

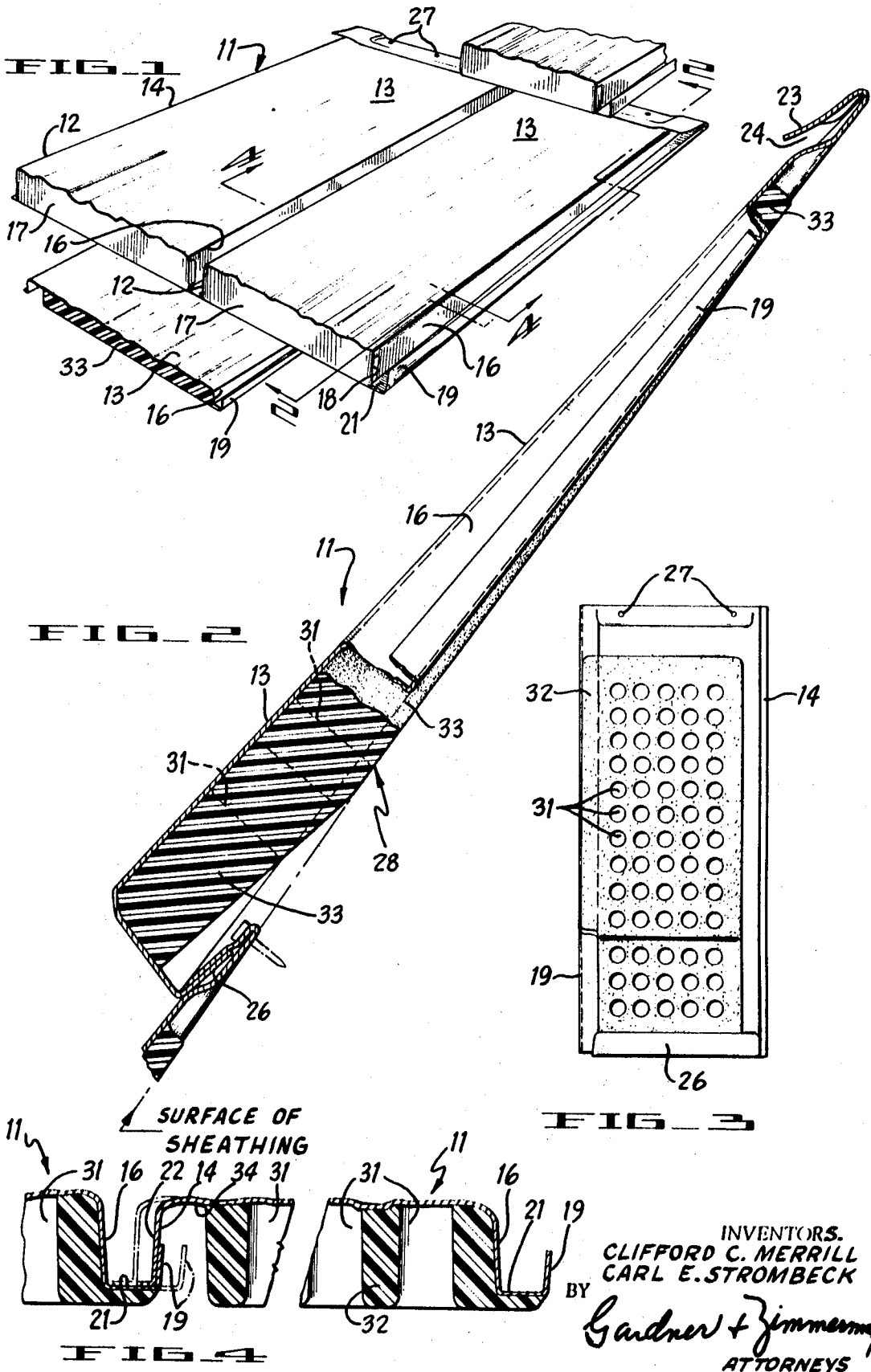
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WOOD SIMULATING SHINGLE

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WOOD SIMULATING SHINGLE

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ABSTRACT OF THE DISCLOSURE

A shingle is described which simulates a wood shake shingle and has the incompressibility and insulation properties of conventional wood shake shingles. The shingle includes an outer metal shell defined by a rectangular body section of metal having downwardly depending wedge-shaped side walls and a rectangularly shaped end wall. A pad of a generally noncompressible material, such as a closed cell polyurethane rigid foam fills substantially the full cavity defined by the shell. The pad of material extends between the underneath surface of the body section of the shell and the roof base to which the shingle is secured so as to support the body section and prevent concentrated loads from bending the same. The shingle includes at its sides and ends structure for interlocking the same with similar shingles to provide a shingle roof arrangement. The interlocking structure at the sides of the shingles is designed to permit lateral shifting of the shingle relative to shingles laterally adjacent thereto, and the pad has a configuration permitting such adjustability.

BACKGROUND OF THE INVENTION

This invention relates to a shingle for a roof or the like, and more particularly to a shingle having a metallic outer casing or shell enclosing a pad of material providing the shingle with incompressibility similar to that of a wooden shingle.

Because of their durability, inexpensive and weather-proof nature, metal shingles are finding increased use in the home building industry in place of the usual wood or asbestos shingles. The metal shingle state of the art has advanced to the point at which metal shingles can be obtained which have a great similarity in appearance to wood shingles when arranged on a roof. In this connection, reference is made to U.S. Pat. No. 3,363,380 issued on Jan. 16, 1968 to Clifford C. Merrill, one of the co-applicants of this application, and our application Ser. No. 804,424 for Interlocking Metal Shingle Construction filed contemporaneously herewith. The metal shingles described and claimed in such patent and patent application possess improved means for interlocking adjacent shingles together to assure that the joints between the shingles are leakproof and that the shingles are rigidly secured to the roof. However, one problem with metal shingles is that from the standpoint of weight and cost the shingles must be made from relatively light gauge material. The result is that normally the shingles cannot withstand a concentrated load or heavy pressure without bending, such as when a person walks upon a roof of such shingles. While due to the durability of a metal shingle roof it is generally not necessary to repair the same, the lack of resistance to bending or flexing of most conventional metal shingles hinders walking on the roof for access to chimneys, television aerials, vents, etc. One other disadvantage of conventional metal shingles is that generally they do not provide the thermal and sound insulation qualities of wood shingles.

SUMMARY OF THE INVENTION

The instant invention provides a shingle simulating a wood shake or shingle having incompressibility and insulation properties similar to that of conventional wood shake shingles. In its basic aspects, the shingle of the invention comprises an outer metal shell defined by a generally rectangular body section of metal and having side walls and at least one end wall extending generally perpendicularly therefrom. A pad of a generally noncompressible material fills substantially the full cavity defined by the body section to provide with the shell a generally incompressible simulated wood shingle. From the standpoint of weight, cost and durability, it is preferable that the pad be of a generally closed cell rigid foam material, such as polyurethane foam, having these properties. Such a material will provide the desired incompressibility and also give to the shingle better thermal and sound insulation properties than generally found in roof shingles, metal or otherwise.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a plurality of shingles of our invention illustrating the interlocked shingles as arranged on a roof, some of the shingles being shown partly broken away;

FIG. 2 is a section view of one of the shingles of FIG. 1 taken in the plane indicated by the lines 2—2 in FIG. 1;

FIG. 3 is a rear elevational view of a shingle of the invention illustrating the relationship between the metal shell and the pad; and

FIG. 4 is a sectional view taken on the line 4—4 in FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to the attached drawing, FIG. 1 illustrates a plurality of shingles 11 of the invention interlocked in proper relation and secured upon the sheathing or the tiles of a roof. Each of the shingles 11 comprises a metal shell 12 which includes a generally rectangular body section 13 having ridges or the like to simulate the surface of a split wood shingle or shake. Shell 12 further includes first and second side walls 14 and 16, respectively, depending generally perpendicular from opposite side edges of the body section, and a generally rectangular end wall section 17 depending downwardly from the lower end edge of section 13. Each of the side walls 14 and 16 are generally wedge-shaped with their base ends located adjacent to the side ends of wall 17 and the shallow ends are disposed at the upper end of the body section 13. End portions 18 of wall 17 are bent inwardly in encompassing relation to the base edges of the side walls and tightly engage the same to provide a seal at each lower corner of the shingle joint.

A third wedge-shaped side wall 19 is spaced outwardly from and parallel to side wall 16 and is connected at its lower longitudinal edge to the lower longitudinal edge of the wall 16 by an interconnecting web 21. Side walls 16 and 19 and web 21 thus define a U-shaped channel which when the shingles are secured together simulates the usual spacing between adjacent edges of wooden shingles when associated in customary manner. Moreover, such U-shaped channel cooperates with the side wall 14 of a laterally adjacent shingle to interlock such adjacent shingles together. In other words the side wall 14 of one shingle is adapted to overlap the side wall 19 of a shingle adjacent thereto and engage such shingle within its U-shaped channel. A lip 22 extending longitudinally of the lower edge of the side wall 14 and right

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angularly outward with respect thereto mates with the interconnecting web 21 of the adjacent shingle to provide a water seal between the joints of the two shingles.

The shingles of the invention are also provided with cooperable means at their upper and lower ends for interlocking adjacent courses of the shingles together. More particularly, the upper end of the body section 13 of each shingle is provided with a preferably integral holding flange 23 which extends substantially the whole width of the body section and is curved reentrantly upward and inward from the upper end of section 13. The flange 23 is closely spaced to and conforms generally to the upper surface of the body section therebeneath to define with such section a slot 24.

Cooperable means are also provided at the lower end of each shingle for engagement within the slot 24 of a lower course shingle to provide for the desired interlocking of the shingles thereat. Accordingly, a tongue 26 extends inwardly of the shingle from the lower edge of the end wall 17 in substantially perpendicular relationship thereto. Tongue 26 extends for substantially the full width of the body section and, as is shown in FIG. 2, is receivable within the slot 24 of the shingle of the lower adjacent course. The upper end of each of the shingles includes transversely spaced holes 27 for the reception of a nail or the like to secure such upper end of the shingle to the roof sheathing.

It will be appreciated that the reception of the tongue 27 at the lower end of a shingle within the slot 24 of a lower shingle will result in such lower end of the shingle also being secured to the roof without the necessity of nailing or the like. Of course, the lowermost course of shingles on a roof will have to have their lower ends secured to the roof by a starter strip or the like, such as the starter strip disclosed in our aforesaid application filed contemporaneously herewith.

In accordance with the invention, and as an important part thereof, shingle 11 includes means for assuring that it will not be damaged when a considerable weight is applied thereupon such as when a person steps on the shingle. For this purpose the shingle of the invention includes as a part thereof a support for transmitting the load from the body section directly to the roof sheathing without permitting the body section to be bent or flexed beyond its elastic limit. In the present embodiment the support is provided by means of a generally incompressible body filling substantially the entire cavity formed by the body section 13, the depending side walls 14 and 16, and the end wall 17. More particularly said body is here shown in the form of a pad 28 of a generally non-compressible material contained within the cavity. As illustrated in FIG. 2, pad 28 is in firm engagement with the under surface of body section 13 and extends outward sufficiently to engage with the roof sheathing to which the shingle is to be secured. It will be appreciated that with this arrangement the pad or filler 28 will firmly support the body section 13 a predetermined distance above such sheathing and thereby minimize inward bending of such body section when a load is impressed thereon. Ordinarily, the pad 28 should be of a material providing with the body 13 the compression strength to withstand at least approximately seven pounds per square inch. The pad can be formed of wood, or any one of the thermoplastic or thermosetting plastic formulations providing the desired incompressibility.

The pad should also be capable of withstanding the temperature variations, i.e., between about 175° F., and minus 50° F., that roofs in many climates and countries may be subject to. It has been found satisfactory to form the pad of the closed-cell, rigid foam plastic materials, such as one of the rigid polyurethane foams. Such foam plastic materials can be made to have densities such that the product may withstand relatively high pressures without compressing. Moreover, because of their closed-cell configuration, the foamed material will have good sound

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and thermal insulation qualities. Also many of such materials when molded into the shell of the shingle will adhere strongly to the walls thereof upon setting and have good thermal warp characteristics assuring that the material will stay adhered to the shell under ambient temperature variations. The closed-cell polyurethane rigid foam formulations sold by the Olin Mathieson Chemical Corporation, under the trademark "AUTOFROTH I" are quite suitable, particularly the "AUTOFROTH I" formulation No. A202 series. Such formulations are capable of withstanding relatively high compressive forces. For example, formulation No. A202C2 will withstand up to 32 p.s.i. Formulations of polypropylene, polystyrene, polyvinylchloride, epoxy, and the polyesters will also provide a suitable pad for the shingle.

As illustrated, particularly in FIGS. 3 and 4, pad 28 is provided with a plurality of perforations 31 which extend from the outer surface 32 of the pad to the inner surface of the body section 13. The perforations 31, when the shingle is secured to a roof, provide closed insulation cells which enhance the insulative properties of the shingle.

As mentioned previously, the pad 28 extends outwardly from the body section 13 for a distance sufficient to be in engagement with the surface of the roof sheathing when attached thereto. As will be apparent from FIG. 2, when the shell of the shingle is secured to a roof sheathing, the lower end thereof is elevated somewhat from the roof sheathing due to the overlap of such end with the upper end of the shingles of the lower course. The pad 28 therefore extends outwardly beyond the lower edges of the side walls 14 and 16 and in view thereof, will engage the roof sheathing near the lower end of the shingle. Furthermore, the pad 28 includes a longitudinal ledge extension 33 secured to and positioned beneath web 21 of the channel, the undersurface of the extension being co-planar with that of the undersurface of the body of the pad so as to provide a firm support for the web on the roof.

The location of adjacent interlocked shingles in the same course with respect to one another is laterally adjustable. More particularly, and with reference to FIG. 4, the side wall 14 of one shingle overlapping into the channel 21 of the adjacent shingle is shiftable with respect to such channel between the position shown in full lines and the position shown in dotted lines. Moreover, the holding flange structure at the upper end of each shingle adjacent the walls 14 and 16 is provided with intermeshing structure, such as disclosed in the aforementioned copending application, to permit such lateral adjustability of the shingles for the full length. The pad has a configuration enabling this lateral adjustability. Thus, as is illustrated in FIGS. 3 and 4, the pad terminates a distance from side wall 14 corresponding to the distance through which the lateral position of one shingle with respect to another may be shifted. Thus, a longitudinal space or groove 34 is provided inwardly of and adjacent side wall 14 to leave a space for the side wall 19 of an adjacent shingle whenever such shingles are shifted laterally closer to one another. Where the shingles are shifted laterally toward one another to the extent that side wall 14 is in the dotted line position shown in FIG. 4, the side wall 19 of the channel of the adjacent shingle will be in the dotted position shown for such wall.

At the forward end of the shingle, the exterior surface of pad 28 tapers inwardly and upwardly to a point within the shell 12 beneath the tongue 26. This provides space between the exterior surface of the pad and the roof sheathing to accommodate the holding flange and upper end of the shingle of the lower adjacent course. End wall 17 and the upper end structure of the shingle of the lower course provides sufficient support for the lower end of the shingle without the necessity of the pad 28 being in engagement with the sheathing surface in this area. Thus, it is possible to provide the relieved portion of the pad 28

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at the lower or base end of the shingle so that the interlocking structure can be accommodated.

It will be further noted that at the upper end of the shingle the pad 28 terminates inwardly of the interlocking structure of the upper end of the shingle. While this is not necessary, it is preferable whenever the pad 28 is made of foamed plastic material due to the tapered nature of the shingle. The pad terminates at a point near the upper end of the shingle cavity where the pad thickness is sufficient to avoid any tendency to crack or break off.

From the above it will be appreciated that the instant invention provides a shingle which combines the durability and resistance to weather of a metal shingle with the incompressibility and insulative properties of wooden shingle. The shingle of the invention is nevertheless relatively simple and easy to apply.

We claim:

1. A shingle simulating a wooden shake shingle, comprising a metal shell having a body section equipped along the opposite side edges thereof with inwardly extending first and second sidewalls and along the bottom edge thereof with an inwardly extending end wall section, said shell also having cooperable means along the side edges thereof interlockingly engageable with similar shingles adjacent thereto in side-by-side relation and permitting lateral adjustment therebetween through a distance several orders of magnitude greater than the thickness of either of said sidewalls, said first and second sidewalls being tapered from greater dimensions adjacent the bottom of said shingle to reduced dimensions adjacent the top thereof to provide the shingle with a wedge-shaped configuration, and a generally non-compressible wedged-shaped pad filling substantially the entire cavity defined along the interior of said shell by said body section in conjunction with said sidewalls and end section to lie along and engage throughout substantially its entire area the surface of a roof covered by said shingle and provide with said shell a generally incompressible simulated wooden shingle, said pad being spaced from one of said sidewalls to accommodate such lateral adjustability.

2. A shingle according to claim 1 in which said cooperable means includes both a third sidewall disposed in generally parallel spaced relation with said first sidewall and a web extending between said first and third sidewalls and defining a generally U-shaped channel section therewith, said second sidewall of one shingle being adapted to overlap the third sidewall of a similar shingle adjacent thereto and seat within the associated U-shaped channel section, said pad being spaced from said second sidewall by a distance substantially the same as the width

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of said web and at least as great as the lateral distance through which adjacent shingles are adjustable.

3. A shingle according to claim 2 in which said web is disposed above the lower surface of said pad, and in which said pad essentially abuts said first sidewall and extends beneath said web.

4. A shingle according to claim 3 in which said shell further includes additional cooperable means adjacent the ends thereof for interlockingly engaging similar shingles adjacent thereto at the ends thereof, said additional cooperative means including a tongue provided by said end wall and extending rearwardly therefrom for substantially the full width of said body section and further including a slot at the upper end thereof so that the tongue of one shingle is insertable into the slot of a similar shingle, said pad having a taper providing a relieved portion above said tongue to enable cooperation thereof with such an adjacent shingle, said tongue being laterally shiftable within such slot to accommodate the aforesaid lateral adjustment of interengaged shingles.

5. A shingle according to claim 1 in which said shell further includes additional cooperable means adjacent the ends thereof for interlockingly engaging similar shingles adjacent thereto at the ends thereof, said additional cooperative means including a tongue provided by said end wall and extending rearwardly therefrom for substantially the full width of said body section and further including a slot at the upper end thereof so that the tongue of one shingle is insertable into the slot of a similar shingle, said pad having a taper providing a relieved portion above said tongue to enable cooperation thereof with such an adjacent shingle, said tongue being laterally shiftable within such slot to accommodate the aforesaid lateral adjustment of interengaged shingles.

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