

April 4, 1967

D. G. BERG
SHINGLE STRUCTURE WITH REENTRANT JOINT
CONFIGURATIONS AND A NAILING TAB

3,312,031

Original Filed Nov. 26, 1963

2 Sheets-Sheet 1

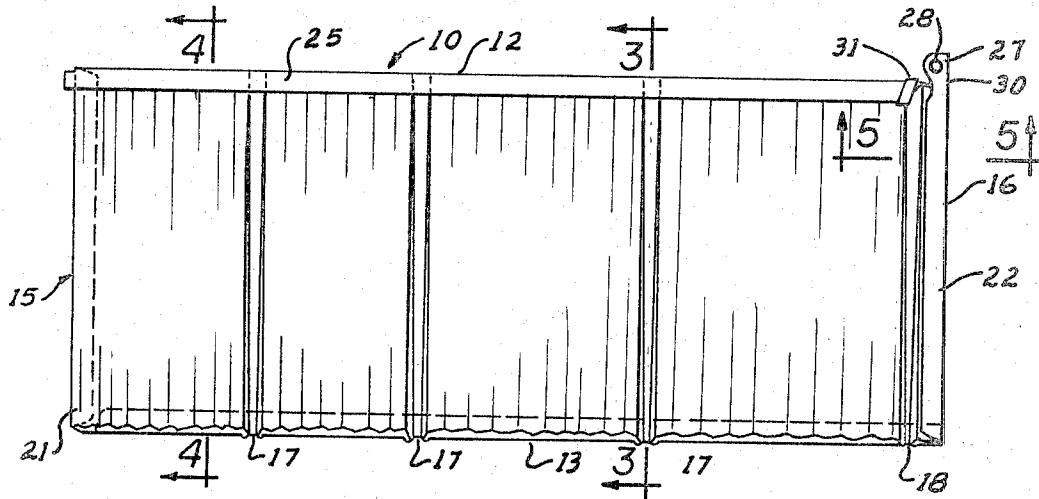


FIG. 1

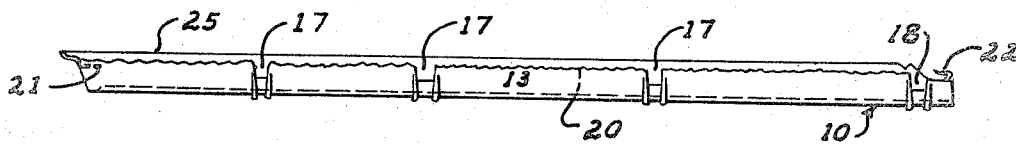


FIG. 2

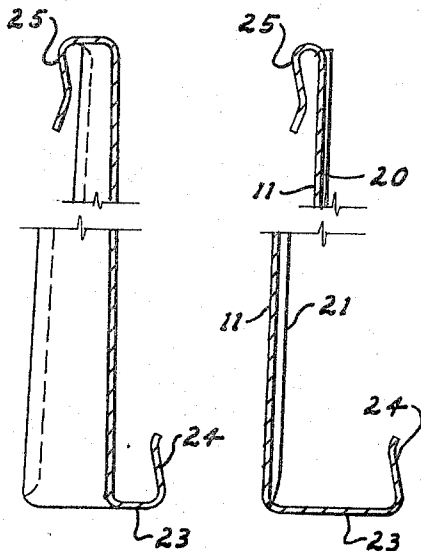


FIG. 3 FIG. 4

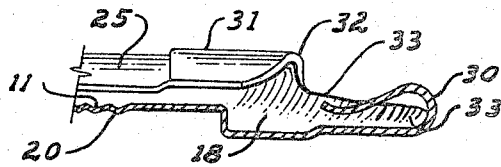


FIG. 5

INVENTOR.

DAVID G. BERG

BY

James E. Cooney

ATTORNEY

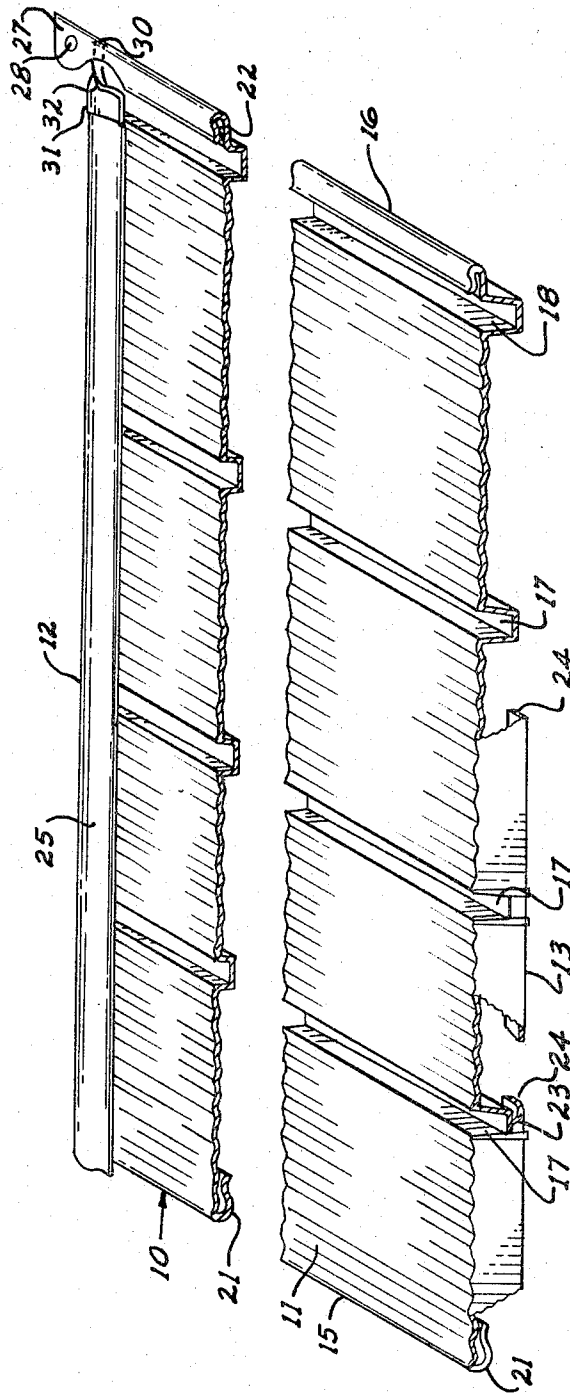
April 4, 1967

D. G. BERG
SHINGLE STRUCTURE WITH REENTRANT JOINT
CONFIGURATIONS AND A NAILING TAB

3,312,031

Original Filed Nov. 26, 1963

2 Sheets-Sheet 2



INVENTOR
DAVID G. BERG

BY

James E. Conroy
ATTORNEY

1

3,312,031

SHINGLE STRUCTURE WITH REENTRANT JOINT CONFIGURATIONS AND A NAILING TAB

David G. Berg, Oakland, Calif., assignor to Kaiser Aluminum & Chemical Corporation, Oakland, Calif., a corporation of Delaware

Continuation of application Ser. No. 326,134, Nov. 26, 1963. This application Apr. 4, 1966, Ser. No. 540,106
3 Claims. (Cl. 52—530)

This application is a continuation of Ser. No. 326,134 filed Nov. 26, 1963, and now abandoned.

This invention relates to a metal shingle structure and particularly to a metal shingle structure formed to interlock with similar shingle structures to form a strong, wind resistant roof that resists water penetration even under severe weather conditions. This invention further relates to a metal shingle structure that is attractive, and may even be made to simulate closely the appearance of highly priced cedar shake roofs, and having elements of construction which contribute both to the pleasing appearance and to the function of the structure.

Although a variety of ductile metals may be employed in the shingle structure of this invention, the invention is particularly adapted to aluminum. Aluminum is ductile enough to be formed, strong enough to resist wind and snow loads, but it is corrosion-resistant enough to be used as a permanent building roof.

Although sheet metal has long been used for roofing, sheet metal roofs of one sort or another have suffered from many serious drawbacks. Long sheets of metal must be installed with exposed nails which are not only unsightly but provide points for leakage to occur. Metal shingles of a gauge suitable for roofing are too thin to resist being bent by the wind unless they are connected to the roof along the bottom edge as well as along the top. Connecting the shingle along the bottom edge is usually accompanied by exposed nails which produce leakage. This problem has been solved by interlocking the bottom of one shingle with the top of the next lower shingle, but interlocking of shingles prohibits a long overlap and causes leakage water driven under the shingles by the wind.

Another serious drawback to general use is that metal shingles are so lacking in depth and individualized character that they are aesthetically undesirable to the extent that their use has been confined almost exclusively to industrial buildings where appearance is not a consideration. The present invention relates to a shingle structure which avoids or at least greatly mitigates the above-noted problems to provide a strong, leakproof, water resistant metal roof that may closely approximate the appearance of conventional roofs.

The shingle structure of this invention will be described in conjunction with the accompanying drawings which illustrate various views of one shingle embodying this invention and which are intended to be illustrative of the invention rather than limiting upon its scope.

FIG. 1 is a front elevational view of a shingle embodying this invention;

FIG. 2 is a bottom view of the shingle of FIG. 1;

FIG. 3 is a sectional view with parts omitted taken along the line 3—3 of FIG. 1;

FIG. 4 is a sectional view with parts omitted taken along the line 4—4 of FIG. 1;

FIG. 5 is a fragmentary sectional view taken along the line 5—5 of FIG. 1; and

FIG. 6 is a perspective view with parts omitted and partly in section presented to provide a clearer picture of the single structure illustrated in FIGS. 1—5.

The shingle structure of this invention generally designated 10 is illustrated with an irregularly creased sur-

2

face that is provided to simulate the rough wood grain of cedar shake shingles in appearance. The flat surface is irregularly corrugated so that outside surface 11, which is the surface normally exposed to weather, will appear as having a long parallel wood grain. The shingle is provided with an upper edge 12, a lower edge 13, a left side edge 15 and a right side edge 16 each of which is adapted to interlock with adjacent shingles in a waterproof manner as will be described. The shingles are also provided with medial grooves 17 and a right side groove 18 which are spaced to provide the appearance of random width individual shingles rather than a continuous metal sheet. The grooves 17 and 18 intersect lower edge 13, as shown in FIG. 2, so that water on the floor of the groove may run off without obstruction.

The shingle structure, as stated above, is made of one continuous sheet of metal which has an outside surface 11 and an undersurface 20. The left side edge 15 is formed by bending the periphery of the continuous sheet back upon the undersurface 20 to form an interlocking flange 21 which is slightly tapered at the top and bottom. The right side edge 16 is formed by bending or doubling the periphery of the sheet back upon itself toward the outside surface 11 to form a flange 22 which terminates in a specially formed nailing tab which will be described in greater detail hereinafter. The bottom edge 13 of the shingle structure is formed into a deep boxlike structure as shown in FIGS. 3 and 4, by bending the periphery into a segment 23 that is perpendicular generally to the plane of the main shingle structure and a second portion 24 that is generally parallel to the main shingle structure and which forms a flange for interlocking with an adjacent shingle. As used herein, the term *box bend*, or terms of similar import, means a bend in sheet metal in which the sheet is bent through 180° back upon itself, but where the bent portion has a dimension perpendicular to the plane of the sheet.

The upper edge 12 of the shingle structure is also formed by a portion bent or folded back upon the outside surface 11 of the shingle structure to form a flange 25. The flange 25, as shown in FIGS. 1 and 2, extends a short distance beyond the left edge 15 of the shingle structure.

As best illustrated in FIG. 5, the intersection of upper edge 12 and right side edge 16 is of special construction to provide means for fastening the shingle structure to a roof. The right side edge 16 extends beyond the upper edge 12 to form a nailing tab 27 provided with a hole 28 to receive a nail. The flange 22 is flattened as it merges into nailing tab 27 thereby providing a double thickness for the nailing tab so that hole 28 will not tear out, and importantly providing a box bent edge 30 to give enough stiffness to the nailing tab to resist flexing and breaking at the neck portion.

The upper edge 12, as it approaches intersection with the nailing tab 27, is provided with an expanded portion 31 which is cut on the bias as at 32 to merge into the edge 16 at the box bent edge 30. However, the edge 12 is formed so that a portion 33 extending perpendicularly upward from the outside surface 11 is provided to form a dam 33 to prevent wind driven water from entering the area of the nailing tab. The dam 33 operates in conjunction with the groove 18 so that the height of the dam is exaggerated by the existence of an indentation 18 and the tapering groove 18 provides a steeper pitch for water run-off than the pitch of the shingle structure in general.

The grooves 17 and 18 all increase in depth from the top edge 12 of the shingle to the bottom edge 13 of the shingle thereby providing the appearance of shingles of tapering thickness and at least in the case of groove 18 providing the desirable function of promoting drain-off from the critical area adjacent to tab 28.

In installing a roof employing the shingle structure of

this invention, the first shingle structure is laid at the lower left-hand corner of the roof. The shingle structure is aligned with the eaves and fixed in place by driving a nail through hole 28 in nailing tab 27. Preferably, flange 24 is engaged with a hook-shaped starter strip connected to the eaves. The shingle thus installed is free to rotate about the single nail holding it. The next shingle structure is installed by interlocking the flange 21 of the second shingle structure with the flange 22 of the first, and laying in the second shingle structure immediately adjacent and to the right of the first. The second shingle structure is also fixed by a single nail through the hole 28, and the long edge to edge interlocked contact of the two shingle structures rigidifies both so that neither is free to rotate about the single nail holding each. In setting the second shingle structure, the portion of flange 25 that extends beyond the edge 15 of the second structure extends into the outwardly indented portion 31 of the first shingle structure whereby the flanges of the first and second shingle structures are aligned, the indented part 31 being sufficiently offset to accept the gauge of the extending portion of the adjacent shingle structure. Subsequent shingle structures are laid from left to right until the entire bottom row of shingles is complete and, as may be seen, each subsequent shingle interlocking with each previous shingle creates a unitary structural unit whereby none of the shingle structures is free to rotate about the single nail holding each.

When the bottom row of shingles is completed the next higher row of shingles may be begun. It is preferred that shingles are laid offset from one another rather than aligned vertically so that the flange 24 of a shingle interlock with the flange 25 of two lower shingles. Offsetting each horizontal row of shingle structures by $\frac{1}{4}$ to $\frac{1}{2}$ the width of a shingle structure will provide a better water drainage configuration and will further provide a more aesthetic appearance in that the widths between adjacent grooves 17 and 18 will not be aligned to be immediately above one another and will appear more random. The shingles may be cut with ordinary tin snips so that they come evenly to the end of the roof.

Each successive row of shingles is offset from the one below, is laid interlocked from left to right as well as being interlocked from bottom to top to create a unitary structure in the vertical direction as well as the horizontal direction, and although only one nail per shingle structure is employed, the effect of the interlocked shingles is to have one nail in each corner of each shingle. Where severe wind loads are anticipated additional nails may be provided by inserting small auxiliary nailing clips which are, in cross-section, in the shape of a hook adapted to interlock flange 25 and extend slightly above it where a nailing hole may be provided to connect the clip to the roof. These auxiliary clips are well known in the art and will not be shown nor described in detail herein.

From the foregoing description it is evident that the shingle structure of this invention provides a roofing material that overcomes the objectionable features of the metal shingles of the prior art. The shingle structure of this invention first is provided with depth by the deep box bend at lower edge 13 and by the deep and tapering grooves 17 and 18 which provide both aesthetic qualities to the shingle structure and the functions of improving the drainage of water from the roof and adding considerable stiffness. Additionally the structure of this invention provides a double thickness nailing tab with a box edge to provide both strength and resistance to bending. The upper interlocking flange 25 of the shingle structure is provided with a recess in which the next adjacent shingle may be received thereby obviating problems of alignment that previously existed in shingles and it is terminated, as it approaches the double nailing tab and corner, so that a dam is constructed to prevent wind blown water from entering beneath the shingles. The dam thus constructed acts cooperatively with a groove 18 which exaggerates the

height of the dam and provides a steeply pitched drainage channel to remove water from the vicinity of the dam as well as contributing to the aesthetic unity of the entire roof structure.

The shingle structures of this invention may be embossed or formed to simulate wood or other shingle materials of the prior art or they may be decoratively embossed in unique patterns. The shingle structure may be coated with organic or inorganic coatings such as paint, anodic oxides, baked enamel, vitreous enamel, etc. to provide beauty and weather resistance. When the shingle structure of this invention is formed from aluminum, corrosion is minimized or completely absent so that the roof will endure as long as the building upon which it is placed.

Special elements that match the shingle structures of this invention in color and construction but which are not a part of this invention may be employed to cover the ridge, to finish the roof at the eaves or at the intersecting elements of hip or gable roofs. These structures will operate on the principles of similar structures employed with conventional roofs, but since they form no part of this invention they will not be described in detail herein.

What is claimed is:

1. A shingle structure comprising a continuous sheet of metal having, in normal position, an upper edge, a lower edge, a right-side edge, a left-side edge, an under-surface normally facing a roof or the like and an outside surface normally exposed to weather, said structure having medial grooves and an end groove adjacent said right-side edge of said shingle structure, all of said grooves being defined by indentations in said sheet running from lower edge to said upper edge and formed to be deeper at said lower edge and shallower at said upper edge and to intersect the surface defining said lower edge, said lower edge being formed by a deep box-bend of said sheet, the portion of said lower edge box-bend normal to said sheet being wider than said grooves and the portion of said box-bend generally parallel to said sheet and underlying the undersurface thereof, said upper edge being formed by a folded-back portion overlying said outside surface and said upper edge folded-back portion also extending beyond said left-side edge, said left-side edge being formed by a bent-back portion underlying said undersurface, and said right-side edge being formed by a doubled-back portion overlying said outside surface, the corner formed by the intersection of said upper edge and said right-side edge being formed with an extension of said doubled-back portion of said right-side edge flattened to form a double thickness nailing tab having a box-bend at the edge thereof and said upper edge folded-back portion terminating to form a dam across the end of the groove disposed adjacent the right-side edge, with the folded-back portion of the upper edge also being offset to receive the folded-back portion of a second shingle structure which extends beyond the left-side edge of said second shingle structure whereby the second shingle structure can be interlocked with the right-side edge of the first-mentioned shingle structure.

2. The shingle structure of claim 1 wherein a pattern is formed between said grooves to simulate wood grain.

3. The shingle structure of claim 1 wherein a durable coating is placed on said outside surface.

References Cited by the Examiner

UNITED STATES PATENTS

2,631,552	3/1953	Korter	52—530
2,680,415	6/1954	Rodermund	52—530
2,830,546	4/1958	Rippe	52—530 X
3,269,075	8/1966	Marini et al.	52—530 X

FRANK L. ABBOTT, *Primary Examiner.*

A. C. PERHAM, *Assistant Examiner.*