

EXTERIOR MATERIAL AND MANUFACTURING METHOD FOR SAME

TECHNICAL FIELD

[0001]

The present invention relates to an exterior material having a decorative surface that appears on an outer surface of a building, such as a wall and a roof.

BACKGROUND ART

[0002]

Such a type of exterior material conventionally used can include a structure shown in Patent Document 1 or the like, for example. That is, in the conventional structure, an exterior material (a roofing member) disposed on a roof base is provided with a pattern consisting of linear irregularities on a decorative surface of the exterior material in order to facilitate flowing of rain water.

CITATION LIST

Patent Literature

[0003]

Patent Document 1: Japanese Patent Application Publication No. 2015-71927 A

SUMMARY OF INVENTION

Technical Problem

[0004]

In the conventional exterior material as described above, the pattern of irregularities is provided on the decorative surface. When changing such a concave-convex pattern, it is necessary to change members used for production of exterior materials, such as embossing rolls and press dies, for example. Therefore, the conventional exterior material is difficult to change the patterns, so that diversity of a design is difficult to be ensured.

[0005]

The present invention has been made to solve the above problems. An object of the present invention is to provide an exterior material that can easily ensure the diversity of the design.

Solution to Problem

[0006]

The present invention relates to an exterior material having a decorative surface that appears on an outer surface of a building, wherein the decorative surface comprises a first pattern represented by linear irregularities and a second pattern represented by linear coated films, and wherein the first and second patterns are provided so as to be asynchronous with each other.

Advantageous Effects of Invention

[0007]

According to the roofing member of the present invention, the first pattern represented by the irregularities and the second pattern represented by the coated film are provided so as to be asynchronous with each other, so that many designs can be expressed by the second pattern without being limited to the first pattern. Thus, the diversity of the design can be more easily ensured.

BRIEF DESCRIPTION OF DRAWINGS

[0008]

FIG. 1 is a perspective view showing an exterior material (a roofing member) according to Embodiment 1 of the present invention.

FIG. 2 is a cross-sectional view showing the exterior materials in FIG. 1 which have been arranged side by side on a roof base.

FIG. 3 is a perspective view showing the exterior materials in FIG. 2.

FIG. 4 is an explanatory view showing an example of a first pattern provided on a decorative surface of the exterior material in FIG. 1.

FIG. 5 is an explanatory view showing an example of a second pattern provided on a decorative surface of the exterior material in FIG. 1.

FIG. 6 is an explanatory view showing a state where the first and second patterns in FIG. 4 and FIG. 5 have overlapped with each other.

FIG. 7 is an explanatory view showing an example of a third pattern provided on a decorative surface of an exterior material according to Embodiment 2 of the present invention.

FIG. 8 is an explanatory view showing a state where the first to third patterns in FIG. 4, FIG. 5 and FIG. 7 have overlapped with one another;

FIG. 9 is a perspective view showing an exterior material (an outer wall member) according to Embodiment 3 of the present invention.

FIG. 10 is a cross-sectional view showing a state where the exterior materials in FIG. 9 have been disposed on a wall surface.

DESCRIPTION OF EMBODIMENTS

[0009]

Embodiments for carrying out the present invention will be described with reference to the drawings.

Embodiment 1.

FIG. 1 is a perspective view showing an exterior material 1 (a roofing member) according to Embodiment 1 of the present invention, FIG. 2 is a cross-sectional view showing the exterior materials 1 in FIG. 1 which have been arranged side by side on a roof base, and FIG. 3 is a perspective view showing the exterior materials 1 in FIG. 2.

[0010]

The exterior material 1 shown in FIG. 1 is a tiled shaped (corrugated sheet shaped) roofing member having a substantially rectangular shape as viewed in plane, which has a longitudinal direction 1L (a width direction) and a short direction 1S (a depth direction). That is, the exterior material 1 according to the present embodiment is a roofing member which is arranged on a roof base. The exterior material 1 includes: an exterior material body 10 made of a metal sheet; and a core material (not shown) provided on the whole or a part of a back surface of the exterior material body 10.

[0011]

The metal sheet making up the exterior material body 10 that can be used includes a hot-dip Zn plated steel sheet, a hot-dip Al plated steel sheet, a hot-dip Zn plated stainless steel sheet, a hot-dip Al plated stainless steel sheet, a stainless steel sheet, an Al sheet, a Ti sheet, a coated hot-dip Zn plated steel sheet, a coated hot-dip Al plated steel sheet, a coated hot-dip Zn plated stainless steel sheet, a coated hot-dip Al plated stainless steel sheet, a coated stainless steel sheet, a coated Al sheet or a coated Ti sheet.

[0012]

The core material is made of, for example a foamed resin or the like, and is directly bonded to the back surface of the exterior material body 10. The core material that can be used includes, but not limited to, urethane, phenol, cyanurate resins and the like. Since the core material is provided on the back surface of the exterior material body 10, the tile shaped exterior material body 10 is difficult to tread down. For example, when the exterior material body 10 has a flat plate shape, the core material may be omitted.

[0013]

The exterior materials 1 are arranged side by side on the roof base together with the other exterior materials 1 as shown in FIGS. 2 and 3. Each exterior material 1 is

arranged on the roof base such that the longitudinal direction 1L is along an eave direction 2 of a roof and the short direction 1S is along an eave-ridge direction 3 of the roof. That is, in the roof member 1 according to the present embodiment, the longitudinal direction 1L corresponds to the eave direction, and the short direction 1S corresponds to the eave-ridge direction.

[0014]

As particularly shown in FIG. 2, an end portion of each exterior material 1 in the short direction 1S is provided with each of first and second fitting portions 11, 12 formed by bending an end portion of the metal sheet forming the exterior material body 10. As shown in FIG. 2, the first and second fitting portions 11, 12 of the respective exterior materials 1 are fitted to each other, whereby the exterior materials 1 are connected to each other in the eave-ridge direction of the roof.

[0015]

A surface of the exterior material body 10 forms a decorative surface 13 that appears on an outer surface of the roof. The decorative surface 13 of each exterior material 1 is provided with a first and second patterns 4, 5 shown in FIG. 4 and FIG. 5 as described below.

[0016]

FIG. 4 is explanatory view showing an example of the first pattern 4 provided on the decorative surface 13 of the exterior material 1 in FIG. 1. The first pattern 4 is a linear pattern that extends in the eave-ridge direction 3 and is represented by irregularities. More particularly, the first pattern 4 is formed by a plurality of convex portions 40 that linearly extend in the eave-ridge direction 3 and a plurality of concave portions 41 that are provided between the convex portions 40. The first pattern 4 can be provided on the decorative surface 13 by subjecting the exterior material body 10 or a material metal sheet thereof to mechanical processing including embossing and pressing.

[0017]

FIG. 5: is explanatory view showing an example of the second pattern 5 provided on the decorative surface 13 of the exterior material 1 in FIG. 1. The second pattern 5 is a linear pattern that extends in the eave-ridge direction 3 and is represented by a coated film. More particularly, the second pattern 5 is formed by a plurality of first coated films 50 that linearly extend in the eave-ridge direction 3. The arrangement pattern of the first coated films 50 of the second pattern 5 is configured to be different from the arrangement pattern of the convex portions 40 of the first pattern 4. The second pattern 5 can be provided on the decorative surface 13 by subjecting the exterior material body 10 or a metal sheet thereof to printing by means of a printing machine

including letterpress printing, lithographic printing, intaglio printing and inkjet printing.

[0018]

The first and second patterns 4, 5 may be provided on the decorative surface 13 in any order. In other words, the second pattern 5 may be provided on the decorative surface 13 before the first pattern 4 is provided on the decorative surface 13, or the second pattern 5 may be provided on the decorative surface 13 after the first pattern 4 is provided on the decorative surface 13. That is, a method for manufacturing the exterior material 1 according to Embodiment 1 includes the steps of providing the first pattern 4 on the decorative surface 13 and forming the second pattern 14 on the decorative surface 13 before or after providing the first pattern 4 on the decorative surface 13. As described below, the first and second patterns 4, 5 are provided so as to be asynchronous with each other.

[0019]

When the material of the roofing member body 10 is a coated metal sheet, the first coated films 50 of the second pattern 5 may have a color that is not similar to the coated color of the coated metal sheet, but it may have a similar color to the coated color of the coated metal sheet. The similar color as used herein can be defined as a color having a color difference ΔE of 10 or less. The color differences ΔE of two colors can be expressed as $(\Delta L^2 + \Delta a^2 + \Delta b^2)^{1/2}$, using their lightness (L values), redness (a value) and yellowness (b value). The ΔL is a difference between the L values of the two colors, the Δa is a difference between the a values of the two colors, and the Δb is a difference between the b values of the two colors.

[0020]

Next, FIG. 6 is an explanatory view showing a state where the first and second patterns 4, 5 in FIG. 4 and FIG. 5 have overlapped with each other. As described above, the arrangement pattern of the first coated films 50 of the second pattern 5 is different from the arrangement pattern of the convex portions 40 and the concave portions 41 of the first pattern 4. Therefore, as shown in FIG. 6, even if the first and second patterns 4, 5 are overlapped and provided on the decorative surface 13, the first and second patterns 4, 5 are not synchronized with each other. That is, the first and second patterns 4, 5 are provided on the decorative surface 13 so as to be asynchronous with each other. In FIG. 6, only a part of the first pattern 4 is shown to overlap with a part of the second pattern 5 such that the individual states of the first and second patterns 4, 5 also appear. However, the first and second patterns 4, 5 can be provided on the decorative surface 13 such that both of the first and second patterns 4 and 5 overlap with each other as a whole.

[0021]

As used herein, the phrase “the first and second patterns 4, 5 are synchronized” means that the first coated films 50 of the second pattern 5 completely overlap with the convex portions 40 of the first pattern 4. That is, the phrase “the first and second patterns 4, 5 are provided on the decorative surface 13 so as to be asynchronous with each other” means that the first and second patterns 4, 5 are provided on the decorative surface 13 such that at least a part of the first coated films 50 of the second pattern 5 protrude from the convex portions 40 of the first pattern 4.

[0022]

On the other hand, both of the first and second patterns 4, 5 are linear patterns extending in the eave-ridge direction 3, so that the linear image can be maintained even if the first and second patterns 4, 5 overlap with each other. By adjusting a pitch (clearance) between the convex portions 40 of the first pattern 4 and a pitch (clearance) between the first coated films 50 of the second pattern 5, the linear image can be more reliably maintained. In addition, by allowing an average value of the pitches between the convex portions 40 of the first pattern 4 to agree with an average value of the pitches between the first coated films 50 of the second pattern 5 or setting a difference between those average values to a predetermined value or less, a better image can be obtained when the first and second patterns 4, 5 overlap with each other.

[0023]

The present embodiment has been described such that the first and second patterns 4, 5 are provided so as to be asynchronous with each other on the decorative surface 13 based on the difference in the arrangement patterns of the convex portions 40 and the first coated films 50. However, even if the arrangement pattern of the convex portions 40 is the same as the arrangement pattern of the coated films of the first pattern 50 when the patterns 4, 5 are individually viewed, the first and second patterns 4, 5 can be provided on the decorative surface 13 so as to be asynchronous with each other by arranging the first and second patterns 4, 5 so as to be shifted to each other in the eave direction 2. That is, the arrangement patterns of the convex portions 40 and the first coated films 50 are not necessarily required to be different from each other.

[0024]

According to such exterior materials 1, the first pattern 4 represented by the irregularities and the second pattern 5 represented by the coated films are provided so as to be asynchronous with each other, so that many designs can be expressed by the second pattern 5 without be limited to the first pattern 4. Thus, the diversity of the design can be more easily ensured. This configuration is particularly useful for metal

roofing members in which their decorative surfaces are easily processed. Particularly in a metal roofing member, the second pattern 5 is printed on a smooth metal sheet by letterpress printing, lithographic printing, intaglio printing, ink jet printing or the like, the first pattern 4 represented by the irregularities can be then formed by embossing roll processing or press molding in a so-called pre-coating method. The pre-coating method can allow desired asynchronous designs to be more reliably developed.

[0025]

Embodiment 2.

FIG. 7 is explanatory view showing an example of a third pattern 6 provided on the decorative surface 13 of the exterior material 1 according to Embodiment 2 of the present invention. The third pattern 6 is a linear pattern that extends in the eave-ridge direction and is represented by a coated film having a color tone different from that of the second pattern 5. More particularly, the third pattern 6 is formed by a plurality of second coated films 60 that have a color tone different from that of the second pattern 5 and linearly extend in the eave-ridge direction 3. The different color tone can be defined as a color in which the above color difference $\bullet E$ is more than 10. The arrangement pattern of the second coated films 60 of the third pattern 6 is different from the arrangement pattern of the convex portions 40 of the first pattern 4 and the arrangement pattern of the first coated films 50 of the second pattern 4. The third pattern 6 can be provided on the decorative surface 13 by subjecting a front substrate 12 or a material metal sheet thereof to printing by means of a printing machine including letterpress printing, lithographic printing, intaglio printing, and inkjet printing.

[0026]

Next, FIG. 8 is an explanatory view showing a state where the first to third patterns 4 to 6 in FIG. 4, FIG. 5 and FIG. 7 have overlapped with one another. In addition to the first and second patterns 4, 5 of the first embodiment, the third pattern 6 in FIG. 9 is provided on the decorative surface 13 (see FIG. 1) of the exterior material 1 of Embodiment 2. As described above, even if the first to third patterns 4 to 6 where the arrangement pattern of the second coated films 60 of the third pattern 6 is different from the arrangement pattern of the convex portions 40 of the first pattern 4 and the arrangement pattern of the first coated films 50 of the second pattern 4 are provided on the decorative surface 13 as shown in FIG. 8, the first to third patterns 4 to 6 are not synchronized with one another. That is, the first to third patterns 4 to 6 are provided on the decorative surface 13 so as to be asynchronous with each other. In FIG. 8, only a part of the respective patterns 4 to 6 is shown to overlap with one another such that the individual states of the first to third patterns 4 to 6 also appear. However, the first to third patterns

4 to 6 can be provided on the decorative surface 13 such that they overlap with one another as a whole.

[0027]

On the other hand, all of the first to third patterns 4 to 6 are linear patterns extending in the eave-ridge direction 3, so that even if the first to third patterns 4 to 6 overlap with one another, the linear image is still maintained. Further, the third pattern 6 is represented by the coated film having a color tone different from that of the second pattern 5, a more complicated design can be expressed by the combination of the second and third patterns 5, 6. The other configurations are the same as those of Embodiment 1.

[0028]

In such exterior materials 1, the third pattern 6 is further provided on the decorative surface 13, so that the diversity of the design can be more easily and more reliably ensured.

[0029]

While Embodiment 2 has been described such that the first to third patterns 4 to 6 are provided on the decorative surface 13 so as to be asynchronous with one another, the third pattern may be provided so as to be synchronous with one of the first and second patterns.

[0030]

Further, while Embodiments 1 and 2 have been described such that the exterior material 1 is formed by the metal roofing member in which the material of the exterior material body 10 is a metal sheet, the present invention may be applied to other roofing members such as ceramic roofing members, for example slates.

[0031]

Furthermore, while Embodiments 1 and 2 have been described such that all of the first to third patterns 4 to 6 are linear patterns extending in the eave-ridge direction 3, at least one of the first to third patterns 4 to 6 may extend in a direction crossing with the eave-ridge direction 3.

[0032]

Embodiment 3.

FIG. 9 is a perspective view showing an exterior material 7 (an outer wall member) according to Embodiment 3 of the present invention, and FIG. 10 is a cross-sectional view showing the exterior materials 7 in FIG. 9. The exterior material 7 shown in FIG. 7 is a substantially rectangular corrugated sheet-shaped outer wall member having a longitudinal direction 7L (a width direction) and a short direction 7S (a depth direction).

[0033]

The exterior material 7 is provided with an exterior material body 70, a first fitting portion 71, and a second fitting portion 72. Each of the first fitting portion 71 and the second fitting portion 72 is formed by bending an end portion of a metal sheet forming the exterior material body 70, and is disposed at an end portion of the exterior material 7 in the short direction 7S. As shown in FIG. 10, the first fitting portion 71 or the second fitting portion 72 of the exterior material 7 is fitted into the second fitting portion 72 or the first fitting portion 71 of the other exterior material 7, so that the exterior materials 7 are connected to one another in the short direction 7S. While FIG. 9 and FIG. 10 show that the exterior materials 7 are disposed such that the short direction 7S is along the vertical direction, the exterior materials 7 may be disposed such that the short direction 7S is along the horizontal direction.

[0034]

A surface of the exterior material body 70 forms a decorative surface of the exterior material 7 appearing on an outer surface of a building. The decorative surface of the exterior material 7 is provided with a first pattern 4 which is a linear pattern that extends in the longitudinal direction 7L and is represented by irregularities. More particularly, the first pattern 4 is formed by a plurality of convex portions 40 linearly extending in the longitudinal direction 7L and a plurality of concave portions 41 provided between the convex portions 40.

[0035]

Further, the decorative surface of the exterior material 7 is provided with a second pattern 5 which is a linear pattern extending in the short direction 7S and is represented by a coated film. The second pattern 5 is formed by strip-shaped coated films linearly extending in the short direction 7S. That is, the first and second patterns 4, 5 are linear patterns extending in a direction where they cross with each other. More particularly, the first and second patterns 4, 5 are in a direction orthogonal to each other.

[0036]

Thus, while Embodiments 1 and 2 have described the exterior material 1 for a roof, the present invention may be applied to exterior materials for other applications, such as the exterior material 7 for the outer wall as described in Embodiment 3. Also, in the exterior material for other applications, the first and second patterns 4, 5 may be linear patterns extending in the same direction or a crossing direction other than a right angle. Moreover, the exterior material for other applications may be further provided with a third pattern (linear coated films having a color tone different from that of the second pattern 5) so as to be asynchronous with at least one of the first and second patterns 4,

5. Other configurations are the same as those of Embodiments 1 and 2.

What is claimed is:

1. An exterior material having a decorative surface that appears on an outer surface of a building,
wherein the decorative surface comprises: a first pattern represented by linear irregularities; and a second pattern represented by linear coated films, and
wherein the first and second patterns are provided so as to be asynchronous with each other.
2. The exterior material according to claim 1, wherein the first and second patterns are linear patterns extending in the same direction.
3. The exterior material according to claim 2, wherein the exterior material is disposed on a roof base, and wherein the same direction is an eave-ridge direction.
4. The exterior material according to claim 1, wherein the first and second patterns are linear patterns extending in a direction where they cross with each other.
5. The exterior material according to any one of claims 1 to 4, wherein the decorative surface further comprises a third pattern represented by linear coated films having a color tone different from that of the second pattern, and wherein the third pattern is provided so as to be asynchronous with at least one of the first and second patterns.
6. A method for manufacturing an exterior material having a decorative surface that appears on an outer surface of a building, the decorative surface comprising a first pattern represented by linear irregularities and a second pattern represented by linear coated films, the method comprising the steps of:
providing the first pattern on the decorative surface; and
forming the second pattern on the decorative surface by means of a printing machine, before or after providing the first pattern on the decorative surface,
wherein the first and second patterns are provided so as to be asynchronous with each other.