VENTILATING COVERING ELEMENT FOR BUILT-UP ROOFING

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ABSTRACT OF THE DISCLOSURE

A ventilating felt for use between a roof deck and a roof membrane is coated with a bituminous layer provided with interconnecting grooves. The felt is installed on the roof with the grooved side down to permit air and water vapor entrapped between the roof covering and the deck to escape.

This application is a continuation of 333,003 filed Dec. 24, 1963, now abandoned.

This invention relates to built-up roofing, and more particularly, to a novel roof covering element and a roofing arrangement employing the same for ventilating a built-up roof.

Built-up roofing is comprised of a number of layers of bitumen impregnated roofing felt laid on a shingling of insulating board or, in many cases, directly on the roof deck. Hot bitumen is rolled over each layer of felt during application of the roofing to adhere the layers together and to provide a waterproof coating between the felt layers. The uppermost felt is sometimes manufactured, or covered on the job, with a thin bituminous coating on its outer surface, or with a bituminous coating having surfacing material, such as gravel, embedded therein. The lowermost or base felt is usually heavier than the others to provide better insulation and to help smooth out uneven roof deck surfaces. It also provides a waterproof barrier in addition to the one provided by the built-up roof itself.

A serious difficulty often associated with built-up roofing is the presence of blisters often in and under the membrane formed by the roofing felts. Blisters are primarily caused by expansion of air and water vapor entrapped between adjacent layers of felt or between the lowermost layer and the roof deck. Because it is virtually impossible to prevent moisture from collecting in a built-up roof, attempts have been made to provide for its escape after it has become entrapped. An early attempt involved the use of perforated roofing felts on the theory that air, which normally might be entrapped between adjacent layers of felt, and steam, which might be generated from moisture contained in the felt upon contact or proximity of the hot coating asphalt, could escape through the perforations. This expedient, however, does not prevent subsequent collection of moisture or air immediately above the roof deck surface and immediately beneath the roof membrane surface.

Another method of permitting the escape of air and water vapor involves a special ventilating felt of different construction than the usual saturated felt, the special felt being adapted for installation between the roof deck and subsequent layers of felt. This product comprises a roofing felt coated with a bituminous composition which has a number of spaced, relatively large granules embedded in the surface thereof. The felt is applied with the granule side down, so that vapor, which is present or subsequently collects between the roof deck and the felt, can pass through the passageways formed by the spaces between the granules. Because the passageways are interconnected and extend to the edge of the roofing, water vapor can escape to the air.

While this system is effective, in that it provides passageways through which air and water vapor may flow, it has a number of disadvantages. The relatively large granules which are required, ranging from about No. 14 U.S. mesh to ¼ inch in diameter, tend to puncture the felt on which they are supported. Moreover, because the granules are large in comparison with the thickness of the bituminous coating in which they are embedded, their adhesion to the coating is often poor, and many granules become loose and fall off during application of the felt. These loose or unbound particles become a serious problem in the application of subsequent layers of felt, causing punctures and forming pockets in which air or vapor can be entrapped. Furthermore, the manufacture of such felt is sometimes difficult because the required special grading of gravel is not readily available in all locations.

An object of the present invention is to provide a novel roofing felt having passageways therein through which gases may pass, which felt can be easily and rapidly applied to a roof support.

Another object of the invention is to provide a ventilating roofing felt which is simple and economical to manufacture.

A further object is to provide a built-up roofing arrangement which will not normally blister.

Another object is to provide a ventilating roofing felt which can take the place of a base felt.

Briefly, the invention involves a roof covering element comprising a base carrier web having a bituminous coating on a major surface thereof, the coating having a plurality of intersecting grooves extending to the edges thereof. The element is applied directly to the roof deck or the insulating boards forming the roof base, with the grooved coating engaging the roof base. The element may be adhered by spot or other discontinuous mopping of adhesive, or it may be nailed to the roof base, so long as a reasonable flow of air or other gases is permitted in the grooves, and so long as there are enough grooves to preclude isolation of substantial areas of the coating from communication, through the grooves, with the atmosphere, at the edges of the coating of areas of the grooved coating. Gases which enter the space between the roof base and the covering element can flow through the passageways formed by the grooves and out into the air, thus substantially eliminating the danger of blister formation.

The nature of the invention will be more fully understood, and other objects may become apparent, when the following detailed description is considered in connection with the accompanying drawing, wherein:

FIG. 1 is a pictorial representation of a portion of a ventilating felt;
FIG. 2 is a partial plan view of the underside or grooved surface of the ventilating felt;
FIG. 3 is a sectional view taken on line 3—3 of FIG. 1;
FIG. 4 is a pictorial representation of a section of roof having ventilating felt and other roofing felt plies thereon;
FIG. 5 is a sectional view taken on line 5—5 of FIG. 4;
FIG. 6 is a sectional view similar to that of FIG. 5, but showing a slightly modified joint arrangement;
FIG. 7 is a partial plan view of the grooved surfaces of two adjacent courses of ventilating felt; and
Referring to FIG. 1 of the drawing a roof covering element or ventilating felt, is indicated generally at 18. The covering element comprises a base web 12 having a bituminous coating 14 on a major surface thereof. The web 12 may comprise any of the well-known roofing felts,
either organic or inorganic. Such felts are usually saturated with asphalt at the plant for purposes of waterproofing. Preferred roofing felts are asphalt saturated rag, asbestiform or glass fiber felts.

As best shown in FIG. 2, the coating 14 is provided with a number of intersecting grooves 16 and 18, shown here as being arranged at right angles, but which may take any desired pattern, so long as the grooves which terminate at one edge of the ventilating felt communicate with the groove which terminate at an adjoining edge. If desired, the ventilating felt may be provided with a selvage strip 19, that is, a strip adjacent one of the long edges of the web which has no bituminous coating. The selvage strip is useful in applying the ventilating felt to a roof deck, as will be brought out more clearly hereinafter.

Referring to FIG. 3, the surface of the base web or felt 12 opposite the coating 14 may be provided with a relatively thin bituminous coating 20. Such coatings are commonly applied to the upper surface of base webs or felts intended for use as base sheets in a built-up roof, and are normally applied to the intermediate ply felts.

For the purpose of this invention, the ventilating felt may, or may not be coated on its upper surface, since this coating does not affect the ability of the felt to ventilate gases from between the roof deck and the felt. Talc, sand, or other particulate material may be provided on the coating 14 to prevent sticking when the felt is rolled up in a package. Of course, the coating 20 also may be so coated, if desired.

The thickness of the upper coating 20 and the carrier base or felt 12 may vary according to the type of product desired to be manufactured. The base web or felt must be strong enough so that it can adequately carry the relatively thick bituminous coating 14. The cross-sectional design of the grooves may vary, as may the groove dimensions and groove spacing. The over-all design should be such, however, that the groove pattern permits gas to flow in the grooves from any point on the roof surface to the air. This means that the grooves should be spaced sufficiently close so as to practically preclude any accumulation of gas between the ventilating felt and the roof deck and between grooves. Ranges of dimensions which have been found to effectively permit passage of gases to the air are:

- Groove size—1/8 inch to 3/8 inch in width 15 mils to 100 mils in depth
- Groove spacing—1/4 inch to 3 inches on center
- Coating thickness—15 mils to 150 mils

In the manufacture of the ventilating felt described above, care must be taken so that the bituminous coating 14 does not flow and fill the grooves. This difficulty may be overcome by employing a bitumen which has a high viscosity, or by adding a sufficient amount of filler material, such as, for example, talc or limestone, to increase its viscosity. Since lower viscosity asphalts are preferred, for reasons of economy and handling, it is highly desirable to use a filled coating composition. It is preferred to use a asphalt having a melting point about 10°F. to 50°F. above 77°F. The amount of mineral stabilizer or filler to be used should preferably range between 0–60%, depending upon the type of asphalt. If the melting point of the asphalt is high, the amount of filler required is less.

During manufacture, sand or other particulate material may be deposited on the coating surface immediately after the coating composition has been applied, and while it is still wet. After this dusting or surfacing operation, the coated web may be subjected to the action of an embossing roll to form the grooves in the coating composition. It should be understood that the sand or other particulate material deposited on the coating composition should be a great deal smaller than the large granules employed in the prior art ventilating felt described earlier, and thus not be the cause of the manufacturing and performance difficulties mentioned in connection with such prior art arrangements.

FIG. 4 of the drawing illustrates the ventilating felt of the present invention applied on a roof deck 24. Ventilating felt 19a is applied directly on the deck 24, while felt 19b is applied to the deck adjacent 16a and overlies the edge thereof at 26. The overlapping portion of felt 19b corresponds to the selvage strip 19, shown in FIG. 2. The ventilating felts are illustrated as being covered by widths of roofing felts 28, 29, and 30 to form a built-up roof.

Referring to FIG. 5, the selvage strip 19b of carrier web or felt 12b is illustrated as overlapping the edge portion 32 of the ventilating felt 19a to form overlapping portion 36. The undersurface of the strip 19b engages the upper corner 33 of edge portion 32, which is higher above the roof deck than the normal position of the undersurface of the web 12b, thus creating a gap or space 34 between the adjacent coatings 14a and 14b. This gap ensures a conduit or passageway between adjacent courses of ventilating felt. It will be understood that the joint between adjacent courses or widths of ventilating felt need not be a lap joint, but may be a butt joint, in which event there would be no need for a selvage strip. But a butt joint is more time consuming to apply and is more costly, since to obtain a waterproof structure the joints should be tape instead of merely using ordinary asphalt adhesive. In case of a lap joint, furthermore, a lap joint automatically exhausts the gap or space between adjacent courses of ventilating felts.

The gap may be provided by a modified arrangement such as that shown in FIG. 6, wherein the edge portion 36 is not as thick as the remainder of the felt 38, but is about as thick as the coating 40 of the adjacent felt 42. By making the reduced thickness portion 36 of less width than the selvage strip 44 of the felt 42, the edge of the selvage strip abuts the felt 38 along the line corresponding to the beginning of the reduced thickness portion 36, and a gap 34 is provided. With this modification, a relatively smooth lap joint may be obtained.

Referring to FIG. 7, it is seen that adjacent courses of ventilating felts need not be exactly in alignment, but may be displaced by part of or more than the width of a groove 18, since the gap 34 connects the grooves 18 of one course with the grooves 18 of another course.

The ventilating felt may be conveniently packaged in rolls, with the grooved side out, so that by unrolling it, the felt will be put down in place with a minimum of labor. When the ventilating felt of the present invention applied to a roof, the interconnecting grooves exhaust the air to the edges of the roof structure.

It is to be understood that variations and modifications of the present invention may be made without departing from the spirit of the invention. It also is to be understood that the scope of the invention is not to be interpreted as limited to the specific embodiments disclosed herein, but only in accordance with the appended claims, when read in the light of the foregoing disclosure.

What I claim is:

1. A roof covering element, comprising
   (a) a base carrier web comprising a roofing felt,
   (b) a bituminous coating of substantially uniform thickness on a major surface of the carrier web,
   (c) said bituminous coating having a plurality of interconnecting grooves therein extending into the coating to and through the edges of the coating and providing passageways for the flow of gases through the edges of the coating when the coating element is laid on a roof,
   (d) said coating having a sufficiently high viscosity to resist flow of the coating under usual roof installation and service conditions, and comprising asphalt having a melting point of the order of about 150°F. to about 250°F., and a ring and ball penetration of the order of about 10 to about 50 at 77°F.,
(e) the asphalt optionally containing mineral filler material in the amount of about 0 to about 50 percent to increase its viscosity, the desired amount of the filler material in general being greater for lower melting point asphalts than for higher melting point asphalts,

(f) the thickness of the coating being of the order of about 15 mils to about 150 mils, and

(g) the depth of the grooves being of the order of about 15 mils to about 100 mils and the width of the grooves being of the order of about \( \frac{1}{64} \) inch to about \( \frac{1}{8} \) inch.

2. A roof covering element as recited in claim 1, wherein the grooves are spaced on the order of about \( \frac{1}{4} \) inch to about 3 inches on center.

3. In a built-up roof construction comprising

(a) a roof base and

(b) a roofing membrane overlying the roof base,

the improvement comprising:

(c) a bituminous layer between the lowermost surface of the membrane and the roof base,

(d) said bituminous layer having a plurality of interconnecting grooves therein extending into the coating and to and through the edges of the coating and providing passageways communicating with the atmosphere to provide for the flow of gases thereto,

(e) said bituminous layer having sufficiently high viscosity to resist flowing under usual temperature and pressure conditions of installation and service of the roof, which would tend to fill the grooves and block the flow of gases therethrough.

4. A roof construction as recited in claim 3, wherein said bituminous layer comprises asphalt having a melting point of the order of about 150°F to about 250°F, and a ring and ball penetration of the order of about 10 to about 50 at 77°F, the asphalt optionally containing mineral filler material, in the amount of 0 to about 60%, to increase its viscosity, the desired amount of the mineral filler material in general being greater for lower melting point asphalts than for higher melting point asphalts.

5. A roof construction as recited in claim 3, wherein:

(a) said bituminous layer is of the order of about 15 mils to about 150 mils thick;

(b) the depth of the grooves is of the order of about 15 mils to about 100 mils;

(c) the width of the grooves is of the order of about \( \frac{1}{64} \) inch to about \( \frac{1}{8} \) inch; and

(d) the grooves are spaced on the order of about \( \frac{1}{4} \) inch to about 3 inches on center.

6. A roof construction as recited in claim 3, wherein:

(a) said roofing membrane comprises a plurality of roofing felts adhesively secured together; and

(b) the grooved layer is integrally attached to the lowermost felt.

7. A built-up roof comprising:

(a) a roof base and

(b) a covering element overlying the base in engagement therewith and comprising:

(1) a carrier web,

(2) a bituminous coating on the carrier web and engaging the roof base,

(3) the bituminous coating having spaced, interconnecting grooves extending into its lower surface and distributed over substantially the entire area thereof and communicating with the atmosphere through the edges of the coating,

(4) the size, number, and spacing of the grooves being sufficient to provide for the flow of air or vapor from between the roof base and the covering element out to the atmosphere,

(5) said bituminous coating being resistant to flow of the coating under usual installation and service conditions, which would tend to fill the grooves and block the flow of gases therethrough;

(c) said roof further comprising at least one roofing felt overlying and adhered to said carrier web.

8. In a built-up roof having

(a) a roof base and

(b) a membrane overlying the roof base, the improvement comprising:

(c) a plurality of courses of carrier webs adhered to the lower surface of the membrane;

(d) a bituminous coating on the lower surface of each carrier web and being in engagement with the roof base;

(e) the coating of each carrier web having a plurality of intersecting grooves extending into the coating and to the edges of the coatings;

(f) the grooves of adjacent webs communicating to form passageways to the atmosphere for gases entrapped between the carrier webs and the roof base;

(g) the size, number, and spacing of the grooves being sufficient to provide for the flow of air or vapor from between the roof base and the covering element out to the atmosphere; and

(h) said bituminous coating being resistant to flow of the coating under usual installation and service conditions, which would tend to fill the grooves and block the flow of gases therethrough.

9. A built-up roof as recited in claim 8, wherein there is a space between the coatings of adjacent courses of carrier webs.

10. A built-up roof as recited in claim 9, wherein a strip along a longitudinal edge of each carrier web is devoid of coating and overlaps the edge of the adjacent carrier web.

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