (3). The abovementioned rebate (7) comprises a stop (8) on the side of the indoor environment (2).

[0028] This ventilation device (1) comprises a ventilation housing that is provided for installation in the abovementioned rebate. Said ventilation housing is provided with a profile (4) that is contiguous to the indoor environment (2). Said profile (4) that is contiguous to the indoor environment (2) runs on in the longitudinal direction until behind the stop (8), so that any connection between this profile (4) and an end piece (9) is in the rebate (7), and water therefore cannot penetrate into the indoor environment (2) along this route.

[0029] This ventilation housing furthermore comprises a number of profiles (5) that are contiguous to the outdoor environment (3) and said ventilation housing is provided with end pieces (9) that partially screen off the ends of the ventilation housing at the level of the rebate (7). Said end pieces (9) here screen off the ends of the ventilation housing at the level of the profiles (5) that are contiguous to the outdoor environment (3) and run on into the rebate (7) in which the ventilation housing is installed. Said end pieces (9) could also be designed here in such a way that they likewise at least partially screen off the ends of the ventilation housing in the rebate (7). For this purpose, the part of said end pieces (9) that then at least partially screens off the ends of the ventilation housing in the rebate (7) is preferably made narrower than the width of the stop (8), so that the connection between the end pieces (9) and the ventilation housing on the side of the indoor environment (2) is in the rebate (7), with the result that water cannot penetrate into the indoor environment (2) by way of this connection.

[0030] In order to increase further the watertightness of this ventilation device (1) as illustrated in Figures 1, 2 and 3, said ventilation device is furthermore provided with a number of aids from the prior art, namely a rotating valve (10), an external cap (11) and drainage grooves (12).

Claims

1. Ventilation device (1), comprising a ventilation housing that is provided with one or more profiles (4) that are contiguous to an indoor environment (2) and one or more profiles (5) that are contiguous to an outdoor environment (3), and comprising an air through-flow channel (6), and comprising a rebate (7) of a window, the ventilation housing being provided for installation in said rebate (7), the rebate (7) comprising a stop and/or a glazing bead (8), and the window being provided so as to screen off the abovementioned indoor environment (2) from the abovementioned outdoor environment (3), **characterized in that** the abovementioned one or more profiles (4) of the ventilation housing that are contiguous to the indoor environment (2) run on in their longitudinal direction until behind the corresponding glazing bead or stop (8) of the rebate (7).

2. Ventilation device (1) according to Claim 1, **characterized in that** the ventilation device (1) is provided with end pieces (9), which are provided so as to at least partially screen off the ends of the ventilation housing at the level of the rebate (7), said end pieces (9) screening off the ends of the ventilation housing at the level of the one or more profiles (5) that are contiguous to the outdoor environment (3), and said end pieces running on into the respective rebate (7) in which the ventilation housing is installed.

3. Ventilation device (1) according to Claim 2, **characterized in that** the end pieces (9) at least partially screen off the ends of the ventilation housing in the rebate (7).

4. Ventilation device (1) according to Claim 3, **characterized in that** the part of the end pieces (9) that at least partially screens off the ends of the ventilation housing in the respective rebate (7) is made narrower than the width of the stop or the glazing bead (8) that is contiguous to the indoor environment (2).

5. Ventilation device (1) according to one of the pre-

ceding claims, **characterized in that** said ventilation device (1) comprises a rotating or sliding valve (10), by means of which the air through-flow channel (6) can be closed off.

6. Ventilation device (1) according to one of the preceding claims, **characterized in that** the air through-flow channel (6) is provided with obstructions that disrupt the airflow through the air through-flow channel (6).

7. Ventilation device (1) according to one of the preceding claims, **characterized in that** said ventilation device comprises an external cap (11), which screens off the air through-flow channel (6) on the side of the outdoor environment (3).

8. Ventilation device (1) according to one of the preceding claims, **characterized in that** the air through-flow channel (6) is provided with one or more drainage grooves (12).

9. Ventilation device (1) according to one of the preceding claims, **characterized in that** the rebate (7) forms part of a vertical or sloping window.

10. Ventilation device (1) according to Claim 9, **characterized in that** the sloping window is provided for fitting in a veranda roof.

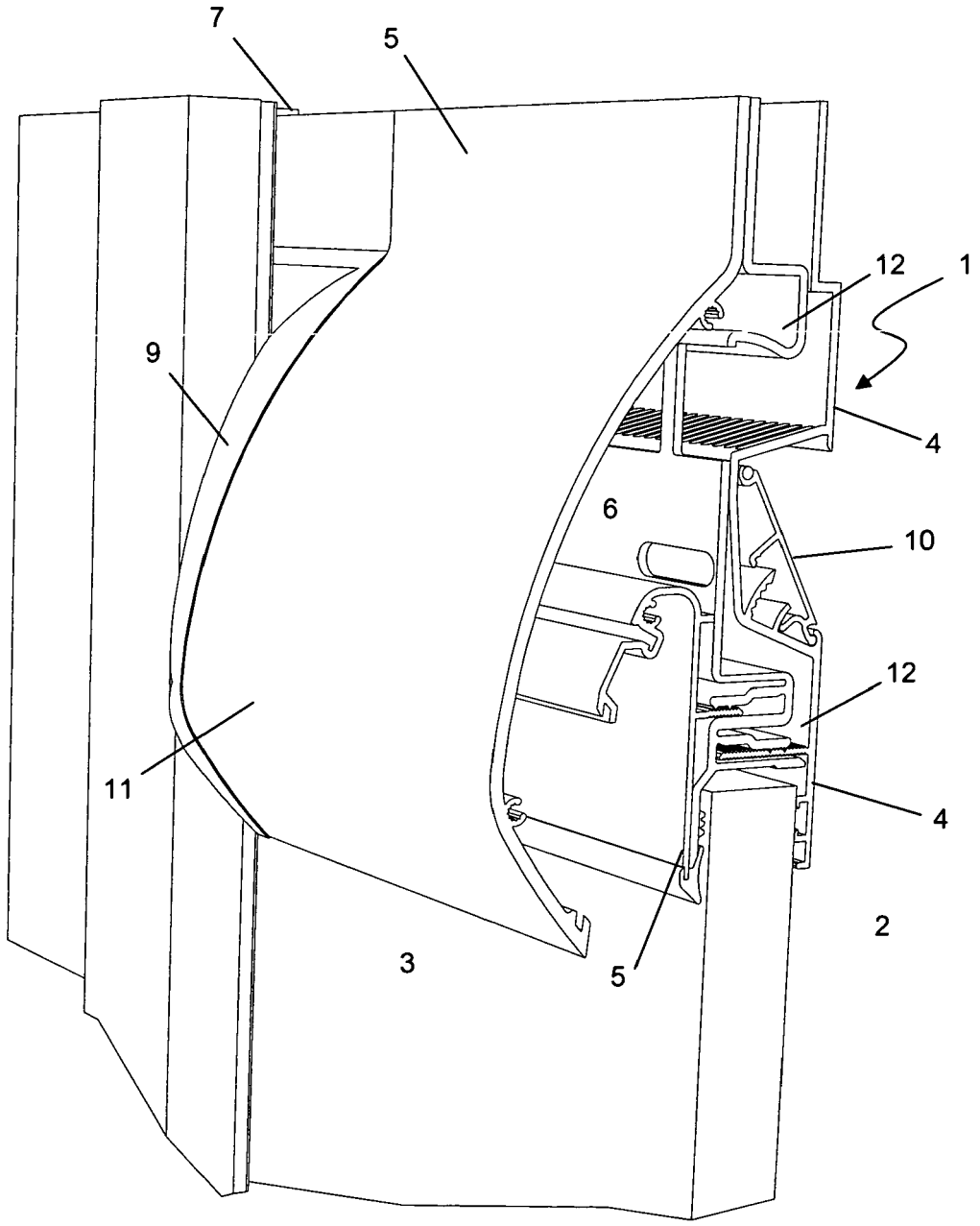

FIG. 1

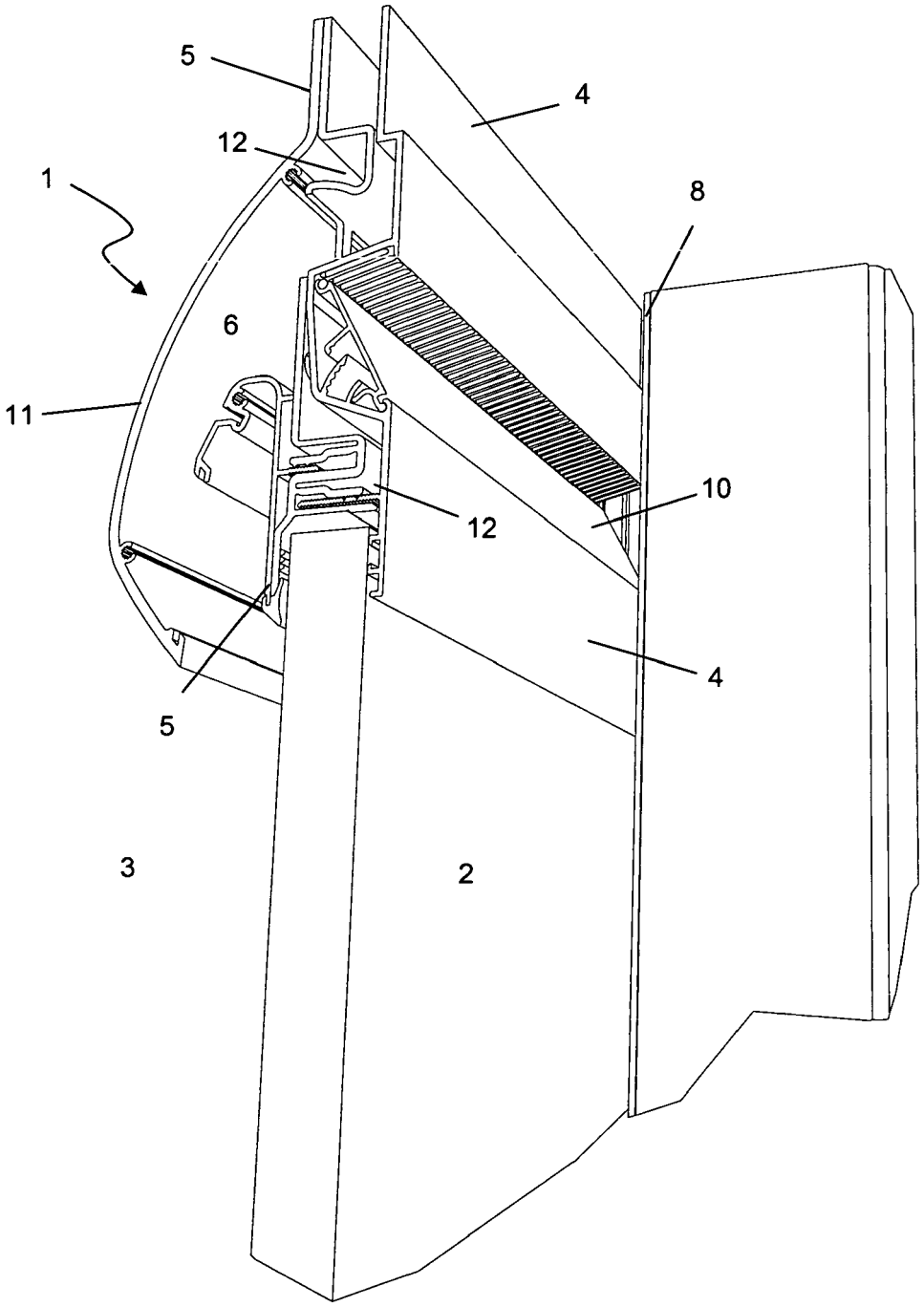

FIG. 2

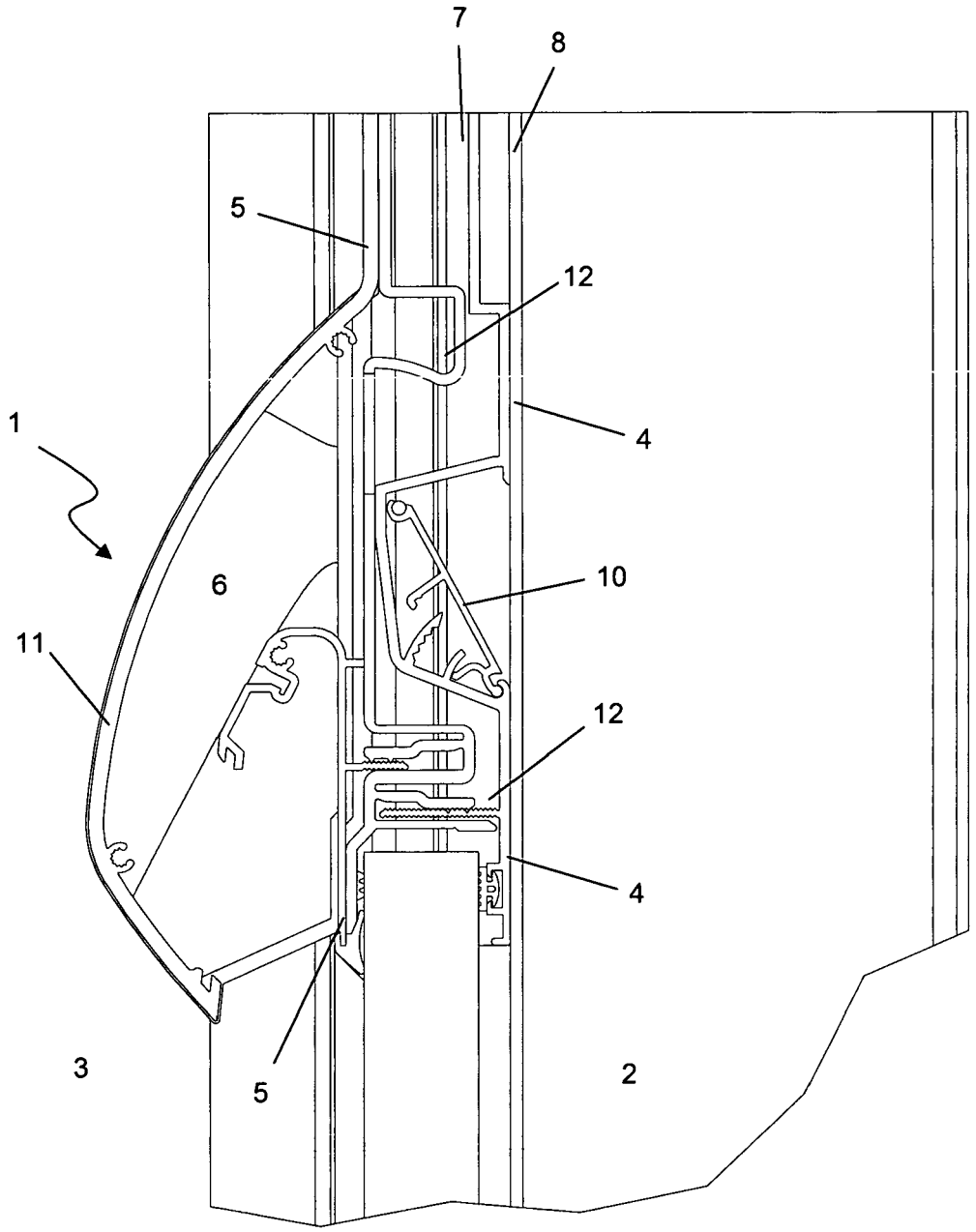

FIG. 3

REFERENCES CITED IN THE DESCRIPTION

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