

DESCRIPTION

TITLE OF THE INVENTION

MULTIPLE PANE WINDOW STRUCTURE AND METHOD FOR
5 INSTALLING SAME

TECHNICAL FIELD

The present invention relates to a multiple pane
window structure and a method for installing same.

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BACKGROUND ART

Conventionally, a double glazed window is known
that is formed by attaching an approximately rectangular-
shaped new glass plate with a spacer to an inner surface
15 of an existing glass window through the spacer (e.g., see
Patent Document 1). In the double glazed window described
in Patent Document 1, the glass plate with the spacer has
an inner surface that faces the inner surface of the
existing glass window, a glass plate having a smaller size
20 than that of the existing glass window, and a spacer that
is arranged on an inner surface of the glass plate so as
to have a certain distance from a periphery of the glass
plate. Moreover, the double glazed window has a seal
member that causes the inner surface of the existing glass,
25 an outer peripheral surface of the spacer of the glass
plate with the spacer and the inner surface of the glass
with the spacer to bond together, and the seal member is
made of a polysulfide based sealant or a silicone based
sealant.

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Furthermore, a glass plate with a spacer is
known in which one side surface of a spacer is adhered to
a location inside the periphery of one surface of the
glass plate through first butyl rubber; second butyl

rubber is adhered to the other side surface of the spacer;
and a protective sheet is detachably adhered to the second
butyl rubber (e.g., see Patent Document 2).

Thus, the conventional post-installed glass
5 plates with the spacers are configured to cause the glass
plates with the spacers to adhere to the inner surface of
the existing glass window, and need to compress the first
butyl rubber by a predetermined recessed amount to ensure
sufficient airtightness. In such a configuration, to cause
10 the glass window with the spacer to adhere to the existing
window, the existing glass window is required to have a
certain degree of strength.

PRIOR ART DOCUMENTS

PATENT DOCUMENTS

15 Patent Document 1: Japanese Patent Publication No. 5783438
Patent Document 2: Japanese Laid-Open Patent Application
Publication No. 2012-148966

SUMMARY OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

In the meantime, demands for the above-mentioned
post-installed double glazed window are increasing in
semi-developed countries such as Southeast Asia. However,
existing window glasses in the semi-developed countries do
25 not necessarily enough strength, and the glass windows
described in the above-mentioned Patent Documents 1 and 2
cannot be applied to the glass windows that do not have
enough strength as they are. Otherwise, in the existing
window glasses in the semi-developed countries, technical
30 information such as drawings for confirming required
strength is sometimes insufficient, which may cause
inconvenience of application.

In addition, even in advanced countries where

the existing window glasses have enough strength, the configuration described in Patent Document 2 had problem of requiring a significant degree of time and effort for installation operation because a curing period for
5 hardening a seal member requires a long period in joining a glass with a spacer to an existing glass. Even in advanced countries, the convenience of installing and removing the double glazed glass may be sometimes prioritized to the airtightness and sealing properties
10 depending on the intended use.

Therefore, the present invention is intended to provide a multiple pane window structure and a method for installing the same that are readily and independently attachable and detachable without contacting an existing
15 glass window.

MEANS FOR SOLVING THE PROBLEM

To achieve the above purpose, according to an embodiment of the present invention, there is provided a
20 multiple pane window structure includes:

a face material provided on an indoor side of an existing window and approximately parallel to the existing window;

a pair of outside regulating members provided on
25 an upper side and a lower side of the face material and on the indoor side of the existing window and on an outdoor side of the face material so as to regulate a movement of the upper side and the lower side of the face material toward the outdoor side; and

30 a pair of inside regulating members detachably provided on the upper side and the lower side of the face material and on the indoor side of the face material so as to regulate a movement of the upper side and the lower

side of the face material toward the indoor side.

According to another embodiment of the present invention, there is provided a multiple pane window structure, comprising:

5 attaching first and second outside regulating members to first and second fixed surfaces, respectively, present on an upper side and a lower side of a location on an indoor side of an existing window, the outside regulating members regulating a movement of an upper side
10 and a lower side of a face material toward an outdoor side;

 placing the face material at a neighborhood on the indoor side of the first and second outside regulating members; and

15 attaching first and second inside regulating members to the first and second fixed surfaces, respectively, at a neighborhood on the indoor side of the face material, the inside regulating members regulating a movement of the upper side and the lower side of the face
20 material toward the indoor side.

ADVANTAGEOUS EFFECT OF THE INVENTION

 According to the present invention, a multiple pane window can be simply and conveniently installed
25 without contacting an already glass window.

BRIEF DESCRIPTION OF THE DRAWINGS

 FIG. 1 is a vertical cross-sectional view illustrating an example of a multiple pane window structure according to a first embodiment of the present
30 invention;

 FIG. 2 is a front view illustrating an example of a multiple pane window structure according to the first

embodiment of the present invention;

FIG. 3 is a transverse cross-sectional view illustrating an example of a multiple pane window structure constituted of a single face material according to the first embodiment of the present invention;

FIG. 4 is a transverse cross-sectional view illustrating an example of a multiple pane window structure constituted of a successive face material according to the first embodiment of the present invention;

FIG. 5 is a vertical cross-sectional view illustrating an example of a multiple pane window structure according to a second embodiment of the present invention;

FIG. 6 is a vertical cross-sectional view illustrating an example of a multiple pane window structure according to a third embodiment of the present invention;

FIG. 7 is a vertical cross-sectional view illustrating an example of a multiple pane window structure according to a fourth embodiment of the present invention;

FIG. 8 is a transverse cross-sectional view illustrating an example of a multiple pane window structure according to the fourth embodiment of the present invention;

FIG. 9 is a vertical cross-sectional view illustrating an example of a multiple pane window structure according to a fifth embodiment of the present invention;

FIG. 10 is a transverse cross-sectional view illustrating an example of a multiple pane window structure according to the fifth embodiment of the present

invention;

FIG. 11 is a vertical cross-sectional view illustrating an example of a multiple pane window structure according to a sixth embodiment of the present invention;

FIG. 12 is a transverse cross-sectional view illustrating an example of a multiple pane window structure according to the sixth embodiment of the present invention;

FIG. 13 is a perspective view illustrating an example of a multiple pane window structure according to a seventh embodiment of the present invention;

FIG. 14 is a transverse cross-sectional view illustrating an example of a multiple pane window structure according to the seventh embodiment;

FIG. 15 is a vertical cross-sectional view illustrating an example of a multiple pane window structure according to the seventh embodiment of the present invention;

FIG. 16 is a diagram illustrating an example of a process of attaching an L-shaped member of a method of installing a multiple pane window structure according to an embodiment of the present invention;

FIG. 17 is a diagram illustrating an example of a process of placing a face material of a multiple pane window structure according to an embodiment of the present invention; and

FIG. 18 is a diagram illustrating an example of a process of attaching a fall prevention component of a multiple pane window structure according to an embodiment of the present invention.

MODE OF CARRYING OUT THE INVENTION

Embodiments of carrying out of the present invention are described below with reference to the accompanying drawings.

5 [First Embodiment]

FIG. 1 is a vertical cross-sectional view illustrating an example of a multiple pane window structure 200 according to a first embodiment of the present invention. The multiple pane window structure 200
10 according to the first embodiment is provided on an indoor side of an existing window 10 constituted of an existing pane of glass 11 and an existing sash 12. Specifically, the multiple pane window structure 200 is provided at locations where fixed surfaces 20, 21 are formed. The
15 fixed surfaces 20, 21 only have to include the fixed surface 20 present on the upper side and the fixed surface 21 present on the lower side. The fixed surfaces 20, 21 may be an upper surface and a lower surface of a window frame, or a ceiling surface and a floor surface of a room,
20 for example. Moreover, the fixed surface 20, 21 need not be an upper surface and a lower surface that are horizontally installed, but may be an upper region and a lower region of a wall surface (vertical surface) on the room side of the window frame. Furthermore, the fixed
25 surface may be an upper portion and a lower portion of a side surface (vertical surface) fixed and installed in the room such as a mullion that divides sashes. Thus, the fixed surfaces 20, 21 may be a variety of surfaces including a vertical surface as long as the multiple pane
30 window structure 200 can be fixed at upper and lower positions. As illustrated in FIG. 1, the first embodiment is described by citing an example of forming a window frame as the fixed surfaces 20, 21.

The multiple pane window structure 200 includes a face material 30, L-shaped members 40, and fall prevention components 60. The face material 30 is provided on an indoor side of the existing window 10. Moreover, the
5 L-shaped members 40 are provided between the existing window 10 and the face material 30 and in the vicinity of an upper side and a lower side on an outdoor side of the face material 30, and regulate a movement of the upper side and the lower side of the face material 30 toward the
10 outdoor side. Furthermore, the fall prevention components 60 are provided in the vicinity of the upper side and the lower side of the face material 30 on the indoor side, and regulate a movement of the face material 30 toward the indoor side. The L-shaped parts 40 are fixed to the fixed
15 surfaces 20, 21 provided on the upper and lower sides by screws 70. The fall prevention components 60 are fixed to base parts 41 of the L-shaped members 40 via the screws 71.

Thus, the multiple pane window structure 200 regulates forward and backward movements (toward the
20 outdoor side and the indoor side) of the face material 30 by sandwiching the face material 30 between the L-shaped parts 40 and the fall prevention components 60, and loosely supports the face material 30. Here, loosely supporting means to support the face material 30 to a
25 degree that the face material 30 does not fall down while allowing the face material 30 to slightly shift and to slightly move forward and backward, and does not mean to fix the face material 30 completely. Moreover, a setting block 80 may be provided between the base part 41 of the
30 L-shaped member 40 on the lower side and a lower end of the face material 30. Furthermore, cushioning materials 50 may be provided inside regulating parts 42 of the L-shaped members 40, and may elastically support the outer surface

of the face material 30.

Thus, the multiple pane window structure 200 according to the first embodiment does not have the airtightness and sealing properties with the existing
5 window 10 and the existing pane of glass 11 more than a conventional pair glass structure, but is installed at a location inside the existing window 10 with a simple and convenient structure and has a structure similar to the pair glass. Such a multiple pane window structure 200 can
10 improve a heat shielding effect and can obtain effects similar to the pair glass more than a case of providing only the existing window 10. Moreover, because the multiple pane window structure 200 is installed without touching the existing window 10, the multiple pane window
15 structure 200 can be installed without respect to strength and tolerance of the existing window 10. Furthermore, because adhesion to the existing pane of glass 11 is not needed, curing time and labor therefore are not needed, and construction for installation can be simply and
20 conveniently performed. Thus, the multi pane window structure according to the first embodiment excels in convenience of installation and easiness of removal, and can be preferably applied to existing windows 10 of semi-developed countries using existing panes of glass 11 with
25 weaker strength, in exchange for less requiring airtightness and sealing properties than the conventional pair glass structure.

Individual components of the multiple pane window structure 200 according to the first embodiment are
30 described below in more detail.

The face material 30 is a plate-shaped member that is newly installed inside relative to the existing window 10. The face material 30 is, for example, made of a

plate of glass. Here, the glass includes both non-organic glass and organic glass. The non-organic glass includes soda-lime glass, borosilicate glass, alkali-free glass, quartz glass and the like. A plate of tempered glass may
5 be used as the plate of glass to enhance safety. The plate of tempered glass obtained by a cold air tempering method and a chemical tempering method can be used as the plate of the tempered glass. Polycarbonate, acrylic resin and the like are cited as the organic glass. In other words,
10 the face material 30 may be made of a variety of materials as long as the face material 30 is made of a transparent face material that can play a role of a windowpane without sticking to a glass material. Here, the role of the windowpane is, for example, having a transparent body to
15 ensure visibility, being able to let in light, having an effect of blocking heat, and the like. As long as the face material 30 has a basic function of the windowpane, the material of the face material 30 is not limited. In addition, the face material 30 does not need to be a
20 single plate, but laminated glass, double glazed glass and the like may be used. Thus, the face material 30 can adopt a variety of materials depending on the intended use.

A surface of the face material 30 may be coated with a Low-E film, and may be configured to enhance heat
25 shielding properties and heat insulating properties thereof. On this occasion, the double glazed glass may be used as the face material 30 itself, and the Low-E film may be formed on the inner surface of the sealed double glazed glass by being deposited thereon by sputtering.
30 Moreover, as described above, when a single glass is newly installed as the face material 30 in the open air in Southeast Asia and the like, a face material 30 on which a Low-E film is deposited by CVD (Chemical Vapor Deposition)

may be used. Because the Low-E film deposited by sputtering needs to be kept in a state of dry air, the double glazed glass is preferably used as the face material 30. In contrast, the Low-E film deposited by CVD
5 can be used in the open air, and is preferably used as the face material 30 made of a single plate of glass as it is.

In addition, the face material 30 may be a digital signage that advertises or displays guidance and the like using an electronic display device such as a
10 display. Because the fall prevention components 60 of the multiple pane window structure 200 according to the present embodiment are readily detachable and attachable by the screws 71, the multiple pane window structure 200 according to the present embodiment can be preferably
15 applied to the installation of the digital signage that needs maintenance of electronic parts and the like.

Thus, the multiple pane window structure 200 according to the first embodiment of the present invention is meant to have a structure similar to the double glazed
20 glass, and is not intended to limit the face material 30 to only glass. This point is similarly applied to the following embodiments.

The L-shaped members 40 are outer regulating members that regulate the movement of the upper side and
25 lower side of the face material 30 toward the outdoor side. Hence, the L-shaped members 40 are provided at positions that can regulate the movement of the upper side and lower side of the face material 30 toward the outdoor side while forming a pair on the upper and lower sides. The L-shaped
30 members 40 include the base parts 41 and the regulating parts 42. The base parts 41 are parts that become base pedestals of the L-shaped members 40, extend horizontally, and are fixed to the fixed parts 20, 21 on the upper and

lower sides by the screws 70. Here, through holes 43 that allow the screws 70 to penetrate therethrough are formed in the bottom surfaces of the base parts 41. The lower end of the face material 30 may be configured to be directly placed on the fixed surface 21, and only the regulating parts 42 may be configured to be provided, but in the first embodiment, the base part 41 extends in a depth direction, and the face material 30 is placed on the base part 40 via the setting block 80 while the fall prevention component 60 is attached on the base part 41. Such a configuration enables the face material 30 and the fall prevention component 60 to be installed on the surface 41 of the base part without respect to the state of the fixed surfaces 20, 21, thereby achieving stable installation. Here, the setting block 80 is provided between the base part 41 of the L-shaped member 40 on the lower side and the lower end of the face material 30, and serves to stabilize the face material 30. The setting block 80 may be made of a variety of materials as long as the face material 30 is strong enough to support the face material 30.

The regulating parts 42 are provided so as to cover the upper end portion and the lower end portion of the face material 30 from the outdoor side to be able to regulate the movement of the upper end and the lower end of the face material 30 toward the outside of the room. Moreover, the cushioning materials 50 are provided on the surface on the indoor side of the regulating parts 50 as necessary, and elastically contact the face material 30, thereby elastically supporting the surface on the outdoor side of the upper side and the lower side of the face material 30. Even if a gap is present between the regulating parts 41 and the face material 30, the movement

of the face material 30 toward the indoor side can be regulated, but providing the cushioning material 50 is preferable because the face material 30 can be more stably supported by installing the face material 30 such that the
5 cushioning material 50 elastically contacts the surface on the outdoor side of the face material 30 and that the face material 30 is lightly pressed against the cushioning material 50. Here, the cushioning material 50 may be made of a variety of materials, but for example, rubber may be
10 used. Moreover, the regulating parts 42 may include grippers 48 to hold the cushioning materials 50 on the indoor side.

The L-shaped members 40 may be configured, for example, to extend along the upper side and the lower side
15 of the face material 30 with a predetermined length and at least two pieces thereof may be provided on each of the upper side and the lower side, or may be configured as a continuous member extending along the upper side and the lower side of the face material 30. When the L-shaped
20 member 40 is formed as the continuous member, the L-shaped member 40 has advantages of being able to stably support the face material 30 and to prevent intrusion of rainwater from the outside even if the sealing properties of the existing window 10 is low. In contrast, when the L-shaped
25 members 40 are formed into pieces, the reduction of manufacturing cost is advantageous. The L-shaped members 40 may be configured to have a variety of lengths depending on the intended use as long as the L-shaped members 40 have a L-shaped cross section and include the
30 base parts 41 and the regulating parts 42.

The L-shaped members 40 may be made of a variety of materials as long as the L-shaped members 40 are strong enough to support the face material 30, but for example,

the L-shaped members 40 may be made of a metal material such as aluminum. Also, the L-shaped members 40 may be made of resin and the like. Thus, the L-shaped members 40 may be made of a variety of materials depending on the intended use as long as the L-shaped members 40 have necessary strength.

The fall prevention components 60 are inside regulating members to regulate the movement of the upper side and the lower side of the face material 30 toward the indoor side, and are provided so as to form a pair on the upper and lower sides. Hence, the fall prevention components 60 are provided by being fixed to the neighborhood of the surface of the upper end and the lower end of the face material 30 on the indoor side. The L-shaped members 40, which are outside regulating members, and the fall prevention components 60, which are inside regulating members, support the face material 30 by sandwiching the face material 30 therebetween. The fall prevention components 60 may be a continuous member, or may be formed as parts such as pieces that partially cover the upper side and the lower side of the face material 30 from the indoor side. Accordingly, at least one piece is provided on the upper side and the inner side from the indoor side to be able to support the face material 30.

The fall prevention components 60 may be formed into a variety of shapes as long as the fall prevention components 60 have surfaces capable of regulating the movement of the face material 30 toward the indoor side so as to face the face material 30 as opposite surfaces, but for example, the fall prevention components 60 may have a hog-backed shape formed by cutting a short cylinder or column in half, or a domed shape. The fall prevention components 60 have hollow hole 61 to let through a screw

or a through hole 62 in the bottom surface, and is fixed to the upper surface of the base parts 41 of the L-shaped members 40 by the screws 71. In the first embodiment, the fall prevention components 60 are fixed on the base parts 5 41 because the L-shaped members 40 are used as the outside regulating members, but the fall prevention components 60 may be directly fixed to the fixed surfaces 20, 21 when the outside regulating members are configured not to include the base parts 41. In other words, the fall 10 prevention components 60 are provided by being fixed to the fixed surfaces 20, 21 indirectly or directly.

The fall prevention components 60 may be made of a variety of materials as long as the fall prevention components 60 are strong enough to regulate the movement 15 of the face material 30 toward the indoor side, and for example, the fall prevention components 60 may be made of resin. As illustrated in FIG. 1, because, usually, a cushioning material is not particularly provided between the fall prevention components 60 and the face material 30 20 in many cases, the fall prevention components 60 may be preferably made of a material that does not harm the face material 30 while being able to support the face material 30. Resin is a material that satisfies such conditions, but a variety of materials including metal materials such 25 as aluminum can be used as long as the material can satisfy such conditions.

The fall prevention components 60 may be provided so as to contact the face material 30 or to have a slight gap between the fall prevention components 60 and 30 the face material 30. This is because the movement of the upper side and the lower side of the face material 30 toward the indoor side can be regulated in either case. The distance of the gap may be properly set depending on

the size of the face material 30, the intended use and the like, but for example, the distance may be set in a range that is longer than 0 mm and shorter than or equal to 25 mm, preferably in a range that is longer than 0 mm and
5 shorter than or equal to 20 mm, and further preferably in a range that is longer than 0 mm and shorter than or equal to 15 mm.

FIG. 2 is a front view illustrating an example of a multiple pane window structure 200 according to the
10 first embodiment of the present invention. As illustrated in FIG. 2, the L-shaped members 40 are provided on the upper side and the lower side as continuous members, and two fall prevention components 60 are provided on each of the upper side and the lower side distant from each other
15 for one face material 30. Each of the fall prevention components 60 has a semicircular shape. Thus, the L-shaped members 40 may be formed as the continuous members, and the fall prevention components 60 may be formed as piece members.

20 Moreover, in FIG. 2, an example of providing two face materials 30 continuously is illustrated, and an edge cover material 100 connects a space between the two face materials 30. The edge cover material 100 is a member to couple lateral sides of the two face materials 30 to each
25 other, and the two face materials 30 can be coupled to each other in a transverse direction while keeping airtightness.

Furthermore, as illustrated in FIG. 2, vertical frames 90 are provided on lateral sides of ends in a
30 horizontal direction of the two face materials 30. The vertical frames 90 are members to support the lateral sides of the ends of the face material 30, and may be provided as necessary.

FIG. 3 is a transverse cross-sectional view of an example of a multiple pane window structure made of a single face material according to the first embodiment of the present invention. FIG. 3 illustrates a multiple pane window structure 200 in which the face material 30 is formed as a single plate and the vertical frames 90 are provided. As illustrated in FIG. 3, the vertical frames 90 are fixed to the fixed surface (wall surface) 22 on the lateral side by using the screws 70. The vertical frames 90 have an L-letter shape similar to the L-shaped member 40, but differ from the L-shaped members 40 in that base parts 91 are formed into a plate-like shape and are not formed to support another member thereon because the fall prevention components 60 are not provided. Here, the vertical frames 90 are similar to the L-shaped members 40 in that regulating parts 92 that regulate the movement of the lateral sides of the face material 30 toward the outdoor side are provided and that the cushioning materials 50 are provided in the regulating parts 92.

Thus, the vertical frames 90 extending in the vertical direction may be provided in order to regulate the movement of the lateral sides of the face material 30 toward the outdoor side as necessary.

FIG. 4 is a transverse cross-sectional view illustrating an example of a multiple pane window structure made of successive face materials according to the first embodiment of the present invention. In FIG. 4, the face material 30 is constituted of two plates, and the two face materials 30 are coupled to each other near the center via the edge cover material 100. In other words, FIG. 4 corresponds to the transverse cross-sectional view in the form as illustrated in FIG. 2. The edge cover material 100 couples the two successive face materials 30

to each other while keeping the distance therebetween at about 10 mm, for example. When the face materials 30 are consecutive, the two successive face materials 30 can be coupled to each other while keeping the airtightness thereof by using the edge cover material 100 at a coupling part.

Here, because the other components are the same as those of FIG. 3, the description is omitted while attaching the same numerals as the corresponding components.

[Second Embodiment]

FIG. 5 is a transverse cross-sectional view illustrating an example of a multiple pane window structure 201 according to a second embodiment of the present invention. In FIG. 5, the multiple pane window structure according to the second embodiment differs from the multiple pane window structure 201 according to the first embodiment in that a protruding part 44 is provided at a lower position on a surface on the outdoor side of a regulating part 42a of an L-shaped member 40a and that a seal member 110 is provided in a recessed space in a depth direction under the protruding part 44.

Thus, by forming a seal member holding space 45 that can hold the seal member 110 at the lower position on the surface on the outdoor side of the regulating part 42a of the L-shaped member 40a, the seal member 110 may be provided in the seal member holding space 45. The seal member 110 may be made of an elastic material such as rubber, for example. By providing the seal member 110 at the lower end of the L-shaped member 40a lying at the outermost position, the sealing properties at the lower end of the multiple pane window structure 201 can be improved, and rainwater and the like intruding from the

existing window 10 can be reliably prevented. The multiple pane window structure according to the embodiments of the present invention is not basically and mainly intended to improve the airtightness and the sealing properties, but is intended to improve heat shielding properties by simple and convenient installation of the multiple pane windows. However, by providing such a seal member 110, a seal malfunction of the existing window 10 can be compensated.

Here, because the other components are the same as those of the multiple pane window structure 200 according to the first embodiment, the description is omitted by attaching the same numerals as the corresponding components.

[Third Embodiment]

FIG. 6 is a vertical cross-sectional view illustrating an example of a multiple pane window structure according to a third embodiment of the present invention. The multiple pane window structure 202 according to the third embodiment is similar to the multiple pane window structure 201 according to the second embodiment in terms of holding a seal member 110 at the lower end of a L-shaped member 40b, but differs from the multiple pane window structure 201 according to the second embodiment in that instead of the protruding part 44 protruding from the surface on the outdoor side of the regulating part 42a, a surface 46 on the outside of a base part 41b forms a seal member holding space 45a by being recessed in a depth direction and holds the seal member 110 in the seal member holding space 45a that is recessed toward the indoor side.

Thus, the outside surface of the base part 41b may be recessed toward the indoor side, thereby forming the seal member holding space 45a. Even in this case,

because the seal member 110 is provided at the lower end of the multiple pane window structure 202, the water prevention effect can be obtained similar to the second embodiment.

5 Furthermore, the multiple pane window structure according to the third embodiment differs from the multiple pane window structures 200, 201 in that a screw fastener plate holding part 49 is provided inside the base part 41b of the L-shaped member 40b and that a screw
10 fastener plate 120 is provided in the screw fastener plate folding part 49.

 The screw fastener plate 120 is a plate that can be fastened together with the screw 71, and is movable in the screw fastener plate holding space 49 having a rail
15 shape. In other words, when the L-shaped members 40b are formed as continuous members, the fall prevention components 60 can be installed at any location in the direction along the upper side and the lower side of the face material 30 by moving the screw fastener plate 120.
20 Thus, the multiple pane window structure may be configured to be able to adjust the installation positions of the fall prevention components 60.

 Thus, the multiple pane window structures 200, 201, 202 can be formed into a variety of configurations.

25 Here, because the other components are the same as multiple pane window structures 200, 201 according to the first and second embodiments, the description is omitted while attaching the same numerals to the corresponding components as those in the first and second
30 embodiments.

[Fourth Embodiment]

 FIG. 7 is a vertical cross-sectional view illustrating an example of a multiple pane window

structure 203 according to a fourth embodiment of the present invention. The multiple pane window structure 203 according to the fourth embodiment differs from the multiple pane window structures 200 through 202 in that an
5 outside regulating members provided on the outdoor side of the face material 30 are not the L-shaped materials 40, 40a, 40b, and that fall prevention components 60 are used as the outside regulating members.

Thus, using the L-shaped members 40, 40a, 40b as
10 the outside regulating members are not required, and the fall prevention components 60 may be used instead. As described in the first through third embodiments, because the fall prevention components 60 may be piece members, the fall prevention components 60 that serve as the
15 outside regulating parts and the fall prevention components 60 that serve as the inside regulating members are preferably provided to face each other via the face material 30. By providing both members opposite to each other, the face material 30 can be configured to be
20 sandwiched between the outdoor side and the indoor side at the facing positions, thereby reliably supporting the face material 30.

Moreover, in this case, the fall prevention components 60 on the outdoor side are required at least at
25 one location on the upper side and at least at one location on the lower side to support the face material 30.

FIG. 8 is a transverse cross-sectional view illustrating an example of the multiple pane window structure 203 according to the fourth embodiment of the present invention. FIG. 8 illustrates a configuration in
30 which the fall prevention components 60 that regulate the forward and backward movements of the face material 30 from the outdoor side and the indoor side are provided

even at the lateral side of the face material 30. Thus,
the fall prevention pats 60 may be provided at the lateral
side of the face material 30 as necessary. Even in this
case, the fall prevention components 60 provided outside
5 relative to the face material 30 and the fall prevention
components 60 provided inside relative to the face
material 30 are preferably provided opposite to each other
via the face material 30 in terms of reliably supporting
the face material 30.

10 Here, because the fall prevention components 60
provided on the lateral side differ from the fall
prevention components 60 provided on the upper side and
the lower side and are auxiliary support members,
providing at least one on the right side and/or at least
15 one on the left side is sufficient. However, needless to
say, when one fall prevention component 60 is provided on
the right side, symmetrically providing one fall
prevention component 60 on the left side is preferred.

The fall prevention components 60 provided on
20 the lateral side only have to be provided on the other
fixed surface 22 using screws 71 similar to the fall
prevention components 60 provided on the upper side and
the lower side.

Thus, according to the multiple pane window
25 structure 204 according to the fourth embodiment, the
multiple pane window structure 203 can be configured by
supporting the face material 30 at minimum necessary
supporting points on the upper side and the lower side by
the fall prevention components 60, thereby simply and
30 conveniently installing the multiple pane window structure
203 at a low cost.

Here, because the other components are the same
as those of the multiple pane window structures 200

through 202 according to the first through third embodiments, the description is omitted while attaching the same numerals as the corresponding components.

[Fifth Embodiment]

5 FIG. 9 is a vertical cross-sectional view illustrating an example of a multiple pane window structure 204 according to a fifth embodiment of the present invention. The multiple pane window structure 204 according to the fifth embodiment differs from the
10 multiple pane window structures 200 through 203 according to the first through fourth embodiments in that magnetic gaskets 130 are loaded on the upper side and the lower side of the face material 30, that L-shaped members 40c, 40d are made of a magnetic substance such as iron, and
15 that the fall prevention components 60 are not provided. The magnetic gaskets 130 are gaskets including magnets 131, have sealing properties, and can discharge attraction forces that are magnetic forces from the magnet 131. As described above, because the L-shaped members 40c, 40d are
20 made of a magnetic substance such as iron, the L-shaped members 40c, 40d receive magnetic action, and can attract the magnetic gasket. Thus, when the face material 30 is installed, the face material 30 is attracted toward the L-shaped member 40c by the magnetic action, and the face
25 material 30 can be very readily installed. In this manner, because the magnetic gaskets 130 can be fixed to the L-shaped members 40c, 40d having the magnetic substance, the fall prevention components 60 on the indoor side can be removed. Hence, the multiple pane window structure may be
30 configured to support and fix the face material 30 to the L-shaped members 40c, 40d on the outdoor side by the magnetic force from the magnets 131 and not to provide the fall prevention components 60 on the indoor side.

The L-shaped member 40d provided on the upper side has a configuration made of a single plate material similar to the L-shaped member 40c on the lower side, but differs from the L-shaped member 40c in that a vertical
5 part 47 extending downward from a base part 41d on the indoor side is provided due to a lack of the fall prevention component 60 on the indoor side.

FIG. 10 is a transverse cross-sectional view illustrating an example of a multiple pane window
10 structure 204 according to a fifth embodiment of the present invention. As illustrated in FIG. 10, the multiple pane window structure 204 according to the fifth embodiment may be configured to include a vertical frame 90a as necessary. The vertical frame 90a may be configured
15 to be similar to the L-shaped member 40c illustrated in FIG. 9. Then, by loading the magnetic gasket 130 to the lateral end of the face material 30, the magnet 131 can attract a regulating part 92a of the vertical frame 90a by a magnetic force. Also, the vertical frame 90a can be
20 attached to the fixed surface 22 on the lateral side by the screw 70.

Thus, by loading the magnetic gasket 130 to the face material 30 and forming the L-shaped members 40c, 40d and the regulating parts 42c, 42d, 92a of the vertical
25 frame 90a, the magnetic gasket 130 can be readily fixed to the L-shaped member 40c, 40d and the vertical frame 90a, and the fall prevention components 60 can be made unnecessary.

In FIGS. 9 and 10, an example of loading the
30 magnetic gasket 130 including the magnet 131 on the upper side and the lower side of the face material 30 is described, but using a gasket including a suction cup is possible instead of the magnetic gasket 130. Specifically,

the suction cup only has to be provided at a location where the magnet 131 is provided instead of the magnet. In this case, by forming a surface on the indoor side opposite to the suction cups of the regulating parts 42c, 42d of the L-shaped members 40c, 40d of the gasket into a flat surface, and loading the gasket on the upper end and the lower end of the face material 30 including the suction cups at the position where the magnet 13 was provided, the gasket can be fixed to the surface on the indoor side of the regulating parts 42c, 42d of the L-shaped members 40c, 40d by an adsorption power of the suction cup, and the fall prevention components 60 can be made unnecessary.

Moreover, a hook and loop fastener can be used instead of the magnetic gasket 130. Specifically, the hook and the loop only have to be installed at the location where the magnet 131 was provided instead of the magnet. In this case, by arranging the hook or the loop (the loop of the hook and loop fastener when the hook is installed at the location of the magnet 131) to the surface on the indoor side opposite to the hook or the loop of the hook and loop fastener installed at the location of the magnet 131 of the regulating parts 42c, 42d of the L-shaped members 40c, 40d of the gasket, the gasket can be fixed to the surface on the indoor side of the regulating parts 42c, 42d of the L-shaped members 40c, 40d, and the fall prevention components 60 can be made unnecessary.

Thus, the gasket having an adsorption function such as a suction cup or an attraction function may be used as well as the magnet 131.

According to the multiple pane window structure 204 of the fifth embodiment, the lower side and the upper side of the face material 30 can be fixed to the L-shaped

members 40c, 40d by the attraction action between the gasket attached to the face material 30 and the L-shaped members 40c, 40d, and the fall prevention components 60 can be made unnecessary.

5 Here, because the other components are the same as those of the first through fourth embodiments, the description is omitted while attaching the same numerals to the corresponding components as those of the first though fourth embodiments.

10 [Sixth Embodiment]

FIG. 11 is a vertical cross-sectional view illustrating an example of a multiple pane window structure 205 according to a sixth embodiment of the present invention. As illustrated in FIG. 11, the multiple
15 pane window structure 205 according to the sixth embodiment differs from the multiple window structure 200 through 202, 204 according to the first through third embodiments, and the fifth embodiments in that the multiple pane window structure 205 according to the sixth
20 embodiment has regulating parts 42e of an L-shaped member 40e and fall prevention components 60a that have significantly similar shapes. The L-shaped member 40e has an L-letter shape vertically long extending as a whole, and a cushioning material 50a is thinly formed. The
25 setting block 80b is provided to fill a space formed between the regulating part 42e of the L-shaped member 40e and the surface on the indoor side of the fall prevention component 60a, and supports the lower end of the face material 30. The fall prevention component 60a has a
30 batten shape, and supports the face material 30 so as to push the lower side on the indoor side of the face material 30. The cushioning material 50a is provided on the surface on the indoor side of the batten-shaped fall

prevention components 60a, and has a configuration similar to the regulating part 42e of the L-shaped member 40e. In this case, the fall prevention components 60a can be screwed to the lateral surface of the base part 41e of the L-shaped member 40e, or can be adhesively fixed thereto. Even such a configuration can regulate the movement of the face material 30 in the forward and backward direction, and can support the face material 30.

In this case, the fall prevention components 60a are not formed as piece members but formed as continuous members in general. The fall prevention components 60a are provided to correspond to the L-shaped members 40e. When the L-shaped members 40e are continuous members, the fall prevention components 60a are formed as the continuous members. When the L-shaped members 40e are piece members that have a predetermined length, the fall prevention components 60a are formed as the piece members that have the same length as the L-shaped members 40e.

FIG. 12 is a transverse cross-sectional view illustrating an example of the multiple pane window structure 205 according to the sixth embodiment of the present invention. As illustrated in FIG. 12, a vertical frame 90b may be provided to regulate and support the lateral side of the face material 30 as necessary. The vertical frame 90b may be formed to have a cross-sectional shape similar to that of the L-shaped member 40e, and the fall prevention components 60a may be used corresponding to the vertical frame 90b as it is.

According to the multiple pane window structure 205 of the sixth embodiment, the multiple pane window structure 205 can be formed by using the batten-shaped fall prevention components 60a while saving space.

[Seventh Embodiment]

FIG. 13 is an overall perspective view illustrating an example of a multiple pane window structure 206 according to a seventh embodiment of the present invention. As illustrated in FIG. 15, the multiple pane window structure according to an eighth embodiment is structured to be attached to a mullion 13 of an existing sash 12. Hence, an area is smaller than an existing pane of glass 11 of an existing window 10 in the vertical direction, and only an upper portion becomes the multiple pane window structure 206. In other words, L-shaped members 40f are configured to be attached to a lateral surface of the mullion 13 of the existing sash 12.

FIG. 14 is a transverse cross-sectional view illustrating an example of the multiple pane window structure 206 according to the seventh embodiment. As illustrated in FIG. 14, the multiple pane window structure 206 is structured to be attached to the mullion 13 of the existing sash 12. Moreover, a vertical frame 90c is provided on the lateral side. When the multiple pane window structure 206 is attached to the mullion 13 of the existing sash 12, the frame 90c is also preferably provided in terms of improving the stability.

Here, the vertical frame 90c is configured to be similar to the L-shaped members 40f and the batten-shaped fall prevention components 60b, and the detail is described in FIG. 15.

FIG. 15 is a vertical cross-sectional view illustrating an example of the multiple pane window structure 206 according to the seventh embodiment. As illustrated in FIG. 15, the L-shaped members 40f and the fall prevention components 60b are configured to be similar to those of the L-shaped members 40e and the fall prevention components 60a of the multiple pane window

structure 205 according to the sixth embodiment. In other words, a setting block 80c is installed in a space enclosed by inner surfaces of the L-shaped member 40b that forms an L-letter shape by a single plate and the batten-shaped fall prevention component 60b, and the lower end of the face material 30 is supported thereon. Moreover, a cushioning member 50 such as rubber is provided between the regulating part 42f of the L-shaped member 40f and the surface on the outdoor side of the face material 30, and the fall prevention component 60b is also configured to be symmetrical to the L-shaped member 40b with respect to the face material 30 except that the base part 41f is not provided. The lateral surfaces of the L-shaped members 40f are fixed to the surface on the indoor side of the mullion 13 by screws 70. Here, the L-shaped members 40f and the fall prevention components 60b are formed as the continuous members.

Such a configuration allows the multiple pane window structure 206 to be installed on the mullion 13 of the existing sash 12. Thus, a fixed surface on which the multiple pane window structure 206 is installed is not limited to a horizontal surface on the upper side and the lower side of a window frame, such as a ceiling, a floor and the like, but may be a fixed lateral surface fixed to the indoors.

[Installation Method]

Next, an installation method for mounting the multiple pane window structures 200 through 206 according to the first through seventh embodiments is described below.

Because the installation method includes common portions to all the embodiments, a method for installing the multiple pane window structure 200 according to the

first embodiment is described as a representative example, and the embodiments including a differing installation method are referred to as appropriate timing.

FIG. 16 is a diagram illustrating an example of
5 a process of attaching an L-shaped member. In the process of attaching the L-shaped member, L-shaped members 40 are attached to fixed surfaces 20, 21 on the upper side and the lower side by using screws 70. By doing this, outside
10 regulating members that regulate a movement of a face material 30 are fixed and installed on the fixed surfaces 20, 21. Here, when the multiple pane window structure 207 according to the seventh embodiment is installed, the L-shaped members 40f are fixed to the mullion 13 of the
15 existing sash 12. Moreover, in the multiple pane window structure 203 according to the fourth embodiment, the fall prevention members 60 are attached and fixed to the fixed surfaces 20, 21 instead of the L-shaped members 40.

FIG. 17 is a diagram illustrating an example of
a process of placing a face material. In the process of
20 placing the face material, the face material 30 is placed on the base part 41 of the attached L-shaped member 40. At this time, in the multiple pane window structure 204 according to the fifth embodiment in which the magnetic
25 gaskets 130 or the gaskets incorporating the suction cup are loaded on the face material 30, the gaskets are loaded on the upper side and the lower side of the face material 30, and the face material 30 is installed after loading the gaskets. These gaskets are attracted to the L-shaped
members and fixed thereto.

30 FIG. 18 is a diagram illustrating an example of a process of attaching fall prevention components 60. In the process of attaching the fall prevention components, the fall prevention components 60 are fixed to the base

parts 41 of the L-shaped members 40 by using screws 71. Thus, inside regulating members that regulate the movement of the upper side and the lower side of the face material toward the indoor side are fixed and installed, and the
5 face material 30 is supported. Here, in the multiple pane window structure 204 according to the fifth embodiment, this process is unnecessary. Moreover, the fall prevention components 60 are fixed to the fixed surfaces 20, 21, not to the base parts 41 of the L-shaped members
10 40 depending on the mode. Furthermore, in the multiple pane window structures 205, 206 according to the sixth and seventh embodiments, the fall prevention components 60 are attached to the lateral surface of the L-shaped member.

In addition, the fall prevention component 60
15 can be readily removed by removing the screw 71 in any case, and an exchange of the face material 30, cleaning and the like can be readily performed.

Thus, according to the multiple pane window structures 200 through 206 and the method for installing
20 the same of the embodiments of the present invention, because installation and removal can be performed by simple work without contacting the existing window 10 and because all of the existing windows 10 are applicable, a wide post-installation is possible.

25 It is understood that the embodiments disclosed herein are illustrative and non-restrictive in any respect. The scope of the present invention is defined by the terms of the claims, rather than the embodiments described above, and is intended to include any modifications within the
30 scope and meaning equivalent to the terms of the claims.

The present application is based upon and claims priority to Japanese Patent Application No. 2016-8724 filed on January 20, 2016 in Japanese Patent Office, the

entire contents of which are herein incorporated by reference.

DESCRIPTION OF THE REFERENCE NUMERALS

5	10	existing window
	11	existing pane of glass
	12	existing sash
	13	mullion
	20, 21, 22	fixed surface
10	30	face material
	40, 40a to 40f	L-shaped member
	50, 50a	cushioning material
	60, 60a, 60b	fall prevention component
	70, 71	screw
15	90, 90a to 90c	vertical frame
	80, 80a to 80c	setting block
	100	edge cover material
	110	sealing material
	120	screw fastener plate
20	130	magnetic gasket
	131	magnet
	200 to 206	multiple pane window structure

CLAIMS

1. A multiple pane window structure, comprising:
a face material provided on an indoor side of an
5 existing window and approximately parallel to the existing
window;
a pair of outside regulating members provided on
an upper side and a lower side of the face material and on
the indoor side of the existing window and on an outdoor
10 side of the face material so as to regulate a movement of
the upper side and the lower side of the face material
toward the outdoor side; and
a pair of inside regulating members detachably
provided on the upper side and the lower side of the face
15 material and on the indoor side of the face material so as
to regulate a movement of the upper side and the lower
side of the face material toward the indoor side.
2. The multiple pane window structure as claimed
20 in claim 1, wherein the outside regulating members and the
inside regulating members are attached and fixed to a
location that forms a fixed surface in a room where the
existing window is provided.
- 25 3. The multiple pane window structure as claimed
in claim 1 or 2, wherein the outside regulating members
are members having an L-shaped cross section.
4. The multiple pane window structure as claimed
30 in any one of claims 1 to 3, further comprising:
a cushioning material provided on the indoor
side of each of the outside regulating members.

5. The multiple pane window structure as claimed
in any one of claims 1 to 3,

wherein the outside regulating members are made
of a magnetic substance, and

5 wherein the face material includes a gasket
incorporating a magnet in a surface opposite to the
outside regulating members, and the outside regulating
members and the facing material are fixed by a magnetic
force.

10

6. The multiple pane window structure as claimed
in any one of claims 1 to 3,

wherein the indoor side of the outside
regulating members includes a flat surface, and

15 wherein the face material includes a gasket
including a suction cup in a surface opposite to the
outside regulating members, and the outside regulating
members and the facing material are fixed by adsorption.

20

7. The multiple pane window structure as claimed
in any one of claims 1 to 6,

wherein the outside regulating members are
formed as continuous members extending in a horizontal
direction, and

25 wherein the outside regulating member provided
on the lower side has a space having a depth formed by a
projection or a recessed shape at its lower end on the
outdoor side, and a seal member is provided in the space.

30

8. The multiple pane window structure as claimed
in any one of claims 1 to 7, wherein a surface on one side
of the face material is coated with a Low-E film.

9. A method for installing a multiple pane window structure, comprising:

- 5 attaching first and second outside regulating members to first and second fixed surfaces, respectively, present on an upper side and a lower side of a location on an indoor side of an existing window, the outside regulating members regulating a movement of an upper side and a lower side of a face material toward an outdoor side;
- 10 placing the face material at a neighborhood on the indoor side of the first and second outside regulating members; and
- 15 attaching first and second inside regulating members to the first and second fixed surfaces, respectively, at a neighborhood on the indoor side of the face material, the inside regulating members regulating a movement of the upper side and the lower side of the face material toward the indoor side.