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LEAK RESISTANT ROOF COVERING AND MULTITAB SHINGLE THEREFOR

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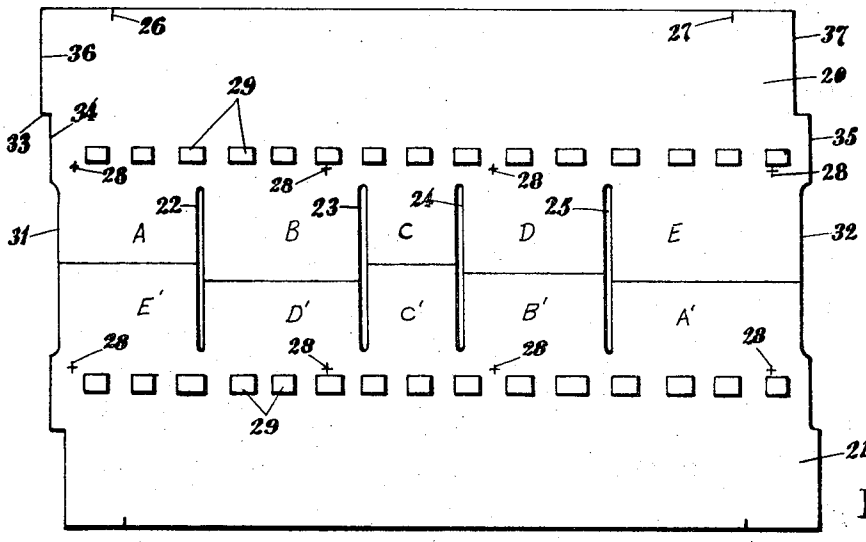

Fig.1

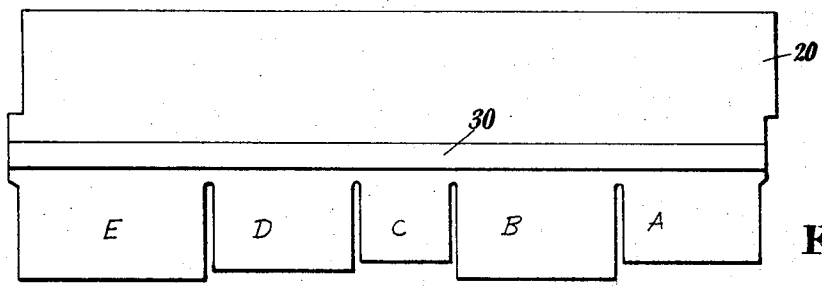

Fig.2

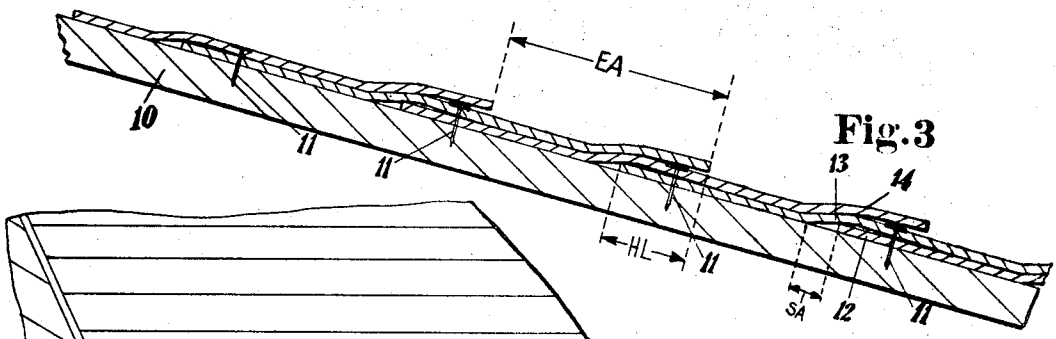

Fig.3

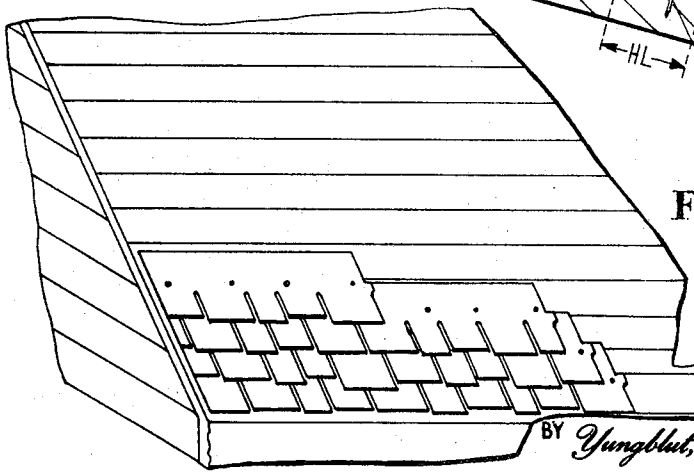

Fig.4

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LEAK RESISTANT ROOF COVERING AND MULTITAB SHINGLE THEREFOR

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ABSTRACT OF THE DISCLOSURE

A granule faced asphalt saturated and coated composition multitab strip shingle wherein the several tabs are of different lengths and of different widths and providing a minimum sidelap of three inches which can be laid at random without exercise of particular skill to provide a roof covering having the tab dividing slots between adjacent courses out of alignment and also providing automatically for water tightness.

This invention relates to a leak resistant roof covering and multitab shingle therefor. More particularly it has to do with the achievement of a granule faced asphalt saturated and coated composition shingle having the random and attractive appearance of a wood shingle when laid on a roof.

Wood shingles on a roof have a delightful random appearance and a lack of regularity which is much sought after, but of course wood shingles have a very poor fire rating. In recent years the granule surfaced asphalt saturated and coated composition shingle has almost entirely replaced the wood shingle because of its superior fire resistance. Because of the methods and machinery used in the manufacture of these composition shingles they are produced in large quantities and all shingles are exactly alike so that when they are laid on the roof the appearance is one of monotonous regularity. Often a unique and attractive house will become less so because of the monotonous appearance of the roof.

Numerous attempts have been made in the past to provide the random effect described above and various patents have been granted on such attempts. Among these may be cited the Miles Patent No. 2,149,741; Beckman Patent No. 1,958,560; and Schuetz et al. Patent No. 2,171,010. So far as is known, none of the shingles according to any of these patents or any other shingle seeking the same effect has even attained commercial success. Such shingles when laid on a roof have not been proof against leakage and the reasons for this have apparently not been understood.

While this invention is applicable to any type of material that is supplied in the form of shingles, it is generally applicable to shingles of granule faced asphalt saturated and coated construction and is especially applicable to the thicker and heavier weight asphalt composition shingles of the type eligible to bear the Underwriters' Laboratories Inc. Class A Fire Resistant label such as those described in U.S. Patent No. 2,326,723.

With the foregoing considerations in mind, it is a principal object of the present invention to provide a shingle which will give to a roof when laid thereon with other like shingles a random appearance similar to that of wood shingles, which can be manufactured on modern roofing machines in high speed production, which can be applied to the roof with the same ease as a conventional

asphalt shingle, and which will avoid the leakage problems described above.

Ancillary to the foregoing object, it is a further object to provide guide means for use in laying the roof such that a roofer can without exercise of any particular skill lay the shingles on a roof in such a manner that there is not only no substantial alignment of any of the tab dividing slots running vertically down the roof but also whereby a watertight roof is automatically achieved.

These and other objects of the invention which will be pointed out in more detail hereinafter or which will become apparent to one skilled in the art upon reading the specification, are accomplished by that certain construction and arrangement of parts of which the following describes certain exemplary embodiments.

Reference is made to the drawing forming a part hereof and in which:

FIG. 1 is a plan view of a typical pair of strip shingles according to the invention, interfitted in the relation in which they are manufactured on the machine.

FIG. 2 is a plan view of one of the shingles of FIG. 1 from the reverse side.

FIG. 3 is a fragmentary cross sectional view through a typical roof deck with shingles applied thereto in overlapping courses, taken on a line normal to the eave; and

FIG. 4 is a fragmentary perspective view showing the manner in which the shingles are laid on a roof deck.

Briefly, in the practice of the invention the shingles will be manufactured in complementary pairs, i.e. "rights" and "lefts" with the two shingles of a pair being mirror images of each other. They will have a number of tabs of different widths and of different lengths, the tabs being of generally rectangular shape, and separated from each other by slots. As will be described in more detail hereinafter, the tab widths are selected in accordance with certain guides in such manner that there is no possibility of coincidence between the slots of any shingle in any one course with the slots of any shingle in any adjacent course either above or below, whereby the establishment of a "repeat" pattern is effectively avoided and so that an adequate sidelap is provided to prevent leakage. The term "sidelap" will be defined more clearly hereinafter.

Over the years the problem of leakage in asphalt composition strip shingles has been the subject of a great deal of research and as a result minimum headlap requirements have been established. A 1941 publication of the National Bureau of Standards "Building Materials and Structures Report BMS 70," gives the following definition of "headlap."

"Headlap, in shingle-type roofs, is usually defined as the distance a shingle in any course overlaps a shingle in the second course below it. A more proper definition of headlap is the distance water must travel upwards from the outside to the inside of a roof (deck surface), assuming there are no breaks in the fabric. This latter definition emphasizes the importance of headlap to the waterproofness of a shingle roof."

Similarly, the A.S.T.M. definition of headlap is as follows:

"The minimum distance, measured at 90 deg. to the eave along the face of a shingle as applied to a roof, from the upper edge of the shingle to the nearest exposed surface (of the deck)."

Standard specifications now in force for asphalt shingles of the A.S.T.M., Underwriters' Laboratories Inc., and Federal Specifications of the U.S. Government all require a minimum headlap of two inches for asphalt shingles.

The conditions which may cause leakage of shingles having insufficient headlap are easily understood. When rainfall is gentle, steady and free from turbulence, leakage usually not occur because the water simply flows down over the surface of the shingle tabs to the eave. However, wind-driven rain projected against the roof surface in the direction from the eave to the ridge will enter the cut-out spaces between the tabs and flow upwardly over the surface of the underlying shingle at the headlap. This is especially true if the tabs are not sealed down, thus they lift in the wind and expose the underlying shingle directly to the upward flow of water. The lower the pitch (slope) of the roof deck, the easier it is for water from wind-driven rain to flow upwardly over the underlying shingle, against the force of gravity, to reach the roof deck and cause a leak.

Another set of conditions which often induces leakage of asphalt shingle roofs occurs in northerly climatic areas where roofs are covered for many months with snow and ice. As the snow melts, with alternate freezing and thawing, there is a tendency to form "ice dams" along the lower tab edges of the shingles, particularly in the lower area of the roof near the eave. These ice dams retard the flow of water toward the eave and often cause it to back up underneath the shingle tabs until it flows over the headlap edge to the underlying roof deck. In such climatic areas it is often necessary to provide special waterproofing of the deck underneath the shingle courses near the eave by applying a waterproofing layer of asphalt-saturated or saturated-and-coated felt to the deck in the eave area, extending upward from the eave for a distance of 18 inches to 24 inches beyond the inner line of the building wall. On low slope roofs (less than 4 inch pitch per horizontal foot) it may be necessary to provide such special waterproofing underlayment over the entire roof deck to prevent leakage.

For the purpose of describing the present invention, when reference is made hereafter in the specification or in the claims to "sidelap," it will be defined as follows.

Sidelap, for multi-tab strip shingles applied in overlapping courses with the ends of the strips in each course contiguous, is the shortest distance that water must travel laterally, parallel to the lower tab edge, from any vertical tab edge, underneath the overlying tabs, to reach a joint or opening in the underlying course of shingles giving access to the roof deck surface.

The foregoing definition is given because the A.S.T.M. does not have an official definition of sidelap. The Underwriters' Laboratories use the term sidelap but use it only in respect to so-called "single coverage" shingles of the "Dutch Lap" or "French Hex Lap" types wherein the shingles in each course actually do overlap. There is no Underwriters' Laboratories requirement for sidelap with respect to Square-Tab Strip or Hexagonal Strip Shingles since these shingles are applied in each course with the edges contiguous rather than overlapped. Since Hex strip shingles are applied on the roof in a predetermined pattern with the tab centered over the joint between shingle strips, a sidelap according to the above definition of about 3 inches is provided. With the Square Tab Strip shingle the tabs are usually at least about 12 inches wide and the shingles are applied on "halves" or "thirds" in succeeding courses. When the shingles are laid on halves, a sidelap of about 6 inches is provided and when laid on thirds the sidelap is about 4 inches. All of these inherent sidelaps are adequate to prevent leakage due to lateral flow of water.

When attention is turned to a shingle of the type herein discussed wherein it is desired to give the random appearance, it has occurred that a slot dividing two tabs on a shingle has been so located that lateral travel of water could readily cause leakage.

A very important factor in lateral leakage on a roof deck is the cant of the deck. A roof deck is said to be canted when the surface has lateral inclination toward one end or the other, i.e. it slopes away from a true horizontal line parallel to the ridge and eaves. This cant may result from natural variation in the dimensions of the lumber used in the construction of roofs or from warpage of deck timbers and roof boards. The materials and workmanship in roof construction simply do not lend themselves to precision control of the deck on which the shingles are to be applied so that most roof decks have some degree of cant in at least a part of the deck and often the entire deck is canted. While the degree of cant may naturally vary, a cant of ⅛ inch or even ¼ inch per horizontal foot is quite common and since this amounts to only about 1% to 2% deviation from the horizontal, it cannot be detected by visual observation.

It has not previously been recognized that the cant of a roof deck is an important factor contributing to the leakage of asphalt shingle roofs. When rainfall flows down the roof over the surface of the shingles from the ridge to the eaves, if the roof deck has a cant the rain will also tend to flow laterally in the direction of the cant. A prevailing wind in the same direction will naturally increase the lateral flow to a great extent. This water can pass through the cut-outs or slots between the shingle tabs and thus have access to the unexposed surface of the shingles in the underlying course. Under the influence of gravity the water flows laterally in the direction of the cant and may ultimately drain out from under the overlying shingle tab; but it may also continue to flow until it reaches the end edge of the underlying shingle, at which point it can of course leak through to the roof deck underneath. Since the end edges of two adjacent strip shingles are contiguous, there is, of course, a slit opening between the end edges, the width of which will depend upon how tightly the shingles are placed together. This end joint opening is not water tight and if water flows into it, the roof will leak at that point.

Another important factor in the leakage resistance and waterproofness in the roof covering of asphalt strip shingles applied in overlap courses is the shingle thickness. Contrary to expectations, the thicker the shingle the greater the tendency toward leakage. The reasons for this may be observed by an examination of FIG. 3, wherein the roof deck is indicated at **10**, the nails by means of which the shingles are fastened are shown at **11**, the most underlying course is shown at **12**, the underlying course at **13**, and the overlying course at **14**. The headlap is indicated at HL, the exposure area is indicated at EA, and a sag area is indicated at SA. From an examination of FIG. 3, it will be seen that even though the deck upon which the shingles are applied is smooth or flat, the shingles themselves do not lie truly flat, particularly in the upper portion or unexposed area. The upper portion of the shingle is considerably deformed above the line of the top edge of the most underlying shingle. It must be remembered that asphalt shingles are thermoplastic and after they have been in place on the roof, the heat from the sun softens them and in the areas that are not supported they will sag, as indicated at SA. The sag tends to make the water flow laterally also and of course since the thicker the shingles are the greater the amount of sag, the more vulnerable the thicker shingles are to leakage. It may also be pointed out that the vulnerability of the roof to leakage is greater on roofs having low slopes than it is on roofs having steep slopes. The problem of leakage is thus compounded because the current trend in the roofing industry is toward heavier weight shingles of increased thickness and the current architectural trend is to low slope roofs and both of these trends make the leakage problem more severe.

In order to avoid lateral leakage, a sidelap of at least 3 inches is necessary. This has now been determined experimentally and it is therefore necessary to bear the sidelap requirement in mind in the design of the random shingles of the present invention.

Referring now to FIG. 1, a strip of suitable material

may be cut on a machine to provide a pair of complementary shingles **20** and **21**. These shingles come from a strip which is cut to provide two lanes which are complementary to each other. It will of course be understood that in larger machines four lanes may constitute the width of the strip. If the shingle **20** be referred to as a "right," the shingle **21** will be referred to as a "left." A series of slots **22**, **23**, **24**, **25** divide the exposure portions of both shingles into a series of tabs which have been designated as A, B, C, D, E (for the shingle **20**) and A', B', C', D', and E' (for the shingle **21**). It will be observed that the cuts dividing the tabs A from E', B from D', C from C', D from B', and E from A' are parallel, and are variously located so that adjacent tabs in each shingle will be of different lengths and that adjacent tabs in both shingles are of different widths, but when placed butt to butt, as seen in FIG. 1, the butt edges interfit, with the slots aligned. In FIG. 1, the lay marks are indicated at **26** and **27** and the nail marks are indicated at **28**. Gobs of adhesive may be provided at **29** to make the shingles self-sealing. In order to prevent sticking in the package, the reverse side of each shingle as shown in FIG. 2 is provided with a tape **30** of material incompatible with the adhesive gobs 29 so as to prevent sticking. The indentations at **31** and **32** when two shingles are contiguous endwise will provide a slot of the same width as the slots **22–25** and an aligning offset may be provided at **33** as is common. In the drawing the numerals **34** and **35** designate the basic end edges of the shingle.

In determining the parameters for the shingles, it is first necessary to select the sidelap dimension and this must be a minimum of 3 inches. To insure that there will be a minimum of 3 inch sidelap, the narrowest end tab at either end of a shingle must be at least twice as wide as the desired sidelap and consideration must also be given to the offset, if any. Thus, taking the minimum sidelap as 3 inches, if an offset of ⅜ inch is desired, this must be added. Thus, it is necessary to add 3 inches plus 3 inches plus ⅜ inch, giving 6⅜ inches. This is the narrowest end tab that can be used with the ⅜ inch offset and which will insure a minimum sidelap of 3 inches. The end shingle tab will be positioned over the joint of the underlying shingles so that the center of the tab will be in alignment with the center of the ⅜ inch offset. The positioning of the tab is controlled by the laying marks **26** and **27** shown on FIG. 1. In this particular example the laying mark **26** would be positioned 3⅜ inches from the vertical edge **36** and the laying mark **27** would be positioned 3 inches from the vertical edge **37**. The position of the laying marks **26** and **27** is dependent on the sidelap and offset.

In the actual shingle shown in FIG. 1, there is provided a tab A that is 6¾ inches wide. When the tab is centered over the ⅜ inch offset **33**, a sidelap of 3⅜ inches is obtained. In this example the laying mark **26** is positioned 3⅜ inches from the vertical edge **36** and the laying mark **27** is positioned 3⅜ inches from the vertical edge **37**. The width of the tab A is equal to the sidelap of 3⅜ inches plus 3⅜ inches plus the offset of ⅜ inch—a total of 6¾ inches.

Thereafter, the widths of the remaining tabs in the shingle are selected in such manner that the respective distances from the edge of that shingle to the near edges of each of the slots differ from the respective distances (plus or minus the sum of the sidelap in each case plus one-half the offset, if any) from the corresponding edge of a complementary shingle to the near edges of the several slots in said complementary shingle and further so that no tab has a width the same as the selected sidelap.

Stating the above proposition in other words, if a pair of shingles are provided having n tabs each, the sidelap is selected as X, the slot width is 2Y, the offset is Z and the sum of the sidelap (X) plus one-half of the offset ($Z/2$) is W, and the tab widths of the "right" shingle are A, B - - - N and the tab widths of the "left" shingle taken in the same sense are A',B' - - - N' and wherein $A=N'=2X+Z$, each of the dimensions $A+Y$,

$$A+Y+2Y+B$$

$A+Y+2Y+B+---2Y+N$ must differ from all of the dimensions $A'+Y+W$, $A'+Y+2Y+B'\pm W$,

$$A'+Y+2Y+B'+---2Y+N'\pm W$$

and each of the dimensions $A'+Y$, $A'+Y+2Y+B'$, $A'+Y+2Y+B'+---2Y+N'$ may differ from all of the dimensions $A+Y\pm W$, $A+Y+2Y+B\pm W$,

$$A+Y+2Y+B+---2Y+N\pm W$$

As pointed out above of course all tabs should have widths differing from W. If these conditions are satisfied, a series of "right" and "left" shingles will be provided which may be laid randomly on a roof deck and which will in every case provide a minimum sidelap of 3 inches as above defined, and the slots on adjacent courses will be out of alignment. By random laying it is meant that "rights" and "lefts" may be intermingled randomly in each course, or successive courses may have only "rights" or only "lefts"; and in no case will an obvious repeat pattern be created. The intended results are achieved even if the entire deck is laid with all "rights" or with all "lefts."

Exmplary of a shingle or pair of shingles fulfilling the requirements of the invention is a nominal 12" x 36" strip shingle having five tabs as illustrated in FIG. 1. The offset which has been identified as Z is ⅜ inch, the slot width is ⅝ inch, and the tabs have the following widths: $A=6⅞$ inch, $B=8⅞$ inch, $C=4⅛$ inch, $D=6⅛$ inch, $E=8⅝$ inch. Of course the tabs of the complementary shingle will have the same widths but in the order E', D', C', B', A'. Below the above outlined considerations are displayed in tabular form.

	I	II	III	IV	V	VI
"Right"	6⅞	A	6⅞+⅛	6⅞	10⅜	3⅛
	8⅞	B	6⅞+⅜+8⅞	15⅜	18⅝	12
	4⅛	C	15⅜+⅜+4⅛	20⅛	23⅛	16⅝
	6⅛	D	20⅛+⅜+6⅛	26⅞	30⅜	23⅛
	8⅝	E	26⅞+⅜+8⅝	35⅞	39⅜	32⅛
"Left"	8⅝	A'	8⅝+⅛	8⅞	12⅜	5⅛
	6⅛	B'	8⅞+⅜+6⅛	15¼	19	12⅛
	4⅛	C'	15⅝+⅜+4⅛	20⅜	23⅝	17
	8⅜	D'	20⅜+⅜+8⅜	28⅞	32⅜	25⅛
	6⅝	E'	28⅞+⅜+6⅝	35⅞	39⅜	32⅛

In the above table, column I gives the tab widths; column II identifies the tabs as shown in FIG. 1. In column III the slot widths and the widths of the next tab have been added. Column IV therefore shows the distances from the left edge of the shingle to the near edge of each of the slots. In column V the sidelap of 3⅜ inches plus one-half of the width of the ⅜ inch offset, i.e. 3/16 inch (W) has been added to each of the distances in column IV, and in column VI the sidelap plus offset (W) has been subtracted from each of the distances in column IV. To determine that the shingle satisfies the requirements, the figures in column IV of the "right" shingle must not be identical with any of the figures in column V or VI of the "left" shingle. Similarly, the figures in column IV for the "left" shingle must not be the same as any of the figures in column V or VI of the "right" shingle. For the shingle above displayed, the nail marks will be located at distances of 1 inch, 14 inches, 22 inches, and 35 inches from the left edge of the shingles and the lay marks will be located at 3⅝ inches from the left edge of the shingles and at 3¼ inches from the right edge of the shingles.

Beyond this, it is important that the nail positions be carefully selected such that no nail will be exposed in the slots of an overlying shingle. The nail locations should be positioned on the shingles so that a space of at least 1 inch exists between the nail and any slot on the overlying shingle when the shingles have been applied to the roof. This requirement can be achieved by plotting linearly the distances from the left edge of the shingle to the near edge of each of the slots, and also these same

distances plus and minus the sidelap plus one-half of the width of the offset (W). For the preferred shingle the plotting of the values of columns IV, V, and VI for both the "Right" and "Left" shingles will result in the nails being located at approximately 1 inch, 14 inches, 22 inches, and 35 inches when measured from edge **34** of FIG. 1 for shingle **20**.

It will be understood that the specific shingle dimensions outlined above are exemplary only and that many combinations of tab widths may be selected within the guides outlined above so as to satisfy the requirements of a leakproof random tab roof. Accordingly, numerous modifications may be made without departing from the spirit of the invention and no limitation not specifically set forth is intended.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A pair of strip shingles adapted to be laid on a roof with other like strip shingles to give the appearance of random width wood shingles, and to provide a sidelap of at least three inches to prevent leakage resulting from canting of the roof deck, sagging of the shingles in the unexposed areas when applied, wind effects and ice dams, said shingles having upper edges, unexposed areas, exposure areas, and butt edges, the said shingles having, in said exposure areas, a number of slots of equal width separating a number of tabs, said tabs being of different widths and of different lengths, the shingles of said pair being complementary, such that if said two shingles are placed butt to butt, the said butt edges will interfit, the upper edges thereof will be parallel, and the respective slots will be aligned, the shingles of such a pair constituting a "right" and a "left"; the narrowest endmost tabs of said shingles having a width of at least twice said sidelap, the width of the remaining tabs being such that the respective distances from the edge of a "right" shingle of said pair to the near edges of the respective slots in said "right" shingle differ from the respective distances, plus the sidelap, and also differ from said respective distances minus the sidelap, from the corresponding edge of a "left" shingle to the near edges of the several slots in the "left" shingle, and each tab has a width different from said sidelap.

2. A pair of strip shingles according to claim **1** having n tabs each, wherein the sidelap equals X, the slot width equals 2Y, and wherein the tab widths of the "right" shingle are A, B - - - N, and the tab widths of the "left" shingle, taken in the same sense, are A', B' - - - N', and wherein $A=N'=2X$, and wherein each of the dimensions $A+Y$, $A+Y+2Y+B$, $A+Y+2Y+B+$ - - - $2Y+N$, differs from all of the dimensions $A'+Y\pm X$,

$$A'+Y+2Y+B'\pm X$$

$A'+Y+2Y+B'+$ - - - $2Y+N'\pm X$ and each of the dimensions $A'+Y$, $A'+Y+2Y+B'$,

$$A'+Y+2Y+B'+ \text{ - - - } 2Y+N'$$

differs from all of the dimensions $A+Y\pm X$,

$$A+Y+2Y+B\pm X$$

$A+Y+2Y+B+$ - - - $2Y+N\pm X$, and each tab has a width different from X.

3. A pair of strip shingles according to claim **2**, having nailing markers located at distances from the edge of the shingle which differ by at least one inch, from any of $A+Y$, $A+Y+2Y+B$, $A+Y+2Y+B+$ - - - $2Y+N$, $A'+Y$, $A'+Y+2Y+B'$, $A'+Y+2Y+B'+$ - - - $2Y+N'$.

4. A pair of strip shingles according to claim **1**, said shingles having an offset, and wherein the narrowest endmost tabs of said shingles have a width at least twice said sidelap plus said offset, the width of the remaining tabs being such that the respective distances from the edge of a "right" shingle of said pair to the near edges of the respective slots in said "right" shingle differ from the respective distances plus the sum of the sidelap plus one-half said offset, and also differ from said respective distances minus the sidelap plus one-half the offset, from the corresponding edge of a "left" shingle to the near edges of the several slots in the "left" shingle, and each tab has a width different from the said sidelap plus one-half the offset.

5. A pair of strip shingles according to claim **4**, having n tabs each, wherein the sidelap=X, the slot width=$2Y$, the offset=Z, and wherein W=the sidelap plus one-half the offset ($=X+Z/2$), and wherein the tab widths of the "right" shingle are A, B, - - - N, and the tab widths of the "left" shingle, taken in the same sense, are A', B' - - - N', and wherein $A=N'=2X+Z$, and wherein each of the dimensions $A+Y$, $A+Y+2Y+B$,

$$A+Y+2Y+B+ \text{ - - - } 2Y+N$$

differs from all of the dimensions $A'+Y+W$,

$$A'+Y+2Y+B'\pm W$$

$$A'+Y+2Y+B'+ \text{ - - - } 2Y+N'\pm W$$

and each of the dimensions $A'+Y$, $A'+Y+2Y+B'$, $A'+Y+2Y+B'+$ - - - $2Y+N'$ differs from all of the dimensions $A+Y\pm W$, $A+Y+2Y+B\pm W$,

$$A+Y+2Y+B+ \text{ - - - } 2Y+N\pm W$$

and each tab has a width different from W.

6. A pair of strip shingles according to claim **5**, wherein $X=3\frac{3}{16}$ inches, $Y=\frac{1}{8}$ inch, $Z=\frac{3}{8}$ inch, and $n=5$.

7. A pair of strip shingles according to claim **6**, having nailing markers located at distances which differ by at least 1 inch, from any of $A+Y$, $A+Y+2Y+B$,

$$A+Y+2Y+B+ \text{ - - - } 2Y+N$$

$A'+Y$, $A'+Y+2Y+B'$, $A'+Y+2Y+B'+$ - - - $2Y+N'$.

8. A strip shingle according to claim **4**, having five tabs and having a nominal size of 12 in. x 36 in., said shingle having tab widths (from left to right) of about 8¾ inch, 6½ inch, 4½ inch, 8¼ inch, and 6¾ inch, said shingle having ¼ inch slots and a ⅜ inch offset.

9. A strip shingle according to claim **4**, having five tabs and having a nominal size of 12 in. x 36 in., said shingle having tab widths (from left to right) of about 6¾ inches, 8¼inches, 4½ inches, 6½ inches and 8¾ inches, said shingle having ¼ inch slots and a ⅜ inch offset.

10. A roof covering composed of a plurality of strip shingles in double coverage arrangement, said shingles having upper edges, unexposed areas, exposure areas, and butt edges, the said shingles having, in said exposure areas, a number of slots of equal width separating a number of tabs, said tabs being of different widths and of different lengths, said shingles occurring as "rights" and "lefts," wherein a "right" and a "left" are complementary, such that if said "right" and "left" are placed butt to butt, the said butt edges will interfit, the upper edges thereof will be parallel, and the respective slots will be aligned, said shingles capable of being randomly laid as to "rights" and "lefts," the location of said slots being such that when the shingles of one course are laid in contiguous relation, the end edges of the shingles in said course will be laterally spaced from any slot in an underlying course to provide a sidelap of at least three inches to prevent leakage resulting from canting of the roof deck, sagging of the shingles in the unexposed areas, wind effects and ice dams, and so that all the slots in all the shingles of any one course are out of alignment with all the slots in all the shingles in the next upper and next lower courses.

11. A roof covering according to claim **10**, wherein said sidelap is $3\frac{3}{16}$ inches, wherein said shingles have 5 tabs and the slots between said tabs are ¼ inch wide and said shingles have an offset of ⅜ inch.

12. A roof covering according to claim **11**, wherein said shingles are nominally 12 in. x 36 in. and wherein one of said shingles has tab widths (from left to right) of about 8¾ inch, 6½ inch, 4½ inch, 8¼ inch and 6¾ inch.

13. A roof covering according to claim **11**, wherein said shingles are nominally 12 in. x 36 in. in size and wherein one of said shingles has tab widths (from left to right) of about 6¾ inch, 8¼ inch, 4½ inch, 6½ inch and 8¾ inch.

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