

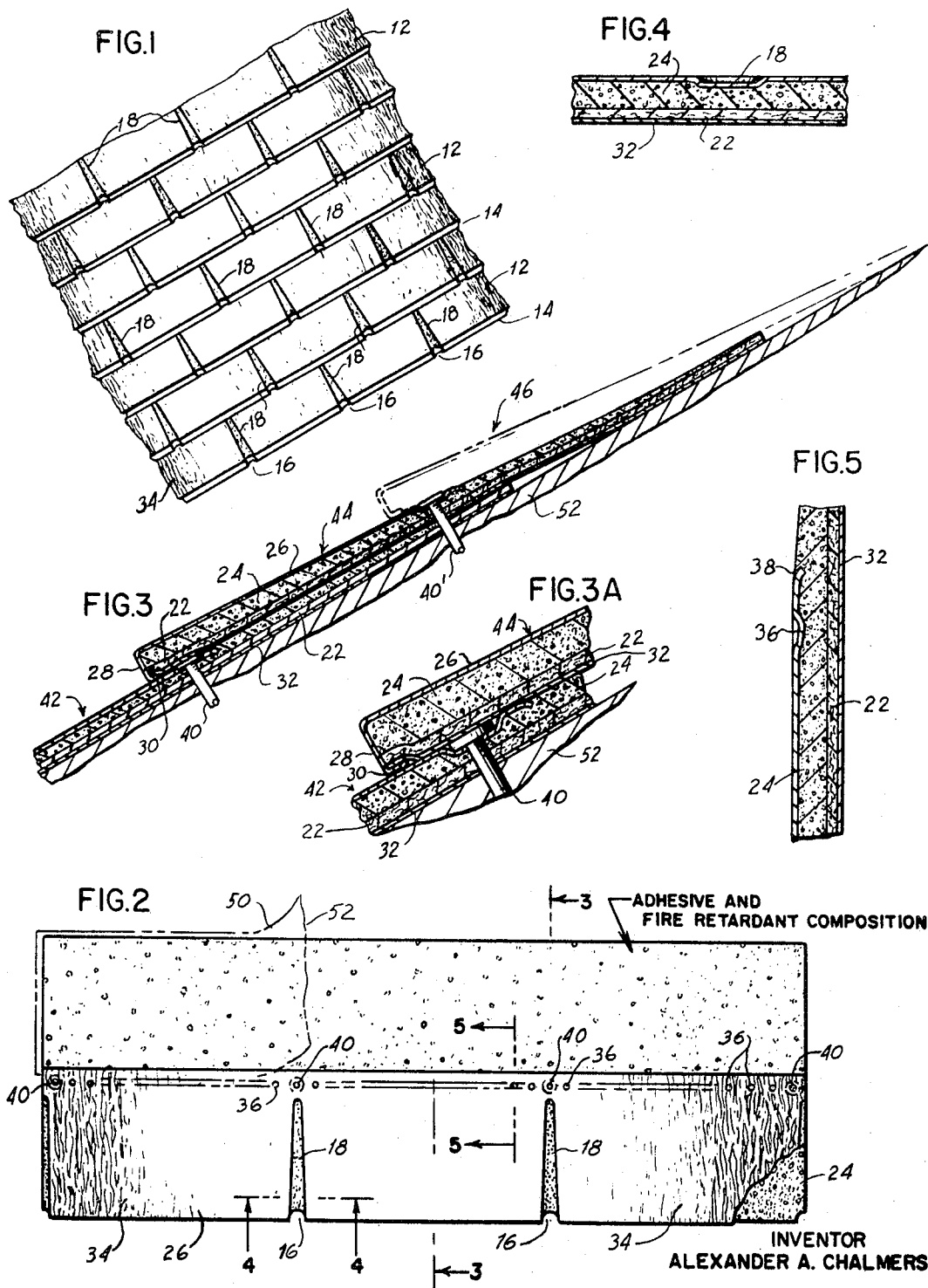
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COMPOSITE STRIP SHINGLE

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ADHESIVE AND
FIRE RETARDANT COMPOSITION

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COMPOSITE STRIP SHINGLE

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11 Claims

ABSTRACT OF THE DISCLOSURE

The strip shingle has a single layer of asphalt saturated felt which is substantially longer than high. A novel and defined composition which is both adhesive and fire retardant is applied over the base to a thickness which, at the lower edge of the shingle is very much greater than the saturated felt, but which tapers in thickness from the lower edge to very little at the upper edge. A thin aluminum sheath is disposed over the lower approximately half of the base, and the lower metal edge is bent around the thick lower edge of the base and then reversely, to form a thick butt edge which is say one-quarter inch thick. The sheet metal is strongly secured to the base because of the highly adhesive character of the composition. The metal sheath and the base are somewhat indented on transverse lines at intervals, and the indentations are darkened in color to simulate the edges of adjacent individual shingles. Both the metal sheath and the base are upwardly notched at the lower ends of these darkened indentations, to break up the continuity of the shadow line at the thick lower edge of the strip. These notches are well rounded or semicircular in outline to avoid sharp inside corners. The bottom of the shingle is coated with thin aluminum foil or paper backed foil which is strongly adhered to the felt, and the lower edge of which is received and clamped beneath the reversely folded edge of the metal sheath. The foil provides heat reflection and a moisture seal. When the shingle strips are applied to a roof deck the lower butt edge of an upper row overlies the upper portion of the metal sheath of the next lower row. The bottom surface of the upper row rests directly on and is adhered to the exposed adhesive composition area of the lower row, thereby adhesively securing the upper row against wind lift.

BACKGROUND OF THE INVENTION

Strip shingles of the asphalt saturated felt type lack a rich heavy appearance, because they are thin at the exposed lower edge. It has been proposed to make strip shingles of formed hollow metal with a thick butt edge, but such shingles are not good for sound and heat insulation, and need many special fittings at valleys and corners. A strip shingle has been suggested which is a composite of multiple layers of saturated felt and a metal sheath, combining the advantages of both. The present strip shingle is an improvement on such composite strip shingles.

SUMMARY OF THE INVENTION

The present strip shingle has a single layer of asphalt saturated felt which is substantially longer than high. A composition which is both fire retardant and adhesive is applied over the base to a thickness which, at the lower edge of the shingle is very much greater than the saturated felt, say three or more times the thickness of the felt, but which tapers in thickness from the lower edge to very little at the upper edge. The composition and felt together form a solid filling for the strip shingle. A thin sheet metal sheath is disposed over the lower

approximately half of the base, and the lower metal edge is bent around the thick lower edge of the base and reversely to form a thick butt edge, which is say one-quarter inch thick. The sheet metal is strongly secured to the base because of the highly adhesive character of the composition, the metal being pressed forcibly against the composition as the base is being clad with the metal.

The metal sheath and the base are somewhat indented on transverse lines at intervals, and the indentations are darkened in color to simulate the edges of adjacent individual shingles. Both the metal sheath and the base are upwardly notched at the lower ends of these darkened indentations, to break up the continuity of the shadow line at the thick lower edge of the strip. These notches are rounded and even semicircular in outline in order to avoid sharp inside corners.

The fire retardant and adhesive composition used is made up of a mixture of coating asphalt, a mineral filler, asbestos fibre, perlite, soya bean oil, and mica, used in a preferred ratio. The filler may be slate or stone or equivalent mineral filler.

The bottom of the asphalt saturated felt is preferably coated with thin metal foil which is strongly adhered to the felt by an adhesive asphalt. The lower edge of the foil is received and clamped beneath the reversely folded edge of the metal sheath. The sheath is preferably made of thin sheet aluminum, preliminarily coated with a vinyl resin paint to give the shingle strip a desired color. Such a paint has been found to be durable and so flexible that the metal may be fabricated into the shingle strip without spoiling the coating. The metal foil applied to the bottom also is preferably made of aluminum, and may be paper backed.

When the strip shingles are applied to a roof deck the lower butt edge of an upper row overlies the upper portion of the metal sheath of the next lower row, and the bottom of the upper row rests directly on and is strongly adhered to the exposed adhesive composition area of the lower row, thereby securing the upper row against wind lift.

The foregoing and additional features are described in the following detailed specification, which is accompanied by a drawing in which:

FIG. 1 is a perspective view showing the appearance of a small piece of roof covered with strip shingles;

FIG. 2 is a front elevation of a single strip shingle embodying features of the invention;

FIG. 3 is a vertical section taken approximately on the line 3—3 of FIG. 3, and also shows the relation of a row to the next lower and higher rows of strip shingle;

FIG. 3A shows a part of FIG. 3 drawn to enlarged scale;

FIG. 4 is a fragmentary section taken approximately on the line 4—4 of FIG. 2, drawn to larger scale; and

FIG. 5 is a fragmentary section taken approximately on the line 5—5 of FIG. 2, drawn to larger scale.

Referring to FIG. 1, the roofing simulates the appearance of individual shingles 12, having a relatively thick exposed butt edge 14. The butt edge is interrupted at intervals by notches 16. The strip shingles are indented and darkened on a transverse line above each notch, as is indicated at 18. The strip shingles are laid in staggered formation, as is usual in roofing.

Referring now to the other figures of the drawing, the strip shingle comprises a single layer of asphalt saturated felt 22, this being substantially longer than high, as shown in FIG. 2. In the specific case shown, the strip shingle is three feet long, and one foot high, and has the darkened lines 18 at intervals of one foot to simulate shingles one foot wide, but of course different widths may be simulated by changing the spacing. A so-called thirty pound

asphalt felt which is commercially available and has a thickness of close to $\frac{1}{16}$ inch may be used. A range from 20 pound to 60 pound felt is usable.

The highly adhesive and fire-retardant composition 24 is applied over the felt 22 to a thickness which, at the lower butt edge is very much greater than that of the saturated felt. As here shown, the composition at the lower edge builds the base up to a thickness of about $\frac{1}{4}$ inch, and the composition tapers from the lower edge to very little at the upper edge, but it is definitely continued all the way to the upper edge, and may have a thickness there up to say $\frac{1}{16}$ inch. At the upper edge the thickness of the composition may be comparable to that of the single layer of felt. A thin metal sheath 26 is applied over the lower approximately half of the base, and the lower metal edge is bent around the thick lower edge of the base as shown at 28, and reversely as shown at 30, at the thick butt edge. This sheet metal is thin but is strongly secured to the base because of the adhesive character of the composition 24.

Referring to FIGS. 2 and 4, the metal sheath and the base are somewhat indented by the transverse lines 18 at intervals, and the indentations are darkened in color to simulate the edges of or the shadow line between adjacent individual shingles.

The top metal 26, the composition base, and the bottom metal 30 all are punched away to form the notches 16. These notches are rounded in outline, in order to avoid sharp inside corners, and in preferred form they may be semicircular, or slightly deeper but terminated at the top by a semicircle. It has been found that if the notches are rectangular, the resulting sharp inside corners become points of weakness, in that there is a tendency to tear at the corners during the punching operation. Moreover, the half-round notches accommodate expansion and contraction with changes of temperature, which otherwise cause metal fatigue and the formation of cracks radiating from the sharp corners as a result of repeated expansion and contraction over a period of years.

The coating on the indented lines 18 and around the edge of the rounded notches 16 is black, or a dark color which is related to the shingle color may be used, that is, very dark brown for a brown shingle, very dark green for a green shingle, etc.

The fire-retardant and adhesive composition 24 preferably comprises a mixture of coating asphalt, mineral filler, asbestos, perlite, soya bean oil, and mica. More specifically, in a preferred formulation it comprises 75 parts of coating asphalt to 30 parts of mineral filler to 10 parts of asbestos fibre to 10 parts of perlite to 5 parts of soya bean oil, and 5 parts of mica, this proportion being by weight. The asbestos fibre may be sized as 7RS type, the soya bean oil may be alkali refined or it may be raw, the latter being less expensive. This composition may initially burn, but in burning it cokes and forms a skeletal insulated blanket which prevents spread of flame, so that the undersurface is preserved and therefore the usual wood roof deck is preserved. The weights given in the above formulation may vary a reasonable amount, say plus or minus 20 percent.

In preferred form the bottom of the shingle is preferably coated with a thin metal foil 32, this being adhered to the asphalt saturated felt 22 by an adhesive asphalt. The asphalt is applied hot and includes in it a hot melt adhesive, so that the foil is strongly adhered. The foil is preferably applied before the metal sheath 26 is added, the lower edge of the foil 32 then being received and clamped beneath the reversely folded edge 30 of the metal sheath.

The metal sheath is preferably sheet aluminum having a thickness of between six and twelve thousandths of an inch. This is thin enough so that a shingle strip is readily cut on the job to desired length to fit a roof end or a valley, etc., as by scoring with a knife, or by using shears. The aluminum may be utility grade sheet aluminum. A

good example is the No. 3105 alloy, treated to be "half hard." It is preferably embossed to give it a wood grain finish, as is suggested at 34 in FIGS. 1 and 2. This embossing is only partially shown in FIG. 2, but is used over the entire surface, but not in the indentations 18. The embossing increases the adherence of the sheet metal to the composition.

The shingles may be given any desired color, and for this purpose a "Plastisol" vinyl resin paint is used, this being so flexible that the sheet aluminum may be coated before being fabricated around and embossed as a part of the strip shingle, and it is so durable that it has a life expectancy of twenty years or more.

The solid filling of the sheath by the base results in a sturdy strip shingle. For example, it may be walked on without denting or spoiling the shape of the metal on the shingle.

The foil 32 is preferably aluminum foil and it may have a thickness of the order of 0.00035 inch. It provides a desirable heat reflection in addition to that provided by the aluminum sheath, and it also acts as a vapor barrier to prevent moisture from penetrating through the shingle from the bottom and working its way upward. The foil may be a commercially available paper backed or laminated foil, which is easier to handle and apply.

In FIG. 2 it will be seen that there is a line of small round indentations 36 near the upper portion of the metal sheath. These result from pressure by a feed wheel or feed chain as the materials are fed in strip form during application of the metal sheath to the base. They help adhere the sheath to the composition, in addition to helping feed the material. The top edge of the sheath is preferably indented somewhat into the composition as shown at 38 in FIG. 5. This too is accomplished during fabrication of the shingle. These things result in strong adherence of the thin sheet aluminum to the base, as is desired.

The line of indentations 36 acts also as a nailing guide when applying the strip shingle in rows. Very few nails are needed to anchor the shingles to the roof deck, and it is sufficient to use four nails on a strip shingle three feet long, one nail being driven near each end, and two more being located above the upper ends of the indented shadow lines 18, as indicated in FIG. 2 by the numerals 40. If desired, more nails may be used, say three more, one in the middle of each simulated shingle, making seven in all. The nail guide 36 would serve for any number of nails.

The overlapped relation of the strip shingles is shown in FIGS. 3 and 3A. In the specific case shown the shingle is twelve inches high, and the overlap is such that only five inches are exposed. The metal 26 is wider, say $6\frac{1}{4}$ inches wide, leaving $5\frac{3}{4}$ inches of adhesive composition exposed above the metal. The nails are driven in the concealed upper part of the metal sheath which part is $1\frac{1}{4}$ inches wide, the nails being protected by the next higher row of strip shingles. In FIG. 3 the nail 40 for the row 42 is covered by the next row 44, and nail 40' for the row 44 is covered by the next row 46, shown in broken lines. Each nail goes through two shingles, that is, it passes through the exposed composition area of the next lower row, in addition to passing through the metal sheath of the row being nailed.

There is a minimum thickness of two superposed shingles, and at the nailing line there are three superposed shingles, two of which receive the nail, and the third of which is disposed over and covers the nails.

In the drawing it will be seen that the bottom of shingle 44 rests directly on and therefore becomes adhered to the exposed adhesive composition area of the lower shingle 42. Similarly the bottom of the next higher shingle 46 rests directly on and becomes adhered to the exposed adhesive composition area of shingle 44. This requires direct surface-to-surface contact, and there is no interference with such contact because the heads of the nails 40 and 40' are readily sunk, the thin aluminum and the composi-

tion both yielding enough to receive the nail heads. The reversely folded edge 30 of the aluminum sheath is greatly exaggerated in thickness in the drawing, and in practice is very thin and presses against the base of the shingle enough to provide a flush or flat bottom surface for the entire shingle. The upper edge of the metal sheath shown at 38 in FIG. 5 also is exaggerated in thickness in the drawing, and in practice is readily pressed to a flush relationship with the composition material. The nailing operation itself increases the adhesion. In consequence there is a firm adherence of shingle-to-shingle without the use of a special extra adhesive strip, or a mechanical interlock.

In ordinary asphalt-felt shingles the asphalt material is initially protected by granules, but the granules erode away, and then the exposed asphalt dries out and deteriorates. In the present construction the composition area in the upper half of the shingle is permanently covered by the next higher row of shingles, and the exposed lower half of the shingle is permanently protected by the metal sheath cemented thereon.

Because of the highly adhesive nature of the composition material, the strip shingles are covered with a so-called "release" paper during storage and shipment. The release paper has an area at least coextensive with the exposed composition area shown in FIG. 2, and in practice is preferably a little larger in both length and width so that it is readily applied and readily peeled off. In FIG. 2 a portion of the release paper is shown at 50, as though being removed by being pulled from the right toward the left, but with much of the paper broken away as indicated at the irregular broken line 52. A possible dimension for such paper is suggested in broken lines.

It will be understood that alternate strip shingles are reversed when stacking and storing the shingles, so that the thick butt edge of one shingle is at the thin edge of the subjacent and superjacent shingles. The shingles complement one another to compensate for their taper, and are protected against undesired adhesion by the release paper.

In FIGS. 3 and 3A, the shingles are shown applied to a generalized deck 52, with no attempt made to show the structure of the deck. This may comprise wooden planks, or large area waterproof plywood boards. Usually the wood surface is preliminarily covered with long continuous lengths of asphalt-impregnated roofing felt, to provide an "underlayment" beneath the shingles. This underlayment is purposely not shown here on the deck 52 in order to more clearly show the parts of the present strip shingles. The shingles may be used as siding as well as roofing.

It is believed that the construction and method of use of my improved strip shingle, as well as the advantages thereof, will be apparent from the foregoing detailed description. It will also be understood that while I have shown and described the shingle in a preferred form, changes may be made without departing from the scope of the invention.

I claim:

1. A shingle comprising a single base layer of asphalt saturated felt which is substantially longer than wide, an adhesive composition applied over the felt to a thickness which is very much greater than that of the saturated felt at the lower edge of the shingle and which tapers in thickness toward the upper edge, said adhesive composition extending and tapering all the way from the lower edge to the upper edge, a thin metal foil coating secured to the bottom of the felt by an adhesive, said foil covering substantially the entire bottom of the shingle, a thin sheet metal sheath over only the lower approximately half of the base, said composition and felt forming a solid filling for the metal sheath, the lower metal edge being bent around the thick lower edge of the base and reversely to form a thick butt edge, the sheet metal sheath being strongly secured to the base because of the adhesive

character of the composition, and the upper half of the base having exposed adhesive composition to receive and adhesively hold the lower half of a next higher shingle when the shingles are laid.

2. A shingle as defined in claim 1, in which the adhesive composition is also a fire retardant composition, and in which the metal sheath is somewhat indented on transverse lines at intervals, and the indentations are darkened in color to simulate the edges of a plurality of adjacent individual shingles.

3. A shingle as defined in claim 2, in which the metal sheath and the base are upwardly notched at the lower ends of the darkened indentations in order to break up the continuity of the shadow line at the thick lower edge of the strip, said notches being rounded in outline in order to avoid sharp inside corners.

4. A shingle as defined in claim 3, in which the fire-retardant and adhesive composition comprises coating-asphalt, mineral filler, asbestos, perlite, soya bean oil, and mica.

5. A shingle as defined in claim 3, in which the fire-retardant and adhesive composition comprises coating-asphalt, mineral filler, asbestos, perlite, soya bean oil, and mica in a ratio of approximately 75, 30, 10, 10, 5 and 5 parts by weight respectively.

6. A shingle as defined in claim 4, in which the metal sheath is made of sheet aluminum having a thickness of between six and twelve thousandths of an inch, the said aluminum being coated with a flexible coating of desired color, and in which the metal foil at the bottom of the shingle is aluminum foil having a thickness of the order of 0.00035 inch.

7. A shingle as defined in claim 1, in which the adhesive composition comprises a coating-asphalt, mineral filler, asbestos, perlite, soya bean oil, and mica in a ratio of approximately 75, 30, 10, 10, 5 and 5 parts by weight respectively, said composition being fire retardant as well as adhesive.

8. A shingle as defined in claim 1, in which the metal sheath is made of sheet aluminum having a thickness of between six and twelve thousandths of an inch, the said aluminum being coated with a flexible durable coating of desired color.

9. A shingle as defined in claim 1, in which the metal sheath and the base are upwardly notched at intervals in order to break up continuity of the shadow line at the thick lower edge of the strip, said notches being rounded in outline in order to avoid sharp inside corners.

10. In combination, a plurality of rows of strip shingles, each shingle comprising a single base layer of asphalt saturated felt which is substantially longer than wide, an adhesive composition applied over the felt to a thickness which is very much greater than that of the saturated felt at the lower edge of the shingle and which tapers in thickness toward the upper edge, said adhesive composition extending and tapering all the way from the lower edge to the upper edge, a thin metal foil coating secured to the bottom of the felt by an adhesive, said foil covering substantially the entire bottom of the shingle, a thin sheet metal sheath over only the lower approximately half of the base, said composition and felt forming a solid filling for the metal sheath, the lower metal edge being bent around the thick lower edge of the base and reversely to form a thick butt edge, the sheet metal sheath being strongly secured to the base because of the adhesive character of the composition, and the upper half of the base having exposed adhesive composition, the lower butt edge of an upper row overlying the upper portion of the metal sheath of a next lower row, the bottom of the upper row resting directly on and being adhered to the exposed adhesive composition area of the lower row, the adhesive quality of the composition of the lower row securing the upper row against wind lift, each row being secured by widely spaced nails driven through that upper part of the metal sheath that is subsequently covered by the lower

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part of the next higher row, said nails also passing through the unsheathed upper part of the next lower row.

11. The combination defined in claim 10, in which the adhesive composition is also a fire retardant composition, said composition comprising coating-asphalt, mineral filler, asbestos, perlite, soya bean oil, and mica, in a ratio of approximately 75, 30, 10, 10, 5 and 5 parts by weight respectively, and in which the metal sheath is somewhat indented on transverse lines at intervals, and the said indentations are darkened in color to simulate the edges of a plurality of adjacent individual shingles, and in which the metal sheath and the base are upwardly notched at the lower ends of the darkened indentations in order to break up the continuity of the shadow line at the thick lower edge of the strip, and said notches being rounded in outline in order to avoid sharp inside corners.

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