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(54) **COVERING PANEL FOR ROOFS AND OUTSIDE WALLS OF BUILDINGS.**

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Description

The present invention relates to a covering panel for roofs and the outside walls of buildings.

It has been proposed to provide various covering panels for use in covering the roof or outside wall of a building, and many such covering panels are provided with corrugations at least adjacent two opposite longitudinal edges of the panel.

When covering a roof or wall with panels, such as corrugated panels, the separate panels are positioned with the side edges overlapping each other, so that one corrugation adjacent the leading edge of one panel is positioned over a corrugation at the trailing edge of a preceding panel. However, in this overlap region a narrow gap or slot may be defined between the panels, and when rain is falling water can penetrate through this gap or slot by capillary suction. When the wind is blowing it is often found that the penetration of water increases due to the creation of a partial vacuum under the covering panels as the result of the action of the wind. Such penetration of water can cause serious damage, giving rise to damp, and thus it is frequently necessary to provide a separate layer of waterproof material, underneath a roof or wall covering of the type described above, to provide adequate protection against leaking water.

Attempts have been made to prevent leakage by securing the panels as tightly as possible to each other in the overlapping regions, in an attempt to eradicate the gap or slot between the panels. However, it has not been found to be possible to provide water tight overlaps at a reasonable price, due to manufacturing tolerances.

It has been proposed to provide conduits for draining any water that may penetrate between overlapped panels in the region of the overlaps, see e.g. SE 381 075. The provision of such conduits, however, will make the manufacture and mounting of the panels more complicated, and thus more expensive.

It has also been proposed to provide a corrugation, adjacent the edge of a panel, which is provided with a depressed groove on the exterior flange of the corrugation. See for example, AU 255 261. Such a groove leads to the creation of a space between the panels in the region of the overlap, and no capillary action can operate within the space. Whilst the provision of such a space tends to eliminate the capillary forces in a region of the overlap, it does not totally prevent penetration of water between the panels due to the partial vacuum created under the panels when the wind blows. Also, from a manufacturing point of view, it is relatively difficult to provide such a depressed groove on the final flange of a corrugation.

US—A—879 708 discloses a sinusoidal corrugated panel, and a panel having two triangular corrugations, one adjacent each longitudinal edge. The specification describes a joint between two corresponding panels, and in each case the

final flange of the upper corrugation of the overlapping joint is spaced from the corresponding flange of the corrugation of the lower panel, and the free edge of said final flange touches the upper surface of the lower panel. Even with a joint of this nature, whilst the capillary action may be defeated, moisture may still penetrate the overlapping joint when a partial vacuum is created beneath the panels due to the effect of the wind.

The present invention seeks to provide a covering panel having an edge portion which can be overlapped with the opposite edge portion of a corresponding covering panel to provide a joint which prevents leakage between the panels, the panel nevertheless being simple to manufacture.

According to this invention there is provided a covering panel for covering a roof or the outside wall of a building, said covering panel comprising at least two projecting corrugations, one extending along each of two longitudinal edges of the panel, the free flange of one of these corrugations being provided with a bent region extending continuously in the longitudinal direction of the corrugation, the bent region being such that a portion of the free flanges is spaced away from the underlying corrugation of a corresponding panel, when the said one corrugation is located over the corrugation provided at the opposite longitudinal edge of the corresponding panel to create an overlapped joint, a gap or chamber being created with such a large width that no capillary forces can arise between the walls of the gap and the free edge of the free flange of the said one corrugation of the upper panel being situated at a point which is spaced from the underlying flange of the underlying corrugation, wherein the free edge of the free flange is spaced sufficiently from the base of the underlying corrugation to define an open mouth which is open towards the lower panel, so that a partial vacuum arises within the resultant gap or chamber when the wind is blowing.

Preferably the free edge of the flange is situated at a distance below the upper level of the said one corrugation which is smaller than half the height (h) of the corrugation.

Conveniently the said bent region is provided immediately below the upper level of the said one corrugation.

Advantageously the gap or chamber has a width of at least 4 millimetres, and preferably 5—10 millimetres.

In order that the invention may be more readily understood, and so that further features thereof may be appreciated, the invention will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of portions of two corrugated covering panels in accordance with the invention with overlapping edges; and

Figure 2 is a cross-section on an enlarged scale through the region of the overlap.

Figure 1 illustrates two identical covering panels 10, 11 which are each corrugated. The

panels define longitudinal corrugations or ribs, panel 10 defining corrugations or ribs 12—15 and panel 11 defining corrugations or ribs 16—17 respectively. Each corrugation or rib has a trapezoidal cross-section, and thus each corrugation or rib comprises a top section 13a, and flange sections 13b, 13c on either side of the top section.

Each panel is illustrated as being provided with a plurality of corrugations, but the most important corrugations are the corrugations adjacent each longitudinal edge of the panel.

In Figure 1 only portions of the two panels 10, 11 are illustrated, one flange 15 adjacent the leading edge of the panel 10 being illustrated overlapping the trailing edge of the other panel 11.

The flange 15c that forms part of the outermost corrugation 15 of the first panel, and which also serves to define the free edge of the upper panel 10 is provided with a bent region 15d, which is more clearly illustrated in Figure 2. It is to be noted that the panels are located with a single overlap, that is to say one corrugation of the upper panel 10 overlaps only one corrugation of the lower panel.

Referring to Figure 2, the overlapping portions of the panels are shown on an enlarged scale. The corrugation 16 of the lower panel 11 has a planar top portion 16a, and planar flange portions 16b, 16c. The flange 16c is provided with a curved or bent terminal edge region 18 which defines the edge of the panel, and lies under the trough defined between the corrugation 15 and the adjacent corrugation 14 in the upper panel 10.

The corrugation 15 of the upper panel 10 has a planar top portion 15a and two flange portions 15b, 15c, with the flange portion 15c serving to define the edge of the panel. The flange 15c does not engage or cover the whole of the flange 16b of the corrugation 16 of the lower panel, but terminates at a point above the middle of the flange 16b, the point being spaced away from the flange 16b.

The vertical distance between the free edge of the outer flange 15c of the corrugation of the upper panel, and the uppermost level of the upper panel is less than half the height h of each corrugation present in the upper panel.

The free flange 15c is provided with a bent region 15d that extends continuously in the longitudinal direction of the corrugation over the entire longitudinal length of the panel. The bent region includes two parallel folds 20, 21, the first being outward fold and the second being a downward fold. Thus the lower terminal region of the flange 15c is displaced from, but parallel to, the plane of the uppermost region of the flange 15c. Consequently a gap or chamber 22 is established between the terminal portion of a flange 15c and the underlying flange 16b of the corrugation 16 of the lower sheet 11. The gap or chamber 22 is open downwardly towards the lower panel, and has an open mouth illustrated as having a width b . Thus no capillary forces can arise within this gap or chamber.

The gap or chamber forms a chamber of turbulence in which a partial vacuum arises when the wind is blowing. This partial vacuum tends to balance the partial vacuum that arises under the panels when the wind is blowing thus preventing water from penetrating between the panels and running away under the panels.

The turbulence that arises in the gap when the wind blows further decreases the risk of water penetrating between the panels in the region of the overlap.

To obtain the desired function of the gap or chamber 22, it has been found that the gap or chamber should preferably have a width at least 4 millimetres, and most advantageously at least 5 millimetres, e.g. 5—10 millimetres. This specified width of the gap refers to the perpendicular distance between the terminal portion of the upper flange of the corrugation of the upper sheet and the corresponding flange of the corrugation of the lower sheet.

The bent region 15d on the free flange 15c is preferably arranged immediately below the upper level of the corresponding corrugation, so that the upper portion of the gap or chamber 22 is connected to an air channel 23 formed between the panels in the region of the upper edges of the flanges 15c, 15d, due to the difference between the inner radius and the outer radius of the corrugations.

The distance between the folds 20, 21, can preferably be in the region of 8—9 millimetres, and the portion between the folds 20, 21 can lie at an angle of approximately 45° to the plane occupied by the uppermost region and the lower terminal region of the free flange 15c. The distance from the lower fold 21 to the lower free edge of the flange 16c can preferably be about 6 millimetres.

Whilst only one embodiment of a panel in accordance with the invention has been illustrated and described, it is clear that many variations of modifications are possible within the scope of the invention as defined by the following claims.

Embodiments of the invention incorporate at least two corrugations, that is to say one corrugation along each of two opposite longitudinal edges of the panel. It is to be understood that the details of the design of the panel between these two corrugations is not important, as far as the present invention is concerned. The corrugations need not necessarily have a trapezoidal cross-section but it can alternatively have a wave-like or square cross-section.

The bent region in the free flange of the final corrugation of the upper sheet need not necessarily be created by folding the free flange, but can alternatively be created by providing a soft bending of the flange. It is possible to use a combination of a fold and a soft bend.

It is not essential for the walls of the gap or chamber 22 to be parallel, but it is important that the free flange, at its edge, opens, into a space or chamber in which a partial vacuum arises when

the wind is blowing, so that the partial vacuum created under the panels by the wind is balanced or compensated. The described gap or chamber can alternatively be positioned lower, that is to say closer to the bottom portion of the corrugations than illustrated in the accompanying drawings and described above.

Claims

1. A covering panel (10, 11) for covering a roof or the outside wall of a building, said covering panel comprising at least two projecting corrugations (15, 16), one extending along each of two longitudinal edges of the panel, the free flange (15c) of one of these corrugations being provided with a bent region (15d) extending continuously in the longitudinal direction of the corrugation, the bent region being such that a portion of the free flange (15c) is spaced away from the underlying corrugation (16) of a corresponding panel, when the said one corrugation (15) is located over the corrugation (16) provided at the opposite longitudinal edge of the corresponding panel to create an overlapped joint, a gap or chamber (22) being created with such a large width that no capillary forces can arise between the walls of the gap and the free edge of the free flange (15c) of the said one corrugation (15) of the upper panel being situated at a point which is spaced from the underlying flange (16b) of the underlying corrugation, characterised in that the free edge of the free flange is spaced sufficiently from the base of the underlying corrugation to define an open mouth which is open towards the lower panel, so that a partial vacuum arises within the resultant gap or chamber (22) when the wind is blowing.

2. A covering panel according to claim 1, wherein the free edge of the flange is situated at a distance below the upper level of the said one corrugation (15) which is smaller than half the height (h) of the corrugation.

3. A panel according to claim 1 or 2, wherein the said bent region is provided immediately below the upper level of the said one corrugation (15).

4. A panel according to any one of the preceding claims, wherein the gap or chamber (22) has a width of at least 4 millimetres.

5. A panel according to claim 4, characterised in that the width of the gap or chamber is 5—10 millimetres.

Patentansprüche

1. Deckplatte (10, 11) zur Abdeckung eines Daches oder einer Außenwand eines Gebäudes, wobei die Deckplatte zumindest zwei vorstehende Profilteile (15, 16) aufweist, von denen eines sich entlang jeder von zwei längsverlaufenden Ecken der Deckplatte erstreckt, der freie Flansch (15c) von einem der Profilteile mit einem gebogenen Bereich (15d) versehen ist, der sich kontinuierlich in Längsrichtung des Profilteils erstreckt, wobei weiter der gebogene Bereich so gebildet ist, daß ein Bereich des freien Flansches (15c) von dem

unterliegenden Profilteil (16) einer zugehörigen Deckplatte beabstandet ist, wenn das eine Profilteil (15) über dem Profilteil (16) angeordnet ist, das an der gegenüberliegenden Längsecke der entsprechenden Deckplatte vorgesehen ist, um eine überlappende Verbindung zu bilden, und ein Spalt oder eine Kammer (22) gebildet ist, mit einer solch großen Weite, daß keine Kapillarkräfte zwischen den Wänden des Spaltes entstehen können und die freie Ecke des freien Flansches (15c) des einen Profilteils (15) der oberen Deckplatte an einem Punkt gelegen ist, der von dem unterliegenden Flansch (16b) des unterliegenden Profilteils beabstandet ist, dadurch gekennzeichnet, daß die freie Ecke des freien Flansches ausreichend von der Basis des unterliegenden Profilteils beabstandet ist, um einen offenen Mund zu bilden, der zu der unteren Deckplatte hin geöffnet ist, so daß ein teilweiser Unterdruck in dem sich ergebenden Spalt oder in der Kammer (22) entsteht, wenn der Wind bläst.

2. Deckplatte nach Anspruch 1, wobei die freie Ecke des Flansches in einem Abstand unterhalb des oberen Niveaus des einen Profilteils (15) sich befindet, der kleiner ist als die Hälfte der Höhe (h) des Profilteils.

3. Deckplatte nach Anspruch 1 oder 2, wobei der gebogene Bereich unmittelbar unterhalb des oberen Niveaus des einen Profilteils (15) vorgesehen ist.

4. Deckplatte nach einem der vorstehenden Ansprüche, wobei der Spalt oder die Kammer (22) eine Weite von zumindestens 4 mm besitzt.

5. Deckplatte nach Anspruch 4, dadurch gekennzeichnet, daß die Weite des Spaltes oder der Kammer 5 bis 10 mm beträgt.

Revendications

1. Panneau de recouvrement (10, 11) pour recouvrir une toiture ou la paroi externe d'un bâtiment, ce panneau de recouvrement comprenant au moins deux ondulations (15, 16) en saillie, dont l'une s'étend le long de chacun des deux bords longitudinaux du panneau, l'aile libre (15c) de l'une de ces ondulations étant munie d'une région cintrée (15d) s'étendant sans interruption dans le sens longitudinal de l'ondulation, la région cintrée étant telle qu'une partie de l'aile libre (15c) se trouve espacée de l'ondulation sous-jacente (16) d'un panneau correspondant lorsque ladite ondulation précitée (15) coiffe l'ondulation (16) prévue sur le bord longitudinal opposé du panneau correspondant en vue de former un joint superposé, un interstice ou espace vide (22) étant réservé avec une largeur telle que des forces capillaires ne puissent pas être engendrées entre les parois de l'interstice, et le bord libre de l'aile libre (15c) de ladite ondulation précitée (15) du panneau supérieur étant situé en un point distant de l'aile sous-jacente (16b) de l'ondulation sous-jacente, caractérisé par le fait que le bord libre de l'aile libre est espacé, de la base de l'ondulation sous-jacente, d'une distance suffisante pour délimiter une poche

ouverte béant en direction du panneau inférieur, de telle sorte qu'un vide partiel soit créé dans l'interstice ou espace vide (22) résultant lorsque le vent souffle.

2. Panneau de recouvrement selon la revendication 1, dans lequel le bord libre de l'aile est situé, au-dessous de niveau supérieur de l'ondulation précitée (15), à une distance inférieure à la moitié de la hauteur (h) de cette ondulation.

3. Panneau selon la revendication 1 ou 2, dans

lequel la région cintrée est ménagée immédiatement au-dessous du niveau supérieur de l'ondulation précitée (15).

4. Panneau selon l'une quelconque des revendications précédentes, dans lequel l'interstice ou espace vide (22) présente une largeur d'au moins 4 millimètres.

5. Panneau selon la revendication 4, caractérisé par le fait que la largeur de l'interstice ou espace vide est comprise entre 5 et 10 millimètres.

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Fig. 1

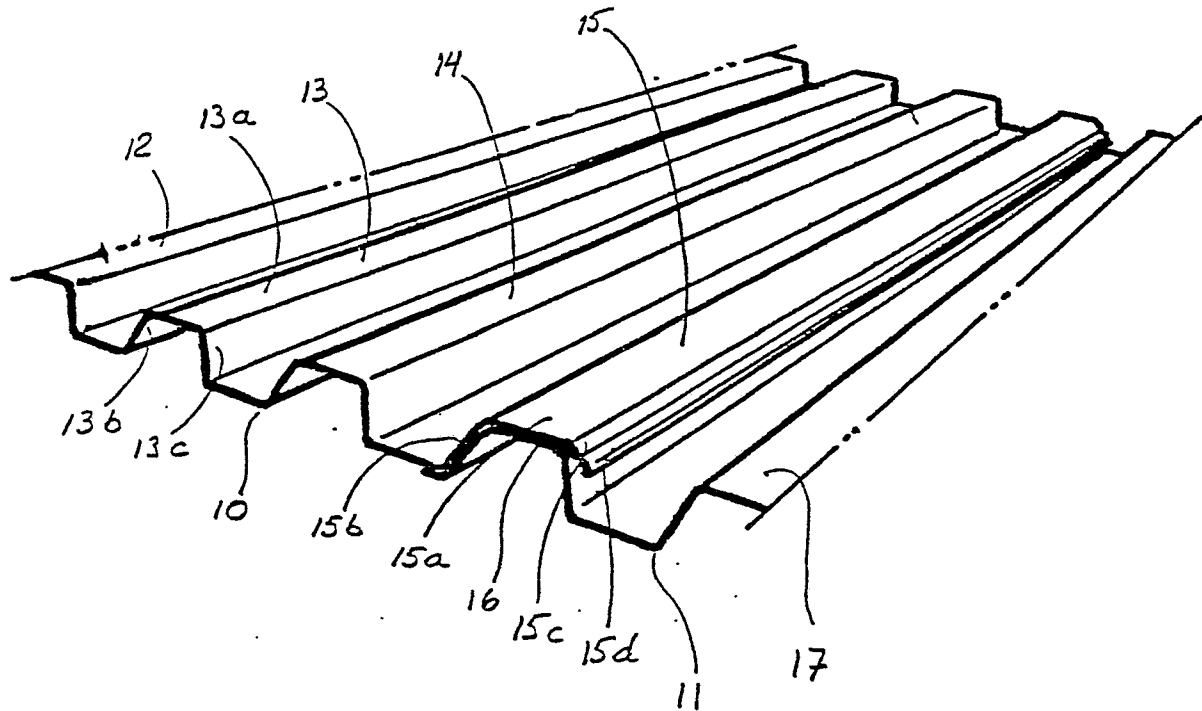


Fig. 2

