

DESCRIPTION

TITLE OF THE INVENTION: BUILDING WALL AND METHOD OF
CONSTRUCTING THE SAME

5 TECHNICAL FIELD

[0001]

The present disclosure relates to a building wall and a method of constructing the same.

10 BACKGROUND ART

[0002]

Conventionally, a method of constructing a building wall, such as a partition wall, a room interior-side wall of an outer wall, and the like, by
15 attaching a face panel for construction to studs (or puncheons) is implemented by connecting one face panel for construction to studs, which are erected at horizontal intervals, via piercing-type connection members, such as screws or the like. Here, when a
20 building wall is a type applied as a single layer, one face panel for construction is connected to each flange of a stud composed of, for example, channel steel and the like.

[0003]

25 On the other hand, when a building wall is a laminate type to be composed of, for example, two face panels for construction, an under-layer face panel, which is among the face panels for construction, is connected to studs via screws or the like, an adhesive,
30 such as a vinyl acetate-based adhesive or the like, is applied to the back surface of a top-layer face panel, and the back surface of the top-layer face panel is adhesively connected to the surface of the under-layer

face panel. Since it takes some time for the adhesive to cure, this adhesive connection method employs a method of attaching the top-layer face panel to the under-layer face panel provisionally, and then driving
5 a connection member, such as a staple and the like, through them from the surface of the top-layer face panel, to thereby provisionally connect the top-layer face panel to the under-layer face panel. Because this staple is left in place, the under-layer face panel and
10 the top-layer face panel are mutually connected via both the adhesive and the staple.

[0004]

The amount of the adhesive used to mutually connect the under-layer face panel and the top-layer
15 face panel is typically approximately 150 g/m² or greater, and a plurality of staples are used to provisionally connect one top-layer face panel. For example, PTL 1 also proposes a partition wall, in which an under-layer face panel is fixed to studs via tapping
20 screws, screws, or the like, and a top-layer face panel is fixed to the under-layer face panel via an organic adhesive and staples.

[0005]

In the connection of the top-layer face panel
25 to the under-layer face panel, the integration of the laminated layers is enhanced by the strong connection via both the adhesive and the staples as described above. Therefore, in the event of a fire, the under layer on the fire side is restricted from being
30 deformed under the restraint of the top layer, to keep them in the contacting state and allow heat from the fire to be conducted from the under layer to the top layer on the non-fire side, causing the top layer to

deform due to this heat. There is this structural problem in which the top layer is prone to detaching from the under layer.

[0006]

5 In addition, connecting the top-layer face panel to the under-layer face panel using both an adhesive and staples creates a construction-related issue in that the installation is time consuming and labor intensive.

10

CITATION LIST

PATENT LITERATURE

[0007] PTL 1: Japanese Patent Application Laid-Open Publication No. 2020-169468

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SUMMARY OF THE INVENTION

TECHNICAL PROBLEM

[0008]

20 The present disclosure provides a building wall and a method of constructing the same, which contribute to: inhibiting a top-layer face panel from being detached from an under-layer face panel in the event of a fire, due to the top layer being deformed through the heat of the fire being conducted from the under layer on the fire side to the top layer on the non-fire side due to both of them being kept in the contacting state as the under layer is restricted from being deformed under the restraint of the top layer; and reducing labor and time required for construction.

30

SOLUTION TO THE PROBLEM

[0009]

A building wall according to an embodiment of

the present disclosure is a building wall, including at least:

an under-layer face panel connected directly or indirectly to a stud; and

5 a top-layer face panel connected to the under-layer face panel and facing a room interior, wherein the top-layer face panel is connected to the under-layer face panel via a screw; the screw reaches the stud while penetrating the under-
10 layer face panel, and

an interval at which the screw is driven is in a range of 304 mm to 1,000 mm.

[0010]

A building wall according to another
15 embodiment of the present disclosure is a building wall, including at least:

an under-layer face panel connected directly or indirectly to a stud; and

a top-layer face panel connected to the
20 under-layer face panel and facing a room interior, wherein the top-layer face panel is connected to the under-layer face panel via a screw, the screw reaches the stud while penetrating the under-layer face panel, and

25 a number of screws driven is in a range of 1.65 screws/m to 4.95 screws/m, each of the screws being the screw.

[0011]

A building wall according to another
30 embodiment of the present disclosure is a building wall, including at least:

an under-layer face panel connected directly or indirectly to a stud; and

a top-layer face panel connected to the under-layer face panel and facing a room interior, wherein the top-layer face panel is connected to the under-layer face panel via a screw;

5 the screw reaches the stud while penetrating the under-layer face panel, and

an interval at which the screw is driven is in a range of 304 mm to 1,000 mm, and a number of screws driven is in a range of 1.65 screws/m to 4.95 screws/m, each of the screws being the screw.
10 [0012]

A building wall according to another embodiment of the present disclosure is a building wall, including at least:

15 an under-layer face panel directly or indirectly connected to a stud; and

a top-layer face panel connected to the under-layer face panel and facing a room interior, wherein the top-layer face panel is connected
20 to the under-layer face panel via a staple,

the staple reaches at least a position within the under-layer face panel thickness-wise, and

an interval at which the staple is driven is in a range of 228 mm to 1,000 mm.

25 [0013]

A building wall according to another embodiment of the present disclosure is a building wall, including at least:

30 an under-layer face panel connected directly or indirectly to a stud; and

a top-layer face panel connected to the under-layer face panel and facing a room interior, wherein the top-layer face panel is connected

to the under-layer face panel via a staple,

the staple reaches at least a position within the under-layer face panel thickness-wise, and

a number of staples driven is in a range of
5 3.6 staples/m² to 32.6 staples/m², each of the staples being the staple.

[0014]

A building wall according to another embodiment of the present disclosure is a building
10 wall, including at least:

an under-layer face panel connected directly or indirectly to a stud; and

a top-layer face panel connected to the under-layer face panel and facing a room interior,

15 wherein the top-layer face panel is connected to the under-layer face panel via a staple,

the staple reaches at least a position within the under-layer face panel thickness-wise, and

an interval at which the staple is driven is
20 in a range of 228 mm to 1,000 mm; and a number of staples driven is in a range of 3.6 staples/m² to 32.6 staples/m², each of the staples being the staple.

[0015]

Further, a building wall according to another embodiment of the present disclosure is a building
25 wall, including at least:

an under-layer face panel connected directly or indirectly to a stud; and

a top-layer face panel connected to the under-layer face panel and facing a room interior,

30 wherein the top-layer face panel is connected to the under-layer face panel via a screw and a staple, the screw reaches the stud while penetrating

the under-layer face panel,
an interval at which the screw is driven is in a range
of 304 mm to 1,000 mm,

the staple reaches a position within the
5 under-layer face panel thickness-wise, and
an interval at which the staple is driven is
in a range of 228 mm to 1,000 mm.

[0016]

A building wall according to another
10 embodiment of the present disclosure is a building
wall, including at least:

an under-layer face panel directly or
indirectly connected to a stud; and

a top-layer face panel connected to the
15 under-layer face panel and facing a room interior,
wherein the top-layer face panel is connected
to the under-layer face panel via a screw and a staple,
the screw reaches the stud while penetrating
the under-layer face panel,

20 a number of screws driven is in a range of
1.65 screws/m to 4.95 screws/m, each of the screws
being the screw,

the staple reaches a position within the under-layer
face panel thickness-wise, and

25 a number of staples driven is in a range of
1.8 staples /m² to 29.0 staples /m², each of the
staples being the staple.

[0017]

A building wall according to another
30 embodiment of the present disclosure is a building
wall, including at least:

an under-layer face panel connected directly
or indirectly to a stud; and

a top-layer face panel connected to the under-layer face panel and facing a room interior, wherein the top-layer face panel is connected to the under-layer face panel via a screw and
5 a staple,

the screw reaches the stud while penetrating the under-layer face panel,

an interval at which the screw is driven is in a range of 304 mm to 1,000 mm, and a number of
10 screws driven is in a range of 1.65 screws/m to 4.95 screws/m, each of the screws being the screw, the staple reaches a position within the under-layer face panel thickness-wise, and

an interval at which the staple is driven is
15 in a range of 228 mm to 1,000 mm, and a number of staples driven is in a range of 1.8 staples/m² to 29.0 staples /m², each of the staples being the staple.
[0018]

Further, a method of constructing a building
20 wall according to one embodiment of the present disclosure is a method of constructing a building wall including at least an under-layer face panel connected directly or indirectly to a stud and a top-layer face panel connected to the under-layer face panel and
25 facing a room interior, the method including:

an under-layer face panel connecting step of connecting the under-layer face panel directly or indirectly to the stud; and

a top-layer face panel connecting step of
30 connecting the top-layer face panel to the under-layer face panel via a screw,

wherein the screw is made to reach the stud by penetrating the under-layer face panel, and

an interval at which the screw is driven is in a range of 304 mm to 1,000 mm.

[0019]

A method of constructing a building wall according to another embodiment of the present disclosure is a method of constructing a building wall including at least an under-layer face panel connected directly or indirectly to a stud, and a top-layer face panel connected to the under-layer face panel and facing a room interior, the method including:

an under-layer face panel connecting step of connecting the under-layer face panel directly or indirectly to the stud; and

a top-layer face panel connecting step of connecting the top-layer face panel to the under-layer face panel via a screw,

wherein the screw is made to reach the stud by penetrating the under-layer face panel, and

a number of screws driven is in a range of 1.65 screws/m to 4.95 screws/m, each of the screws being the screw.

[0020]

A method of constructing a building wall according to another embodiment of the present disclosure is a method of constructing a building wall including at least an under-layer face panel connected directly or indirectly to a stud, and a top-layer face panel connected to the under-layer face panel and facing a room interior, the method including:

an under-layer face panel connecting step of connecting the under-layer face panel directly or indirectly to the stud; and

a top-layer face panel connecting step of

connecting the top-layer face panel to the under-layer face panel via a screw,

wherein the screw is made to reach the stud by penetrating the under-layer face panel, and

5 an interval at which the screw is driven is in a range of 304 mm to 1,000 mm, and a number of screws driven is in a range of 1.65 screws/m to 4.95 screws/m, each of the screws being the screw.

[0021]

10 A method of constructing a building wall according to another embodiment of the present disclosure is a method of constructing a building wall including at least an under-layer face panel connected directly or indirectly to a stud, and a top-layer face panel connected to the under-layer face panel and facing a room interior, the method including:

an under-layer face panel connecting step of connecting the under-layer face panel directly or indirectly to the stud; and

20 a top-layer face panel connecting step of connecting the top-layer face panel to the under-layer face panel via a staple,

wherein the staple is made to reach a position within the under-layer face panel thickness-wise, and

25 an interval at which the staple is driven is in a range of 228 mm to 1,000 mm.

[0022]

30 A method of constructing a building wall according to another embodiment of the present disclosure is a method of constructing a building wall including at least an under-layer face panel connected directly or indirectly to a stud, and a top-layer face

panel connected to the under-layer face panel and facing a room interior, the method including:

an under-layer face panel connecting step of connecting the under-layer face panel directly or
5 indirectly to the stud; and

a top-layer face panel connecting step of connecting the top-layer face panel to the under-layer face panel via a staple,

wherein the staple is made to reach a
10 position within the under-layer face panel thickness-wise, and

a number of staples driven in a range of 3.6 staples/m² to 32.6 staples/m², each of the staples being the staple.

15 [0023]

A method of constructing a building wall according to another embodiment of the present disclosure is a method of constructing a building wall including at least an under-layer face panel connected
20 directly or indirectly to a stud, and a top-layer face panel connected to the under-layer face panel and facing a room interior, the method including:

an under-layer face panel connecting step of connecting the under-layer face panel directly or
25 indirectly to the stud; and

a top-layer face panel connecting step of connecting the top-layer face panel to the under-layer face panel via a staple,

wherein the staple is made to reach a
30 position within the under-layer face panel thickness-wise, and

an interval at which the staple is driven is in a range of 228 mm to 1,000 mm, and a number of

staples driven is in a range of 3.6 staples/m² to 32.6 staples/m², each of the staples being the staple.

[0024]

A method of constructing a building wall
5 according to another embodiment of the present disclosure is a method of constructing a building wall including an under-layer face panel connected to a stud, and a top-layer face panel connected to the under-layer face panel and facing a room interior, the
10 method including:

an under-layer face panel connecting step of connecting the under-layer face panel directly or indirectly to the stud; and

a top-layer face panel connecting step of
15 connecting the top-layer face panel to the under-layer face panel via a screw and a staple,

wherein the screw is made to reach the stud by penetrating the under-layer face panel,
an interval at which the screw is driven is in a range
20 of 304 mm to 1,000 mm,

the staple is made to reach a position within the under-layer face panel thickness-wise, and

an interval at which the staple is driven is in a range of 228 mm to 1,000 mm.

25 [0025]

A method of constructing a building wall according to another embodiment of the present disclosure is a method of constructing a building wall including an under-layer face panel connected to a
30 stud, and a top-layer face panel connected to the under-layer face panel and facing a room interior, the method including:

an under-layer face panel connecting step of

connecting the under-layer face panel directly or indirectly to the stud; and

a top-layer face panel connecting step of connecting the top-layer face panel to the under-layer face panel via a screw and a staple,

wherein the screw is made to reach the stud by penetrating the under-layer face panel,

a number of screws driven is in a range of 1.65 screws/m to 4.95 screws/m, each of the screws being the screw,

the staple is made to reach a position within the under-layer face panel thickness-wise, and

a number of staples driven is in a range of 1.8 staples/m² to 29.0 staples/m², each of the staples being the staple.

[0026]

A method of constructing a building wall according to another embodiment of the present disclosure is a method of constructing a building wall including an under-layer face panel connected to a stud, and a top-layer face panel connected to the under-layer face panel and facing a room interior, the method including:

an under-layer face panel connecting step of connecting the under-layer face panel directly or indirectly to the stud; and

a top-layer face panel connecting step of connecting the top-layer face panel to the under-layer face panel via a screw and a staple,

wherein the screw is made to reach the stud by penetrating the under-layer face panel,

an interval at which the screw is driven is in a range of 304 mm to 1,000 mm, and a number of

screws driven is in a range of 1.65 screws/m to 4.95 screws/m, each of the screws being the screw,
the staple is made to reach a position within the under-layer face panel thickness-wise, and
5 an interval at which the staple is driven is in a range of 228 mm to 1,000 mm, and a number of staples driven is in a range of 1.8 staples/m² to 29.0 staples/m², each of the staples being the staple.

10 ADVANTAGEOUS EFFECTS OF THE INVENTION
[0027]

According to the present disclosure, in the event of a fire, it is possible to inhibit a top-layer face panel from being detached from an under-layer face
15 panel due to the top layer being deformed through the heat of the fire being conducted from the under layer on the fire side to the top layer on the non-fire side due to both of them being kept in a contacting state as the under layer is restricted from being deformed under
20 the restraint of the top layer. According to the present disclosure, it is possible to reduce labor and time required for construction.

BRIEF DESCRIPTION OF THE DRAWINGS

25 [0028]

[FIG. 1] FIG. 1 is an oblique view showing an example of a building wall according to a first embodiment.

[FIG. 2] FIG. 2 is a view showing an example of screw driving positions in an example of a configuration for
30 connecting a top-layer face panel to an under-layer face panel.

[FIG. 3] FIG. 3 is a table explaining the basis based on which a range of the numbers of screws driven,

corresponding to respective screw driving intervals, is set in a case of connecting a top-layer face panel only via screws.

[FIG. 4] FIG. 4 is a view explaining a method for
5 setting the number of screws to be driven.

[FIG. 5A] FIG. 5A is a side view showing an example of how an under layer and a top layer are deformed in the event of a fire, and their laminated state.

[FIG. 5B] FIG. 5B is a view seen on an arrow in a B
10 direction of FIG. 5A.

[FIG. 6] FIG. 6 is an oblique view showing an example of a building wall according to a second embodiment

[FIG. 7] FIG. 7 is a view showing an example of staple driving positions in another example of a configuration
15 for connecting a top-layer face panel to an under-layer face panel.

[FIG. 8] FIG. 8 is a table explaining the basis based on which a range of the numbers of staples driven, corresponding to respective staple driving intervals,
20 is set in a case of connecting a top-layer face panel only via staples.

[FIG. 9] FIG. 9 is an oblique view showing an example of a building wall according to third embodiment.

[FIG. 10] FIG. 10 is a table explaining the basis based
25 on which a range of the numbers of staples driven, corresponding to respective staple driving intervals, is set in a case of connecting a top-layer face panel via screws and staples.

30 DETAILED DESCRIPTION OF THE INVENTION

[0029]

An example of a building wall and a method of constructing the same according to each embodiment will

be described below with reference to the attached drawings. In this specification and drawings, duplicate descriptions of substantially identical components may be omitted by denoting them by the same reference numerals.

[0030]

[Building Wall and Method of Constructing the Same according to First Embodiment]

First, an example of a building wall and a method of constructing the same according to a first embodiment will be described with reference to FIGS. 1 to 4. Here, FIG. 1 is an oblique view showing an example of a building wall according to the first embodiment, and FIG. 2 is a view showing an example of screw driving positions in an example of a configuration for connecting a top-layer face panel to an under-layer face panel. FIG. 3 is a table explaining the basis based on which a range of the numbers of screws driven, corresponding to respective screw driving intervals, is set in a case of connecting a top-layer face panel only via screws, and FIG. 4 is a view explaining a method for setting the number of screws to be driven. Although FIG. 4 is a view explaining an example of the method for setting the number of screws to be driven, the method can likewise be applied as the method for setting the number of staples to be driven.

[0031]

Here, the building wall of the illustrated example is a partition wall of a both-side two-layered type including, on each side of a stud, a laminate composed of two layers, namely, an under layer and a top layer. The building wall may otherwise be a

partition wall of a type in which three or more face panels are laminated on each side of a stud. In addition, the building wall may be a partition wall including a two-layered, three-layered, or such
5 laminate only on a single side of a stud. The building wall may not only be a partition wall, but may be a room interior-side wall of an outer wall. In the case of a partition wall of a two-layered type as in the illustrated example, an under-layer face panel is
10 directly attached to a stud. In the case of a type in which three or more face panels are laminated, an under-layer face panel is indirectly attached to a stud, because another face panel (another face panel different from a top-layer face panel and the under-
15 layer face panel) that is to be in close adhesion with the illustrated under-layer face panel is attached to the stud.

[0032]

A partition wall 100 shown in FIG. 1 is
20 applied to buildings of steel-frame construction, buildings of Reinforced Concrete (RC) construction, buildings of wooden construction, and the like. These buildings include general detached houses, condominiums, such as apartment buildings and the like,
25 as well as plants and warehouses.

[0033]

The partition wall 100 includes a plurality of studs 40, a lower runner 46 (or a floor runner), and an upper runner 45 (or a ceiling runner), which
30 constitute a main shaft assembly. The studs 40 extend longitudinally (vertically), and the upper runner 45 and the lower runner 46 extend transversely (horizontally).

[0034]

Both the upper runner 45 and the lower runner 46 are composed of lightweight steel members, such as channel steel and the like. The upper runner 45 is
5 attached to an upper floor structure 47 with its opening facing downward, and the lower runner 46 is attached to a lower floor structure 48 with its opening facing upward.

[0035]

10 The studs 40 are composed of lipped channel steel made of a lightweight steel material, but may also be composed of channel steel or square steel pipe.

[0036]

An upper end 43 and a lower end 44 of each
15 stud 40 are fitted into the upper runner 45 and the lower runner 46, respectively, to fix the stud to the upper runner 45 and the lower runner 46. Here, although not shown, a plurality of anti-sway pieces extending in the horizontal direction may be provided
20 at a predetermined pitch (for example, 1,200 mm pitch) in the height direction of the stud 40.

[0037]

The upper runner 45, the lower runner 46, and the studs 40 are, for example, lightweight steel
25 members having a thickness of 0.4 mm or greater, and steel runners and steel studs specified in JIS A 6517 ("Steel foundations for construction"), or equivalent, similar, or replaceable products thereof can be applied as them. In the partition wall 100, the plurality of
30 studs 40 are built upright between the lower runner 46 and the upper runner 45 at intervals of 608 mm or less (for example, intervals of 606 mm, or 455 mm) in the width direction of the wall (longer direction of the

lower runner 46, and the like in FIG. 1).

[0038]

In the partition wall 100, back surfaces 32 of under-layer face panels 30A disposed for being laid transversely are brought into contact with a pair of attaching surfaces 41 and 42 of the stud 40, and are connected to the attaching surfaces 41 and 42 on both sides of the stud 40 via screws 51 (an example of an under-layer fastener), such as captive screws and the like, applied from their front surface 31 side. A plurality of under-layer face panels 30A connected to the studs 40 form an under layer 30.

[0039]

Meanwhile, top-layer face panels 20A disposed for being laid vertically on the under layer 30 are connected to the under layer 30 via screws 52 (an example of a top-layer fastener), such as captive screws and the like, driven from their room interior-side surfaces 21 on the front side. More specifically, the driven screws 52 penetrate the under-layer face panels 30A and are connected to the studs 40. A plurality of top-layer face panels 20A connected to the under layer 30 form a top layer 20.

[0040]

Thus, on each side of the studs 40, the under layer 30 and the top layer 20 form a two-layered laminate 10. Here, not only may they be disposed as in the illustrated example, but the under-layer face panels 30A may be disposed for being laid vertically and the top-layer face panels 20A may be disposed for being laid transversely. Although not shown, in a configuration in which three or more face panels are laminated, another face panel (another face panel

different from the top-layer face panel and the under-layer face panel) is connected to the studs via screws and the like, the under-layer face panel is connected to the another face panel via screws and the like, and
5 the top-layer face panel is connected to the under-layer face panel via screws and the like. Here, the screws and the like connecting the top-layer face panel to the under-layer face panel may be driven into the studs through the another face panel.

10 [0041]

Plasterboard, gypsum board, calcium silicate board, particle board, hard board, plywood, structural plywood, and the like are applied as the under-layer face panel 30A, which is a face panel for construction.
15 Among them, plasterboard and gypsum board are suitably used.

[0042]

Meanwhile, plasterboard, gypsum board, calcium silicate board, and the like are applied as the
20 top-layer face panel 20A, which is a face panel for construction. Among them, plasterboard and gypsum board are suitably used.

[0043]

Examples of the gypsum board include not only
25 typical gypsum boards, but a fire-resistant gypsum board, a gypsum board-regular-hard type, a gypsum sheathing board-hard type, a fire-resistant gypsum board-humidity control type, a gypsum board-humidity control-regular type, a gypsum sheathing board-humidity
30 control-hard type, a glass fiber nonwoven fabric-containing gypsum board, a glass fiber mat gypsum board, and the like.

[0044]

For example, when using a gypsum board, it is composed of a fire-retardant material having dimensions of 910 mm in shorter side × 1,820 mm in longer side × 9.5 mm in thickness, an incombustible material having dimensions of 910 mm in shorter side × 1,820 mm (2,420 mm, 2730 mm) in longer side × 12.5 mm (15 mm, 21 mm, 25 mm) in thickness, and the like. The width (shorter side) of the gypsum board may be not only 910 mm, but also 606 mm, 1,000 mm, 1,220 mm, and the like. The length (longer side) of the gypsum board may be not only 1,820 mm, but also 2,000 mm, 3,030 mm, and the like. In actual construction, there may be a case where, for example, a gypsum board located at an end of a wall is cut at the site for size adjustment. Therefore, there is also a gypsum board cut into a desirable size, not only the gypsum boards having the dimensions mentioned above.

[0045]

In the under layer 30, longitudinal joints (not shown) and transverse joints 36, which are butt joints, are provided between the plurality of under-layer face panels 30A adjacent to each other in the vertical and transverse directions. Depending on the height of the wall and the like, there is a configuration in which no transverse joints are provided.

[0046]

Meanwhile, in the top layer 20, longitudinal joints 25 and transverse joints 26, which are butt joints, are provided between the plurality of top-layer face panels 20A adjacent to each other in the vertical and transverse directions. Depending on the height of the wall and the like, there is a configuration in

which no transverse joints are provided.

[0047]

In the example of the top-layer face panel 20A shown in FIG. 2, the vertical length t1 is 1,820 mm and the transverse width t2 is 910 mm. In the configuration in which the under layer 30 and the top layer 20 are connected only via the screws 52 as shown in FIG. 2, labor and time required for construction are reduced and the construction performance is remarkably improved, compared with the existing configuration in which an adhesive and staples are used in combination.

[0048]

Here, the interval at which the screws 52 as the top-layer fasteners are driven is set in the range of 304 mm to 1,000 mm, and the number of the screws 52 driven is set in the range of 1.65 screws/m to 4.95 screws/m. The interval at which the screws 52 are driven is set to be longer than the conventional range of 303 mm or less.

[0049]

As described above, by making the interval at which the screws 52 serving as the top-layer fasteners are driven longer than in conventional examples and driving fewer screws 52 than in conventional examples, it is possible to reduce labor and time required for the construction even more and to improve the construction performance even better.

[0050]

A preferable driving interval of the screws 52 within the above specified range of 304 mm to 1,000 mm is in the range of 304 mm to 606 mm, and desirably in the range of 304 mm to 455 mm. These ranges are more suitable when considering both the construction

performance and fire resistance described below.

[0051]

FIG. 3 shows the results of trial calculation of the number of screws 52 driven, calculated for each driving interval (pitch). For example, the method by which the number of screws in the vertically laying cases is calculated to be 3.85 screws/m in the case where the pitch is 304 mm to 1,000 mm is explained as follows.

10 [0052]

FIG. 3 shows the results of cases of using top-layer face panels having a 2×6-type size, which is the minimum area in which the maximum number of fasteners, such as screws and the like, can be obtained, and top-layer face panels having a 3×10-type size, which is the maximum area in which the minimum number of fasteners can be obtained.

[0053]

As shown in FIG. 4, when calculating the number of screws to be driven, it is assumed that the position at which a screw 52 is to be driven at an end part of the top-layer face panel 20A is 10 mm apart from the end of the top-layer face panel 20A, and therefore a total of 20 mm amounting to the two screws on both end parts is deducted. Furthermore, it is assumed that a screw 52 to become adjacent to the screw 52 at the end part is driven at a spacing of 10 mm or greater, and therefore 10 mm is further deducted. Thus, the number of screws 52 other than the screws 52 at the end parts is $(1,820-30)/304+2$ (which is the number of screws at the end parts) = 7 screws (decimal places being truncated), which is thus calculated to be $7/1.82 \text{ (m)} = 3.85 \text{ (screws/m)}$. As can be seen, while

the driving interval in an overall part is 304 mm, there may be some narrow parts in which the intervals are less than 304 mm.

[0054]

5 As shown in FIG. 3, in the case where the driving interval of the screws 52 is in the range of 304 mm to 606 mm, the preferable range of the number of screws 52 driven is a range of 1.98 screws/m to 4.95 screws/m.

10 [0055]

 Furthermore, as shown in FIG. 3, in the case where the driving interval of the screws 52 is in the range of 304 mm to 455 mm, the preferable range of the number of screws 52 driven is a range of 2.64 screws/m to 4.95 screws/m.

[0056]

 As a prerequisite for fastening the top-layer face panel 20A, the under-layer face panel 30A needs to be fastened to the studs 40. Therefore, fastening of
20 the under-layer face panel 30A to the studs 40 via the screws 51 is performed from the viewpoint of good construction performance. For example, the driving interval of the screws 51 as under-layer fasteners can be set to be approximately 600 mm to 1,000 mm.

25 [0057]

 By the screws 52, which are driven to fasten the top-layer face panel 20A to the under-layer face panel 30A, penetrating the under-layer face panel 30A to be fastened to the studs 40, connection between the
30 studs 40 and the laminate 10 is achieved. That is, by means of the screws 52, which are top-layer fasteners driven from the room interior side of the top-layer face panel 20A, integration between the studs 40 and

the laminate 10 is achieved. As a result, the screws 51, which are under-layer fasteners used to fasten the under-layer face panel 30A to the studs 40 from the viewpoint of construction performance, serve as fasteners assisting in the integration of the studs 40 and the laminate 10.

[0058]

As the driving interval of the screws 52 serving as top-layer fasteners is longer than that in conventional examples and the number of screws 52 driven is less than that in conventional examples, the construction performance is even better improved. On the other hand, there is a risk that the fire resistance performance of the building wall 100 may deteriorate in the event of a fire. Here, the fire resistance performance of the building wall 100 will be described with reference to FIGS. 5A and 5B.

[0059]

Here, FIG. 5A is a side view showing an example of how the under layer and the top layer are deformed in the event of a fire, and their laminated state. FIG. 5B is a view seen on an arrow in the B direction of FIG. 5A.

[0060]

In FIG. 5A, the under layer 30-side of the laminate 10 is on the fire side, and the top layer 20-side is on the non-fire side and faces the room interior.

[0061]

In the event of a fire, an upper part (ceiling side) of the room interior gains heat faster. Therefore, of the under layer 30 on the fire side, the upper region thereof is more likely to be deformed by

the heat, and is deformed in the X1 direction toward the fire side as in the illustrated example. Here, in FIG. 5A, the under layer 30 before being deformed is shown by a dash-dotted line, and the under layer 30 after being deformed is shown by a solid line.

[0062]

Based on that the transverse joints 36, which are weak parts in terms of strength, and their vicinity are the more easily deformable parts of the upper part of the under layer 30, the inventors of the present invention have found out that setting the driving interval and number of the screws 52 to connect the under layer 30 and the top layer 20 within the above-specified numerical ranges resulted in deformation having been caused in the deformation mode shown in FIG. 5A. Since the heat acting on the lower part of the under layer 30 is relatively lower than that on the upper part, the lower part undergoes a small amount of deformation, and undergoes almost no deformation depending on the case.

[0063]

As the upper part of the under layer 30 deforms toward the fire side, an air layer 60 is formed between the under layer 30 and the top layer 20 in the upper part of the laminate 10. For example, FIG. 5B shows an air layer formation area A formed in the upper part of the laminate 10.

[0064]

In the event of a fire, the air layer 60 is formed in at least a part of the region between the under layer 30 and the top layer 20, thereby inhibiting heat transfer from the under layer 30 to the top layer 20, and inhibiting deformation of the top layer 20 as

shown in FIG. 5A. FIG. 5A shows a state in which the top layer 20 is not thermally deformed. However, actually, for example, an upper region of the top layer 20 undergoes slight thermal deformation, the amount of which is however less than that of the under layer 30. [0065]

The upper region of the under layer 30 is deformed to the fire side and the top layer 20 remains largely undeformed. Therefore, as shown in FIG. 5A, although the laminate 10 after being thermally deformed includes the air layer 60 in the upper region thereof, the under layer 30 and the top layer 20 remain in the connected state at their lower regions and upper ends. [0066]

If, for example, the under layer and the top layer are firmly connected to each other via an adhesive applied in a conventionally typical amount or via a conventionally typical number of staples or the like, the under layer is restricted by the top layer from being thermally deformed to the fire side in the upper region of the laminate, and an air layer is hardly formed between the under layer and the top layer. When no air layer is formed between the under layer and the top layer, the heat from the fire is conducted from the under layer to the top layer on the non-fire side, causing the top layer to be deformed, which might cause the top-layer face panel to be detached from the under-layer face panel. [0067]

The above-specified numerical ranges concerning the driving interval and number of the screws 52 serving as the top-layer fasteners are such driving intervals and numbers by which is formed a

connection strength at which the under layer 30 and the top layer 20 are released from connection when the laminate 10 receives heat from a fire (for example, heat in an upper region of a room interior).

5 Therefore, in the laminate 10 of the building wall 100, the under layer 30 is relatively largely deformed by the heat of the fire, to promote formation of the air layer 60 between the under layer 30 and the top layer 20, to thereby inhibit heat transfer to the top layer
10 20 and prevent it from being detached from the under layer 30.

[0068]

Therefore, the building wall 100 can be a building wall that has both a good construction
15 performance and excellent fire resistance.

[0069]

The method of constructing the illustrated building wall 100 is as follows (see FIG. 1). First, the screws 51 serving as the under-layer fasteners are
20 driven into the studs 40 from the room interior side of the under-layer face panel 30A, to thereby provisionally connect the under-layer face panel 30A and the studs 40. In the illustrated example, the under layer 30 is constructed by connecting a plurality
25 of under-layer face panels 30A to a plurality of studs 40 in a transversely-laid arrangement. Here, the under-layer face panels 30A may be vertically laid (an under-layer face panel connecting step).

[0070]

30 Next, the screws 52 serving as the top-layer fasteners are driven from the room interior side of the top-layer face panel 20A, to make the screws 52 reach the studs 40 by penetrating the under-layer face panel

30A, to thereby connect the top-layer face panel 20A to both the under-layer face panel 30A and the studs 40.

In the illustrated example, the top layer 20 is constructed by connecting a plurality of top-layer face panels 20A in their vertically-laid arrangement to a plurality of studs 40 through the plurality of under-layer face panels 30A. The top-layer face panels 20A may be transversely laid.

[0071]

10 Here, the driving interval of the screws 52 serving as the top-layer fasteners is set in the range of 304 mm to 1,000 mm, and the number of screws 52 driven is set in the range of 1.65 screws/m to 4.95 screws/m. Preferably, the driving interval of the screws 52 is set in the range of 304 mm to 606 mm, and the number of screws 52 driven is set in the range of 1.98 screws/m to 4.95 screws/m. Desirably, the driving interval of the screws 52 is set in the range of 304 mm to 455 mm, and the number of screws 52 driven is set in the range of 2.64 screws/m to 4.95 screws/m (a top-layer face panel connecting step).

[0072]

25 In the top-layer face panel connecting step, the top-layer face panel 20A is connected to both the under-layer face panel 30A and the studs 40, to thereby construct the laminate 10 composed of the under layer 30 and the top layer 20, to thereby construct the building wall 100 with the laminate 10 fastened to the studs 40.

30 [0073]

According to this method of constructing the building wall, constructional labor and time that might be required in the case of using an adhesive and

staples or the like in combination for fastening the top-layer face panel to the under-layer face panel as in the conventional construction methods are eliminated, and constructional labor and time that might be required in the case of driving screws at dense driving intervals are eliminated, making it possible to remarkably improve the construction performance.

[0074]

10 [Building Wall and Method of Constructing Same according to Second Embodiment]

Next, an example of a building wall and a method of constructing the same according to the second embodiment will be described with reference to FIGS. 6 to 8. Here, FIG. 6 is an oblique view showing an example of the building wall according to the second embodiment, and FIG. 7 is a view showing an example of staple driving positions in another example of a configuration for connecting a top-layer face panel to an under-layer face panel. FIG. 8 is a table explaining the basis based on which a range of the numbers of staples driven, corresponding to respective staple driving intervals, is set in a case of connecting a top-layer face panel only via staples.

25 [0075]

A building wall 100A differs from the building wall 100 in that staples 53 are applied as top-layer fasteners.

[0076]

30 Unlike the screws 52 shown in FIG. 1 and the like, the staples 53 driven from the room interior side of a top-layer face panel 20A connect the top-layer face panel 20A to an under-layer face panel 30A by

reaching at least a position within the under-layer face panel 30A thickness-wise.

[0077]

The top-layer face panel 20A shown in FIG. 7 has a vertical length t_1 of 1,820 mm and a transverse width t_2 of 910 mm. As shown in FIG. 7, in the configuration in which an under layer 30 and a top layer 20 are connected only via the staples 53, labor and time required for construction are reduced and the construction performance is remarkably improved, compared with the conventional configuration in which an adhesive and staples are used in combination.

[0078]

Here, the driving interval of the staples 53 serving as the top-layer fasteners is set in the range of 228 mm to 1,000 mm, and the number of staples 53 driven is set in the range of 3.6 staples/m² to 32.6 staples/m².

[0079]

A preferable driving interval of the staples 53 within the above specified range of 228 mm to 1,000 mm is in the range of 228 mm to 606 mm, and desirably in the range of 228 mm to 350 mm. These ranges are more suitable when considering both the construction performance and the fire resistance described below.

[0080]

FIG. 8 shows the results of trial calculation of the number of staples 53 driven, calculated for each driving interval (pitch). For example, the method by which the number of staples driven in the vertically laying cases is calculated to be 32.6 staples/m² in the case where the pitch is 228 mm to 1,000 mm is explained as follows.

[0081]

Similarly to FIG. 3, FIG. 8 shows the results of cases of using top-layer face panels having a 2×6-type size, which is the minimum area in which the maximum number of fasteners, such as screws and the like, can be obtained, and top-layer surface panels having a 3×10-type size, which is the maximum area in which the minimum number of fasteners can be obtained.

[0082]

When calculating the number of staples to be driven, it is assumed that a staple 53 is driven at a spacing of 10 mm from an end of the top-layer face panel 20A in the longer direction of the top-layer face panel 20A, and therefore a total of 20 mm amounting to the two staples on both end parts is deducted. Furthermore, it is assumed that a staple 53 to become adjacent to the staple 53 at the end part is driven at a spacing of 10 mm or greater, and therefore 10 mm is further deducted, resulting in $(1,820-30)/228+2$ (which is the number of staples 53 at the end parts) = 9 staples (decimal places being truncated). The number of staples 53 driven in the width direction of the top-layer face panel 20A is $(606-30)/228+2$ (which is the number of screws at the end parts) = 4 (decimal places being truncated). Therefore, the total number of staples 53 is $9 \times 4 = 36$ staples. The total number divided by the area of the top-layer face panel 20A is $32.6 \text{ staples/m}^2 = 36/(1.82 \times 0.606)$. As can be seen, while the driving interval in an overall part is 228 mm, there may be some narrow parts in which the intervals are less than 228 mm.

[0083]

As shown in FIG. 8, in the case where the

driving interval of the staples 53 is in the range of 228 mm to 606 mm, the preferable range of the number of staples 53 driven is a range of 6.5 staples/m to 32.6 staples/m.

5 [0084]

Further, as shown in FIG. 8, in the case where the driving interval of the staples 53 is in the range of 228 mm to 350 mm, the preferable range of the number of staples 53 driven is a range of 14.5
10 staples/m to 32.6 staples/m.

[0085]

Thus, in addition to using no adhesive in combination unlike in conventional examples, making the driving interval of the staples 53 serving as the top-
15 layer fasteners longer than that in conventional examples and driving fewer staples 53 than in conventional examples make it possible to reduce even more constructional labor and time, and to improve the construction performance even better.

20 [0086]

In addition, in the building wall 100A, the screws 51 serving as the under-layer fasteners connecting the under-layer face panels 30A to the studs 40 serve as fasteners connecting the laminate 10 to the
25 studs 40. Therefore, from the viewpoint of both of construction performance and connection strength, it is good to set the driving interval of the screws to approximately 600 mm, which is the lower limit among 600 mm to 1,000 mm, which are the driving intervals of
30 the screws 51 in the building wall 100, and as needed, a driving interval in a range of 300 mm to 600 mm, which is a shorter driving interval, may be applied.

[0087]

From the building wall 100A as well, it has been confirmed by the present inventors and the like that an air layer 60 is formed between the under layer 30 and the top layer 20 in an upper part of the laminate 10 as already described with reference to FIGS. 5A and 5B, and it has been confirmed that the formation of the air layer 60 provides excellent fire resistance. In addition, in the building wall 100A, since heat transfer is effectively inhibited by the formation of the air layer 60, the surface of the top layer 20 on the non-fire side can be inhibited from temperature rise, thereby improving the performance to qualify as a fireproof wall. Thus, like the building wall 100, the building wall 100A serves as a building wall having both a good construction performance and excellent fire resistance performance.

[0088]

The method of constructing the illustrated building wall 100A is as follows (see FIG. 6). First, the screws 51 serving as the under-layer fasteners are driven into the studs 40 from the room interior side of the under-layer face panel 30A, to thereby connect the under-layer face panel 30A and the studs 40 to each other. In the illustrated example, the under layer 30 is constructed by connecting a plurality of under-layer face panels 30A to a plurality of studs 40 in a transversely-laid arrangement. Here, the under-layer face panels 30A may be vertically laid (an under-layer face panel connecting step).

[0089]

Next, the staples 53 serving as the top-layer fasteners are driven from the room interior side of the top-layer face panel 20A, to thereby connect the top-

layer face panel 20A to the under-layer face panel 30A.
In the illustrated example, the top layer 20 is
constructed by connecting a plurality of top-layer face
panels 20A in their vertically-laid arrangement to the
5 plurality of under-layer face panels 30A. The top-
layer face panels 20A may be transversely laid.

[0090]

Here, the driving interval of the staples 53
serving as the top-layer fasteners is set in the range
10 of 228 mm to 1,000 mm, and the number of staples 53
driven is set in the range of 3.6 staples/m² to 32.6
staples/m². Preferably, the driving interval of the
staples 53 is set in the range of 228 mm to 606 mm, and
the number of staples 53 driven is set in the range of
15 6.5 staples/m² to 32.6 staples/m². Desirably, the
driving interval of the staples 53 is set in the range
of 228 mm to 350 mm, and the number of staples 53
driven is set in the range of 14.5 staples/m² to 32.6
staples/m² (a top-layer face panel connecting step).

20 [0091]

In the top-layer face panel connecting step,
the top-layer face panel 20A is connected to the under-
layer face panel 30A, to thereby construct the laminate
10 composed of the under layer 30 and the top layer 20,
25 to thereby construct the building wall 100A with the
laminate 10 fastened to the studs 40.

[0092]

According to this method of constructing the
building wall, constructional labor and time that might
30 be required in the case of using an adhesive and
staples or the like in combination for fastening the
top-layer face panel to the under-layer face panel as
in the conventional construction methods are

eliminated, and constructional labor and time that might be required in the case of driving staples at dense driving intervals are eliminated, making it possible to remarkably improve the construction performance.

[0093]

[Building Wall and Method of Constructing Same according to Third Embodiment]

Next, an example of a building wall and a method of constructing the same according to the third embodiment will be described with reference to FIGS. 9 and 10. Here, FIG. 9 is an oblique view showing an example of the building wall according to the third embodiment, and FIG. 10 is a table explaining the basis based on which a range of the numbers of staples driven, corresponding to respective staple driving intervals, is set in a case of connecting a top-layer face panel via screws and staples.

[0094]

A building wall 100B differs from the building walls 100 and 100A in that screws 52 and staples 53 are applied as the top-layer fasteners.

[0095]

Even though both of the screws 52 and the staples 53 are applied as the top-layer fasteners, the thing in common to the building walls 100 and 100A is that the construction performance is improved by eliminating an adhesive of the conventional examples, and making the driving intervals of the screws 52 and the staples 53 longer than those in the conventional examples to drive less numbers of them than in the conventional examples.

[0096]

In the building wall 100B, both of the screws 52 and the staples 53 are applied as the top-layer fasteners. The driving intervals of both of the screws 52 and the staples 53 and the numbers of both of them
5 driven may be set in the same manner as in the building walls 100 and 100A. However, since both of the screws 52 and the staples 53 are applied, it is rational to set the driving intervals of both of them and the
10 numbers of both of them driven in ranges close to, for example, the upper limits within the above-specified numerical ranges of the driving intervals of both of them and the numbers of both of them driven.
[0097]

In the building wall 100B as well, it has
15 been confirmed by the present inventors and the like that an air layer 60 is formed between the under layer 30 and the top layer 20 in an upper part of the laminate 10 as already described with reference to FIGS. 5A and 5B, and it has been confirmed that the
20 formation of the air layer 60 provides excellent fire resistance. Therefore, like the building walls 100 and 100A, the building wall 100B serves as a building wall having both a good construction performance and excellent fire resistance performance.
25 [0098]

The method of constructing the illustrated building wall 100B is as follows (see FIG. 9). First, the screws 51 serving as the under-layer fasteners are driven into the studs 40 from the room interior side of
30 the under-layer face panel 30A, to thereby connect the under-layer face panel 30A and the studs 40. In the illustrated example, the under layer 30 is constructed by connecting a plurality of under-layer face panels

30A to a plurality of studs 40 in a transversely-laid arrangement. Here, the under-layer face panels 30A may be vertically laid (an under-layer face panel connecting step).

5 [0099]

Next, the screws 52 and the staples 53 serving as the top-layer fasteners are driven from the room interior side of the top-layer face panel 20A, to thereby make the screws 52 reach the studs 40 by
10 penetrating the under-layer face panel 30A to connect the top-layer face panel 20A to both of the under-layer face panel 30A and the studs 40, and to thereby make the staples 53 reach the under-layer face panel 30A to connect the top-layer face panel 20A to the under-layer
15 face panel 30A also via the staples 53. In the illustrated example, the top layer 20 is constructed by connecting a plurality of top-layer face panels 20A in their vertically-laid arrangement to a plurality of studs 40 through a plurality of under-layer face panels
20 30A. The top-layer face panels 20A may be transversely laid.

[0100]

Here, the driving interval of the screws 52 serving as the top-layer fasteners is set in the range
25 of 304 mm to 1,000 mm, and the number of screws 52 driven is set in the range of 1.65 screws/m to 4.95 screws/m. The driving interval of the staples 53 serving as the top-layer fasteners is set in the range of 228 mm to 1,000 mm, and the number of staples 53
30 driven is set in the range of 1.8 staples/m² to 29.0 staples/m².

[0101]

Preferably, the driving interval of the

screws 52 is set in the range of 304 mm to 1,000 mm, and the number of screws 52 driven is set in the range of 1.65 screws/m to 4.95 screws/m. Here, the driving interval of the staples 53 is set in the range of 228 mm to 606 mm, and the number of staples 53 driven is set in the range of 3.6 staples/m² to 29.0 staples/m². Desirably, the driving interval of the screws 52 is set in the range of 304 mm to 1,000 mm, the number of screws 52 driven is set in the range of 1.65 screws/m to 4.95 screws/m, the driving interval of the staples 53 is set in the range of 228 mm to 350 mm, and the number of staples 53 driven is set in the range of 9.1 staples/m² to 29.0 staples/m². The per-pitch range of the number of the staples 53 driven is shown in FIG. 10.

[0102]

When calculating the number of screws and staples driven, the driving positions of both the screws 52 and the staples 53 at the end parts of the top-layer face panel 20A are set to be 10 mm apart from the ends of the top-layer face panel 20A, and the distance between the screws 52 and the staples 53 is set to be 10 mm or greater. It is preferable to not drive staples 53 but to drive screws 52 at the four corners of the board (a top-layer face panel connecting step).

[0103]

In the top-layer face panel connecting step, the top-layer face panel 20A is connected to both the under-layer face panel 30A and the studs 40, to thereby construct the laminate 10 composed of the under layer 30 and the top layer 20, to thereby construct the building wall 100B with the laminate 10 fastened to the

studs 40.

[0104]

According to this method of constructing the building wall, constructional labor and time that might be required in the case of using an adhesive and staples or the like in combination for fastening the top-layer face panel to the under-layer face panel as in the conventional construction methods are eliminated, and constructional labor and time that might be required in the case of driving screws and staples at dense driving intervals are eliminated, making it possible to remarkably improve the construction performance.

[0105]

Other embodiments in which other components are combined with the components and the like stated in the foregoing embodiments are also possible, and the present disclosure is not limited to the configurations shown here by any means. In this respect, modifications are applicable within a range not departing from the spirit of the present disclosure, and can be appropriately specified according to the application form.

[0106]

This international application claims priority based on Japanese Patent Application No. 2023-124126, filed on July 31, 2023, the entire contents of which are incorporated herein.

REFERENCE SIGNS LIST

[0107] 10: laminate
20: top layer
20A: top-layer face panel

21: room interior-side surface
25: longitudinal joint (butt joint)
26: transverse joint (butt joint)
30: under layer
5 30A: under-layer face panel
31: front surface
32: back surface
36: transverse joint (butt joint)
40: stud
10 45: upper runner
46: lower runner
47,48: floor structure
51: screw (under-layer fastener)
52: screw (top-layer fastener)
15 53: staple (top-layer fastener)
60: air layer
100, 100A, 100B: partition wall (building
wall)
A: air layer formation area

CLAIMS

[Claim 1]

5 A building wall, comprising at least:
 an under-layer face panel directly or
indirectly connected to a stud; and
 a top-layer face panel connected to the
under-layer face panel and facing a room interior,
10 wherein the top-layer face panel is connected
to the under-layer face panel via a screw,
 the screw reaches the stud while penetrating
the under-layer face panel, and
 an interval at which the screw is driven is
15 in a range of 304 mm to 1,000 mm.

[Claim 2]

 A building wall, comprising at least:
20 an under-layer face panel connected directly
or indirectly to a stud; and
 a top-layer face panel connected to the
under-layer face panel and facing a room interior,
 wherein the top-layer face panel is connected
25 to the under-layer face panel via a screw,
 the screw reaches the stud while penetrating
the under-layer face panel, and
 a number of screws driven is in a range of
1.65 screws/m to 4.95 screws/m, each of the screws
30 being the screw.

[Claim 3]

A building wall, comprising at least:
an under-layer face panel directly or
indirectly connected to a stud; and

5 a top-layer face panel connected to the
under-layer face panel and facing a room interior,
wherein the top-layer face panel is connected
to the under-layer face panel via a screw,
the screw reaches the stud while penetrating
the under-layer face panel, and
10 an interval at which the screw is driven is
in a range of 304 mm to 1,000 mm, and a number of
screws driven is in a range of 1.65 screws/m to 4.95
screws/m, each of the screws being the screw.

15

[Claim 4]

A building wall, comprising at least:
an under-layer face panel directly or
indirectly connected to a stud; and

20 a top-layer face panel connected to the
under-layer face panel and facing a room interior,
wherein the top-layer face panel is connected
to the under-layer face panel via a staple,
the staple reaches at least a position within
25 the under-layer face panel thickness-wise, and
an interval at which the staple is driven is
in a range of 228 mm to 1,000 mm.

30 [Claim 5]

A building wall, comprising at least:
an under-layer face panel connected directly
or indirectly to a stud; and

a top-layer face panel connected to the
under-layer face panel and facing a room interior,
wherein the top-layer face panel is connected
to the under-layer face panel via a staple,
5 the staple reaches at least a position within
the under-layer face panel thickness-wise, and
a number of staples driven is in a range of
3.6 staples/m² to 32.6 staples/m², each of the staples
being the staple.

10

[Claim 6]

A building wall, comprising at least:
an under-layer face panel directly or
15 indirectly connected to a stud; and
a top-layer face panel connected to the
under-layer face panel and facing a room interior,
wherein the top-layer face panel is connected
to the under-layer face panel via a staple,
20 the staple reaches at least a position within
the under-layer face panel thickness-wise, and
an interval at which the staple is driven is
in a range of 228 mm to 1,000 mm, and a number of
staples driven is in a range of 3.6 staples/m² to 32.6
25 staples/m², each of the staples being the staple.

[Claim 7]

A building wall, comprising at least;
30 an under-layer face panel connected directly
or indirectly to a stud; and
a top-layer face panel connected to the
under-layer face panel and facing a room interior,

wherein the top-layer face panel is connected to the under-layer face panel via a screw and a staple, the screw reaches the stud while penetrating the under-layer face panel,
5 an interval at which the screw is driven is in a range of 304 mm to 1,000 mm, the staple reaches a position within the under-layer face panel thickness-wise, and an interval at which the staple is driven is
10 in a range of 228 mm to 1,000 mm.

[Claim 8]

A building wall, comprising at least:
15 an under-layer face panel directly or indirectly connected to a stud; and a top-layer face panel connected to the under-layer face panel and facing a room interior, wherein the top-layer face panel is connected
20 to the under-layer face panel via a screw and a staple, the screw reaches the stud while penetrating the under-layer face panel, a number of screws driven is in a range of 1.65 screws/m to 4.95 screws/m, each of the screws
25 being the screw, the staple reaches a position within the under-layer face panel thickness-wise, and a number of staples driven is in a range of 1.8 staples/m² to 29.0 staples/m², each of the staples
30 being the staple.

[Claim 9]

A building wall, comprising at least:

an under-layer face panel connected directly or indirectly to a stud; and

a top-layer face panel connected to the
5 under-layer face panel and facing a room interior,
wherein the top-layer face panel is connected to the under-layer face panel via a screw and a staple,
the screw reaches the stud while penetrating the under-layer face panel,

10 an interval at which the screw is driven is in a range of 304 mm to 1,000 mm, and a number of screws driven is in a range of 1.65 screws/m to 4.95 screws/m, each of the screws being the screw,

the staple reaches a position within the
15 under-layer face panel thickness-wise, and

an interval at which the staple is driven is in a range of 228 mm to 1,000 mm, and a number of staples driven is in a range of 1.8 staples/m² to 29.0 staples/m², each of the staples being the staple.

20

[Claim 10]

The building wall according to any one of claims 1 to 9,

25 wherein in event of a fire, the under-layer face panel located on a fire side deforms more than the top-layer face panel does, to form an air layer in a part of a region between the under-layer face panel and the top-layer face panel in a state in which the top-
30 layer face panel is not detached from the under-layer face panel.

[Claim 11]

A method of constructing a building wall including at least an under-layer face panel connected directly or indirectly to a stud, and a top-layer face panel connected to the under-layer face panel and facing a room interior, the method comprising:

an under-layer face panel connecting step of connecting the under-layer face panel directly or indirectly to the stud; and

a top-layer face panel connecting step of connecting the top-layer face panel to the under-layer face panel via a screws,

wherein the screw is made to reach the stud by penetrating the under-layer face panel, and

an interval at which the screw is driven is in a range of 304 mm to 1,000 mm.

[Claim 12]

A method of constructing a building wall including at least an under-layer face panel connected directly or indirectly to a stud, and a top-layer face panel connected to the under-layer face panel and facing a room interior, the method comprising:

an under-layer face panel connecting step of connecting the under-layer face panel directly or indirectly to the stud; and

a top-layer face panel connecting step of connecting the top-layer face panel to the under-layer face panel via a screw,

wherein the screw is made to reach the stud by penetrating the under-layer face panel, and

a number of screws driven is in a range of

1.65 screws/m to 4.95 screws/m, each of the screws being the screw.

5 [Claim 13]

A method of constructing a building wall including at least an under-layer face panel connected directly or indirectly to a stud, and a top-layer face panel connected to the under-layer face panel and
10 facing a room interior, the method comprising:

an under-layer face panel connecting step of connecting the under-layer face panel directly or indirectly to the stud; and

a top-layer face panel connecting step of
15 connecting the top-layer face panel to the under-layer face panel via a screw,

wherein the screw is made to reach the stud by penetrating the under-layer face panel, and

an interval at which the screw is driven is
20 in a range of 304 mm to 1,000 mm, and a number of screws driven is in a range of 1.65 screws/m to 4.95 screws/m, each of the screws being the screw.

25 [Claim 14]

A method of constructing a building wall including at least an under-layer face panel connected directly or indirectly to a stud, and a top-layer face panel connected to the under-layer face panel and
30 facing a room interior, the method comprising:

an under-layer face panel connecting step of connecting the under-layer face panel directly or indirectly to the stud; and

a top-layer face panel connecting step of connecting the top-layer face panel to the under-layer face panel via a staple,

wherein the staple is made to reach a
5 position within the under-layer face panel thickness-wise, and

an interval at which the staple is driven is in a range of 228 mm to 1,000 mm.

10

[Claim 15]

A method of constructing a building wall including at least an under-layer face panel connected directly or indirectly to a stud, and a top-layer face
15 panel connected to the under-layer face panel and facing a room interior, the method comprising:

an under-layer face panel connecting step of connecting the under-layer face panel directly or indirectly to the stud; and

20 a top-layer face panel connecting step of connecting the top-layer face panel to the under-layer face panel via a staple,

wherein the staple is made to reach a position within the under-layer face panel thickness-
25 wise, and

a number of staples driven is in a range of 3.6 staples/m² to 32.6 staples/m², each of the staples being the staple.

30

[Claim 16]

A method of constructing a building wall including at least an under-layer face panel connected

directly or indirectly to a stud, and a top-layer face panel connected to the under-layer face panel and facing a room interior, the method comprising:

an under-layer face panel connecting step of
5 connecting the under-layer face panel directly or indirectly to the stud; and

a top-layer face panel connecting step of connecting the top-layer face panel to the under-layer face panel via a staple,

10 wherein the staple is made to reach a position within the under-layer face panel thickness-wise, and

an interval at which the staple is driven is in a range of 228 mm to 1,000 mm, and a number of
15 staples driven is in a range of 3.6 staples/m² to 32.6 staples/m², each of the staples being the staple.

[Claim 17]

20 A method of constructing a building wall including an under-layer face panel connected to a stud, and a top-layer face panel connected to the under-layer face panel and facing a room interior, the method comprising:

25 an under-layer face panel connecting step of connecting the under-layer face panel directly or indirectly to the stud; and

a top-layer face panel connecting step of connecting the top-layer face panel to the under-layer
30 face panel via a screw and a staple,

wherein the screw is made to reach the stud by penetrating the under-layer face panel,
an interval at which the screw is driven is in a range

of 304 mm to 1,000 mm,

the staple is made to reach a position within
the under-layer face panel thickness-wise, and

an interval at which the staple is driven is
5 in a range of 228 mm to 1,000 mm.

[Claim 18]

A method of constructing a building wall
10 including an under-layer face panel connected to a
stud, and a top-layer face panel connected to the
under-layer face panel and facing a room interior, the
method comprising:

an under-layer face panel connecting step of
15 connecting the under-layer face panel directly or
indirectly to the stud; and

a top-layer face panel connecting step of
connecting the top-layer face panel to the under-layer
face panel via a screw and a staple,

20 wherein the screw is made to reach the stud
by penetrating the under-layer face panel,

a number of screws driven is in a range of
1.65 screws/m to 4.95 screws/m, each of the screws
being the screw,

25 the staple is made to reach a position within
the under-layer face panel thickness-wise, and

a number of staples driven is in a range of
1.8 staples/m² to 29.0 staples/m², each of the staples
being the staple.

30

[Claim 19]

A method of constructing a building wall

including an under-layer face panel connected to a stud, and a top-layer face panel connected to the under-layer face panel and facing a room interior, the method comprising:

5 an under-layer face panel connecting step of connecting the under-layer face panel directly or indirectly to the stud; and

 a top-layer face panel connecting step of connecting the top-layer face panel to the under-layer
10 face panel via a screw and a staple,

 wherein the screw is made to reach the stud by penetrating the under-layer face panel,

 an interval at which the screw is driven is in a range of 304 mm to 1,000 mm, and a number of
15 screws driven is in a range of 1.65 screws/m to 4.95 screws/m, each of the screws being the screw,

 the staple is made to reach a position within the under-layer face panel thickness-wise, and

 an interval at which the staple is driven is
20 in a range of 228 mm to 1,000 mm, and a number of staples driven is in a range of 1.8 staples/m² to 29.0 staples/m², each of the staples being the staple.