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(54) **MULTI-LAYER SHINGLE WITH SHIPLAP JOINT**

(57)

ABSTRACT

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A multi-layer laminate shingle has a base layer and at least a second layer above the base layer. At one end of the shingle the base layer projects beyond the second layer while at the other end the second layer projects beyond the base layer. When the shingles are laid in a course along the roof, the projecting end of the second layer overlaps the projecting end of the base layer of the next shingle, forming a shiplap joint over all or substantially all of the width of the shingle, protecting the joint against rain penetration. This shiplap feature allows the headlap to exposure ratio of the shingle to be reduced to less than 1 and even to 0.5 or less, thus reducing the cost of shingles per unit of roof coverage area. If desired, a narrow strip can be adhered to the top of the headlap portion of the shingle or beneath the butt portion of the shingle to emulate the appearance of a costly triple laminate shingle.

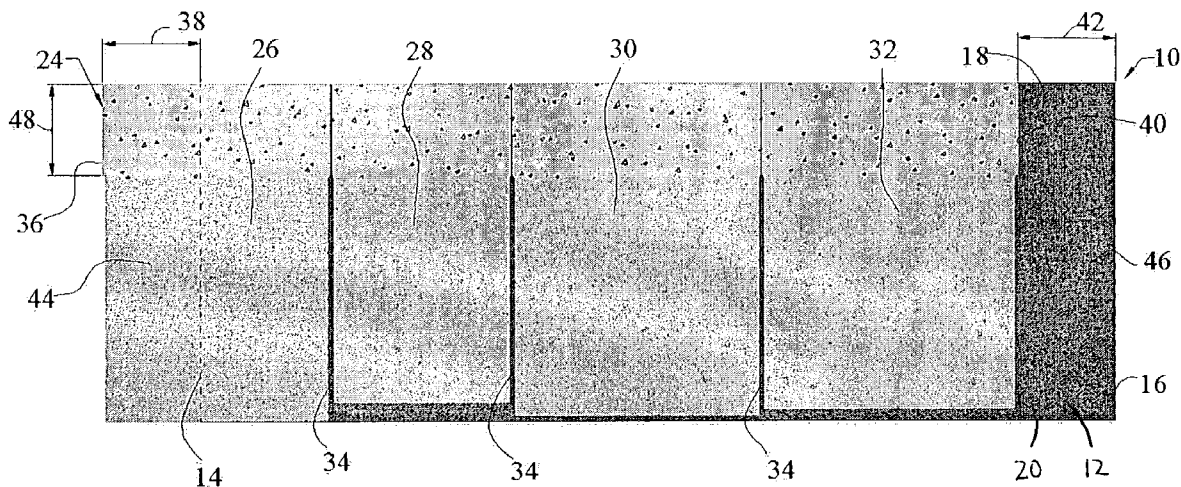
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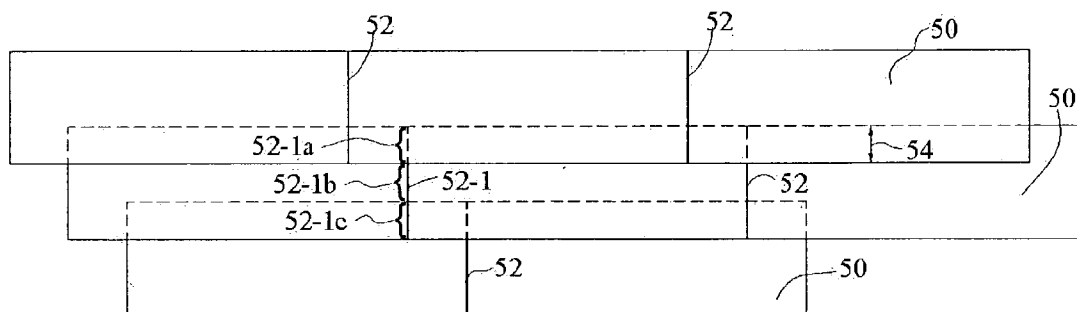
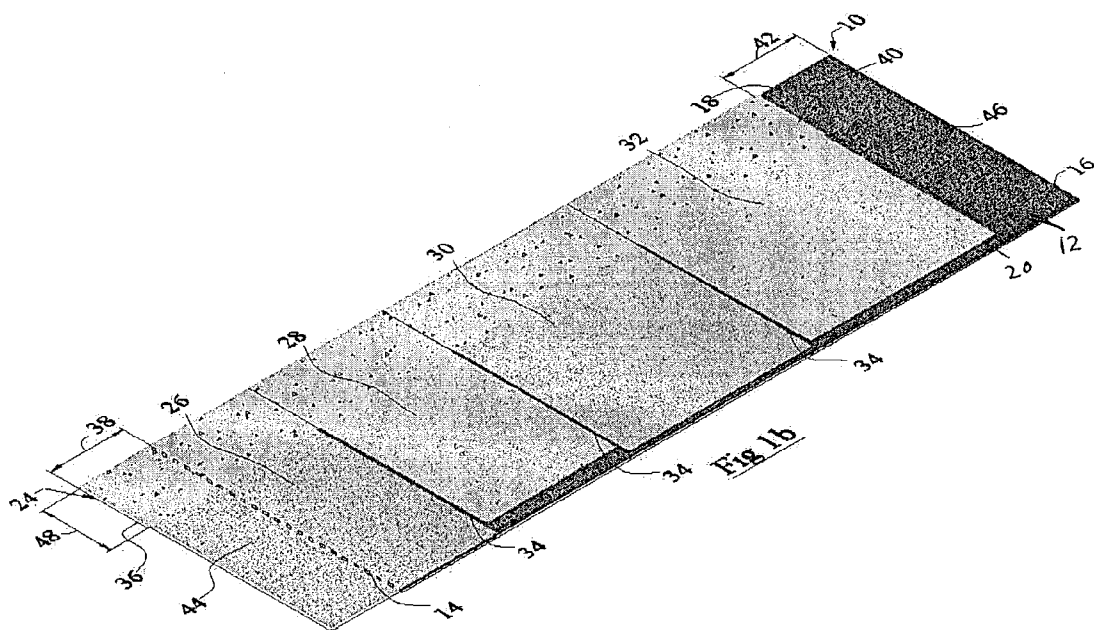
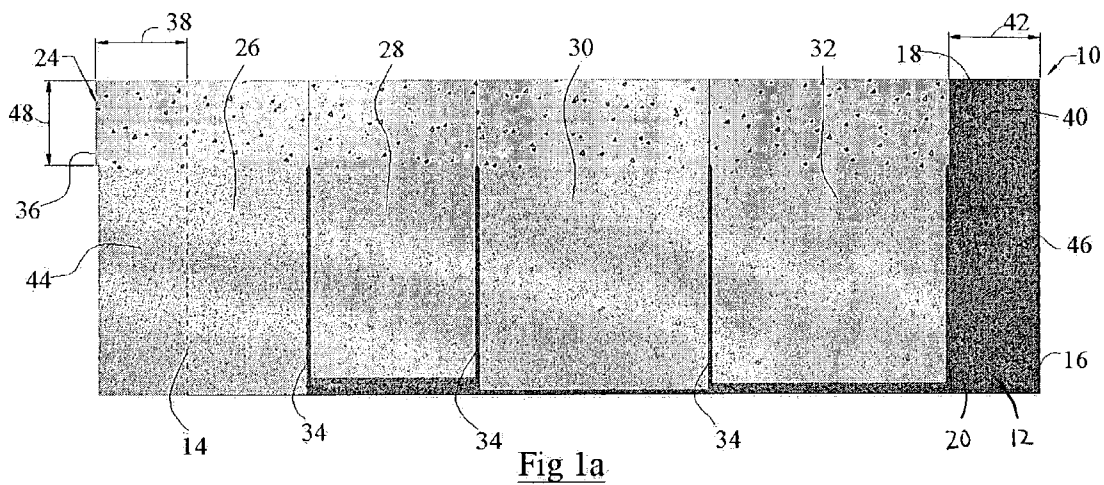
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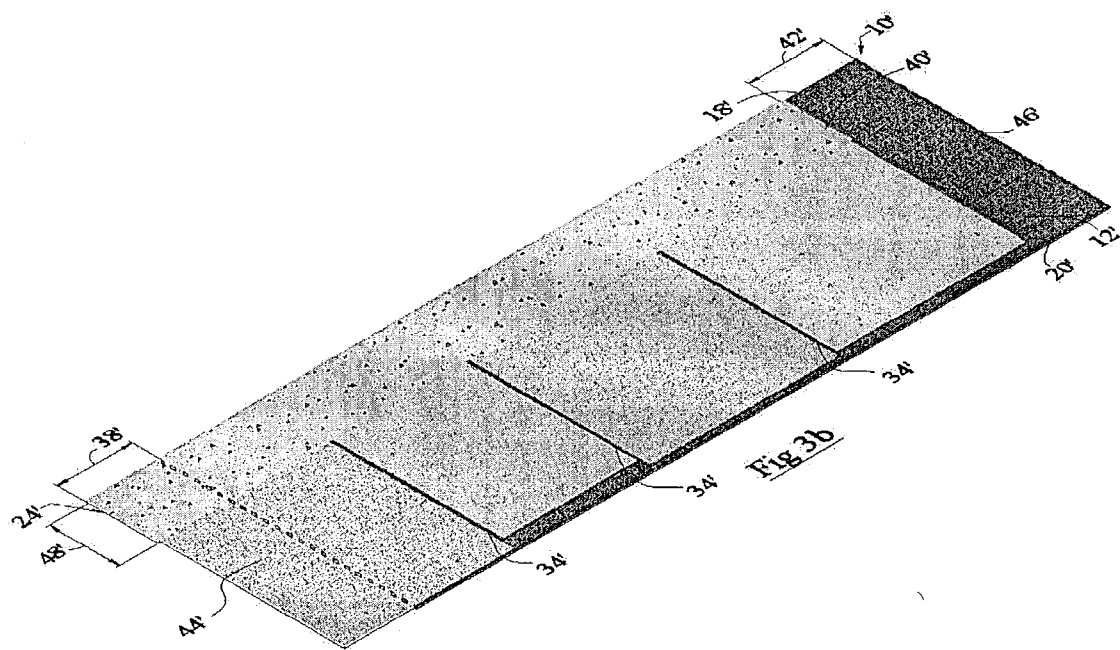
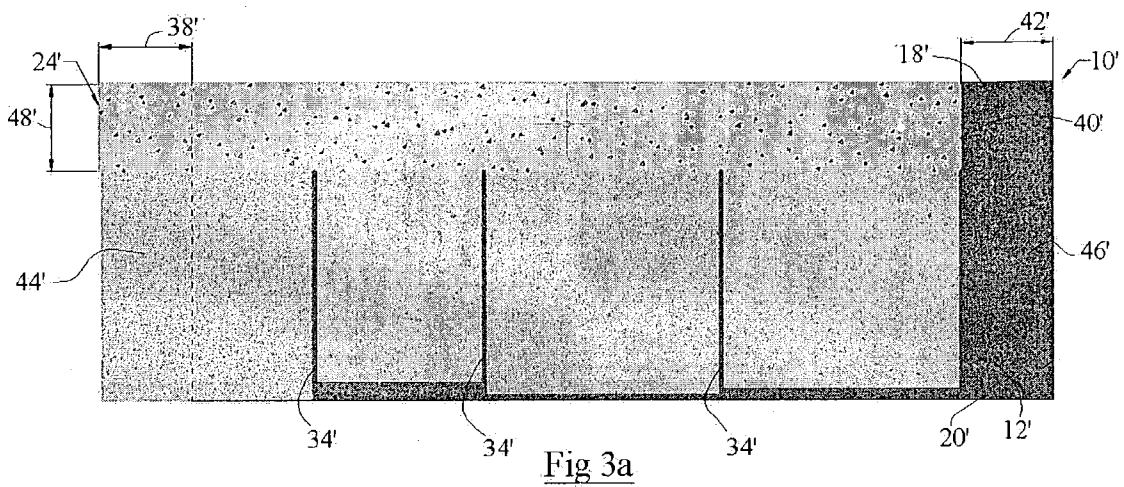
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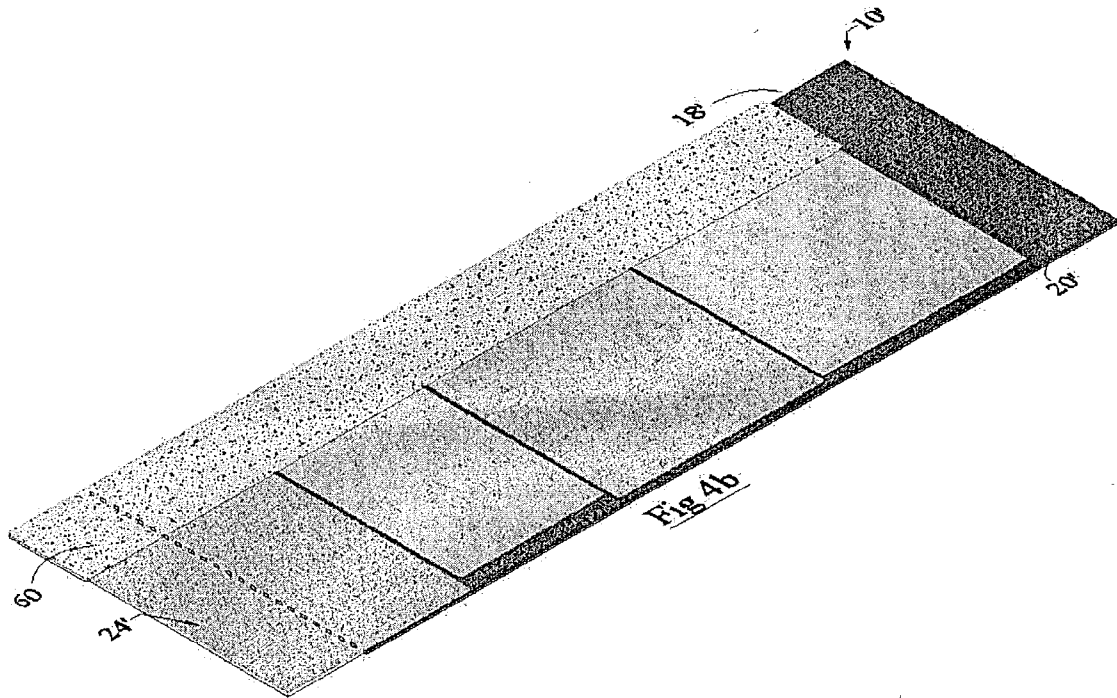
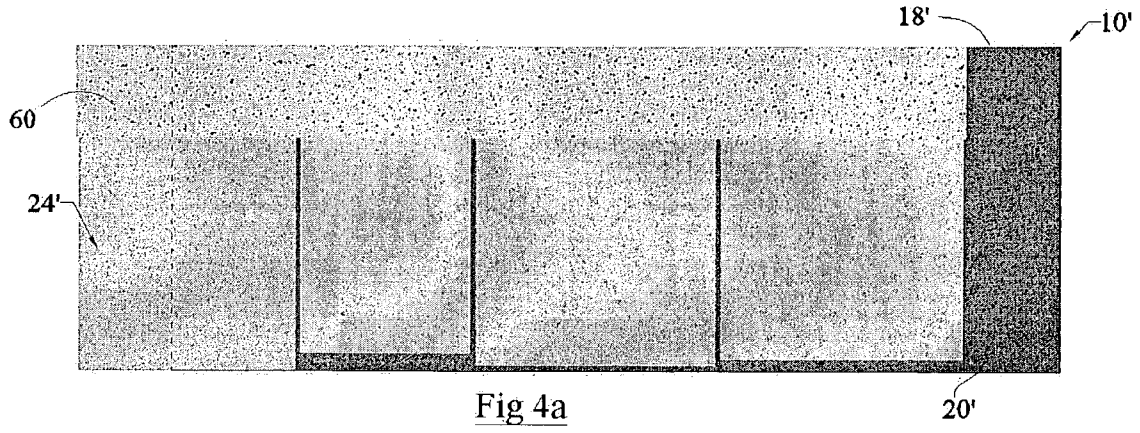
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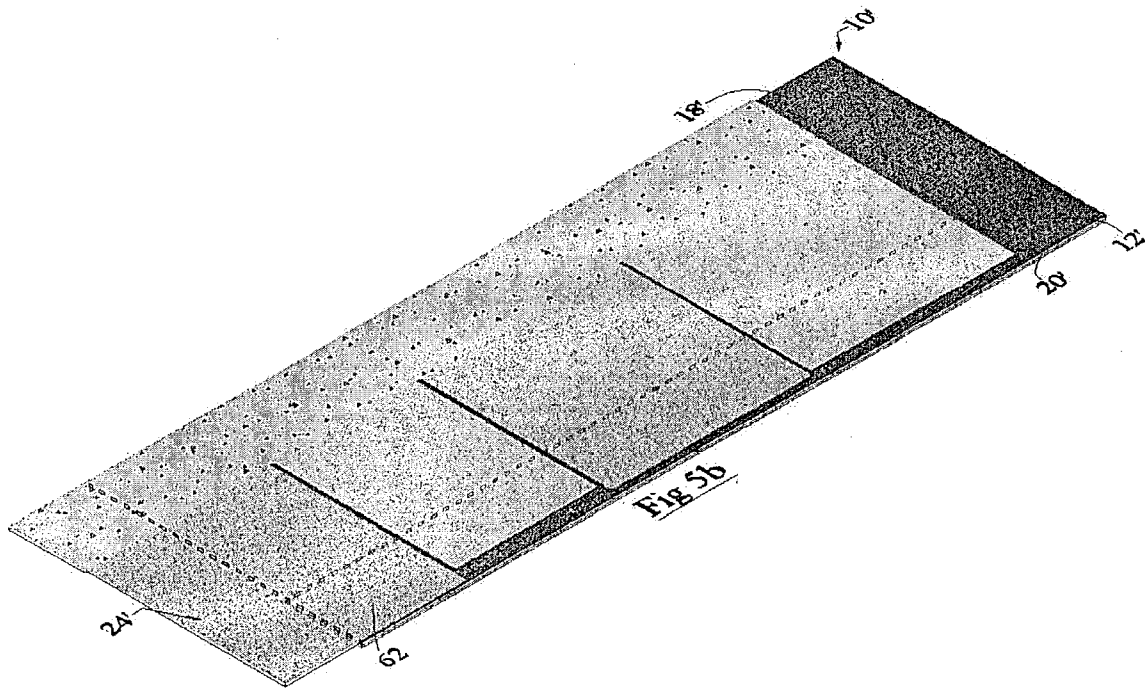
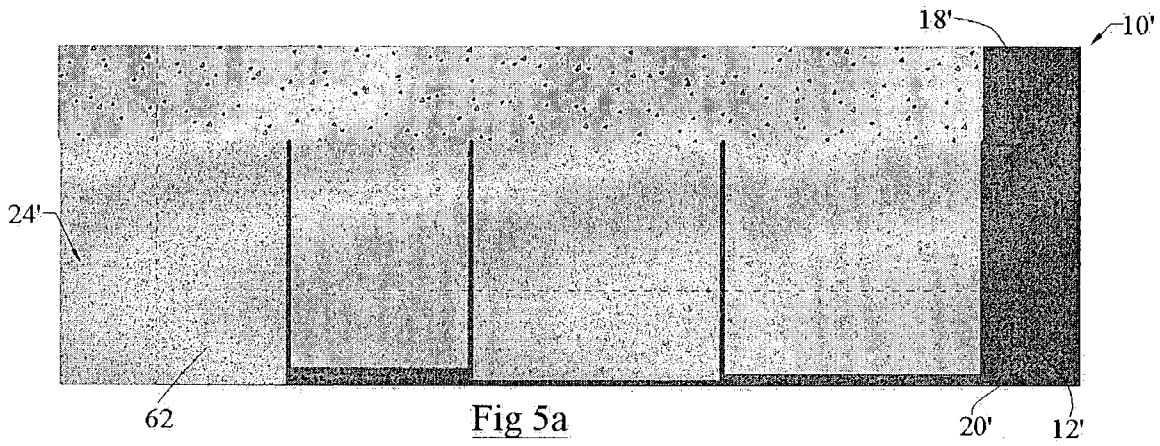
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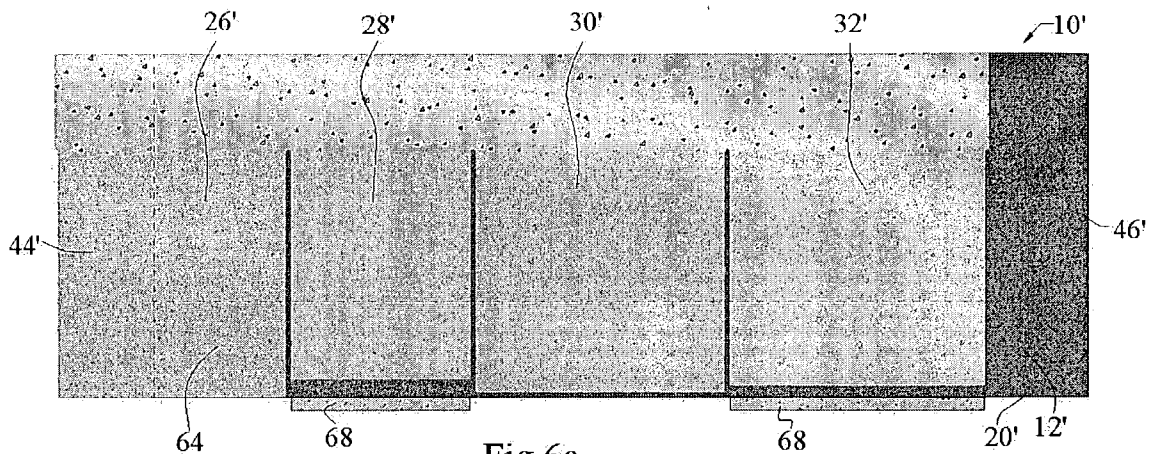


Fig 6a

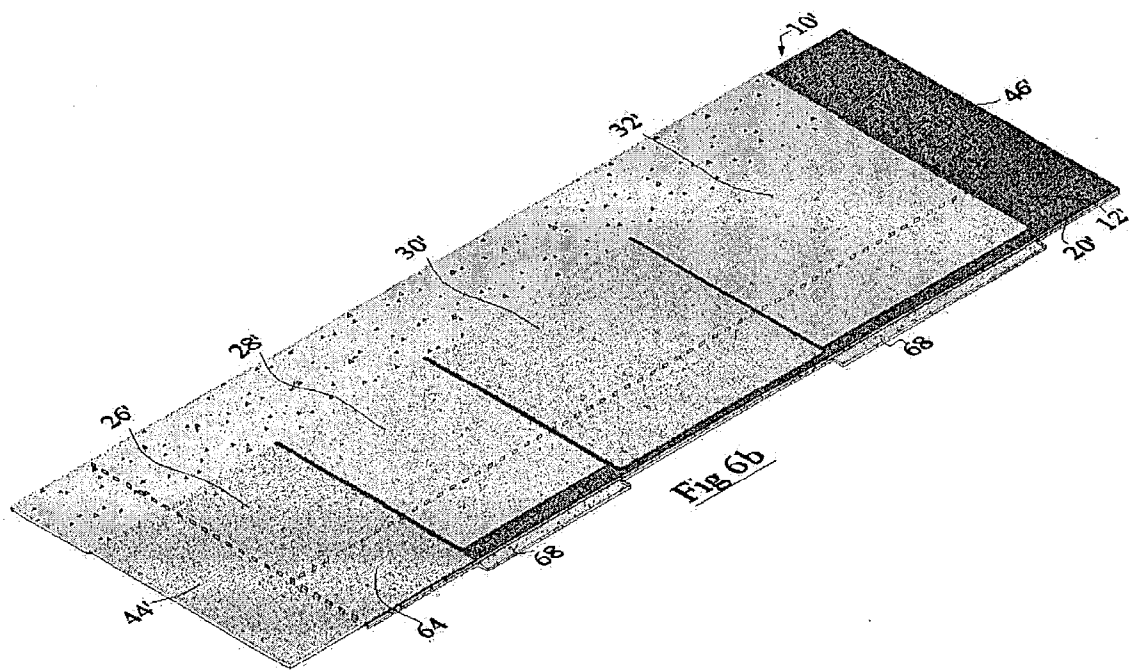


Fig 6b

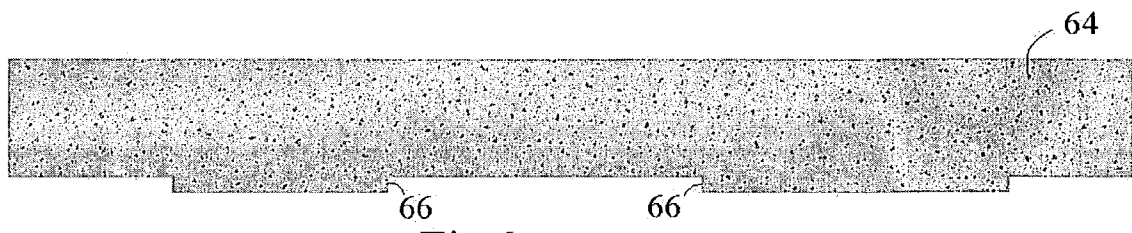


Fig 6c

MULTI-LAYER SHINGLE WITH SHIPLAP JOINT

FIELD OF THE INVENTION

[0001] This invention relates to the designs of multi-layer shingles. In particular, it relates to multi-layer shingles having shiplap joints.

BACKGROUND OF THE INVENTION

[0002] Asphalt roofing shingles have been in general use on roofs for nearly 100 years. They provide excellent water shedding characteristics to protect roofs from water leaks. The shingles are installed on a roof and overlap each other in a way that water cannot leak through the joints of the shingles to the base board of the roof. Typically, each course of shingles is horizontally offset, about 4" to 10", relative to the preceding course of shingles so that the joints of the shingles in a course do not line up with the joints of the shingles in the preceding or succeeding course. In addition, except for the starter course, each course of shingles overlaps the preceding course of shingles by more than 50% of the shingle width. This is to ensure that all portions of the joints in the same course either are placed on top of the shingles in the preceding course or are covered by shingles in the succeeding course. This means that over 50% of the total shingle surface area is covered by other shingles, which is a costly use of material.

[0003] A shingle surface can be divided into two areas, called the "headlap portion" and the "exposure portion". After the shingles are installed on the roof, the headlap portion is the area of the shingle covered by the shingles of the succeeding (i.e. next higher) course of shingles, while the exposure portion is the area of the shingle exposed to the environment. More overlapping area means less roof coverage area for the shingle. Hence, the higher the ratio of the headlap portion to the exposure portion, the higher the shingle cost per unit of roof coverage area is, because a larger overall shingle area is required to provide an amount of exposure which is equal to the roof coverage area. In order to maintain the water shedding integrity of the shingle system, the headlap to exposure ratio cannot (in the prior art) be reduced to less than one.

BRIEF SUMMARY OF THE INVENTION

[0004] While single layer shingles are very common, due to their low price, double layer and triple layer laminate shingles are becoming more widely used, because of their attractive ornamental appearance. The applicant has realized that when such multiple layer laminate shingles are used, their multiple layer construction can be used to provide a shingle design which can substantially reduce the headlap to exposure ratio of the shingle, while maintaining the water shedding integrity of a roofing system formed from such shingles.

[0005] In one aspect the invention provides a roofing shingle comprising: (a) a base layer having first and second longitudinally spaced-apart end edges defining between them a length for said base layer, said base layer also having laterally spaced-apart top and bottom edges defining a width for said base layer, said base layer having an upper surface, (b) a second layer laminated to said upper surface of said base layer, (c) said second layer having a first end portion inset from said first end edge of said base layer over at least

a substantial portion of the width of said base layer, said first end portion being inset from said first end edge from a position adjacent said top edge of said base layer to a position at or near said bottom edge of said base layer, so that said first end edge of said base layer extends in a longitudinal direction beyond said first end portion of said second layer over said substantial portion of the width of the base layer to form a projecting end of said base layer, (d) said second layer having a second end portion extending longitudinally beyond said second end edge of said base layer over at least a substantial portion of the width of said base layer, said second end portion so extending from a position adjacent said top edge of said base layer to a position at or near said bottom edge of said base layer to form a projecting end of said second layer, (e) so that when two or more of said shingles are assembled end to end to form a horizontal course of shingles, said projecting end of said second layer of one shingle will extend over the projecting end of said base layer of an adjacent shingle to form a shiplap joint, whereby to protect the joint between adjacent shingles from penetration by rain.

[0006] Further objects and advantages of the invention will appear from the following description, taken together with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] In the drawings:

[0008] FIG. 1a is a top view of a double laminate shingle according to the invention;

[0009] FIG. 1b is an isometric view of the double laminate shingle of FIG. 1;

[0010] FIG. 2 is a top view showing several courses of prior art shingles on a roof, laid so as to illustrate the joint coverage problem;

[0011] FIG. 3a is a top view of a modified double laminate shingle according to the invention;

[0012] FIG. 3b is an isometric view of the double laminate shingle of FIG. 3a;

[0013] FIG. 4a is a top view of a triple laminate shingle according to the invention;

[0014] FIG. 4b is an isometric view of the triple laminate shingle of FIG. 4a;

[0015] FIG. 5a is a top view of another triple laminate shingle according to the invention;

[0016] FIG. 5b is an isometric view of the triple laminate shingle of FIG. 4a.

[0017] FIG. 6a is a top view of still another triple laminate shingle according to the invention;

[0018] FIG. 6b is an isometric view of the shingle of FIG. 6a; and

[0019] FIG. 6c is a top view of a strip used in the FIG. 6a shingle.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

[0020] In conventional multi-layer asphalt roofing shingles, the typical size of each shingle is about 39³/₈"

(long) \times 13 $\frac{1}{4}$ " (wide). Usually, such shingles are installed across the roof in horizontal courses, without overlapping any other shingles in the same horizontal course. However they overlap the shingles in the preceding course, as courses or rows are applied vertically up the roof. In addition, each course of shingles is installed with an offset horizontally to the preceding course, so that joints between the shingles in the same course do not line up with the joints between the shingles in the preceding course or succeeding course. In the aforementioned shingle, the typical exposure of the shingle is about 5 $\frac{5}{8}$ " out of the 13 $\frac{1}{4}$ " width of the shingle. In other words, 7 $\frac{5}{8}$ " (from the total shingle width of 13 $\frac{1}{4}$ ") is the headlap portion, which is covered by the shingles in the succeeding course after installation. (More generally, the exposure portion is usually the width of the shingle less 2", divided by 2, which yields the 5 $\frac{5}{8}$ " exposure portion in the above example.)

[0021] In the example given, the headlap-to-exposure ratio of the shingle is 7 $\frac{5}{8}$ " divided by 5 $\frac{5}{8}$ " and is equal to 1.36. To avoid rain water leaking through the joints between two consecutive shingles in the same horizontal course, it is clearly important not to reduce the headlap-to-exposure ratio close to one or less than one. All portions of the vertical joint between horizontally adjacent shingles in the same course must either be placed on top of the shingles in the preceding course or be covered by the shingles in the succeeding course.

[0022] The inventor has realized that when multiple layer laminate shingles are used, they can be designed to provide a shiplap feature which can eliminate the restriction that the headlap-to-exposure ratio must be greater than 1. Once the restriction is removed, the headlap-to-exposure ratio can be reduced significantly. A smaller shingle width will then be required to provide the same amount of roof coverage area, or alternatively the same overall shingle width can provide a larger amount of roof coverage area.

[0023] A shiplap joint is the overlapping portion of two consecutive shingles in the same course after installation. Reference is first made to FIGS. 1a, 1b which show a double laminate shingle 10. Shingle 10 includes a base layer 12 having longitudinally spaced-apart end edges 14, 16 which define between them the length of the shingle base layer, and laterally spaced-apart top and bottom edges 18, 20 which define between them the width of the base layer. (When the shingle 10 is laid, the top edge 18 will be at the top of the headlap portion and the bottom edge 20 will be at the bottom of the exposure portion.)

[0024] Shingle 10 also includes a second layer 24, formed in the FIGS. 1a, 1b embodiment by four individual tabs 26, 28, 30, and 32. The number, spacing and size of these tabs is largely optional, except as will be explained. (For example, the tabs 26, 28, 30 and 32 can be of substantially equal size.) The tabs 26-32, which can have various colors of granules applied to them, are laminated to the base layer 12 in conventional fashion, with slots 34 between the tabs 26-32 to provide an ornamental appearance.

[0025] In accordance with the invention, one end tab 26 has an end edge 36 extending longitudinally beyond the end edge 14 of the base layer 12 by a first longitudinal offset indicated at 38. Typically the first longitudinal offset 38 is about 2" to 6".

[0026] Similarly, the end edge 40 of the fourth tab 32 is inset from the end edge 16 of the base layer by a second

longitudinal offset 42 which is preferably of the same longitudinal extent as offset 38 (although offset 42 can be slightly smaller or larger if desired).

[0027] It will be realized that the end edges 36, 40 will usually not be straight, since they are cut to a shape such that the end edge 36 of one shingle, and the end edge 40 of its adjacent shingle, form one of the slots 34 when the shingles are installed on a roof.

[0028] Thus, the shingle 10 has at one end a projecting tab portion 44 and at the other end a projecting base layer portion 46. When the shingles 10 are installed in a horizontal course across the roof, the projecting tab portion 44 will cover the projecting base layer portion 46 for adjacent shingles, thus forming a set of shiplap joints which cover any gaps between horizontally adjacent shingles in the same course. Therefore, no rain water can leak through the joints, even if the joints are neither placed on top of shingles in the preceding (lower) course nor covered by the shingles in the succeeding (next higher) course. Therefore, the headlap-to-exposure ratio no longer needs to be greater than 1. However, preferably the headlap width 48 of the double laminate shingle 10 is larger than 2", to provide sufficient overlapping area between successive courses of shingles to avoid rain water being driven up between the courses by high winds and leaking through in the headlap area. The exposure portion of the shingle may be between 6" and 18". The headlap-to-exposure ratio can be reduced from more than 1 to 1.0 or less, or (preferably) 0.5 or less.

[0029] In the FIGS. 1a, 1b embodiment, it will be seen that the tab 26 which has the projecting portion 44 extends fully from the top edge 18 to the bottom edge 20 of the base layer 12. With this arrangement, the vertical joint between horizontally adjacent shingles is fully covered (from top to bottom) by the projecting tab portion 44. However it is not essential that the projecting tab portion 44 extend over the full width of the shingle, although it is desirable that it do so, or at least that it extend over most of the shingle width. It is particularly desirable that the tab 26 extend to a position adjacent (at or near) the top edge 18 of the base layer 12. The bottom edge of the tab 26 can be displaced slightly upwardly from the bottom edge 20 of the base layer 12 (e.g. for decorative purposes), but it should preferably be close to (e.g. within an inch or two of the bottom edge 20 of the base layer 12.

[0030] The reasons for this will best be understood from FIG. 2, which shows portions of three courses of prior art shingles 50 laid on a roof (without any shiplap joints). For purposes of illustration, the prior art shingles 50 may each be assumed to be three units wide (i.e. high) and have vertical joints 52 between horizontally adjacent shingles. In this arrangement, and looking at joint 52-1, it will be seen that the top $\frac{1}{3}$ of this joint (indicated at 52-1a and located in the headlap portion 54) will be covered by the succeeding course, and in addition the bottom third of the joint (indicated at 52-1c) will be protected by the preceding course which is beneath it. However the middle third of the joint (indicated at 52-1b) is exposed and will be penetrated by rain. It is this middle portion 52-1b of the joint which needs to be protected by the shiplap joint. In theory the shiplap joint can extend only a short distance above and below the middle third 52-1b of the joint 52-1 and will provide protection against rain penetration. However in practice this would not normally be sufficient to prevent wind driven rain penetration. Therefore it is preferred that the tab 26 having the projecting portion 44 extend from a position at or close

to the top edge 18, to a position at or close to, or at least not spaced too much above, the bottom edge 20 of the base layer 12.

[0031] Reference is next made to FIGS. 3a, 3b which show a double laminate shingle very similar to that of FIGS. 1a, 1b, and in which primed numerals indicate corresponding parts. The only difference between the FIGS. 3a, 3b embodiment and that of FIGS. 1a, 1b is that in the FIGS. 3a, 3b embodiment, the second layer 24' is formed from a single sheet instead of from a plurality of individual tabs. The second layer 24' contains cutouts or slots 34' extending from its bottom edge over part of its width to form decorative tabs, which can have various colors of granules applied thereto.

[0032] Reference is next made to FIGS. 4a, 4b, which show an embodiment which is the same as that of FIGS. 3a, 3b except that a longitudinally extending narrow strip 60 (which forms a third layer) has been adhered on top of the headlap portion of the double laminate shingle, adjacent the top edge 18'. The length of the narrow strip 60 can be equal to or less than the overall length of the second layer 24'. The strip 60 does not affect the shiplap joint previously described, but when the shingles of FIGS. 4a, 4b are installed on a roof, the butts of the shingles in each succeeding course will line up with the bottom longitudinal edges of the narrow strips 60. Therefore these shingles after installation will to some extent have the appearance of more costly triple laminate shingles.

[0033] FIGS. 5a, 5b show another design which is the same as that of FIGS. 4a, 4b except that strip 60 has been omitted and a narrow strip 62 has now been adhered beneath the base layer 12', flush with the butt or bottom edge 20' of the base layer 12'. Again the length of the narrow strip 62 can be equal to or less than the length of the base layer 12' and will provide the appearance of a more costly triple laminate shingle.

[0034] Finally, reference is made to FIGS. 6a, 6b and 6c, which show an embodiment similar to that of FIGS. 5a, 5b except that the narrow strip or third layer 64 (similar to strip 62) is now irregular in shape, having wider portions 66, which project below the bottom edge 20' of the base layer 12' in selected locations as shown for projections 68. The projections 68 can be of desired width, e.g. 1/4 to 1/2 inch, or they can be of different widths, or they can be slanted, i.e. starting at zero projection and ending at 1/4 or 1/2 inch. The projections 68 will normally have colored granules applied thereto (as will the remainder of the exposed portions of the shingles), but use of granules in the remainder of strip 64 is optional. Preferably the locations for projections 68 are chosen to be aligned with tabs of the second layer, e.g. the second and fourth tabs 28', 32', as shown in FIGS. 6a, 6b. This again provides a more decorative appearance for the shingle, at relatively low cost.

[0035] While preferred embodiments of the invention have been described, it will be understood that modifications may be made within the scope of the invention, and such scope is intended to be limited only by the attached claims.

1. A roofing shingle comprising:

- a) a base layer having first and second longitudinally spaced-apart end edges defining between them a length for said base layer, said base layer also having laterally spaced-apart top and bottom edges defining a width for said base layer, said base layer having an upper surface,

- b) a second layer laminated to said upper surface of said base layer,

- c) said second layer having a first end portion inset from said first end edge of said base layer over at least a substantial portion of the width of said base layer, said first end portion being inset from said first end edge from a position adjacent said top edge of said base layer to a position at or near said bottom edge of said base layer, so that said first end edge of said base layer extends in a longitudinal direction beyond said first end portion of said second layer over said substantial portion of the width of the base layer to form a projecting end of said base layer,

- d) said second layer having a second end portion extending longitudinally beyond said second end edge of said base layer over at least a substantial portion of the width of said base layer, said second end portion so extending from a position adjacent said top edge of said base layer to a position at or near said bottom edge of said base layer to form a projecting end of said second layer,

- e) so that when two or more of said shingles are assembled end to end to form a horizontal course of shingles, said projecting end of said second layer of one shingle will extend over the projecting end of said base layer of an adjacent shingle to form a shiplap joint, whereby to protect the joint between adjacent shingles from penetration by rain.

2. A roofing shingle according to claim 1 and having a headlap area adapted to be covered by the next higher course of shingles, and an exposed area adapted to be visible on a roof, and wherein the ratio of said headlap area to said exposed area is less than or equal to 1.

3. A roofing shingle according to claim 2 wherein said ratio is less than 1.

4. A roofing shingle according to claim 3 wherein said ratio is less than 0.5.

5. A roofing shingle according to claim 3 wherein the length of said projecting end of said base layer and the length of said projecting end of said second layer are substantially the same.

6. A roofing shingle according to claim 5 wherein said length of said projecting portions is between 2 inches and 6 inches.

7. A roofing shingle according to claim 1 wherein said second layer comprises a plurality of separate portions.

8. A roofing shingle according to claim 1 wherein said second layer comprises a single sheet having cutouts therein to form tabs.

9. A roofing shingle according to claim 1 and including a third sheet laminated on top of a portion of said second layer.

10. A roofing shingle according to claim 1 and including a third sheet laminated beneath said base layer.

11. A plurality of roofing shingles each in accordance with claim 1, said roofing shingles being assembled end-to-end to form a horizontal course of shingles with vertical joints between them, at least a substantial portion of said vertical joint between each adjacent pair of shingles being covered by a said projecting end of said second layer of one of said shingles.