

TITLE OF THE INVENTION

MULTI-PANED WINDOW STRUCTURE AND INSTALLATION
METHOD THEREOF

5 TECHNICAL FIELD

[0001] The present invention relates to a multi-paned window structure and an installation method thereof.

10 BACKGROUND ART

[0002] Conventionally known is a sash in which a sash groove for erecting a window plate body made of light control glass having a liquid crystal layer as an energizing unit in a sandwiched manner is formed on a sash main body and in which a wiring accommodation space for electric wirings extending from the window plate body is formed in the sash main body (see, for example, PTL 1). Such a sash is provided with a wiring service hole through which the electric wirings from the window plate body in the sash groove are passed into the wiring accommodation space, and a wiring work opening portion for the electric wirings accommodated in the wiring accommodation space is formed along a longitudinal direction of the sash. With such a configuration in which the wiring accommodation space is formed separately from the sash groove, it is not necessary to accommodate the electric wirings in the sash groove, and the peripheral portion of the window plate body and the electric wirings can be accommodated in separate spaces, and the erection work of the window plate body and the wiring work can be performed separately, and the wiring work can

be performed from the outside through the opening portion formed in the sash longitudinal direction. Therefore, the work can be performed easily by enlarging the space for the work portion.

5 **[0003]** The light control glass described above has recently attracted attention as a technique that eliminates the need for blinds, curtains, and the like because the glass itself can change the transmittance and light shielding performance. In
10 general, the light control glass has a laminated glass structure with a special intermediate component due to its structure characteristics. At the same time, electric wirings are required for its light control function. As described, a
15 configuration for accommodating electric wirings is required.

[0004] The structure of the sash for the light control glass described in PTL 1 as explained above can be planned, designed, manufactured, and
20 installed from the initial stage if it is applied to a new building. In fact, many light control glasses are being developed for new buildings.

[Citation List]

25 [Patent Literature]

[0005] [PTL 1] Japanese Laid-Open Utility Model Publication No. H3-119194

SUMMARY OF THE INVENTION

30 [Technical Problem]

[0006] However, when sashes for new buildings such as the one described in PTL 1 are applied to many existing buildings, it is necessary to change

the sash frames and replace the glass with light control glass. Then, it is easy to imagine that a large budget and a long period will be required because full replacement work is required, and scaffolding and curing are also required. In reality, such replacement work could not be performed, and has not been carried out until present.

[0007] In addition to light control glass, there are other wiring-attached plate-shaped bodies, such as photovoltaic module, LED built-in glass, heated glass, and blind built-in glass. A similar problem can occur when such a wiring-attached plate-shaped body is desired to be installed in an existing building.

[0008] Therefore, in view of this background, it is an object of the present invention to provide a multi-paned window structure and an installation method thereof capable of installing light control glass, which is the state-of-the-art technology, and other wiring-attached plate-shaped bodies to existing buildings and the like in which conventional glass has already been installed, with a relatively easy method without performing large-scale renovation work.

[Solution to Problem]

[0009] In order to achieve the above object, a multi-paned window structure according to an aspect of the present invention includes:

a plate-shaped body disposed at an indoor side relative to an existing window substantially in parallel with the existing window;

a wiring disposed to be connected to a predetermined position of the plate-shaped body; and a frame body accommodating and covering the wiring.

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[Advantageous Effects of Invention]

[0010] According to the present invention, with a simple configuration and while maintaining aesthetics, light control glass and other wiring-attached plate-shaped bodies can be installed at an existing window.

BRIEF DESCRIPTION OF DRAWINGS

[0011] FIG. 1 is a longitudinal sectional view illustrating an example of a multi-paned window structure according to a first embodiment of the present invention;

FIG. 2 is a front view, seen from an indoor side, illustrating an example of the multi-paned window structure according to the first embodiment of the present invention;

FIG. 3 is a traverse sectional view illustrating an example of the multi-paned window structure according to the first embodiment of the present invention;

FIG. 4 is a traverse sectional view illustrating an example in a case where the multi-paned window structures according to the first embodiment of the present invention are continuously installed;

FIG. 5 is a drawing illustrating an example of a base member attachment step in an installation method for installing the multi-paned window

structure according to the first embodiment of the present invention;

FIG. 6 is a drawing illustrating an example of a light control glass placement step in the installation method for installing the multi-paned window structure according to the first embodiment of the present invention;

FIG. 7 is a drawing illustrating an example of a fixing member attachment step in the installation method for installing the multi-paned window structure according to the first embodiment of the present invention;

FIG. 8 is a drawing illustrating an example of a wiring attachment step in the installation method for installing the multi-paned window structure according to the first embodiment of the present invention;

FIG. 9 is a drawing illustrating an example of a frame body attachment step in the installation method for installing the multi-paned window structure according to the first embodiment of the present invention;

FIG. 10 is a cross sectional view illustrating an example of a multi-paned window structure according to a second embodiment of the present invention;

FIG. 11 is a longitudinal sectional view illustrating an example of a multi-paned window structure according to a third embodiment of the present invention; and

FIG. 12 is a longitudinal sectional view illustrating an example of a multi-paned window structure according to a fourth embodiment of the

present invention.

MODES FOR CARRYING OUT THE INVENTION

[0012] Hereinafter, an embodiment for carrying
5 out the present invention will be described with
reference to the drawings.

[0013] [First embodiment]

FIG. 1 is a longitudinal sectional view
illustrating an example of a multi-paned window
10 structure 200 according to the first embodiment of
the present invention. The multi-paned window
structure 200 according to the first embodiment is
provided at an indoor side relative to an existing
window 10 including existing glass 11 and an
15 existing sash 12 in a separated manner from the
existing window 10. More specifically, the multi-
paned window structure 200 is provided at a portion
where fixing surfaces 20, 21 are formed in a room
where the existing window 10 is disposed. The
20 fixing surfaces 20, 21 may have the fixing surface
20 disposed at an upper part and the fixing surface
21 disposed at a lower part, and may be, for example,
upper and lower surfaces of the window frame, or a
ceiling surface and a floor surface of the room.
25 Alternatively, the fixing surfaces 20, 21 may be
upper and lower areas of the wall surface (vertical
surface) of the indoor side of the window frame,
instead of the horizontally installed upper and
lower surfaces. Still alternatively, the fixing
30 surfaces 20, 21 may be upper and lower portions of a
side surface (vertical surface) fixed and installed
in the room, such as mullions partitioning the sash.
As described above, the fixing surfaces 20, 21 may

be various surfaces including a vertical surface as long as the multi-paned window structure 200 can be fixed at the upper part and at the lower part. As illustrated in FIG. 1, in the first embodiment, an example in which the window frames are the fixing surfaces 20, 21 will be described. Therefore, the ceiling surface 23 of the room is provided at an indoor side relative to the fixing surface 20.

[0014] The multi-paned window structure 200 according to the first embodiment includes a light control glass 30, an upper side frame body 40, and a lower side frame body 50. The multi-paned window structure 200 is provided independently from the existing window 10. None of the light control glass 30, the upper side frame body 40, and the lower side frame body 50 comes into contact with the existing window 10, and is arranged away from the existing window 10. In other words, the multi-paned window structure 200 according to the present embodiment can be installed regardless of the structure of the existing window 10, and as long as the upper and lower fixing surfaces 20, 21 are provided, the multi-paned window structure 200 can be installed at any existing building. This is very different from a sash using light control glass that is intended to be installed only for new buildings.

[0015] The multi-paned window structure 200 has a structure in which the upper side frame body 40 supports the upper side and the lower side frame body 50 supports the lower side of the light control glass 30. That is, the upper side frame body 40 supports around the upper side, i.e., around the upper end portion, of the light control glass 30.

The lower side frame body 50 supports around the lower side, i.e., around the lower end portion, of the light control glass 30.

[0016] The light control glass 30 is glass having
5 a light control function, and changes the color of the glass itself to change its transmittance and light shielding performance. Thereby, the light control glass 30 can achieve functions such as improving the shielding performance to serve as
10 blinds and curtains when the sunlight is strong, increasing the transmittance to increase the visibility when the sunlight is weak, and actively absorbing the sunlight to warm the room.

[0017] For example, the light control glass 30
15 includes a configuration in which a light control function material 33 is sandwiched between two glass plates 31 and 32. As the light control function material 33, for example, an electrochromic function material may be used. The electrochromic material
20 is a polymer material that is colored or discolored by a reversible oxidation-reduction reaction that is electrically induced, and the color can be changed by applying a voltage. The light control function material 33 may be any material that can reversibly
25 change its optical properties, and may be a thin film that can be coated on at least one of the two glass plates 31, 32, or a solid or gel-like body that can be sandwiched between the two glass plates 31, 32. The light control function material 33 may
30 be not only the electrochromic function material described above but also an SPD (Suspended Particle Device), a liquid crystal, a polymer dispersed liquid crystal, and the like. The light control

glass 30 is formed by protecting, from the outside, the light control function material 33 with the two glass plates 31, 32.

[0018] The light control function material 33 is
5 connected to a wiring for light control so as to allow application of a voltage because the transmittance and light shielding performance change according to the application of the voltage. For example, an electric wiring 35 is connected to the
10 light control function material 33 via a connector 34. The electric wiring 35 is connected to a power source and a controller of a building not illustrated. FIG. 1 illustrates a configuration in which the connector 34 is provided at a
15 predetermined position on the upper side of the light control glass 30 and an electric wiring 35 extending from the connector 34 extends to behind the ceiling of the building. The electric wiring 35 extends to behind the ceiling above the ceiling
20 surface 23 to be connected to the power source and the controller (not illustrated) provided behind the ceiling.

[0019] The glass plates 31 and 32 of the light control glass 30 may be composed of various types of
25 sheet glass. The glass includes both inorganic glass and organic glass. Examples of the inorganic glass include soda lime glass, borosilicate glass, alkali-free glass, and quartz glass. As a sheet glass, a reinforced glass plate may be used to
30 enhance safety. As a tempered glass plate, a tempered glass plate obtained by an air cooling strengthening method or a chemical strengthening method can be used. Examples of the organic glass

include polycarbonate and acrylic resin. In other words, the glass plates 31 and 32 may be made of various materials as long as they are transparent materials that can sandwich the light control function material 33 from both sides, and can serve as window glass, regardless of the glass material. Here, examples of functions achieved by the window glass include capability of ensuring visibility with a transparent body, capability of taking in sunlight, and having a heat shielding effect. The glass plates 31 and 32 can be made of any material as long as the glass plates 31 and 32 have the basic function of the window glass. As described above, various materials can be used for the glass plates 31 and 32 according to the purposes.

[0020] Further, the glass plates 31, 32 may be coated with a Low-E film so as to improve the heat shielding performance and the heat insulating performance. At this occasion, an insulated glazing unit may be used for the glass plates 31 and 32, and a Low-E film may be formed by sputtering, and the Low-E film may be formed on an inner surface of the sealed insulated glazing unit. The glass plates 31 and 32 on which a Low-E film is formed by CVD (Chemical Vapor Deposition) may be used. Since the low-E film formed by sputtering needs to be kept in dry air, it is preferable to use an insulated glazing unit as the glass plates 31 and 32. Conversely, the Low-E film formed by CVD can be used in the open air, and is preferably used with the glass plates 31 and 32 each made of a single sheet of glass or the like without being made into an insulated glazing unit.

[0021] The upper side frame body 40 is a member for covering the electric wiring 35 and fixing the upper side of the light control glass 30. The upper side frame body 40 has a base member 41, a fixing member 42, and a cover member 43. The base member 41 and the fixing member 42 are engaged by an engagement unit 45 at an indoor side relative to the light control glass 30, and the fixing member 42 and the cover member 43 are also engaged by engagement units 46, 47 at an indoor side relative to the light control glass 30.

[0022] The base member 41 is a member for restricting the movement of the upper side of the light control glass 30 toward the outdoor. For example, as illustrated in FIG. 1, the base member 41 has an L-shaped cross sectional shape including a base portion 41a provided in close contact with the fixing surface 20 and an outside restriction portion 41b extending vertically downward from the fixing surface 20. As illustrated in FIG. 1, the base portion 41a may be fastened and fixed to the fixing surface 20 with screws 80. Thereby, the outside restriction portion 41b is also fixed, and the movement of an outdoor-side surface of the light control glass 30 toward the outside can be reliably restricted.

[0023] For example, the base member 41 may be configured to extend a predetermined length along the upper side of the light control glass 30. The base member 41 may be configured as a single piece. Alternatively, two or more base members 41 may be provided. Still alternatively, the base member 41 may be configured as a through member that extends

horizontally throughout the upper side of the light control glass 30. When the base member 41 is configured as a through member, the light control glass 30 can be stably supported, and the connector 5 34 and the electric wiring 35 can be covered from the outdoor side. In addition, in a case where the existing window 10 has low sealing performance, the base member 41 configured as a through member has an advantage of preventing rainwater from entering from 10 the outside. Alternatively, in a case where one or more base members 41 are provided, the base members 41 have an advantage of capability of reducing the manufacturing cost. As long as the base member 41 has an L-shaped cross section and includes the base 15 portion 41a and the outside restriction portion 41b, the base member 41 can be configured in various lengths depending on the purposes.

[0024] In addition, a cushioning material 60 may be provided at the tip of the outside restriction 20 portion 41b, and the outside restriction portion 41b may be configured to restrict, with the cushioning material 60, movement of the outdoor-side surface of the light control glass 30 toward the outside. Thereby, the movement toward the outdoor can be 25 restricted by causing the cushioning material 60 to be elastically in contact with the surface of the light control glass 30. Even if there is a gap between the outside restriction portion 41b and the light control glass 30, the movement of the light 30 control glass 30 toward the outdoor can be restricted, but it is preferable to provide the cushioning material 60 because the light control glass 30 can be supported more stably if the

cushioning material 60 is elastically in contact with the outdoor-side surface of the light control glass 30 and the light control glass 30 is installed to be pressed lightly against the cushioning material 60. The cushioning material 60 may be made of various materials having elasticity. For example, silicone or rubber may be used. A gasket may be used as the cushioning material 60.

[0025] Since the base member 41 is a member for restricting the movement of the upper side of the light control glass 30 toward the outside, the base member 41 may be referred to as an upper side outside restriction member. The outside restriction portion 41b may be in contact with a position near the upper side of the outdoor-side surface of the light control glass 30 through the cushioning material 60, and the outside restriction portion 41b may not be directly in contact with the upper side of the light control glass 30.

[0026] The fixing member 42 is a member for restricting the movement of the upper side of the light control glass 30 toward the indoor. The fixing member 42 is engaged with the base member 41 by the engagement unit 45 to support the light control glass 30 from the indoor side. More specifically, the movement of the light control glass 30 toward the indoor is restricted. Since the fixing member 42 restricts the movement of the upper side of the light control glass 30 toward the inside, the fixing member 42 may be referred to as the upper side inside restriction member.

[0027] The fixing member 42 is provided so as to be in contact with the indoor side surface of the

light control glass 30, and the light control glass 30 is preferably sandwiched and fixed between the base member 41 and the fixing member 42, but the fixing member 42 may not be necessarily in contact with the light control glass 30, and there may be a slight gap between the fixing member 42 and the light control glass 30. This is because the movement of the upper side of the light control glass 30 toward the indoor can be restricted even in a case where the fixing member 42 is installed with a slight gap between the fixing member 42 and the light control glass 30. The size of the gap may be set as appropriate depending on the size, purpose, and the like of the light control glass 30. For example, the size of the gap may be set in a range of larger than 0 mm and equal to or less than 25 mm, preferably larger than 0 mm and equal to or less than 20 mm, more preferably larger than 0 mm and equal to or less than 15 mm.

[0028] The fixing member 42 may be configured to have various shapes as long as the fixing member 42 has a surface that faces the light control glass 30 and can restrict the movement of the light control glass 30 toward the indoor, and the cover member 43 can be engaged with the fixing member 42.

[0029] As illustrated in FIG. 1, the base member 41 and the fixing member 42 support the light control glass 30 so as to sandwich the light control glass 30 from the outside and the inside, and fix and support the upper side of the light control glass 30. As illustrated in FIG. 1, the cushioning material 70 may be provided between the fixing member 42 and the indoor-side surface of the light

control glass 30. The fixing member 42 may be in contact with a position near the upper side of the indoor-side surface of the light control glass 30 through the cushioning material 70, and may not be
5 directly in contact with the upper side of the light control glass 30.

[0030] In FIG. 1, the base member 41 and the fixing member 42 support and sandwich the light control glass 30. From the viewpoint of securely
10 holding the light control glass 30, the light control glass 30 is preferably sandwiched between the base member 41 and the fixing member 42. However, as described above, the base member 41 and the fixing member 42 may not necessarily fix and
15 sandwich the light control glass 30 completely, and the movement of the light control glass 30 toward the outdoor and indoor sides may be restricted to gently support the light control glass 30. Here, the term "gently support" means that the light
20 control glass 30 is supported to such an extent that the light control glass 30 does not fall down while allowing a slight deviation and a slight back-and-forth movement of the light control glass 30. Unlike a sash installed with a new building, the
25 multi-paned window structure 200 additionally installs the light control glass 30 to the existing window 10 to add the light control function, and has the structure of the multi-paned window, so that the multi-paned window structure 200 makes a structure
30 similar to a structure provided with an insulated glazing unit, and is intended to improve the heat insulating performance. Therefore, unlike repair work for complete fixation, the intended function

can be sufficiently achieved as long as the light control glass 30 is fixed so as not to fall down.

[0031] The cover member 43 is a member for covering the electric wiring 35. As described above, when the light control glass 30 is provided, it is necessary to apply a voltage to the light control function material 33, and therefore, the electric wiring 35 is to be provided, but in a case where the light control glass 30 is retrofitted, there is a problem in that the electric wiring 35 is exposed and the aesthetic appearance is impaired. Therefore, in the multi-paned window structure 200 according to the present embodiment, the cover member 43 covering the electric wiring 35 is provided. With the cover member 43 covering the electric wiring 35, a hole is made in the ceiling surface 23 of the building, and a connection is made with the power source and the controller behind the ceiling surface 23 through electric wiring 35, and therefore, this can prevent deterioration in the aesthetics caused by the retrofitted light control glass 30. As illustrated in FIG. 1, the cover member 43 extends horizontally toward the indoor and extends vertically upward to cover the electric wiring 35 to hide the portion of the electric wiring 35 extending to behind the ceiling. As described above, the electric wiring 35 of the light control glass 30 added through retrofitting on the existing window 10 can be reliably covered with a simple configuration.

[0032] The cover member 43 is preferably provided at an indoor side relative to the light control glass 30. As illustrated in FIG. 1, the base member 41 is fixed to the indoor fixing surface 20 with the

screws 80, but the fixing member 42 is removable, and therefore, the wiring work is easier if the electric wiring 35 is extended to the fixing member 42. Therefore, the electric wiring 35 is preferably
5 extended to an indoor side relative to the light control glass 30, and the cover member 43 is also provided at an indoor side relative to the light control glass 30.

[0033] Since the cover member 43 also covers the
10 portion where the electric wiring 35 extends into the inside of the ceiling surface 23, there is no need to make a hole through the cover member 43 in which the electric wiring 35 is passed. From this perspective, the multi-paned window structure 200
15 according to the present embodiment has an excellent appearance in terms of design.

[0034] Further, as illustrated in FIG. 1, the cover member 43 may be provided to engage with the fixing member 42 by the engagement units 46, 47.
20 The light control glass 30 is often installed by a construction contractor or a window installation contractor, but the wiring work of the electric wiring 35 is often performed by an electric engineering contractor. In other words, different
25 contractors perform the installation work and the wiring work. For example, in a configuration in which electric wirings are accommodated in a predetermined portion of a sash as described in PTL 1, it is necessary to simultaneously perform
30 installation of the sash and installation of the electric wirings, but if both are attempted to be performed simultaneously, two contractors have to arrange their schedules, which increased the

constraints.

[0035] In contrast, with the multi-paned window structure 200 according to the present embodiment, the light control glass 30 can be installed first, and thereafter the wiring work can be performed at any time convenient for the electric engineering contractor. In other words, the light control glass can be installed using only the base member 41 and fixing member 42. Subsequently, the wiring installation of the electric wiring 35 and attachment of the cover member 43 may be performed at any time convenient for the electric engineering contractor, so that the installation of the multi-paned window structure 200 is completed. Thus, with the multi-paned window structure 200 according to the present embodiment, the installation work can also be easily performed.

[0036] As described above, the base member 41, the fixing member 42, and the cover member 43 are configured to be assembled by engagement, so that the installation of the multi-paned window structure 200 using the light control glass 30 can be easily performed. However, the base member 41, the fixing member 42, and the cover member 43 may not be configured to be assembled by engagement. As long as the base member 41, the fixing member 42, and the cover member 43 can be ultimately assembled together, they can be assembled by adhesion or by fixation with screws.

[0037] In addition, a horizontal portion 43a extending horizontally toward the light control glass 30 exists below the engagement unit 47 for engagement of the cover member 43 with the fixing

member 42. The horizontal portion 43a is provided in order to cover the cushioning material 70 from below so as not to deteriorate the aesthetics. It is not essential to provide the horizontal portion 43a, and the horizontal portion 43a may be provided as necessary.

[0038] The lower side frame body 50 is provided at the lower side of the light control glass 30. The lower side frame body 50 supports the lower side of the light control glass 30. The lower side frame body 50 has a frame shape like the upper side frame body 40. The lower side frame body 50 supports the lower side of the light control glass 30 so that the lower side of the light control glass 30 is sandwiched between the outdoor side and the indoor side. The lower side frame body 50 has a base member 51 and a fixing member 52.

[0039] The base member 51 is a member for restricting the movement of the lower side of the light control glass 30 toward the outdoor. The base member 51 has a base portion 51a that is tightly fixed to the fixing surface 21, and an outside restriction portion 51b that extends vertically upward from the base portion 51a, and has an L-shaped cross-sectional shape. The base member 51 is slightly different in shape from the base member 41 of the upper side frame body 40, but has a similar function in that the base member 51 has an L-shape similar to that of the base member 41, and the movement of the light control glass 30 toward the outside is restricted by the outside restriction portion 51b. In that sense, the base member 51 may be referred to as a lower side outside restriction

member. The base portion 51a is slightly different from the base portion 41a of the upper side frame body 40 in that the base portion 51a supports the lower part of the light control glass 30, but is the same as the base portion 41a of the upper side frame body 40 in that the base portion 51a is fastened and fixed to the fixing surface 21 by screws 80 and supports, at the outside, the outside restriction portion 51b extending vertically upward. Further, in a manner similar to the outside restriction portion 41b of the upper side frame body 40, a cushioning material 60 may be provided at the tip of the outside restriction portion 51b. It should be noted that the outside restriction portion 51b may be in contact with a position near the lower side of the outdoor-side surface of the light control glass 30 through the cushioning material 60, and the outside restriction portion 51b may not be directly in contact with the lower side of light control glass 30.

[0040] The fixing member 52 is a member for restricting the movement of the lower side of the light control glass 30 toward the indoor, and has the same function as the fixing member 42 of the upper side frame body 40. The fixing member 52 is different from the fixing member 42 of the upper side frame body 40 in that the fixing member 52 has an L shape, but the fixing member 52 has the same function as the fixing member 42 in that the fixing member 52 is engaged with the base member 51 by the engagement unit 53, and fixes, from the inside, the lower side of the light control glass 30. Further, a cushioning material 70 may be provided at the tip

of the fixing member 52, and the indoor-side surface of the light control glass 30 may be elastically fixed and supported by the cushioning material 70. It should be noted that the fixing member 52 may be in contact with a position near the lower side of the indoor-side surface of the light control glass 30 through the cushioning material 70, and the fixing member 52 may not be directly in contact with the lower side of the light control glass 30.

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10 **[0041]** A setting block 90 may be provided between the lower end of the light control glass 30 and the base portion 51a of the base member 51. Thereby, the lower end of light control glass 30 can be supported stably. The setting block 90 may be made of various materials as long as the setting block 90 has a strength capable of supporting the light control glass 30. Two setting blocks 90 are preferably disposed along the lower end of the light control glass 30 in order to stably support the light control glass 30, but a single piece of single setting block 90 may be provided, or three or more setting blocks 90 may be provided.

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[0042] Like the upper side frame body 40, the lower side frame body 50 may not necessarily fix and sandwich the light control glass 30 completely, and it is sufficient to restrict the movement of the lower side of the light control glass 30 toward the outdoor and indoor sides to gently support the lower side of the light control glass 30 so that the light control glass 30 does not fall down or does not greatly shift.

25

30 **[0043]** The base members 41, 51, the fixing members 42, 52, and the cover member 43 may be made

of various materials as long as they have a strength capable of supporting the light control glass 30. For example, the base members 41, 51, the fixing members 42, 52, and the cover member 43 may be made
5 of metal materials such as, for example, aluminum, or may be made of resin and the like. As described above, the upper side frame body 40 and the lower side frame body 50 can be made of various materials according to purposes as long as the upper side
10 frame body 40 and the lower side frame body 50 have desired strengths.

[0044] In the lower side frame body 50, no member corresponding to the cover member 43 provided in the upper side frame body 40 is provided. Since the
15 light control function material 33 may be connected, at one external side, to the electric wiring 35, the light control function material 33 is connected, at the upper side, to the connector 34 and the electric wiring 35, but the electric wiring 35 can be
20 provided at the lower side so as to extend to below the floor, or the electric wiring 35 can be provided to extend from the left or right side to the ceiling or the floor. In the present embodiment, the cover member 43 is provided only for the upper side frame
25 body 40, but in a case where the electric wiring 35 is provided so as to extend to below the floor, a cover member may also be provided for the lower side frame body 50. In a case where the electric wiring 35 is provided so as to extend from the left side or
30 the right side of the light control function material 33 to the ceiling or the floor, the cover member may be configured to extend so as to cover the electric wiring 35.

[0045] FIG. 2 is a front view, seen from an indoor side, illustrating an example of the multi-paned window structure according to the first embodiment. FIG. 2 illustrates a state in which the
5 cover member 43 of the upper side frame body 40 and the fixing member 52 of the lower side frame body 50 are not provided.

[0046] In FIG. 2, the base member 41 of the upper side frame body 40 covers, as a through member, the
10 entire upper side of the outdoor-side surface of the light control glass 30, but the fixing members 42 partially cover the upper side of the indoor-side surface of the light control glass 30. In FIG. 2, two fixing members 42 are provided at the upper side
15 to support, from the indoor side, the light control glass 30 at two positions near the upper end of the light control glass 30. As illustrated in FIG. 2, a single connector 34 is provided at one position on the upper surface of the light control glass 30, and
20 therefore, when the portion in which the connector 34 is provided is not covered by the fixing member 42, the connector 34 and the electric wiring 35 are exposed without being covered by the fixing member 42, and the connector 34 and the electric wiring 35
25 can be accessed very easily. Therefore, in this state, a wiring work is performed to arrange the electric wiring 35 into the inside of the ceiling surface 23, and when the connector 34 and the electric wiring 35 are covered by the cover member
30 43 after the completion of the wiring work, the connector 34 and the electric wiring 35 are not exposed, which can prevent deterioration in the aesthetics.

[0047] The cover member 43 may be configured to cover only the connector 34 and the electric wiring 35, or, similarly to the base member 41, may be configured to cover the entire upper side of the light control glass 30. From the viewpoint of design, the cover member 43 preferably covers the entire upper side.

[0048] Thus, when the fixing members 42 are provided at positions not covering the connector 34 and the electric wiring 35 extending from the upper end portion of the light control glass 30, and the fixing members 42 are configured to partially support the indoor-side surface of the light control glass 30, the connector 34 and the electric wiring 35 can be easily accessed, and the wiring work can be easily performed. In addition, the wiring work can be performed independently after the light control glass 30 is installed, and the scheduling of the wiring work can be easily arranged.

[0049] As illustrated in FIG. 2, the lower side of the light control glass 30 is supported, at the outdoor-side surface, by the lower side frame body 50. Of the lower side frame body 50, only the base member 51 is illustrated, but when the light control glass 30 is fixed, the fixing member 52 is also provided. The fixing member 52 can be provided at various positions as long as the movement of the indoor-side surface of the lower side of the light control glass 30 can be restricted. For example, the fixing members 52 may be provided at two positions so as to correspond to the fixing members 42 of the upper side frame body 40, or may be provided at two positions at both ends in the width

direction of the light control glass 30.

[0050] The fixing members 42, 52 may be provided so as to support only one point or support two or more points as long as the fixing members 42, 52 can
5 restrict the movement of the light control glass 30 toward the indoor and can support the light control glass 30 so that the light control glass 30 does not fall.

[0051] Further, the fixing member 42 of the upper
10 side frame body 40 may be configured, as a single piece, to continuously cover a region that does not cover the connector 34 and the electric wiring 35, and the fixing member 52 of the lower side frame body 50 may be configured, as a through member, to
15 cover the entire width direction of the lower side of the light control glass 30. In particular, when the cover member 43 is configured to cover the entire width of the light control glass 30, the fixing member 52 of the lower side frame body 50 is
20 preferably configured as a through member that covers the entire width of the light control glass 30 from the viewpoint of design because the upper and lower sides are balanced.

[0052] Similarly, the base members 41, 51 are
25 also configured to cover the entire width direction of the light control glass 30 in FIG. 2, but the base members 41, 51 may not be necessarily configured to cover the entire width direction, and may be configured to support the light control glass
30 30 by partially covering several places. However, from the viewpoint of the design for not exposing the connector 34 and the electric wiring 35 when seen from the outdoor side, as illustrated in FIG. 2,

the base member 41 is preferably configured as a through member to cover the entire upper side of the light control glass 30, and the base member 51 is preferably configured, as a through member, to cover the entire lower side of the light control glass 30 just like the base member 41 at the upper side.

[0053] The multi-paned window structure 200 may be provided in a blind concealment box in which existing blinds and the like are stored. When a blind covering the inside of the existing window is provided, the blind concealment box for storing the blind is often provided on the ceiling surface 230. The blind concealment boxes usually have a depth of about 10 cm to 20 cm. In the multi-paned window structure 200 according to the present embodiment, the depth of the upper side frame body 40 from the base member 41 to the cover member 43 is less than 10 cm, and therefore, the upper side frame body 40 can be stored in the blind concealment box. Since the blind concealment box is formed on the ceiling surface 230 in a hollow shape, the upper side frame body 40 can be stored in the recess. This facilitates the installation of the multi-paned window structure 200, and the upper side frame body 40 can be stored in the blind concealment box, which achieves an excellent appearance in terms of design. Since the light control glass 30 electrically serves as a blind and the like, the light control glass 30 can be arranged according to the functions and purposes in terms of the installation position.

[0054] In a case where the upper side frame body 40 is provided in the blind concealment box, the cover member 43 may be configured to have only a

horizontal portion visible from below.

[0055] As described above, in the multi-paned window structure 200 according to the first embodiment, while the wiring used for applying the voltage to the light control function material 33 such as the connector 34 and the electric wiring 35 is hidden, the light control glass 30 can be installed independently from the existing window 10. This makes it possible to install the light control glass 30, which is the state-of-the-art technology, in the existing building while maintaining excellent aesthetics. Moreover, the installation of the light control glass 30 and the wiring work of the electric wiring 35 and the like can be performed separately, and the installation can also be easily performed.

[0056] Furthermore, since the multi-paned window structure 200 is provided at an inner side relative to the existing window 10, a structure similar to an insulated glazing unit is achieved as a whole. That is, the multi-paned window structure 200 according to the first embodiment has less airtightness and sealing property from the existing glass 11 of the existing window 10 than that of the conventional insulated glazing unit structure, but the multi-paned window structure 200 has a simple structure and is attached to an inner side relative to the existing window 10 and has a structure similar to an insulated glazing unit. With the multi-paned window structure 200, the heat shielding effect can be enhanced as compared with the case where only the existing window 10 is provided, and an effect similar to that of an insulated glazing unit can be attained. In addition, since the multi-paned window

structure 200 is installed without coming into contact with the existing window 10, the multi-paned window structure 200 can be installed regardless of the strength and durability of the existing window
5 10. In addition, since the multi-paned window structure 200 is not required to be adhered to the existing glass 11, a curing time and labor are not required, and the installation can be easily performed. Since the light control glass 30 can
10 change the transmittance and the light shading performance, the light control glass 30 has an adjustment function superior to that of an ordinary insulated glazing unit.

[0057] As described above, in exchange for the
15 airtightness and the sealing property not being regarded as important relative to the conventional insulated glazing unit structure, the multi-paned window structure 200 according to the first embodiment achieves excellent ease of installation,
20 excellent ease of removal, and the like, and the multi-paned window structure 200 can be suitably applied to the existing window 10 having a low degree of strength produced in a middle-advanced country. In other words, the light control glass 30,
25 which is the state-of-the-art technology, can be easily installed with the existing window 10, and even if the light control glass 30 was not introduced when a building was newly constructed, the benefits can be enjoyed by retrofitting the
30 light control glass 30.

[0058] FIG. 3 is a traverse sectional view illustrating an example of the multi-paned window structure 200 according to the first embodiment of

the present invention. FIG. 3 illustrates the multi-paned window structure 200 having a configuration in which the light control glass 30 is constituted by a single sheet of glass and vertical frames 110 are provided. As illustrated in FIG. 3, the vertical frame 110 is fixed to a lateral fixing surface (wall surface) 22 using screws 80. The vertical frame 110 has an L shape similarly to the base members 41, 51, but since the fixing members 42, 52 are not to be provided on the sides, a base portion 111 is different from the base member 41, 51 in that the base portion 111 is formed as a single plate and does not have the engagement units 45 and 53. An outside restriction portion 112 is provided to restrict the movement of the side of the light control glass 30 toward the outdoor. The restriction portion 112 is similar to the base members 41, 51 in that the restriction portion 112 is provided with a cushioning material 60.

[0059] As described above, as necessary, the vertical frames 110 extending vertically may be provided to restrict the movement of the side of the light control glass 30 toward the outdoor.

[0060] FIG. 4 is a traverse sectional view illustrating an example in a case where the multi-paned window structure according to the first embodiment of the present invention is continuously installed. In FIG. 4, the light control glass 30 is composed of two sheets of glass. The two sheets of light control glass 30 are connected by an edge cover member 120 near the center. That is, FIG. 4 corresponds to the traverse sectional view of the aspect illustrated in FIG. 2. The edge cover member

120 connects the two continuous sheets of light control glass 30 while a predetermined distance of, e.g., about 10 mm is maintained between the two continuous sheets. In a case where the sheets of light control glass 30 are continuous, the edge cover member 120 is used for the connecting portion, so that the two continuous sheets of light control glass 30 can be connected while the hermetic property is maintained.

10 [0061] Since the other constituent elements are similar to those of FIG. 3, the corresponding constituent elements are denoted with the same reference numerals and description thereabout is omitted.

15 [0062] Subsequently, an installation method for installing the multi-paned window structure 200 according to the first embodiment of the present invention will be explained.

20 [0063] FIG. 5 is a drawing illustrating an example of a base member attachment step in the installation method for installing the multi-paned window structure 200 according to the first embodiment. In the base member attachment step, the base members 41, 51 are attached to the fixing surfaces 20, 21, respectively. The base members 41, 51 are attached by, for example, fastening the base portions 41a, 51a of the base members 41, 51 to the fixing surfaces 20, 21, respectively, by screws 80. Holes through which the screws 80 pass are formed in the base portions 41a, 51a in advance, and are configured to be able to be screwed and fastened to the fixing surfaces 20, 21. In addition, the cushioning materials 60 made of elastic materials,

30

such as rubber and the like, are preferably provided at the tips of the base members 41, 51.

[0064] In addition, the position where the base members 41, 51 are attached are the position where
5 the light control glass 30 is to be installed which is an inner side relative to the existing window 10. The base members 41, 51 are provided independently and spaced apart from the existing sash 12 of the existing window 10.

10 **[0065]** FIG. 6 is a drawing illustrating an example of a light control glass placement step in the installation method for installing the multi-paned window structure 200 according to the first embodiment. In the light control glass installation
15 step, the light control glass 30 is placed, from the indoor side, to come into contact with the base members 41, 51. At that time, as necessary, the setting blocks 90 are installed on the base portion 51a of the base member 51 of the lower side frame
20 body 50, and the light control glass 30 is placed on the setting blocks 90.

[0066] At this stage, the electric wiring 35 naturally hangs downward from the upper end of the light control glass 30 and is not fixed. The
25 connector 36 may be provided at the tip of the electric wiring 35.

[0067] FIG. 7 is a drawing illustrating an example of a fixing member attachment step in the installation method for installing the multi-paned
30 window structure 200 according to the first embodiment. In the fixing member attachment step, the fixing members 42, 52 are attached, and the light control glass 30 is supported from the indoor

side. For example, the fixing members 42, 52 are attached by engagement with the base members 41, 51 via the engagement units 45, 53. The cushioning materials 70 are preferably provided at the tips of the fixing members 42, 52 to come into contact with the glass plate 32 of the light control glass 30.

[0068] As a result of the fixing member attachment step, the light control glass 30 is fixed and supported so as to be sandwiched between the upper side frame body 40 and the lower side frame body 50. As described above, instead of being "fixed and supported", the light control glass 30 may be gently supported.

[0069] The fixing member 42 at the upper side partially supports the light control glass 30 as explained in FIG. 2. Therefore, a gap through which the electric wiring 35 can be passed is formed between the fixing members 42 adjacent to each other. The fixing member 52 at the lower side may be configured as a through member and may be provided without any gap, or the fixing members 52 may be provided with a gap in a manner similar to the fixing members 42 at the upper side.

[0070] The light control glass attachment step is constituted by the base member attachment step to the fixing member attachment step in FIG. 5 to FIG. 7. That is, as a result of the light control glass attachment step, the light control glass 30 is attached to a predetermined position at an inner side relative to the existing window 10.

[0071] FIG. 8 is a drawing illustrating an example of a wiring attachment step in the installation method for installing the multi-paned

window structure 200 according to the first embodiment. In the wiring attachment step, wiring work is performed to connect the electric wiring 35 extending from the light control glass 30 to a wiring (not illustrated) connected to the power source (not illustrated) behind the ceiling surface 23. Such wiring work is usually performed by a wiring work contractor. In the wiring work, the electric wiring 35 is passed between the fixing members 42 spaced apart from each other, and the connector 36 is connected to a wiring connection unit (not illustrated) behind the ceiling surface 23.

[0072] Once the light control glass 30 is attached in the light control glass attachment step, the light control glass 30 is in a stable state, and therefore, no problem will occur even if the light control glass 30 is left as it is for several days. That is, it is possible to wait until the wiring work contractor becomes available.

[0073] FIG. 9 is a drawing illustrating an example of a frame body attachment step in the installation method for installing the multi-paned window structure 200 according to the first embodiment. In the frame body attachment step, the cover member 43 of the upper side frame body 40 is attached, and the electric wiring 35 is covered by the cover member 43. For example, the cover member 43 may be attached by engagement with the fixing member 42 via the engagement units 46, 47.

[0074] The cover member 43 covers at least the electric wiring 35 and is preferably configured as a through member to cover the entire width of the upper side of the indoor side of the light control

glass 30.

[0075] The electric wiring 35 is covered and hidden as a result of the frame body attachment step. Therefore, an excellent appearance in terms of design can be maintained.

[0076] Thus, according to the installation method for installing the multi-paned window structure according to the present embodiment, the light control glass attachment step and the wiring attachment step are not required to be performed simultaneously and are independent. In addition, after finishing the frame body attachment step, the light control glass 30 can be attached to the existing building with an excellent appearance in terms of design, and the light control glass 30 can be easily introduced.

[0077] [Second embodiment]

FIG. 10 is a cross sectional view illustrating an example of a multi-paned window structure 201 according to the second embodiment of the present invention. In the multi-paned window structure 201 according to the second embodiment, the shape of a cover member 44 of an upper side frame body 40a is different from the shape of that of the multi-paned window structure 200 according to the first embodiment. In addition, the multi-paned window structure 201 according to the second embodiment is different from the attachment environment of the multi-paned window structure 200 according to the first embodiment in that the ceiling surface 23 of the room in which the multi-paned window structure 201 is installed is higher than the ceiling surface 23 of the room illustrated in FIG. 1 and FIGs. 5 to

9. Since the other constituent elements are the same as those in the first embodiment, the corresponding constituent elements are denoted with the same reference numerals and description
5 thereabout is omitted.

[0078] As illustrated in FIG. 10, in the multi-paned window structure 201 according to the second embodiment, the length of a vertical cover portion 44b extending upward in the vertical direction from
10 a horizontally-extending horizontal cover portion 44a of the cover member 44 is longer than that of the first embodiment, and is in contact with the ceiling surface 23 through the cushion member 130. The ceiling surface 23 of the second embodiment is
15 higher than that of the first embodiment, and in addition, the cover member 44 of the second embodiment is different from the cover member 43 of the multi-paned window structure 200 according to the first embodiment in that the cover member 44 is
20 extended until it comes into contact with the ceiling surface 23 through the vertical cover portion 44 and the cushion member 130. In this way, the cover member 44 may be configured to be extended to the ceiling surface 23. The electric wiring 35
25 can be completely covered by extending the cover member 43 to the ceiling surface 23. Further, the cover member 44 may not be necessarily extended to the ceiling surface 23, and the cover member 44 can be variously changed according to the shape of the
30 ceiling surface 23. In other words, as long as the connector 34 and the electric wiring 35 can be covered appropriately, the cover member 44 can have various shapes. In this way, by making the cover

member 44 into an appropriate shape according to the shape, height, and the like of the ceiling surface 23, the light control glass 30 can be installed with an excellent aesthetic appearance.

5 **[0079]** It should be noted that the installation method for installing the multi-structured window according to the second embodiment can be performed by a method similar to the installation method for installing the multi-paned window structure
10 according to the first embodiment, and thus description thereabout is omitted.

[0080] [Third embodiment]

FIG. 11 is a longitudinal sectional view illustrating an example of a multi-paned window structure 202 according to a third embodiment of the
15 present invention. In FIG. 11, the multi-paned window structure according to the third embodiment is different from the multi-paned window structure 200 according to the first embodiment in that a
20 protrusion unit 510c is provided at a lower part of an outdoor-side surface of an outside restriction portion 510b of a base member 510, and a seal member 140 is provided in a space having a depth below the protrusion unit 510c.

25 **[0081]** In this way, a seal member holding space 510d that can hold the seal member 140 may be formed at the lower part of the outdoor-side surface of the outside restriction portion 510b of the base member 510, and the seal member 140 may be provided in the
30 seal member holding space 510d. The seal member 140 may be made of an elastic material such as rubber, for example. The seal member 140 is provided at the lower end portion of the base member 510 which is

located at the outermost position, so that the sealing performance of the lower end portion of the multi-paned window structure 202 is improved, and even when rainwater or the like enters from the existing window 10, waterproofing can be achieved reliably. The multi-paned window structure according to the embodiments of the present invention is basically not intended to improve the airtightness and sealing property, and the main object is to improve the heat shielding performance by installing the simple multi-paned window structure, but the multi-paned window structure according to the embodiments of the present invention may compensate for seal failure of the existing window 10 by providing the seal member 140.

[0082] Since the other constituent elements are similar to those of the multi-paned window structure 200 according to the first embodiment, the corresponding constituent elements are denoted with the same reference numerals and description thereabout is omitted.

[0083] [Fourth embodiment]

FIG. 12 is a longitudinal sectional view illustrating an example of a multi-paned window structure 203 according to the fourth embodiment of the present invention. The multi-paned window structure 203 according to the fourth embodiment is the same as the multi-paned window structure 202 according to the third embodiment in that the seal member 140 is held at the lower end of the base member 511, but is different from the multi-paned window structure 202 according to the third embodiment in that a protrusion 511c does not

protrude from the outdoor-side surface of the outside restriction portion 511b, but an outside surface 511e of the base portion 511a forms a seal member holding space 511d having a depth and recessed into the indoor side, and the seal member 140 is held in the seal member holding space 511d recessed to the indoor side.

[0084] As described above, the outside surface of the base portion 511a may be recessed to the indoor side to form the seal member holding space 511d. Even in this case, since the seal member 140 is provided in the lower end portion of the multi-paned window structure 203, a waterproof effect can be attained in a manner similar to the third embodiment.

[0085] As described above, the multi-paned window structures 200 to 203 can have various configurations depending on the purposes.

[0086] Since the other constituent elements are similar to those of the multi-paned window structures 200, 201, 202 according to the first to third embodiments, the corresponding constituent elements are denoted with the same reference numerals and description thereabout is omitted.

[0087] In the above-described embodiment, the configuration in which the light control glass is provided at the indoor side of the existing window has been described. However, the present invention can be applied to not only the light control glass but also a plate-shaped body to which wiring is connected. For example, a photovoltaic module, LED built-in glass, heated glass, and blind built-in glass may be used instead of the above-described light control glass.

[0088] An example of a photovoltaic module includes that of a laminated glass structure in which solar cells are sandwiched between two interlayers which are in turn sandwiched by two glass plates.

[0089] Examples of LED built-in glass include: an insulated glazing unit which includes two glass plates, in which a transparent conductive film having LEDs formed thereon is formed on a principal face of one of the two glass plates at an air layer side; and laminated glass in which LEDs are formed on a transparent conductive film on an interlayer, which are sandwiched between two glass plates. The LEDs are turned on by energizing the transparent conductive film.

[0090] An example of the heated glass includes heated glass in which a transparent conductive film is formed on a principal face of a glass plate. By energizing the transparent conductive film, the entire glass surface generates heat, so that the room can be warmed.

[0091] An example of blind built-in glass includes an insulated glazing unit having an electric blind in a hollow layer.

[0092] Even in a case where a plate-shaped body other than light control glass is used, the installation method for installing the multi-paned window structure according to the embodiments can be applied in a similar manner, and a Low-E film can be coated in a manner similar to the light control glass.

[0093] Although the preferred embodiments of the present invention have been described in detail

above, the present invention is not limited to the
above-described embodiments, and various
modifications and substitutions can be applied to
the above-described embodiments without deviating
5 from the scope of the present invention.

[0094] This application claims the priority based
on the basic application 2017-140043 filed with the
Japan Patent Office on July 19, 2017, the entire
contents of which are incorporated herein by
10 reference.

REFERENCE SIGNS LIST

[0095] 10 existing window
11 existing glass
15 12 existing sash
13 mullion
20, 21, 22 fixing surface
30 light control glass
31, 32 glass plate
20 33 light control function material
34, 36 connector
35 electric wirings
40 upper side frame body
41, 51, 410, 510 to 513 base member
25 41a, 51a, 511a, 513a base portion
41b, 51b, 112, 510b to 513b outside
restriction portion
42, 52 fixing member
43, 44 cover member
30 44a horizontal cover portion
44b vertical cover portion
50 lower side frame body
60, 70 cushioning material

80 screw
90, 91 setting block
110, 110a, 110c vertical frame
120 edge cover member
5 130 cushion member
140 seal material
150 magnet gasket
200 to 205 multi-paned window structure

WHAT IS CLAIMED IS:

5

[Claim 1]

A multi-paned window structure comprising:
a plate-shaped body disposed at an indoor side
relative to an existing window substantially in

10 parallel with the existing window;

a wiring disposed to be connected to a
predetermined position of the plate-shaped body; and
a frame body accommodating and covering the
wiring.

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[Claim 2]

20 The multi-paned window structure according to
claim 1, wherein the plate-shaped body is light
control glass.

25

[Claim 3]

The multi-paned window structure according to
claim 1 or 2, wherein the plate-shaped body is
30 provided independently from the existing window
without being in contact with the existing window.

[Claim 4]

5 The multi-paned window structure according to
any one of claims 1 to 3, wherein the frame body
fixes the plate-shaped body at least at one point.

10

[Claim 5]

15 The multi-paned window structure according to
any one of claims 1 to 4, wherein the predetermined
position is at an upper side of the plate-shaped
body.

20 [Claim 6]

The multi-paned window structure according to
claim 4, further comprising:

25 an outside restriction member restricting
movement of the plate-shaped body toward an outdoor
side; and

an inside restriction member restricting
movement of the plate-shaped body toward an indoor
side,

30 wherein at least a portion of the plate-shaped
body is fixed by the outside restriction member and
the inside restriction member.

[Claim 7]

5 The multi-paned window structure according to claim 6, wherein the outside restriction member includes an upper side outside restriction member, included in the frame body, restricting movement of an upper side of the plate-shaped body toward the outdoor side,

10 the inside restriction member includes an upper side inside restriction member, included in the frame body, restricting movement of the upper side of the plate-shaped body toward an indoor side,

the frame body includes a cover member covering

15 the wiring, and

at least one point of the upper side of the plate-shaped body is fixed by the upper side outside restriction member and the upper side inside restriction member.

20

[Claim 8]

25 The multi-paned window structure according to claim 6 or 7, wherein the outside restriction member includes a lower side outside restriction member restricting movement of a lower side of the plate-shaped body toward the outdoor side,

30 the inside restriction member includes a lower side inside restriction member restricting movement of the lower side of the plate-shaped body toward the indoor side, and

the inside restriction member is detachably attached.

5

[Claim 9]

The multi-paned window structure according to any one of claims 6 to 8, wherein the outside
10 restriction member and the inside restriction member are attached and fixed to a position where a fixing surface is formed in a room where the existing window is disposed.

15

[Claim 10]

The multi-paned window structure according to any one of claims 6 to 9, wherein the outside
20 restriction member is a member having a cross sectional shape in an L shape.

25

[Claim 11]

The multi-paned window structure according to any one of claims 6 to 10, wherein a cushioning
30 material is disposed at an indoor side of the outside restriction member.

[Claim 12]

5 The multi-paned window structure according to any one of claims 6 to 11, wherein the outside restriction member is configured as a through member extending in a horizontal direction, and

10 at a lower end at the outdoor side of the outside restriction member disposed at a lower part, a space having a depth made by a protrusion or a recessed shape is formed, and a seal member is disposed in the space.

15

[Claim 13]

20 The multi-paned window structure according to any one of claims 6 to 12, wherein a Low-E film is coated on a face of one side of the plate-shaped body.

25

[Claim 14]

An installation method for installing the multi-paned window structure according to any one of claims 6 to 13, comprising:

30 a plate-shaped body attachment step for attaching the plate-shaped body to a predetermined position at an inner side relative to the existing window;

a step of performing wiring work for connecting and installing the wiring; and

a frame body attachment step for attaching the frame body for covering the wiring having been wired
5 in the wiring work,

the plate-shaped body attachment step, the step for performing the wiring work, and the frame body attachment step are performed in order.