United States Patent

Merrill et al.

[15] **3,667,184**

[45] **June 6, 1972**

[54] INTERLOCKING METAL SHINGLE CONSTRUCTION

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[22] Filed: **Feb. 24, 1970**

[21] Appl. No.: **13,592**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 804,424, Mar. 5, 1969, abandoned.

[52] **U.S. Cl.** **52/530**
[51] **Int. Cl.** **E04d 1/00**
[58] **Field of Search** 52/519–538, 542, 52/547

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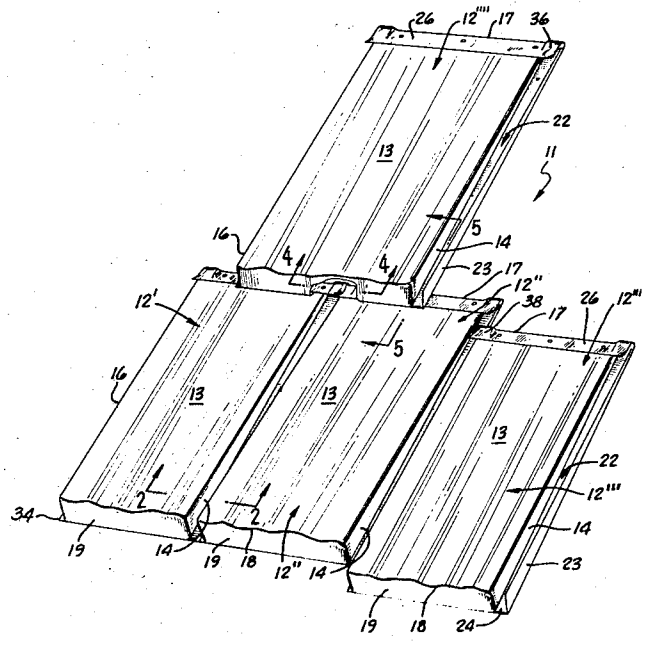
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[57] **ABSTRACT**

A metal shingle construction containing simulated shingles formed of sheet metal which present the appearance of wooden Hollywood shakes. The shingles of adjacent courses are in interlocking engagement as are adjacent shingles in each course so as to prevent a hard and driven rain from penetrating the joints between adjacent shingles, as well as to prevent flapping of the shingles in the wind. Nailing of the shingles to a roof substructure is only required at one end of each shingle, securance of the opposite end being provided by interlocking engagement with the shingles of an adjacent course. The nails, or other fastening means, are disposed in the shingle construction in completely sheltered position with respect to the weather without requirement of mastic or equivalent sealing means. The shingles are arranged such that prior to attachment of the shingles of each course the shingles therein may be shifted laterally and angled, or "skewed", relative to each other to adjust the length of the course to the dimensions of the roof and thereby prevent the course from overlapping the edge of the roof.

Special forms of shingles are provided for forming valleys, and another special form is provided for constructing hip roofs — both of which are necessary when two flat roof surfaces intersect to form a valley or a hip. Generally speaking, the construction of these special shingles is substantially the same as that outlined above for regular shingles, but differs in the one respect that one side of the shingle is formed at an angle to the other side. The shingles designed for use in valleys are narrow at the lower and thicker end and wider at the top and thin end, while the shingles designed for hips are wider at the lower end and narrow at the upper. These special shingles for both hips and valleys are necessarily constructed, sold and used in pairs as they must form a special joint where they abut at the hip or valley. Another difference between these special shingles for valleys and those for the regular flat roof structure lies in the fact that there is no flange or gutter where the two valley shingles of each pair abut each other.

9 Claims, 14 Drawing Figures



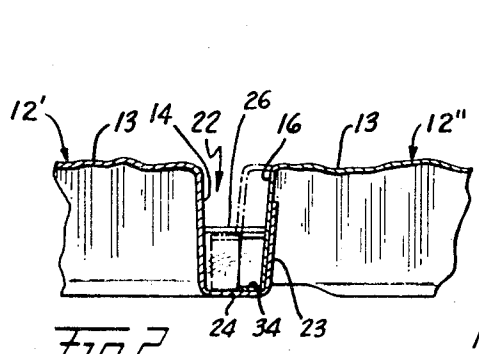


Fig. 2

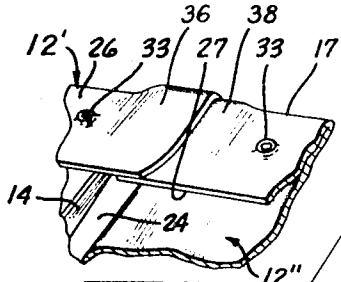


Fig. 3

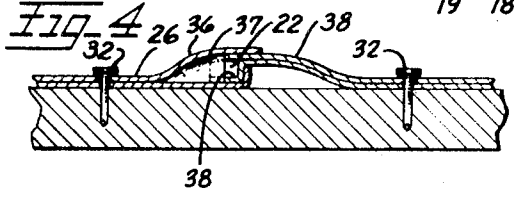


Fig. 4

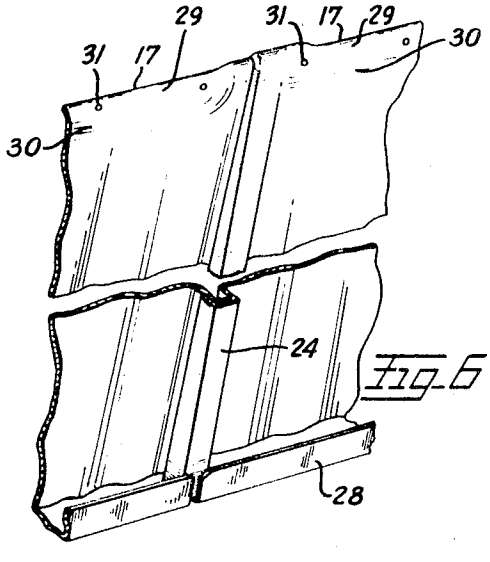


Fig. 6

Fig. 1

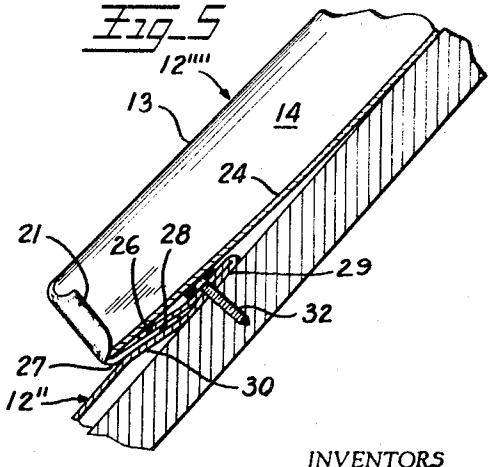


Fig. 5

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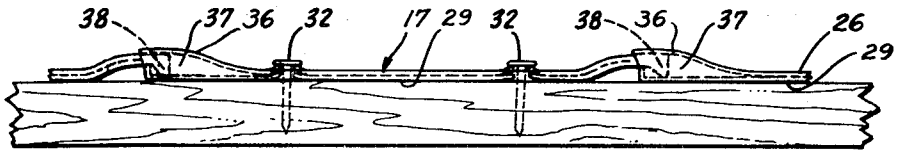


Fig. 7

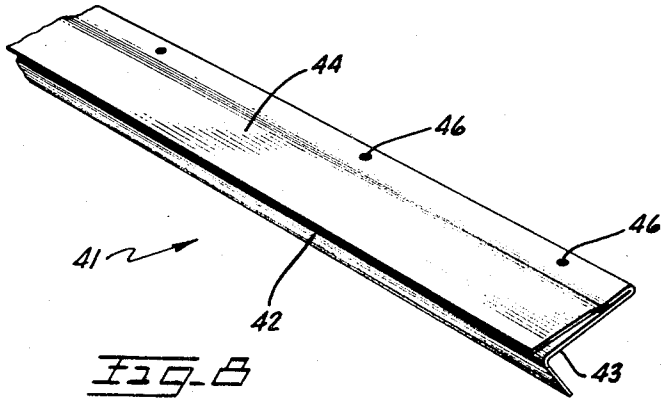


Fig. 8

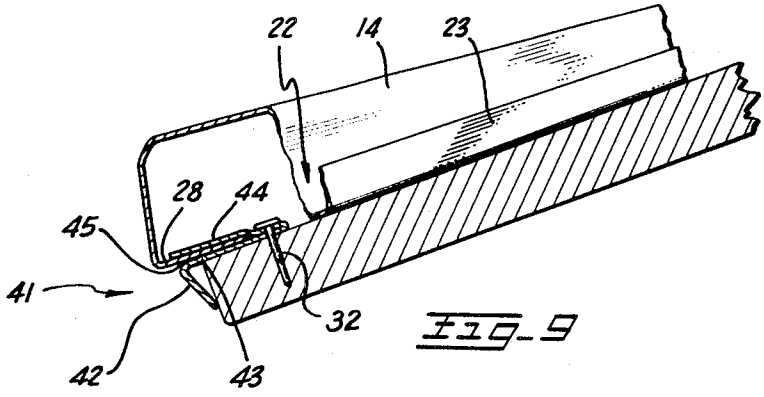


Fig. 9

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FIG. 10

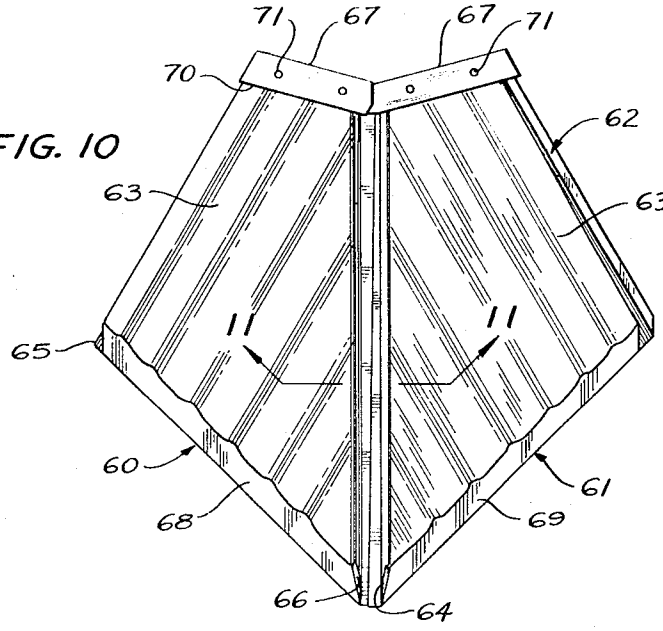
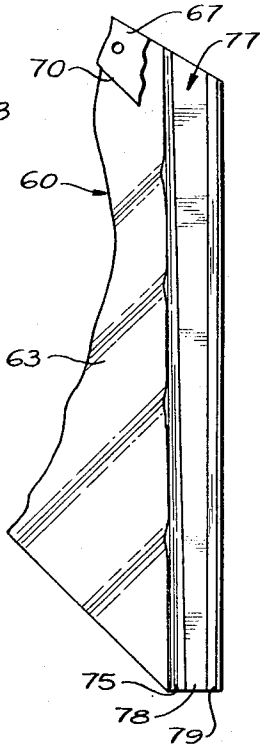


FIG. 12



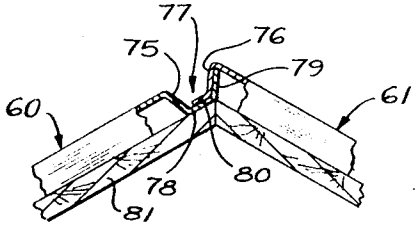


FIG. 11

FIG. 13

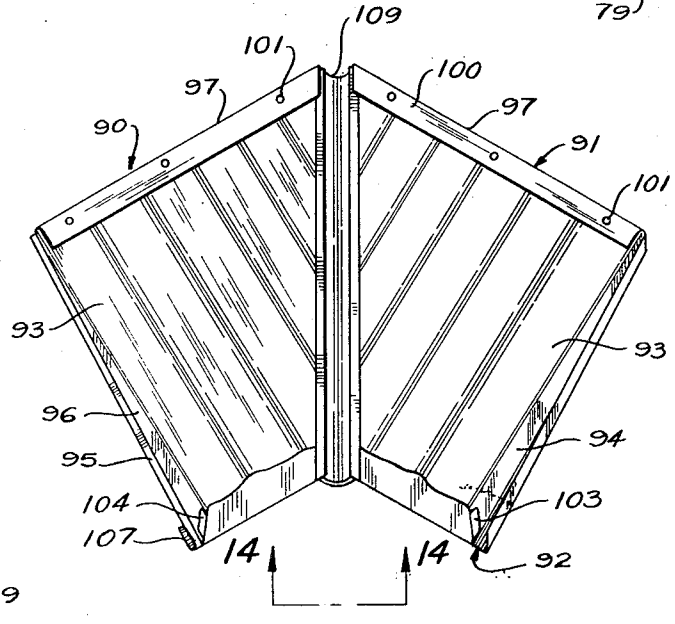
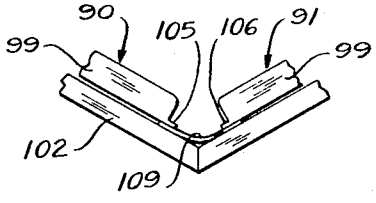


FIG. 14



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INTERLOCKING METAL SHINGLE CONSTRUCTION

CROSS REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of our copending patent application Ser. No. 804,424, filed Mar. 5, 1969, now abandoned.

BACKGROUND OF THE INVENTION

This invention relates to a metal roof shingle and, more particularly, to a metal roof shingle which simulates a wooden shake shingle and has an improved construction providing it with versatility and making it easily installable, but yet which assures a weather-proof roof assembly.

Various metal shingles have been designed to provide a metal shingle roof construction which in appearance resembles that of a wooden shingle roof but yet possesses advantages thereover particularly as to ease of installation, cost, durability, and the like. However, it has been necessary in the past for metal shingles to have relatively complicated interlocking structure for securing adjacent shingles together to assure that the resulting roof is secure and weatherproof. In some instances, it has been found necessary or desirable to coat the undersides of the metal shingle with a mastic or equivalent adhesive sealing means to provide the roof with the necessary sealed properties. Besides the increased cost of construction arising from the addition of the sealing means it is necessary that metal shingles be interlocked on a roof in a manner which assures that the joints between the shingles are leakproof.

Most shingle interlocking arrangements provided in the past require that adjacent shingles be in particular locations with respect to one another before the shingle joint will have the necessary water seal. Most metal shingle roofs therefore have a regular pattern of shingles which distinguishes the same from conventional wood shake roofs with their more irregular shingle patterns. Moreover, the interlocking structure between adjacent shingles has generally been such that the shingles cannot readily be moved relative to one another in order to adjust the length of a course of shingles to conform to the dimensions of the roof. Consequently, a course of shingles frequently overlaps the edge of the roof, and the outermost shingle of the course must be trimmed flush with the roof edge. Besides this resulting in an unsightly edge appearance, problems result in properly sealing the edge to assure a tight, waterproof seal of the shingles to the roof. Further, the interlocking structure of former shingles generally prevents angling, or twisting, of a shingle with respect to those adjacent to it.

SUMMARY OF THE INVENTION

The instant invention is a metal shingle of improved construction formed to simulate a wood shake and equipped with structure for interlocking the shingle with adjacent shingles in a manner which permits relative adjustability thereof so that the precise location and orientation of the shingle relative to those adjacent thereto can be selectively changed both as respects the distance separating any one shingle from those laterally adjacent thereto in the same course and as respects the angle at which it lies relative to the others, all while assuring a weatherproof securence of the shingle to adjacent shingles and to the roof base.

In its basic aspects, the metal shingle is wedge-shaped and includes a body section having along opposite longitudinal edges thereof, first and second downwardly extending tapered or wedge-shaped side walls which, with a generally rectangular downwardly extending end wall or base, simulate the wedge-shape of a conventional wooden shake shingle. The shingle in certain forms thereof also includes a third wedge-shaped side wall spaced from and extending along the first side wall to which it is connected by a web to define at one side of the shingle a U-shaped channel or gutter section which simulates the spacing ordinarily provided between wooden shake shingles when fastened onto a roof. The shingle is provided with cooperable means at both the upper and lower ends of the body section thereof for interlocking the shingle with similar shingles of adjacent upper and lower courses, respectively. Moreover, the second side wall of the shingle is adapted to overlap the third side wall of a substantially identical shingle in the same course and engage such adjacent shingle within its U-shaped channel to interlock the shingles together.

The cooperable means at the upper and lower ends of the body section of each single for interlocking the same with similar shingles of both upper and lower courses is meshable with the corresponding interlocking means of its laterally adjacent shingles to permit such adjacent shingles to be laterally shiftable with respect to one another so that the length of a course of shingles can be readily adjusted to the dimensions of the roof. This construction also permits the laterally adjacent shingles in the same course to be angled with respect to one another in order to adjust the shingles so as to correct variations in the base. The cooperable means at the upper and lower ends of the body sections are also designed to permit shingles of the adjacent upper and lower courses to be secured to the shingle in any lateral position with respect thereto. In short, the construction of a metal shingle according to the present invention provides a completely waterproof joint between each shingle and all adjacent shingles, and yet permits variations in the spacing of laterally adjacent shingles, permits the offset of the shingles of one course with respect to those of an upper or lower course, and permits differences, not only in the spacing of laterally adjacent shingles, but also in the angles at which they lie with respect to one another in order to compensate for the slight variation in the roof base which is common in building construction. Thus, these shingles provide a waterproof roof in which the shingles can be adjusted to a considerable degree with respect to those lying immediately adjacent thereto.

BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments of the invention are illustrated in the accompanying drawings in which:

FIG. **1** is a perspective view of a plurality of shingles of the invention illustrating the manner in which they are interlocked:,

FIG. **2** is a sectional view on an enlarged scale taken on a plane indicated by the lines **2—2** of FIG. **1** and illustrating the interlocking arrangement between adjacent shingles in the same course which permits such adjacent shingles to be laterally shifted with respect to one another and yet provides a weatherproof seal;

FIG. **3** is a partial perspective view of interlocked upper end corners of two adjacent shingles;

FIG. **4** is a sectional view on an enlarged scale taken on a plane indicated by lines **4—4** of FIG. **1**, illustrating the interlocking structure of the upper end corners of the adjacent shingles and the manner in which such structure is meshable to permit adjacent shingles of a course to be shifted laterally with respect to each other prior to nailing to adjust the length of the shingle course to the dimensions of a roof;

FIG. **5** is a sectional view taken on a plane indicated by line **5—5** of FIG. **1** and illustrating the cooperating means for interlocking shingles of adjacent courses together;

FIG. **6** is a partial rear, or bottom, view of a shingle of the invention interlocked with adjacent shingles and illustrating the interlocking structure from below;

FIG. **7** is an upper end view of a shingle of the invention secured to a roof sheathing and interlocked with adjacent shingles;

FIG. **8** is a perspective view of a starter strip for securing the lowermost course of shingles onto a roof;

FIG. **9** is a partial view of a shingle of a lowermost course of shingles secured to a roof by the starter strip of FIG. **8**;

FIG. **10** is a perspective view of a pair of shingles designed for the formation of a hip roof;

FIG. 11 is a broken transverse sectional view of the pair of shingles forming a hip, the section being taken along the line 11—11 of FIG. 10;

FIG. 12 is a broken top plan view of one of the shingles shown in FIG. 10;

FIG. 13 is a perspective view of a pair of adjacent shingles forming a valley; and

FIG. 14 is a broken lower end view of the pair of shingles shown in FIG. 13, the view being taken along the line 14—14 of FIG. 13.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Considering now the invention in detail and referring to the illustrated form thereof in the drawings, FIG. 1 depicts a roof shingle arrangement 11 comprising a plurality of interlocking metal shingles generally referred to by the reference character 12 but individually characterized by the prime markings ', '', ''', and ''''. These shingles are arranged in courses with the shingles of adjacent courses being in interlocking engagement and the adjacent shingles of each course being in interlocking engagement in a manner subsequently described. Each shingle is preferably formed of a single sheet of metal, such as aluminum, in a configuration which simulates a wooden shake shingle such as that known as a Hollywood Shake. More particularly, each shingle 12 includes a generally rectangular body section 13 and various other sections integrally connected along each one of the four edges thereof and folded with respect thereto. Preferably, this body section, or top 13 of a shingle is stamped with irregular corrugations to simulate the upper surface of a wooden shake. To further simulate a wooden shake, the first and second wedge-shaped side walls 14, 16, respectively, are provided at the opposite sides of body section 13 in right angular relation thereto.

The points of the side walls are positioned at the first, or upper, end 17 of the body section, while the large or base end edges of the side walls are positioned at opposite, or lower, end 18 thereof. An end wall section 19 depends generally right-angularly from the end 18 of the body section and extends transversely between the base ends of side walls 14, 16. It will be noted, particularly from FIG. 5, that the ends 21 of the end wall 19 are folded inwardly and tightly around the base ends of the respective wedge-shaped side walls 14 and 16 similar to the folded seam of a tin can. Thus, each of the folded over ends 21 is in tight sealing engagement with its associated side wall end. It has been found that this arrangement provides a tight water seal between the side walls and end wall of the shingle so that water cannot get beneath the shingles through the side wall – end wall joint.

From the above it will be appreciated that the body section 13, side walls 14 and 16, and end wall 19 present exteriorly the appearance of a solid wood shake shingle. Each of the shingles 12 further includes means defining a longitudinal channel along its sides similar to the channel found between wood shingles secured to a roof. More particularly, one side of the shingle 12 (the left side in these Figures) consists entirely of the side wall 16, which terminates at its lower edge in a narrow, flat lip 34 (see particularly the left side of FIG. 1 and the left side of shingle 12'' in FIG. 2). The other side wall 14 defines a part of a U-shaped channel 22 longitudinally of the other side of the shingle. Such channel is further defined by a third wedge-shaped side wall 23 which is in spaced parallel relation to side wall 14 and interconnected therewith by a right angularly extending web 24 which runs lengthwise of the shingle between opposite ends 17, 18 of the shingle body section 13.

Each of the shingles 12 is provided with cooperable means at its upper and lower ends for interlocking the shingle with similar shingles of adjacent upper and lower courses. More particularly, the upper end 17 of the body section 13 of each shingle is provided with a preferably integral holding flange 26 which extends substantially the whole width of the body section reentrantly upwardly and inwardly from the end 17. Such holding flange is closely spaced to and conforms to the upper surface of the body section therebeneath to define with such body section a slot 27 (see particularly FIGS. 3 and 5). The lower end of the body section 13 of each shingle is provided with means for engagement within the slot 27 of a shingle or shingles on an adjacent lower course to provide the desired interlocking. That is, a tongue 28 extends inwardly from the lower end edge of the end wall 19 substantially perpendicular thereto. As best illustrated in FIG. 6, such tongue 28 extends for substantially the full width of the body section and, as shown in FIG. 5, is receivable within a slot 27 defined by the shingles of a lower adjacent course.

As mentioned previously, the cooperable means of interlocking shingles of adjacent courses together is designed to permit the shingles of the adjacent courses to be interlocked without regard to the particular location of the shingles to one another. That is, the shingles of an upper course may be secured over the joint of two shingles of a lower course such as is illustrated in FIG. 1, as well as in alignment with one of the lower shingles. The particular configuration of the holding flange 26 at the upper ends of the shingles is primarily responsible for this ability. More particularly, as is best illustrated in FIGS. 3 and 5, flange 26 conforms for its full length fairly closely to the configuration of the body section therebeneath. In this connection, the uppermost portion of the body section adjacent its upper end is flat (as indicated by the reference character 29, FIGS. 5 and 6) for substantially the full width of the body section and is connected to the remainder of the body section 13 by an upwardly inclined portion 30. The holding flange also includes a flat portion overlying the flat portion of the body section and a section inclined upwardly with the inclined portion of the body section. At the free end of the holding flange, it extends upwardly away from the body section to provide a mouth for the reception of the tongue of the upwardly adjacent shingle. Thus, neither the holding flange nor the body section therebeneath has any structure which would prevent the tongue of an upwardly adjacent shingle from being inserted within the slot 27 any place along its length, even across the joint between two shingles.

As is illustrated in FIGS. 5 and 7, the flat upper edge portion of the body section has another advantage. It provides beneath the shingle a flat surface 29 for engagement with the flat surface of a roof sheathing or the like to which the shingle is to be secured. This mating engagement of the two surfaces assures that when the shingle is secured to the roof sheathing its upper end will be rigidly secured thereto for its full width without bending. To enable securance of the shingles to the roof sheathing, the flat portion of the upper end of the body section 29 and the holding flange 26 are provided with transversely spaced sets 31 of registering holes or apertures for the reception of headed fasteners, such as the nail 32, to secure the shingle upper ends to the sheathing. As is best illustrated in FIG. 3, each set of the holes 31 is provided with an annular raised ridge 33 circumscribing the same on the upper surface of the holding flange 26. This raised ridge sealingly engages the head of a fastener 32 passing through its associated hole set 31 to provide a seal between such fastener and the hole. The raised ridges 33 are preferably provided by forming the registering sets 31 of holes by punching the same from the bottom of the shingle on a punch press which will result in the area around the hole on the upper side of the shingle having the ridge.

It should be noted that in installing a plurality of the shingles of the invention on a roof, the shingles are secured to the roof in courses with the lowermost course being the first secured to the roof, the next higher course being the second, and so on. When a shingle is being secured to a shingle of the next lower course, the tongue 28 of the former shingle is inserted into the slot 27 at the upper end of the lower shingle. Most desirably, the tongue 28 of each shingle is angled downward at an obtuse angle with respect to its associated end wall 19 and at an angle with respect thereto greater than the angle of the slot 27

thereto when the shingles are secured to the roof. The result is that upon the tongue initially being engaged within the slot **27** of a lower shingle secured to the roof sheathing, the upper shingle will angle upwardly from its lower end away from the roof sheathing and its upper end must be forced down to permit the same to be nailed to the sheathing. Thus, the shingle is placed in tension at the time it is secured to the roof. It has been found that such tension at the joints between the shingles of two adjacent courses provides an enhanced securance of the shingles together and assures that wind or the like will not be able to break the connection between such shingles.

As a particularly salient feature of the invention, the interlocking structure between adjacent shingles in the same course is designed to permit lateral shifting of the shingles relative to one another and yet provide the weatherproof seal that is necessary in the joint between such shingles. As is illustrated in FIG. **2**, adjacent shingles in the same course are interlocked along their entire length by the wedge-shaped side wall **16** of one shingle being received within the U-shaped channel **22** of its adjacent shingle with the side wall **16** encompassing the side wall **23** of its adjacent shingle. As will be described below, the holding flanges of the adjacent shingles are meshed in a manner which will permit the shingles to be laterally adjusted relative to one another between the illustrated solid line and dotted line positions of the shingle **12'** relative to the shingle **12''** (FIG. **2**). It is especially important to note that a lip **34** extends laterally outward from the lower longitudinal edge of the side wall **16** of each shingle for substantially its full length and that this lip has a width substantially less than that of web **24**. This lip engages the web **24** of the adjacent shingle in a mating relationship as shown. It has been found that this mating relationship between the shingle and the web assures that a watertight seal is provided between the shingles, irrespective of the lateral location of the side wall **16** within the channel **24**.

The structure for interlocking the upper end of each shingle with the lower end of a shingle of an adjacent upper course is made meshable with the corresponding interlocking structure on the upper end of the laterally adjacent shingles of the same course so that the lateral adjustability discussed above is possible. More particularly, as is best illustrated in FIG. **4**, the holding flange **26** of each shingle includes a hooded end portion **36** extending laterally over the upper end of the channel **22**. The corner portion **36** is upwardly and laterally offset with respect to the channel section to form with the channel upper end a socket **37** adapted to receive a locking tab **38** of an adjacent shingle.

The locking tab **38** of each shingle is formed by the upper end corner of the body section opposite to the portion **36** being upwardly and laterally offset relative to the flat upper end portion of the shingle and terminating in the downwardly extending locking tab **38**, which is the upper end of the side wall **16** and lip **34**. As illustrated, such locking tab is engageable within the socket **37** in overlapping relationship to the upper end of the channel side wall **23** of the adjacent shingle. Because of the socket formed by the upwardly extending holding flange portion **36** and the channel **22** therebeneath, the locking tab **38** is laterally movable within such socket between the location shown in solid lines and that indicated by dotted lines, thereby permitting lateral adjustment of one shingle relative to another for the full length of such shingles. This socket construction not only permits lateral movement of one shingle **12** with respect to the laterally adjacent one, but it also permits skewing or angling of one shingle **12** with respect to its laterally adjacent neighbor. It is well-known that in building construction there are many minor irregularities in a roof base, and to compensate for such irregularities, it is desirable to twist, or skew, one shingle **12** slightly with respect to the one immediately adjacent thereto. The fact that the locking lip **34** at the bottom edge of the side wall **16** is much narrower than the web **24** which forms the base of channel **22**, and the fact that the socket **37** also permits lateral adjustment of the top corner of a shingle, automatically provides the necessary lateral adjustment of two adjacent shingles, both spatially and angularly.

It should be noted that the meshing structure just described is located closer to the upper end **17** of the body section that the depth to which the tongue **28** of an upper adjacent shingle is to extend within the slot **27**. Thus, such meshing structure does not interfere with the securance of an upper adjacent shingle over a joint of two shingles in the same course. From FIG. **6** it will be noted that the side edges of the tongue **28** of each shingle terminate at locations adjacent the side walls **14** and **16** and such tongue does not extend beneath the U-shaped channel so that it will not interfere with the tongues of the laterally adjacent shingles when they are shifted laterally with respect to the shingle of which the tongue is a part.

The lateral shiftability of the location of two adjacent shingles in the same course permits the length of the course to be readily adjusted to the dimensions of a roof so that overlap of the roof edge can be prevented. Moreover, it permits the visible width of the channels between various shingles to be varied or staggered to provide an irregular shingle arrangement more closely resembling the shingle arrangement obtained with conventional wood shakes.

As has been explained before, when shingles of the invention are to be secured onto a roof sheathing, the lowermost course of the shingles is the first one secured to the sheathing. Means must be provided for securing the lower ends of the lower course shingles to such sheathing. FIGS. **8** and **9** illustrate an improved starter strip, generally referred to by the reference numeral **41**, for this purpose. Starter strip **41** is in the form of an elongated strip of metal, such as aluminum, which is bent longitudinally thereof to provide means for sealing the same to the roof sheathing and means for securing the lower end of the shingles. More particularly, strip **41** includes a lip **42** which depends downwardly and inwardly from a longitudinally extending main or flat section **43** adapted for mating engagement with the upper surface of the roof sheathing. A holding flange **44** at the upper end of section **43** extends reentrantly upwardly and inwardly thereof over such section to define a slot **45** for the tongues **28** of the lowermost course shingles. As is illustrated, registering sets of holes **46** are transversely spaced longitudinally along strip **41** and extend through both holding flange **44** and main section **43** for the passage of nails or the like to secure such holding strip to a roof sheathing. When the strip is so secured to a roof sheathing, it is forced upwardly relative to the edge of the sheathing to cause lip **42** to tightly engage the sheathing edge, and it has been found that such lip will then provide a good watertight seal between such sheathing and the starting strip. Thereafter, the tongues **28** of the lower course shingles are inserted within the slot **45** to thereby secure the same to the roof edge. It will be appreciated that the engagement of the tongue within the slot **45** will prevent leakage of water or the like between the shingle and such strip, thereby assuring a watertight seal between the shingle and the sheathing.

Many roof surfaces are formed with an intersection of two planar surfaces. When an exterior angle is formed by the intersection of the two roof surfaces, it is known as a "hip" roof; and when an interior angle is formed by the two intersecting surfaces, it is known as a "valley." Special shingles are required to accommodate hips and valleys, as one end of each shingle therefor must be much wider than the other end thereof. Specifically, a shingle for a hip roof is wider at the bottom than at the top, and for a valley it is wider at the top than the bottom. Accordingly, while the shingles **12** heretofore described are substantially rectangular, those adapted for use on hips and in valleys have somewhat the appearance of a truncated right triangle, and along their outer sides are respectively adapted to cooperate with the laterally adjacent shingles **12** in the same course along their angled sides, the hip and valley shingles cooperate with one another, and it is believed apparent that such shingles must be manufactured and sold in pairs, i.e., a left-hand and right-hand shingle, in order to cooperate with each other. Further, the outer side of the right-

hand shingle is formed with a channel corresponding to the channel 22 of the rectangular shingle 12 and the outer side of the left-hand shingle is formed with a lip corresponding to the lip 34 of the shingles 12.

It is evident that as the slope of the roof surfaces change, the angle at which the cooperative edges of a pair of hip or a pair of valley shingles engage must also change. However, we have found that by using the construction hereinafter described, it is possible to standardize the shingle pairs so as to afford sufficient lateral and angular adjustment to accommodate a number of different slopes. As an example, such shingle pairs can satisfy the requirements of roofs varying from slopes with a rise in 3 inches per foot of run to a rise of 8 inches per foot of run, or from a rise of one in four, which is a gently sloping roof, to a rise of two in three, which is very steep.

A pair of shingles 60, 61 for a hip roof is shown in FIGS. 10 and 11, and such shingles are adapted to cooperate with each other along their inner adjacent edges and along their respective outer edges with the shingles 12 shown in FIGS. 1 through 9 which are intended for generally planar runs or courses. The shingle 61 has a channel or gutter 62 formed along the right side edge 64 thereof which is essentially the same as the gutter 22 of the rectangular shingles 12. Similarly, the left edge 66 of the left-hand shingle 60 is formed with a lip 65 adapted to lie within the channel 22 of the laterally adjacent shingle 12 and is essentially the same as the wall and lip 16, 34 thereof. Also, the tops 67 of the shingles 60 and 61, the lower end walls 68 and 69 thereof, the side wall 64 of the channel 62 are substantially the same as described in connection with the rectangular shingle 12 shown in FIGS. 1 to 9, inclusive. The upper end 67 of each of the shingles 60, 61 is provided with an integral holding flange 70 formed in the same manner as previously described although the flange on the shingle 60 may be slightly longer adjacent its channel or gutter 77 to be described subsequently. The upper ends 67 are also provided with nail holes 71 so that the shingles can be securely attached to the roof structure. It is believed clear to those skilled in the art that the base or lower end walls 69 are provided with an interlocking flange or tongue corresponding to the tongue 28 previously described, although such tongue is not shown in FIGS. 10 and 11. It will be appreciated, that the shingles 60, 61 are generally the same as the shingles 12 described in connection with FIGS. 1 through 9, including stamped upper surfaces 63 to simulate the top of a wooden shingle, but their adjacent inner walls 75, 76 are not respectively parallel to their other sides 66, 64. As previously indicated, the interior walls 75, 76 are respectively cut at an angle relative to the outer walls 64, 66 such that the top 67 of each hip shingle is considerably narrower than the associated lower end walls 68, 69 thereof.

In order to provide for the lateral adjustment and change in angular relationship between the two hip shingles 60 and 61, the wall 75 is equipped with a channel or gutter 77 defined by a lip 78 extending laterally from the wall 75 at the bottom thereof and a wall 79 extending upwardly from the lip in spaced relation with the wall 75. The walls 75 and 79 diverge rearwardly toward the end 67 so that the gutter 77 is wider at the rear of the shingle 60 than at the forward end thereof, as shown best in FIG. 12. Also, the walls 75 and 79 are angularly disposed relative to the plane of the top wall section 63 and diverge upwardly from the web 78. The wall 76 of the shingle 61 is also angularly disposed relative to the top wall section 63, and initially inclines outwardly and downwardly therefrom at its lower edge is equipped with a lip 80 which tapers from front to rear so as to be substantially wider at the front of the shingle.

The pair of shingles 90, 91 for forming a valley between two intersecting roof surfaces are shown in FIGS. 13 and 14. One of the shingles (91 in this instance) is formed with a gutter 92 on the same side as the gutters formed on the rectangular shingles 12 (for purposes of illustration the gutter 22 is shown on the right side of shingles 12, although it is apparent that the gutter 22 and lip 34 could be reversed). The opposite wall of the other shingle (90 in this instance) is provided with a lip 95 adapted to lie in the gutter 22 of an adjacent shingle 12 (not shown in these figures). These shingles, as are all of those described in this application, are wedge-shaped, being thin at the top 97 and thick at the bottom 98. Necessarily, therefore, these shingles 90, 91 have wedge shaped side walls 94, 96 which correspond to sides 14, 16 of the rectangular shingles shown in FIGS. 1 to 9, inclusive.

Plate surface 93 is stamped to simulate the top of the wooden shingle, or shake, and has a bottom wall 99 corresponding to the bottom wall 19 of the rectangular shingles. The bottom wall 99 is provided with a forwardly and downwardly extending tongue 107 which corresponds to the tongue 28 of the rectangular shingle, which is shown in FIG. 5. The upper end of the shingle 97 is formed with an integral holding flange 100, which is similar in construction to the flange 26 shown in the figures illustrating the rectangular shingles. This flange and the plate 93 immediately therebelow are provided with a plurality of nail holes 101 so that the shingles can be rigidly attached to the roof deck 102. The shingles for construction of a roof valley are similar to those shown and described for forming a hip in that the adjacent walls 103 and 104 are angularly disposed, but are provided with lips 105, 106, respectively, and the base ends 98 are narrower than the upper ends 97 which is the reverse of that for the formation of a hip, as is shown by comparing FIGS. 10 and 12.

Each of the adjacent walls 103, 104 is formed with a lip, 105 and 106, which will lie in a separate gutter formed by a gutter strip 109 of any suitable material, such as a heavy roofing composition or a bendable metal strip. The use of the abutting lips 105, 106 permits angular adjustment between the valley shingles 90, 91 as is necessary to accommodate the angular differences occasioned by pitch variations in different roofs or different sections of the same roof. The same pitch variations can be handled as indicated for the previously described hip shingles 60 and 61. Since the shingles are formed of bendable metal, the lips 105 and 106 can be bent to conform to the valley shape. By adjusting the angles between the shingle walls 103, 104, a wide range of valley angles can be accommodated by using the standard adjustable shingles described.

It is believed obvious from the foregoing description that the shingles 60, 61 used for forming hips and the shingles 90, 91 used for forming valleys are essentially those of the rectangular form shown in FIGS. 1 to 9, inclusive. They differ from the regular shingle in that both are shaped as truncated triangles — the hip shingles 60, 61 having their base corresponding to the bottom wall 69 and the truncated top at the upper end 67, while the valley shingles 90, 91 have their broadest portion (the base of the triangle) at the top 97 and the truncated narrowest portion at the lower end 98. It is evident that these shingles must be formed in pairs comprising left-hand and ring-hand shingles. Thus, for both hips and valleys, there is a right-hand and a left-hand shingle necessary to form the paired construction desired.

The spacing between the shingles 90 and 91 along the adjacent edges thereof may be varied to suit the requirements of any particular roof installation, and by way of example, the spacing is often of the order of 4 inches. Since the shingles 90 and 91 are unconnected to each other, they can be canted or angularly disposed as necessary so long as the gutter strip 109 continues to underlie the same. It should be noted that the necessity for relative angular adjustment between the shingles particularly at a hip and at a valley is that the base ends of these hip and valley shingles should define an angle very close to 90° so that the courses of shingles respectively comprising the same lie along straight lines on the associated roof sections and align properly with the other courses and not have some unacceptable angular inclination which would make the courses run along a skew line. It will be appreciated that as the pitch of a roof changes, the relative orientation of the hip-forming shingles 60 and 61 and valley-forming shingles 90 and 91 must be changed in order to effect the close approximation to 90° required by the intersection of the lower base walls 68 and 69 in the case of the shingles 60 and 61 and by the base walls 99 in the case of the valley forming shingles 90 and 91.

It will be noted in FIGS. **10** and **13** that the base walls of the hip- and valley-forming shingles have tabs that bend around the respectively associated longitudinal side walls so as to interconnect the same. This is essentially the same as in the case of the shingles **12** of rectangular configuration in which the tabs interconnecting the longitudinal side walls and base wall of each shingle are provided by the base walls and are bent into continguous relation with the side walls. It is evident that the tabs can be provided either on the base or side walls, or these coactive wall elements could be interconnected in some appropriate alternative to effect the desired mechanical interlock and weather seal therebetween.

From all of the foregoing, it will be appreciated that all forms of the shingles provide relative adjustment therebetween, and ordinarily the lateral bodily displacement indicated in FIG. **2** is sufficient to enable standardized shingles **12** to be adjusted sufficiently to accommodate the requirements of flat roofs. However, any two cooperative shingles can be angularly adjusted or canted relative to each other, as indicated best in FIG. **10**, which is especially advantageous as concerns the paired hip and paired valley shingles **60**, **61** and **90**, **91**, respectively, in order to enable standardized shingle pairs to be adjusted sufficiently to accommodate the angular variation at a roof hip or valley caused by changes in the pitch of the roof. The tapering channel **77** which widens rearwardly and tapering lip **80** which narrows rearwardly enhance the angular accommodation afforded by the cooperative hip shingles.

What is claimed is:

1. A metal shingle comprising a body section defining a top wall, first and second wedge-shaped side walls extending downwardly from said top wall along opposite sides thereof with the smaller narrow ends of said side walls being adjacent an upper first end of said body section and with the larger base ends of said side walls being adjacent a lower second end of said body section, an end wall section depending from said top wall adjacent the lower end of said body section and extending transversely between said side walls to simulate therewith and with said top wall a wedge-shaped shingle having a thick lower end and thin upper end, said side walls being respectively provided with cooperable structure extending essentially from one end to the other of said body and enabling one of the side walls of said shingle to be disposed in association with the opposite side wall of a similar shingle laterally adjacent thereto in the same course so as to form a joint therebetween enabling any two such similar laterally adjacent shingles to be shifted relative to each other to orient the same in accordance with the requirements of any particular roof, cooperable means providing elements respectively adjacent the upper end of said body and adjacent the lower edge of said end wall section for interlocking said shingle with similar shingles of adjacent upper and lower courses, respectively, and including adjacent the upper end of said body a holding flange extending over said top wall to define therewith a downwardly opening slot and also including adjacent the lower end of said body a tongue extending upwardly from the lower edge of said end wall section for reception within the slot of a similar shingle disposed in a lower course to interconnect one with the other, said holdingflange element having opposite lateral edge portions respectively overlying said cooperable structure along each side of said shingle and being structurally complementary with respect to each other so that one lateral edge portion of said shingle will cooperatively interengage the opposite lateral edge portion of a similar shingle laterally adjacent thereto in the same course, the elements of said cooperable means at the upper end of said body for interlocking said shingle with similar shingles of an upper adjacent course being meshable with the elements of said cooperable means at the lower end of such similar shingles in the upper adjacent course to enable such interlocked shingles of adjacent courses to be shifted with respect to each other to orient the same in accordance with the requirements of any particular roof.

2. A metal shingle according to claim **1** in which said cooperable structure along one of said side walls comprises a generally U-shaped channel including a third side wall disposed in spaced apart relation with said first side walland a web extending therebetween and interconnecting the same adjacent the lower edges thereof, said body along the underside thereof adjacent said second side wall being substantially free from obstructions to enable said second side wall to be inserted into the channel of a similar laterally adjacent shingle so as to be disposed intermediate the firstand third side walls thereof, said lateral edge portions overlying the respectively associated channel and second side wall.

3. A metal shingle according to claim **1** in which said top wall defined by said body section is generally rectangular and said first and second side walls are substantially parallel.

4. A metal shingle according to claim **1** in which the top wall defined by said body is generally trapezoidal with the thick lower and thin upper ends thereof being substantially parallel, one of said first and second side walls being substantially normal to the lower and upper ends of said shingle and the other such side wall being angularly disposed with respect thereto.

5. A metal shingle according to claim **1** further including a metallic starter strip for securing said shingle onto the lower end of a roof sheathing, said strip including an elongated main section having a holding flange extending reentrantly upward and inward from the upper longitudinal end thereof in closely spaced relationship to said main section to define therewith a downwardly opening slot for receiving the tongue of said shingle, said strip having transversely spaced sets of registering holes through said holding flange thereof and the main section therebeneath rearwardly of the location in said slot for said tongue, and said strip further including a sealing lip depending downwardly and inclined inwardly from the lower end of said main section for butting engagement with the end of said roof sheathing.

6. A metal shingle according to claim **2** wherein one of the lateral edge portions of said holding flange extends laterally over the upper end of said U-shaped channel section and is upwardly and laterally offset with respect thereto to form with said channel upper end a socket for receiving therein a locking tab of an adjacent shingle, and wherein the upper end of said body section adjacent said second side wall and the lateral edge portion of the holding flange thereover are upwardly and laterally offset with said body section corner terminating in a downwardly extending locking tab engageable within a socket of an adjacent similar shingle and laterally adjustable therein for substantially the full width of said socket.

7. A metal shingle according to claim **2** in which said channel is wide relative to the thickness of said second side wall and tapers in width from end to end thereof so that said first and third side walls diverge toward the aforesaid first end of said body section, the aforesaid shiftability of shingles constituting bodily lateral displacements of similar adjacent shingles and also angular displacements thereof so that two such similar laterally adjacent shingles can be canted with respect to each other from end to end thereof.

8. A metal shingle according to claim **10** in which the top wall defined by said body is generally trapezoidal with the thick lower and thin upper ends thereof being substantially parallel, one of said first and second side walls being substantially normal to the lower and upper ends of said shingle and the other such side wall being angularly disposed with respect thereto.

9. A metal shingle according to claim **8** in which said top wall defined by said body has a generally trapezoidal configuration with the thick lower and thin upper ends of said shingle being substantially parallel, and further comprising an elongated gutter adapted to underlie the associated side walls forming a joint between two laterally adjacent trapezoidal shingles at a valley of a roof structure.

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