

COMPOSITE FOLDING DOOR HAVING INSULATION EFFECT

CROSS REFERENCE TO RELATED APPLICATION

The present application claims priority to Korean Patent Application No. 10-2016-0109299, filed August 26, 2016, the entire contents of which is incorporated herein for all purposes by this reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a composite folding door having insulation effect. More particularly, the present invention relates to a composite folding door having insulation effect, in which a swinging door rotatably opened to an outside and a plurality of foldable doors folded or unfolded together are installed in a doorframe defining an entrance in a wall of a building, and insulators are installed in the doorframe, the swinging door and the plurality of foldable doors to enhance insulation effect.

2. Description of the Related Art

Generally, a folding door is installed in a wall of a building to substitute for an inner or outer wall.

That is, the folding door is used as an outer structure because it has good durability against mechanical external force and good soundproof and windproof effects. In addition, the folding door is used as an inner structure because it has an
5 excellent design.

As such, patent document 1 has proposed a folding door including a handle frame that is located in the door and has a rotating shaft formed in a longitudinal direction on both left and right sides to integrally extend; a rotary frame having a plate
10 that extends in a longitudinal direction and is coupled to an adjacent door frame, and a guider formed on an outer end of the plate to extend integrally and having therein an annular guide groove coupled to the rotating shaft of the corresponding handle frame, and having on an end thereof a 90-degree opening part; a
15 handle inserted into a center of an outer side of the handle frame to be rotatable at 90 degrees, with a carrier being coupled to an inner side thereof to move up and down along an inner surface of the handle frame by rotation; and upper and lower locking plates coupled to the carrier to be selectively locked or unlocked to a
20 locking groove of the doorframe by the rotation of the handle.

However, there is a need for a folding door having improved insulation effect while having a swinging door that is generally used to be opened or closed.

25 **【Related Art Document】**

【Patent Document】

(Patent Document 1) Korean Patent Application Publication No.
10-2007-0112359 (published on Nov. 23. 2007)

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SUMMARY OF THE INVENTION

Accordingly, the present invention has been made keeping in mind the above problems occurring in the related art, and an object of the present invention is to provide a composite folding
10 door having insulation effect, in which a swinging door rotatably opened to an outside and a plurality of foldable doors folded or unfolded together are installed in a doorframe defining an entrance in a wall of a building, and insulators are installed in the doorframe, the swinging door and the plurality of foldable
15 doors to enhance insulation effect.

In order to accomplish the above object, the present invention provides a composite folding door having insulation effect having a doorframe that defines an entrance in a wall, a swinging door that is installed in the doorframe to rotatably open to an
20 outside, and a plurality of foldable doors that are slidably guided along the doorframe to be folded or unfolded, wherein the doorframe includes upper and lower frames, the upper and lower frames being installed at upper and lower portions of an inner surface of the wall, rail holes being formed in an outer surface
25 opposite to an outer surface that is in contact with the wall,

straight first fitting protrusions protruding from the outer surface that faces an interior, the upper and lower frames including first insulators having first fitting holes into which the first fitting protrusions are fitted, and first and second
5 side frames installed at left and right side of the inner surface of the wall, first mounting holes being formed in both sides of an outer surface opposite to the outer surface that is in contact with the wall, straight second fitting protrusions protruding from the outer surface facing the interior, the first and second side
10 frames including second insulators having second fitting holes into which the second fitting protrusions are fitted, the swinging door includes second mounting holes formed at both edges of the outer surface facing the doorframe, a straight third fitting protrusion protruding from an edge of the outer surface facing the
15 interior, and a third insulator having a third fitting hole into which the third fitting protrusion is fitted, and each of the foldable doors includes third mounting holes formed at both edges of the outer surface facing the doorframe, a straight fourth fitting protrusion protruding from an edge of the outer surface
20 facing the interior, and a fourth insulator having a fourth fitting hole into which the fourth fitting protrusion is fitted, a first locking frame is installed in a pair of second mounting holes facing the foldable door that is adjacent to the swinging door, a second locking frame is installed in a pair of third
25 mounting holes facing the swinging door that is adjacent to the

foldable door, and is in close contact with the first locking frame, first hinge members are installed in one of the first mounting holes and one of the second and third mounting holes adjacent to the first mounting holes, at predetermined intervals
5 in a longitudinal direction of the first, second, and third mounting holes, second hinge members are installed in one of the neighboring third mounting holes to fold or unfold each foldable door, at predetermined intervals in a longitudinal direction of each third mounting hole, and a roller member having a roller
10 slidably guided to the rail holes is hinged to the second hinge member that is installed at the foldable door adjacent to the swinging door.

As described above, the present invention provides a composite folding door having insulation effect, which may use
15 both a typical swinging door and a plurality of foldable doors folded or unfolded together.

The present invention provides a composite folding door having insulation effect, in which first, second, third, and fourth insulators are installed in a doorframe, a swinging door,
20 and a plurality of foldable doors, thus improving insulation effect.

The present invention provides a composite folding door having insulation effect, in which first, second, third, and fourth straight fitting protrusions of a doorframe, a swinging
25 door, and a plurality of foldable doors are fitted into first,

second, third, and fourth fitting holes of first, second, third, and fourth insulators, thus making it easy to detachably attach the first, second, third, and fourth insulators to the doorframe, the swinging door, and the plurality of foldable doors.

5 The present invention provides a composite folding door having insulation effect, in which shocks resulting from external force generated when a swinging door and a plurality of foldable doors are closed and transmitted to each gasket may be reduced by an inclined surface and a shock absorbing protrusion formed on
10 each gasket.

That is, when the swinging door and the plurality of foldable doors are closed, the shock absorbing protrusion allows a contact area with each gasket to be reduced, and simultaneously prevents the external force generated when the doors are closed from being
15 directly transmitted to each gasket, due to the inclined surface.

Consequently, the life span of each gasket is increased, so that replacement cost for a damaged gasket is reduced.

BRIEF DESCRIPTION OF THE DRAWINGS

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The above and other objects, features and advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

25 FIG. 1 is a view illustrating an installed state of a

composite folding door having insulation effect according to an embodiment of the present invention;

FIGS. 2 and 3 are sectional views of FIG. 1;

FIGS. 4 to 6 are partially enlarged sectional views of FIG.

5 3; and

FIGS. 7 and 8 are views illustrating a state in which the composite folding door having insulation effect according to the embodiment of the present invention is opened or closed.

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DESCRIPTION OF PREFERRED EMBODIMENTS

Hereinafter, a preferred embodiment of the present invention will be described in detail with reference to the accompanying drawings.

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As illustrated in FIGS. 1 to 8, a composite folding door 100 having insulation effect according to an embodiment of the present invention is installed in a wall 1 of a building, such as a high-class restaurant, an apartment, a house, or a shopping mall.

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Further, the composite folding door 100 having insulation effect includes a doorframe 10 that defines an entrance in a wall 1 of the building, a swinging door 20 that is installed in the doorframe 10 to rotatably open to an outside, and a plurality of foldable doors 30 that are slidably guided along the doorframe 10 to be folded or unfolded.

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The doorframe 10 includes upper and lower frames 11 and 12.

The upper and lower frames 11 and 12 are installed at upper and lower portions of an inner surface of the wall 1. Rail holes 11b' and 12b' are formed in an outer surface of the upper and lower frames opposite to an outer surface that is in contact with the wall 1. Straight first fitting protrusions 11a' and 12a' protrude from the outer surface of the upper and lower frames facing an interior. The upper and lower frames 11 and 12 include first insulators 11c and 12c having first fitting holes 11c' and 12c' into which the first fitting protrusions 11a' and 12a' are fitted.

Here, the upper and lower frames 11 and 12 include first frames 11a and 12a that are installed in the wall 1, are open at one side thereof, and have the first fitting protrusions 11a' and 12a', and second frames 11b and 12b that are inserted into the first frames 11a and 12a, are open at one side thereof, and have the rail holes 11b' and 12b'.

Further, the first fitting protrusions 11a' and 12a' of the first frames 11a and 12a are fitted into the first fitting holes 11c' and 12c', respectively, thus installing the first insulators 11c and 12c.

The doorframe 10 includes first and second side frames 13 and 14. The first and second side frames 13 and 14 are installed at left and right side of the inner surface of the wall 1. First mounting holes 13a and 14a are formed in both sides of an outer surface opposite to the outer surface that is in contact with the wall 1. Straight second fitting protrusions 13b and 14b protrude

from the outer surface facing the interior. The first and second side frames 13 and 14 include second insulators 13c and 14c having second fitting holes 13c' and 14c' into which the second fitting protrusions 13b and 14b are fitted.

5 Here, the second fitting protrusions 13b and 14b of the first and second side frames 13 and 14 are fitted into the second fitting holes 13c' and 14c', thus installing the second insulators 13c and 14c.

10 The swinging door 20 has second mounting holes 21a formed at both edges of the outer surface facing the doorframe 10, a straight third fitting protrusion 21b protruding from an edge of the outer surface facing the interior, and a third insulator 23 having a third fitting hole 23a into which the third fitting protrusion 21b is fitted.

15 In this regard, the swinging door 20 includes a first frame 21 having the shape of a rectangular frame that is open at a center thereof and having a second mounting hole 21a and a third fitting protrusion 21b, a second frame 22 installed at an edge of an inner surface of the first frame 21 that is close to the interior and having a fitting protrusion formed on an outer surface close to the interior, and glass mounted between the first and second frames 21 and 22 by a glass fixing member.

25 Here, the third fitting protrusion 21b of the first frame 21 and a fitting protrusion of the second frame 22 are fitted into the third fitting hole 23a, thus installing the third insulator

23.

Each foldable door 30 has third mounting holes 31a formed at both edges of the outer surface facing the doorframe 10, a straight fourth fitting protrusion 31b protruding from an edge of the outer surface facing the interior, and a fourth insulator 33 having a fourth fitting hole 33a into which the fourth fitting protrusion 31b is fitted.

In this regard, the foldable door 30 includes a first frame 31 having the shape of a rectangular frame that is open at a center thereof and having a third mounting hole 31a and a fourth fitting protrusion 31b, a second frame 32 installed at an edge of an inner surface of the first frame 31 that is close to the interior and having a fitting protrusion formed on an outer surface close to the interior, and glass mounted between the first and second frames 31 and 32 by a glass fixing member.

Here, the fourth fitting protrusion 31b of the first frame 31 and a fitting protrusion of the second frame 32 are fitted into the fourth fitting hole 33a, thus installing the fourth insulator 33.

Further, a first locking frame 24 is installed in a pair of second mounting holes 21a facing the foldable door 30 that is adjacent to the swinging door 20, and a second locking frame 34 is installed in a pair of third mounting holes 31a facing the swinging door 20 that is adjacent to the foldable door 30, and is in close contact with the first locking frame 24.

In this regard, a fourth insulator 33 is mounted on an outer surface of the second locking frame 34 that is close to the interior.

Further, first hinge members 40 are installed in one of the first mounting holes 13a and 14a and one of the second and third mounting holes 21a and 31a adjacent to the first mounting holes 13a and 14a, at predetermined intervals in a longitudinal direction of the first, second, and third mounting holes 13a, 14a, 21a, and 31a.

Second hinge members 41 are installed in one of the neighboring third mounting holes 31a to fold or unfold each foldable door 30, at predetermined intervals in a longitudinal direction of each third mounting hole 31a.

Here, each of the first and second hinge members 40 and 41 has a hinge structure. That is, the first and second hinge members 40 and 41 include a pair of rotary plates that are installed at the first, second, and third mounting holes 13a, 14a, 21a, and 31a by a fastening member, a pair of hinge tubes that are integrally formed on the pair of rotary plates, and a hinge pin that joins the pair of hinge tubes in a hinged manner.

Further, a roller member 42 having a roller 42a slidably guided to the rail holes 11b' and 12b' is hinged to the second hinge member 41 that is installed at the foldable door 30 adjacent to the swinging door 20.

That is, the roller member 42 includes the hinge tube that is

hinged to the hinge tube of the second hinge member 41 via the hinge pin, a fixed shaft that is integrally formed on the hinge tube, and the roller 42a that is connected to the fixed shaft.

Further, the composite folding door 100 having insulation
5 effect includes a plurality of gaskets 50. The gasket includes a head part 51 that is fitted into remaining first, second, and third mounting holes 13a, 14a, 21a, and 31a, and an exposed part 52 that is formed integrally with the head part 51 to be exposed in the first, second, and third mounting holes 13a, 14a, 21a, and
10 31a.

Here, the plurality of gaskets 50 is installed to prevent gaps from being formed between the doorframe 10, the swinging door 20 and the plurality of foldable doors 30, and the head part 51 and the exposed part 52 have space therein.

15 Further, the gasket 50 has an inclined surface 52a formed on the exposed part 52. A shock absorbing protrusion 52a' protrudes from the inclined surface 52a.

The composite folding door 100 having insulation effect includes mohair to prevent condensation and improve insulation and
20 soundproofing effect. The folding door further includes a handle and a locking device.

Moreover, the first, second, third, and fourth insulators 11c, 12c, 13c, 14c, 23, and 33 are made of a polystyrene material to improve insulation effect, and various transfer interior films
25 are applied to maximize interior effects.

When each foldable door 30 is folded, the roller member 42 may be hinged to the second hinge member 41 that moves within the doorframe 10.

The operation and effects of the present invention configured
5 as such will be described below.

As illustrated in FIGS. 1 to 8, when the swinging door 20 and each foldable door 30 of the composite folding door 100 having insulation effect according to the embodiment of the present invention are opened, the swinging door 20 is rotated to the
10 outside and opened by the first hinge member 40, and each foldable door 30 is folded to be opened by the first and second hinge members 40 and 41.

Here, the roller 42a of the roller member 42 hinged to the second hinge member 41 moves towards the wall 1 in which the
15 second side frame 14 is installed, while being slidably guided along the rail holes 11b' and 12b' of the doorframe 10.

Further, when the swinging door 20 and each foldable door 30 of the composite folding door 100 having insulation effect are closed, each foldable door 30 is unfolded to be closed by the
20 first and second hinge members 40 and 41.

Here, the roller 42a of the roller member 42 moves away from the wall 1 in which the second side frame 14 is installed, while being slidably guided along the rail holes 11b' and 12b' of the doorframe 10.

25 Furthermore, in each gasket 50 installed in the first

mounting hole 14a of the second side frame 14 and the third mounting hole 31a of each foldable door 30, only the shock absorbing protrusion 52a' comes into close contact with the inclined surface 52a.

5 That is, each gasket 50 is reduced in contact area by the shock absorbing protrusion 52a', thus mitigating shocks by external force generated when each foldable door 30 is closed.

Further, the external force generated when each foldable door 30 is closed is not directly but is obliquely transmitted to each
10 gasket 50 by the inclined surface 52a.

That is, shocks resulting from the external force generated when each foldable door 30 is closed are further mitigated.

The swinging door 20 is locked by the foldable door 30 while being rotated by the first hinge member 40.

15 That is, the first locking frame 24 installed in the swinging door 20 is locked by the second locking frame 34 installed in the foldable door 30 while being in close contact therewith.

Likewise, in each gasket 50 installed in the first mounting hole 13a of the first side frame 13 and the second mounting hole
20 21a of the swinging door 20, the shock absorbing protrusion 52a' is in close contact with the inclined surface 52a.

Further, the composite folding door 100 having insulation effect may close each foldable door 30 and open the swinging door 20, or may open each foldable door 30 and close the swinging door
25 20.

Since the first, second, third, and fourth fitting protrusions 11a', 12a', 13b, 14b, 21b, and 31b of the composite folding door 100 having insulation effect are formed in the shape of a straight line, the fitting protrusions may be easily fitted
5 into or released from the first, second, third, and fourth fitting holes 11c', 12c', 13c', 14c', 23a, and 33a of the first, second, third, and fourth insulators 11c, 12c, 13c, 14c, 23, and 33.

Although a preferred embodiment of the present invention has been described for illustrative purposes, those skilled in the art
10 will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

WHAT IS CLAIMED IS:

1. A composite folding door having insulation effect having a doorframe that defines an entrance in a wall, a swinging door
5 that is installed in the doorframe to rotatably open to an outside, and a plurality of foldable doors that are slidably guided along the doorframe to be folded or unfolded,

wherein the doorframe comprises upper and lower frames, the upper and lower frames being installed at upper and lower portions
10 of an inner surface of the wall, rail holes being formed in an outer surface opposite to an outer surface that is in contact with the wall, straight first fitting protrusions protruding from the outer surface that faces an interior, the upper and lower frames comprising first insulators having first fitting holes into which
15 the first fitting protrusions are fitted, and

first and second side frames installed at left and right side of the inner surface of the wall, first mounting holes being formed in both sides of an outer surface opposite to the outer surface that is in contact with the wall, straight second fitting
20 protrusions protruding from the outer surface facing the interior, the first and second side frames comprising second insulators having second fitting holes into which the second fitting protrusions are fitted,

the swinging door comprises second mounting holes formed at
25 both edges of the outer surface facing the doorframe, a straight

third fitting protrusion protruding from an edge of the outer surface facing the interior, and a third insulator having a third fitting hole into which the third fitting protrusion is fitted, and

5 each of the foldable doors comprises third mounting holes formed at both edges of the outer surface facing the doorframe, a straight fourth fitting protrusion protruding from an edge of the outer surface facing the interior, and a fourth insulator having a fourth fitting hole into which the fourth fitting protrusion is
10 fitted,

 a first locking frame is installed in a pair of second mounting holes facing the foldable door that is adjacent to the swinging door,

 a second locking frame is installed in a pair of third
15 mounting holes facing the swinging door that is adjacent to the foldable door, and is in close contact with the first locking frame,

 first hinge members are installed in one of the first mounting holes and one of the second and third mounting holes
20 adjacent to the first mounting holes, at predetermined intervals in a longitudinal direction of the first, second, and third mounting holes,

 second hinge members are installed in one of the neighboring third mounting holes to fold or unfold each foldable door, at
25 predetermined intervals in a longitudinal direction of each third

mounting hole, and

a roller member having a roller slidably guided to the rail holes is hinged to the second hinge member that is installed at the foldable door adjacent to the swinging door,

5 wherein the composite folding door having insulation effect further comprising:

a plurality of gaskets, each of the gaskets comprising a head part that is fitted into remaining first, second, and third mounting holes, and an exposed part that is formed integrally with
10 the head part to be exposed in the first, second, and third mounting holes, and

wherein the gasket has an inclined surface formed on the exposed part, a shock absorbing protrusion protruding from the inclined surface,

15 whereby, when the swinging door and each of the foldable doors are closed, the shock absorbing protrusion of the gasket comes into close contact with the inclined surface of the gasket.