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INTERLOCKING ROOFING SHINGLE

Filed April 14, 1966

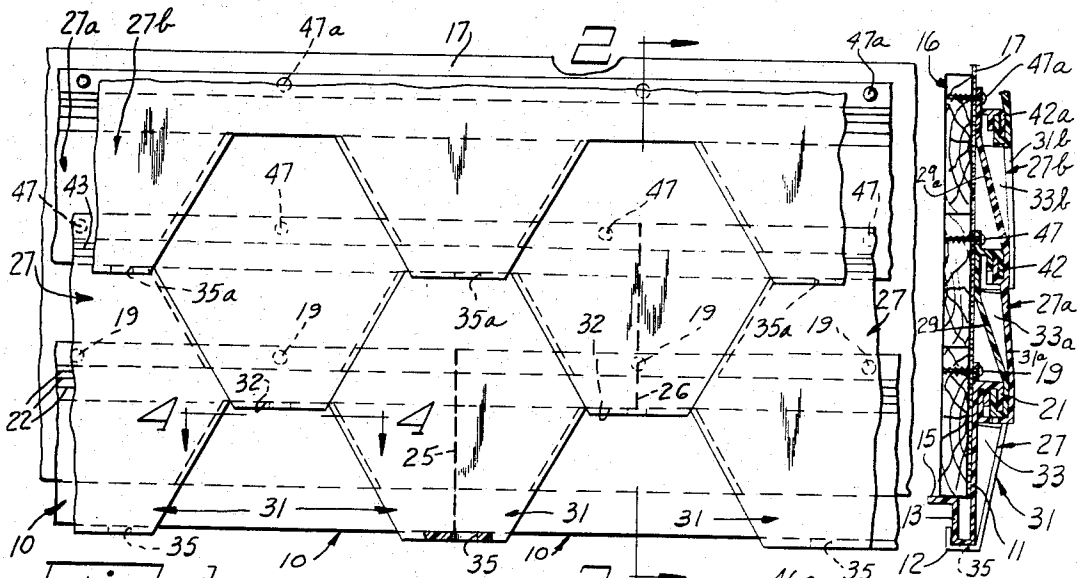

Fig. 1

Fig. 2

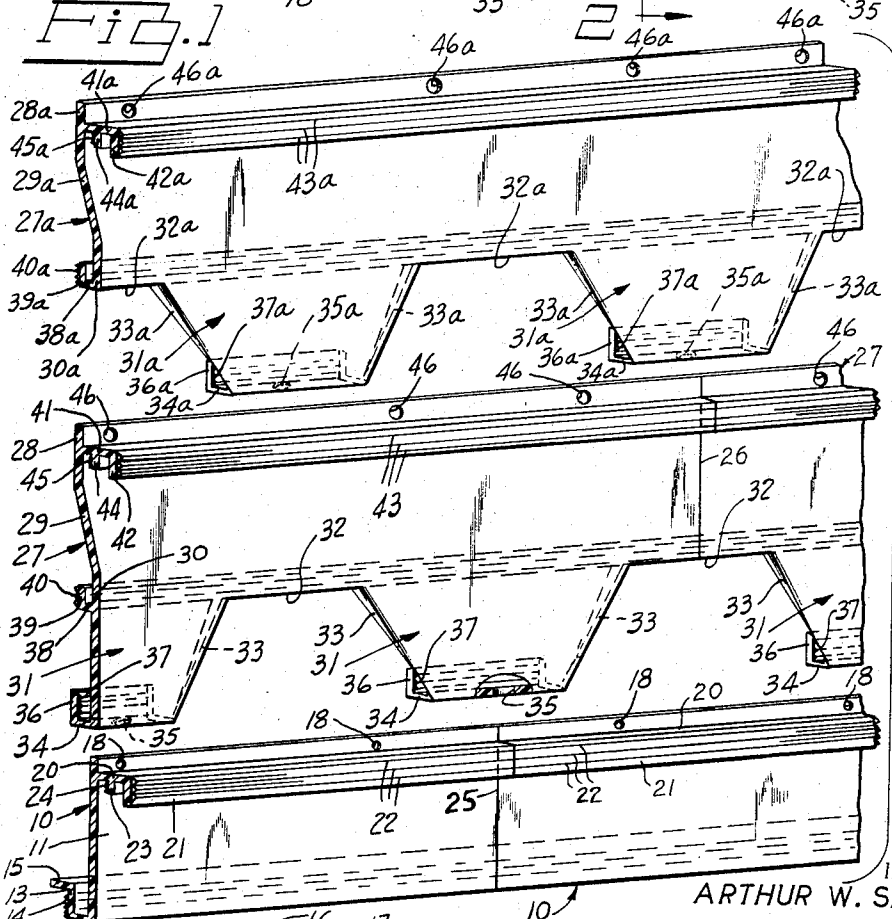

Fig. 3

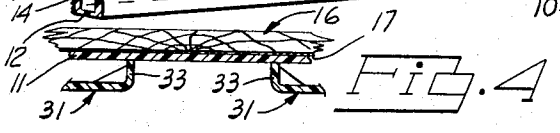

Fig. 4

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INTERLOCKING ROOFING SHINGLE

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ABSTRACT OF THE DISCLOSURE

A triple locking shingle having a pair of downwardly facing channels on the outer side of the shingle, along the upper edge thereof, an upwardly facing flange on the inner side of the shingle along the upper edge of a plurality of recesses in the long end of the shingle, and an upwardly facing flange on the inner side of the shingle along the lower edge of each of the single portions between the recesses.

This invention relates generally to roofing shingles for use on dwellings and other buildings, and more particularly to a permanent roofing shingle construction that will provide an interlocked, self-sealing shingle covering.

The prior art shingles, such as asphalt shingles with embedded surface granules, have many inherent disadvantages. For example, when such prior art or conventional shingles are used on roofs, snow and ice accumulate on the roof thereby adding considerable weight. This requires the use of reinforcing members in the roof structure in order to accommodate the weight of the ice and snow. Accordingly, it will be seen that the added load tolerance, in itself, is one disadvantage in using known roofing constructions. A further disadvantage of such prior art shingles is that many of the surface granules are removed from the asphalt material when ice and snow slide off of a roof provided with such shingles under the force of gravity. Thereafter, during the warm months of the year, the heat of the sun is absorbed by the exposed portions of the asphalt material. The loss of the surface granules also detracts from the appearance or aesthetic quality of the shingle design. A further disadvantage of the prior art shingles is that there is a tendency for moisture to accumulate under the shingles, thereby causing a fungus-type growth. This growth results from a lack of evaporation of the accumulated moisture between the roofing material and the wood understructure.

In view of the foregoing, it is an important object of the present invention to provide a permanent type shingle which will overcome the aforementioned inherent shortcomings or disadvantages in the conventional shingle constructions.

It is another object of the present invention to provide a shingle design made of permanent roofing material wherein undesired vibrations of the material due to wind currents are eliminated.

It is a further object of the present invention to provide a roofing shingle which is formed of permanent material and which will not result in an increased roof load in comparison to the roof load experienced with conventional roofing. This is due to the fact that snow and ice will tend to slide off the roofing of the present invention due to the slope of the roof, thereby preventing a unit weight build-up.

It is another object of the present invention to provide a permanent shingle adapted to be made of any suitable materials, as for example, polyvinyl chloride, which is easy to clean, can be made in all colors, does not corrode, blister, warp, dent, split or show scratches, which does not conduct heat or electricity, will not interfere with radio or television reception, muffles outside noises, and which

is fireproof, self extinguishing and does not require painting.

It is still another object of the present invention to provide a shingle which is formed of permanent material and wherein individual shingles are double interlocked in four places around the shingle tab and single locked across the top of the tab. The lower margin of one shingle is adapted to establish an interlocking connection between the upper end or margin of a first companion shingle and an intermediate region of a second companion shingle. This establishes a sealing action between the surfaces of the individual shingles and provides a rigid, interlocked assembly that is free of vibrations. Suitable retainer or fastening means may be used for attaching the interlocked shingles to the roof substructure, and the overlapping of the shingles prevents removal of the retainer or fastening means. The novel overlapping construction of the shingles provides rapid lateral or endwise alignment of the shingles during assembly. The interlocking portions of the shingles are provided with ridges or serrations which function to provide a positive lock between shingles at certain points and also effect a waterproof connection between the shingles without any slipping therebetween.

Other objects, features and advantages of this invention will be apparent from the following detailed description, appended claims, and the accompanying drawing.

In the drawing:

FIG. 1 is a plan view of a fragmentary portion of a roofing construction made in accordance with the principles of the present invention;

FIG. 2 is a vertical cross-section view of the structure illustrated in FIG. 1, taken along the line 2—2 thereof, and looking in the direction of the arrows;

FIG. 3 is an exploded view showing the elements of an interlocked shingle assembly made in accordance with the principles of the present invention; and,

FIG. 4 is a horizontal, fragmentary section view of the structure illustrated in FIG. 1, taken along the line 4—4 thereof, and looking in the direction of the arrows.

In the drawing, the shingle assembly of the present invention has been illustrated in FIG. 1 in the form of a fragmentary portion of a shingle assembly mounted on the roof of a building. FIG. 2 shows a vertical section view of the structure of FIG. 1 and illustrates the interlocking construction of the shingle assembly of the present invention. FIG. 3 is an exploded view and shows the parts of the shingle assembly of FIG. 1 in the relationship in which they are successively mounted on a building roof and interlocked with each other.

As best seen in FIG. 3, the shingle assembly of the present invention includes a base shingle or shingle starter strip, generally indicated by the numeral **10**, and which includes an elongated plate-like body **11**. Integrally formed on the lower end of the inner side of the shingle starter strip body **11** is an integral, perpendicular, inwardly extended flange **12**, which is in turn integral with the lower end of a vertical flange **13**. The flange **13** extends upwardly in a parallel, spaced apart position relative to the body **11**. A perpendicular, rearwardly extended flange **15** is formed integral with the upper end of the vertical flange **13** and is adapted to be mounted on the lower edge of the roofing sub-structure boards **16** of the roof of a building, as shown in FIG. 2, when in an assembled position on the building.

As shown in FIG. 2, the body portion **11** of the shingle starter strip **10** is adapted to be mounted on the usual tar paper covering **17** or the like, which is mounted over the roofing boards **16** of the roof of a building. The body portion **11** is secured to the roofing boards **16** by any suitable means as by a plurality of suitable retainer mem-

bers, as nails, or as screws **19** which extend through the holes **18** in the upper end of the body portion **11**.

As illustrated in FIG. 3, the inwardly disposed flange **13** on the lower end of the shingle starter strip body **11** is provided with a plurality of longitudinally extended, vertically spaced apart, outwardly extended integral ridges **14** which are adapted to engage a mating surface on the shingle **27** which is disposed on the starter strip **10**, as more fully explained hereafter, and to provide a positive water barrier and weather sealing engagement therewith. The ridges **14** also provide a locking function and may be made in any suitable manner as, for example, with outwardly extended, longitudinal sharp edges or serrations. As shown in FIG. 1, the shingle starter strips **10** are assembled in end to end relationship. The numeral **25** indicates the juncture between the two illustrated shingle starter strips **10**.

As shown in FIG. 3, the shingle starter strip **10** is provided along the upper end thereof with a longitudinal, outwardly extended flange **20** which is disposed perpendicular to the body **11**, on the outer side of the shingle starter strip. An integral flange **21** is formed on the outer end of the flange **20** in a position spaced apart from the starter strip body **11** and parallel thereto. The outer face of the flange **21** is provided with a plurality of longitudinally extended serrations or ridges **22** which are formed integral with the flange **21** and function in the same manner as the aforementioned ridges **14** to prevent sliding and to provide a waterproof seal. An integral flange **23** is formed on the lower side of the flange **20** in an intermediate position between the flange **21** and the starter strip body **11**. The flange **23** is shorter than the flange **21** and is parallel to the flange **21** and the starter strip body **11**. Flange **23** is provided on the inner surface thereof with a plurality of ridges **24** which extend longitudinally of the flange **23**, and which function in the same manner as the ridges **14**. It will be seen that the retainer holes **18** are disposed adjacent the upper margin or edge of the shingle starter strip **10**, and that the flange **20** is disposed immediately below the holes **18**.

The next shingle of the shingle assembly of the present invention is designated generally by the reference numeral **27**. As shown in FIG. 3, the shingle **27** includes a body portion comprising an upper end portion **28** which is adapted to be seated flush against the tar paper covering **17** as shown in FIG. 2. The body portion of the shingle **27** further includes the integral downwardly and outwardly upper intermediate sloping portion **29** which extends between the upper end portion **28** and the lower intermediate body portion **30** which is parallel to the upper end portion **28** and which is spaced apart outwardly toward the front side of the shingle.

As shown in FIG. 3, the shingle **27** is provided along the lower margin thereof with a plurality of evenly spaced recesses **32**. The recesses **32** in the embodiment shown are of a trapezoidal shape, although it is contemplated that they also may be rectangular in shape or any other suitable shape, depending upon the shingle design that is desired after the shingles are assembled. The lower end of the body of the shingle **27** is thus provided with a plurality of evenly spaced, downwardly extended legs **31** which are trapezoidal in shape, and inverted in shape relative to the shape of the recesses **32**.

As shown in FIGS. 2 and 3, each of the legs **31** is provided with a means on the lower end thereof for interlocking engagement with the flanges **12** and **13** on the shingle starter strip **10**. An integral, rearwardly extended flange **34** is formed on the lower end of each leg **31** and it extends perpendicularly rearward from each leg **31**, and it is integral at the outer end thereof with a second flange **36** which extends upwardly in a position parallel and spaced from each leg **31**. Each flange **34** is provided with a weep hole or drainage hole **35**. A plurality of longitudinally extended ridges or serrations **37** are formed on the front side of the flange **36** and are adapted to be

engaged with the ridges **14** on the rear face of the flange **13** when the shingle **27** is mounted on the shingle starter strip **10**, as illustrated in FIG. 2. In FIG. 2, the ridges **14** and **37**, and the other ridges heretofore described, and hereafter described, are not shown for purposes of clarity since they are very small. It will be seen that the particular ridges **14** and **37** provide an interlocking action, as well as a gripping and waterproof action in this particular instance.

As shown in FIGS. 2 and 4, each of the shingle legs **31** is provided along the sides thereof with an inwardly folded triangular flange **33** which is adapted to be seated against the body **11** of the shingle starter strip. The flanges **33** are integral with the legs **31** and function to support the legs **31** in positions spaced apart from the shingle starter strip **11** and they further function to give the appearance of thickness to the shingle. The flanges **33** extend downwardly from the upper ends of the legs **31** and terminate at a point approximately adjacent the upper ends of the flanges **36**.

The shingle **27** further includes an interlocking angle means on the rear side of the lower intermediate portion **30** and this interlocking means extends longitudinally of the shingle. As shown in FIG. 3, the last mentioned interlocking means includes the integral flange **38** which extends rearwardly and perpendicularly from the lower intermediate body portion **30**. Integrally formed on the outer end of the flange **38** is an upwardly extended flange **39** which is parallel to the body portion **30** and spaced rearwardly apart therefrom. The flange **39** is provided on the rearward face thereof with a plurality of integral serrations or ridges **40** which are similar to the previously described ridges **14**, **22**, **24** and **37**, and which function in a similar manner. As shown in FIG. 3, the flange **38** is disposed adjacent the upper edge of the recesses **32**.

As shown in FIG. 3, the shingle **27** is provided with an interlocking means along the upper margin thereof which is identical to the interlocking means formed along the upper margin of the shingle starter strip **10**. The shingle **27** is provided along the upper margin thereof with a plurality of retainer holes **46** which are formed through the body upper end portion **28**. As shown in FIG. 2, the shingle **27** is adapted to be secured to the roofing **16** by any suitable means, as by a plurality of suitable retainer members, as nails, or as screws **47** which extend through the holes **46** and into retaining engagement with the roofing **16**.

As shown in FIG. 3, the interlocking means along the upper end of the shingle **27** includes the flanges **41**, **42** and **44** which are similar to the flanges **20**, **21** and **23**, respectively, on the upper end of the shingle starter strip **10**. The flange **41** is formed integral with the shingle upper end portion **28** and extends outwardly therefrom and longitudinally of the shingle. Flange **41** is disposed perpendicular to the shingle body portion **28** and has integrally formed on the outer end thereof the downwardly extended flange **42**. The flange **42** is spaced apart from the shingle body portion **28** and is parallel thereto. The outer face of the flange **42** is provided with a plurality of longitudinally extended serrations or ridges **43** which are formed integral with the flange **42** and which function in the same manner as the aforementioned ridges **14**, **22**, **24**, **37** and **40**. The flange **44** is integrally formed on the lower side of the flange **41** in an intermediate position between the flange **42** and the shingle body portion **28**. Flange **44** is shorter than flange **42** and is parallel to the flange **42** and the shingle body portion **28**. Flange **44** is provided on the inner surface thereof with a plurality of serrations or ridges **45** which extend longitudinally of the flange **44**, and which function in the same manner as the previously described ridges. As shown in FIG. 3, the shingles **27** are assembled in end to end relationship and the numeral **26** indicates the parting or juncture line between a pair of individual shingles **27**.

The shingles in the next succeeding row of shingles in

the shingle assembly are designated by the reference numerals **27***a*. The shingles **27***a* are substantially identical to the shingles **27**, and accordingly, the corresponding parts have been designated by the same reference numerals, followed by the small letter "*a*." As shown in FIG. 1, the shingles in the next succeeding row of shingles in the shingle assembly are designated by the numerals **27***b*. The shingles **27***b* are substantially identical to the shingles **27**, and accordingly, the corresponding parts have been marked with the same reference numerals followed by the small letter "*b*."

FIGS. 1 and 2 illustrate the manner in which the individual shingles would be assembled to form a shingle assembly. The flange **15** on the shingle starter strip **10** is shown seated in flush engagement with the lower end of the roofing **16**. The numeral **19** indicates the retainer screw holding the shingle starter strip **10** in position on the roofing **16**. The shingles **27** are shown mounted on the roofing **16** with the lower interlocking means formed by the flanges **12** and **13** disposed around the lower end of the shingle starter strip **10** and with the ridges **14** on the shingle starter strip **10** in engagement with the ridges **37** on the shingle **27**. The upper end of the shingle **27** is secured to the roofing **16** by means of the screws **47**. The intermediate locking means on the shingle **27** is also engaged with the interlocking means on the upper end of the shingle starter strip **10**. As shown in FIG. 2, the flange **40** is seated between the flanges **21** and **23** on the upper end of the shingle starter strip **10**. The next row of shingles **27***a* is disposed above the row of shingles **27** and the shingles **27***a* are interlocked with the shingles **27** in the same manner as the shingles **27** are interlocked with the shingle starter strips **10**.

As shown in FIG. 2, the interlocking means on the legs **31***a* of the shingle **27***a* is interlocked with the upper end of the shingle starter strip **10** by means of the flange **36***a* seated between the shingle starter strip body rear wall and the flange **23**. The legs **31***a* are flexed outwardly, as shown in FIG. 2, when they are in the interlocked position with the shingle starter strip **10**. The legs **31***a* are each aligned with one of the recesses **32** in the shingles **27** and the flanges **34***a* through the recesses **32** and underlie against the flanges **38** on the shingles **27**. It will also be seen that the legs **31** on the lower shingles **27** are flexed and slope downwardly and inwardly toward the roofing **16**. The intermediate interlocking means on the shingles **27***a* are interlocked with the shingles **27** by means of the flange **39***a* being seated between the flanges **42** and **44** on the upper end of the shingles **27**. The next row of shingles **27***b* are interlocked with the shingles **27***a* and **27** in a similar manner.

The succeeding shingles are then assembled in the aforedescribed fashion in a repetitive manner until the entire roof is covered. It will be seen that the joints between the various shingles create an effective weatherproof seal which also prevents vibration of the shingles under the influence of wind forces. The interlocking joints or connections between the shingles also prevent entry of water into the roof understructure. It will be seen that the shingles interlock with each other in a secure fashion to form three-element joints, in spaced apart positions along each row of shingles. The particular overlapping arrangement of the shingles also covers and locks the shingle nails or screws in place and prevents their removal.

It will be understood that any of several materials may be used for forming the shingles of the present invention. Also, appropriate colors may be used so that the shingles will blend into any decorating scheme. One suitable material is a plastic material readily available on the market and known as polyvinyl chloride. Any other suitable plastic or metal may be used, but it has been found that polyvinyl chloride may be extruded in a fast and economical manner to form the flanges of the present invention with its aforedescribed interlocking flange means. The shingle can be made by blanking and forming the shingle tabs. Polyvinyl chloride is the preferable material since it is non-combustible, resists indentation, as opposed to aluminum or steel, is a non-conductor of electricity and heat, and does not provide any capillary action as does metal. Snow and ice also will readily slide off of the shingles of the present invention. Further advantages of polyvinyl chloride are that it will not warp, split, or show scratches, and it does not require painting. It can be made in all colors, and the colors are homogeneous and solid throughout the cross section of a shingle made from the last mentioned material.

The total load for which the roof must be designed will be less when the shingle construction of the present invention is used if it is compared to the design roof load that is necessary when conventional asphalt shingles are employed. This is due to the fact that snow and ice will tend to slide off of the roof that is provided with the improved shingle construction of the present invention, and will not be allowed to accumulate as in the case of conventional asphalt shingles.

The shingle construction of the present invention also acts as an insulator. It is effective to reflect back into the dwelling by radiation, if it is made of metal, a substantial portion of the heat that would otherwise escape through the roof. It also reflects, during warm months of the year, the heat due to sunlight, thereby maintaining a dwelling at a cooler temperature than would be possible if asphalt shingles were employed.

While it will be apparent that the preferred embodiment of the invention herein disclosed is well calculated to fulfill the objects above stated, it will be appreciated that the invention is susceptible to modification, variation and change without departing from the proper scope or fair meaning of the subjoined claims.

What I claim is:

1. In an interlocking shingle assembly, the combination comprising: individual shingles with each shingle being provided with a pair of adjacent, spaced apart, downwardly extending flanges on the outer side, along the entire length of the upper end thereof which form a pair of downwardly facing channels comprising an inner channel and an outer channel; each of said shingles being provided with recesses formed along the lower end thereof, at regularly spaced locations; each of said shingles being provided with an upwardly extended flange on the inner side, along the entire length of each of the lower end edge portions between said recesses; said recesses including an upper edge formed parallel to the upper and lower end edges of the shingles; each of said shingles being provided with an upwardly extended flange on the inner side, along the entire length of the shingle along the upper edges of said recesses; the upwardly extended flanges on the lower end edge portions of one shingle overlying the upper edges of the recesses and the flange along said recesses in the immediately preceding shingle and extended into the inner channel on the upper end of the second preceding shingle, and the upwardly extended flange along the upper edges of the recesses on the inner side of the immediately preceding shingle is extended upwardly into said outer channel to form a triple locked shingle assembly.

2. An interlocking shingle assembly as defined in claim **1**, including: fastening means for securing said shingles to a roof understructure at a location between the upper end edge of each shingle and the upper edges of the recesses thereof, whereby the next succeeding shingle will overlie the fastening means that is employed.

3. An interlocking shingle assembly as defined in claim **1**, wherein: said shingles are formed of metallic sheet material thereby defining a permanent interlocked shingle assembly that will prevent a build-up of ice and snow on the roof of the dwelling and which will act as an inherent heat insulator for the dwelling.

4. An interlocking shingle assembly as defined in claim **1**, wherein: said shingles are formed of a plastic

material in the form of sheets, and wherein said flanges are integrally formed on the shingles.

5. An interlocking shingle assembly as defined in claim 1, including: starter strip shingles with each starter strip shingle being provided with an inwardly directed flange along the lower edge thereof adapted to be secured to the lower edge of a roof or a dwelling and with means adapted to be engaged by said upwardly extended flanges on the lower end edges of said immediately preceding shingles; and, each of said starter strip shingles being provided with a pair of adjacent, spaced apart downwardly extended flanges on the outer side, along the entire length of the upper end thereof which form a pair of downwardly facing channels comprising an inner channel and an outer channel and adapted to be engaged by the upwardly extended flanges on the lower end edges of said second preceding shingles and the upwardly extended flanges along the upper edges of the recesses on the immediately preceding shingles.

6. An interlocking shingle assembly as defined in claim 1, wherein: said flanges comprise angle members.

7. An interlocking shingle assembly as defined in claim 1, wherein: the said one shingles in said assembly and said immediately preceding shingles in said assembly and said second preceding shingles in said assembly are each respectively arranged in end to end abutting relationship.

8. An interlocking shingle assembly as defined in claim 1, wherein: the portions of the shingles between the recesses comprise tabs having side flanges which extend rearwardly to provide a support means and give the appearance of increased thickness to the shingles, and present a positive shadowline of shingle shape.

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