

EXTERIOR FACING PANELS FOR OUTER WALLS OF BUILDINGS

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates to exterior facing panels attached to outer walls of a structure such as buildings. More particularly, it relates to exterior facing panels which can be effectively prevented from deforming due to contraction or expansion thereof caused by change of outside temperature, and also which can be effectively prevented from bedewing by attaching an adiabatic plates between the exterior facing panels and an interior frame on which the panels are attached.

Description of the Prior Art

Fig. 5 shows an example of the exterior facing panels of prior art. In the Fig. 5, the end portions(12a) of side faces(11a) of the exterior facing panels(10a) are bent exteriorly (to the left direction of the side face in Fig. 5) so that the adjacent end portions(12a) are close or next to each other on the frame(40a). The end portions(12a) are fixed directly to the frame(40a) by connecting means such as fastners. When outdoor temperature changes, the exterior facing panels suffer from contraction or expansion caused by the temperature changes and deform because the panel have no room to absorb the physical changes of contraction or expansion thereof. Therefore, in response to the change of the outer temperature, the panels become uneven in the surface. The panels tend to have bad appearance and be relatively weakened, unstable or undurable in structure and duration of use thereof are reduced. In addition, since the panels of prior art have the outward-bent end portions(12a) mentioned above, the panels tend to be easily damaged and to hurt bodies of workers when

being handles. Moreover, the out-bent end portions(12a) essentially require to using additional fixing tape for fixing adiabatic materials filled in inner portions of the panels. Furthermore, the panels having the outward-bent end portions(12a) are relatively inferior in loading or stocking or carrying because of their geometric structure.

SUMMARY OF THE INVENTION

In view of the problem of the prior art, it is object of the present invention to provide the exterior facing panels having the following characteristics : the size change of the panels caused by the temperature change can be absorbed, occurrence of bedewing on the panels or the frames can be prevented, the adiabatic materials can be filled within the panels without additional fixing tape; the panels have relatively superiority in loading, stocking, carrying or handling, and the panels are especially physically safe when handled by workers.

In accordance with the present invention, the exterior facing panels for outer walls of the buildings comprising a plurality of panels, each of the panels comprising : a top face; side faces connected to said top face and bent downwardly from the edge of the top face; inward-bent end portions connected to said side faces and bent inwardly into the panel in substantially right angle with respect to said side faces, and said inward-bent end portions supporting and holding an adiabatic materials filled within the panels : the side faces including engaging holes extending laterally across some parts of the side faces in a manner that the adjacent engaging holes of the adjacent side faces of the adjacent panels do not face oppositely with each other ; and a clip having a claw for engaging with said engaging hole, a holding portion for engaging with said inward-bent end portion of the panel, a connecting portion for connecting the clip with a frame which are used for structurally holding and supporting the

exterior facing panels, and an adiabatic plate attached to bottom of said connecting portion for preventing heat or cold from transferring between said panels and frames.

Preferably, in the said exterior facing panels, size of the claw of the clip inserted into the engaging hole is smaller than that of said engaging hole.

BRIEF DESCRIPTION OF THE DRAWINGS

A preferred embodiment of the present invention will be discussed in detail below with reference to the attached drawing figures.

Fig. 1 is a partially broken-away sectional side view of an exterior facing panel in accordance with an embodiment of the present invention.

Fig. 2 is a partially enlarged sectional side view of the exterior facing panel in accordance with an embodiment of the present invention.

Fig. 3 is a sectional side view showing the exterior facing panels of the present invention installed on the frames.

Fig. 4 is a plan view showing the exterior facing panels of the present invention installed on the frames.

Fig. 5 is a sectional side view showing the exterior facing panels of the prior art installed on the frames.

The brief description of reference numerals of drawings

10 : Exterior facing panel	11 : Side faces
12 : Inward-bent end portions	
13 : Engaging holes	20 : Clips
21 : Claw	22 : Holding portion
23 : Connecting Portion	30 : Adiabatic plate
40 : Frames	50 : Adiabatic Material

DESCRIPTION OF THE PREFERRED EMBODIMENT

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

Referring to Figs. 1 and 2, each of the exterior facing panels(10) has a top face, four side faces(11) connected to the top face and bent downwardly, and inward-bent end portions (12) connected to the side faces (11) and bent inwardly to the panels (to the right direction of Fig. 1, 2 and 3), in right angle with respect to the side faces(11). Engaging holes(13) are formed on, and extended laterally across some parts of the side faces(11), preferably, located on the positions adjacent to corners of the side faces(11) in such manner that the adjacent engaging holes(13) of adjacent opposite side faces(11) of adjacent panels(10) do not face with each other, as shown in Fig. 4. As a result, adjacent clips(20)(described below) of adjacent panels(10) can be engaged with the corresponding engaging holes(13), and fixed on the frames(40) without interfering with each other.

Each of the clips(20) comprises a claw(21) for detachably, idly, and firmly engaging with the corresponding engaging hole(13), a holding portion(22) for firmly holding the inward-bent end portion(12) of the panel(10), and a connecting portion(23) for connecting the clip(20) with the frame(40) with for example fasteners, such as a screw.

Also, the clip(20) has an adiabatic plate(30) attached to the bottom thereof. The claw(21) of the clip(20) has a bent end inserted to the engaging hole(13).

In addition, the holding portion(22) of the clip(20) has a bent end firmly fixed with the inward-bent end portion(12) of the panel(10). Preferably, sizes of the claws 21 is smaller than those of the engaging holes(13) so that the space formed between the engaging holes(13) and the claws(21) can absorb contraction or expansion of the panel caused by the temperature change, as

described above.

Fig. 3 is a sectional view showing the exterior facing panels(10) installed on the frames(40), and Fig. 4 is a plan view showing the plural exterior panels(10) installed on the frames(40).

As shown in Fig. 3 and 4, each clip(20) is fixed on the frame(40) via the adiabatic plate(30) by for example, fasteners. The adjacent clips(20) of the adjacent panels(10) do not face and contact with each other. They are located laterally side by side.

The adiabatic plates(30) attached to the bottom of the clips(20) can prevent heats or cold from transferring between the panels(10) and the frames(40).

Finally, the reference numerals 50 in Fig.3 of the present invention and Fig. 5 of prior art indicate all the adiabatic materials filled within box-like panels(10).

In accordance with the panels of the present invention mentioned above, the present invention has the following characteristics:

First, since the sizes of the engaging holes(13) are larger than those of the ends of the claws that are inserted in the engaging holes, the spaces formed between the engaging holes and the inserted ends of claws can absorb the side change of the panels in both vertical and horizontal direction according to contraction or expansion caused by the temperature change.

Therefore, the panels of the present invention can keep evenness and good appearance in the surfaces thereof and can maintain relatively good durability and long life.

Second, the adiabatic plates(30) of the clip(20) can effectively prevent bedewing by insulating the heat or cold transferred between the frames(40) and the panels(10) via the clips(20).

Third, since the panels(10) have box-like shapes in part by inwardly bending the end portions(12), the adiabatic materials can be received and effectively fixed therein without additional fixing tapes which is essentially required in

the panels of prior art material, because the inward-bent end portions(12) of the panels(10) can support and fix the adiabatic materials received within the box-like panels.

Fourth, the outward-bent end portions(12a) of prior art frequently have physically injured the workers, and tends be damaged by contacting them with other articles when workers handling the panels of prior art. However, in the present invention, there is nearly no possibility to hurt workers by the inward-bent end portions(12) or to damage the panel by contacting other article

Fifth, the panels of the present invention are relatively superior to those of prior art in loading, stocking, carrying, or handling because the geometric structure of the inward-bent end portions thereof.

What is claimed is:

1. Exterior facing panels for outer walls of buildings, each of the panels comprising:

a top face:

at least one side face connected to said top face and bent downwardly from the edge of the top face:

at least one inward-bent end portion connected to said side face bent inwardly towards the panel and in substantially right angle with respect to said side faces, and said inward-bent end portions supporting and holds an adiabatic materials filled within the panel: and

said side face including engaging holes extending laterally across some parts of the side face in a manner that the adjacent engaging holes of the adjacent side face of the adjacent panels do not face oppositely with each other: and

a clip having a claw for engaging with said engaging hole, a holding portion for engaging with said inward-bent end portion of the panel, and a connecting portion for connecting the clip with a frame which are used for structurally holding and supporting the exterior facing panels, and an adiabatic plate attached to bottom of said connecting portion for preventing heat or cold from transferring between said panel and frame.

2. The exterior facing panels as claimed in claim 1, wherein size of the claw of the clip inserted into the corresponding engaging hole is smaller than that of said corresponding engaging hole.