Dec. 10, 1968 D. F. COLETTA 3,415,029

ROOFING MATERIAL

Filed Aug. 4, 1966

FIG. 1

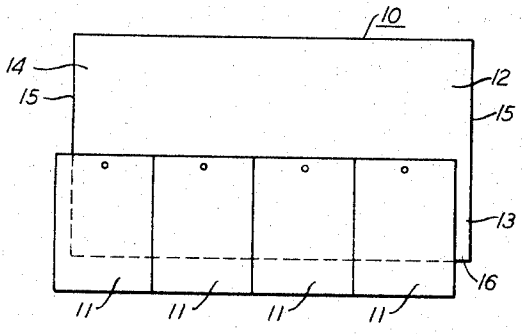


FIG. 2

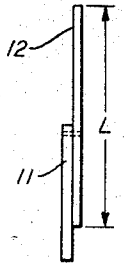


FIG. 3

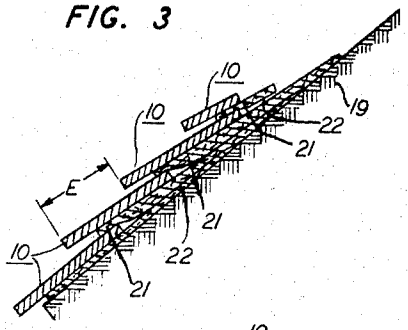
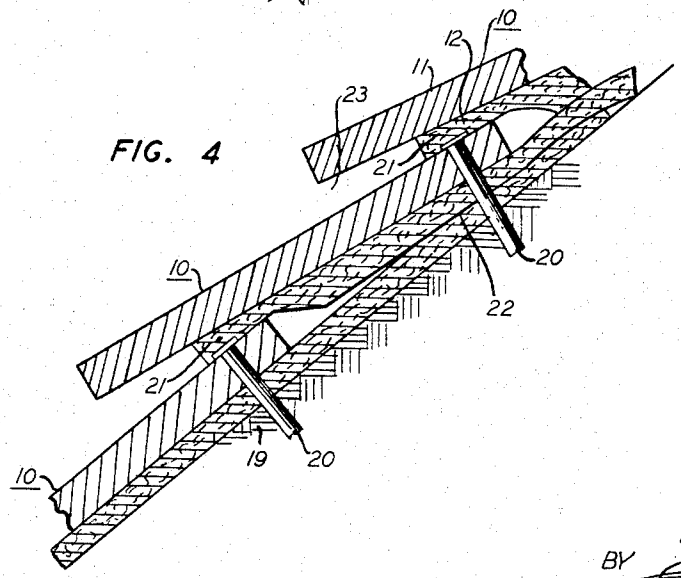


FIG. 4



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ROOFING MATERIAL

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This invention pertains to roofing materials and relates to shingles in particular.

It is broadly the object of this invention to improve roofing materials.

Roofing materials are divided generally into two commonly used types; viz, slate and composition. Composition roofing material is relatively inexpensive and can be installed by persons having little mechanical skill. However, it is susceptible to atmospheric decomposition and must be replaced long before the building it covers wears out.

Slate and other rigid roofing material similar to slate, on the other hand, resist decomposition indifinitely. Installation, however, is very expensive because it requires trained, skillful artisans. Moreover, rigid roofing material requires special structural design to insure adequate support for its weight, it has both a high maintenance cost and a high material cost, it must be installed with a base sheet in order to provide a waterproof covering, it cannot be walked upon without risking severe damage, voids which admit weather under the roof are an inherent problem, and it is limited to roofs having a 6 inch on 12 inch pitch. Furthermore, rigid roofing and slate in particular is a poor insulator in the sense that it absorbs heat and radiates it inwardly for prolonged periods thereby increasing cooling costs. Finally, it is difficult to join one roof to another at the valleys without causing damage.

Accordingly, an object of this invention is to incorporate the desirable qualities of slate and composition roofing materials into a single roofing material without including the undesirable qualities.

A more specific object of this invention is to provide a shingle which is easy to install but which lasts indefinitely.

Still another object of this invention is to increase the amount of protection which can be provided by a roof.

According to a preferred embodiment of this invention, slate pieces are combined with an underlayment or backing sheet to form a shingle. Each shingle in the preferred embodiment comprises four slates and the backing sheet. The slates are aligned with each other on the backing sheet in side by side abutting relationship and the backing sheet has a length L equal to at least 2E.

One side of the first slate overlaps one edge and one side of the backing sheet to form a space. The last slate, on the other hand, forms a space by overlapping the same edge of the backing sheet overlapped by the first slate, but is itself overlapped by the other side of the backing sheet. The remaining slates are aligned between the first and last slates and also form spaces by overlapping the edge of the backing sheet.

When successive shingles are laid up on a roof, the backing sheet on each overlapping shingle contacts the backing sheet on the shingle it overlaps and forms a seal. Furthermore, each overlapping shingle is disposed so that its space is located over the seal, the seal extends beyond the end of the overlapped slate and a portion of the surface of the slate in the overlapped shingle is left exposed for a length E.

These and other aspects of this invention will be more

fully understood from the following detailed description when taken in conjunction with the drawing in which:

FIG. 1 in a plan view of a shingle constructed in accordance with this invention;

FIG. 2 is an end view of the embodiment shown in FIG. 1;

FIG. 3 is a partial end view of several shingles laid up over a roof; and

FIG. 4 is an enlarged detail portion of the shingles shown in FIG. 3.

Referring now to FIG. 1, a shingle 10 is shown which comprises a plurality of slates **11** and an underlayment or backing sheet **12**. The backing sheet **12** is advantageously flexible and made from a quality material such as a composition of asphalt, asbestos and felt without filters. The slates **11** are advantageously made of quarried stone although other impervious mtaerials such as plastic or the like are also satisfactory.

The slates **11** are positioned side by side and in line with each other on the backing sheet **12**. Each slate is placed so as to abut tightly against its neighbor and thereby form a tight joint which will protect the backing sheet **12** from the atmosphere in general and the rays of the sun in particular. As shown in FIG. 1, the slates **11** cover only the lower portion **13** of the backing sheet **12** while the upper portion **14** remains uncovered.

When assembling the shingle **10**, each slate **11** is first coated on one side with a mastic. Many suitable mastics are available commercially as, for example, 400 type as manufactured by the Philip Carey Company. The one chosen, however, should be mixable with an agent which will tend to dissolve the material of the backing sheet **12**. This is not absolutely essential, but it will improve the bond between the slates **11** and the backing sheet **12**. It is important, however, that the selected mastic remain pliable in order to allow for expansion and contraction of the constituents of the shingle **10** after assembly.

The mastic coated slates **11** are next positioned on the backing sheet **12**. As shown in FIGS. 1 and 2, they are positioned to overlap the backing sheet **12** on one side **15** and along one edge **16**. Specifically, one side **15** and the edge **16** are overlapped.

The purpose of the overlap is fourfold. First, it hides the backing sheet **12** and thereby protects the appearance of the finished roof. Second, it reduces the possibility that mastic will smear over the completed roof during construction. Third, it contributes to a good bond between adjacent shingles; that is, the side which is not overlapped on one shingle fits under the overlapped slate on an adjacent shingle and forms a bond. When adjacent shingles are bonded in this fashion, each shingle course effectively becomes a single continuous cover.

Finally, the overlap encourages a secondary seal between overlapping shingle layers. This last will be described in more detail below.

It has been found that when the shingle **10** is being assembled with slates overlapping the backing sheet, the slates can be positioned on the backing sheet in accordance with the relationship L equal to at least 2 times E. L is shown in FIG. 2 and is defined as the length of the edge of the backing sheet **12**. E. shown in FIG. 3 and is defined as the amount of slate surface which is uncovered and exposed to the weather when the slate is overlaid by another shingle.

Assembly of the shingle **10** is completed when the

slate and backing sheet combination is placed on a stack of other shingles for curing under pressure. Curing is advantageously carried out at room temperature for an interval of approximately three days.

Shorter curing, however, can be achieved by subjecting the assembled shingle **10** to elevated pressure after assembly. For example, if the shingle **10** is pressed until the mastic coating on the slates **11** impregnates the material in the backing sheet **12**, the shingle **10** will be sufficiently cured and can be used immediately.

It is important that bonding be performed carefully. When done properly, the resulting shingle will be a unitary structure which is resistant to shear failure and is practically impervious to heat as well as being impervious to moisture, dust and other atmospheric elements.

As shown in FIG. 3, the completed shingles **10** are installed on a roof sheathing **19** where they are held in place by the nails **20**. The shingles **10** overlap each other and form two sets of seals. The first set of seals occurs at points **21** while the second set of seals occurs at points **22**. The two sets of seals complement each other and effectively double the resistance of the final roof to the penetration of atmospheric elements. In fact, with the double seals, the final roof is so resistant to penetration that it functions as a vapor barrier. Both sets of seals form principally in response to heat of the sun and pressure exerted by successive shingle layers.

Because of the double seal between overlays of the shingles **10**, there are no voids leading from the outside to the inside of the roof. Capillary action, therefore, is prohibited and moisture is unable to penetrate the space covered by the roof. As a consequence, it is no longer necessary to provide the base paper which heretofore has been a necessity between the sheathing and conventional roofing materials.

As illustrated in detail in FIG. 4, the slates and the backing sheet **12** overlap to form at the end of the shingle **10** a recess or space **23** which encourages a secondary seal between overlapping shingles **10**. Specifically, a secondary seal is encouraged between the overlapping shingles **10** at the point **22** located directly below the space **23**. More precisely, the secondary seal forms at the point **22** in response to heat from the sun, and the formation thereof is assisted by the overlap wherein the absence of the insulating backing sheet **12** permits a greater heat flow to the seal.

Where the overlapping shingles **10** are subjected to substantial amounts of summer sunlight, the secondary seals form readily. Where the roof is shaded, however, the secondary seals are more difficult to form. But, by extending the ends of the slates **11** over the backing sheet **12** to form the space **23**, a significant amount of insulation is removed from between the secondary seals and the heat of the sun. Thus, in areas deficient in sunlight, extending the slates **11** over the backing sheet **12** to form an overlap substantially increases the ability of the secondary seals to form.

In conclusion, therefore, a revolutionary type of roofing material has been described herein. With it, roofing costs are reduced, construction is simplified and maintenance is substantially eliminated. While only one embodiment has been disclosed, it is merely illustrative of the invention and others skilled in the art will readily recognize other embodiments which will fall within the scope of the invention.

I claim the following as my invention:

1. In a roof covering, the combination comprising:

a first shingle having a first backing sheet made of a composition of asphalt, asbestos and felt without fillers and a rigid first roofing member, said first backing sheet and said first roofing member being joined by a mastic to form a unitary structure;

a second shingle having a second backing sheet made of a composition of asphalt, asbestos and felt without fillers and a rigid second roofing member, said second backing sheet and said second roofing member being joined by a mastic to form a unitary structure, said second shingle being laid over said first shingle with said second backing sheet in contact with said first roofing member at a first point and in contact with said first backing sheet at a second point, said second point being located beneath said second roofing member and said first and second backing sheets being joined to form a seal extending between said second point and a third point located beyond the end of said second roofing member; and

a third shingle having a third backing sheet made of a composition of asphalt, asbestos and felt without fillers and a rigid third roofing member, said third backing sheet and said third roofing member being joined by a mastic to form a unitary structure and being juxtaposed to form a recess at one end of said third shingle, and said third shingle being laid over said second shingle in a position wherein said recess is located above said second point whereby ambient heat in low temperature areas is readily transmitted to the area of said seal without passing through said third backing sheet in order to improve the propensity of said seal to form at said second point.

2. The combination in accordace with claim **1** wherein said third shingle is disposed over said second shingle in a position wherein said third roofing member overlaps less than half of said second roofing member, a length E of said second roofing member is left exposed and said second backing sheet has a length L equal to at least 2E.

3. The combination in accordance with claim **1** wherein said second backing sheet and said third backing sheet are in contact at said third point.

4. In a roof covering, the combination comprising:

a first shingle including a first backing sheet made of an asphaltic material and a rigid first roofing member;

a second shingle including a second backing sheet made of an asphaltic material and a rigid second roofing member, said second shingle being laid over said first shingle with said second backing sheet in contact with said first roofing member at a first point and in contact with said second backing sheet at a second point, said second point being located beneath said second roofing member, said first and second backing sheets being joined in a seal extending between said second point and a third point located beyond the end of said second roofing member, and said first and second backing sheets each being joined to said first and second roofing members, respectively, by a mastic to form unitary structures; and

a third shingle including a third backing sheet made of an asphaltic material and a rigid third roofing member, said third backing sheet being joined to said third roofing member by a mastic to form a unitary structure and said third shingle being laid over said second shingle with said third backing sheet in contact with said second roofing member.

5. The combination in accordance with claim **4** wherein said third backing sheet and said third roofing member are juxtaposed to form a recess at one end of said third shingle and said third shingle is positioned over said second shingle with said recess located over said seal.

6. The combination in accordance with claim **4** wherein said second backing sheet and said third backing sheet are in contact at said third point.

7. The combination in accordance with claim **4** wherein said third backing sheet and said third roofing member are juxtaposed to form a recess at one end of said third shingle and said third shingle is positioned over said second shingle with said recess located over said seal

and said second and third backing sheets are in contact at said third point.

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U.S. Cl. X.R.

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