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Wilson et al.

[11] **3,848,383**

[45] **Nov. 19, 1974**

[54] **STRUCTURAL SURFACE METAL SHINGLE COVERING**

[76] Inventors: **Robert J. Wilson,** 1076 W. San Bruno; **Robert W. Naden,** 39880 Ave. 7½, both of Fresno, Calif.

[22] Filed: **Feb. 26, 1973**

[21] Appl. No.: **336,087**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 97,773, Dec. 14, 1970, Pat. No. 3,720,031, which is a continuation-in-part of Ser. No. 817,607, March 24, 1967, abandoned.

[52] **U.S. Cl.** **52/533,** 52/542, 52/560

[51] **Int. Cl.** **E04d 1/18**

[58] **Field of Search** 52/520, 521, 533, 536, 52/542, 553, 560, 518

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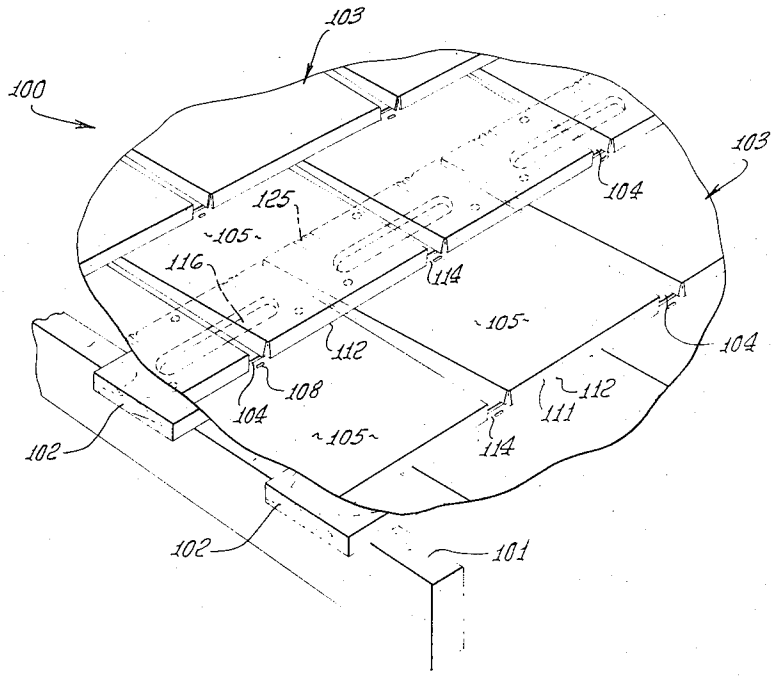
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Assistant Examiner—Henry Raduazo
Attorney, Agent, or Firm—Edward F. Jaros

[57] **ABSTRACT**

A structural surface metal shingle covering for a wall or roof of a building or the like in which the single covering includes a plurality of metal shingle cover elements disposed in parallel courses upon a framework providing a surface. The metal shingle cover elements are tapered and arranged with their narrowing portions exposed to weather and define tapered openings therebetween under which a plurality of tapered flashing elements are disposed and held by the shingle cover elements to mask the tapered openings whereby a relatively lightweight virtually leak proof, fire proof metal structural covering for the surface. A metal shingle element provided with an integral structural configuration to resist distortion of the shingle element in the area of the shingle element which cooperates with the next above course of shingle elements to assure virtuality linear contact of the butt flange on the next above shingle element across the width of the lower shingle element.

5 Claims, 16 Drawing Figures



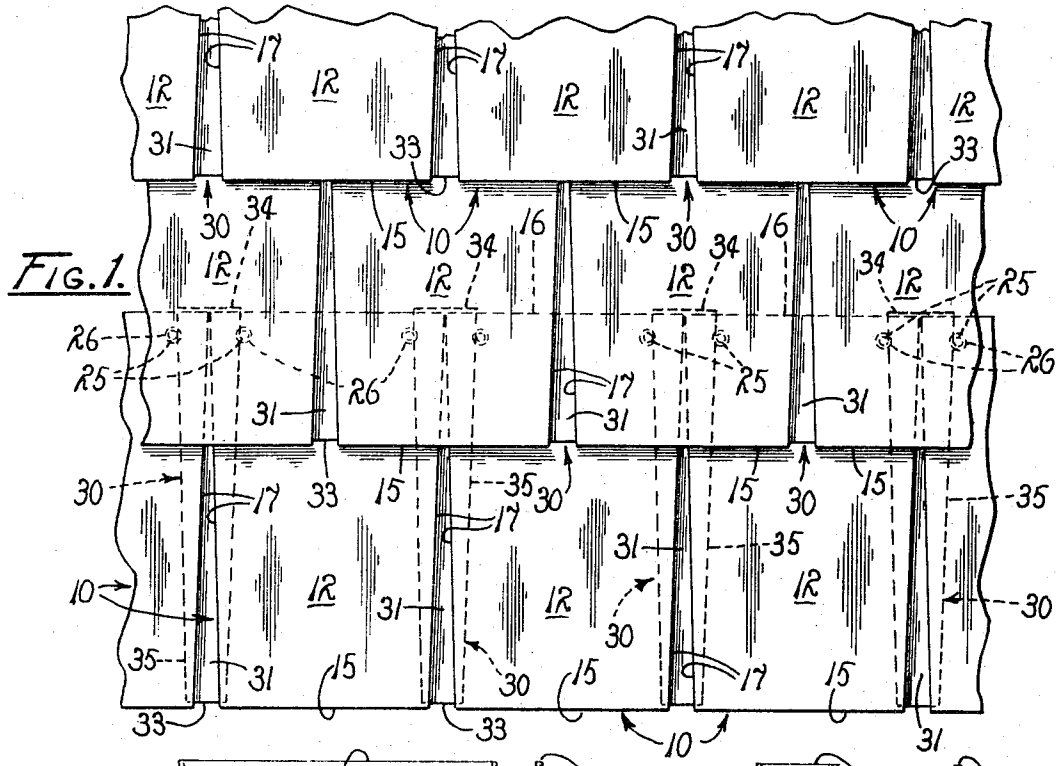


FIG. 1.

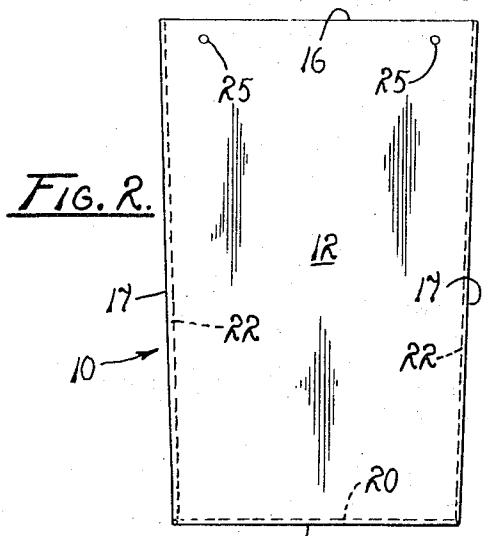


FIG. 2.

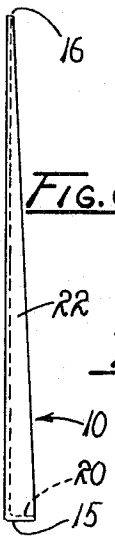


FIG. 3.

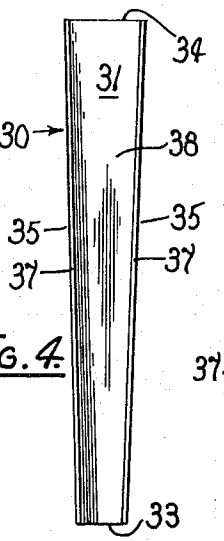


FIG. 4.

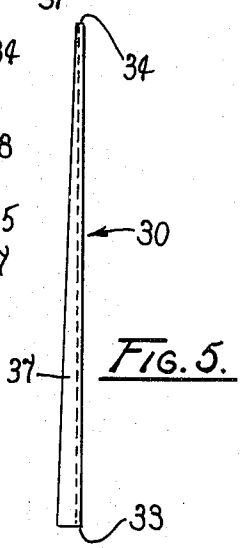


FIG. 5.

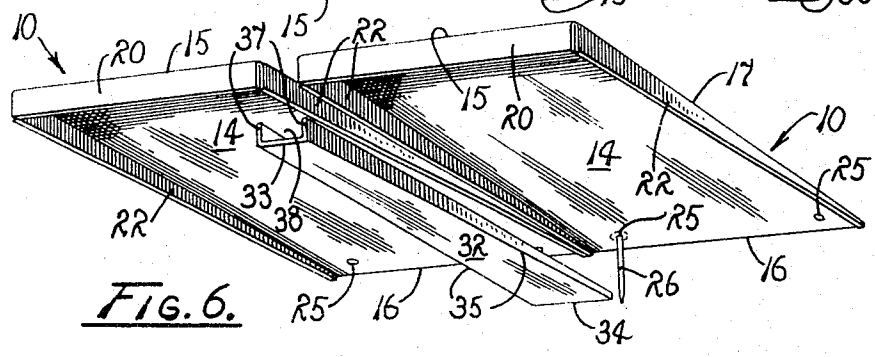


FIG. 6.

FIG. 7.

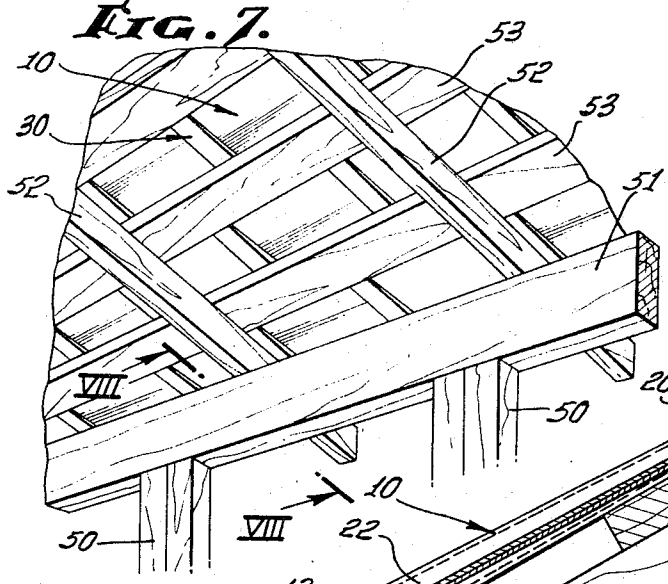


FIG. 10.

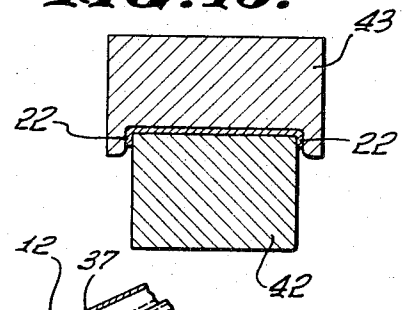


FIG. 8.

FIG. 9.

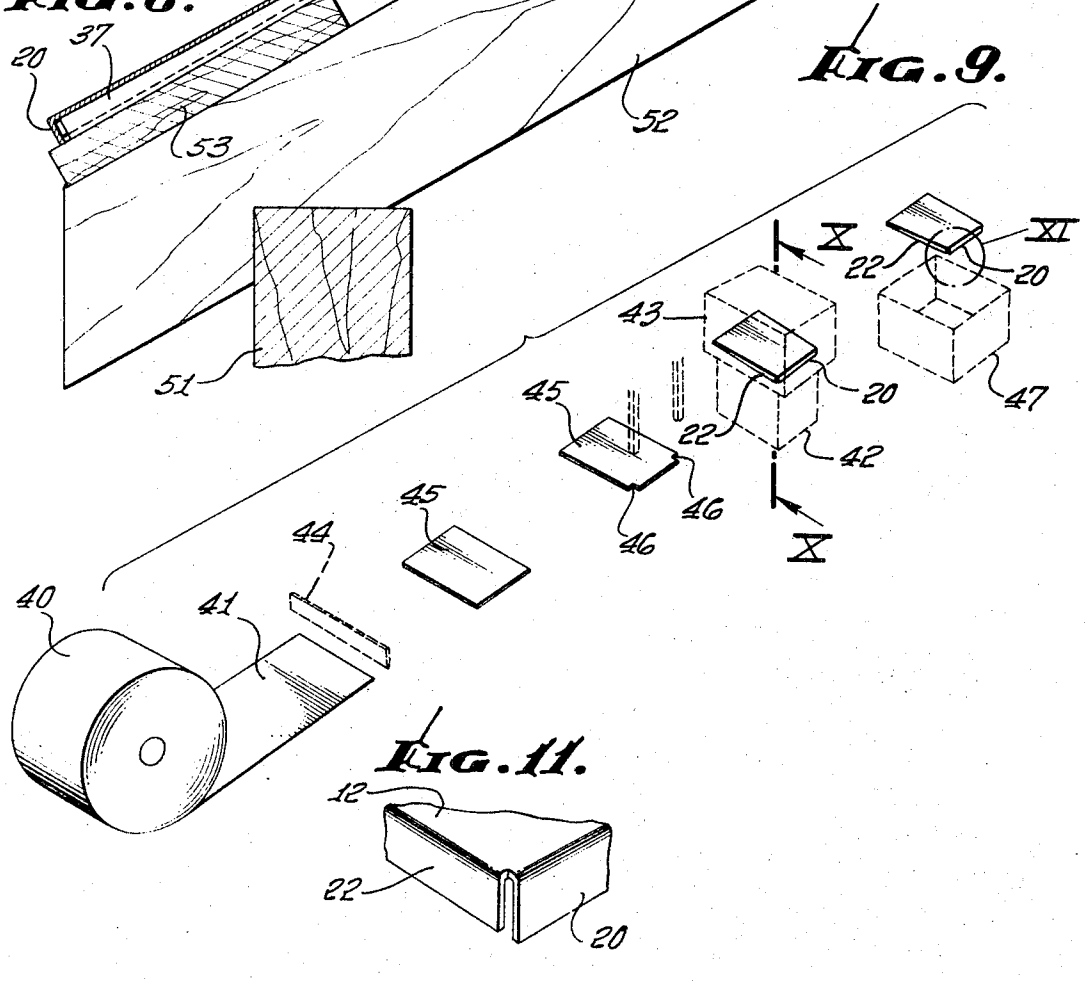


FIG. 11.

FIG. 12.

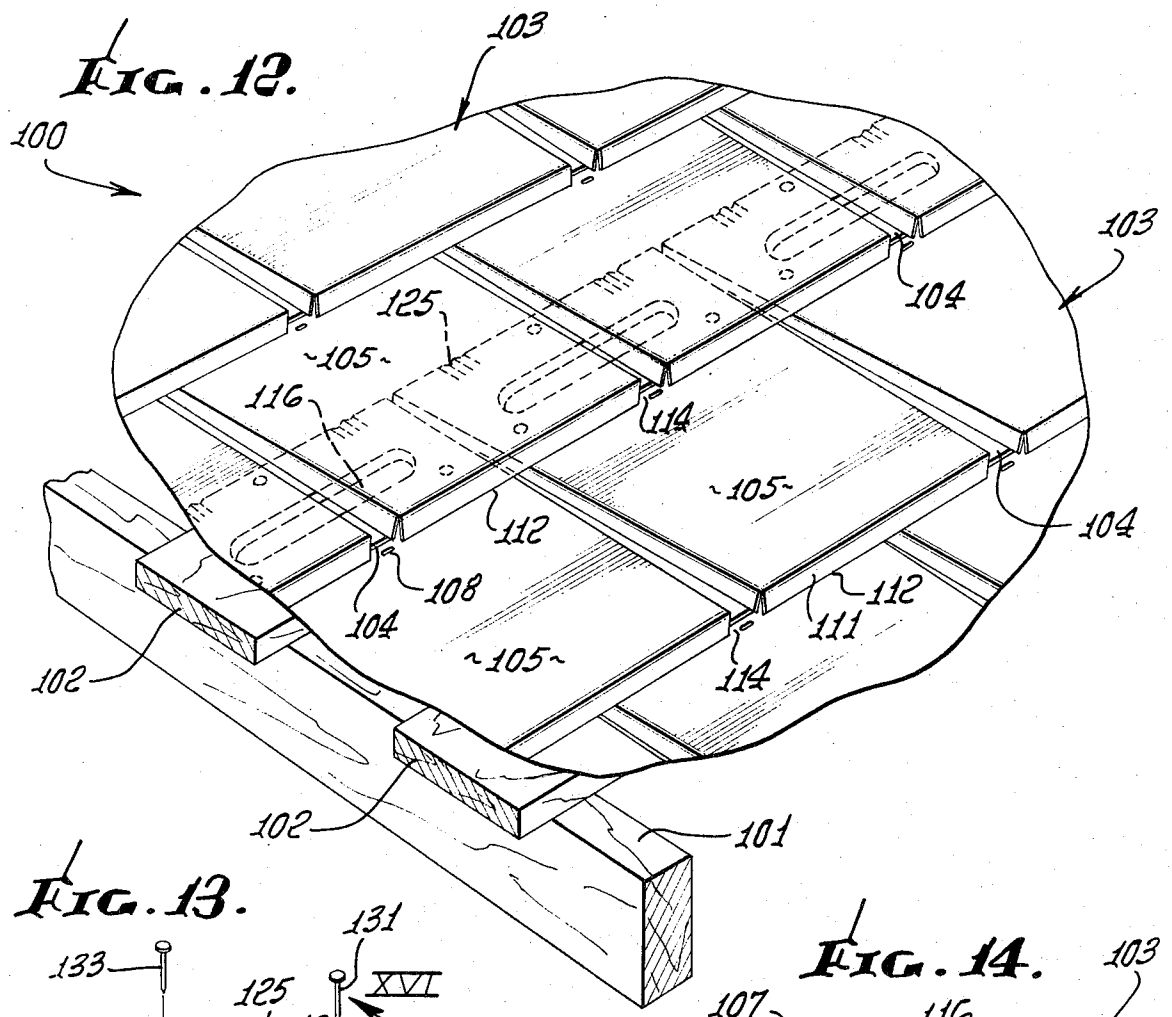


FIG. 13.

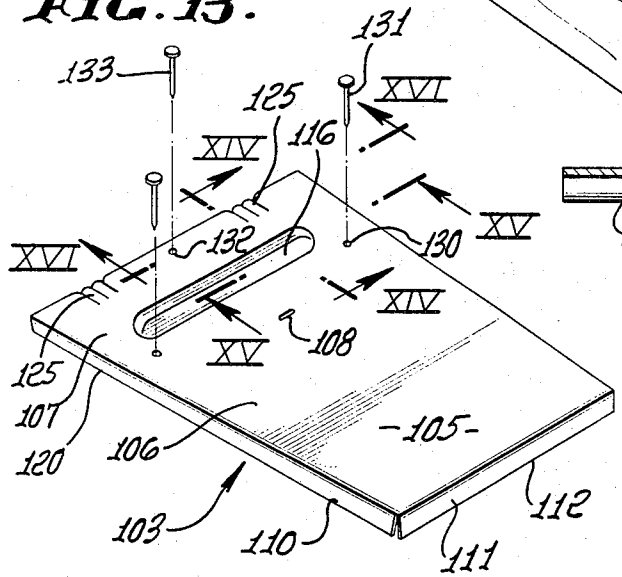


FIG. 14.

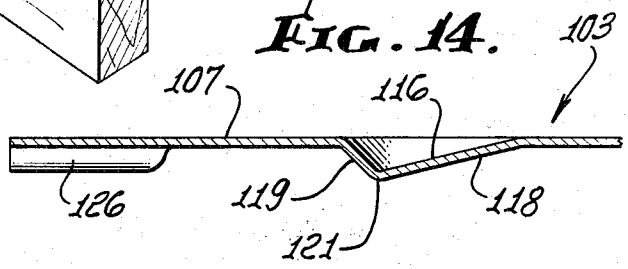


FIG. 15.

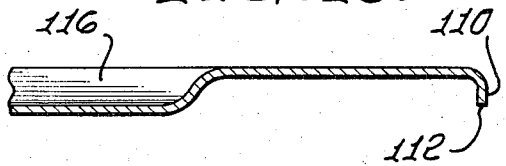
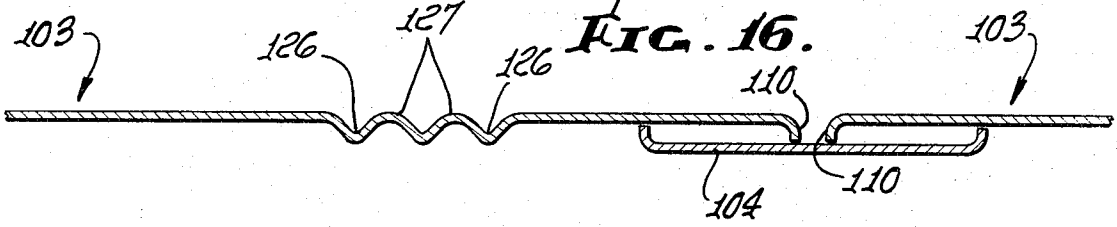


FIG. 16.



STRUCTURAL SURFACE METAL SHINGLE COVERING

This application is a continuation-in-part application of Ser. No. 097,773 filed Dec. 14, 1970 and issuing as U.S. Pat. No. 3,720,031 on Mar. 13, 1973, application Ser. No. 097,773 being a continuation-in-part application of Ser. No. 817,607 filed Mar. 24, 1969 which was abandoned in favor of application Ser. No. 097,773.

BACKGROUND OF THE INVENTION

Wooden shingles and shakes have long been employed as a covering for exterior building walls, roofs and the like in view of their traditionally rustic, aesthetic appearance, ready availability, and economical cost. The shingles are arranged on a suitable supporting surface, usually spaced wood lath, in multi-overlapping rows. The rows of shingles are extensively overlapped to minimize leakage, and a relatively large number of shingles per square foot coverage of the supporting surface are required. However, such coverings can only be installed by the most skilled workmen. Consequently, with the increasing cost of labor and shingle material itself, such coverings are becoming economically prohibitive.

Furthermore, wooden shingles have a relatively short life before rotting unless pretreated with preservatives, and are also highly susceptible to damage from high winds and fire. The latter poses a particularly onerous problem in forested areas which may be subject to intense rapidly moving fires which may produce myriads of sparks which may fall upon a wood roof and set the roof on fire. In such areas the shingles must be chemically treated with fire retardant materials which factor also contributes to the higher cost of wood roofing materials and installation. Fireproof roof materials other than wood are commercially available, such as slate or clay tile or the like, but these materials are frequently expensive, difficult to handle and install, and because of their relatively great weight, require a much more substantial supporting structure than the other described non-fire resistant materials. Metal shingles of copper are subject to the same disadvantages; while those of lightweight aluminum have utilized expensive complex interlocking arrangements between shingles. Accordingly, in most instances and particularly in the construction of small homes, the additional expense of such fireproof covering materials is prohibitive. In addition, structural framing for a wood shingle or shake roof is inadequate to support a clay tile roof covering; changing of the wood type roof covering on existing buildings to a clay tile or other heavy fireproof material is structurally cost-wise usually not feasible.

In the application of metal shingles to a surface structure, careless driving of nails through holes provided in the shingle element sometimes resulted in some distortion of the metal particularly if the metal were of relatively thin gauge or section. Distortion of the normally flat surface of the shingle element at the area contacted by the edge of the butt flange of the next above shingle elements might result in an unwanted space between the edge of the butt flange and the shingle surface. Such space was noncritical under normal or usual storm weather conditions. Under severe storm conditions as where strong winds drove rain against the shingle surface and into such space resulted in an excessive amount of water driven beneath the shingle. Various

governmental agencies such as city, county and state impose standards for shingle roofing which must be met before approval and acceptance of roof constructions. An example of such a standard requires that the shingle covering withstand a 100 mile per hour wind with the equivalent of 6 inches of rain per hour applied to a 4 foot by 8 foot roof area. In addition along each course and adjacent courses, such space between the butt flange edge and the shingle surface may be nonuniform and detract from the appearance of the roof.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide an improved fireproof structural surface covering of exceptionally long life for buildings and the like which may be economically, easily and conveniently installed in either new or existing building constructions.

Another object is to provide such an improved structural surface covering which substantially simulates the ornamental and aesthetic appearance of conventional wooden shingles or shakes but which requires fewer roof construction components than a comparable wooden shingle covering.

Another object is to provide an improved structural covering which employs a plurality of structurally coacting shingle and flashing strips which can be arranged effectively to provide a leak-proof, fireproof covering.

Another object is to provide an improved structural covering in which the covering elements are constructed of a relatively lightweight metal material of selected gauge having high strength, good resistance to atmospheric corrosion, and also enhanced in aesthetic appearance while aging.

Another object is to provide an improved structural covering in which the shingles and flashing strips have cooperating flashing portions with the flashing strips precisely constraining the shingles in desired spaced relation upon a support surface, which arrangement requires only a minimum of nails to hold the shingles and flashing strips in place on the support surface and provides a covering surface adapted to be walked upon without damage to appearance or weatherability of the covering.

Another object is to provide an improved structural covering element and method of making in which the flanged covering elements can be individually fabricated from substantially rectangular blanks of such sheet material substantially without any waste.

Still another object of the invention is to disclose a roof or wall structure adapted for inexpensive new construction and for old construction without requiring substantial structural change for roofs, for example, of wood shingle type.

A specific object of the present invention is to provide a metal shingle element of relatively lightweight gauge which includes a construction or configuration which resists deformation of the nonexposed portion of the shingle whereby the shingle surface at the area of contact by the next above shingle is planar to afford virtually linear contact along the length of the butt flange of the next above shingles.

Another specific object of the present invention is to provide a metal shingle element provided with lateral and longitudinally extending indentations to resist de-

formation of the shingle surface during application by nailing.

A still further specific object of the present invention is to provide a shingle covering element in which nail holes are located with respect to such indentations to minimize deformation of the shingle surface.

A further object of this invention is to provide metal shingle elements formed to provide structural characteristics and yet adapted to be readily trimmed in the field for fitting the shingle elements about vent pipes, chimneys, or other roof projections.

Other objects and advantages of the present invention will be readily apparent from the following description of the drawings in which an exemplary embodiment of the invention is shown.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a fragmentary top plan view of the improved structural covering embodying the principles of the present invention showing a plurality of shingles and flashing strips disposed in coacting installed position upon a support surface such as a building, roof or the like.

FIG. **2** is a somewhat enlarged top plan view of one of the shingles of FIG. **1** removed from the support surface.

FIG. **3** is a side elevation of the shingle of FIG. **2.**

FIG. **4** is a somewhat enlarged top plan view of one of the spacer flashing strips of FIG. **1,** removed from the support surface.

FIG. **5** is a side elevation of the spacer flashing strip of FIG. **4.**

FIG. **6** is a perspective view of a pair of adjacent shingles of FIG. **1** removed from the support surface with their common spacer flashing strip lowered somewhat from its installed position between the adjacent side edges of the shingles in masking relation to the space between the shingles.

FIG. **7** is a fragmentary view of a roof structure provided with the structural covering shown in FIG. **1,** the view being taken from below the roof structure and looking upwardly thereto.

FIG. **8** is an enlarged fragmentary sectional view taken in the plane indicated by line VIII—VIII of FIG. **7.**

FIG. **9** is an exploded schematic view illustrating the method of making a surface covering element embodying the invention.

FIG. **10** is a fragmentary enlarged sectional view taken in the plane indicated by line X—X of FIG. **9.**

FIG. **11** is an enlarged perspective view of a corner of a covering element, the corner area being indicated by the phantom circle **11** indicated in FIG. **9.**

FIG. **12** is a fragmentary perspective view of a structural metal shingle covering for a roof showing shingle elements embodying the invention of the present application.

FIG. **13** is a perspective view of a shingle element shown in FIG. **12.**

FIG. **14** is a fragmentary longitudinal sectional view taken in the plane indicated by line XIV—XIV of FIG. **13.**

FIG. **15** is a fragmentary transverse sectional view taken in the plane indicated by line XV—XV of FIG. **13.**

FIG. **16** is an enlarged fragmentary transverse sectional view taken in the plane indicated by line XVI—XVI of FIG. **13.**

DESCRIPTION OF THE EMBODIMENT SHOWN IN APPLICATION SER. NO. 097,773 FILED DEC. 14, 1970 AND NOW U.S. PAT. NO. 3,720,031.

Referring particularly to the drawing, an improved structural covering means embodying the principles of the present invention includes a plurality of elongated tapered shingle or outer cover elements or panels **10** of slightly trapezoidal configuration. The shingle elements **10** are adapted to be stamped from a single substantially rigid sheet of relatively thin gauge steel plate, aluminum, or the like. It is particularly contemplated and preferred that the shingle elements be constructed of a weathering metal material which during corrosive action, forms a weather coating, such as "Cor-Ten" made by United States Steel, this material requiring no protective painted covering or the like and being adapted to weather naturally without any maintenance, such "Cor-Ten" material being described hereafter.

As best shown in FIGS. **2, 3,** and **6,** each of the outer shingles or cover elements **10** which substantially simulates a conventional wood shingle or shake, provides opposite substantially flat top and bottom surfaces **12** and **14,** respectively. Each shingle element further includes a lower butt end **15** and an opposite, relatively wider upper head end **16.** The upper and lower ends of each shingle element are interconnected by opposite sides **17** which converge toward lower end **15.** An elongated depending flange **20** is integrally formed from the lower end **15** and said flange **20** has sufficient width to substantially simulate the thick or butt end of a conventional wood shingle or shake. A longitudinal edge flange **22** is integrally formed in depending relation from each side **17** of the shingle element **10.** Each flange **22** longitudinally tapers from a maximum height at its lower end adjacent to butt flange **20** to blend or merge at its opposite end into lower surface **14** of shingle element **10** at the upper head end **16** thereof to simulate inside elevation the tapered cut of a wood shingle or shake. It should be noted that the maximum height of flange **22** at butt flange **20** is slightly less than the height of butt flange **20** by an amount approximately the same as the thickness of the metal, such difference in height being indicated at **21,** FIG. **11.** A pair of nail holes **25** are provided through each of the shingle elements, each hole **25** being adjacent an upper corner of head end **16** to receive therethrough conventional shingle constraining nails **26** (FIGS. **1** and **6**).

The improved structural covering means of the present invention further includes a plurality of spacer flashing elements or inner strips **30** which are constructed of the sheet metal material as outer shingle elements **10.** As best shown in FIGS. **4, 5,** and **6,** each of the spacer flashing strips **30** has planar top and bottom surfaces **31** and **32,** respectively, and a narrow lower end **33** and an opposite relatively wide upper end **34.** Flashing strips **30** are longitudinally tapered in trapezoidal configuration with opposite ends interconnected by converging sides **35.** Each side **35** includes an upstanding longitudinal side flange **37** which is longitudinally tapered from lower end **33** to substantially blend or merge into top surface **31** of strip **30** at upper end **34.** Side flanges **37** thus define with top surface **31,** an open ended longitudinal slightly converging drainage

channel **38** therebetween. The flanges **37** have a height at lower end **33** approximately the height of side flange **22** on the cover element **10** so as to precisely nest within the outer shingle element **10** in substantially corresponding lengthwise tapered relation along the length of side flanges **37** and **22.** When so nested, the lower end edge face of side flange **37** is in abutting relation to the inner surface of the lower butt flange **20** of shingle element **10.** Also in this nested relation, the bottom edge face of butt flange **20** of shingle element **10** may rest upon the top surface **12** of the adjacent lowermost shingle element **10,** such relationship being permitted by the difference in height of the side flange **37** and **22** at a lower butt corner of a shingle element and flashing strip assembly.

It is noted that both side flanges **22** of shingle elements **10** and side flanges **37** of flashing strips **30** can preferably be formed as by bending in a stamping operation from a substantially rectangular sheet of blank material as more fully described hereafter. It is also apparent that the combined peripheral dimension of the edges of the butt flange **20** at lower end **15** and the side flanges **17** is virtually equal to the width of the edge at the opposite head end **16.** Accordingly, no costly trimming operations are required and a substantial savings results by eliminating any waste of the sheet material from which shingles and flashing strips are formed.

Method

In particular, the method of making a shingle element and a flashing strip is now described with specific relation to the shingle element **10.** Adaptation of the method to flashing strip **30** will be readily apparent to those skilled in the art. The method of the invention is illustrated in FIG. **9** wherein a coil or reel **40** of sheet metal stock of selected width is suitably supported for rotation about its axis by means not shown. As sheet metal strip **41** is withdrawn from the coil **40,** it is passed into a stamping apparatus which may comprise a bottom anvil die **42** and a top mating stamping die **43.** The shingle element **10** is formed by one stamping operation, the several stamping sub-operations being shown in exploded sequence in FIG. **9.** Thus, when strip **41** is fed into position above fixed die **42** and upper die **43** is moved downwardly in a stamping operation, the first substamping action is the cutting from the strip as by a knife or shear blade **44** of a sheet metal blank **45** of selected width. As blank **45** is supported on die **42** movable die **43** notches lower corners **46** from blank **45.** As the stamping operation continues, die **43** folds over side flanges **22** and butt flange **20.** As upper die **43** moves upwardly in the stamping operation, the formed shingle element **10** is ejected from the stamping apparatus and is placed in a box **47** for packaging or transported by other means to storage. It is apparent from the above description of a method of making the shingle element **10** that the only wastage which occurs is the loss of the minute corner material at **46** and that the one-step stamping operation converts strip stock material into a usable shingle in an economical manner.

Operation

The operation of the described embodiment of the subject invention is believed to be clearly apparent and is briefly summarized at this point. An exemplary roof structure upon which shingle elements **10** and flashing strips **30** may be employed is shown in FIG. **7** wherein spaced studs **50** support horizontal plates or beams **51** which carry upwardly inclined roof rafters **52** upon which may be nailed at selected spaced intervals nailing boards or roof lath **53** which may usually comprise 1 × 4 or 1 × 6 boards. In customary installation of a wood shingle roof, a double thickness or layer of shingle is provided at the lowermost roof edge. In some installations a sheet of roofing felt may be laid over the roof lath or nailing boards before applying the wood shingles. Prior to nailing, spacer flashing strips **30** and shingle elements **10** may be generally arranged in a horizontal starter course at the bottom edge of the roof with the strips **30** underlying adjacent edges of shingle elements **10.** The strips **30** and shingle elements **10** interengage to positively position each shingle element **10** with respect to the adjacent shingle element **10** and the intermediate flashing strip **30.** When arranged in such interengagement, the upper corners of the shingle elements **10** are in close proximity and may touch when the top edges of adjacent shingles lie in a straight line. In this relationship of the outer cover or shingle elements **10** the flashing strip at its lower end has upstanding end portions of side flanges **37** in proximity to and in engagement with the depending side flanges **22** of shingle element **10.** Further, abutment of upstanding end edges of side flanges **37** on the strip **30** against the inner surfaces of the depending butt flange **20** of the shingle elements serves to facilitate proper alignment and arrangement of shingle elements **10** and the flashing strip element **30.** When properly arranged it will be apparent that the upper portions of sides **35** of the strip **30** will lie closely between nail holes **25** of adjacent corners of adjacent shingle elements **10.** Thus, when nails are driven through holes **25** the nails **26** laterally fix the position of the top end of flashing strip **30.** Moreover, the flashing strip **30** cannot move downwardly because of the conveggence downwardly of the side edges **35** of strip **30** which act to wedge the strip between the nails **26** and further because of the abuttment of side flanges **37** against butt flanges **20** on the adjacent shingles. Thus, a channel is defined between adjacent shingles elements **10** which flares downwardly and outwardly.

After a portion of the first course has been laid, a second course of shingles may be layed in which the second course shingle elements are offset laterally a selected distance from the first course shingle elements. Amount of such offsetting depends upon the type of roof pattern desired. The lower ends of the second course shingles may overlap the upper end of the lower course shingles a selected distance so as to provide a desired amount of weathering surface on the lower course of shingle elements. Laying the second course may be performed in the same manner as that described for the first course. It will be apparent that the lower edges of the second course shingle elements **10** and flashing strips **30** will rest upon the top surfaces of the lower course shingle elements and will present a virtually straight butt line with slight interruptions amounting to the thickness of the sheet metal employed at the flashing strips **30.**

It should be noted that in the arrangement of the courses of the shingle elements **10** and strips **30** that no nails are driven through the flashing strips **30** and that the nails are covered by the central portion of the weather area of the upper course of shingles. A minimum number of nails is thus required for securing the

shingle elements and flashing strips on the roof surface and no penetration of the flashing strips **30** is made since water falling from one course of shingles to another will include some water falling onto the flashing strip **30** and being drained thereby to the next lower adjacent shingle element. The lack of nails in the flashing strip **30** together with the disposition of strip **30** in fixed position by interengagement of shingle elements and flashing strips is advantageous in providing a waterproof weathertight roof covering.

It should be noted that each lower corner of shingle element **10** is provided with a weep opening for drainage of any water which might collect beneath an outer shingle element **10** by reason of wind or capillary action. It will be apparent that the amount of overlapping of one course with a lower course or the amount of head lap may be minimized because of the present construction and thus permit a greater surface of each course to be exposed to the weather and thus result in fewer shingles being used to cover a roof area.

It is important to note that the interleaving of the depending side flanges **17** of shingle elements **10** and the upstanding flanges **37** of the flashing strips **30** together with their corresponding reduction in height permits such flanges to act as structural walls to support the outer shingle or cover elements **10.** Thus, a metal shingle roof covering embodying the construction of the present invention may be walked upon without damage to the protection offered by the roof covering. Moreover, the butt and side flanges of each shingle element **10** provide stiffness and rigidity so that adjacent courses provide a rigid structure adapted to resist strong heavy winds.

The metal shingle construction described above is preferably made of weathering steel, such as "Cor-Ten" as above mentioned. Such material provides exceptional resistance to atmospheric corrosion and thereby eliminates the need for any protection or surfaces exposed to the atmosphere and also eliminates subsequent maintenance. Moreover, the protection oxide formed gradually darkens and assumes an aesthetically pleasing texture and color varying from a dark brown to a warm purple-black depending upon the exposure conditions. Such material is also of high strength and therefore a lightweight weather resistant structurally rigid shingle element and roof covering is provided which enhances the appearance of the roof with age and which will serve its protective purpose for an exceptionally long period of time without maintenance. The surface of such "Cor-Ten" material rapidly heals in the event it is scratched or broken and thus the life of such a roof remains virtually unimpaired.

DESCRIPTION OF THE PRESENT INVENTION

In FIGS. **12 – 16** inclusive a roof construction generally indicated at **100** may comprise a plurality of spaced roof rafters **101** which support horizontally extending spaced lath boards **102** which provide a supporting surface for the metal shingle elements **103** arranged in horizontally extending parallel courses.

The present invention relates to a modified construction of the metal shingle element **103.** The arrangement of the shingle elements **103** and flashing strip elements **104** with respect to each other corresponds to the arrangement described hereinabove and claimed in U.S. Pat. No. 3,720,031.

Shingle element **103** comprises a shingle wall **105** of trapezoidal shape having a lower portion **106** and an upper portion **107,** the portions being defined by an alignment and registration mark **108** provided in wall **105** at approximately the longitudinal center line thereof. Lower portion **106** is that portion of the shingle which is exposed to weather and upper portion **107** is covered by the walls **105** of metal shingle elements of the next above course as shown in FIG. **12.** Each shingle element **103** includes longitudinally tapered side flanges **110** and a bottom butt flange **111** having a straight bottom edge **112** adapted to contact the top surface of wall **105** of the course of shingle elements therebelow at a contact zone **114** which generally corresponds to the registration mark **108.** It will be apparent from a consideration of FIG. **12** that if wall **105** at the contact zone **114** is not planar that the bottom straight edges **112** of adjacent shingle elements **103** will not uniformly contact shingle element **103** and that canting of one or both of the shingle elements of the next above course may occur. In other words, the straight bottom edge **112** of the butt flange **111** will not uniformly contact the transversely extending contact zone at **114.**

The present invention relates to means for minimizing or virtually eliminating deformation or distortion of the transverse contact zone **114** and the generally planar characteristics of the upper portion **107** of the metal shingle. Such deformation minimizing means comprises a transversely extending indentation **116** formed by deforming metal of the upper portion of the shingle to form a relatively shallow sloping wall portion **118** at the lower section of the indentation and a rather steeply inclined wall portion **119** at the upper section of the indentation. The depth of the indentation **116** generally corresponds to the depth of the side flange **110** of the shingle at the transverse location indicated by **120.** The bottom surface edge **121** of indentation **116** may be approximately in contact with board **102** as indicated in FIGS. **12** and **14.** Opposite ends of indentation **116** are spaced from the side flanges **110** of the shingle element a sufficient distance to permit ready accomodation of the top end of the metal flashing element **104.** Indentation **116** is thus located adjacent contact zone **114** and the indentation portions **118** and **119** transversely reinforce the upper wall portion **107** of the shingle element to virtually eliminate possible bending of the wall **105** about a longitudinal axis of the shingle.

Deformation minimizing means also includes two sets of longitudinally extending indentations **125** formed in the top edge margin of the upper portion **107** of shingle wall **105.** Each set of longitudinal indentations **125** may be spaced from side flanges **110** approximately the same distance as the end of transverse indentation **116.** Each set of indentations **125** may include a plurality of corrugations providing spaced valleys **126** interconnected by spaced ridges **127.** The length of each corrugation may be the same as the adjacent corrugation and each ends in spaced relation to the transverse indentation **116.** The two sets of longitudinal indentations **125** minimize deformation of the top edge margin of the wall **105** about a transverse axis and assures that the top edge portion or margin of the upper portion **107** will lie in flat parallel relation to the supporting surface provided by the boards **102.**

Means securing each metal shingle element **103** to the boards **102** may comprise pre-punched or pre-drilled nail holes **130** provided in wall **105** in the upper portion **107** thereof in a location between ends of indentation **116** and side flanges **110.** As shown in FIG. **13** each nail hole **130** is located slightly forwardly of the indentation **116.** It is also spaced a selected distance from side flange **110** to restrict lateral displacement of the flashing strip element **104** as described in the previous embodiment. It will be thus understood that driving a nail **131** through a hole **130** may be readily accomplished without deformation of the upper portion **107** of the shingle element. In the event a hammer blow misses the nail head, the metal surface struck by the hammer head will be adjacent the end of the transverse indentation or the side flanges **110** and since the indentation and side flanges **110** are in virtual contact with the underlying supporting surface, deformation of the wall **105** at the contact zone **114** will be virtually eliminated.

In this example of the invention, a third nail hole **132** may be provided for a nail **133,** the nail hole **132** being pre-punched in the top longitudinal edge margin of the upper portion **107** of wall **105.** Nail hole **132** is pre-punched as a spare or reserve nail hole in the event the supporting surface for some reason would not provide adequate material for securement by one of the nails **131.** In such event, it will be noticed that absence of one of the nails **131** would normally permit displacement of the top end of the flashing strip element **104** in such direction to the extent of interleaving of the flanges on the flashing strip element and shingle element.

It will be understood that installation of the modified shingle element **103** as shown in FIGS. **12 – 16** may correspond to the installation of the shingle element of the previously described embodiment. During installation of registration mark **108** facilitates accurate placement of the flashing strip elements **104** with respect to the shingle elements of the lower course and also facilitates transverse alignment of the bottom butt flanges **111** of the elements **103.** It will be understood the top corners of wall **105** may be in approximate contact as described in the previous embodiment of the invention. Upon completion of the installation, it will be readily apparent that the appearance of the butt flanges of the shingles in each course is virtually uniform and aesthetically pleasing.

In view of the above description, it is readily apparent that the shingle element and roof structure of the present invention provides an improved covering for support surfaces such as walls and roofs of buildings by the use of relatively lightweight metal shingle elements and spacer flashing strips which provide a virtually leak-proof, fireproof covering for the building structure. The flashing strips precisely constrain the shingle elements in the desired spaced relation for permitting quick and easy installation by workmen of even less than average skills, the flashing strips being precisely held in described position by the nails which hold the outer shingle elements in place without the necessity of such nails passing through the flashing strips. Such structural covering means embodying the present invention may substantially simulate wood, shake, or shingles employed on conventional wood roofs and requires relatively fewer components than a comparable wood shingle roof and provides a substantially fireproof covering with only a fraction of the weight imposed upon the supporting roof structure than with other fireproof roofing material such as clay tile and the like.

Although the invention has been herein shown and described in what is conceived to be the preferred embodiment, it is recognized that departures may be made from within the scope of the invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices, methods, and structures.

We claim:

1. In a roof structure having a plurality of horizontal boards providing a supporting surface, a plurality of horizontally arranged courses of formed metal shingle elements each having a shingle wall of trapezoidal shape and generally planar, downturned tapering side flanges on said wall, a downturned bottom butt flange on said wall having a bottom edge adapted to contact corresponding walls of the next lower course of shingle elements; a plurality of flashing strip elements extending beneath and between edges of adjacent shingle elements of a course and positioned by said butt flanges; and means securing said shingle elements to said supporting surface; each shingle wall having a lower portion having a planar uninterrupted surface exposed to weather and an upper portion covered by the lower portion of the next above adjacent shingle elements and associated flashing elements in the next above course of shingle elements; wherein the improvement comprises:

means for minimizing lateral and longitudinal distortion of each shingle wall out of its normal preformed plane at the contact zone of the butt flange edges of shingle elements of the next above course, said distortion minimizing means comprising

indentation means extending laterally and longitudinally in the upper portion of each shingle wall above the contact of the butt wall of the upper shingle therewith and spaced from the side flanges thereof;

said means for securing each shingle element being located in the portion of said shingle wall between said indentation means, said side flanges and above said butt wall contact of the upper shingle with the lower portion whereby said planar surface of the lower portion and edge of the butt wall of the upper shingle form a virtually uniform joint line appearance.

2. In a roof structure as claimed in claim **1** wherein said indentation means includes

a transverse depression in said upper shingle wall portion adjacent said contact zone,

the transverse depression extending continuously across a major central portion of the wall;

the lowermost surface of the transverse depression corresponding in depth to approximately that of the lower edge of laterally adjacent shingle side flanges.

3. In a roof structure as claimed in claim **2** wherein

said transverse depression extends continuously beneath the flashing strip element and the adjacent shingle wall elements of the next above course of shingle elements;

said flashing strip element extending below the transverse depression and adjacent the contact of the butt wall of the upper shingle.

4. In a roof structure as claimed in claim 3 wherein said indentation means includes

longitudinally extending formed depressions in the top edge margin of each shingle wall.

5. In a roof structure as claimed in claim 1 wherein said indentation means comprises

a transverse depression in the upper portion of said shingle wall;

longitudinally extending sets of depressions in the top edge margin of the upper portion of each shingle and in spaced relation to side flanges of said shingle wall;

said means for securing each shingle element to said supporting structure including nail holes in said upper portion of said shingle wall located between said transverse depression and each side flange of said shingle wall, and between the sets of longitudinal depressions.

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