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SELF-SEALING SHINGLES

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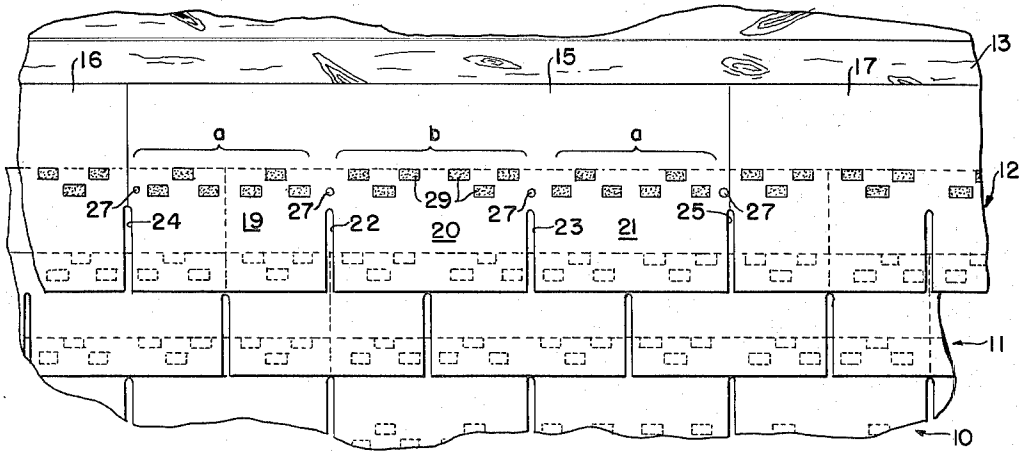

FIG. 1

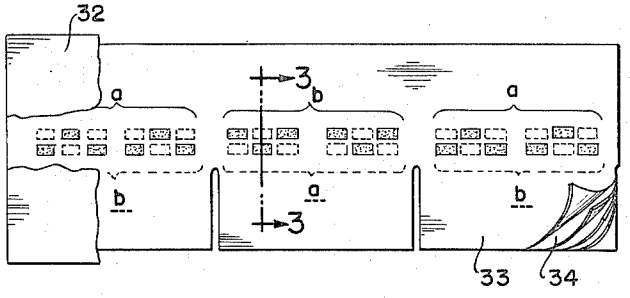

FIG. 2

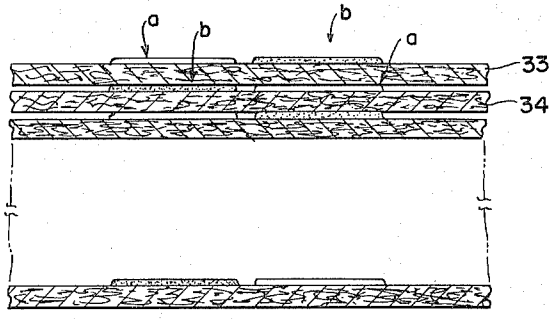

FIG. 3

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SELF-SEALING SHINGLES

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This invention relates to improvements in self-sealing shingles. More particularly, it relates to self-sealing shingles having discontinuous self-sealing adhesive areas applied thereto in certain novel patterns which permit similarly oriented shingles to be superimposed without placing the adhesive areas in registry and which increases the holding efficiency of the areas when the shingles are laid in place. The invention also provides a method of making such shingles and a novel package thereof.

It is common practice to adhere the overlying exposed tab portions of shingles in some way to the lower course shingles to prevent the tabs from being lifted by the wind. In shingles of the self-sealing type, this often is accomplished by applying a self-sealing adhesive to their front face where they are overlaid by the tab portions of the next course so that under the slight but continuous pressure of the tabs and the warmth of the sun the adhesive activates to grip the free ends of the tabs.

There are many difficulties in making, packaging and laying self-sealing shingles of this type. For example, if all self-sealing shingles in a package are alike and are oriented the same way, the adhesive areas are placed in registry and build up into a much greater thickness than the remainder of the shingles. Hence, a greater part of the weight of the shingles is concentrated directly upon the adhesive areas and the danger arises that they may be prematurely activated or so flattened that the compound is too thin to develop an adequate bond. This compression is particularly severe when similarly oriented packages of such shingles are stacked one on top of the other in a pallet load. Also, the remainder of the shingles droop to each side of the built-up adhesive areas to such an extent that they are sometimes permanently deformed and cannot be laid flat when applied.

Another problem to be avoided in the use of self-sealing adhesives on shingles is that the adhesive areas should not be disposed at the points where the shingles are to be nailed in place because in the non-activated form the adhesive is quite brittle and spalls off if pierced by a nail. Also, for aesthetic reasons the adhesive should not be visible through the cut-out slots which commonly define the tab portions of the shingles. Notwithstanding these restrictions as to the position of the adhesive areas on the shingles, they should present uniform and expansive contact to the lower ends of the tab portions in order to grip them efficiently.

Registry of adhesive areas in the package remains the most severe problem, however, and to avoid this alternate shingles have been stacked in the package in opposite directions, i.e., with the tab portions placed alternately to the left and to the right from one shingle to the next. This can prevent the adhesive areas from coinciding but it means that the shingles cannot be automatically packaged upon emerging from fabrication without providing complicated means for turning them one way and then the next. Similarly, when the shingles are removed from such a package in the field, they must again be alternately reversed and this adds considerably to labor time.

Another solution to adhesive area coincidence in packages is to apply a continuous band of adhesive in one of two longitudinal zones in alternate shingles so that every other shingle in the package has its band disposed laterally from those adjacent it and the bands do not come into registry. This avoids the successively reversed orientation of the shingles in the package but it gives rise to further disadvantages of its own. Unless an adhesive printing wheel of impractically large diameter is used, the alternate unlike shingles must be fed to the packaging apparatus from two different fabricating lanes and this results in a somewhat complicated transferral of the two types of shingles to the one packaging device. Also continuous bands across the shingles are visible at the slots defining the tab portions and thus create a less attractive appearance on the roof. Another disadvantage is that since the bands are located in one of two longitudinal zones they do not provide a uniform center of holding on all of the tab portions.

Self-sealing shingles wherein random spots of adhesive are dispersed along each shingle at least incidentally attempt to avoid these disadvantages of continuous band shingles. However, even though the randomness of the adhesive areas is intended to reduce to some extent (but not eliminate) coincidence of the adhesive areas in the package, interference at the nailing areas, and visibility in the slots, these undesirable results still occur. Therefore, such shingles are not a full solution to any of the aforementioned problems but merely mitigate their effects to some extent.

Self-sealing shingles made in accordance with the present invention are free of all of these shortcomings. They may be fabricated in succession and be placed one after the other into a package without reversing their orientation or placing the adhesive areas in registry. Also, when they are applied the adhesive does not appear through the slots or interfere with nailing, yet every tab portion is gripped effectively by a uniform arrangement of adhesive areas.

This improvement in self-sealing shingles comprises a plurality of discontinuous self-sealing adhesive areas applied in respective longitudinal zones extending in uniform lateral position along one face of the shingles. The adhesive areas are arranged in two pattern groups which differ in that the adhesive areas in a pair of the differing groups on respective similarly oriented shingles assume a position of non-registry upon superimposition of the pair of groups. The zone on each shingle contains an odd number of groups throughout the length thereof with no two of the same group immediately adjacent one another.

The package of such shingles as provided by the invention comprises a stack of superimposed similarly oriented self-sealing shingles and means for containing the stack. The shingles include a plurality of discontinuous self-sealing adhesive areas applied to respective longitudinal zones extending in uniform lateral position along one face thereof. These adhesive areas are arranged in two pattern groups which differ in that superimposition in the stack of the differing groups does not result in registry (i.e., superimposition) of the respective areas thereof. The zone on each shingle contains an odd number of groups throughout the length thereof with no two of the same group immediately adjacent one another. Alternate shingles in the stack are of two respective types which differ in the relative number of the two adhesive area groups included thereon.

In addition, a new method of making these self-sealing shingles is contemplated by the invention. This method comprises forming an extended strip of shingle body material equal to the desired shingle width. Then, in a longitudinal zone extending along the strip, a plurality of discontinuous adhesive areas are applied in two successively alternating pattern groups which differ in that the adhesive areas in a pair of the differing groups of respective similarly oriented shingles assume a position of non-registry upon superimposition of the pair of

groups. Finally, the strip is cut laterally into individual shingles containing an odd number of the groups of adhesive areas.

Since the zones of application of the adhesive are in uniform lateral position on all of the new shingles, the adhesive may be put in place continuously by one applicator device before the individual shingles are cut laterally from the strip of shingle material. By providing the two pattern groups of adhesive areas, groups of differing patterns may be superimposed in the package without placing the individual areas of adhesive in registry. To achieve this, each shingle contains an odd number of groups with no two of the same group immediately adjacent one another. Every other shingle being a duplicate, a shingle beginning with an adhesive arrangement of one group is followed out of the machine and into the package by a shingle beginning with an adhesive arrangement of the other group and the adhesive areas thereof are not placed in registry. The result is that there are actually shingles of two types provided by the invention which differ in the relative number of the two adhesive area groups included thereon.

A preferred embodiment of the invention is described hereinbelow with reference to the accompanying drawing, wherein

FIG. 1 is a fragmentary plan view of a number of the new shingles partially covering roof sheathing;

FIG. 2 is a plan view partly broken away of a package of the shingles of FIG. 1; and

FIG. 3 is an enlarged fragmentary section taken along the line 3—3 of FIG. 2.

Referring first to FIG. 1, courses **10**, **11** and **12** of the new shingles are at least partially shown on a section of roof sheathing **13**. In the last-applied course **12**, a shingle **15** is in full view between shingles **16** and **17**. The shingle **15** includes tab portions **19**, **20** and **21** which are uniformly dimensioned and defined by cut-out slots **22** and **23**. The slots **22** and **23** extend laterally into the shingle a distance less than half its width. Half-slots **24** and **25** at each end of the shingle **15** are opposed to like half-slots in the adjacent shingles **16** and **17** so that together they define full slots at the outer ends of the shingle **15**. Each of these features is typical of conventional square-butt shingles.

The shingle **15** is applied over the lower course **11** and nailed in place as indicated at **27** along its central portion adjacent the top of the various tab portions. This leaves the tab portions free in overlying position on the previously applied course **11**. To prevent wind from lifting the tab portions, a self-sealing adhesive is applied to the front face of each shingle where it can contact the underside of the tab portion ends and hold them in place. This means that the adhesive must be located in a longitudinal zone extended substantially centrally throughout each shingle. Such a zone can be seen most clearly in the exposed shingle **15** where a plurality of small rectangular self-sealing adhesive areas **29** are applied substantially from one end of the shingle to the other about midway between its longitudinal sides. The zone is not intersected by the cut-out slots **22–25** and it extends in a uniform lateral position from one shingle to the next. This is important for fabricating reasons as is discussed hereinbelow and also because it permits each tab portion to be adhered at the same region on its outer end. It is also apparent from FIG. 1 that the shingles are longitudinally off-set from one course to the next a distance equal to one-half the width of a tab portion in the conventional manner.

Referring again to the shingle **15**, the adhesive areas **29** are arranged in two pattern groups *a* and *b* which differ in that the adhesive areas thereof cannot be placed in registry when differing groups on similarly oriented shingles are superimposed. Specifically, the pattern group *a* is made up of two sub-groups. Both of these sub-groups have one area entirely on the side of the zone nearest the headlap portion of the shingle and two areas spaced longitudinally apart a distance greater than their individual length entirely on the side of the zone nearest the tab portions. In the group *b*, there are also two similar sub-groups but these sub-groups have two areas spaced longitudinally apart a distance greater than their individual length entirely on the side of the zone nearest the headlap portion of the shingle and one area entirely on the side of the zone nearest the tab portions.

It is evident that various arrangements of the adhesive areas in the groups *a* and *b* will effect non-registry of the areas under the conditions described. Any such arrangements are satisfactory so long as they all fall within the given longitudinal zone in the shingle and provide contact over an expansive area of the tab portions which they are adapted to hold. In addition they should be discontinuous so that the nailing points and cut-out slots in the next-applied course of shingles can be avoided and also so that drainage paths across the zone can be provided for any water which may enter longitudinally through the slots.

Since the shingles are longitudinally off-set with respect to one another from course-to-course, any one tab portion overlays two adjoining groups *a* and *b* of adhesive areas with one side of the tab portion held down by a sub-group of *a* and the other side being held down by a sub-group of *b*. The effect of this is that each tab portion is secured by the same total arrangement of adhesive areas and the geometric center of holding on each tab is the same throughout all the shingles. Hence, no one tab is less securely held than any other. It will be noted that each tab is held at substantially its outermost portion which minimizes the lifting and leverage force of the wind.

This novel arrangement of adhesive areas on the face of self-sealing shingles also proves advantageous in the manufacture of the shingles. Shingles are generally fabricated by the steps (not necessarily in this order) of forming a wide sheet of shingle body material, continuously cutting the sheet longitudinally into a number of extended strips equal to the desired shingle width, cutting the cut-out slots which define the tab portions, and cutting each strip laterally along the center-line of every third slot into individual shingles. When the present shingles are manufactured in this manner, applicator rollers may be arranged uniformly relative to all the longitudinal strips to apply to each strip alternate groups *a* and *b* of adhesive areas. This application of adhesive is to the substantially central longitudinal zone of each strip, and the groups of adhesive in each zone are equally spaced longitudinally so that each group is positioned between the centerlines of adjacent slots defining the tab portions. The simplicity of laying alternate *a–b–a–b* adhesive groups to a single zone in this manner is a considerable improvement over the application of adhesive to more than one zone.

As the strips are made in this fashion, they can be placed directly in a package because every other shingle is a duplicate having either an *a–b–a* or *b–a–b* arrangement of groups. In FIGS. 2 and 3, a package in accordance with the invention is shown including a stack **31** of the new shingles and containing means **32** for binding the stack together. The containing means **32** is shown only diagrammatically in the drawing since it may be in any of the forms now readily available. In the stack **31**, a plurality of the new self-sealing shingles are superimposed one over the other and similarly oriented, i.e., the tab portions are all to one side and the headlap portions are all on the opposite side.

In FIG. 2, a shingle **33** is shown as the first one in the stack and a shingle **34** as the second. The shingle **33** is of the type wherein group *a* of adhesive areas are on each end of the longitudinal zone with a group *b* in the middle and shingle **34** immediately beneath it is of the type wherein adhesive areas of the group *b* are on the

ends of the zone and group *a* is in the middle. These two shingles **33** and **34** would therefore be cut successively from their strip and they can be placed in the package in that order.

With the shingle **33** superimposed directly over shingle **34**, group *a* is over group *b* at both ends and group *b* is over group *a* in the middle and in no case do any two adhesive areas come into registry. This is particularly clear from FIG. 3. Consequently, the cumulative thickness of the stack is reduced by half the total thickness of the adhesive areas and the pressure on each area is correspondingly less. As a result, there is less tendency for the adhesive areas to become prematurely activated and less distortion is imparted to the remainder of the shingles. Also, when the package is opened in the field, the shingles may be lifted out one after the other and applied to the roof longitudinally end-to-end as shown in FIG. 1 without any alternate reversal of the shingles.

We claim:

1. At least one pair of superimposed similarly oriented self-sealing shingles adapted to be included in a package of such shingles, both shingles of the pair having a plurality of discontinuous self-sealing adhesive areas applied to respective longitudinal zones superimposed along corresponding faces of the respective shingles of the pair, said pair of shingles being improved in that the adhesive areas are arranged in the zones in two differing pattern groups, each group in one zone being superimposed with respect to one of the other groups in the other zone with the adhesive areas of the respective superimposed differing groups offset from one another, and each zone containing an odd number of the groups alternating along its length.

2. A pair of shingles according to claim **1** wherein each zone extends centrally along the face of its respective shingle.

3. A pair of shingles according to claim **1** wherein the groups in each zone are at least three in number and are equally spaced.

4. A pair of shingles according to claim **3** wherein the endmost groups in each zone are spaced from the respective adjacent ends of the associated shingle a distance substantially equal to one-half the spacing between the other groups in that zone.

5. A plurality of superimposed similarly oriented self-sealing shingles adapted to be included in a package of such shingles, each of said shingles having three tab portions along one longitudinal side defined by two lateral slots and having a rectilinear butt portion along the opposite longitudinal side, all of said shingles having a plurality of discontinuous self-sealing adhesive areas applied to respective longitudinal zones superimposed along their front faces substantially centrally between the longitudinal sides of the respective shingles and spaced from the respective slots, said shingles being improved in that the adhesive areas are arranged in the zones in two differing pattern groups, each group in the zone of one shingle being superimposed with respect to one of the other groups in the zone on the adjoining shingle with the adhesive areas of the respective superimposed differing groups on adjoining shingles being offset from one another, and each zone containing an odd number of at least three of the groups alternating and equally spaced along its length with the endmost groups in each zone spaced from the respective adjacent ends of the associated shingle a distance substantially equal to one-half the spacing between the other groups in that zone.

6. Self-sealing shingles according to claim **5** wherein said two pattern groups each include two longitudinally adjacent triangularly arranged sub-groups of adhesive areas, each sub-group in one pattern group having one area entirely on the side of the zone nearest the shingle butt portion and two areas spaced longitudinally apart a distance greater than their individual length entirely on the side of the zone nearest the tab portions, and each sub-group in the other pattern group having two areas spaced longitudinally apart a distance greater than their individual length entirely on the side of the zone nearest the shingle butt portion and one area entirely on the side of the zone nearest the tab portions.

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