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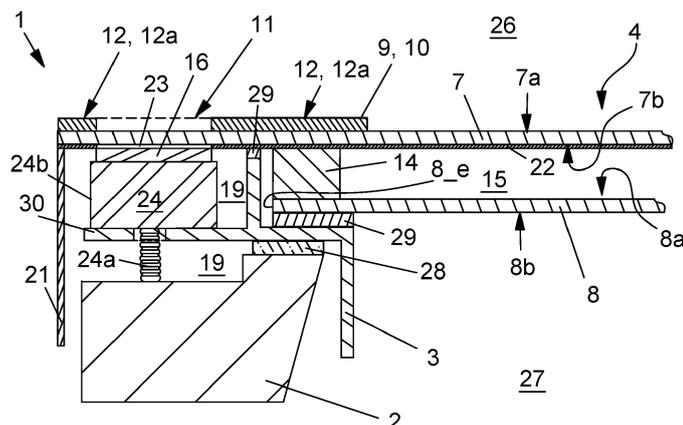
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(54) **WINDOW WITH A SWITCHABLE MASK REGION**

(57) The present disclosure relates to a window (1), such as a roof window (1), for a building (25), said window (1) comprising a window frame (2) and a sash (3) mounted thereon, wherein the sash (3) comprises a pane module (4) comprising at least a first glass pane (7) and a see-through area (13), the window (1) further comprises a masking (10) arranged in a masking area (9), wherein the masking area (9) is arranged along an edge of the pane module and arranged to cover the pane module (4) so that the masking (10) reduces the visibility of at least a part of the sash (3) and/or window frame (2), when viewed from an exterior side towards an interior side of the pane module, wherein the masking area (9) is divided into one or more first region(s) (11) and one or more second region(s) (12), and wherein the masking of each first region(s) (11a) is switchable between an open con-

figuration and a closed configuration, wherein in the closed configuration the masking (11a) covers a part of the pane module (4) and wherein in the open configuration the masking (11a) exposes the part of the pane module (4), so that the first region (11) in the open configuration is of increased optical transparency compared to the optical transparency through the first region (11) in the closed configuration, and wherein in at least the open configuration, the window (1) comprises one or more installation space(s) (19) arranged beneath the first region (11) and outside the see-through area (13) and wherein the installation space(s) (19) are arranged to accommodate an instalment of at least one optical sensor surface (16) of one or more optical sensor devices, so that the optical sensor surface (16) is exposed to light provided through the first region (11).



*Fig. 12*

## Description

**[0001]** The invention relates to a window comprising a masking in a masking area, wherein a first region of the masking area is arranged to be switchable between an open and a closed configuration.

## BACKGROUND

**[0002]** The development in windows for buildings has over many years lead to windows incorporating more and more functionalities, one of such functionalities being a functional mask arranged along a boarder of a glass pane of the window. Patent document no. WO2009018828 A1 describes a functional mask, which comprises the functions of protecting gaskets situated between a pane and a frame from UV-irradiation or of contributing to promoting the attachment of the pane. Additionally to being a functional mask, the mask may also have an aesthetical purpose of achieving a better architectural whole of the window.

## SUMMARY

**[0003]** It is an object of the present invention to provide a window of an appealing aesthetic appearance promoted by utilizing the aesthetic effect of a mask and simultaneously allowing retrofitting of one or more functional devices, such as an optical sensor surface, without destroying the aesthetic appearance and/or the functionality of the window.

**[0004]** The present invention relates to a window, such as a roof window, for a building, said window comprising a window frame and a sash mounted thereon, wherein the sash comprises a pane module comprising at least a first glass pane and a see-through area,

the window further comprises a masking arranged in a masking area, wherein the masking area is arranged along an edge of the pane module and arranged to cover the pane module so that the masking reduces the visibility of at least a part of the sash and/or window frame, when viewed from an exterior side towards an interior side of the pane module, wherein the masking area is divided into one or more first region(s) and one or more second region(s), and wherein the masking of each first region(s) is switchable between an open configuration and a closed configuration, wherein in the closed configuration the masking covers a part of the pane module and wherein in the open configuration the masking exposes the part of the pane module, so that the first region in the open configuration is of increased optical transparency compared to the optical transparency through the first region in the closed configuration, and wherein in at least the open configuration, the window comprises one or more installation space(s) ar-

ranged beneath the first region and outside the see-through area and wherein the installation space(s) are arranged to accommodate an instalment of at least one optical sensor surface of one or more optical sensor devices, so that the optical sensor surface is exposed to light provided through the first region.

**[0005]** Advantageously, the present invention provides a window being arranged to allow for installation of an optical sensor surface in an area, which is otherwise covered by the masking. The window allows the customer to choose between two configurations of the window, one in which the masking in the first region is functioning as the masking in the second region and one in which the masking in the first region is at least partially removed, so as to allow installation of an optical sensor surface below the first region of the masking area. The window may thereby be configured to be retrofitted with an optical sensor surface, for example, the customer may choose to retrofit a photovoltaic cell at a later stage, which is enabled by allowing the masking to be moved into the open configuration. Advantageously, the invention may further allow the window and devices for the window, e.g. optical sensor device to be sold separately.

**[0006]** Open configuration is in the present disclosure intended to mean a configuration allowing more light to be transmitted through the masking area than in the closed configuration. The closed configuration is generally a configuration in which the transmission of the light is substantially the same as the transmission of light through the second region of the masking area. Advantageously, this can allow for substantially equal appearance to the human eye between the masking of the second region and of the masking in the first region in the closed configuration.

**[0007]** In one or more embodiments, the masking area is arranged around the periphery of the pane module. An innermost boarder of the masking area may enclose and define the see-through area of the pane module. The see-through area allows for light, e.g. sunlight to be transmitted from the exterior of the pane module to the exterior of the pane module, i.e. from the outside to the inside of a building in which the window is installed.

**[0008]** In one or more embodiments, the window comprises one or more masking areas. The masking areas may be separated by an area of the window not covered or comprising a masking. E.g., a first masking area may be provided on a first side of the see-through area and a second masking area may be provided on an opposite second side of the see-through area and/or a first masking area may be arranged to cover the window frame and a second masking area may be arranged to cover the sash and/or a part of the pane module. Each masking area may comprise one or more first regions and one or more second regions.

**[0009]** In one or more embodiments, the masking area is generally an area defined in one or more planes, e.g.

each generally overlapping with a part of an exterior surface of the masking, the exterior surface directed towards the outside of the building. In one or more embodiments, the masking area is defined in one plane, arranged substantially parallel to the major surface(s) of the glass pane(s) of the pane module. In one or more embodiments, one or more of the glass pane(s) may be curved, and the masking may either be arranged substantially parallel to one of the glass pane(s) at the edge or arranged substantially parallel to the façade or roof in which the window is installed.

**[0010]** In one or more embodiments, the masking of the masking area is arranged to visually hide the parts of the window arranged directly below the masking, such as a part of sash and/or window frame, e.g. an interface between the sash and the window frame. Advantageously, the masking thereby provide a more aesthetically appealing window in which sides and frame components, such as gasket or seals etc. are hidden when viewing the window from the outside. In one or more embodiments, the masking is arranged to cover elements of the window arranged outside the see-through area.

**[0011]** In one or more embodiments, the masking is preferably patterned or coloured, e.g. the masking may appear black to the human eye. In one or more embodiments, the masking may be provided by a coating, e.g. ceramic coating, lacquer, foil or by a plate structure, such as an opaque plate structure.

**[0012]** In one or more embodiments, the masking may be arranged above and/or below the pane module, such as directly above and/or below a glass pane of the pane module with nothing in between, e.g. the masking may be arranged at the exterior side of the pane module and/or at the interior side of the pane module. In one or more embodiments, a masking of a first region may be arranged below the pane module, such as below a first or second glass pane, and a masking of a second region may be arranged above the pane module such as above the first glass pane, or vice versa.

**[0013]** Preferably, when the masking is arranged below the pane module. Additionally, preferably no elements are arranged between the masking and the part of the pane module, which it covers, so that the masking is fully visible through the pane module along the masking area. The masking of both the first and second region are preferably arranged substantially parallel and flush to each other.

**[0014]** In one or more embodiments, the masking may be arranged to reduce or prevent transmission of sunlight by absorbing or reflecting a large portion of the sunlight.

**[0015]** In one or more embodiments, the optical sensor surface may be arranged to be most effective in the same region of the light spectrum blocked or reduced by the masking, whereby there exist the need to remove the masking as an obstruction to the light. Advantageously, the present invention allows for this by having the first region capable of being transferred into the open configuration.

**[0016]** In one or more embodiments, the first glass of the pane module extends beyond the sash opening enclosed by sides of the sash. The first glass pane of the pane module may additionally extend over the window frame opening provided by the sides of the window frame. In one or more embodiments, the first glass pane extends over the window frame sides, so as to cover the window frame sides from the outside.

**[0017]** In one or more embodiments, the glass panes are substantially transparent to visible light, e.g. at least about 50% transparent, more preferably at least about 80% transparent, and most preferably at least about 90% transparent across at least the visible spectrum. Any suitable glass from which glass panes can be obtained may be used for the glass panes. Examples include a soda lime silica glass and an alkali aluminosilicate glass. In one or more examples, at least one of the glass panes are tempered glass panes. The term "tempered glass pane" as used herein is understood to mean glass panes in which compressive stresses have been introduced in the surface(s) of the glass pane. In one or more embodiments, the tempered glass panes have been tempered by thermal tempering, chemical tempering, plasma tempering, or a combination comprising at least one of the foregoing.

**[0018]** In one or more embodiments, the window frame is arranged to be fixed to the building. The sash may be connected to the window frame by means of hinge(s) and/or lever mechanism(s), such that the sash may be displaced relative to the window frame, thereby providing an opening between the sash and the window frame. In one or more embodiments, the window is not arranged to be opened and the sash is attached in a fixed position relative to the window frame. The window frame may provide a window frame opening of larger extend than the sash, so as to allow the sash to be movably connected to the window frame such that the sash can move through said window frame opening, e.g. by pivoting the sash about an axis. In one or more embodiments, the sash is movably connected to the window frame so that the window can be opened by pivoting the top part of the sash either outwards towards the outside of the building or inwards towards the inside of the building, when the window is installed. For example, in an embodiment the top of the sash is movable inwards about an axis, and the masking arranged above the axis, along the top part of the sash, may be arranged to be stationary, when pivoting the sash. The masking below the masking may be separated into a masking connected to the sash and masking connected to the window, allowing the sash to move outwards away from the window frame at the bottom part of the sash. Preferably, the first region of the masking may be provided at the masking covering the top part of the window and sash or at bottom part of the sash. A pivotal connection between the sash and the window frame, such as comprising one or more hinges, may be provided along one or more sides of the window frame, preferably beneath the masking area according to the present in-

vention.

**[0019]** In one or more embodiments, masking of the first region in the closed configuration covers the pane module in that it covers a part of the interior major surface of the pane module when the window is installed or it covers a part of the exterior side, such as the exterior major surface, of the pane module when the window is installed. Additionally, the masking of the first region in the open configuration optically exposes the part of the major surface of the pane module by either exposing it to the interior of the building and/or any components of the window, if the masking is arranged at the interior side of the pane module or to the exterior of the building, if the masking is arranged at the exterior side of the building. In these processes any components of the window, such as the sash or window frame arranged beneath the first region of the masking area, when the window is installed, may be optically exposed to the outside of the building. In one or more embodiments, the masking area is arranged between the pane module and the sash and/or the window frame.

**[0020]** In one or more embodiments, an increase in optical transparency may constitute an increase in transmission of all wavelength in the entire optical spectrum. Advantageously, this allows for a wide range of optical sensor devices to be used at the first region. In one or more embodiments, the optical sensor device is any sensor device, which absorb incident light and provides an output based thereon. The optical sensor device may be a photovoltaic cell device arranged to provide and output of electrical energy being proportional to the intensity of the incident electromagnetic light.

**[0021]** In one or more embodiments, the open configuration may provide an increase in transmission of wavelengths being part of at least the visible spectrum and/or the IR-spectrum. Photovoltaic cells are typically configured to be most efficient in the visible and/or IR spectrum, e.g. with maximum efficiency between 400 and 1300 nm, depending on the type of photovoltaic cell. For photovoltaic cells it is therefore in particular advantageous, that the first region allows for increase of light intensity in the visible and IR-spectrum to be incident on the optical sensor surface of the photovoltaic cell. The first region is preferably arranged to be switchable between low and high transmission of sunlight. Advantageously, this allows for the masking of the first region to shield the parts of the window arranged beneath the masking area in the closed configuration when no optical sensor surface is installed in the installation space and to expose the optical sensor surface when it is present beneath the first region.

**[0022]** In one or more embodiments, the installation space may be provided below the masking area, between the masking area and the pane module and/or sash and/or window frame, such that at least an optical sensor surface may be fitted in the installation space. The installation space may include space created when switching from an open to a closed configuration. In one or more

embodiments, the installation space may be arranged to accommodate the optical sensor device. In one or more embodiments, the installation space may be occupied by an insulation element, such as Expanded Polystyrene insulation, when an optical sensor device or optical sensor surface is not installed in the installation space. In one or more embodiments, the installation space may be suitable for installation of an optical sensor surface to be arranged substantially parallel to a major surface of the pane module and/or to the second region of the masking and/or substantially flush with an exterior major surface of the second region of the masking. The window may be arranged to be fitted with an optical sensor surface, which is plate-shaped.

**[0023]** In one or more embodiments, the optical sensor surface may be arranged to receive sunlight provided through the pane module at the first region and generate an output based thereon to the optical sensor device.

**[0024]** In one or more embodiments, the optical sensor device may be arranged to supply one or more functional device(s) with electrical energy based on the output received from the optical sensor surface(s) of the optical sensor device. Additionally to the optical sensor surface(s), the optical sensor device may preferably comprise one or more battery unit(s) chargeable by energy provided by the optical sensor surface(s) and optionally also a charge controller. The optical sensor device may be partly or fully installed in the installation space or elsewhere, e.g. the majority of the optical sensor device excluding the optical sensor surface may be installed elsewhere in the window. For example, the majority of the optical sensor device may be installed under a second region of the masking e.g. in the sash. Advantageously, only the optical sensor surface(s) of the optical sensor device will be visible through the masking area, when the masking of the first region is in an open configuration.

**[0025]** In one or more embodiments, the installation space is arranged beneath the first region of the masking area when viewed from the exterior of the building towards the interior of the building when the window is installed. In the open configuration, at least a part of the installation space is preferably optically exposed to the outside of the building. In one or more embodiments, the pane module shields the installation space from the environment outside the building.

**[0026]** In one or more embodiments, the window may be arranged so as to allow the optical sensor surface to be arranged in the installation space, so that the optical sensor surface is positioned overlapping the first region of the masking when viewed perpendicular to the masking area from the outside of the window, when the window is installed.

**[0027]** In one or more embodiments, the optical sensor surface may not be fixed to the window but may be retained in the installation space by providing an installation space corresponding to the optical sensor surface or the optical sensor device, having the optical sensor surface arranged directed towards the outside of the building,

preferably towards the sun. In one or more embodiments, the optical sensor device may be arranged in the installation space, so that the optical sensor surface is positioned overlapping the first region of the masking when viewed perpendicular to the masking area from the outside of the window, when the window is installed.

**[0028]** In one or more embodiments, the window may comprise one, two, three or a plurality of first regions of the masking. The first region(s) may be arranged along the bottom edge and/or the top edge of the window, when the window is installed. Alternatively or additionally, the first region(s) may be arranged along the right and/or left edge of the window when the window is installed. Preferably, the first region may be arranged in a position at which it is expected that the optical sensor device is to be most effective. In one or more embodiments, the first region(s) may be arranged evenly along an edge of the window and/or around the periphery of the window outside the see-through area. In one or more embodiments, the first region is fully enclosed by the second region. Alternatively, the first region is at a boarder thereof arranged overlapping an edge of the masking region, and preferably directly adjacent an interface between the outside and the window, such that the masking of the first region is easily accessible from the outside.

**[0029]** In one or more embodiments, the area size of the first region is preconfigured to a fixed area size, preferably such that the area size of the first region corresponds to the collective area size of one or more optical sensor surfaces of one or more optical sensor devices, such as one or more photovoltaic cell devices.

**[0030]** Advantageously, this increases the possibility of providing an opening in the masking, which corresponds to the size of optical sensor surface, so that a minimal gap between the optical sensor surface and the second region exist upon instalment of the optical sensor surface. Furthermore, it allows for a larger control of the resulting appearance of the window.

**[0031]** In one or more embodiments, the shape and area size of the first region may be chosen based on the possible area size(s) of the optical sensor surface(s), which can be installed. The first region may be of circular, rectangular or quadratic shape or may be shaped to correspond to the shape of a specific optical surface extent. In one or more embodiments, the first region may be arranged to be moved into a plurality of configurations comprising a closed configuration and two or more open configurations, wherein the open configurations differ in the area size, e.g. the masking of the first region may be arranged to be gradually moved or moved in steps in order to provide the open configurations. Advantageously, this allows for the first region to be designed to fit different sizes of optical sensor surface(s), such that gaps between the optical sensor surface and the masking of the second region is minimized. The area size of the first region may be measured as a continuous area of the first region, which additionally may be extending substantially parallel to the major surface of the second region of the

masking and possibly also a major surface of the pane module.

**[0032]** In one or more embodiments, the position of the interface between the masking of the first and second region may be pre-determined in that they are provided during manufacturing of the window, such that the first region and the second region can be viewed as being separate maskings even in the closed configuration. Advantageously, this may provide easy switching between the open and closed configuration and easy partial or full separation of the first region of the masking from the window.

**[0033]** In one or more embodiments, the masking may comprise one or more masking panel(s) provided with a masking, e.g. a masking panel(s) may comprise the masking of the first and/or second region(s). The masking panel(s) may be arranged extending along an interior side of the pane module, such as in a pocket, between the sash and/or the window frame and the pane module, and/or the masking panel(s) may be arranged extending along the exterior side of the pane module. The masking panel may be made of any structurally rigid material, preferably plate material. The masking panel may be made of glass, metal, plastic, wood and/or any other suitable material. In one or more embodiments, the masking panel may in itself provide the masking e.g. by being made of a substantially opaque material, like substantially opaque plastic, metal and/or glass, e.g. black coloured glass, metal or plastic, and/or the masking may be provided by a coating, lacquer, print, film and/or foil applied to the masking panel. In one or more embodiments, the first region of the masking may be provided by a masking panel, while the second region of the masking may be provided by other means, or vice versa. Other means may be a coating, lacquer, print, film and/or foil, which may be applied e.g. on the pane module. The masking is a combination of the first region(s) and second region(s). In one or more embodiments, the window comprises a first masking panel comprising a masking of the first region and a second masking panel comprising a masking of the second region.

**[0034]** In one or more embodiments, the masking of the first region may be connected to said window by means of any permanent and/or temporary connection arrangements.

**[0035]** In one or more embodiments, the masking of the first region is arranged to be reversibly switched between the open configuration and the closed configuration. Advantageously, this allow for both mounting and demounting of an optical sensor surface, such as a photovoltaic cell, without compromising the original integrity of the masking.

**[0036]** In one or more embodiments, the masking of the first region is arranged to be switchable between the open configuration and the closed configuration by means of one or more connection arrangements e.g. comprising adhesive(s), bracket(s), profile(s), clip(s), clamp(s), pockets and/or hinge(s), fixed to the window.

In one or more embodiments, the connection arrangement(s) are arranged so that an exterior major surface of the masking of the first region is substantially parallel and/or flush with an exterior major surface of the masking of the second region, when the masking of the first region is arranged in the closed configuration. The exterior major surface of the masking being directed towards the outside of the building, when the window is installed. Advantageously, this allows for a more appealing masking. This may in particular be arranged when using adhesive as connection arrangement.

**[0037]** In one or more embodiments, the connection arrangement(s) are arranged so that an exterior major surface of the masking of the first region is arranged beneath an exterior major surface of the masking of the second region, when the masking of the first region is arranged in the closed configuration and possibly also in the open configuration.

**[0038]** In one or more embodiments, the connection arrangement(s) are configured to retain the masking of the first region in the closed configuration and optionally also in the open configuration. In one or more embodiments, the connection arrangement(s) may be fixed to the sash, the pane module, the second region of the masking and/or other elements of the window, such as functional devices installed in the sash, e.g. housing of a chain actuator.

**[0039]** In one or more embodiments, the masking of the first region is arranged to be switchable between the open configuration and the closed configuration by means of a connection arrangement comprising one or more hinges.

**[0040]** Advantageously, this allows for a displacement of the masking of the first region without having to separate the masking of the first region from the masking of the second region. In one or more embodiments, the masking may be connected to the window, such as the masking panel comprising the second region or the sash, by means of a hinge connection allowing for pivotal displacement of the masking of the first region relative so as to expose the pane module and provide the open configuration of the first region. Preferably, the hinge(s) may be arranged to allow pivotal movement about an axis arranged parallel to a major surface of the masking, e.g. the hinge(s) may be arranged along an interface between the first and second region. In one or more embodiments, the hinge(s) may allow for the masking of the first region to be pivoted approximately 180 degrees, so that a major surface of the masking of the first region is substantially parallel to a major surface of the masking of the second region.

**[0041]** In one or more embodiments, the masking of the first region may be arranged to be separated from the masking of the second region.

**[0042]** Advantageously, this minimizes the risk of the masking of the first region to be in the way and/or take up space when arranged in the closed configuration.

**[0043]** In one or more embodiments, the masking of

the first region is arranged to be switchable between the open configuration and the closed configuration by means of a connection arrangement comprising brackets and/or profiles.

**[0044]** Advantageously, brackets and profiles are readily available on the market and may be installed in many different ways. Further they may be arranged to accommodate holding a masking of a wide array of sizes.

**[0045]** In one or more embodiments, the masking of the first region may be connected to the window by means of bracket(s) e.g. connected to the sash and/or to the masking panel comprising the second region of the masking, so as to allow for the masking of the first region to be switchable from at least the closed configuration to the open configuration. The bracket(s) may be arranged to be fixed to the window by mechanical or chemical means, such as screws or adhesive.

**[0046]** In one or more embodiments, the connection arrangements, e.g. comprising bracket(s), may be arranged to support the masking of the first region, such as by providing a shelf for supporting the masking of the first region at an edge thereof, e.g. an underside edge thereof. In one or more embodiments, in a tilted window, the bracket(s) may be arranged to provide a pocket configuration accommodating the placement of the masking of the first region.

**[0047]** In one or more embodiments, the bracket connection may be arranged, so that the masking of the first region can be operating as a sliding door. E.g., the bracket(s) may be arranged so that the masking of the first region may be stored below the masking of the second region, in the closed configuration. This may be enabled, by providing bracket/guiding rail/profile(s) which extend a distance away from the first region of the masking, a distance large enough to accommodate the masking of the first region in the closed configuration.

**[0048]** In one or more embodiments, the masking of the first region may be connected to the window by means of profile(s), e.g. a guide rail, fixed to e.g. the sash or the underside of the masking panel e.g. at a position opposite the side facing the outside of the building. The profile(s) may be U-shaped profiles of a thickness corresponding to the masking of the first region and optionally also the thickness of the optical sensor surface. Additionally, the profile may be fitted with retaining means, such as a spring means or dovetail connection for further retaining the masking and/or optical sensor surface.

**[0049]** In one or more embodiments, the masking of the first region may be switchable between the open and closed configuration by one or more recesses in the masking panel. The masking panel providing the masking, may comprises one or more recesses at the interface between the first and second region(s) arranged to support the masking of the first region in the closed configuration. E.g. the masking panel comprises a hole through the masking panel comprising a first opening and a second opening, wherein the first opening the first opening is of larger extent than the second opening. The first

opening may be arranged above or below the second opening. The masking of the first region may be of a shape corresponding to the hole, such that the masking of the first region may be arranged in said hole and together with the second region of the masking provide a full masking covering in the masking area. At least one edge of the masking of the second region at the interface between the first and second region of the masking may extend above or below the masking of the first region in the closed configuration. In one or more embodiments, the masking of the first region is of a shape such that it is substantially flush with the masking of the second region, when in the closed configuration. Seen from the side, a substantially L-shaped recess may thereby be provided in the masking panel, and the edges of the first region of the masking panel may be of corresponding shape.

**[0050]** In one or more embodiments, the masking of the first region is arranged to be switchable between the open configuration and the closed configuration by means of a connection arrangement comprising one or more clamps.

**[0051]** Advantageously, clamp configurations both allow for supporting and retaining the masking of the first region, such that the masking may be fixed in position, thereby decreasing the risk of unwanted displacement of the masking of the first region.

**[0052]** In one or more embodiments, the masking of the first region may be connected to the window by means of clamp(s) arranged to retain the masking by applying a pressure onto the first region holding it in place. The masking may be removable by biasing the clamp(s) so as to release the pressure exerted on the masking, whereby it may be removed. In one or more embodiments, the connection arrangement may comprise one or more snap-connections and/or clips. In one or more embodiments, the opposing surfaces holding the masking of the first region may be surface(s) of the connection arrangement, optionally in combination with surface of the sash, pane module, the masking panel and/or other parts of the window.

**[0053]** In one or more embodiments, the clamp(s), bracket(s), profile(s) and/or hinge(s) may be made of any suitable material, such as plastic, wood, metal, glass etc.

**[0054]** In one or more embodiments, the masking of the first region is arranged to be switchable between the open configuration and the closed configuration by means of a connection arrangement comprising adhesive(s).

**[0055]** Advantageously, the adhesive occupies a minimal amount of space and allows for easy removal of the masking of the first region. In one or more embodiments, the masking may comprise a masking coating arranged on a transparent material, such as a transparent plate material, e.g. the pane module or the masking panel. The coating may be attached by means of an adhesive configured so that upon removal of the masking coating, a minimal amount of adhesive residue is present on the

surface of the transparent material. Preferably, the adhesive is transparent, so as to minimize the interference of the adhesive on the appearance of the masking in the first region. In one or more embodiments, the masking coating may be reversibly removable, such that the masking can be peeled off and also reapplied or replaced.

**[0056]** In one or more embodiments, the first region of the masking is attached to the window by means of connection arrangement comprising tape. The tape may be arranged as a continuous piece overlapping a part of the masking of the first region and a part of the window, such as a part of the second region of the masking. E.g., a masking panel may be divided into a first and second region of the masking wherein the first region is attached to the second region by means of tape arranged on the underside of the panel overlapping the interface between the two regions.

**[0057]** In one or more embodiments, the connection arrangement may be arranged to allow for the masking of the first region to be fixed to said connection arrangements by means of permanent or temporary means i.e. non-detachable and detachable means, being mechanical and/or chemical means such as screws or adhesive or magnetic means.

**[0058]** In one or more embodiments, the one or more connection arrangement(s) are arranged to provide installation of at least the optical sensor surface(s) of the one or more optical sensor device(s) beneath the first region.

**[0059]** In one or more embodiments, the connection arrangements may additionally be arranged to support at least the optical sensor surface(s) of the optical sensor device(s) in a position so that the optical sensor surface can be exposed to light through the first region. Additionally, the connection arrangement(s) may be arranged to allow fixation and/or adhesion of at least the optical sensor surface(s) to a position beneath the first region, so that the optical sensor surface can be exposed to light through the first region.

**[0060]** In one or more embodiments, the window may be configured so that the masking of the first region can be replaced by the optical sensor surface, e.g. the optical sensor surface and the masking removed is of similar structural dimensions, such as thickness and/or area size. The masking and optical sensor surface may be held in place by one or more connection arrangements, such as comprising adhesive(s), e.g. tape, clamp(s), clip(s), bracket(s), magnets, pockets and/or profile(s) or any other suitable means.

**[0061]** In one or more embodiments, the positioning of the masking of the first region and the optical sensor surface may be provided by different types of connection arrangements. E.g., the masking may be adhered to the pane module, while the optical sensor surface may be positioned in place by bracket(s).

**[0062]** In one or more embodiments, the optical sensor surface may be arranged to be temporarily or permanently fixed to the sash and/or the window pane and/or the

masking panel and/or to other parts of the window. Additionally or alternatively, the optical sensor surface may be arranged to be connected to functional device(s) in the window, such as an actuator housing. In one or more embodiments, the position of the optical sensor surface may be fixed by mechanical or chemical means, such as screws or adhesive etc.

**[0063]** In one or more embodiments, the masking is made of a light-absorbing material arranged to absorb the majority of incident light of the visible spectrum.

**[0064]** Advantageously, this allows for elements of the window located beneath the masking to be hidden to the human eye, when viewed from the outside. Alternatively, the masking may be made of a light-reflecting material or a combination of light-reflecting and light-absorbing material.

**[0065]** In one or more embodiments, the transmission spectrum of the masking may be configured to allow larger transmission of some wavelength compared to other wavelength. In one or more embodiments, the masking is arranged to provide minimal optical transparency to ultra-violet light having energies with wavelengths below 400 nanometres. Seals and other elements of the window may be sensitive to long exposures of UV-light. By ensuring that the masking either substantially absorbs or reflects UV-light, it is thereby possible to protect the integrity of the window.

**[0066]** In one or more embodiments, the window comprises a cavity beneath the masking area for accommodating an actuator arrangement comprising a drive mechanism, such as a motor and an actuator, such as a chain.

**[0067]** Advantageously, this allows for installation of an actuator arrangement after assembly of the window, e.g. at the building at which it is to be installed. Prior to instalment of the actuator arrangement, the cavity may be filled with a removable insulation material such as insulated foam, e.g. Expanded Polystyrene insulation, so that the cavity does not compromise the thermal insulation properties of the window. In one or more embodiments, the actuator arrangement comprises an actuator housing for enclosing at least a part of the chain and the drive mechanism. The cavity may be of a size substantially corresponding to the size of the actuator housing.

**[0068]** In one or more embodiments, the cavity is provided in the window frame and/or the sash, or it may be provided adjacent to the window frame and/or the sash. In order to avoid having to lead electrical cables between the sash and the window frame such as pass the hinges provided between the sash and the window frame, the cavity may be arranged connection to the window frame. However, in embodiment(s) where the intention of the optical sensor device is to provide electric energy to said actuator arrangement, the cavity is preferably arranged in the same window part as the installation space, e.g. either the sash or the window. In one or more embodiments, the window is arranged to allow relative movement between the sash and the window frame. The ac-

tuator arrangement is preferably arranged to open and close the window by moving the sash relative to the window frame.

**[0069]** In one or more embodiments, the cavity is comprised in an installation space of the one or more installation spaces. Advantageously, this allows for the actuator arrangement to be installed next to the optical sensor surface, e.g. a photovoltaic cell. The optical sensor surface may for example be fixed to said actuator arrangement, such as on the housing of the actuator arrangement. Preferably, the cavity may be arranged beneath the first region of the masking area, so that at least one optical sensor surface of the optical sensor device may be arranged on said actuator arrangement and beneath said first region.

**[0070]** In one or more embodiments, the window comprises said actuator arrangement according to one or more previous embodiments, wherein the actuator arrangement is arranged for opening and closing the window. In one or more embodiments, the actuator arrangement of the window comprises an actuator, such as a chain, an actuator housing for accommodating the actuator and a drive mechanism, such as a motor, wherein the drive mechanism is arranged to move the chain in and out of the actuator housing. In one or more embodiments, the actuator arrangement is located in the cavity of the window.

**[0071]** In one or more embodiments, the pane module further comprises a second glass pane and preferably also a peripheral seal arranged between major surfaces of the first glass pane and the second glass pane, such that the pane module is arranged as an insulated glazing unit.

**[0072]** Advantageously, providing a pane module being an insulated glazing unit provides increased control of the thermal conditions of the air inside the building. The outermost glass pane, directed towards the exterior of the building is preferably the first glass pane and the innermost glass pane, directed towards the interior of the building is preferably the second glass pane.

**[0073]** In one or more embodiments, the pane module may additionally comprises a third glass pane and/or a laminated layer.

**[0074]** In one or more embodiments, the peripheral seal may be sensitive to the exposure of sunlight and it is therefore preferable that the peripheral seal is covered, e.g. by the masking of the window. In one or more embodiments, the peripheral seal may comprise a soldering material, for example a glass solder frit material. In one or more examples, the side seal material may be a lead free solder glass material. In one or more examples, the side seal material comprises less than 0.1% lead. For example, side seal material may be a vanadium-tellurium oxide solder glass material. In one or more embodiment, the peripheral seal may be made of any suitable material, such as glass, metal, plastic and/or rubber.

**[0075]** In one or more embodiments, the pane module may additionally comprise one or more space elements

arranged in a space between major surfaces of the glass panes.

**[0076]** The spacer elements may for example be made of glass, metal and/or plastic. In one or more embodiments, the spacer elements are a part of the peripheral seal and arranged along the edge of the glass panes.

**[0077]** In one or more embodiments, the insulated glazing unit may comprise an insulated space decompressed to vacuum pressure, such as to a reduced pressure such as 0.001 millibars or less, or filled with an inert gas, such as argon. The pane module may for example be a vacuum insulated glazing unit. The vacuum insulated glazing unit, may have a peripheral seal, e.g. made of glass solder material, and further comprise one or more spacer element for maintaining a distance between the glass panes.

**[0078]** In one or more embodiments, a major surface of the first glass pane is of larger extent than a major surface of the second glass pane so as to provide an edge region, which extends a distance beyond the edge of the second glass pane, and wherein the masking area is arranged above at least a part of said edge region. A masking panel according to embodiment(s) of the invention may be arranged to extend above said edge region, with a masking provided thereon.

**[0079]** In one or more embodiments, a major surface of the first glass pane is of larger extent than a major surface of the second glass pane so as to provide an edge region, which extends a distance beyond the edge of the second glass pane, and wherein the masking area is arranged beneath at least a part of said edge region.

**[0080]** Advantageously, this allows for a part of the pane module to extend beyond the sash and even the beyond the window frame, potentially covering the entire extend of the collective major surface of the window visible from the exterior side of the window when installed. Furthermore, the masking may be readily applied beneath the interior side of the first glass pane, being the side directed towards the interior of the building, when the window is installed. This in turn provides a more aesthetically appealing window, as the masking can potentially visually hide both the sash and the window frame. Additionally, an installation space is more readily provided beneath the edge region of the first glass pane, as the space is not taken up by the second glass pane in this region. Furthermore, by installing an optical sensor surface beneath the edge region allows for the edge region to aid in protecting the functional surface of the sensor surface.

**[0081]** In one or more embodiments, the window may comprise further glass pane(s). The first glass pane may extend distance beyond the edge of the further glass pane(s) as well.

**[0082]** In one or more embodiments, the edge region may extend around the entire edge of the pane module, along opposing edges of the pane module or along a single edge of the pane module.

**[0083]** In one or more embodiments, the masking may

provide as a masking panel extending beneath and separately to the edge region or it may be provided as a coating adhering to the interior side of the first glass pane in the edge region by means of an adhesive.

**[0084]** In one or more embodiments, the pane module may comprise a low thermal emissivity (Low-E) coating provided on a planar surface thereof. Low thermal emissivity generally refers to a surface condition that emits low levels of radiant thermal (heat) energy. In one or more embodiments, the Low-E coating may comprise several layers, including silver layers. Low-E coatings can include a layer of an infrared-reflecting film and one or more optional layers of a transparent dielectric film. The infrared-reflecting film, which can include a conductive metal such as silver, gold, or copper, reduces the transmission of heat through the coated pane. A dielectric film can be used to anti-reflect the infrared-reflecting film and to control other properties and characteristics of the coating, such as colour and durability. Commonly used dielectric materials include oxides of zinc, tin, indium, bismuth, and titanium, among others.

**[0085]** In one or more embodiments, the window may comprise a plane comprising the Low-E coating layer, wherein the plane comprises a third region extending across the first region of the masking area when viewed perpendicular to the plane, wherein the third region of the plane is devoid of solar or Low-E coating. The Low-E coating may be applied elsewhere in the plane except on the third region or the Low-E coating may be applied across the entire plane and then subsequently removed in the third region, e.g. such as prior to assembling the pane module at a manufacturing facility.

**[0086]** In one or more embodiments, the plane comprising the low-E coating may be arranged at the interior and/or exterior major surface of the first glass pane and/or the exterior and/or interior major surface of the second or further glass pane, the exterior major surface of the second or further glass pane being directed towards the insulated space of the pane module and the interior major surface of the second or further glass pane being directed towards the interior of the building, when the window is installed.

**[0087]** In one or more embodiments, the Low-E coating of the third region may be arranged to be at least partially removable after assembly of the window. This may either be provided by allowing the Low-E coating to be accessible, so that parts of the Low-E coating can be scraped off, peeled off or otherwise removed.

**[0088]** In one or more embodiments, the masking of the first region may be provided with a Low-E coating so as to make up for a lack of Low-E coating in the third region.

**[0089]** In one or more embodiments, one or both of the first glass pane or the second glass pane comprises a third region arranged coinciding with the first region, which third region comprises a solar and/or Low-E coating arranged to be at least partially removable so that upon removal of the solar and/or low-E coating the trans-

mission of light through the pane module towards the first region is increased.

**[0090]** Advantageously, this allows for the increase transmission of light through the pane module at the first region towards the optical sensor surface(s). It is not uncommon that solar or Low-E coatings can absorb up to and around 50% of electromagnetic light incident on the solar or Low-E coating, and it is therefore preferable that the solar or Low-E coating does not act as an optical shield to the optical sensor surface.

**[0091]** In one or more embodiments, the window may be arranged to be installed in a facade window in walls of the building.

**[0092]** In one or more embodiments, the window is arranged to be installed as a skylight window.

**[0093]** Skylight may also be referred to as rooflight, and means a window installed as a part of the roof area and allowing light to be transmitted through it. Advantageously by the present invention, the skylight window may be self-sufficient in electric energy by fitting the skylight window with an optical sensor device which is arranged to provide electric energy to be utilized in said window, for example for automated functions. A further advantage is, that a skylight may be difficult to reach in order to open it and the possibility to retrofit a solar powered motor in such situations is feasible.

**[0094]** In one or more embodiments, the pane module may comprise curved glass pane(s). In one or more embodiments, the window may comprise shielding means on exterior side of the window, in particular at a bottom edge of a tilted window, wherein the shielding means are arranged to allow water incident on the window to be directed away from the window, such that large amounts of the water is not able to be collected on said window. In one or more embodiments, the shielding means comprises a continuous material extending across an opening provided at an interface between the sash and the window frame. For windows orientated horizontally, the material of the shielding means may be slightly tilted, so that water will travel from the window towards the roof adjacent to the window by means of gravity. In one or more embodiments, the shielding means may be comprised in the masking panel, which masking panel is further provided with the masking according to the present invention. In one or more embodiments, the shielding means is provided by the pane module, which may extend beyond the edge of the window frame and sash, preferably at least at the bottom of the window.

**[0095]** In one or more embodiments, the window further comprises one or more optical sensor device(s) comprising one or more optical sensor surface(s) arranged beneath the first region of the masking area and wherein the masking of the first region is in the open configuration.

**[0096]** Advantageously, the masking of the first region provided in the open configuration provides a window comprising an optical sensor device, which absorbs light incident on the optical sensor surface through the first region.

**[0097]** In one or more embodiments, the optical sensor device may comprise a plurality of optical sensor surfaces, which may arranged side by side in a panel. The optical sensor device may additionally comprise a plurality of such panels. Each panel may preferably be of an area size corresponding to the area size of the first region of the masking area.

**[0098]** In one or more embodiments, the optical sensor device may be photovoltaic cell device, which is arranged to convert electromagnetic energy into electric energy by means of the photovoltaic effect. The purpose of the optical sensor device may preferably be to provide electrical energy to power one or more functional devices of the window. However, the optical sensor device may also be used as a photodetector. The optical sensor surface of the photovoltaic cell device may comprise of one or more of the following semiconductor materials: Silicon (Si), Gallium Arsenide (GaAs), Cadmium Telluride (CdTe), Copper Indium Gallium Selenide (CIGS) and/or carbon-rich polymers. The optical sensor surface, such as crystalline, e.g. mono crystalline, silicon sensor surfaces harvests/retrieves energy from sunlight and may preferably charges a battery connected thereto. In embodiments, the optical sensor device comprises between 3 and 15 photovoltaic cells, such as between 5 and 9 photovoltaic cells. These cells may be coupled in series in the panel. Each cell may provide 0.6V. Hence, for example a 7 cell panel may thereby providing a 4.2 V (0.6 x 7) maximum rated output voltage.

**[0099]** When the sunlight reaches the sensor surface it comprises wavelengths from ultraviolet, through the visible range, to infrared. Typically, the optical sensor surface is arranged such that when the sunlight (or artificial light) strikes the sensor surface, some photons are reflected, others are transmitted through the sensor surface and some photons are absorbed. A part of the absorbed photons may have their energy turned into heat, while the remainder have the right amount of energy to separate electrons from their atomic bonds, thereby producing charge carriers and electric current in the photovoltaic cell. In one or more embodiments, the photovoltaic cell may be arranged to be most effective when absorbing light of the visible and infrared (IR) spectrum.

**[0100]** Due to light-absorbing properties, the masking may appear substantially black to the human eye. In one or more embodiments, the photovoltaic cell may be coated with a non-reflective material, arranged to absorb the light of the visible and infrared (IR) spectrum, thereby also appearing to be black to the human eye. Advantageously, this allows for an aesthetically appealing arrangement of the photovoltaic cell next to the masking of the second region. Furthermore, by coating the photovoltaic cell black, less incident light is reflected and more is absorbed, potentially increasing the efficiency of the cell.

**[0101]** In one or more embodiments, the optical sensor device may comprise any features as previously mentioned in relation to other embodiments of the invention.

**[0102]** In one or more embodiments, the optical sensor device is a photovoltaic cell device, and wherein the optical sensor surface is a photovoltaic cell, the photovoltaic cell device is arranged to charge a battery unit for powering one or more functional device(s) connected to said window, such as a switchable coating arrangement, an actuator arrangement, a heating arrangement, a lighting arrangement and/or a curtain arrangement.

**[0103]** Advantageously, the window may thereby be self-sufficient in powering the different functional device(s) of the window. Preferably, the drive mechanisms, e.g. motors, of the functional device(s) are arranged in the same part of the window as the photovoltaic cell device i.e. either the sash or the window frame, such that the photovoltaic cell device can provide electric energy to the functional device(s) without the need of having leads extending from the sash to the window frame. In one or more embodiment, the functional device(s) and the photovoltaic cell device are arranged in or on the sash. The sash may be provided by a combination of the listed functional device(s) and/or by a plurality of one of the listed functional device(s) and the optical sensor device(s) may be arranged to power these.

**[0104]** The actuator arrangement may be an actuator arrangement according to one or more of any of the previous embodiments. In one or more embodiments, the switchable coating arrangement comprises smart glass arranged to be switchable between a transparent and an opaque state. The transparent state may be turned on by applying electric current through the coating, which allows liquid crystal molecules to line up, generating the transparent state. The opaque state may be provided by randomly orientated liquid crystal molecules. Electrochromic film is another switchable coating example.

**[0105]** In one or more embodiments, the heating arrangement may be arranged to heat at least a part of the window, such as a major surface of the pane module, by means of one or more heating elements, such as heating strips. Advantageously, this may allow for de-misting and/or de-icing of glass pane(s) of the pane module.

**[0106]** In one or more embodiments, the lighting arrangement may be provided on the interior or exterior of the window. The curtain arrangement may comprise a curtain, which is arranged to cover a part of the see-through area of the pane module. Preferably, the curtain is arranged on the interior side of the window when installed in a building.

#### DRAWING

**[0107]** Aspects of the present disclosure will be described in the following with reference to the figures in which:

Fig. 1 shows a cross-sectional view of an embodiment of the present invention having a pane module comprising a single glass pane and

Fig. 2

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Fig. 3

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Fig. 4

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Fig. 5a

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Fig. 5b

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Fig. 6a

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Fig. 6b

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Fig. 7a

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Fig. 7b

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Fig. 8a

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Fig. 8b

Fig. 8c

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masking arranged at an exterior thereof, shows a cross-sectional view of an embodiment of the present invention having a pane module comprising two glass panes and masking arranged at an exterior of the pane module,

shows a cross-sectional view of an embodiment of the present invention having a pane module comprising an edge region and masking arranged at an exterior surface thereof,

shows a cross-sectional view of an embodiment of the present invention having a pane module comprising an edge region and masking arranged at an interior surface thereof,

shows a cross-sectional view of an embodiment of the present invention having a masking with a first region of the masking in a hinged connection with a second region of the masking, where the masking of the first region is in a closed configuration,

shows a cross-sectional view of the embodiment of Fig. 5a, where the masking of the first region is in an open configuration,

shows a cross-sectional view of an embodiment of the present invention having a masking arranged at an edge region by means of brackets and comprising a separated first region and a second region, with the first region of the masking in a closed configuration,

shows a cross-sectional view of the embodiment of Fig. 6a with the first region of the masking in an open configuration,

shows a cross-sectional view of an embodiment of the present invention having a masking clamped at an edge region and comprising a separated first region and a second region, with the first region of the masking in a closed configuration,

shows a cross-sectional view of the embodiment of Fig. 7a with the first region of the masking in an open configuration,

shows a cross-sectional view of an embodiment of the present invention having a masking arranged at an edge region and comprising a separated first region and a second region, with the first region of the masking in a closed configuration,

shows a cross-sectional view of the embodiment of Fig. 8a with the first region of the masking in an open configuration,

shows a side view of a section at an edge of a window according to embodiments of the present invention having a masking area comprising a separated first region and a second region, with the first region of the masking in a closed configuration,

- Fig. 8d shows the side view of the embodiment of Fig. 8c with the first region of the masking in an open configuration,
- Fig. 9a shows an optical sensor surface installed in the window of Fig. 6b in the open configuration,
- Fig. 9b shows an optical sensor surface installed in the window of Fig. 8b in the open configuration,
- Fig. 9c shows an optical sensor surface installed in the window of Fig. 7b in the open configuration,
- Fig. 10a shows a cross-sectional view of an embodiment of the present invention having a masking adhered to an edge region and comprising a separated first region and a second region, with the first region of the masking in a closed configuration,
- Fig. 10b shows a cross-sectional view of the embodiment of Fig. 10a with the first region of the masking in an open configuration,
- Fig. 11a shows a cross-sectional view of an embodiment of the present invention having a masking adhered to an exterior side of an edge region and comprising a separated first region and a second region, with the first region of the masking in a closed configuration,
- Fig. 11b shows a cross-sectional view of the embodiment of Fig. 11a with the first region of the masking peeled away so as to arrange the first region in an open configuration and with insulation means removed,
- Fig. 12 shows a cross-sectional view of the embodiment of Fig. 11a with an optical sensor surface and an actuator arrangement installed beneath the edge region,
- Fig. 13 shows a window according to Fig. 11a, with a masking around the edge of the window,
- Fig. 14 shows the window of Fig. 12, seen in perspective, arranged in an open state comprising an optical sensor device and an actuator arrangement, and
- Fig. 15 shows a house with roof and façade windows according to embodiments of the present invention.

#### DETAILED DESCRIPTION OF THE INVENTION

**[0108]** Figs. 1 to 12 shows cross-sectional views of a part of a building window 1 according to embodiments of the present invention, wherein Figs. 5a-b to 8a-b and 9 to 12 in particular shows cross-sectional views of a part of the window 1 comprising a first region of the masking area 11. The cross-sections are provided in a plane perpendicular to the longitudinal extent of a side of a sash 3 and window frame 2 of the window 1. Figs. 8c-d shows a side view of a part of the window 1 comprising a first region of the masking area 11. In the present examples

of Figs. 1 to 12, the space above the drawing is to represent the exterior of the building 26 and the space below the drawing is to represent the interior of the building 27.

**[0109]** Figs. 1 to 8a-b, and 10 to 12 show a pane module 4 of the window 1 arranged fixed to a sash 3 and a masking area 9 comprising a masking 10 arranged covering the pane module 4. The masking area 9 further covers an installation space 19 arranged beneath the masking area 9 and further at least a part of the window frame 2 of the window 1, arranged below the installation space 19. In the present examples, the masking area 9 further covers a part of the sash 3. In the present examples, the glass pane(s) 7, 8 of the pane module 4 are preferably substantially transparent to the human eye.

**[0110]** The windows of Figs. 1 to 12 are further shown equipped with optional shielding means 21 in the form of a skirt plate structure extending from the masking area 9 or the pane module 4 towards the window frame 2. The shielding means 21 may be beneficial in aiding to enclose the installation space 19. Alternatively, the shielding means 21 may be provided by the window frame 2 and extend towards the masking area 9.

**[0111]** Figs. 1-3 shows different types of pane modules, which may be used in a window according to the present invention. The pane module 4 of Fig. 1 is shown comprising only a first glass pane 7, having an interior major surface 7b connected to the sash 3 by fixations means 29, e.g. adhesive, and an exterior major surface 7a and an edge of the first glass pane 7\_e fixed to a masking panel 10a by fixation means 29, e.g. adhesive, wherein the masking panel 10a comprises a masking 10 in a masking area 9.

**[0112]** The pane module 4 of Fig. 2 to 8a-b and 10 to 12 are shown comprising two glass panes, a first glass pane 7 and a second glass pane 8 arranged in parallel with a spacing 15 between them, and with a peripheral seal 14 enclosing said spacing 15. In Fig. 2, the window 1 comprises a masking panel 10a extending from a position above the exterior surface of the first glass pane 7a, towards the edge of the first glass pane 7\_e, to a position a distance beyond the edge of the first glass pane 7\_e, so as to cover the sash 3 and the window frame 2. The exterior major surface of the first glass pane 7a is seen fixed to the masking panel 10 and an interior major surface 7b fixed to the sash 3 by fixation means 29, e.g. adhesive. The sash 3 is further seen connected to the masking panel 10a by fixation means 29.

**[0113]** The pane module 4 of Figs. 3 to 8a-b and 10 to 12 is shown comprising a stepped pane module 4 comprising a first glass pane 7 and a second glass pane 8 sealed together by a peripheral seal 14 and, wherein the extent of the major surfaces, i.e. the interior major surface 7b and the exterior major surface 7a of the first glass pane is larger than the major surfaces of the second glass pane, i.e. the interior major surface 8b and the exterior major surface 8a of the second glass pane, such that the first glass pane 7 extends a distance beyond the edge of the second glass pane 8\_e and an edge region 6 is cre-

ated. One or more of the pane modules 4 of Figs. 1-15 may be an insulated glazing unit and the spacing 15 may be an insulated space e.g. a vacuum or filled with inert gas.

**[0114]** Fig. 3 and 4 shows two examples of possible locations of the masking 10 relative to the edge region 6 of the pane module 4. In Fig. 3 the masking 10 is arranged above the first glass pane 7, from the edge of the first glass pane 7\_e to a position above the exterior surface of the first glass pane 7a. In Fig. 4 the masking 10 is arranged below the first glass pane 7, from the peripheral seal 14 to the edge of the first glass pane 7\_e. In cases, where the masking 10 does not cover the peripheral seal 14, e.g. as in Fig. 4, the peripheral seal 14 may preferably be of a colour matching the colour of the masking e.g. a dark colour, such as black or dark grey.

**[0115]** In the present examples of Figs. 1 to 15, the masking area 9 defines the location of a masking 10. The masking 10 is substantially opaque, so as to hide parts of the window 1 located below the masking 10, e.g. the masking 10 may be made of any suitable material being substantially opaque to the human eye, e.g. a dark coloured material. The masking 10 may be arranged in or on a masking panel 10a and/or directly on a major surface 7a, 7b, 8a, 8b of the pane module 4, such as one the edge region 6 of the first glass pane 7. Examples of the masking arranged directly on a major surface 7a, 7b, 8a, 8b are shown in Figs. 10a-b, 11a-b, 12, 13 and 14.

**[0116]** Figs. 1 to 9c shows the window 1 comprising a masking panel 10a extending from an edge of the first glass pane 7\_e towards the centre of the pane module 4 and in some examples also along the edge of the pane module 7\_e. Alternatively, in a window 1 comprising a stepped pane module 4 the masking panel 10a may extend from a position above a position on the first glass pane 7 being surrounded by the peripheral seal 14, to a position towards the edge of the first glass pane 7. That is, the masking panel 10a may not necessarily extend all the way to the edge of the first glass pane 7, but may preferably be arranged to at least cover the window frame 2, sash 3 and peripheral seal 14.

**[0117]** The masking panel 10a of Figs. 1 to 9c may in itself provide the masking 10, e.g. by being made of an opaque material, like opaque plastic, metal or black coloured glass, or the masking 10 may be a coating, lacquer, print, film or foil applied onto the masking panel 10a. A major surface of the masking panel 10a may be arranged along a major surface of the first glass pane 7a, 7b, and optionally fixed thereto, such as to an exterior major surface of the first glass pane 7a as seen in Figs. 1-3, 8a-d, 9b or to an interior major surface of the first glass pane 7b, as seen in Figs. 4, 5a-b, 6a-b, 7a-b, 9a and 9c. When the masking panel 10a is arranged at the interior major surface of the first glass pane 7b the masking panel 10a may be fixed to the sash 3, as seen in Figs. 4, 5a-b, 6a-b and 7a-b. The fixation of the masking panel 10a may be made by any suitable connections such as by using fixing means 29, e.g. adhesive. In the present examples

in Figs. 1-9, a major surface of the masking panel 10a is arranged substantially parallel to a major surface of the first glass pane 7a, 7b.

**[0118]** In Figs. 1-14 the pane module 4 is preferably fixed to the sash 3 by fixations means 29 e.g. an adhesive or clamp(s). The sash 3 may be further fixed to the window frame 2 or, as shown in Figs. 1-8a-b, 10-14, the window 1 may be arranged to be opened by displacing the sash 3 away from the window frame 2, the sash 3 may be connected to said window frame 2 by means of a gasket and/or air seal 28, e.g. resilient rubber or foam seal.

**[0119]** In Figs. 1 to 5a-b and Figs. 8a-b, 9b and 11 to 12, the sash is seen comprising an optional platform 30, which extends beneath the first region of the masking area 11. This platform 30 may be useful during instalment of the optical sensor surface 16, in that the optical sensor surface 16 may be supported by the platform 30 in a position beneath the first region of the masking 11. In embodiments of the invention, the platform 30 may accommodate placement of the entire optical sensor device.

**[0120]** In Figs. 5a-b to 15 the masking area 9 is divided into two regions, a first region 11 and a second region 12, wherein the first region 11 is switchable between an open and closed configuration, which is enabled by the masking of the first region 11a being movable. The masking of the second region 12a is preferably fixed.

**[0121]** Fig. 5a and 5b shows a window 1 according to embodiment(s) of the present invention, wherein the masking 10 is provided in a masking area 9 by a masking panel 10a, and wherein the masking panel 10a comprises a connection arrangement having hinge connections 18c arranged between the second region 12 and the first region of the masking area 11. In the present examples, two hinge connections 18c are applied, however, less or more hinge connections 18c may be used to provide the same effect. The masking panel 10a is arranged along the edge region 6 at an interior surface of the first glass pane 7b, and is preferably provided from the edge of the first glass pane 7\_e to the peripheral seal 14 of the pane module 4. The hinge connections 18c are arranged so that the masking of the first region 11a can be arranged in the first region of the masking area 11 in the closed configuration by placing the major surface of the masking of the first region 11a substantially parallel to a major surface of the masking of the second region 12a, as seen in Fig. 5a. The hinge connections 18c are further arranged so that the masking of the first region 11a can be arranged outside the first region of the masking area 11 in the open configuration by for example placing the major surface of the masking of the first region 11a substantially perpendicular to a major surface of the second masking region 12a, as seen in Fig. 5b. In the open configuration shown in Fig. 5b, at least a majority of the incident electromagnetic light may be transmitted through the first glass pane 7 to the installation space 19 beneath the first region of masking area 11, while in the closed configu-

ration, at least a majority of the light is absorbed by the masking 10. The installation space 19 may thereby be operable into an open configuration in which an optical sensor surface in the installation space 19 may utilize the incident light. Upon installation of an optical sensor surface of an optical sensor device (not shown), the installation space 19 created by the removal of the masking of the first region may be utilized, e.g. by attaching the optical sensor surface directly to the interior surface of the first glass pane 7b beneath the first region 11.

**[0122]** Fig. 6a-b shows a window 1 according to embodiment(s) of the present invention, wherein the masking 10 is provided in a masking area 9 by a masking panel 10a, and wherein the masking panel 10a comprises a connection arrangement having bracket connections 18b arranged extending across the interface between the second region 12 and first region of the masking area 11. In the present examples, two bracket connections 18b are applied, however, less or more bracket connections 18b may be used to provide the same effect. For example, the bracket connection 18b may be a single bracket 18b or a plurality of brackets 18b arranged to form a pocket shelf in which the first region of the masking 11a can be rested on as well as slid in and out of e.g. along or perpendicular to the edge of the first glass pane 7\_e. The bracket(s) 18b may for example be made of plastic and may be fixed to the masking panel 10a by means of an adhesive.

**[0123]** In Figs. 6a-b, the masking panel 10a is seen arranged along the edge region 6 at an interior surface of the first glass pane 7b, and is preferably provided from the edge of the first glass pane 7\_e to the peripheral seal 14 of the pane module 4. The bracket connections 18b are arranged so that the masking of the first region 11a can be arranged in the first region of the masking area 11 in the closed configuration by placing the masking of the first region 11a in connection with the bracket connections 18b and optionally also the masking of the second region 12a, so as to provide a substantially continuous masking 10, as seen in Fig. 6a. Additionally, the masking of the first 11a and second regions 12a may be arranged substantially flush. The bracket connections 18b are further arranged so that the masking of the first region 11a can be arranged outside the first region of the masking area 11 in the open configuration by for example removing the entire first region of the masking 11a from the window 1, as seen in Fig. 6b. In the present example, the open configuration is provided by sliding the masking of the first region 11a in a direction along the edge of the first glass pane 7\_e, however, other ways of removing the masking of the first region 11a may be employed, such as by displacing the brackets 18b. In the open configuration shown in Fig. 6b, at least a majority of the incident light, e.g. sunlight, may be transmitted through the first glass pane 7 to the installation space 19 beneath the masking area 9, while in the closed configuration, at least a majority of the light is absorbed by the masking 10, i.e. by both the masking of the first region 11a and the mask-

ing of the second region 12a. The installation space 19 may thereby be operable into an open configuration in which an optical sensor surface 16 in the installation space 19 may utilize the incident sunlight, which for example is seen in Fig. 9a, described in more detail later.

**[0124]** Fig. 7a-b shows a window 1 according to embodiment(s) of the present invention, wherein the masking 10 is provided in a masking area 9 by a masking panel 10a arranged along the interior major surface of the first glass pane 7b at the edge region 6, from the peripheral seal 14 to the edge of the first glass pane 7\_e. The masking panel comprises a connection arrangement having clamp connections 18d arranged extending across the interface between the second region 12 and first region of the masking area 11. In the present examples, at least two connections 18d are applied, however, less or more clamp connections 18d may be used to provide the same effect. For example, the clamp connection 18d may be a single clamp 18d or a plurality of clamps 18d arranged to form a pocket shelf in which the first region of the masking 11a can be retained, and which possible also allows the first region of the masking 11a to be slid in and out off. Preferably, the connection arrangement 18d provides clamping of opposing sides of the first region of the masking 11a as shown in Fig. 7a. The clamps connections 18d may be made of plastic and may be fixed to the masking panel 10a by means of an adhesive, however any other means of attachment may be used.

**[0125]** In Figs. 7a, the clamp connections 18d are arranged so that the masking of the first region 11a can be arranged in the first region of the masking area 11 in the closed configuration by placing the masking of the first region 11a in connection with the window 1, e.g. the first glass pane 7 and preferably substantially parallel to the masking of the second region 12a. The clamp connections 18d are further arranged so that the masking of the first region 11a can be arranged outside the first region of the masking area 11 in the open configuration by fully removing the entire first region of the masking 11a from the window 1, as seen in Fig. 7b. In the present example, the clamp connections 18d clamps the masking of the first region 11a by forcing it towards the interior surface of the first glass pane 7b. The clamp connection 18d may be opened by forcing the clamp 18d, e.g. the clamping surfaces of the clamp, away from the masking of the first region 11a, thereby extending the space between the clamp 18d and the first glass pane 7 and allowing the masking of the first region 11a to be removed. In the open configuration shown in Fig. 7b, at least a majority of the incident light may be transmitted through the first glass pane 7 to the installation space 19 beneath the masking area 9, while in the closed configuration; at least a majority of the light is absorbed by the masking 10. The installation space 19 may thereby be operable into an open configuration in which an optical sensor surface 16 in the installation space may utilize the incident sunlight, which for example is seen in Fig. 9c, which will be described in further detail later.

**[0126]** Figs. 8a-b shows a window 1 according to embodiment(s) of the present invention, wherein the masking 10 is provided in a masking area 9 by a masking panel 10a arranged along the exterior major surface of the first glass pane 7a at the edge region 6, from the edge of the first glass pane 7\_e towards the centre of the first glass pane and extending at least across and covering the peripheral seal 14. The masking panel 10a comprises a connection arrangement having a recess connection 18e provided at the interface between the second region 12 and first region of the masking area 11, and arranged to support the correct placement of the masking of the first region 11a in relation to the masking of the second region 12a.

**[0127]** Figs. 8c-d shows a side view of a window 1 similar to the window shown in Figs. 8a-b, with a masking 10 arranged in a masking area 9 but with the first region of the masking area 11 arranged in a different position within the masking area 9 and with a slightly different recess connection 18e. Figs. 8c-d illustrates the shielding means 21 and the masking panel 10a covering the edge of the first glass pane 7\_e of a stepped pane module 4. The edge of the first glass pane 7\_e is depicted by dashed lines. The masking panel 10a provides a masking 10 in a masking area 9 extending across the pane module (not shown). The masking panel 10a comprises a connection arrangement having a recess connection 18e provided at the interface between a second region 12 and a first region of the masking area 11.

**[0128]** In Figs. 8b, the recess connection 18e is shown providing a through hole 31 having a first opening 31a and second opening 31b, wherein the first opening 31a is arranged closest to the first glass pane 7 and is smaller in extent than a second opening 31b arranged on top and across of the first opening 31a. In the present examples, the shape of the recess connection 18e allows displacement of the masking of the first region 11a in a direction outwards perpendicular to the exterior major surface of the first glass pane 7a.

**[0129]** In the alternative embodiment, shown in Figs. 8c-d, the shape of the recess connection 18e is arranged to prevent a displacement of the masking of the first region 11a outwards in a direction perpendicular to the exterior major surface of the glass pane 7a. This is provided by reversing the stacking of the first opening 31a and second opening 31b compared to Figs. 8a-b, such that the masking of the first region 11a can instead be removed or inserted by sliding the masking 11a along the exterior major surface of the glass pane 7a. The interface between the first opening 31a and the second opening 31b is shown by a dotted line. In the present examples, the first region of the masking area 11 is advantageously arranged abutting or overlapping an edge of the masking panel 10a\_e, preferably an outer edge of the masking panel 10a, such that the masking of the first region 11a may be accessed from said edge 10a\_e and forced out or in of the masking panel 10a, to an open and closed configuration, as shown in Figs. 8d and 8c, respectively.

The first region of the masking area 11 is shown by the dotted line in Fig. 8d.

**[0130]** In Figs. 8a and 8c, the recess connection 18e is arranged so that the masking of the first region 11a can be arranged in the first region of the masking area 11 in the closed configuration by placing the masking of the first region 11a in connection and preferably substantially parallel to the masking of the second region 12a. In Fig. 8a, the connection arrangement 18e provides support of opposing sides of the masking of the first region 11a. In the closed configuration; at least a majority of the light is absorbed by the masking 10. The recess connections 18e are further arranged so that the masking of the first region 11a can be arranged outside the first region of the masking area 11 in the open configuration by fully removing the entire first region of the masking 11a from the window 1, as seen in Fig. 8b and 8d. In the open configurations, at least a majority of the incident light may be transmitted through the first region of the masking area 11, first glass pane 7 and to the installation space 19 beneath the masking area 11. Figs. 8b and 8d show how the masking of the first region 11a has been removed, leaving the first region 11 in an open configuration, devoid of masking 11a, and instead an optical sensor surface may be installed below the first region of the masking area 11, and optionally also beneath the first glass pane 7. An example of Fig. 8b being installed with an optical sensor surface 16 is shown in Fig. 9b.

**[0131]** Preferably, the extent of the optical sensor surface 16 is corresponding to the extent of the second opening 31b, being larger than the first opening 31a, such that the optical sensor surface 16 extends across the first opening 31a. Additionally, in Figs. 8c-d, the optical sensor surface 16 is preferably of an extent of the second opening 31b, such that outward displacement of the optical sensor surface 31b can be prevented.

**[0132]** Figs. 9a-c shows examples of how an optical sensor surface 16 may be installed in the windows 1 of Figs. 6b, 8b and 7b, respectively. Fig. 9a, shows a part of the cross sectional view shown in Fig. 6b, and shows how an optical sensor surface 16 may be inserted below the first region of the masking area 11, in the position previously occupied by the masking of the first region 11a. In this position, the optical sensor surface 16 can absorb light, e.g. sunlight transmitted through the first glass pane 7. Fig. 9b, shows a part of the cross sectional view shown in Fig. 8b, and shows how an optical sensor surface 16 may be placed beneath the first region of the masking area 11, on a platform 30 provided in the sash 3. In this position, the optical sensor surface 16 can absorb light transmitted through the first glass pane 7 and the first region of the masking area 11. Alternatively, the optical sensor surface 16 may instead be placed beneath the first region of the masking area 11 (indicated by dashed line) and above the first glass pane 7, in the position previously occupied by the masking of the first region 11a. In Fig. 9b the optical sensor surface 16 can be connected by electrical wire 17 to the remaining optical

sensor device, which may be arranged elsewhere connected to the sash 3. Fig. 9c, shows a part of the cross sectional view shown in Fig. 7b, and shows how an optical sensor surface 16 may be inserted in the position once occupied by the masking of the first region 11a beneath the first region of the masking area 11. In this position, the optical sensor surface 16 can absorb sunlight transmitted through the first glass pane 7. In one or more embodiments, the optical sensor surface 16 may be placed in any position, which is located beneath the first region of the masking area 11 and which is reachable by light transmitted through the first region of the masking area 11 from the exterior of the building 26.

**[0133]** Fig. 10a-b and 11a-b, shows a window 1 according to embodiments of the invention, wherein the masking of the first region 11a is fixed to the window 1 by means of an adhesive 18a. The masking of the first region 11a may be fixed on to a major surface of the first glass pane 7a, 7b, and/or it may be fixed to the second region of the masking 12a, e.g. by means of glue and/or adhesive tape. Alternatively, the masking of the first region 11a may be fixed on to a masking panel 10a extending across the edge region and which is preferably made of a transparent material, such as glass. The masking panel 10a may in turn be fixed to the sash 3 and/or pane module 4.

**[0134]** In Fig. 10a and 11a, the masking of the first region 11a is arranged in the first region of the masking area 11 in the closed configuration, such that at least a majority of the light incident of the masking 10 is not transmitted to the part of the window 1 beneath the masking 10.

**[0135]** In Fig. 10a, the masking 10 is arranged adhered to the interior surface of the first glass pane 7b, preferably from the edge of the first glass pane 7\_e to at least the peripheral seal 14, such as to a position on the interior major surface of the glass pane 7a adjacent to the spacing 15, as seen in Fig. 10a. In Fig. 11a, the masking 10 is arranged adhered to the exterior surface of the first glass pane 7a, preferably from the edge of the first glass pane 7\_e to a position on the exterior surface of the first glass pane 7a above the spacing 15 of the pane module 4, so that the masking 10 extends across and hides the peripheral seal 14.

**[0136]** In Fig. 10b and 11b, the masking of the first region 11a is peeled away from the first region of the masking area 11, such that the transmission through the first region 11 is increased compared to the closed configuration in Fig. 10a and 11a. Preferably, the removal of the masking of the first region 11a in Figs. 10a-b and 11a-b can be done without the need to apply any chemicals or tools. Additionally, the adhesive 18a may be arranged to allow re-installment of the masking of the first region 11a in to the closed configuration, such that the masking of the first region 11a is switchable between the open and closed configuration. As seen in Figs. 10b and 11b, the adhesive is preferably also removed upon removal of the masking of the first region 11a.

**[0137]** Fig. 11a and Fig. 11b further shows an optical

coating 22 such as solar or lowE coating arranged on the interior surface of the first glass pane 7b, wherein the coating 22 comprises a third region 23 devoid of coating, so as to ensure optimum transmission of sun-light through the third region 23. The third region 23 is placed beneath the first region of the masking area 11a. In the present example, the coating 22 has been removed upon manufacture of the window 1, but it may instead be arranged to be removed after manufacture of the window 1, e.g. upon retrofitting an optical sensor surface 16.

**[0138]** Fig. 11a further shows the window 1 comprising insulation blocks 20 placed in the installation space 19 of the window 1, when the installation space 19 is not occupied e.g. by an optical sensor surface 16 or the entire optical sensor device. In Fig. 11b the insulation blocks 20 have been removed.

**[0139]** Fig. 12, shows a cross-section of the window 1 of Fig. 11b, wherein an optical sensor surface 16 and an actuator arrangement 24 have been installed in the installation space 19. In the present example, the installation space 19 beneath the first region of the masking 11 also provides a cavity for installation of the functional device being the actuator arrangement 24, i.e. installation space 19 is large enough to accommodate an optical sensor surface 16 and an actuator arrangement 24 between the first glass pane 7 and the window frame 2. Alternatively, a cavity for accommodating an actuator arrangement 24 may be provided elsewhere in the window 1, e.g. in the below the second region of the masking area 12.

The optical sensor surface 16 is a part of an optical sensor device, which preferably also comprises a battery unit, arranged to power the actuator arrangement 24. The optical sensor device may be arranged elsewhere in the sash 3 than in the present cross-section and is therefore not shown, however, in other embodiment(s), the installation space 19 may be arranged to also accommodate the entire optical sensor device.

**[0140]** The installation space 19 is preferably arranged so that the optical sensor device and/or the insulation blocks 20 and/or functional device, e.g. an actuator arrangement 24, may be removed or installed through an opening in the sash 3 or between the window frame 2 and the sash 3, when the window 1 is open. Alternatively or additionally, a part of the sash 3 and/or the optional shielding means 21 may be arranged to be temporarily removed in order to remove or install the insulation blocks 20 or devices, 16, 24.

**[0141]** Fig. 12 shows the optical sensor surface 16 arranged on top of a housing 24b of the actuator arrangement 24, and may be for example adhered or hinged hereto. The optical sensor surface 16 is arranged directed towards the exterior of the building 26, towards the first region of the masking area 11, such that the optical sensor surface 16 can absorb sunlight transmitted through the first region of the masking area 11. The actuator arrangement 24 comprises a motor and an actuator being a chain 24a, which is connected to the window

frame 2 at an end thereof. The present window 1 can be opened by displacing the sash 3 relative to the window frame 2 by extending the chain length between the housing 24b and the window frame 2 by means of the motor powered by the optical sensor device 16. Generally, the actuator arrangement 24 may be located in the top or bottom or sides of the window and it is not visible from the interior of the building 27

**[0142]** Alternatively, to the embodiment shown in Fig. 12, the installation space 19 below the first region 11 may only accommodate the placement of optical sensor surface(s) 16 and the remainder of the optical sensor device and any further functional devices related hereto is installed elsewhere in the window 1. In one or more embodiments, the actuator arrangement 24 may for example be arranged outside the window 1, such as next to the window frame 2. Preferably, the optical sensor device and any functional devices powered by the optical sensor device are all arranged in connection to either the sash 3 or the window frame 2.

**[0143]** Fig. 13 shows a window 1 according to Fig. 11a, seen in perspective, wherein the shielding means 21 has been omitted. The window 1 is arranged to be operable between an open and closed position, wherein the open position allows access between the sash 3 and the window frame 2. The masking 10 of the masking area 9 is substantially opaque, and preferably visually hides any elements of the window 1 beneath the masking 10 and between the see-through area 13 and the edge of the window 1\_e. The masking area 9 further encloses the see-through area 13 of the window 1 being substantially transparent. In the present perspective view, a part of the sash 3 of the window is visible through the see-through area 13 and a small part of the window frame 2 of the window 1 is visible at the bottom of the window 1. The window 1 comprises a masking 10 extending around the entire edge of the first glass pane 7\_e. In Fig. 13, an outline of the first region of the masking area 11 and the masking of the first region 11a is visible. The first region 11 is arranged enclosed by the second region 12 in the bottom part of the masking area 9 and the first region 11 is arranged in a closed configuration. Outside the first region 11, the remainder of the masking area is occupied by masking of the second region 12a. The window 1 itself is also closed. Advantageously, the masking 10 covers at least the interfaces existing between the sash 3 and the window frame 2, and further hides the installation space and also the peripheral seal of the pane module.

**[0144]** Fig. 14 shows a window 1 according to Figs. 12 and 13, with sash 3, window frame 2, masking area 9, masking 10, first region of masking area 11, second region of masking area 12, first region of masking 11a, second region of masking 12a and see-through area as previously described. Furthermore, the window 1 Fig. 14 has been retrofitted with an optical sensor device and an actuator arrangement 24 powered by said optical sensor device. A cross-sectional view of the window 1 of Fig. 14, at the first region of the masking area 11 is shown in

Fig. 12. The masking of the first region has been switched to an open configuration, allowing electromagnetic light to penetrate unhindered through the first region of the masking area 11. The optical sensor surface 16 of the optical sensor device has been arranged beneath the first region of the masking area 11, beneath the first glass pane 7, such that the electromagnetic light transmitted through the glass pane 7 beneath the first region 11 reaches the optical sensor surface 16. By absorption of sunlight through the first region 11, electricity is generated by the optical sensor device, which is utilized to power the actuator arrangement 24, which in turn can control the opening and closing of the window 1. In the present example of Fig. 14, the window 1 is open, and the actuator chain 24 is visible between the sash 3 and the window frame 2.

**[0145]** The window 1 according to Fig. 13 and 14 may be a window 1 according to any of the previous embodiments described in relation to any of the Figs. 1-11, with the optical sensor device and the actuator arrangement 24 of Fig. 12-14 fitted therein.

**[0146]** Fig. 15 illustrates a building 25, seen from the exterior side of the building 26. The building 26 comprises windows 1 according to any of the embodiments described herein installed as a roof window and as façade windows. The windows 1 each comprises a masking 10, which is seen covering the window 1 along a peripheral edge 1\_e thereof, and defining a see through area 13 in the window 1, the masking 10 is arranged to be substantially opaque.

## REFERENCE LIST

### [0147]

1	window
1e	edge of the window
2	window frame
3	sash
4	pane module
6	edge region
7	first glass pane
7_e	edge of first glass pane
7a	exterior major surface of first glass pane
7b	interior major surface of first glass pane
8	second glass pane
8_e	edge of second glass pane
8a	exterior major surface of second glass pane
8b	interior major surface of second glass pane
9	masking area
10	masking
10a	masking panel
10a_e	edge of masking panel
11	first region of the masking area
11a	masking of the first region
12	second region of the masking area
12a	masking of the second region
13	see-through area

14	peripheral seal	
15	spacing	
16	optical sensor surface, e.g. photovoltaic cell	
17	electrical wire	
18a	connection arrangement being adhesive	5
18b	connection arrangement being a bracket	
18c	connection arrangement being a hinge	
18d	connection arrangement being a clamp	
18e	connection arrangement being a recess	
19	installation space	10
20	insulation block	
21	shielding means	
22	coating, e.g. solar and/or low-e coating	
23	third region of coating	
24	actuator arrangement	15
24a	actuator, e.g. chain	
24b	housing	
25	a building	
26	exterior of the building when the window is installed	20
27	interior of the building when the window is installed	
28	gasket	
29	fixation means	
30	platform	25
31	through-hole	
31a	first opening of through-hole	
31b	second opening of through-hole	

## Claims

1. A window (1), such as a roof window (1), for a building (25), said window (1) comprising a window frame (2) and a sash (3) mounted thereon, wherein the sash (3) comprises a pane module (4) comprising at least a first glass pane (7) and a see-through area (13),

the window (1) further comprises a masking (10) arranged in a masking area (9), wherein the masking area (9) is arranged along an edge of the pane module and arranged to cover the pane module (4) so that the masking (10) reduces the visibility of at least a part of the sash (3) and/or window frame (2), when viewed from an exterior side towards an interior side of the pane module, wherein the masking area (9) is divided into one or more first region(s) (11) and one or more second region(s) (12), and wherein the masking of each first region(s) (11a) is switchable between an open configuration and a closed configuration, wherein in the closed configuration the masking (11a) covers a part of the pane module (4) and wherein in the open configuration the masking (11a) exposes the part of the pane module (4), so that the first region (11) in the open configuration is of increased optical transparency com-

pared to the optical transparency through the first region (11) in the closed configuration, and wherein in at least the open configuration, the window (1) comprises one or more installation space(s) (19) arranged beneath the first region (11) and outside the see-through area (13) and wherein the installation space(s) (19) are arranged to accommodate an instalment of at least one optical sensor surface (16) of one or more optical sensor devices, so that the optical sensor surface (16) is exposed to light provided through the first region (11).

2. The window (1) according to claim 1, wherein the area size of the first region (11) is preconfigured to a fixed area size, preferably such that the area size of the first region (11) corresponds to the collective area size of one or more optical sensor surfaces (16) of one or more optical sensor devices, such as one or more photovoltaic cell devices.
3. The window (1) according to any of the preceding claims, wherein the masking of the first region (11a) is arranged to be switchable between the open configuration and the closed configuration by means of a connection arrangement comprising one or more hinges (18c).
4. The window (1) according to any of the preceding claims, wherein the masking of the first region (11a) is arranged to be switchable between the open configuration and the closed configuration by means of a connection arrangement comprising brackets (18b) and/or profiles.
5. The window (1) according to any of the preceding claims, wherein the masking of the first region (11a) is arranged to be switchable between the open configuration and the closed configuration by means of a connection arrangement comprising one or more clamps (18d).
6. The window (1) according to any of the preceding claims, wherein the masking of the first region (11a) is arranged to be switchable between the open configuration and the closed configuration by means of a connection arrangement comprising adhesive(s) (18a).
7. The window (1) according to any of the claims 3-6, wherein the one or more connection arrangement(s) (18a, 18b, 18c, 18d, 18e) are arranged to provide installation of at least the optical sensor surface(s) (16) of the one or more optical sensor device(s) beneath the first region (11).
8. The window (1) according to any of the preceding claims, wherein the masking (10, 10a, 11a, 12a) is

made of a light-absorbing material arranged to absorb the majority of incident light of the visible spectrum.

ment (24), a heating arrangement, a lighting arrangement and/or a curtain arrangement.

9. The window (1) according to any of the preceding claims, comprising a cavity beneath the masking area (9) for accommodating an actuator arrangement (24) comprising a drive mechanism, such as a motor and an actuator (24a), such as a chain. 5  
10
10. The window (1) according to any of the preceding claims, wherein the pane module (4) further comprises a second glass pane (8) and preferably also a peripheral seal (14) arranged between major surfaces of the first glass pane (7b) and the second glass pane (8a), such that the pane module (4) is arranged as an insulated glazing unit. 15
11. The window (1) according to claim 10, wherein a major surface of the first glass pane (7a, 7b) is of larger extent than a major surface of the second glass pane (8a, 8b) so as to provide an edge region (6), which extends a distance beyond the edge of the second glass pane (8\_e), and wherein the masking area (9) is arranged beneath at least a part of said edge region (6). 20  
25
12. The window (1) according to any of the preceding claims, wherein one or both of the first glass pane (7) or the second glass pane (8) comprises a third region (23) arranged coinciding with the first region (11), which third region (23) comprises a solar and/or Low-E coating (22) arranged to be at least partially removable so that upon removal of the solar and/or low-E coating (22) the transmission of light through the pane module (4) towards the first region (11) is increased. 30  
35
13. The window (1) according to any of the preceding claims, wherein the window (1) is arranged to be installed as a skylight window (1). 40
14. The window (1) according to any of the preceding claims, wherein the window (1) further comprises one or more optical sensor device(s) comprising one or more optical sensor surface(s) (16) arranged beneath the first region of the masking area (11) and wherein the masking of the first region (11a) is in the open configuration. 45  
50
15. The window (1) according to any of the preceding claims, wherein the optical sensor device is a photovoltaic cell device, and wherein the optical sensor surface (16) is a photovoltaic cell, the photovoltaic cell device is arranged to charge a battery unit for powering one or more functional device(s) connected to said window (1), such as a switchable coating arrangement, an actuator arrange- 55



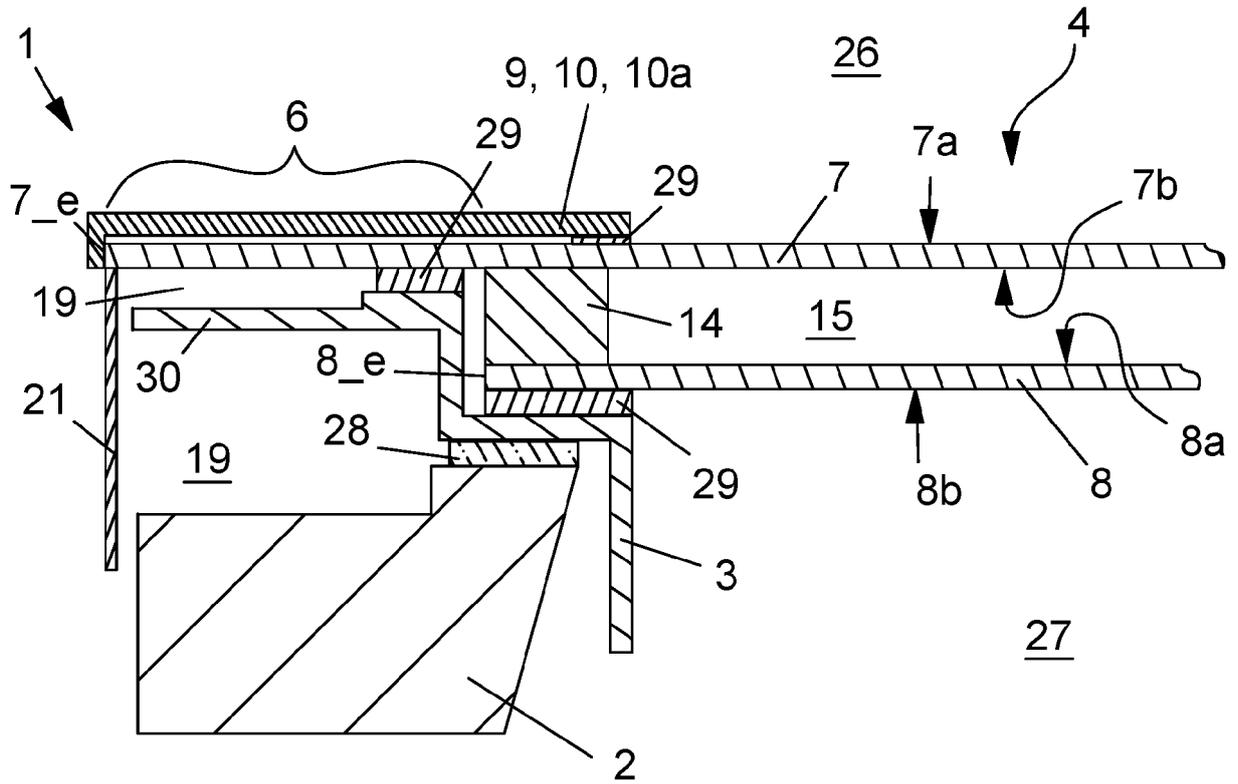


Fig. 3

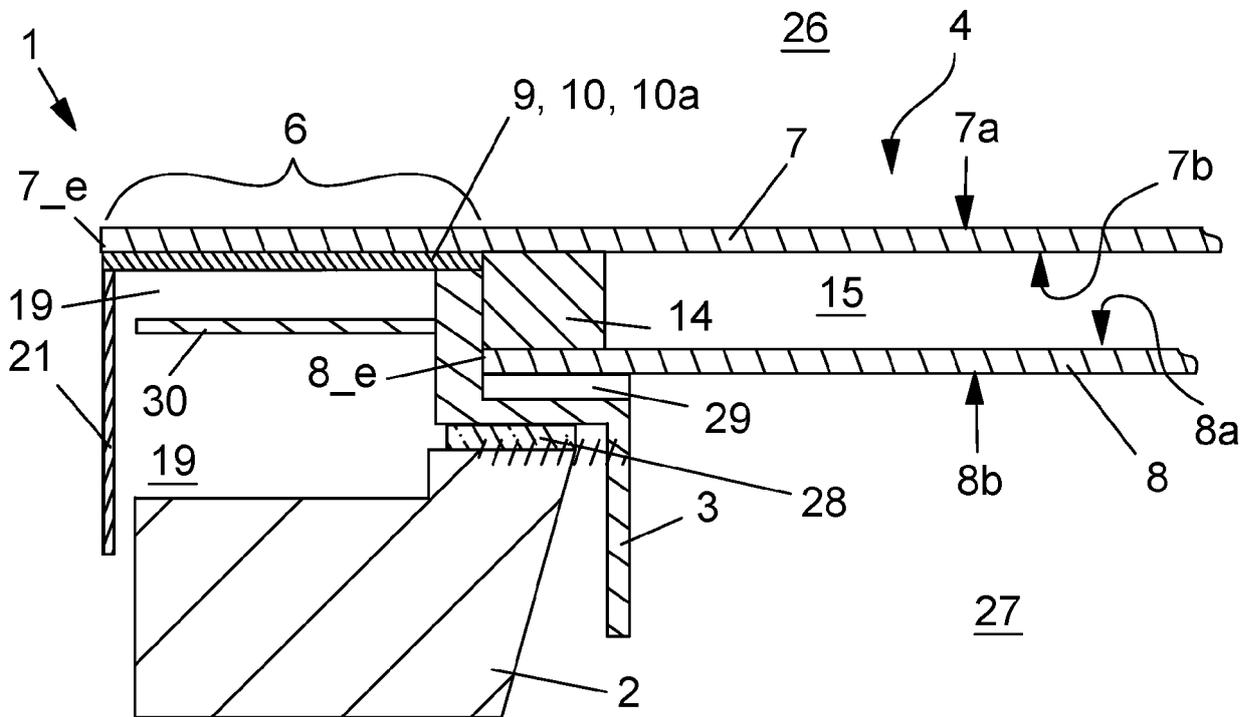


Fig. 4



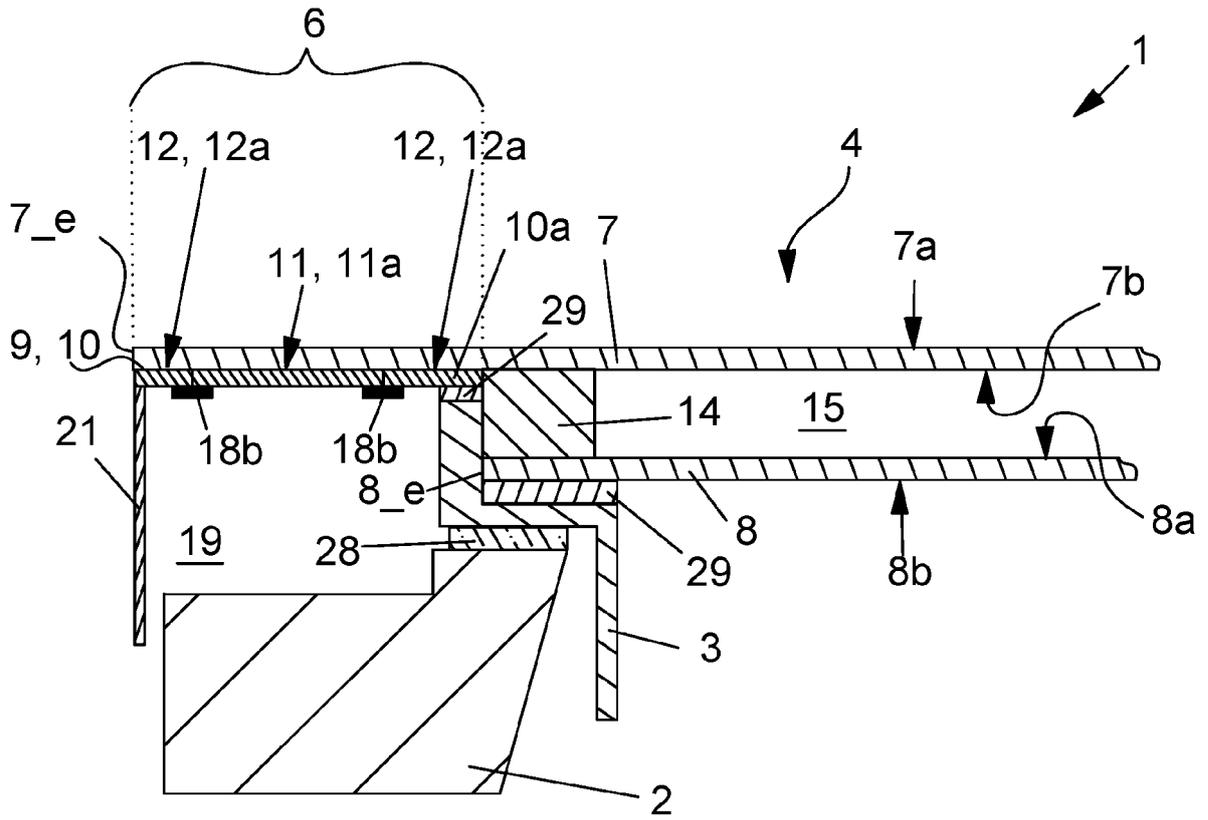


Fig. 6a

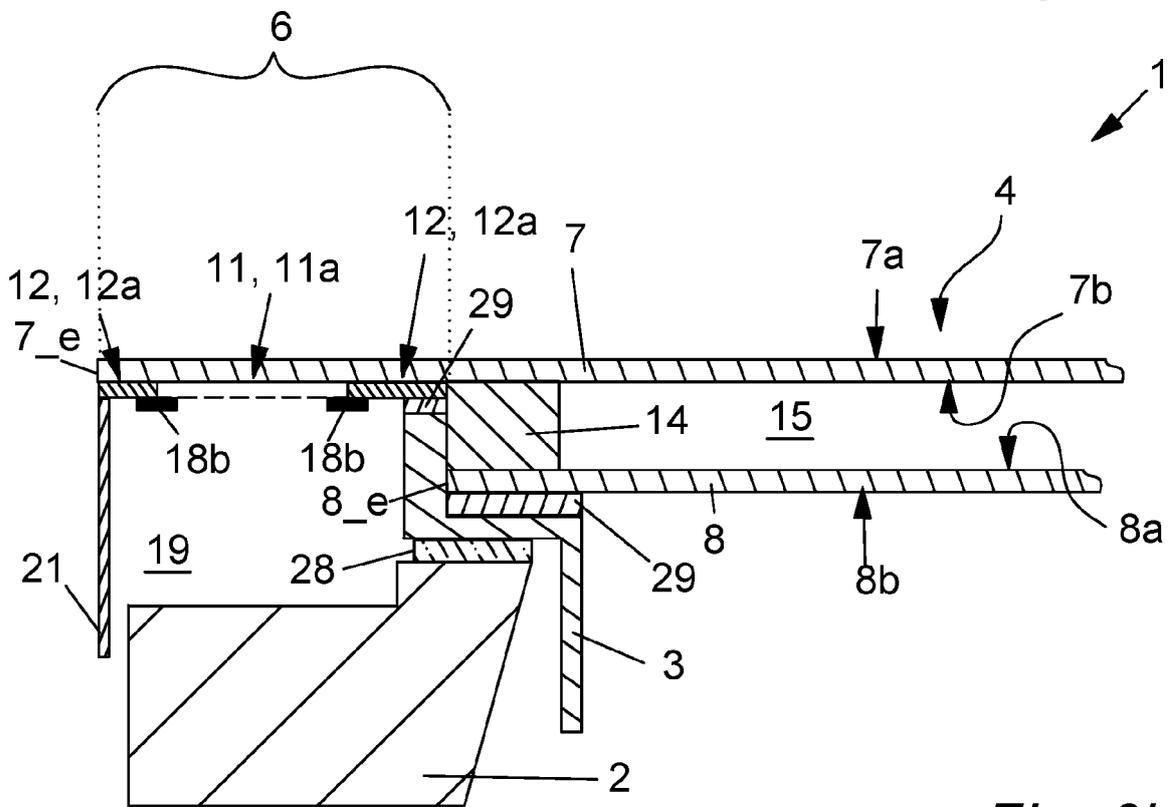


Fig. 6b

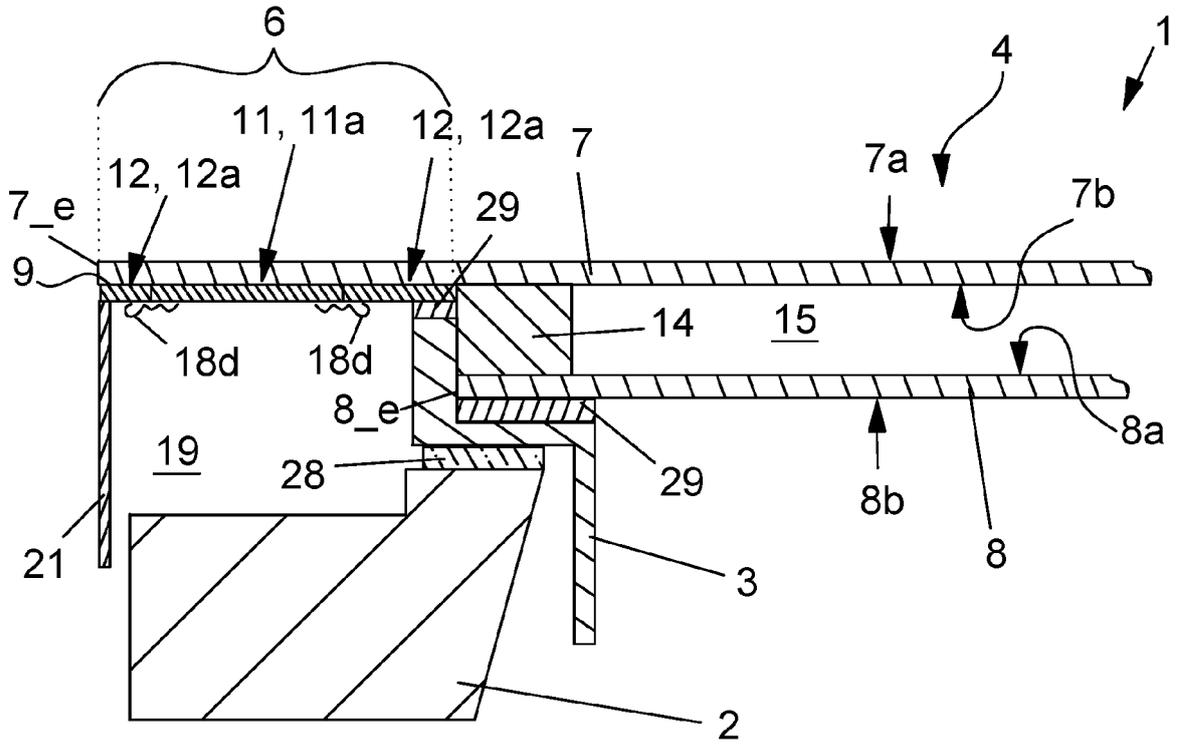


Fig. 7a

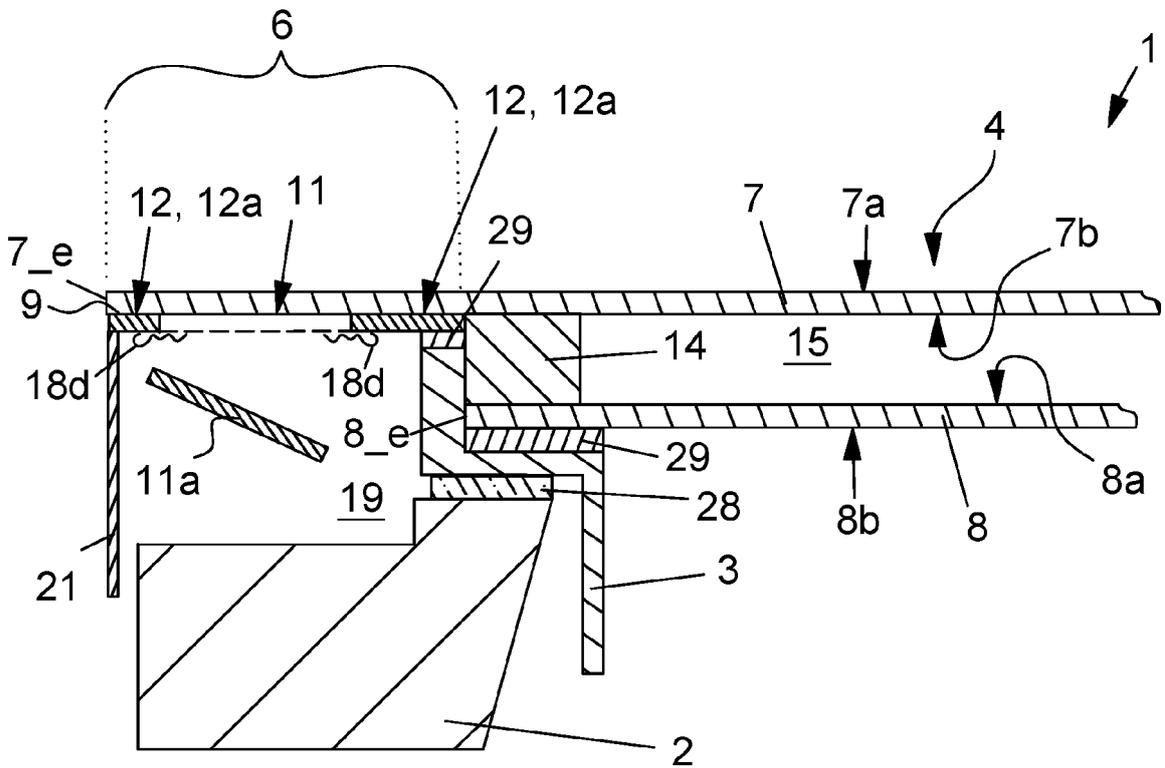


Fig. 7b

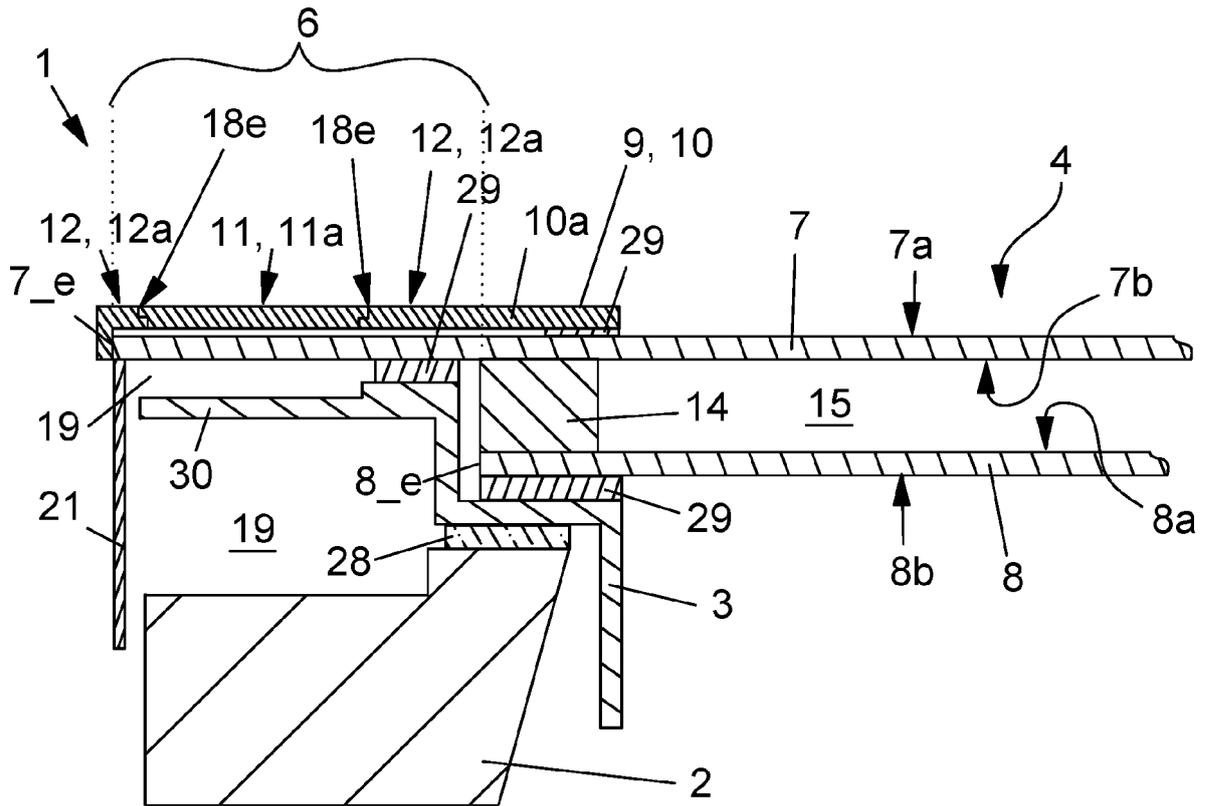


Fig. 8a

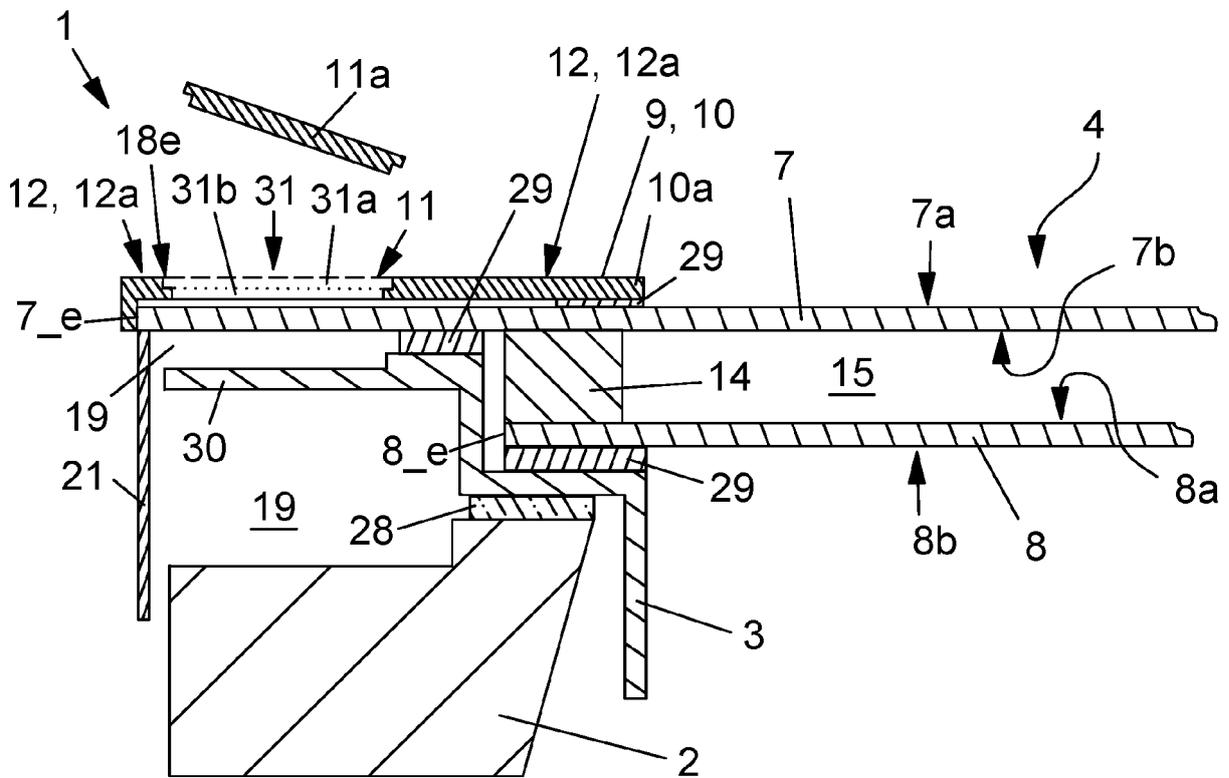
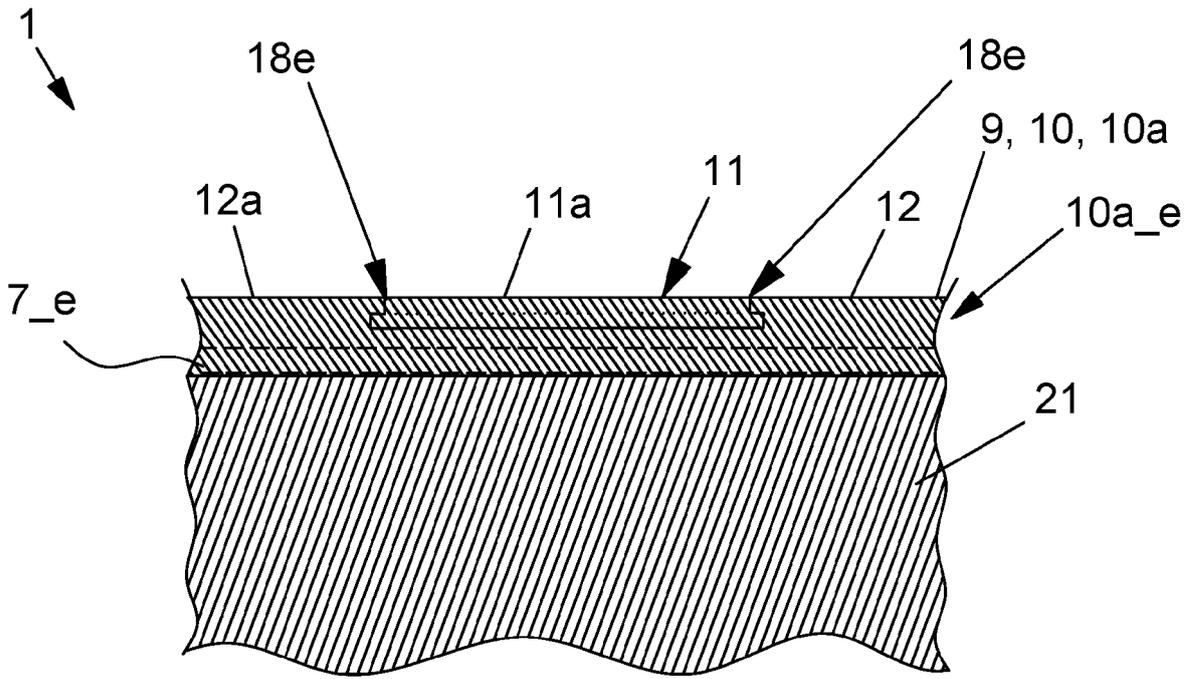
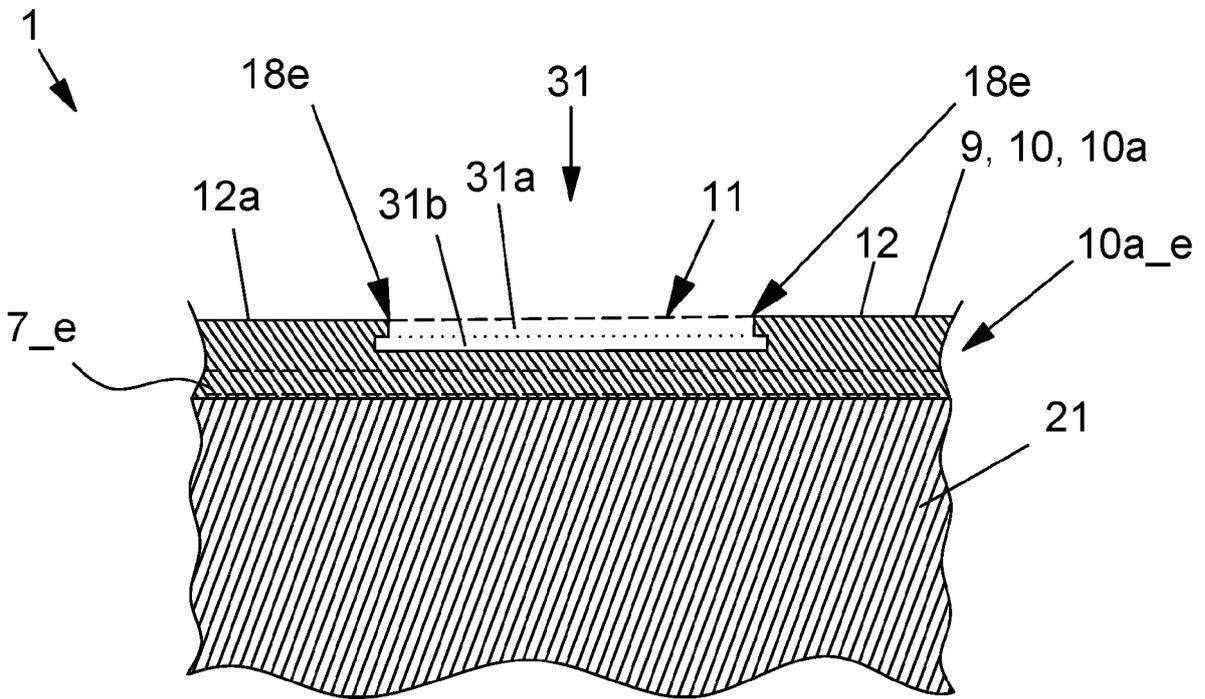


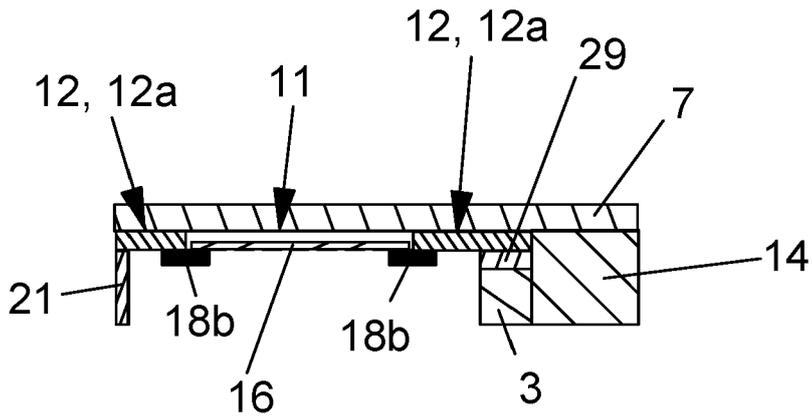
Fig. 8b



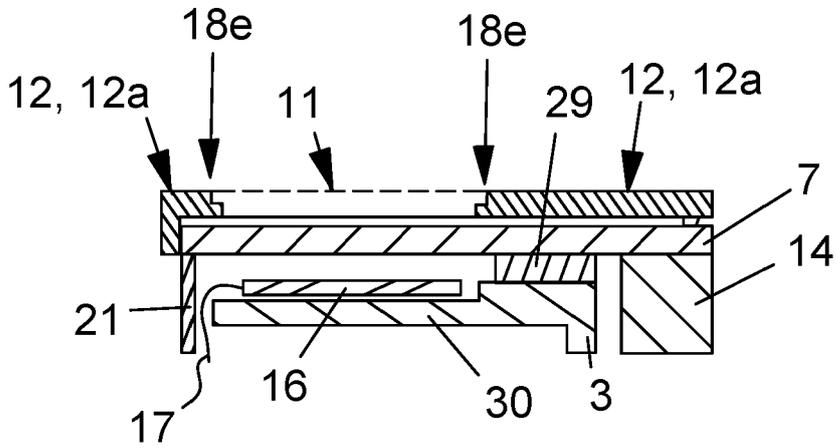
*Fig. 8c*



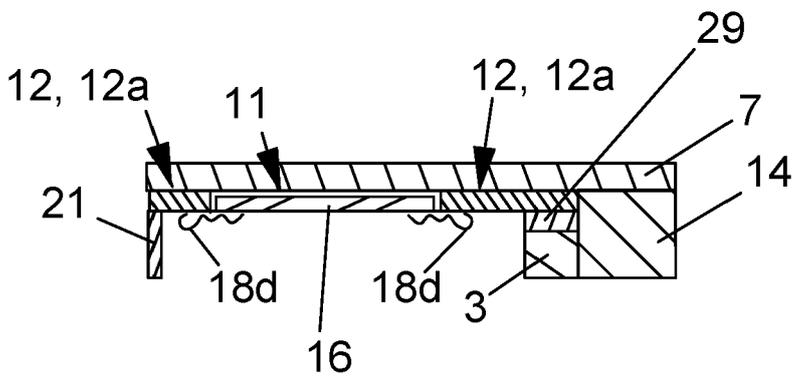
*Fig. 8d*



*Fig. 9a*



*Fig. 9b*



*Fig. 9c*

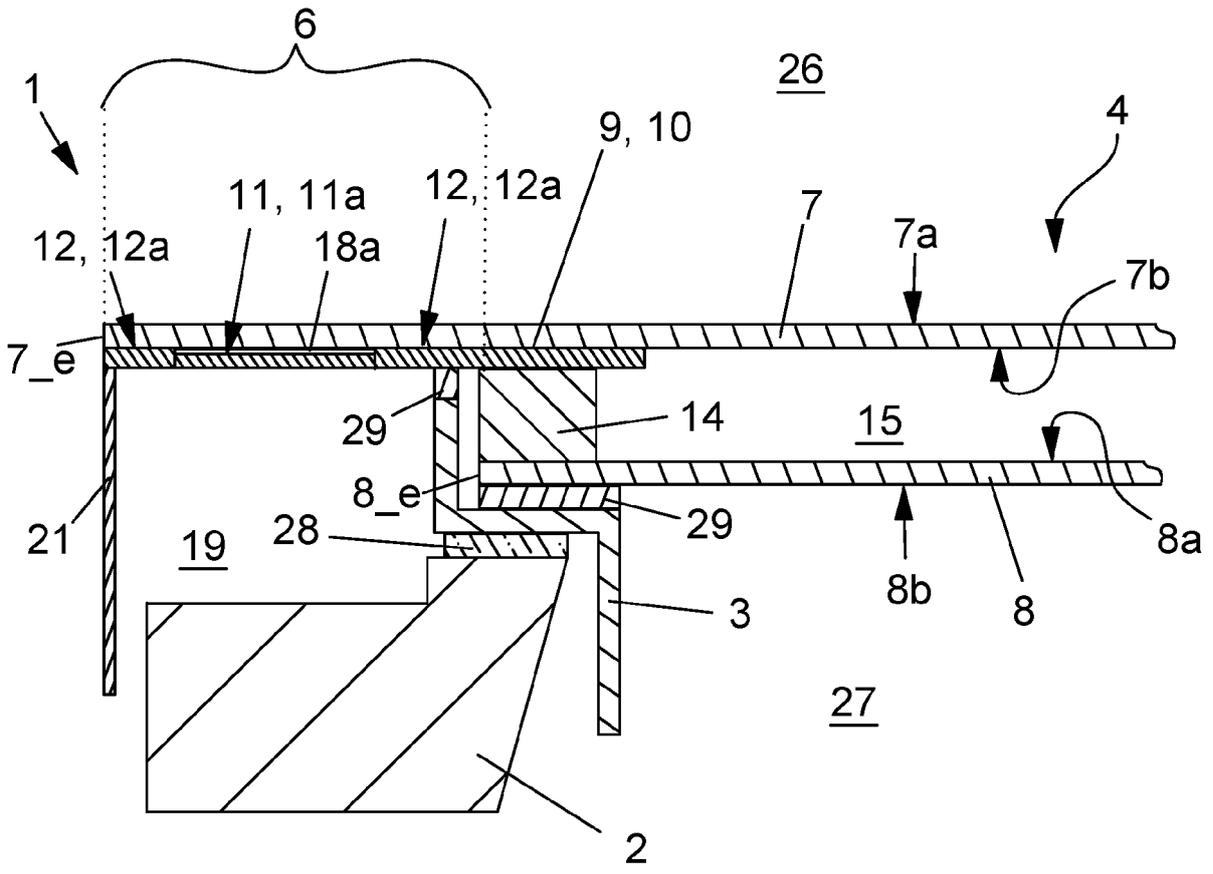


Fig. 10a

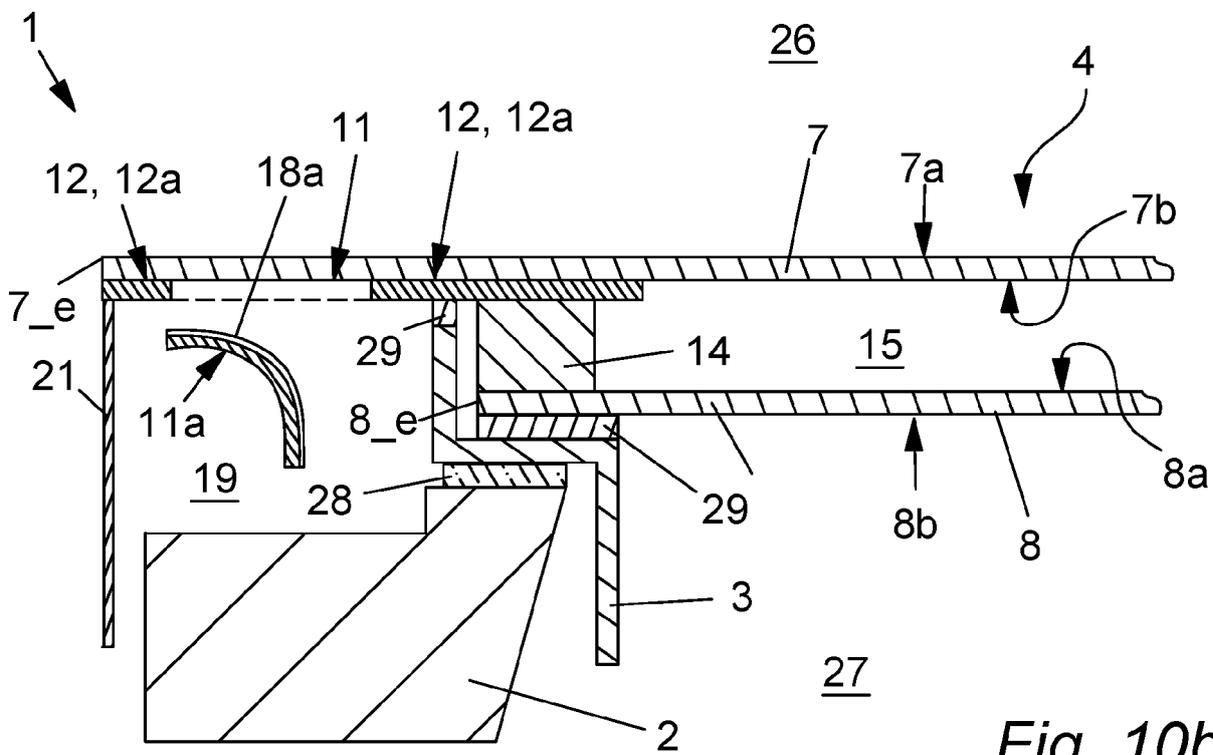


Fig. 10b



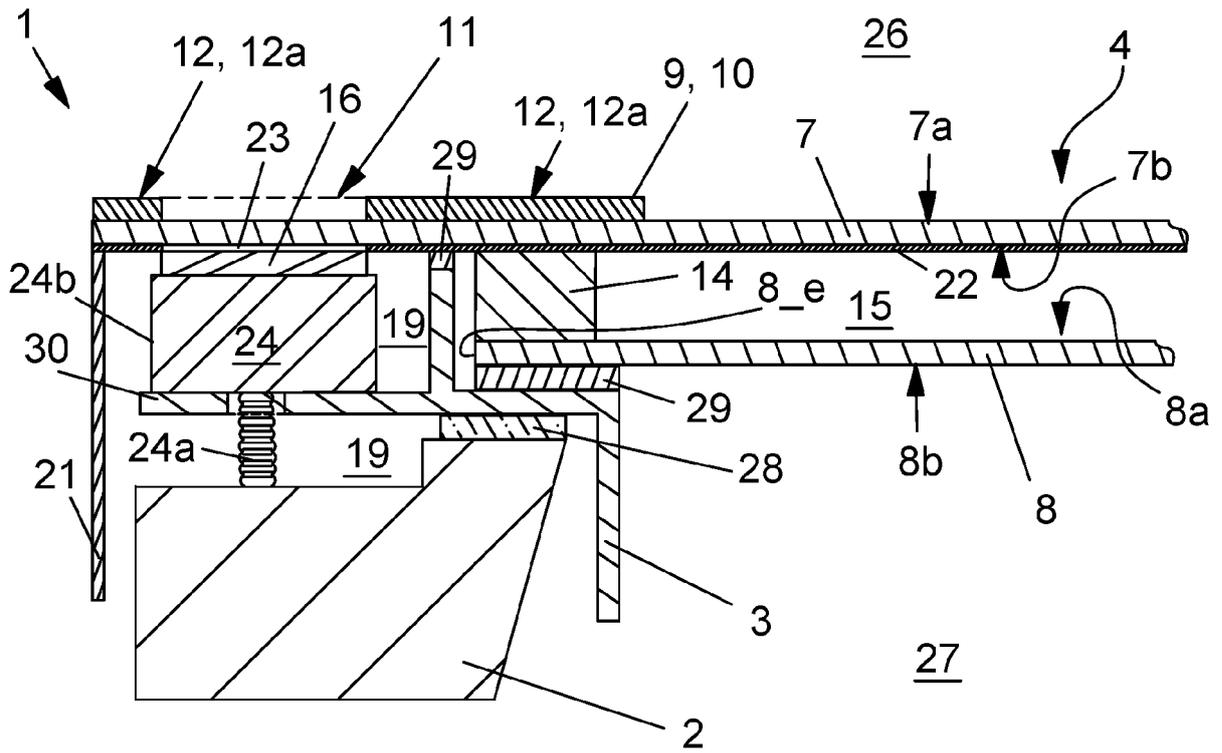


Fig. 12

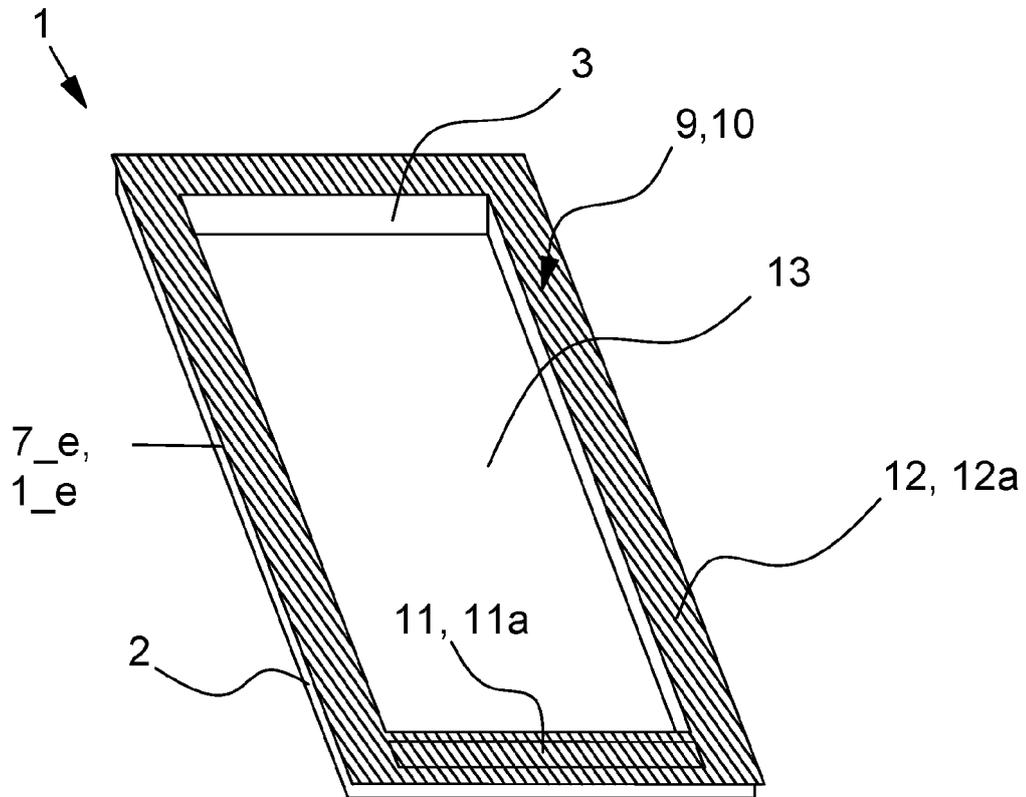


Fig. 13

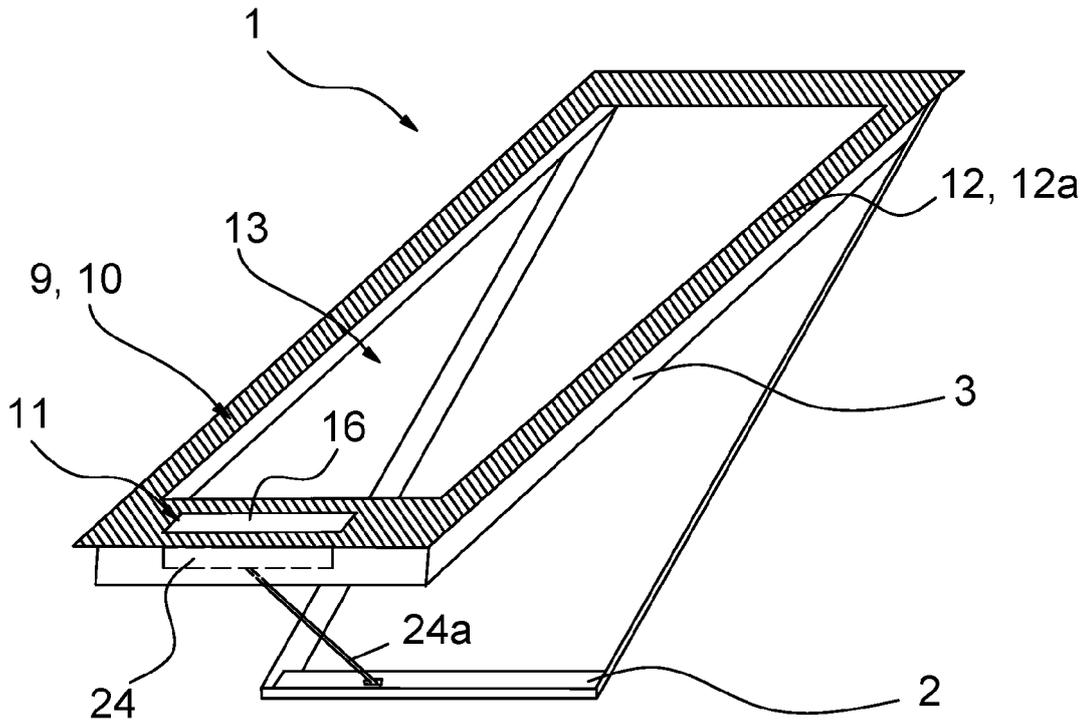


Fig. 14

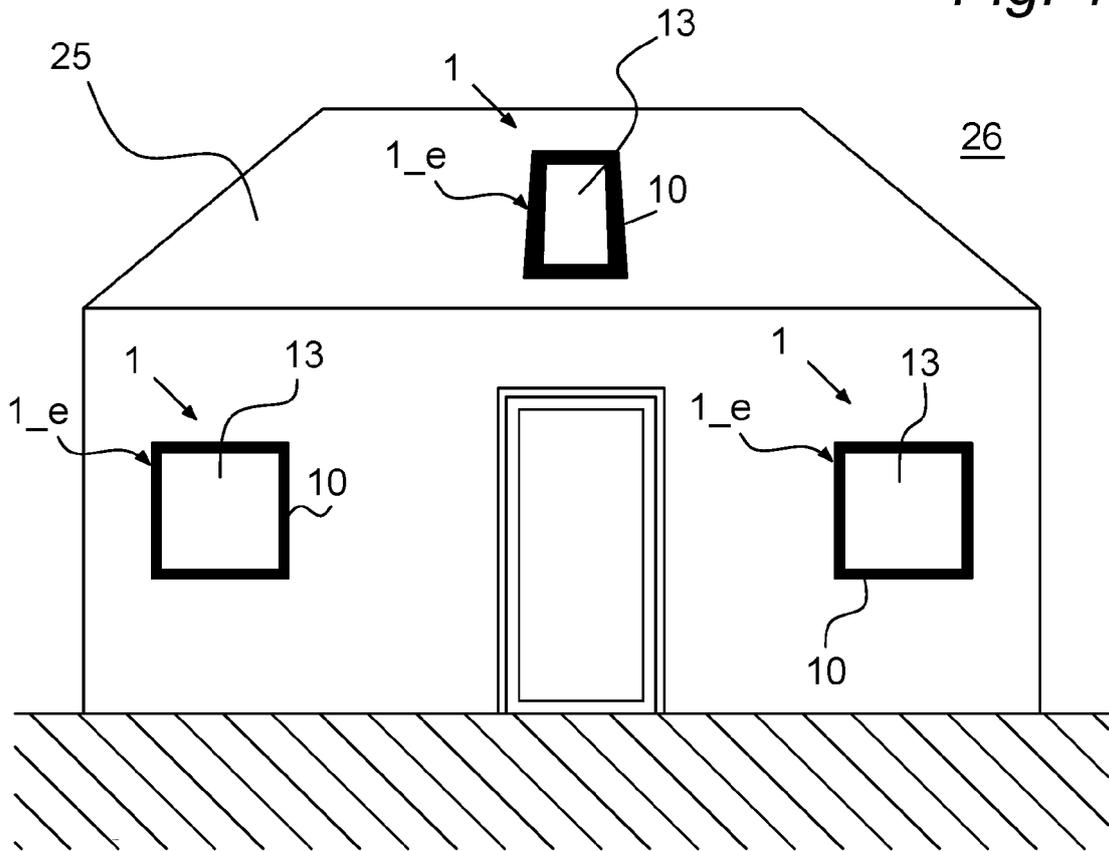


Fig. 15



EUROPEAN SEARCH REPORT

Application Number  
EP 20 20 4932

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Place of search		Date of completion of the search	Examiner
The Hague		9 March 2021	Leroux, Corentine
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