

Aug. 19, 1969

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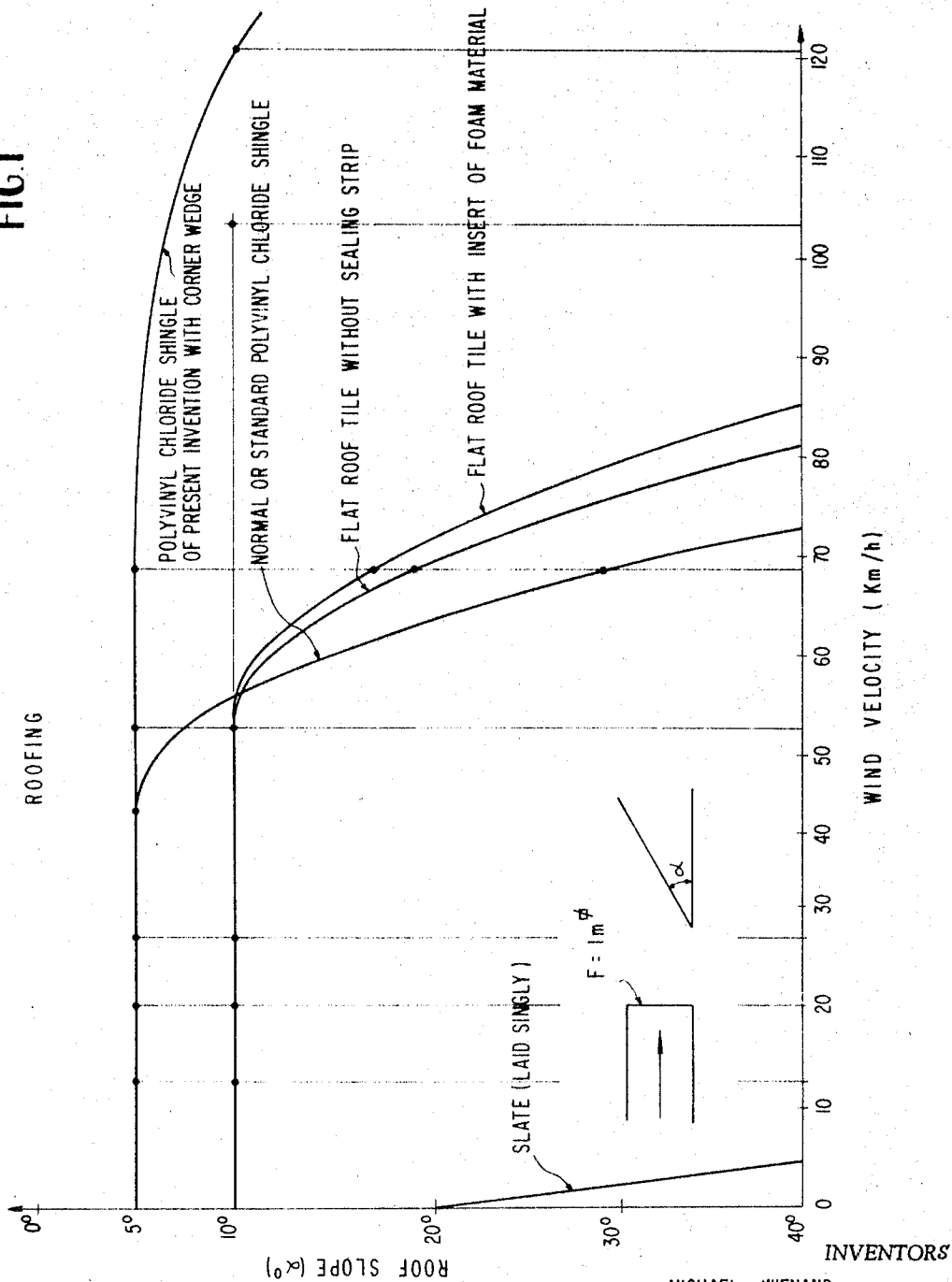
3,461,628

THERMOPLASTIC ROOF SHINGLES

Filed Nov. 25, 1966

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FIG. 1



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FIG. 2a

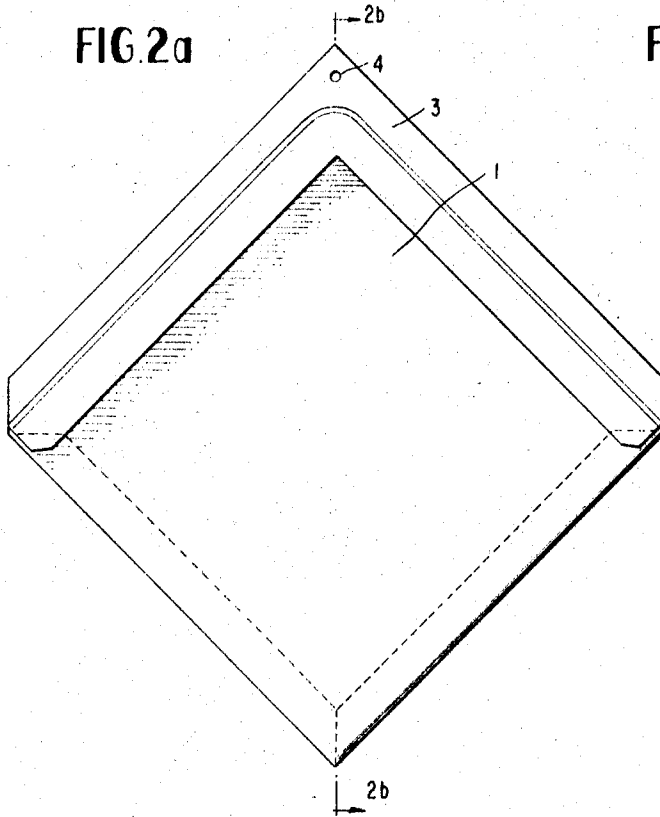


FIG. 2b

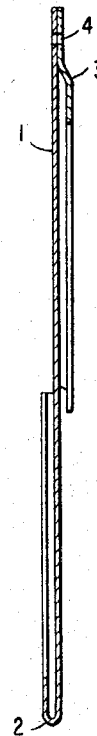


FIG. 3a

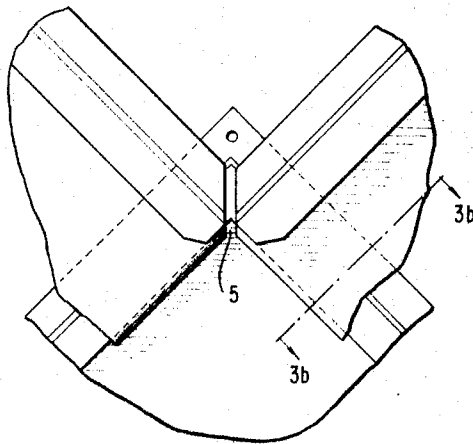
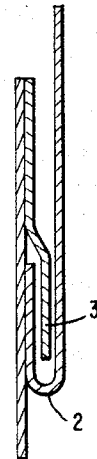


FIG. 3b



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FIG. 4c

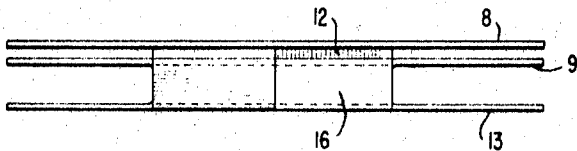


FIG. 4a

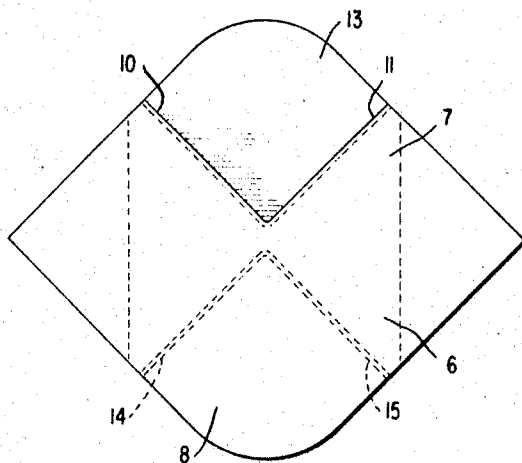


FIG. 4b

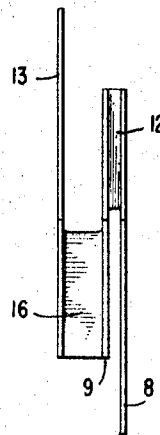
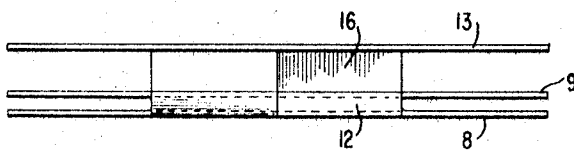


FIG. 4d



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FIG. 5

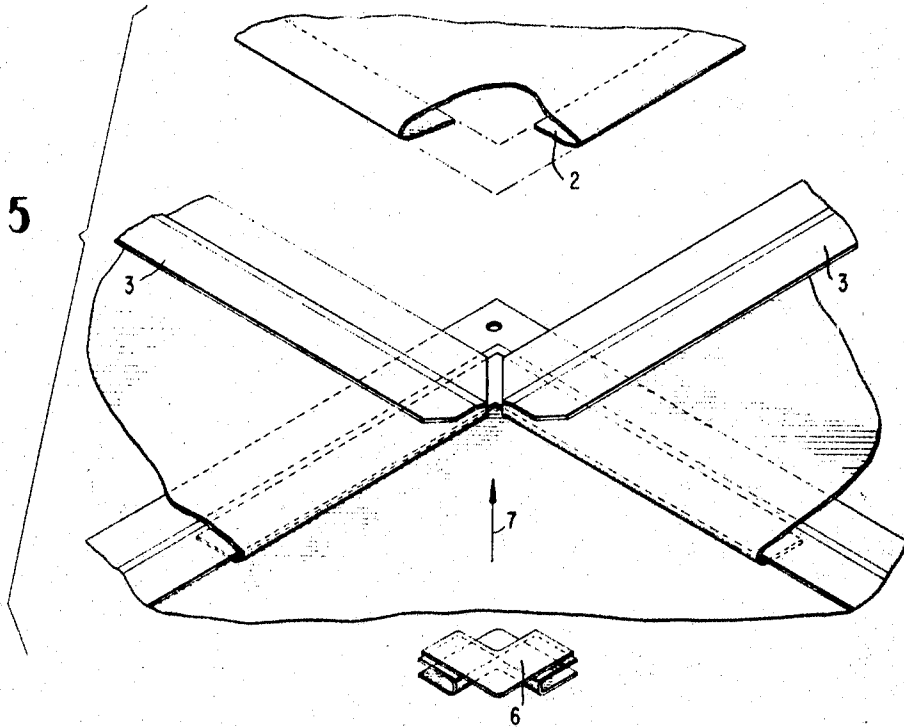


FIG. 6

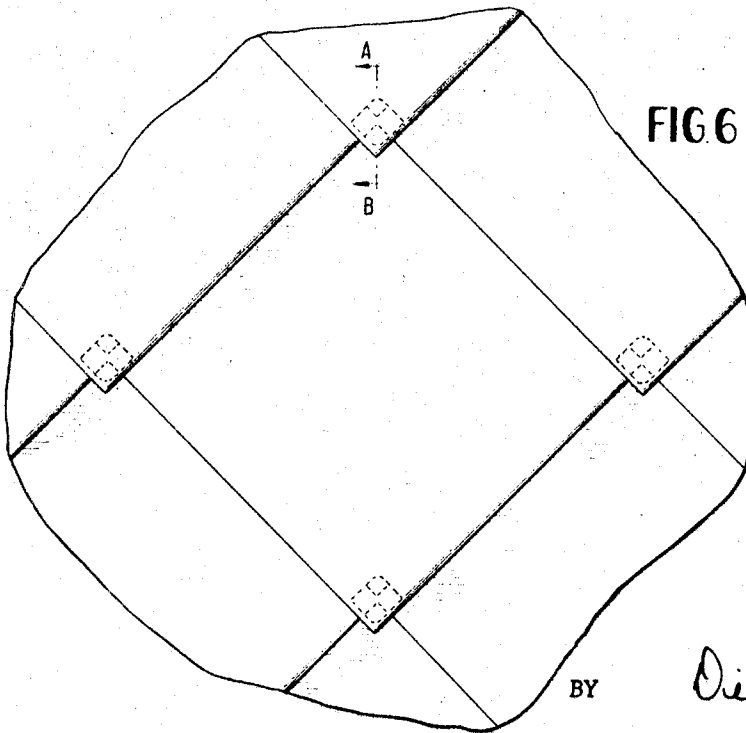
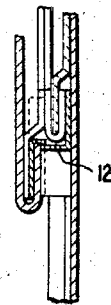


FIG. 7



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THERMOPLASTIC ROOF SHINGLES

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D 48,759

Int. Cl. E04c 1/24

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12 Claims 10

ABSTRACT OF THE DISCLOSURE

The present disclosure is directed to thermoplastic roof shingles having a particular construction. The shingles are bent toward one side in a hook-like manner in the region of two adjacent edges, while a hook is also provided in the region of the other two edges by means of a marginal strip running along the entire length of the edges in the marginal zone of the shingle. Accordingly, the shingles may be interconnected by means of their hooks with the marginal strip of adjacent shingles. The shingles also have truncated edges at the corners adjacent to the corner zone containing a nail hole or the like. The crack between the truncated sides when the shingles are laid may be sealed off by means of corner wedges having a construction as shown in FIGURES 4 and 5.

BACKGROUND OF THE INVENTION

This invention relates to roofing and, in particular, roof shingles made of thermoplastic synthetic material and having a particular construction.

Plate-shaped square roof shingles made of synthetic material have been used as roofing in the prior art. One embodiment thereof involves having these shingles formed into hooks along two adjacent edges, facing in one direction, and in the region of the other two adjacent edges, facing in the opposite direction. The width of these hooks is dimensioned such that the roof shingle can be interconnected by means of the free leg of the hooks with the hooks of additional adjacent roof shingles having the identical construction. Provision is made that these roof shingles are mounted, by means of a nail or the like, with one of their corners in a suspension arrangement on a support, for example, a wooden roof lath.

Experimental laying arrangements of such square synthetic resin roof shingles have shown that these shingles are definitely equivalent to the conventional roof tiles with respect to their quality and suitability. However, there is the drawback with such shingles that with roofs having a very minor slope or inclination it is quite possible that when rain water is pressed upwardly on the roof by strong winds and by capillary action this rain water can penetrate through the nail holes to the inner side of the roof. This can happen even though the nail holes are covered on the outside of the roof.

Accordingly, one of the objects of the present invention is to provide roof shingles which overcome the disadvantages and deficiencies of the prior art.

Another object of the invention is to provide roof shingles which may be used to construct a roof which is virtually impermeable to rain water, even under adverse conditions.

A further object of the present invention is to provide advantageous roof shingles made of a thermoplastic material which may be constructed advantageously and efficaciously in an economical manner.

These and other objects and advantages of the present invention will become apparent to those skilled in

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the art from a consideration of the following specification, drawings and claims.

SUMMARY OF THE INVENTION

In accordance with the present invention, a roofing is provided which is characterized by the use of a substantially square, plate-shaped roof shingle. This shingle is bent toward one side in the manner of a hook in the region of two adjacent edges, while a hook is also provided in the region of the other two edges by means of a marginal strip which is flat along the entire length of the edges in the marginal zone of the shingle. The marginal strip may also be attached at a spacing from the edges in a straight line by means of gluing, welding or the like so that it firmly and tightly adheres thereto. This marginal strip is offset in a step-wise manner in a direction at right angles to its longitudinal extension at about the center area thereof. In the corner zone of the latter two mentioned edges (containing said marginal strip), a nail hole or the like may be provided, if desired, within the connecting surface or outside of the connection line of the marginal strip. A further feature of the shingle construction of the present invention is that the shingle plate is truncated or blunted at the corners positioned on both sides of the diagonal visualized as emanating from the corner zone containing the nail hole or the like in a parallel relationship to said diagonal.

When the roof shingles of the present invention are laid, it is possible that small cracks will be present between adjacent shingles in the area of the corners formed by four shingles. Through these cracks, at extreme conditions, i.e., with a very minor roof slope and a very strong wind, rain water could be pressed toward the inside of the roof. In order to fully satisfy even such extreme conditions, there is provided, according to a further embodiment of the present invention, the additional use of thin-walled corner wedges (gussets). These corner wedges are small compared with the size of the roof shingles and are substantially square. They have an upper layer extending across three quadrants and a lower layer of identical form but oppositely arranged, the two outer quadrants thereof, however, being congruent with those of the upper layer. The corner wedges also have an intermediate layer extending across the congruent quadrants of the upper and lower layer. The intermediate layer is connected with the upper layer along the edges formed by the recess of the fourth quadrant by means of a web portion or a fillet having a height corresponding substantially to the thickness of the roof shingle plates or slabs, or of a height which is only slightly larger than this thickness. The intermediate layer is also connected with the lower layer along the edges formed by the recess of the fourth quadrant by means of a web portion or a fillet having a height corresponding to three times the thickness of the roof shingle plates, or only slightly larger.

Experiments carried out in connection with roofs laid for testing purposes have yielded the result that the roofing of the present invention, using the described roof shingles and the corner wedges together therewith, ensures a complete water tightness of the roof at a roof slope of only 5° and at a wind velocity of almost 70 km./h. With a roof slope of 10°, these roofs show a complete water tightness even at a wind velocity of 120 km./h.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be further illustrated by reference to the accompanying drawings wherein:

FIGURE 1 shows a plot of roof slope against wind velocity for various roof constructions. This plot indicates the limits within which the roofing remains tight, in dependence upon the roof slope and wind velocity, with a constant supply of water at a rate of 50 liters per square

meter per minute. As can be seen therefrom, roofing made from prior art polyvinyl chloride roof shingles, for example, according to German utility model 1,883,161 ensures complete water-tightness only up to a wind velocity of about 45 km./h. when the slope of the roof is 5°. At a roof slope of 10°, such a roof shows complete water tightness only up to a wind velocity of about 55 km./h.

Even less favorable is the situation wherein conventional flat roof tiles are employed. A roof made of this material retains its water tightness, with or without the insertion of sealing means, only up to a wind velocity of about 53 km./h. at a 10° roof slope.

FIGURES 2a and 2b show a flat roof shingle, in accordance with the present invention, having a nail hole, in a plan view and in a sectional view, respectively.

FIGURES 3a and 3b show, in the same manner, a detailed view of FIGURES 2a and 2b, namely, a corner formed from three roof shingles according to FIGURE 2a.

FIGURES 4a, 4b, 4c and 4d show a corner wedge, in accordance with the present invention, in various views.

FIGURE 5 illustrates the engagement of the roof shingles of the present invention and the corner wedge, in a detailed view.

FIGURE 6 shows, in a further detailed view, a schematic illustration of a few laid roof shingles with corner wedges.

FIGURE 7 shows a section through a connecting corner along line A-B of FIGURE 6.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

As shown in FIGURES 2a and 2b, a roof shingle is formed from a thin flat plate 1. This plate is bent to form hook 2 along its two lower edges toward one single side. Of course, the hook could also be formed by using a special part therefor. Along the other two edges on the other side of the plate 1, the marginal strip 3 is applied by gluing, welding or the like. As can be seen from FIGURE 2b, the marginal strip 3 is offset step-wise at about the center portion thereof by an amount corresponding to its thickness, or a little larger. The connection between the plate 1 and the marginal strip 3 can be effected along the entire surface of the external part of the marginal strip 3 which is resting, according to FIGURE 2b, on plate 1. Or, this connection can be effected only along a line extending close to the step-like shoulder. A nail hole 4 may be provided in the upper corner of the shingle. The nail hole extends through the plate 1 and marginal strip 3. As a further feature of the construction of this shingle, the two lateral corners thereof are truncated in a line parallel to a diagonal visualized as emanating from the corner having the nail hole 4.

FIGURES 3a and 3b show three identical roof shingles having the construction of the present invention combined in the manner necessary for laying the same in a finished roof. The two upper roof shingles, as shown in FIGURE 3b, are engaged by means of their hooks 2 in the marginal strip 3 of the lower roof shingle. The crack 5 present between the two upper roof shingles can be sealed off by means of the corner wedges 6 (illustrated in FIGURES 4a-4c), in the manner shown in FIGURE 5. In doing this, the corner wedge 6, illustrated at the bottom of FIGURE 5, wherein its configuration can clearly be seen, is pushed into the corner formed by the three combined roof shingles until the wedge abuts the same before the fourth roof shingle is interconnected, the latter being shown at the top of FIGURE 5. Thereafter, the fourth roof shingle is hooked or hung with its hook-shaped edge into the marginal strip 3 of the two lateral roof shingles. This then terminates the roof laying operation.

As can be seen from FIGURES 4 and 5, the upper layer 8 extending across three quadrants is connected with the intermediate layer 9 along the two edges 10 and 11 by means of the webs 12. The intermediate layer 9 is connected with the lower layer 13, again extending across three quadrants, along the two edges 14 and 15 by means

of webs 16. The height of webs 12, in this connection, corresponds to at least once, times the thickness of the plate 1. The height of the webs 16 corresponds to at least three times the thickness of plate 1. In practice, the corner wedge 6 can, of course, be constructed of one piece without any difficulty. However, it is also possible to compose this wedge of several parts.

As can be seen from FIGURE 6, a smooth outside surface is provided with the finished laid roof. By outside surface, of course, is meant the visible surface exposed to the elements. The nail holes are also advantageously covered on the outside surface.

The manner in which the individual parts engage one another in a corner is fully illustrated in FIGURE 7. The bold line in this figure indicates that a completely tight seal is established between the individual interlocking roof shingles.

Within the scope of the roofing according to the present invention, when employing the principle underlying the construction of the roof shingles, it is possible to provide numerous specific constructions for the roof shingles, for example, for passing antennae, ventilating means, etc. therethrough. These specific constructions are to be considered within the scope of the present invention.

The roof shingles of the present invention are advantageously constructed of a thermoplastic material, such as, for example, polyvinyl chloride, polyvinylidene chloride, polyurethanes, polyethylene, polypropylene, etc. Polyvinyl chloride is the preferred thermoplastic material.

The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications are intended to be included within the scope of the following claims.

1. A substantially square roof shingle made of a thermoplastic material, said shingle having a hook-like bend in the region of two adjacent edges toward one side thereof and having a corresponding hook-like shape in the region of the other two edges in the direction of opposite side thereof, the latter hook-like shape being provided by a continuous marginal strip which is flat along the entire length of the edges upon which it is disposed and is firmly and tightly adherent thereto, said marginal strip being offset in a step wise manner in a direction at right angles to its longitudinal extension at about the center thereof, and said shingle being truncated at the corners positioned on both sides of the diagonal visualized as emanating from one of the other corners thereof in a parallel relationship to said diagonal, wherein a corner zone between the two edges containing said marginal strip and spaced outwardly of the offset portion is provided with a mounting area.

2. A roof shingle according to claim 1, wherein said marginal strip is attached in a straight line at a spacing in from the edges upon which it is disposed.

3. A roof shingle according to claim 1, wherein said mounting area includes a nail hole.

4. A roof shingle according to claim 1, wherein said thermoplastic material is polyvinyl chloride.

5. A corner-wedge roof shingle made of a thermoplastic material, said shingle having an upper layer extending across three quadrants, a lower layer, identical and opposite to said upper layer and congruent with the outer two of said three quadrants occupied by said upper layer, and an intermediate layer extending across said outer two of said three quadrants, said intermediate layer being connected to said upper layer by a first web portion at the edges of said upper layer formed by the recess of the fourth quadrant, said intermediate layer being connected also to said lower layer by a second web portion at the edges of said lower layer formed by the recess of the fourth quadrant.

6. A corner-wedge shingle according to claim 5, wherein said second web portion has a height approximately three times the height of said first web portion.

7. A corner-wedge shingle according to claim 6, where-

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in said first web portion has a height slightly greater than the thickness of a roof shingle adjacent to said corner-wedge shingle.

8. Roofing comprising, in combination, a plurality of shingles made of a thermoplastic material, each of said shingles having a hook-like bend in the region of two adjacent edges toward one side thereof and having a corresponding hook-like shape in the region of the other two edges in the direction of the opposite side thereof, the latter hook-like shape being provided by a continuous marginal strip which is flat along the entire length of the edges upon which it is disposed and is firmly and tightly adherent thereto, said marginal strip being offset in a stepwise manner in a direction at right angles to its longitudinal extension at about the center thereof, a corner zone between the two edges containing said marginal strip and spaced outwardly of the offset portion being provided with a mounting area, and said shingle being truncated at the corners positioned on both sides of the diagonal visualized as emanating from one of the other corners thereof in a parallel relationship to said diagonal.

9. Roofing according to claim 8, wherein said mounting area includes a nail hole.

10. Roofing according to claim 8, further comprising at least one corner-wedge shingle having an upper layer extending across three quadrants, a lower layer, identical and opposite to said upper layer and congruent with the outer two of said three quadrants occupied by said upper layer, and an intermediate layer extending across said outer two of said three quadrants, said intermediate layer being connected to said upper layer by a first web portion at the edges of said upper layer formed by the recess of the fourth quadrant, said intermediate layer being connected also to said lower layer by a second web portion at the edges of said lower layer formed by the re-

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cess of the fourth quadrant, wherein adjacent shingles are interconnected with one another by the engagement of said hook-like portion of one shingle with said marginal strip of the adjacent shingle, said corner-wedge shingle being wedged into the corner formed by three abutting shingles and a fourth shingle being interconnected to two of said three shingles, disposed laterally and above said fourth shingle, by the engagement of the hook-like portion of said fourth shingle with the marginal strip portions of said two laterally disposed shingles.

11. Roofing according to claim 10, wherein the corner zone between the two edges containing said marginal strip of each of said shingles is provided with a nail hole.

12. Roofing according to claim 10, wherein said first web portion has a height slightly greater than the thickness of the roof shingle adjacent to said corner-wedge shingle and said second web portion has a height approximately three times the height of said first web portion.

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JOHN E. MURTAGH, Primary Examiner

U.S. Cl. X.R.

52—521, 531, 551